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## United Kingdom

*With its significant North Sea reserves, the United Kingdom is a major European oil and natural gas producer. It is also one of the largest energy consumers in Europe.*

*Information contained in this report is the best available as of April 2004 and is subject to change.*



### BACKGROUND

The United Kingdom (official name: United Kingdom of Great Britain and Northern Ireland, abbreviated: UK) is a major political power, and also the world's fourth-largest economy (according to 2003 nominal gross domestic product). The country joined the European Union (EU) in 1973 (confirmed by referendum in 1975), but has yet to decide whether to adopt the European Monetary Union's single currency, called the Euro. A new referendum on accepting the Euro appears, however, to be a long way off, particularly after only one of the five economic tests that the government set for Euro membership were satisfied in a June 2003 assessment.

The UK's economy grew faster than expected in 2003, with real gross domestic product (GDP) expanding 2.3%, above the 2.1% goal that the UK government had set in its 2002 pre-budget statement. This economic expansion was considerably higher than in the overall Eurozone (the 12 EU members which have the Euro as an official currency), which grew a combined 0.4% in 2003. According the government's recently issued 2004 budget (March 17, 2004), the UK's economy is expected to remain relatively robust in 2004, with initial forecasts ranging between 3.0% and 3.5%.

### Energy Overview

The UK is the largest petroleum producer and exporter, as well as natural gas producer, in the EU. The UK also provides one of the major "benchmark" crude oils, the Brent price marker. Because Brent crude is traded on the International Petroleum Exchange (IPE) in London,

fluctuations in the market are reflected in the price of Brent. Therefore, the many other crude oils linked to Brent can be priced according to the latest market conditions. However, with production in the UK North Sea Brent system declining to only around 350,000-400,000 barrels per day (bbl/d) in

2002, many felt that such low output was too small to be used as crude benchmark (Brent output declined to an estimated 306,500 bbl/d in 2003).

In order to address the issue of declining Brent production, the industry price assessor, *Platts*, widened the assessment definition of dated Brent by including two similar North Sea crude oils - North Sea Forties (UK) and Oseberg (Norway). According to *Platts*, the new method of calculating dated Brent would more accurately reflect North Sea oil market conditions. The change took effect on July 10, 2002, and initially got off to an uneven start, with Royal-Dutch/Shell (co-operator of the Brent system) opposed to the change, and BP (operator of the 750,000 bbl/d Forties system) in favor. The IPE began using the Platt's Brent formulation (BFO, or Brent-Forties-Oseberg) with its October contract on September 13, 2002. In March 2004, Norsk Hydro, the operator of the Oseberg field, announced its intentions to introduce a lower-quality crude from its Grane field to the BFO blend, as of May 1, 2004. According to analysts, adding Grane crude oil to the BFO crude marker is expected to lessen its value.

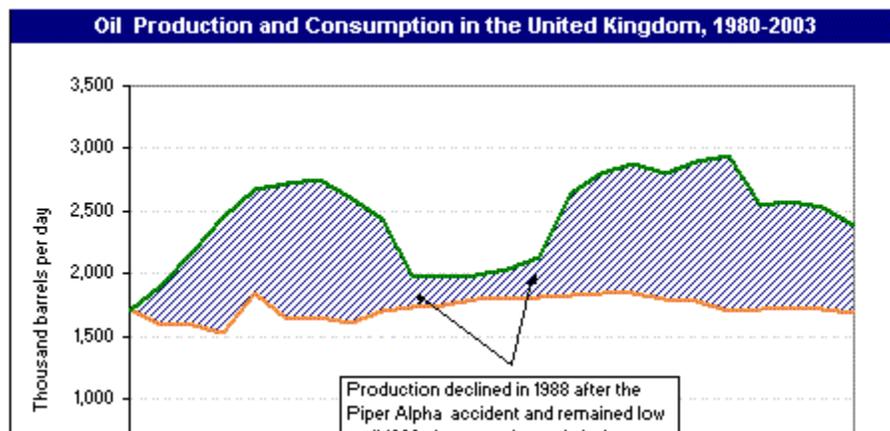
After years of being a net-exporter of natural gas, the UK is expected to become a net-importer of natural gas in 2005-2006 timeframe. The UK also expected to become a net importer of oil. In response, the government has not only undertaken [initiatives](#) to prolong hydrocarbon production but has also begun developing import infrastructure, such as [liquefied natural gas \(LNG\)](#) regasification terminals and [pipelines](#). Another initiative was outlined in a white paper published in February 2003 – [Our Energy Future – Creating a Low Carbon Economy](#). At the core of the paper is the UK's intentions to increase renewables share of power generation to 20% by 2020. It also seeks to reduce the country's greenhouse gas emissions 60% by 2050.

## OIL

As of January 2004, the UK's proven crude oil reserves stood at 4.7 billion barrels, the largest within the EU, according to the *Oil and Gas Journal*. Almost all of the country's reserves are located offshore, on the UK Continental Shelf (UKCS) in the North Sea. The northern North Sea (east of the Shetland Islands) also holds considerable reserves, and smaller deposits are located in the North Atlantic Ocean, west of the Shetland Islands. The one exception is [Wyth Farm](#), Europe's largest onshore oilfield, with estimated reserves of 500 million barrels. The UK's onshore reserves are expected to increase slightly after Pentex Oil announced in August 2003 that it found the equivalent of more than 100 million barrels of oil in Avington, near Winchester, Hampshire. The most significant offshore oil discovery in recent years was the [Buzzard field](#) in 2001. EnCana, along with Intrepid Energy North Sea Ltd., BG Group and Edinburgh Oil and Gas PLC, are currently developing the 400-million-barrel field, which is expected to produce around 180,000-190,000 barrels of oil equivalent per day in 2006.

## Production

Total UK oil production (including condensates, natural gas liquids (NGLs) and refinery gain) in 2003 – 2.38 million barrels per day (bbl/d) – was 20% lower than the record level seen in 1999 and 7.5% lower than in 2002. Oil production in the UK is expected to continue to decline. According to the



Department of Trade and Industry's (DTI) most recent forecasts, oil production, including condensates and NGLs, is projected to decline to a level ranging between 1.38 million bbl/d and 1.59 million bbl/d by 2009.

One reason for this decline has been the overall maturity of the country's oil fields. Other reasons include smaller fields being brought into production and the application of new crude oil extraction technologies, resulting in a particular field being exhausted at a quicker rate. These fields are also becoming costlier to extract, as more of the oil deposits are located in more remote regions and found in smaller quantities. Nonetheless, these technologies have also allowed companies to extend production at many fields. [BP's Enhanced Oil Recovery project](#) for the Magnus field is an example of the technological initiatives taking place in North Sea. The project, which involves reinjecting gas into the field, seeks to recover an additional 60 million barrels of oil from the field.

### **Exports and Imports**

The UK has been a net exporter of oil since 1981. Most of the UK crude oil grades are light and sweet, which generally makes them more attractive to refiners and other buyers than other crude oils on the international market. In 2002, the UK exported 22.6% of its crude oil production to the United States, followed by The Netherlands (18.4%), France (9.3%), Germany (7.5%), and a combined 12.3% to other destinations. The UK's refineries took the remaining 29.9% of the country's total crude oil production. Much of the crude oil exported to The Netherlands is not actually consumed there but is sold at Rotterdam spot market to other countries, according to DTI. In 2002, most of the UK's oil imports came from Norway, with 73% (628,000 bbl/d), followed by Russia (9%), Algeria (5%), the Middle East (3%) – mainly Saudi Arabia, and Mexico (2%).

### **New Trends**

As the UK's oil fields mature, the industry's focus has been shifting from searching for new oil discoveries to continuing the productivity of mature fields, as well as to developing smaller fields that previously were not considered commercially viable. This trend has prompted oil majors, such as BP and Royal Dutch/Shell, to begin selling some of their mature UKCS assets in favor of better prospects in other regions of the world. Smaller, independent oil companies have been acquiring these assets. Most notably was U.S.-based Apache's \$630 million acquisition of BP's Forties fields in early February 2003. Other independents, such as [Talisman Energy](#), [Perenco](#), and [Paladin Resources](#), have also acquired production blocks on the UKCS from oil majors. Many analysts point out that these mature and smaller fields are more economically viable for smaller oil companies as, for example, they have less overhead costs in comparison to the larger companies. Furthermore, these companies reportedly not only bring new investment to the UKCS but also new technologies and practices, which are needed to help prolong hydrocarbon extraction from this region.

Despite a large number of smaller companies entering the UKCS, the main producers remain BP, Royal Dutch/Shell, ExxonMobil, with TotalFinaElf, ChevronTexaco, and Amerada Hess also producing significant amounts of oil.

### **Government Promotional Program: Pilot**

Government programs have been key in attracting new oil independents to the UKCS. In January 2000, the government created the Pilot program to help secure long-term production of oil and natural gas from the UKCS. The program seeks to achieve the following goals by 2010: 1) maintain production at or above 3 million bbl/d oil equivalent; 2) attract \$4.8 billion investment to the industry per year; 3) create 100,000 more jobs; 4) create \$1.6 billion in additional revenue for new business per year; 5) make the UK the safest place to work in the worldwide oil and natural gas industry; and 6) increase in the value of industry-related exports (by 2005) by 50%.

The Pilot program also created the Promote License and the Fallow Initiative. The [Promote License program](#) allows companies to assess the value of a field before committing to it. The rental fee is also cut 90% for the first two years compared to the rate for a traditional production license, thereby providing more opportunity for smaller companies to enter the North Sea market. This two-year period is intended to give companies a chance to explore for oil and natural gas before promoting the licensed area to investors to acquire funding for drilling and other work.

The [Fallow Initiative](#) seeks to rejuvenate activity in dormant acreage and assets by inviting third parties to propose technical ideas that would stimulate new exploration and development. In January 2004, the Pilot program released its listing of fallow blocks and discoveries. The new release added 17 fallow discoveries and 109 new fallow blocks to the list, for a total of 83 fallow discoveries and 151 fallow blocks. The [License Information For Trading \(LIFT\)](#) lists blocks which are made available under the Fallow Initiative.

### ***Norway and the UK Joint Development***

Another aspect of the Pilot program has been to improve the cross-border relations between the UK and Norway. The two countries share a 37.5-mile-wide corridor that is located on either side of the UK/Norway North Sea meridian. The aim of this initiative is to pool infrastructure resources and technology practices to develop this area, which contains an estimated 13 billion barrels of oil equivalent, of which two-thirds is oil. In December 2003, the UK and Norwegian governments released a second report, "[Unlocking Value through Closer Relationships](#)," which summarizes the progress the countries have made to improving relations over the past year.

### ***Offshore Licensing Rounds***

On March 4, 2004, UK Energy Minister Stephen Timms announced the opening of the [22nd Offshore and 12th Onshore Licensing Rounds](#). The Minister also introduced a new license, known as Frontier, which seeks to attract more exploration activity to the offshore area west of the Shetland Islands. This region has not been offered up for bidding for many years. Similar to the Promote License, the rental fee will be cut 90% for the first two years. The 22nd round opened all of the UK onshore area and 1,039 blocks and part blocks in the offshore area for oil and natural gas licensing opportunities.

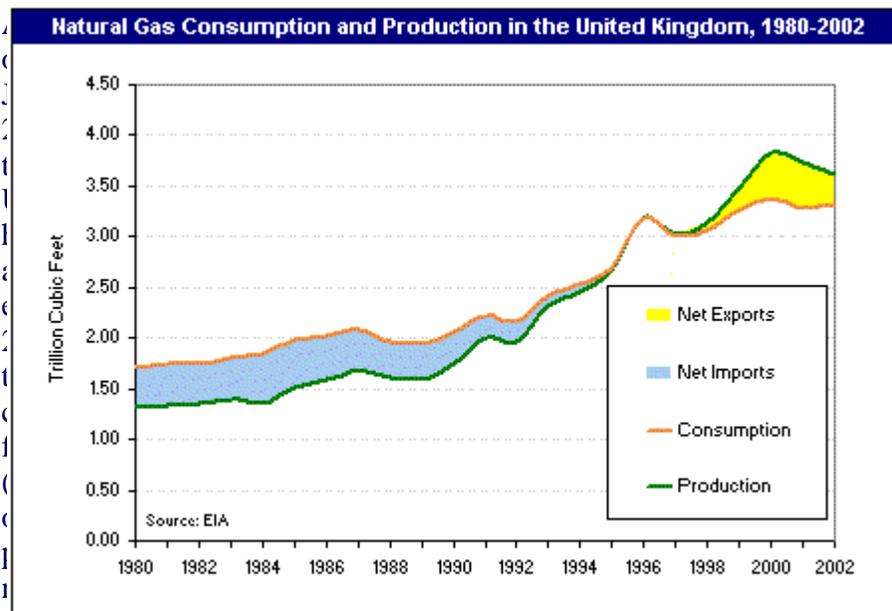
At the conclusion of its 21st licensing round in July 2003, the UK's Ministry of Energy offered 88 new licenses to 62 companies, of which 27 were new entrants to the region. The government accredited the success of the round to its new initiatives, particularly to the Promote License, of which 53 were awarded.

### ***Downstream***

The UK's crude oil refining capacity is approximately 1.82 million barrels per day, just slightly higher than the country's consumption. The UK imports and exports refined products because the country's refineries produce an excess of some grades and products and insufficient quantities of others for local demand. The country's largest refinery is ExxonMobil's (Esso's) 317,000-bbl/d Fawley refinery in Southampton, one of the largest in Europe and marine tanker accessible.

In January 2003, BP announced that it would invest the \$41 million necessary to reinstate the fluidized catalytic cracking unit (FCCU) at its Grangemouth refinery. The FCCU has not been operational since 2000, when it suffered fire damage. BP aims to have the unit operational in spring 2004, with output expected to be maintained at 19,000 bbl/d of high grade motor gasoline components.

## **NATURAL GAS**



gas

reserves, a 9.8% decrease over the previous year, according to the *Oil and Gas Journal*. Most of the reserves are in non-associated natural gas fields located offshore in the Southern Gas Basin, adjacent to the Dutch North Sea sector. The UK shares the declining Frigg field with Norway (39.18% to the UK), which produced 46 million cubic feet per day (Mmcf/d) from December 2002 to November 2003. Frigg's current production is down significantly from its plateau production of 1.6 billion cubic feet per day (Bcf/d) between 1978 and 1987. Frigg is expected to be **decommissioned** at the end of 2004. There are a few small fields onshore, while the Irish Sea contains the large Morecambe (North and South) and Hamilton fields. From December 2002 to November 2003, the Morecambe South field had the highest average production rate in the UK, at 739 Mmcf/d.

Other key producing natural gas fields in the North Sea include Bruce, Britannia, the Brae Region, Brent and Elgin. There are four key pipelines that transport natural gas to the mainland: 1) the Scottish Area Gas Evacuation (SAGE) system to the St Fergus Terminal, which handles natural gas produced from a number of North Sea fields; 2) the Central Area Transmission System (CATS) that also goes to the Central North Sea; 3) the Far North Liquids and Associated Gas System (FLAGS) that takes natural gas from the northern North Sea; and 4) the Fulmar pipeline, which connects to the St Fergus Terminal.

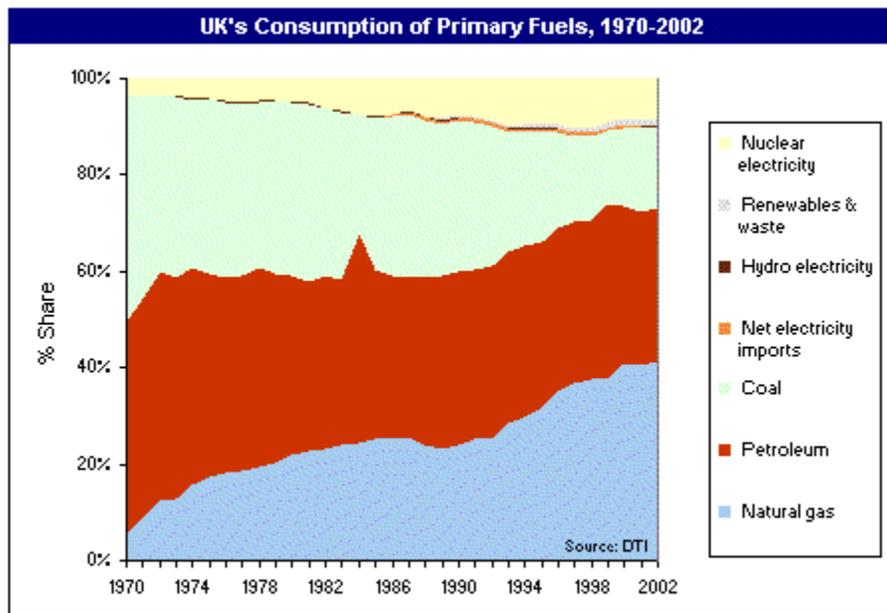
### Production and Consumption

UK natural gas production has been following the same trend as oil production in recent years, steadily declining after peaking in 2000. In 2002, the UK produced 3.6 Tcf of natural gas, a 5.7% decline since 2000. Despite the decline in production and rise in consumption, the UK continued to be a net-exporter of natural gas in 2002, a status it has held since 1997. However, due to the decline in production from mature natural gas fields and limited opportunities to find new, significant prospects, the UK is expected to become a natural gas importer either in 2005 or in 2006.

The last decade has seen a significant increase in UK demand for natural gas, up 37% between 1993 and 2002. In its Ten Year Statement 2003, Transco, the UK's pipeline operator, highlighted two factors behind the increased demand for natural gas: 1) falling prices due to supply surplus and to increased gas on gas competition in the 1990s; and 2) increased number of combined cycle natural gas-fired generation plants. Transco also projected that UK natural gas demand will grow at an annual rate of 1.7% until 2012/13, with natural gas' share of primary energy supply rising to 46%.

## Imports

As UKCS production declines, the government and industry forecasts have recognized the need for the country to secure long-term natural gas imports. In order to meet the expected natural gas supply gap, the UK has been lining up potential international natural gas supplies, via [liquefied natural gas \(LNG\)](#) and [pipelines](#). The Transco report expects that the UK will need to import an estimated 1.9 Tcf by the end of the decade.



## Pipelines

### *Interconnector UK (UKI)*

The UK already has one intercontinental-natural gas pipeline, the 147-mile [Interconnector](#), which connects Bacton, England to Zeebrugge, Belgium. The pipeline, which began operations in 1998, has an annual throughput capacity of 706 Bcf from the UK to Belgium and a reverse-flow capacity (Belgium to the UK) of 300 Bcf. With the UK expected to be a net-importer of natural gas in coming years, the UKI operators have begun increasing the reverse-flow capacity of the pipeline. By December 2005, the reverse-flow capacity will reach 583 Bcf per year and by December 2006, 830 Bcf per year. Currently [17 shippers](#), use the pipeline. There is currently one pipeline connecting Scotland to Northern Ireland. Scotland also is linked to the Republic of Ireland via two parallel pipelines.

## Potential Pipelines

### *Ormen Lange (Britpipe)*

The 750-mile Britpipe would link Norway's Ormen Lange natural gas field to Easington terminal on the UK coast. In October 2003, after nearly two years of negotiations, the UK and Norwegian governments agreed on the treaty principles for a cross-border pipeline. The respective governments will now have to approve the project before a final treaty can be signed. If approved, the project is expected to come onstream in October 2007, supplying up to 883 Bcf per year to the UK.

### *The North European Pipeline*

In January 2004, the Russian government approved construction of the \$5.7 billion-North European Gas pipeline, which would bring natural gas to the UK, as well as to Germany and to Finland. Despite the announcement, it remains unclear whether the project will be realized. Analysts see Russia using the project to gain leverage to resolve Ukrainian and Belarusian transport disputes while others point out that the pipeline may not be economically viable. The pipeline is expected to begin initial operation at a rate of 700 Bcf per year in 2007, and later increase to 1.05 Tcf.

### *Bacton to Balgzand Line (BBL)*

Centrica's subsidiary British Gas Trading Ltd. and Dutch company N.V. Nederlandse Gasunie are planning to construct a 147-mile pipeline (BBL), linking Balgzand (The Netherlands) to Bacton. In November 2003, Gastransport Services, a branch of Gasunie, concluded a cooperation agreement

with Belgium's Fluxys to participate in the project. The project, however, has reportedly been held up by several issues, such as whether the pipeline will be exempt from allowing third-party access. In June 2002, Gasunie agreed to deliver 283 Bcf annually over ten years to British Gas, beginning in 2006 or 2007. Gasunie could use existing infrastructure, namely the UKI, to fulfill its commit, but a dedicated pipeline would secure access to transport capacity.

### ***Other Import Developments***

Denmark's state-owned oil company, Dong, is planning to build by fall 2004 a 63-mile pipeline connecting the Danish Tyra offshore natural gas field to the existing Dutch Nogat pipeline. The Nogat connects to the Dutch onshore Gasunie grid at Den Helder near Balgzand, where the BBL will begin if the project is realized.

In October 2003, Shell and ExxonMobil signed an agreement to import natural gas from Norway's Statfjord redevelopment project to St Fergus, beginning in 2007. Shell and ExxonMobil will use their joint-owned Flaga pipeline system to transport the natural gas to the UK. Centrica already imports of natural gas from Norway after signing a deal with Statoil in September 2003, to deliver annually 7 Bcf annually for three years, beginning in October 2003. This supplements a contract that Centrica signed with Statoil in 2002, to deliver annually 177 Bcf for 10 years, beginning in October 2005.

### **Natural Gas Storage**

In November 2003, Scottish and Southern Energy (SSE) signed a memorandum of understanding with Norway's Statoil to build jointly a 14.8-Bcf natural gas storage facility at Aldbrough, Humberside, on the east coast of England. SSE also owns and operates the 11.5-Bcf [Hornsea facility](#). Other potential projects include Star Energy storage facility at Humbly Grove, with a capacity of 10.6 Bcf from 2005; Scottish Power storage facility at Byley, Cheshire, with a capacity 46 Bcf from 2008/2009; and Star Energy storage facility at Welton, Lincolnshire, with a capacity of 10.6 Bcf from 2005/2006.

Analysts have pointed that as the UK imports more natural gas, it will require more storage capacity to buffer against surges in demand or supply disruptions. Centrica currently owns and operates the country's largest storage facility, the 100 Bcf [Rouge](#). This offshore facility (depleted natural gas field) reportedly accounts for 80% of the UK's storage capacity. Centrica is considering utilizing a neighboring depleted field, York.

### **Liquefied Natural Gas (LNG)**

#### ***Isle of Grain: National Grid Transco (NGT)***

Grain LNG, a subsidiary of NGT, plans to construct and operate an LNG import terminal, located on the Thames estuary. In April 2003, NGT received regulatory approval to convert existing facilities (natural gas storage tanks) at the Isle of Grain site into a LNG importation facility. In October 2003, BP, in partnership with Algeria's Sonatrach, signed a contract to acquire the terminal's initial capacity of 161 Bcf per year for 20 years, beginning in 2005. NGT plans to increase the capacity of the terminal to 283 Bcf per year, as well as its storage capacity.

#### ***Milford Haven: ExxonMobil and Qatar Petroleum***

ExxonMobil and partner Qatar Petroleum (QP) are in the process of acquiring the appropriate regulatory approval to construct an LNG receiving facility at Milford Haven, in southwest Wales. The partnership already received a Hazardous Substance Permit from the local county council and is still waiting for a similar permit from the Pembrokeshire National Park. In February 2004, the UK energy market regulator, Ofgem, ruled that the terminal should be exempt for 25 years from a general EU requirement to provide third-party access. The terminal is expected to come onstream in

2007, with an initial capacity of 380 Bcf per year. When the facility is completed in 2009, it will have an annual capacity of 759 Bcf per year, according to company sources

### ***Milford Haven: Petroplus and BG***

Petroplus (The Netherlands), in partnership with BG Holdings Ltd., a subsidiary of the BG Group and Petroliam Nasional Berhad (Petronas), are also developing an LNG import terminal at Milford Haven in Wales. The facility will have a throughput capacity of 318 Bcf per year and is expected to come onstream in late 2006.

### **Industry Structure**

The restructuring of the UK natural gas market began in 1986, with the privatization British Gas. In 1986, the Office of Gas Supply (Ofgas), now Office of Gas and Electricity Markets (Ofgem), was formed to regulate the industry and protect the interest of customers. In 1992, competition was opened up large industrial and commercial customers, which resulted in alternative suppliers entering the UK natural gas market. British Gas, however, remained the sole natural gas supplier to the rest of the market -- mainly residential -- until the passage of the 1995 Gas Act, which mandated the opening up of the rest of natural gas market to competition. Natural gas competition began regionally, with about 500,000 customers in Devon, Cornwall and part of Somerset (southwest England) allowed to choose alternative natural gas suppliers on on April 29, 1996. By the end of May 1998 the entire market was opened to competition.

In 1996, British Gas decided to restructure the company, splitting it into two new organizations, known as Centrica and BG. Centrica took over the supply business (including British Gas Trading, British Gas Services, the Retail Energy Centres) and the natural gas production from the Morecambe field. BG became responsible for Transco (British Gas' transportation and storage business), British Gas International, Exploration and Production, Research & Technology and Properties. In 1999, BG completed its restructuring which resulted in the creation of a new parent company BG Group and subsequently demerged again in 2000, creating two new companies BG Group and Lattice Group . National Grid Transco became part of the Lattice Group.

In April 2002, National Grid and Lattice announced a merger between the two companies. Upon completion of the merger, the merged group was renamed National Grid Transco (NGT). NGT operates the UK's National Transmission System pipelines, which carry natural gas from the country's seven main beach terminals to customers. The system transports more than 3.2 Tcf of natural gas per year. NGT also controls and operates the transmission lines in England and Wales. Since the restructuring of the natural gas sector, all of these companies have expanded and diversified their energy asset portfolios.

### **COAL**

Coal's importance in the UK energy sector has dropped significantly over the past decades. Coal production in the UK dropped from 119 million short tons (Mmst) in 1986 to 32.6 Mmst in 2002. This downward trend is expected to continue after two major deep coalmines - Longannet in Scotland and the Prince of Wales Colliery in South Yorkshire -- closed during 2003. In addition, the Selby Complex in North Yorkshire, which also reportedly reduced coal production in 2003, is due to close by summer 2004. The Selby Complex consists of the Riccall, Wistow and Stillingfleet mines. England accounts for most of the UK's coal production (69%), with Scotland and Wales accounting for 25% and 6%, respectively.

UK demand for coal has also dropped considerably, from 123 Mmst in 1986 to 64.3 Mmst in 2002. One factor behind this decline has been the increased use of natural gas for thermal electric generation. In the late 1980s, coal-fired power plants accounted for about two-thirds of the UK's

thermal electric production. In 2002, coal's share of total electricity generated dropped to 32%. This proportion is expected to drop further by the end of the decade; however, coal-fired generation could periodically increase. For example, coal-fired generation rose in 2000 when nuclear power plants suffered outages for repair and maintenance. High natural gas prices during winter 2001 and 2002 also resulted in higher coal consumption (see graph below). Nonetheless, the power sector continues to be the largest end-user of coal in the UK, accounting for over 80% of coal consumed in 2002.

In 1984, the UK became a net importer of coal, although initial imports, particularly of types in short supply in the UK, began in the 1970s. About one-third of the country's coal imports in 2002 came from South Africa, with Australia and Russia contributing 17% and 15%, respectively.

### *Future of Coal*

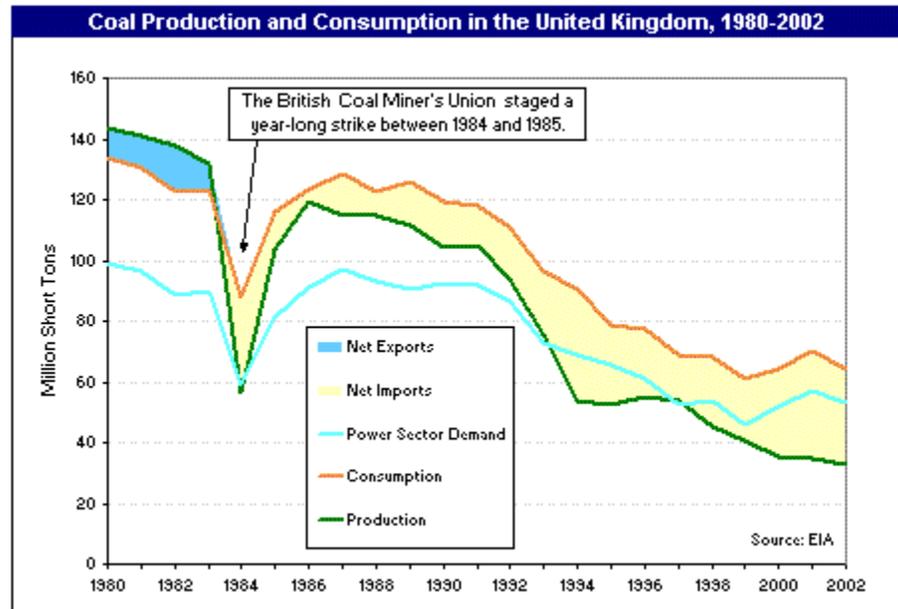
Some estimates predict that UK coal-fired generation could fall to half its current level over the next eight to ten years, and that all coal-fueled electricity generation could end by the year 2016.

New EU environmental directives could further impact the UK coal industry, [Directive 2001/80/EC](#), which seeks to limit nitrogen oxides (NOx) and sulfur dioxide (SO2) emissions produced from large combustion plants. According to limits set by the Directive, all thermal power generators, with at least 50 megawatts (MW) of capacity, will have to reduce their NOx and SO2 emissions or face closure. The UK's commitments to reduce carbon dioxide emissions in accordance with the Kyoto Protocol will further limit coal's role in the country's fuel mix. The UK government, however, has not ruled out use of coal in the future and continues to support research projects to develop options for cleaner coal technologies and for carbon capture and storage.

The UK government continues to provide financial support to the coal industry. In June 2003, the UK government launched the [Coal Investment Aid \(CIA\)](#) program, with a budget of up to \$111 million. The goal of the project is to create or safeguard jobs in the UK coal industry by encouraging coal producers to enter into commercially realistic investment projects that maintain access to reserves.

## **ELECTRICITY**

As of December 2002, the UK had an installed electric generation capacity of 77.0 gigawatts, of which 80% was thermal, 16% nuclear, 2% hydropower, and 2% other sources. In 2002, the country's net power generation was 360.8 billion kilowatthours (Bkwh) of electricity, down 0.23% over the previous year. For the year, natural gas accounted for 39% of the electricity generated in the UK, followed by coal with 32%, nuclear 22%, and hydro 1%. Other fuels and imports (2.4% from France) accounted for the remainder. Electricity consumption was 343.9 Bkwh, down 0.8% over 2001.



## Industry Structure

The privatization of the UK's electricity sector began in 1990, under the terms of the [Electricity Act 1989](#). Prior to 1990, most of the electricity supplied in England and Wales was generated by the CEGB (Central Electricity Generating Board), which also owned and operated the transmission system and the interconnectors with Scotland and France. CEGB sold the majority of its power to 12 area electricity boards, each of which distributed and sold it to customers. After the Electricity Act was initiated, the property of the 12 area electricity boards, including the local distribution systems, were transferred to the 12 regional electricity companies. There now are 9 distribution companies that operate in 12 distribution areas.

The electricity transmission system in England and Wales became the property of the National Grid Company, now a subsidiary of National Grid Transco (NGT). The National Grid Company owns and operates jointly with Electricité de France the interconnector between [England and France](#) and owns jointly with ScottishPower and Scottish and Southern Energy the interconnector with [Scotland](#). (There also is an interconnector (Molye) between Northern Ireland and Scotland since December 2001). There currently are considerations of building other interconnectors, connecting to the [Republic of Ireland](#), [Norway](#), and [The Netherlands](#).

The Electricity Act also allowed customers to choose their own suppliers. Competition was opened in three stages: 1) March 1990 for customers (30% of the market), with demand over 1 MW; 2) April 1994 for customers (an additional 15% of the market), with demand between 100 kilowatts (KW) and 1 MW; and between September 1998 and June 1999 for the remaining customers (55%) were allowed to choose their suppliers. Over the past decade, restructuring of the electricity industry in the UK has resulted in a number of mergers and acquisitions, as companies have tried to become more competitive. For example, in 1991, there were 11 major power generators in the UK and as of October 2002, there were 35. (For more detail regarding mergers and acquisitions since the UK electricity sector was privatized, see [link](#)).

## Scotland

In Scotland, the two main companies, Scottish Power (SP) and Scottish and Southern Energy (SSE), provide generation, distribution and transmission services. The other main company is nuclear generator British Energy, which has contracted its full output to the Scottish power providers until 2005. Both SP and SSE export surplus generation to England and Wales through the interconnector. Both companies are also seeking to increase their renewable generation portfolio in accordance with the [Renewables Obligation](#). SP currently is the country's second-biggest wind farm operator after National Wind Power, a subsidiary of Germany's RWE AG. SSE has a smaller amount of installed wind capacity but ranks as the country's biggest renewable generator, with 1,047 MW of installed hydroelectric capacity.

## Northern Ireland

Prior to privatization, Northern Ireland Electricity Service (NIES) was responsible for generation, transmission, distribution, and supply in Northern Ireland. In 1992, private companies acquired the NIES' four power plants, Ballylumford, Kilroot, Belfast West, and Coolkeeragh. In 1993, NIES was renamed Northern Ireland Electricity (NIE) and was given the following responsibilities: procurement of power under contract from the power stations; operation of transmission and distribution networks; and supply of electricity to the final customer. In 1998, NIE became part of the Viridian Group, which now oversees NIE's operations. Northern Ireland has a separate electricity and natural gas regulatory body, known as Office for the Regulation of Electricity and Gas (Ofreg).

Currently, Northern Ireland and the Republic of Ireland are working on creating "[an all-island](#)

[energy market](#)." In April 2002, NIE and ESB National Grid opened three upgraded electricity interconnectors linking the electricity systems of Northern Ireland with the Republic of Ireland. The new interconnectors allow the Republic of Ireland to import electricity from Scotland via the Molye Interconnector.

### ***New Electricity Trading Arrangements (NETA)***

In March 2001, the structure of the UK electricity industry changed yet again. Under the former system, generators and suppliers in England and Wales traded electricity through an electricity pool, which was regulated by the National Grid Company, owner of the transmission network. The New Electricity Trading Arrangements (NETA) changed this to a wholesale electricity market, based on bilateral trading among generators, suppliers, traders, and customers. The system includes forwards and futures markets, a balancing mechanism to enable the National Grid Company to balance the system, and a settlement process.

Since the introduction of NETA, electricity prices in the UK have dropped significantly. While the decrease in electricity prices has helped consumers, some companies have struggled to remain solvent, such as US-based AES, which scrapped plans to restructure its debt on the Drax power station in early 2003. Another example was British Energy, which was able to avoid insolvency only through a government bailout in September 2002. Electricity prices have, however, begun to rebound. In December 2003, Centrica and Powergen, raised electricity prices 5.9% and 6.9%, respectively, for 2004.

In November 2003, the government began reviewing a new Energy Bill, which seeks to create a common set of trading rules so that electricity can be traded freely across Great Britain and a common set of rules for access to, and charging for the use of, the transmission network (British Energy Transmission and Trading Arrangements). Currently, Scotland operates its own system while England and Wales have a common electricity market.

### **Nuclear**

In 1995, the government announced that it would privatize its more modern nuclear stations while retaining ownership of older stations. In 1996, the more modern stations were privatized and British Energy became the holding company of Nuclear Electric and Scottish Nuclear, which merged in 1998 to form British Energy Generation, the nation's largest private nuclear generator and the world's first wholly privatized nuclear utility. British Energy operates eight nuclear power stations in the UK. Each station consists of two advanced gas-cooled reactors, except Sizewell B, which is a modern pressurized-water reactor. Nuclear power stations were not privatized simultaneously with non-nuclear stations.

Of the UK's 33 reactors, 26 are of the old Magnox design. Six of the Magnox reactors are being decommissioned, as is the Dounreay prototype fast reactor. The remaining Magnox plants are run by the state-owned British Nuclear Fuels. British Nuclear Fuels operates the Sellafield reprocessing plant, and is one of only two companies in the world that provides reprocessing and recycling technologies. The British nuclear industry is regulated by the Department of Trade and Industry's Nuclear Directorate.

### ***British Energy***

British Energy PLC encountered serious financial problems in 2002, due to an increase in the cost of producing electricity combined with lower wholesale market prices. In 2002, the UK government provided a £650 million (\$1 billion) loan and £10 billion (\$16 billion) in subsidies to help keep British Energy solvent. In November 2002, the company announced a [restructuring process](#), with the intention of returning to financial viability. British Energy has already sold its Canadian

subsidiary, Bruce Power in February 2003 and its 50% stake in Amergen in December 2003. It remains unclear whether British Energy will become financially stable after completing its restructuring.

### **Renewables**

The UK intends to supply 10% of the country's electricity needs from renewable sources by 2010 in order to help meet the country's greenhouse gas reduction commitments. In April 2002, the UK government introduced the [Renewables Obligation](#), which requires licensed electricity suppliers in England and Wales to source a portion of their electricity supplied from renewables. Scotland implemented parallel legislation --Renewables Obligation Scotland. In 2003, suppliers in England and Wales were required to source 3% of electricity supplied from renewables. This requirement will increase to 10.4% in 2010 and to 15.4% in 2015. The Scottish Executive set a renewables target of 18% by 2010, rising to 40% by 2020.

### **Wind**

Wind is expected to play a key role in assisting the UK in meeting its renewable targets. The government has already held two licensing rounds for offshore wind farm leases. In December 2003, the government announced the results of the second licensing round, approving 15 leases for companies to develop projects in three offshore areas: the Thames Estuary; the Great Wash on the east coast; and northwest coast of Scotland. Most of the proposed wind farms have installed capacities ranging from 200 MW to 500 MW, though three are larger: the 1,000-MW London Array project in the Thames Estuary; National Wind Power's 750-MW Gwynt y Mor; and 1,200-MW Triton Knoll developments, in the Northwest and Greater Wash areas, respectively.

The first licensing round took place in December 2000 and awarded [18 leases](#) for wind farms. The first of these, North Hoyle, began operations in November 2003. The wind farm is located off the North Wales coast and has an installed capacity of 60 MW. In October 2003, the government gave the go ahead for four other wind farms to be built off the coast of Norfolk, Lincolnshire and Essex. The four projects – Lynn, Lincolnshire, Cromer, and [Gunfleet Sands](#) – will have a combined generation capacity of 456 MW.

### **ENVIRONMENT**

With a reduction in sulfur dioxide and carbon dioxide emissions, environmental conditions in the United Kingdom have improved over the past couple of decades. Some of these environmental improvements, such as a reduction in [air pollution](#), can be attributed to the United Kingdom's [energy use](#) choices. Partially as a result of deregulation and the elimination of coal subsidies, coal's share of total primary energy consumption is gradually being replaced by natural gas.

Improvements in energy efficiency have led to a gradual reduction in both [energy and carbon dioxide intensity](#). In 2000, energy intensity in the United Kingdom registered 7.7 thousand Btu per \$1995\*\*, decreasing to 7.6 thousand Btu per \$1995 in 2001, a 1.3% decline. However, carbon dioxide intensity in 2001 registered 0.44 metric tons per thousand \$1995\*\*, maintaining 2000 levels. [Per capita](#) energy consumption, at 164.8 million Btu in 2001, was up slightly from 2000.

As the United Kingdom enters the [21st century](#), many energy and environment-related policies reflect the country's awareness of climate change issues. With introduction of the Climate Change Levy in 2001, and its exemption for [renewable](#) energy resources like solar and wind, these alternative sources of energy are beginning to gain more attention. For example, the United Kingdom hopes to increase the share of electricity generated by renewables from the current 3.0%, to 10% by 2010.

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*Sources for this report include: Aberdeen Press & Journal; BBC News; Centrica; CIA World Factbook; Dow Jones Newswires; Economist; Economist Intelligence Unit ViewsWire; EnCana; Energy Compass; European Union; Financial Times; Fluxys; Gasunie; Global Insight; International Energy Agency; International Oil Daily; Ofgem; Oil & Gas Journal; Petroplus; Petroleum Economist; Petroleum Intelligence Weekly; Platts; Power Economics; Power In Europe; Reuters; The Crown Estate; The Guardian; The Herald (Glasgow); The Scotsman; Statoil; The Times (London); UK Department of Trade and Industry; UK Electricity Association; UK Offshore Operators Association (UKOOA); Transco; US Energy Information Administration; Utility Week; World Gas Intelligence; World Markets Analysis.*

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## **COUNTRY OVERVIEW**

**Head of State:** Queen Elizabeth II

**Prime Minister:** Anthony (Tony) Blair, re-elected June 2001

**Population (2003E):** 59.7 million

**Location/Size:** Western Europe, islands including the northern one-sixth of the island of Ireland between the North Atlantic Ocean and the North Sea, northwest of France/244,820 sq km (slightly smaller than Oregon)

**Capital City:** London

**Language:** English

**Ethnic groups:** English 81.5%, Scottish 9.6%, Irish 2.4%, Welsh 1.9%, Ulster 1.8%, West Indian, Indian, Pakistani, and other 2.8%

**Religions:** Anglican and Roman Catholic 40 million, Muslim 1.5 million, Presbyterian 800,000, Methodist 760,000, Sikh 500,000, Hindu 500,000, Jewish 350,000 (1991 est.)

## **ECONOMIC OVERVIEW**

**Chancellor of the Exchequer:** Gordon Brown

**Currency:** Pound sterling

**Exchange Rate (4/2/04):** 1 US Dollar = 0.55 pounds

**Gross Domestic Product (2003E):** \$1,794 billion

**Real GDP Growth Rate (2003E):** 2.3% **(2004F):** 3.0%

**Inflation Rate (consumer prices, 2003E):** 2.8% **(2004F):** 2.5%

**Unemployment Rate (2003E):** 5.1%

**Merchandise Exports (2003E):** \$308 billion

**Merchandise Imports (2003E):** \$384 billion

**Merchandise Trade Deficit (2003E):** \$76 billion

**Current Account Balance (2003E):** -\$39.4 billion

**Major Exports:** Food, beverages, and tobacco; crude materials, fuels, chemicals, machinery, transport equipment

**Main Destinations of Exports (2002E):** the United States (15.2%), Germany (11.8%), France (10.0%), Ireland (8.2%), The Netherlands (7.5%)

**Major Imports:** Food, beverages, and tobacco; crude materials, fuels, chemicals, machinery, transport equipment

**Main Origins of Imports (2002E):** the United States (13.7%), Germany (11.3%), France (8.5%), The Netherlands (6.8%)

## **ENERGY PROFILE**

**Secretary of State for Trade and Industry:** Patricia Hewitt

**Energy Minister:** Stephen Timms

**Proven Oil Reserves (1/1/04):** 4.7 billion barrels

**Oil Production (2003E):** 2.38 million bbl/d, of which 2.09 million bbl/d was crude oil

**Oil Consumption (2003E):** 1.69 million bbl/d  
**Net Oil Exports (2003E):** 0.69 million bbl/d  
**Crude Oil Refining Capacity (1/1/04E):** 1.82 million bbl/d  
**Natural Gas Reserves (1/1/04E):** 22.2 trillion cubic feet (Tcf)  
**Natural Gas Production (2002E):** 3.6 Tcf  
**Natural Gas Consumption (2002E):** 3.3 Tcf  
**Natural Gas Net Exports (2002E):** 0.3 Tcf  
**Recoverable Coal Reserves (2001E):** 1.65 billion short tons  
**Coal Production (2002E):** 32.6 million short tons (Mmst)  
**Coal Consumption (2002E):** 64.2 Mmst  
**Net Coal Imports (2002E):** 31.6 Mmst  
**Electrical Generation Capacity (2002E):** 77.0 gigawatts (79.8% thermal, 17.9% nuclear, 2.0% hydro, 0.2% other)  
**Electricity Generation (2002E):** 360.8 billion kilowatt hours (Bkwh)  
**Electricity Consumption (2002E):** 343.9 Bkwh

## ENVIRONMENTAL OVERVIEW

**Secretary of State for the Environment, Food, and Rural Affairs:** Margaret Beckett

**Total Energy Consumption (2001E):** 9.8 quadrillion Btu\* (2.4% of world total energy consumption)

**Energy-Related Carbon Dioxide Emissions (2001E):** 566 million metric tons (2.4% of world carbon dioxide emissions)

**Per Capita Energy Consumption (2001E):** 164.8 million Btu (vs. U.S. value of 341.8 million Btu)

**Per Capita Carbon Dioxide Emissions (2001E):** 9.5 metric tons (vs. U.S. value of 20.2 metric tons)

**Energy Intensity (2001E):** 7,576 Btu/\$1995 (vs U.S. value of 10,810 Btu/\$1995)\*\*

**Carbon Dioxide Intensity (2001E):** 0.44 metric tons/thousand \$1995 (vs U.S. value of 0.64 metric tons/thousand \$1995)\*\*

**Fuel Share of Energy Consumption (2001E):** Oil (35.2%), Natural Gas (35.3%), Coal (16.6%), Nuclear (10.9%), Hydro (0.34%), Other Renewables (0.60%)

**Fuel Share of Carbon Dioxide Emissions (2001E):** Oil (40.8%), Natural Gas (32.9%), Coal (26.3%)

**Status in Climate Change Negotiations:** Annex I country under the United Nations Framework Convention on Climate Change. Under the negotiated Kyoto Protocol (signed on April 29th, 1998 and ratified on May 31, 2002), the UK has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.

**Major Environmental Issues:** Sulfur dioxide emissions from power plants contribute to air pollution; some rivers polluted by agricultural wastes and coastal waters polluted because of large-scale disposal of sewage at sea.

**Major International Environmental Agreements:** A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling.

\* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial

and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

\*\*GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

## **ENERGY INDUSTRY**

**Major Systems:** Brent, Ninian, Forties, Flotta, Fulmar

**Major Fields:** E. Brae, Brent, Forties, Magnus, Miller, Scott

**Oil and Gas Companies:** Amerada Hess, BP Amoco, BHP, ChevronTexaco, ExxonMobil, Kerr-McGee, Phillips, Ranger Oil, Royal-Dutch/Shell.

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## **LINKS**

For more EIA information on the United Kingdom:

[EIA - Country Information on the United Kingdom](#)

[Electricity Restructuring and Privatization in the United Kingdom](#)

Links to other U.S. Government sites:

[CIA World Factbook - United Kingdom](#)

[U.S. State Department Country Commercial Guides: Europe](#)

[U.S. State Department Consular Information Sheet](#)

The following links are provided as a service to our customers and should not be construed as advocating or reflecting any position of the Energy Information Administration (EIA) or the United States Government. EIA does not guarantee the content or accuracy of linked sites.

## **Associations and Institutes**

[Electricity Association](#)

[Royal Institute of International Affairs, Energy and Environmental Programme](#)

[Society of British Gas Industry](#)

[The Gas Forum](#)

[The British Wind Energy Association](#)

[UK Energy Centre](#)

[UK Offshore Operators Association \(UKOOA\)](#)

[UK Petroleum Industry Association](#)

## **Coal**

[British Geological Survey](#)

[UK Coal](#)

## **Government**

[Department of Trade and Industry \(Energy\)](#)

[Department of Transport](#)

[Ofgem](#)

[Ofreg](#)

[The National Assembly for Wales](#)

[The Office of the Deputy Prime Minister](#)

[The Scottish Parliament](#)

## **LNG**

## Milford Haven Terminal

### **Miscellaneous**

[Energy Links for the UK from Online Energy Services](#)

[International Petroleum Exchange](#)

[Scottish Enterprise Energy Group](#)

### **Oil and Natural Gas Companies**

[BG-Group](#)

[British Petroleum](#)

[Edinburgh Oil and Gas](#)

[EnCana Corporation](#)

[Marathon Oil Corporation \(North Sea Operations\)](#)

[Kerr-McGee \(North Sea Operations\)](#)

[Royal Dutch/Shell](#)

[Talisman Energy \(North Sea Operations\)](#)

### **Pipelines**

[Interconnector UK](#)

[Transco](#)

### **Power**

[Centrica](#)

[National Power](#)

[PowerGen](#)

[ScottishPower](#)

[Scottish and Southern Energy](#)

[National Grid](#)

[Northern Ireland Electricity](#)

[British Energy \(nuclear generator\)](#)

[British Nuclear Fuels](#)

[Northern Ireland Electricity](#)

### **Distribution**

[Western Power Distribution](#)

### **Wind**

[Amec Wind](#)

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