NUKLEARFORUM SCHWEIZ
FORUM NUCLÉAIRE SUISSE

Informationsreise «Nukleare Neubaupläne in Grossbritannien»

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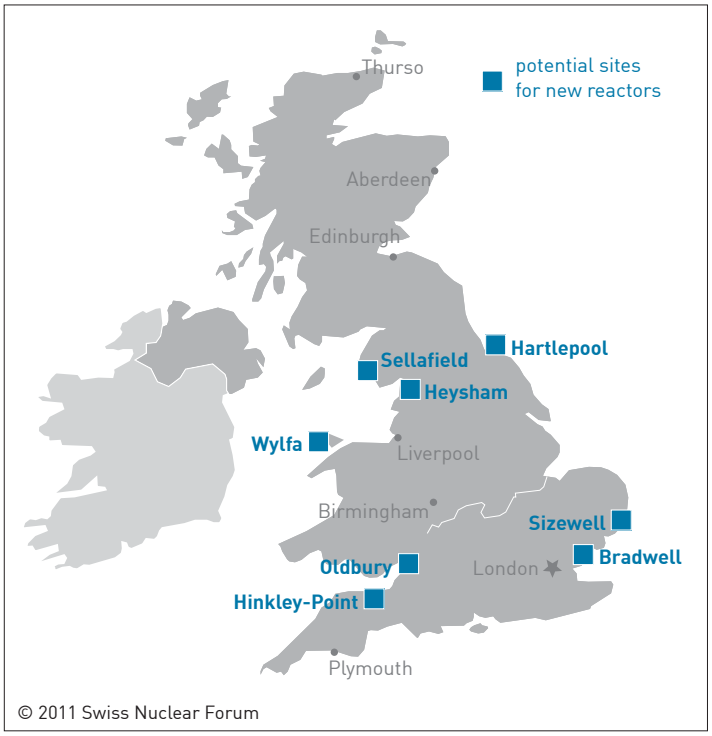

Nuclear Power in the United Kingdom

(Updated July 2011)

- **The UK has 18 reactors generating about 18% of its electricity and all but one of these will be retired by 2023.**
- **The country has full fuel cycle facilities including major reprocessing plants.**
- **The first of some 19 GW_e of new-generation plants are expected to be on line about 2018.**

In the late 1990s, nuclear power plants contributed around 25% of total annual electricity generation in the UK, but this has gradually declined as old plants have been shut down and ageing-related problems affect plant availability.

In 2009, electricity from nuclear power plants produced just over 69 billion kWh net, or 18% of total electricity supply from all sources (371 billion kWh net). Gas-fired generation accounted for 44% of total (165 billion kWh); coal-fired 28% (104 billion kWh); wind 2.5% (9.3 billion kWh); hydro 1.3% (5.2 billion kWh); and other renewables 3% (11.5 billion kWh, mainly from biomass).

Net electricity imports from France - mostly nuclear - in 2009 were 2.8 billion kWh, less than 1% of overall supply, compared with 12.5 billion kWh in 2008, or 3.7% of final electricity consumption. Per capita electricity consumption was 5220 kWh in 2009.

The total electricity supply was 5% lower than the previous year as a result of the global economic crisis. Domestic nuclear production was some 25% greater than for 2008 due to improved plant availability.

In 2009, half of British gas was supplied from imports (compared with 32% in 2007), and this is expected to increase to at least 75% by 2015, as domestic reserves are depleted. This has major implications for electricity generation, with the amount expected to be from gas to almost double from the 170 billion kWh in 2008.

Currently, there are 18 operating reactors in the UK totalling 11 GWe capacity. The last three operating Magnox reactors are due to shutdown by the end of 2012, leaving seven twin-unit AGR stations and one PWR.

Power reactors operating in the UK

Plant	Type	Present capacity (MW_e net)	First power	Expected shutdown
Oldbury 1	Magnox	217	1967	End 2012
Wylfa 1&2	Magnox	2 x 490	1971	End 2012
Dungeness B 1&2	AGR	2 x 545	1983 & 1985	2018
Hartlepool 1&2	AGR	2 x 595	1983 & 1984	2019
Heysham I-1 & I-2	AGR	2 x 580	1983 & 1984	2023
Heysham II-1 & II-2	AGR	2 x 615	1988	2023
Hinkley Point B 1&	AGR	2 x 610, but operating at 70% (430 MW_e)	1976	2016
Hunterston B 1&2	AGR	2 x 610, but operating at 70% (430 MW_e)	1976 & 1977	2016
Torness	AGR	2 x 625	1988 & 1989	2023
Sizewell B	AGR	1188	1995	2035
Total 18 units		**10'745 MW_e**		

New nuclear policy and procedure

It was originally intended that the Sizewell B reactor would be the first of a fleet of PWRs but these plans were abandoned in the 1990s. Since then, the question of new nuclear build was effectively ruled out until 2006, when a review of energy policy reversed the government's opposition to new nuclear. Government policy in England and Wales has since been supportive of new nuclear plants, which should be financed and built by the private sector – with internalised waste and decommissioning costs as per the industry norm internationally. To facilitate new nuclear build, the government has begun implementing several measures, in particular:

- Streamlining the planning process.
- Carrying out strategic siting assessment and strategic environmental assessment processes to identify and assess suitable sites for new nuclear plants.
- Ensuring that the regulators are equipped to pre-license designs for new build proposals (the Generic Design Assessment process).
- Introducing legislation to ensure decommissioning and waste management liabilities will be met from operational revenue.
- Strengthening the EU Emissions Trading Scheme to build investor confidence in long-term carbon pricing.

Planning

A new planning regime was proposed to aid the installation of nuclear reactors as weil as other significant new infrastructure projects such as railways, large wind farms, reservoirs, harbours, airports and sewage treatment works. Under the Planning Act 2008, the need for new infrastructure would be addressed through a National Policy Statement (NPS, see next section on Strategic siting assessment). Then, the local impacts of a particular development would be handled by an independent Infrastructure Planning Commission (IPC) rather than by Ministers or local planning authorities. The IPC was formed in October 2009, but the new coalition government that took office following the May 2010 general election has said it would replace the IPC with an advisory body and return decision-making power to the responsible Minister. Strategic siting assessment Between July and November 2008, a consultation was carried out on a proposed strategic siting assessment (SSA) process for identifying sites which are suitable for new nuclear power stations to be built by the end of 2025. Sites that have been found to be strategically suitable for new nuclear plants through the SSA would be listed in the Nuclear National Policy Statement (Nuclear NPS).

In its January 2009 response to the consultation, the government invited nominations for sites to be assessed for their suitability for the deployment of new nuclear power stations by 2025. Eleven sites were nominated and, following assessment of these sites, the government formed the "preliminary conclusion" that all of the nominated sites, with the exception of Dungeness, are potentially suitable. Three alternative sites – Druridge Bay in Northumberland, Kingsnorth in Kent and Owston Ferry in South Yorkshire – were not considered to be suitable for nuclear development before the end of 2025, although they were said to be worthy of further investigation. The ten sites included in the draft Nuclear National Policy Statement are: Hinkley Point, Oldbury, Sellafield, Sizewell and Wylfa, all of which are the subject of existing proposals (see below); as well as Bradwell, Braystones, Hartlepool, Heysham, and Kirksanton. In October 2010, the two greenfield sites near Sellafield – Braystones and Kirksanton – were removed from the list, and the other eight confirmed.

A consultation on six draft National Policy Statements for energy infrastructure, including the draft Nuclear NPS, ran from November 2009 to February 2010. Following the May 2010 general election, the new coalition government said that all National Policy Statements are to be ratified by Parliament. Following further public consultation they were

presented to parliament in June 2011, confirming selection of the above eight sites. The minister also announced regulatory justification of the AP1000 and EPR reactor designs according to EU law, due to their potential for increasing energy security and decreasing CO_2 emissions outweighing any detriment.

Generic Design Assessment

In June 2006, the UK's Health & Safety Executive (HSE), which licenses nuclear reactors through its Nuclear Installations Inspectorate (Nil), suggested a two-phase licensing process similar to that in the USA. The first phase, developed in conjunction with the Environment Agency (EA), is the Generic Design Assessment (GDA) process. Considering third-generation reactors, a generic design authorisation for each type will be followed by site- and operator-specific licences. Phase 1 would focus on design safety and take around three years to complete; phase 2 is site- and operator-specific and would take around 6-12 months.

Initial guidance on the GDA process was issued by the HSE and EA in January 2007, and in July of that year, applications for four reactor designs were made:

- UK EPR, submitted by Areva and EDF
- Westinghouse's AP1000
- GE-Hitachi Nuclear Energy's ESBWR
- AECL's ACR-1000.

Although the initial assessments of the four designs found no shortfalls, AECL withdrew its design from the GDA process in April 2008. Later, in September 2008, assessment of the ESBWR was halted after GE-Hitachi requested a temporary suspension.

The HSE was on course to complete a meaningful GDA assessment for the two remaining designs by June 2011, although this has now been delayed pending an HSE evaluation of lessons from the Fukushima accident. In any case, a number of issues may still be outstanding at that point.

Funded decommissioning programme

The Energy Act 2008 stipulates that plant operators are required to submit a Funded Decommissioning Programme (FDP) before construction on a new nuclear power station is allowed to commence. The Funded Decommissioning Programme must contain detailed and costed plans for decommissioning, waste management and disposal. The government will set a fixed unit price for disposal of intermediate-level wastes and used fuel, which will include a significant risk premium and escalate with inflation. During plant operation, operators will need to set aside funds progressively into a secure and independent fund. Ownership of wastes will transfer to the government according to a schedule to be agreed as part of the FDP.

Emissions reductions

In its July 2006 energy review report, the government said that the European Union Emissions Trading Scheme (ETS, now referred to as the Emissions Trading System) must be strengthened in its Phase III (2013-2020) in order to "ensure that the EU ETS develops into a credible long-term international framework for pricing carbon." Should it be necessary to provide more certainty to investors, the government said it would "keep open the option of further measures to reinforce the operation of the EU ETS in the UK."

A range of measures aimed at reducing greenhouse gas emissions were introduced in the Climate Change Act 2008, which entered into force in November 2008. The act provided for legally binding greenhouse gas emissions reduction targets of 80% by 2050 (compared with 1990 levels) and 34% by 2020. The act also established the Committee on Climate Change (CCC) to advise the government on setting and meeting carbon budgets.

In July 2009, the government published a white paper setting out a "low carbon transition plan" that will achieve the 2020 emissions reduction target. As one of the key steps, the plan reiterated the government's policy of facilitating the building of new nuclear power station.

Since the May 2010 general election, which replaced the Labour government with a coalition between the Conservatives and the Liberal Democrats, government policy on nuclear power has remained largely unchanged. One important difference is that, whereas the Labour government rejected the idea of guaranteeing a 'floor' price for carbon emissions, this is a policy of the coalition government.

Plans for new nuclear plants

The government assumes there will be a requirement of 60 GW_e of net new generating capacity by 2025, of which 35 GW_e is to come from renewables. The *Draft National Policy Statement for Nuclear Power Generation* states that the expectation is for "a significant proportion" of the remaining 25 GW_e to come from nuclear, although the government has not set a fixed target for nuclear capacity.

Since the government reversed its unfavourable policy towards nuclear in 2006, several utilities have begun planning to build new nuclear plants. The initial concern was that the most promising sites were owned by only two organizations: British Energy – which had recently completed restructuring following its financial collapse in 2002 and the government-owned Nuclear Decommissioning Authority (NDA) - which had recently taken ownership of BNFL's and the UKAEA's nuclear sites in order to decommission them. Utilities wishing to build new nuclear plants in the UK therefore had to either acquire British Energy, or its sites; or acquire land from the NDA.

EDF successfully bid for British Energy, completing the £12.5 billion acquisition in January 2009. Later in 2009, Centrica bought a 20% stake in British Energy for £ 2.3 billion. Conditions attached to the acquisition of British Energy included the sale of land at Wylfa, Bradwell and either Dungeness or Heysham, as weil as to relinquish one of the three grid connection agreements it held for Hinkley Point. Present plans are for four EPR nuclear reactors to be built by EDF Energy at Sizewell in Suffolk and Hinkley Point in Somerset. Planning applications for the first units are expected in mid-2011 when the Generic Design Assessment (GDA) process on reactor designs is due to finish (see section above on Generic Design Assessment). EDF plans to start up the first new reactor (at Hinkley Point) by the end of 2017 and have it grid-connected early in 2018.

Early in 2009, a 50:50 new-build joint venture of RWE npower with E.ON UK was established, now known as **Horizon Nuclear Power**. A second joint venture of Iberdrola (which owns Scottish Power) with GOF Suez along with Scottish & Southern Energy followed, now known as **NuGeneration**. This is owned 37.5% each by Iberdrola and GOF Suez, and 25% by Scottish & Southern. These two partnerships both bid for NDA land alongside old Magnox plants at Oldbury, Wylfa and Bradwell. Other bidders included EDF Energy and Vattenfall. The winning bids for Oldbury and Wylfa were from Horizon Energy, that for Bradwell was from EDF. The auction raised f387 million for the NDA. In October 2009, NuGeneration bought a 190 ha site on the north side of Sellafield from the NDA for f70 million, and announced its intention to build up to 3600 MWe of nuclear plant there, with construction beginning around 2015.

By 2025, Horizon plans to have around 6000 MWe of new nuclear capacity in operation. For its site at Wylfa in Wales, Horizon is proposing constructing up to four AP1000 reactors or three EPR units. For its Oldbury site, it is considering two options: either three AP1000

reactors or two EPRs. The planning application for Wylfa is envisaged in 2012, that for Oldbury in 2014.

Power reactors planned and proposed

Proponent	Site	Type	Present capacity (MW_e net)	Start-up
EDF Energy	Hinkley Point C, Sommerset	EPR x 2	3340	2018 & 2019
EDF Energy	Sizewell C, Suffolk	EPR x 2	3340	2020 & 2022
Horizon (RWE + E.ON)	Oldbury B, Gloucestershire	EPR x 2	3340-3750	2022
Horizon (RWE + E.ON)	Wylfa B, Wales	EPR x 2 or AP1000 x 3	Approx. 5000	2020
NuGeneration (Iberdrola, GDF Suez, Scottish & Suthern)	Sellafield, Cumbria	?	Up to 3600	2023
Total planned and proposed			**Up to approx. 19'000 MW_e**	

The WNA Reactor Database has 4 EPRs as "planned" (6680 MW_e) and 9 units (12'000 MW_e) as "proposed

Fuel cycle facilities and materials

From the outset, the UK has been self-sufficient in conversion, enrichment, fuel fabrication, reprocessing and waste treatment. Uranium is imported.

A 6000 t/yr conversion plant is at the Springfields site, which is managed by Westinghouse on a long-term lease from the Nuclear Decommissioning Authority. Early in 2005, Cameco Corporation bought ten years of toll conversion services from 2006, at 5000 tu/yr. Feed is from Cameco's Blind River refinery in Ontario, Canada.

Enrichment is undertaken by Urenco at Capenhurst in a 1.1 million SWU/yr centrifuge plant, the first part of which dates from 1976. Urenco's shares are ultimately held one-third by the UK government, one-third by the Dutch government and one-third by the German utilities RWE and E.ON.

Urenco is planning to build a 7000 t/yr deconversion plant, or Tails Management Facility, at Capenhurst, with operation expected from 2014. It will treat tails from all three European Urenco sites: Capenhurst, Almeie in the Netherlands and Gronau in Germany. Depleted uranium will then be stored in more chemically stable form as U_3O_8.

Fuel fabrication of AGR and PWR fuel is at Springfields, and other PWR fuel is bought on the open market. Magnox fuel fabrication, also at Springfields, ended in May 2008 after 53 years of production.

Reprocessing activities at Sellafield are undertaken by Sellafield Ud on behalf of International Nuclear Services, which is owned by the NDA. A 1500 t/yr Magnox reprocessing plant which opened in 1964 is due to close around 20160 The Thermal Oxide Reprocessing Plant (Thorp) was commissioned in 1994 and, as of early 2010, had treated about 6000 tonnes of used fuel for overseas and domestic customers. Of this, 2300 tonnes was domestic used AGR fuel. A further 6600 tonnes arising to the end of the AGR operating lifetimes will need to be treated or stored, depending on the outcome of a review of used oxide fuel management strategy Less than 700 tonnes of fuel from overseas customers remains to be reprocessed. It appears likely that Thorp will operate to 2020, according the NDA's revised strategy due to be finalized early in 2011.

Mixed oxide (MOX) fuel fabrication for expert is at the Sellafield MOX plant. In 2010, the NDA and ten Japanese utilities agreed on a plan to refurbish SMP, and this work is being undertaken over three years by Sellafield Ltd, involving a new MOX fuel fabrication line using Areva technology. About 15 tonnes of reactor-grade plutonium owned by the Japanese utilities is being held at Sellafield awaiting incorporation into about 270 tonnes of MOX fuel. Consideration is being given to building a new MOX plant in the UK to utilize over 100 tonnes of stored plutonium.

Recycling domestic plutonium has not to date been regarded as economic, so separated UK plutonium has been stored indefinitely pending a future decision on its disposition. (MOX fuel costs about five times as much to fabricate as conventional uranium oxide fuel, which doubles the total fuel cost.)

A March 2011 report outlined options for using or otherwise dealing with the UK's civil plutonium. This comprises some 100 tonnes of separated reactor-grade plutonium and also that in 6000 tonnes of used AGR fuel from UK reactors - about half as much again if separated. Three of four options involve using the separated plutonium in MOX fuel, the main question is what to do with the AGR fuel - treat as waste, or reprocess at THORP. The report suggests none of the options will be profitable, but some will have more economic and resource benefit than others. In essence, the report shows that it makes sense to produce MOX fuel from the plutonium. The question for the UK is whether it wants to offset this with extra savings and revenues from the potentially expensive return to the full nuclear fuel cycle that would come with a refurbishment of THORP. The public consultation ends in May 2011.

Radioactive wastes

Most UK radioactive wastes are a legacy of the pioneering development of nuclear power, rather than being normal operational wastes arising from electricity generation - though there is a significant amount of these. Until 1982, some low- and intermediate-level wastes were disposed of in deep ocean sites. In 1993, the government accepted an international ban on this.

Solid low-level wastes are disposed of in the 120 ha Low Level Waste Repository (LLWR) at Drigg in Cumbria, near Sellafield, which has operated since 1959. Intermediate-level waste is stored at Sellafield and other source sites, pending disposal.

High-level waste (HLW) arising from reprocessing is vitrified and stored at Sellafield, in stainless steel canisters in silos. All HLW is to be stored for 50 years before disposal, to allow cooling.

A consultation on regulations relating to wastes was carried out from March 2010. A Waste Transfer Pricing Methodology consultation document in the light of this was issued by the government in December 2010, setting out how a price will be determined for the transfer to government of new-build higher-activity waste and its disposal in the UK's planned Geological Disposal Facility (GOF). This includes setting a cap on waste transfer price to provide operators with some price certainty. The cap will be high – perhaps £1100 million per 1350 MW_e PWR, which is three times current cost estimates, and the actual price - including contribution to disposal facility – will be set 30 years after the reactor starts operation, not earlier. Operators will need to make credible and secure provision for funding the waste transfer. Used fuel will be priced in £/tU, not p/kWh as earlier proposed, and as common elsewhere.

The NDA has set up a Radioactive Waste Management Directorate (RWMO) to develop plans for a deep geological repository for high- and intermediate-level wastes and evolve

into the entity that builds and operates it. The Geological Disposal Facility (GOF) is expected to cost around £12 billion undiscounted from conception, through operation from about 2040, to closure in 2100. Site selection is expected to be in around 2025. The government has invited communities to volunteer to host the GOF, with three expressions received so far, representing two areas of Cumbria: Allerdale and Copeland. The next steps are to undertake a 4-year geological study; surface research lasting ten years; and finally a 15-year period of underground research, construction and commissioning. In these steps the NDA will seek to find an 11-year saving to enable operation from 2029.

The government is planning for the GOF to accommodate waste from new build as well as legacy waste (which includes committed waste from existing operational facilities and those undergoing decommissioning). Operators of new plants would be charged a fixed unit price for disposal of intermediate-level wastes and used fuel in the GOF (see section above on Funded decommissioning programme).

Regulation and safety

The principal regulating provision in the UK is the Nuclear Installations Act 1965, which governs the construction and safe operation of nuclear plants. This is administered by Nuclear Directorate of the Health and Safety Executive (HSE). The Nuclear Directorate regulates the safety of all nuclear installations independently of government departments, and licenses them. Within the Nuclear Directorate, nuclear safety regulation is carried out by the Nuclear Installations Inspectorate (Nil); nuclear security regulation is carried out by the Office for Civil Nuclear Security (OCNS); and nuclear safeguards functions are carried out by the UK Safeguards Office (UKSO).

The Nuclear Installations Act is supported by the Ionising Radiations Regulations 1999, which require employers to keep radiation exposure of workers and the public as low as practicable and within specified limits. The Nuclear Generating Stations (Security) Regulations 1996 and the Radioactive Material (Road Transport) Act 1991 are also relevant. Waste management and discharges to the environment are regulated by the Radioactive Substances Act 1993.

Regarding nuclear third party liability, in 1994 the limit was increased to (£ 140 million for each major installation, so that the operator is liable for claims up to this amount and must insure accordingly. The government is running a public consultation (finishing at the end of April 2011) that would increase the liability to €1.2 billion (£ 1 billion), in line with amendments agreed in 2004 to the Paris Convention on nuclear third party liability and Brussels Supplementary Convention.

Non-proliferation

The UK is a nuclear weapons state, party to the Nuclear Non-Proliferation Treaty (NPT) which it ratified in 1968 and under which a safeguards agreement has been in force since 1972. The Additional Protocol in relation to this was signed in 1998. International Atomic Energy Agency safeguards are applied on all civil nuclear activities. (The UK undertook 45 nuclear weapons tests over 1952-91 – most in the 1950s in Australia).

DEPARTMENT OF ENERGY & CLIMATE CHANGE

Overarching National Policy Statement for Energy (EN-1)

Version for Approval

Planning for new energy infrastructure **June 2011**

decarbonise the power sector by 2030, it is necessary to bring forward new renewable electricity generating projects as soon as possible. The need for new renewable electricity generation projects is therefore urgent.

3.5 The role of nuclear electricity generation

3.5.1 For the UK to meet its energy and climate change objectives, the Government believes that there is an urgent need for new electricity generation plant, including new nuclear power. Nuclear power generation is a low carbon, proven technology, which is anticipated to play an increasingly important role as we move to diversify and decarbonise our sources of electricity.

3.5.2 It is Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new capacity. Although it is not possible to predict whether or not there will be a reactor or more than one reactor at each of the eight sites included in EN-6, a single reactor at each of the eight sites would result in 10-14 GW of nuclear capacity, depending on the reactor technology chosen.

Nuclear power as part of a diverse and secure energy mix

3.5.3 New nuclear power stations will help to ensure a diverse mix of technology and fuel sources, which will increase the resilience of the UK's energy system. It will reduce exposure to the risks of supply interruptions and of sudden and large spikes in electricity prices that can arise when a single technology or fuel dominates electricity generation.

3.5.4 The characteristics of nuclear power are quite different to those of conventional fossil fuel or renewable forms and provide specific advantages with regards to energy security:

- nuclear fuel fabrication is a stable and mature industry with a range of uranium sources. Uranium deposits are predicted to last much longer than oil and gas reserves[46]. Following the review of publications from the Organisation for Economic Co-operation and Development (OECD)/International Atomic Energy Agency (IAEA)[47] and the Euratom Supply Agency (ESA)[48] the Government believes that adequate uranium resources exist to fuel a global expansion of nuclear power, including any new nuclear power stations constructed in the UK;

46 Europe's Energy Portal. Estimated dates of exhaustion: natural gas 2068; oil 2047; uranium 2144. http://www.energy.eu/

47 OECD, IAEA. Uranium 2009: Resources, Production and Demand. July 2010. http://www.nea.fr/press/2010/2010-03.html

48 Euratom Supply Agency. Annual Report 2009. July 2010. http://ec.europa.eu/euratom/ar/ar2009.pdf

- the supply chains of nuclear fuel, gas and coal are not interdependent. An interruption in the supply of gas or coal is unlikely to affect the supply of uranium. Consequently, including new nuclear power stations in the generating mix increases the diversity of fuels that we rely on and reduces the risks of interruptions to fuel supply;

- Unlike some other generation technologies (for example gas fired generation), fluctuations in fuel prices do not significantly affect the cost of electricity from nuclear power stations[49].

- In situations where gas prices are high, the relatively low generation costs of nuclear power means that it can place downward pressure on long-run wholesale prices. This might help reduce the UK's exposure to higher fossil fuel prices.

- Nuclear power stations can continue to operate for long periods of time without refuelling.

Nuclear power as part of a low carbon electricity mix

3.5.5 Having examined a range of independent life cycle analyses[50], the Government believes that carbon emissions from a new nuclear power station are likely to be within the range of 7-22g/kWh. This is in line with research published by the Sustainable Development Commission[51] and the IAEA[52]. It is similar to the lifecycle CO_2 emissions from wind power and much less than fossil fuelled plant.

3.5.6 New nuclear power therefore forms one of the three key elements of the Government's strategy for moving towards a decarbonised, diverse electricity sector by 2050: (i) renewables; (ii) fossil fuels with CCS; and (iii) new nuclear.

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49 Tarjanne & Rissanen. Least-Cost Option for Baseload Electricity in Finland. The Uranium Institute 25th Annual Symposium, 30 August-1 September 2000: London. Tarjanne and Rissanen's paper found that an increase in the uranium price causes only a slight increase in nuclear electricity costs, whereas for the natural gas alternative a rising trend of gas prices causes a major cost increase. http://www.world-nuclear.org/sym/2000/pdfs/tarjanne.pdf

50 Life cycle analyses examine the emissions for the complete nuclear fuel cycle (including CO_2 emitted during construction, operation and decommissioning of the power station, mining, transport of fuel and disposal of waste). For a review of life cycle analyses see Chapter 4 of the decisions by the Secretary of State for Energy and Climate Change on the Regulatory Justification of the AP1000 and EPR nuclear power station designs, at http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/new/reg_just/reg_just.aspx

51 Sustainable Development Commission (2006). The role of nuclear power in a low carbon economy. Paper 2: Reducing CO2 emissions – nuclear and the alternatives. p. 21. http://www.sd-commission.org.uk/publications/downloads/Nuclear-paper2-reducingCO2emissions.pdf

52 Spadaro, Joseph V. et al. (2000). Greenhouse gas emissions of electricity generation chains: assessing the difference. IAEA Bulletin, 42/2/2000. pp. 19 – 24. http://www.iaea.org/Publications/Magazines/Bulletin/Bull422/article4.pdf

3.5.7 To ensure our future energy is secure, clean and affordable, the UK needs a mix consisting of each of these forms of electricity generation. The Government believes that new nuclear generation would complement renewables and fossil fuels with CCS in ensuring that we meet our legal obligations as it can provide dependable supplies of low carbon electricity. Nuclear is also the only non-renewable low carbon technology that is currently proven and can be deployed on a large scale[53].

3.5.8 The Government believes that nuclear power is economically competitive with other forms of generating technology (including the lowest cost renewable technologies) and new nuclear is likely to become the least expensive form of low carbon electricity generation[54]. It is therefore anticipated that industry will want to bring forward applications for new nuclear power stations and to date energy companies have announced that they intend to put forward proposals to develop 16 GW of new nuclear power generation capacity by the end of 2025[55].

The urgency of the need for new nuclear power

3.5.9 Given the urgent need for low carbon forms of electricity to contribute to the UK's energy mix and enhance the UK's energy security and diversity of supply, it is important that new nuclear power stations are constructed and start generating as soon as possible and significantly earlier than 2025 (see Section 2.2 of EN-6, which sets out policy in respect of the IPC's consideration of early deployment of new nuclear power stations). Based on the availability of - amongst other things - construction materials, skills, investment, the timescale for licensing, and related investment in transmission and distribution infrastructure, the Government believes that it is realistic for new nuclear power stations to be operational in the UK from 2018, with deployment increasing as we move towards 2025.

3.5.10 For these reasons, the Government's assessment of sites potentially suitable for new nuclear development (see Part 4 of EN-6) only included sites that were shown to be capable of deployment by the end of 2025; 2025 also represents a realistic timeframe for the construction of new nuclear power stations and avoids an unnecessarily long list of potential sites which may not come on stream for some years. Nuclear power stations have an estimated design lifetime of 60 years so any new nuclear power stations operational by the end of 2025 will play a vitally important

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53 16% of the UK's electricity supply came from nuclear power stations in 2010.

54 UK Electricity Generation Costs Update, Mott MacDonald, June 2010: http://www.decc.gov.uk/assets/decc/statistics/projections/71-uk-electricity-generation-costs-update-.pdf; Parsons Brinckerhoff (trading as PB Power), Powering the Nation Update 2010, March 2010, http://www.pbworld.co.uk/index.php?doc=528

55 http://www.centrica.co.uk/index.asp?pageid=217&newsid=1783 http://www.edfenergy.com/media-centre/press-news/EDF_Energy_welcomes_Government_announcement_on_nuclear_sites.shtml http://www.rwe.com/web/cms/en/216362/rwe-npower/more-/our-business/nuclear-power/, http://pressreleases.eon-uk.com/blogs/eonukpressreleases/archive/2009/04/29/1382.aspx http://www.scottishpower.com/PressReleases_1948.htm

role in the decarbonisation of the electricity system and will therefore directly contribute towards our 2050 targets and objectives.

3.5.11 France has already demonstrated that it is technically feasible to build nuclear power stations at the rate that would be needed in the UK if new nuclear power stations were to be constructed on all of the sites listed in this NPS before the end of 2025[56].

3.6 The role of fossil fuel electricity generation

3.6.1 Fossil fuel power stations play a vital role in providing reliable electricity supplies: they can be operated flexibly in response to changes in supply and demand, and provide diversity in our energy mix. They will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy, and Government policy is that they must be constructed, and operate, in line with increasingly demanding climate change goals.

3.6.2 Fossil fuel generating stations contribute to security of energy supply by using fuel from a variety of suppliers and operating flexibly. Gas will continue to play an important role in the electricity sector – providing vital flexibility to support an increasing amount of low-carbon generation and to maintain security of supply. The UK gas market has diversified its sources of supply of gas in recent years, so that as the UK becomes more import dependent, companies supplying the market are not reliant on one source of supply. This protects the UK market from disruptions to supply. UK natural gas supplies come from the producing fields on the UK Continental Shelf, by pipeline direct from Norway, and from continental Europe through links to Belgium and the Netherlands. Liquefied natural gas (LNG) is imported by tanker, supported by ongoing investment in LNG facilities such as those on the Isle of Grain and at Milford Haven. Similarly, although a proportion of coal used in British generating stations is imported, the UK still has its own reserves. Further, coal is available globally and most generating station operators will already have alternative suppliers depending on prevailing market conditions. This ability to source fuel from alternative suppliers helps to give stability to the UK's generating capacity. In addition, unlike some renewable energy sources such as wind power, fossil fuels may be stockpiled in anticipation of future energy demands.

3.6.3 Some of the new conventional generating capacity needed is likely to come from new fossil fuel generating capacity in order to maintain security of supply, and to provide flexible back-up for intermittent renewable energy from wind. The use of fossil fuels to generate electricity produces atmospheric emissions of carbon dioxide. The amount of carbon dioxide produced depends, amongst other things, on the type of fuel and the design and age of the power station. At present coal typically produces about twice as much carbon dioxide as gas, per unit of electricity generated. However, as explained further below, new technology offers the prospect of reducing the carbon dioxide emissions of both fuels to a level

[56] Nuclear Energy Association, Nuclear Energy outlook 2008, NEA No. 6348, p.318.

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Energy plans to go before Parliament

Press Release 2011/053

23 June 2011

The Government today published its finalised Energy National Policy Statements (NPSs) in order for them to be debated in Parliament. This follows an extensive public consultation earlier this year which received over two and a half thousand responses.

The Energy NPSs provide a clear framework for decision making and set out the need for a surge of investment in new energy sources, including 33GW of new renewable energy capacity. The Nuclear NPS lists eight sites across the country as suitable for new nuclear power stations by 2025.

Charles Hendry, Minister of State for Energy said:

“Around a quarter of the UK’s generating capacity is due to close by the end of this decade. We need to replace this with secure, low carbon, affordable energy. This will require over £100billion worth of investment in electricity generation and transmission alone. This means twice as much investment in energy infrastructure in this decade as was achieved in the last decade.

“Industry needs as much certainty as possible to make such big investments. These plans set out our energy need to help guide the planning process, so that if acceptable proposals come forward in appropriate places, they will not face unnecessary hold-ups.

“The Coalition Government is determined to make the UK a truly attractive market for investors, to give us secure, affordable, low-carbon energy. These National Policy Statements are an important milestone.”

Decentralisation Minister Greg Clark said:

"Major infrastructure projects provide a real growth opportunity for this country, will bring billions of pounds of investment and create the bedrock businesses need to thrive in the 21st century.

"These policy statements are an important step in ensuring planning decisions can be made without delay and will boost the reforms the Government is making to the planning system to strip away bureaucracy, give more powers to communities and ensure faster decisions are taken."

The Government’s final proposed Energy NPSs will be debated in Parliament. The date of the debate is subject to confirmation from Parliamentary authorities.

Alongside the NPSs, DECC today published independent research into how noise from wind turbines is assessed in the planning process. In response to the findings, DECC is in discussions with the Institute of Acoustics to establish a working group to develop best practice guidance for planners, developers and local communities.

Notes for editors

1. The Parliamentary Statement is available on the DECC website.
2. The consultation on the NPSs is available on the Archived NPS microsite [External link]. It closed on 24th January 2011. A previous consultation on the NPSs ran from November 2009 to February 2010.
3. The NPSs have been subject to Parliamentary Scrutiny; the House of Commons held a debate on 1 December 2010, the House of Lords Grand Committee debated NPSs on 11 and 13 January 2011, and the Energy and Climate Change Select Committee published a report on 26 January 2011. The Government Response to Parliament, which addresses points made in all these, is published today on the National Policy Statements page of the DECC website
4. The Nuclear National Policy Statement lists the following sites as potentially suitable for the deployment of new nuclear power stations by 2025: Bradwell, Essex; Hartlepool, Borough of Hartlepool; Heysham, Lancashire; Hinkley Point, Somerset; Oldbury, South Glos.; Sellafield, Cumbria; Sizewell, Suffolk; Wylfa, Isle of Anglesey.
5. The onshore wind turbine noise study is available on the Onshore wind page of the DECC website

Huhne welcomes interim report from chief nuclear inspector

Press release: 2011/042
18 May 2011

Energy and Climate Change Secretary Chris Huhne today presented to Parliament the findings of the Chief Nuclear Inspector's interim report into the events at the Fukushima nuclear plant in Japan in March this year.

Chris Huhne asked for an interim report to consider any immediate lessons that could be applied to the UK nuclear industry. Dr Weightman will provide a final report in September this year.

In his interim report, Dr Weightman has found that the UK has displayed a strong safety culture in its response to Fukushima and current safety measures are adequate. Dr Weightman also said that is not necessary to make immediate safety improvements to operating nuclear reactors in the UK.

Chris Huhne said:

"Safety is and will continue to be the number one priority. I am pleased that today's report confirms that the UK's current safety arrangements are working. I want regulators and the industry to work together, so that we continue to improve our safety regime.

"The Chief Nuclear Inspector has made clear the differences between Japan and the UK. We do not use the same reactor types, and do not plan to in future. We also do not expect to experience the extreme natural events seen in Japan.

"Dr Weightman's interim report is authoritative and detailed and I thank him for his work. It provides us with the basis to continue to remove the barriers to nuclear new build in the UK. We want to see new nuclear as part of a low carbon energy mix going forward, provided there is no public subsidy. The Chief Nuclear Inspector's interim report reassures me that it can."

The Energy Secretary added that subject to careful consideration of Dr Weightman's interim report, the Government will bring forward the Energy National Policy Statements for ratification as soon as possible. The NPSs provide a framework for decisions on planning applications for major energy infrastructure projects.

Notes for editors

1. Chief Nuclear Inspector Dr Mike Weightman was asked by the Secretary of State for Energy to report on the lessons learned from the Fukushima disaster in March 2010 – read the associated press notice.
2. Dr Weightman's interim report is available to read in full on the Health and Safety Executive's: Health and safety in the nuclear industry [External link] web page. His final report is due in September 2011.
3. The Secretary of State's full written statement to Parliament is available on the DECC website.

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The Nuclear Industry Association is the trade association and information body for the UK civil nuclear industry.

Who are we?

We are the trade association and representative organisation for over 250 companies. The diversity of NIA membership facilitates and encourages effective industry interaction to support our key objectives.

The NIA and its members take an all-energy view and support the development of a balanced low-carbon energy mix for the UK involving renewables, clean coal, gas and energy efficiency – with stably-priced low-carbon nuclear at the centre.

What's our objective?

- To improve the commercial performance of the nuclear industry by assisting and supporting member companies to develop their businesses in the UK and overseas
- To improve understanding of nuclear energy and the climate of political and public opinion in which the industry works and develops

How do we do it?

- Representing the industry to key audiences
- Providing tools for information sharing and networking
- Responding to Government consultations
- Producing publications, newsletters and information material
- Organising events, meetings and conferences
- Facilitating working groups



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