CND

BRIEFING

Nuclear power in the UK

CND calls for an end to the production of nuclear energy – a technology that is dirty, dangerous and economically unsustainable. Nuclear power burdens future generations with a potential human and environmental disaster that is not compensated for by the expensive electricity produced.

Introduction

The UK has 13 nuclear reactors currently producing 16% of the country's electricity. All but one of these reactors are scheduled to be shut down by the end of 2030. To fill the anticipated gap, the government wants to build a new generation of nuclear power stations, with a new Energy Security Strategy published by the government in April 2022 aiming to make nuclear power the cornerstone of the country's energy policy.

Plans for new nuclear sites set out in 2011 have largely stalled. Companies planning new power stations at Oldbury, Wylfa and Moorside have pulled out. No proposals for new reactors have been put forward for Hartlepool and Heysham, while developments at Sizewell and Bradwell are currently at very early stages. Hinkley Point C is the only nuclear power station where construction has actually started, with work beginning in 2017.

Despite these unpromising developments, industry advocates have continued to champion nuclear power as a reliable, clean energy source. The availability of superior renewable energy technologies rapidly being developed across the world is meanwhile ignored.

Nuclear power in the UK: a short history
Nuclear power is the production of energy through a controlled nuclear reaction.

The majority of the UK's nuclear power stations were built in the 1970s and 1980s, with all apart from Sizewell B due to be shut down in the next eleven years, as their reactors reach the end of their lifetimes.

26 of the closed first-generation Magnox reactors were built at 11 sites between 1956 and 1971. The last Magnox reactor opened at Wylfa on Anglesey in 1971. Wylfa finally ended electricity generation in 2015, but it took until 2019 for the last of the used (nuclear waste) fuel to be removed from the reactors and transported to Sellafield. The current plan is to prepare these old reactors for what is called a 'care and maintenance' phase over the next decade. They will then be left for around 60 years to allow the radioactivity in the reactor buildings to decay before they are dismantled. Even the great grandchildren of today's nuclear workers will be too old to work on the final dismantling of these reactors.

From the very start, Magnox reactors were intimately connected to the UK's nuclear weapons programme. Calder Hall, at Sellafield, which was opened in 1956, is often described as the UK's first civil nuclear power station. However, its primary purpose was in fact to produce plutonium for the UK's nuclear weapons. From 1959, Chapelcross in Dumfriesshire also produced plutonium for nuclear weapons and later produced tritium for them. In 1958, the former Central Electricity Generating Board agreed to modify the designs of Hinkley Point A and of the next two Magnox stations in its building programme to enable plutonium for military purposes to be extracted if necessary.

The second-generation Advanced Gas-cooled Reactor (AGR) design was an attempt to improve on the earlier Magnox design, with the first reactors at Hinkley Point B and Hunterston B opening in 1976. But the former head of the Central Electricity Generating Board, Sir Arthur Hawkins, described the AGR programme as a 'catastrophe we must not repeat'. Dungeness B – which was the first AGR station to be ordered – was 12 years late when it was finally finished, and most of the others were also late with huge cost overruns. A long campaign was run against the construction and opening of the last AGR to be built – Torness in East Lothian, near Edinburgh – in the 1970s and 80s. After Torness opened in 1989, the Glasgow Herald quoted a Scottish Office 'source' who described it as a £2.5 billion mistake which should never have been built.

In 1954, Lewis Strauss, chairman of the former United States Atomic Energy Commission, famously described nuclear electricity as likely to be 'too cheap to meter'. But plagued by delays and cost overruns from the start, the UK nuclear industry's financial record is actually

very poor. The privatisation of nuclear power was shelved in 1989 and only pushed through in 1996. The privatised nuclear company, British Energy, collapsed only six years later in 2002. All 15 of British Energy's reactors were eventually sold to the French, mostly government-owned nuclear company, EDF, for the knock-down price of £12.5 billion.

Yet, far from signalling the end of this expensive and hazardous technology, successive governments have stubbornly persisted with trying to build a new generation of nuclear power stations, despite all the evidence that superior alternatives exist.

Nuclear: a new generation?

A policy of 'new nuclear power' was launched by then Labour Prime Minister Tony Blair in 2006. The coalition government under then Prime Minister David Cameron published a National Policy Statement in 2011 identifying eight locations for new power stations: Bradwell, Hartlepool, Heysham, Hinkley Point, Oldbury, Sizewell, Sellafield and Wylfa. Over a decade later, construction work has only started at one of these sites.

Then Prime Minister Boris Johnson called Britain "the home of nuclear energy" as he launched a new Energy Security Strategy in April 2022. While the policy includes some commitments to solar energy and offshore wind, nuclear is given priority. The government wants to get 25% of its energy mix – or 24 GW – from nuclear by 2050. This will require finding billions of pounds of private investment. A new regulated asset base funding model was also announced.

Currently there is only one nuclear power plant being built in the UK. The government and French government-owned utility company EDF Energy agreed a deal to build a new nuclear reactor at the Hinkley site in 2013. The two sides agreed a 'strike price' of £92.50 per megawatt hour of electricity that Hinkley C generated, with index linked at 2012 prices for 35 years. Because of the linkage, the price has now increased to £106/MWh – around twice the current wholesale price of electricity. This compares unfavourably with the most recent bids for offshore wind of £36.95/MWh.

CND publicly condemned the deal, along with other campaigning groups, Parliament's Public Accounts Committee and many in the finance sector, including the bank HSBC. In fact, HSBC even said they see 'ample reason for the UK government to delay or cancel the project' because of the high burden placed on taxpayers by the deal.[1] In addition, the European Commission and the United Nations have both investigated the project after concerns were raised.

Work continues at the site however, with an expected completion date of 2026 at an estimated construction cost of £26 billion.

EDF is planning to build a new nuclear plant at the Sizewell site.. In one of his final acts as Prime Minister, Boris Johnson pledged £700 million government funding towards the plant in September 2022. A final decision is expected in the next year. But the project has faced opposition on several fronts, from questions about how long it will take to build the new plant, how much it will cost and environmental concerns.

Potential new nuclear reactors in the UK

Location	Developer	Progress
Bradwell	General Nuclear Services	General Design Assessment completed
Hartlepool	No progress	No progress
Heysham	No progress	No progress
Hinkley Point	EDF and CGN	Under construction
Moorside	N/A	Toshiba pulled out in 2018
Oldbury	N/A	Hitachi pulled out in 2020
Sizewell	EDF	Finance negotiations ongoing
Wylfa Newydd	N/A	Hitachi pulled out in 2020

It has not been a good period for the nuclear power industry overall, with plans for three new nuclear reactors crumbling in the past few years.

The multinational conglomerate Toshiba withdrew from the Moorside project in 2018, describing the decision as 'economically rational'.[2] Less than three months later, another Japanese multinational, Hitachi, suspended work on its planned Wylfa and Oldbury projects, again using much the same terms as Toshiba – that it was doing so 'from the viewpoint of its economic rationality'.[3] Hitachi has now confirmed it has permanently withdrawn from both projects.

These developments have led many to question the future of nuclear power in the UK.

Small Modular Reactors

The government announced in 2020, as part of an Energy White Paper, that it was allocating up to £215 million of funding for a Small Modular Reactor (SMR) design.[4] SMRs are smaller versions of nuclear reactors and are intended to be mass produced off-site and then transported, rather than a large construction project such as Hinkley Point C.

But SMRs are still vulnerable to nuclear accidents, terror attacks, and can produce more nuclear waste than conventional reactors per unit of electricity. It is also an unproven and untested technology that will still cost the taxpayer unspecified – and likely large – amounts of money.

A SMR consortium led by Rolls Royce plans to build up to 16 of these 'mini' nuclear power plants in the UK. Rolls-Royce shortlisted six sites for a new factory to build the reactors in July 2022. The potential factory locations are: Richmond in North Yorkshire, Deeside in Wales, Ferrybridge, Stallingborough in Lincolnshire, Sunderland and Carlisle.

Even with the most ambitious time-scale, we will have to wait 10

years for an SMR to produce energy, when renewable alternatives are available now.

Nuclear waste

CND opposes the production of nuclear power for many reasons, one being the large amounts of radioactive waste produced. There is still no safe, long-term solution for dealing with radioactive nuclear waste and yet the government wants to produce more with no answer in sight.

The majority of Britain's nuclear waste is currently held at Sellafield in Cumbria, a site containing over a hundred tonnes of the most toxic substance ever created. The government plans to bury this waste deep below ground for tens of thousands of years, in what it calls a geological disposal facility (GDF).

The government has been trying – without success – for years to find an area of the UK where it would be geologically suitable to build a GDF and where the local community is willing to host it.

Nuclear waste is a problem that the nuclear industry has failed to consider seriously for over sixty years, but one that can no longer be left for future generations.

Heavily subsidised

The British public massively subsidises the nuclear industry and will continue to do so as the government has guaranteed the price of electricity produced from at least one new nuclear power station.

As investors worldwide have withdrawn from planned nuclear power plants, it has become clear that nuclear power is economically unviable. With the expected construction of Hinkley Point C estimated to top £26 billion, costs for the planned Wylfa, Moorside and Oldbury projects were too high even for multi-billion-dollar corporations to stomach. And with the projected decommissioning costs of nuclear facilities such as Sellafield set at an eye-watering £121 billion, nuclear power is clearly financially unmanageable.

In this context, the economic superiority of renewables over nuclear has been recognised even by the government. In 2019, the former Secretary of State for Business, Energy and Industrial Strategy, Greg Clark MP, confirmed that nuclear power is difficult to finance as 'new sources of power become cheaper and more abundant'.[5]

With investors worldwide explicitly retreating from nuclear power because of its unwieldly costs, the government must too face facts: nuclear power does not add up in an era of cheap renewables.

But the UK government has apparently not learned any lessons and is now considering a new finance model for subsidising new nuclear projects. The Regulated Asset Base (RAB) model would involve consumers paying a surcharge on their electricity bills to pay for new nuclear power plants, exposing them to the huge cost over-runs typically associated with nuclear construction projects. Whether the public pays in advance of energy production starting, or afterwards, new nuclear will still cost billions of pounds more than renewables.

Inherent dangers

Nuclear power production is inherently dangerous, as it can lead to cancer clusters in the surrounding areas around power stations and potentially catastrophic disasters or accidents. Even small exposures to radiation can be harmful.

For example, over 40 epidemiology studies world-wide show increased leukaemia rates among children living near nuclear power stations.[6] Yet the government and the nuclear industry continue to refute these findings and resist their implications. This response can be compared to the denials of an association between lung cancer and smoking in the 1960s, or in the more recent past between man-made CO2 emissions and global warming.

And this is from routine emissions. Nuclear accidents are more serious and have disastrous effects. Many thousands of people died or became ill from radiation poisoning after the Chernobyl nuclear disaster. In the early hours of 26th April 1986, one of the four reactors at the Chernobyl nuclear power station in what is now Ukraine went out of control while engineers were running safety tests. A power surge led to a violent explosion. The subsequent graphite fire which lasted for 10 days emitted radioactivity across Europe.

Japan is considered one of the most technologically advanced countries in the world and yet it also experienced its own nuclear disaster recently.

When an earthquake and tsunami hit the Fukushima nuclear power plant on 11th March 2011, it caused a Level 7 nuclear disaster, the highest possible. The result of this has been radiation levels at well over 100 times the fatal dose, the release of 300 tonnes of radioactively contaminated water being dumped into the sea each day[7] and the contamination of 8% of Japan's land mass.[8]

Even here in the UK, nuclear accidents have posed a serious threat to people and the environment. Sellafield was recently forced to pay a £380,000 fine as an employee was exposed to radiation up to eight times the annual limit.[9] This comes after Sellafield's previous prosecution for disposal of radioactive waste in a standard landfill dump, rather than in the required specialist facilities.[10]

Nuclear power is inherently prone to risks, meaning there can never be a complete guarantee of human and environmental safety when using such a dangerous technology. While accidents can and do occur in any industry, the radioactive materials used in the nuclear one mean that safety breaches often have far-reaching and long-lasting repercussions.

The highly respected UN Intergovernmental Panel on Climate Change (IPCC) has confirmed that nuclear energy has negative environmental impacts, such as on water security and can have negative impacts on human health.[11]

Links with nuclear weapons

Both the nuclear power industry and the nuclear weapons industry share a common technological basis and remain inextricably linked.

MPs were given 'persuasive evidence' in 2019 that the government's enthusiasm for civilian nuclear power is, in part, due to the subsidy it generates for the UK's nuclear weapons industry.[12]

Researchers from the University of Sussex, who presented their findings to the House of Commons' Business Select Committee, showed how the government is, in effect, forcing householders to pay higher energy bills to fund nuclear power. This is because of the way it supports the civil nuclear infrastructure required by agencies working on nuclear weapons and nuclear-powered submarines.

The evidence presented by the academics shows 'the costs of maintaining nuclear submarine capabilities are insupportable without parallel consumer-funded civil nuclear infrastructures'. It makes a compelling argument that the government's decisions on new nuclear power stations in the UK may not be based on energy policy considerations alone.

Nuclear weapons and nuclear power share several common features. The long list of links includes their histories, similar technologies, skills, health and safety aspects, regulatory issues and radiological research and development. For example, enriched uranium fuel for nuclear power stations is also used as the fissile material for nuclear weapons. And plutonium – which is a by-product of the nuclear fuel cycle – is still used by some countries to make nuclear weapons.

There is a danger that more nuclear power stations in the world could mean more nuclear weapons. Because countries like the UK are promoting nuclear power, other countries are beginning to consider their own nuclear power programmes too. But past experience shows the danger that countries acquiring nuclear power technology may subvert its use to develop a nuclear weapons programme. After all, the UK's first nuclear power stations were built primarily to provide fissile material for nuclear weapons during the Cold War.

Nuclear materials may also get into the wrong hands and be used to make a crude nuclear device or a so-called 'dirty bomb'.

Not the answer to current challenges

The removal of the UK's cap on energy prices in April 2022 has impacted millions of people, who are now struggling to pay higher energy bills. The war in Ukraine has had a further effect on energy supply, as has efforts to combat the climate crisis. The government's emphasis on nuclear as the answer to both these issues is misguided – nuclear energy is not the answer to our current crisis, or climate change on a wider level.

Any new nuclear projects announced – if they even go ahead – would take decades to build. But we need an answer to the climate crisis now. If nuclear power capacity was doubled worldwide by 2050, 37 new nuclear reactors would need to start producing energy every year until then. For reference, less than 10 have come online per year for the last decade. And even if this hugely ambitious – or more likely, impossible – scenario was realised, it would only result in a 4% reduction in emissions.

The debate and investment into trying to develop new nuclear energy projects divert funds and political motivation away from further developing truly renewable energy sources. In addition, building more nuclear power stations would entail uranium mining, milling and enrichment – all carbon intensive processes.

Alternatives exist

Renewable energy sources have the potential to supply all our energy needs, with the right support and investment.

Energy from renewable sources such as solar and wind have become increasingly more efficient, cheaper and easier to produce. The UK produced more electricity from renewables than fossil fuels the first time in 2020, with experts predicting the trend would continue.[13]

And this is despite a noticeable lack of support from the government. In the past few years, it has withdrawn support for new onshore windfarms, withdrawn subsidies from solar, taxed renewables and failed to develop tidal power.

These policies have led MPs and the UK's environmental and spending watchdogs to highlight how the stringent and needless restrictions on the renewables sector has created a hostile environment to investment in renewables across the board. If billions of pounds were to be invested in the UK developing these technologies rather than subsidising the nuclear industry, we could soon have enough secure and clean energy sources from renewables while creating thousands of new jobs.

It's time to move away from nuclear, and lift the restrictions on these cleaner, safer and efficient means of energy production.

Conclusion

The UK government should announce an immediate programme to phase out existing nuclear power plants and cancel any plans for future investment in the industry.

The costs of nuclear power remain indefensible whilst we have better and cheaper alternatives. Not only do renewables ensure the UK will meet its climate change commitments safely, they will be significantly cheaper for consumers, won't contribute to nuclear weapons technologies and won't produce hazardous, needless radioactive waste.

Nuclear power is not the solution to climate change. We need a safe, genuinely sustainable, global and green solution to our energy needs, not a dangerous diversion like nuclear power.

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September 2022. Campaign for Nuclear Disarmament • Mordechai Vanunu House
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