



WALES AND NUCLEAR POWER

What you need to know



"Please learn from Fukushima.
Please learn from our mistake.
You do not want to apologise to your
own children, to your grandchildren for
making the wrong choice before they were
even born.
I believe no one in this world should go
through what Fukushima is going through
right now.
I deeply hope my voice helps you make a
wise decision."

Plea by Ms Aoki, Fukushima evacuee, to the people of Wales, 2015

Timeline

1947 UK's first nuclear reactor built at Atomic Energy Research Establishment, Harwell.

1956 Calder Hall, the world's first commercial nuclear reactor, opens at Windscale, Cumbria. Its public aim is to generate electricity that would be 'too cheap to meter'. Its secret aim is to produce plutonium for atomic bombs.

1957 A reactor at Windscale catches fire, releasing Iodine-131 which can cause cancer. Nobody is evacuated, but for a month afterwards milk from the surrounding 500km² is collected and dumped into the Irish Sea. The accident is kept secret for 30 years.

1965 Trawsfynydd 1 and 2 nuclear reactors in Snowdonia are connected to grid, the first in Wales.

1965 First Hinkley reactors connected.

1967 Fire and partial meltdown at Chapelcross nuclear power station, Scotland.

1971 Two Magnox nuclear reactors at Wylfa, North Wales, are connected to the grid.

1979 Three Mile island, major nuclear disaster in USA.

1980 The Wales Anti-Nuclear Alliance (WANA) is founded.

1981 Windscale's bad reputation is papered over with a name change – to (the now equally notorious!) Sellafield.

1982 Nuclear Industry Radioactive Waste Executive (NIREX) start search for a site suitable for a geological depository (an underground nuclear waste dump). 35 years later, no site has been agreed.

1982 Nuclear Free Wales declaration by Welsh local authorities.

1984 North Wales shaken by the largest known British earthquake: Llŷn Peninsula, 5.4 on the Richter scale.

1986 Catastrophic nuclear accident at Chernobyl in the USSR (now Ukraine): workers and local population irradiated. The fallout in Wales causes movements of sheep to be restricted on 327 farms until 2012.

1987 Anti-nuclear group CADNO is founded at Trawsfynydd amidst public concern about cancers in the locality.

1988 PAWB is founded to combat PM Margaret Thatcher's plans for a nuclear renaissance, including a new power station at Wylfa B.

1989 The Conservatives drop nuclear new-build on the grounds of expense.

1991 Trawsfynydd reactors shut down for decommissioning.

1993 Low-Level Radiation Campaign is founded at Llandrindod.

1993 A steel grab falls into the Wylfa reactor and blocks a fuel channel. The reactor is not shut down for

9 hours. Nuclear Electric is later fined £250,000 with £138,000 costs.

1994 THORP nuclear fuel reprocessing plant opens at Sellafield. Financial losses, and a severe radiation leak 2004-05, mean that it is due for closure in 2018.

1997 Labour government under Tony Blair wins UK election on a no-nuclear ticket; reiterated before the 2001 general election.

1997 Wales votes for devolution.

2001-02 Labour government's energy review recommends drive for renewables, but nuclear option left open.

2005-06 Tony Blair reverses nuclear policy, initiating nuclear new-build programme.

2008 Go-ahead given for two European Pressurised Reactors (EPRs) to be built by French company EDF at Hinkley C.

2009 Horizon Nuclear consortium is formed, including E.ON and RWE n.power, to build a new nuclear power station at Wylfa B.

2010 A professionally conducted opinion poll reveals most respondents from Ynys Môn and Gwynedd would prefer to see jobs in renewables.

2011 Catastrophic nuclear disaster in Japan at the Fukushima Daiichi plant, following earthquake and tsunami. As at 2017 the disaster is still ongoing.

2012 PAWB publishes Manifesto Môn, an alternative employment blueprint for Anglesey.

2012 E.ON and RWE n.power pull out of Wylfa project. Horizon Nuclear is sold to Hitachi for £696 million.

2012-2015 Wylfa A reactors 1&2 are permanently shut down.

2014 Welsh delegates from CND Cymru, PAWB, Greenpeace and Cymdeithas yr Iaith join Green Cross International mission to Fukushima.

2015 The Office for Nuclear Regulation orders Hitachi to address a 'serious regulatory shortfall' on their plans for Wylfa B.

2015 Naoto Kan, Japan's formerly pro-nuclear PM at the time of the Fukushima disaster, addresses anti-nuclear meetings at Cardiff, Wylfa and Llanfairpwll.

2016 Hitachi Nuclear Energy Europe is formed, a joint venture with Bechtel and JGC Corporation.

2016 Hiroaki Nakanishi, chair of Hitachi, warns that his company might pull out of Wylfa B unless it receives a viable government subsidy.

2016 PM Theresa May halts and then approves Hinkley C, by this point widely regarded as one the most expensive white elephants in UK history.

2017 Concern as UK intends to withdraw from Euratom as part of the Brexit process.

The new nuclear programme

• *Is a new nuclear age about to happen?*

Not really. Ever since the 1950s each new generation of nuclear reactors has been hailed as a cure-all for the problems of the day, such as efficiency, cost, energy security, baseload requirements or low-carbon production. In reality nuclear power just doesn't do many of the jobs it is supposed to. 'Third generation' nuclear technology is already looking old-fashioned and unnecessary.

• *Or is it already on the way out?*

In 2010, just as the UK was gearing itself up for new-build, Germany declared an *Energiewende* (energy transition) which included scrapping nuclear reactors by 2022. In France, the most nuclear-dependent country in the world, the industry is on the verge of bankruptcy. The EPR pressurised water reactors being built in Finland, France and China are running extremely late, amidst huge design and technological problems, legal disputes and massive cost over-runs. In 2015 Newport Labour MP Paul Flynn called new nuclear 'a financial basket case'. He wasn't wrong.

• *How much new-build is proposed?*

In 2010 the government declared the need for 10 new nuclear power stations. This list was later reduced to eight sites:

Hinkley Point, Wylfa, Oldbury, Sizewell, Sellafield (Moorside), Hartlepool, Heysham and Bradwell. How many of these really will happen? Nobody knows. Including the government. It's worth remembering that in 1980 Margaret Thatcher wanted 10 new nuclear power stations to be built; since then only one, Sizewell B, has been built in the UK.

• *Who's in charge – Westminster?*

Nuclear policy is decided by the UK government. Until July 2016 it was the remit of the Department of Energy and Climate and Change, but that has now been taken over by a Department for Business, Energy and Industry. Nuclear policy is discussed by various parliamentary committees, including Welsh Affairs. >> *write to your MP!*

• *What about devolution?*

In Scotland devolved planning powers have made it possible for the SNP government to block nuclear new-build. No nuclear new-build is planned for Northern Ireland. However in Wales the size of the proposed new reactors at Wylfa and their planning regime are not devolved issues. Interestingly, nuclear waste is a devolved issue in Wales – but the Welsh Government is slavishly following Westminster's policy of planning to store radioactive waste in underground tunnels. >> *write to your AM!*

What are nuclear power stations?

Very complicated – and potentially dangerous – kettles. Most thermal power stations use heat to make steam. The steam drives the turbines which generate the electricity. The heat may be provided by fossil fuels such as coal, gas or oil, or by nuclear fuels such as uranium-238, a radioactive isotope. The uranium atoms

are split in a process called fission, which releases energy in the form of heat. This nuclear reaction takes place inside the reactor core, where – in theory – it can be controlled. The building surrounding the reactor must provide strong containment to shield the reactors and prevent radioactive emissions into the atmosphere.

The perils of planning

• *More haste, less speed?*

Frustrated by the delays created by a site-by-site planning approach, the Blair government decided to have one planning system for each type of new reactor. This is called a Generic Design Assessment (GDA). The keystone of the National Infrastructure Planning system is a National Policy Statement (NPS). By issuing an NPS the 'need' for nuclear new-build, essentially a political decision by a government, becomes a legal imperative that overrides most environmental and other concerns, even if its original assumptions no longer apply.

• *Who are the regulators?*

In order to get the go-ahead for new-build, a developing company in the UK has to satisfy various bodies such as the National Infrastructure Planning (NIP) inspectorate; the Office for Nuclear Regulation or ONR (regarding safety and reactor design); the relevant authority for environmental impact (in the case of Wylfa, National Resources Wales); the National Grid, and the Nuclear Decommissioning Authority (NDA). Doors revolve. Inevitably, regulatory staff include many former nuclear company employees. These may well carry out their public duties responsibly, but critics point out that whilst independent on paper, they belong to a pro-nuclear culture.

• *Does the planning system work?*

Well it does for the government and for the companies, but as far as the public goes it's a democratic by-pass. Site-specific planning seems expressly designed to be user-unfriendly. It is freely admitted that the priority is speeding up the planning process. It aims to avoid challenges and to manipulate public consent. In Llangefni in

2016 the National Infrastructure Planning officers admitted that of the last 60 projects submitted by them to public consultation, only one had been rejected.

• *Is community consultation a sham?*

Any company developing a site has to hold 'stakeholder' meetings and engage with the local community. In practice, consultation is largely a public relations exercise, designed to tick boxes. On Anglesey, Horizon Nuclear's corporate 'roadshows' have been slick, but filled with corporate flannel and sparsely attended.

Communities feel manipulated. For example, private nuclear companies are often allowed to trespass into the public domain, using their corporate power to access the education system, without parental or voter consent.

• *Will Brexit affect nuclear regulation?*

Yes. If the UK leaves the EU, it will also have to quit Euratom, the European regulatory umbrella which has extensive duties of oversight, monitoring standards, staff competence and equipment. The ONR would need reorganising and perhaps the International Atomic Energy Agency (IAEA) would need to step in. The changes could delay nuclear development in the UK, resulting in increased costs.



Wales and Hinkley C



• **Love thy neighbour?**

Nuclear fallout does not recognise borders – the effects of the 1986 Chernobyl disaster on North Wales proved that. As the front-runner in UK nuclear new-build, Hinkley C is of immediate concern to Wales. It is just 22 km across the Bristol Channel from the South Wales coast. The progress of the Hinkley C project has been a roller-coaster ride of stops and starts, plus legal challenges from Austria, Germany and Ireland. The estimated cost of the project was originally £6 billion. By the summer of 2016, this had risen to £37 billion.

The UK government had guaranteed the French developer EDF an eye-watering ‘strike price’ (fixed price) of £92.50 per megawatt hour – double the current wholesale price (and index-linked to be inflation-proof) – for the first 35 years of electricity generation. With EDF in severe financial difficulties, the Chinese government stepped in to put up one-third of the money. PM Theresa May halted the programme in August 2016 then restarted it in September 2016. The decision was widely criticised as a risk to national security and as an expensive white elephant.

The proposal is for a 3,299 MW power station with two nuclear reactors of the EPR design, which has already had a troubled construction history:

	Construction started	Original planned finish date	Current (2017) planned finish date	Original budget (billion euros)	Current (2017) cost (billion euros)
Olkiluoto 3, Finland	2005	2009	2018	3.7	8
Flamanville 3, France	2007	2012	2018	3.3	10.5
Taishan 1 & 2, China	2009	2013	2017	8	unknown

Nuclear power in Wales

• **What is proposed for Wales?**

Wylfa A was the site of two Magnox reactors, the last of which closed for decommissioning in December 2015. Wylfa B is currently no.2 in the UK new-build programme, and the only site in Wales. It is to be built on a greenfield site next to the old Magnox site, 11 times the area of Wylfa A. Bizarrely the Welsh government maintains that this is not a new development, but a continuation, despite the fact that Horizon have re-named Wylfa B 'Wylfa Newydd' (new Wylfa).

• **Where is Wylfa?**

Wylfa Head is on the northernmost coast of Wales, on the Isle of Anglesey. The huge new site borders the old site and the village of Cemaes. This area of the island, skirted by the Coastal Path, is very beautiful and is of great geological, historical, cultural and environmental importance.

• **Do we actually need new nukes in Wales?**

No. In 2007 Rhodri Morgan, Labour First Minister of Wales, made it clear that Wales had no need for any new nuclear power stations. That is still true today. Energy consumption has been falling in the last decade and Wales is energy-sufficient, with huge renewable energy potential. First Minister Carwyn Jones, elected in 2009, changed Welsh Labour government policy to one of strong support for a Wylfa B, not on grounds of need, but on a hyped prospectus of job creation. Job creation was also the justification for the Isle of Anglesey County Council's enthusiastic support for a Wylfa B.

• **So which reactors would we have?**

Two GE-Hitachi UK ABWRs (Advanced



Boiling Water Reactors). Together they can generate 2,700 MW and have a supposed lifetime of 60 years. ABWRs are also proposed for the Oldbury site in England. The current estimated cost is £14 billion, but nuclear costs tend to escalate rapidly.

• **Are they any good?**

The record of existing ABWRs is not impressive. Japan has four ABWRs, all of which have produced less than 50 percent of the energy they were supposed to. None is operational at the start of 2017. Taiwan has two under construction, but both are behind schedule and over budget, with public concern over safety. Two have been licensed for the USA, but never built. Plaid Cymru peer Lord Wigley, writing in the Daily Post, has described this as 'tried and tested' technology'. Well, at least he didn't say it was successful...

The Generic Design Assessment (GDA) consent for Wylfa B began in January 2013. Progress has not been smooth. In 2015 the ONR spoke of 'a serious regulatory shortfall'. The GDA process is not now expected to be completed until December 2017.

• **What's the biggest problem?**

ABWRs use high burn-up nuclear fuel. This leaves less volume of waste, but the waste it does produce is about twice as radioactive as that produced by Wylfa A. The old waste could be removed to Sellafield after use, but the Wylfa B waste must remain stored on site for perhaps 150 years. Until then it is simply too hot to handle.

Horizon, Hitachi, Bechtel and us

• *Which companies are in on the deal?*

Horizon Nuclear was founded in 2009 by two companies under German ownership, E.ON and RWE npower. In 2012 both these companies pulled out of nuclear. Russian and Chinese bids were considered but in the end Horizon was sold to Japanese mega-corporation Hitachi.

In 2016 Hitachi put together a construction consortium that included Bechtel (the USA's

'mismanagement' by a US government audit in 2006. In 2014 Bechtel became the UK government's preferred bidder for the procurement of military equipment for the RAF and the Royal Navy. In 2016 the US Energy Department identified over 500 faults in their cleaning up operations at the Hanford nuclear plant in Washington State.

• *Who pays for new nuclear, them or us?*

Post-Thatcher, the guiding principle of all the pro-nuclear UK political parties was that the private sector would have to 'stand on its own two feet' and bear all the costs. Anti-nuclear campaigners warned that they would not be able to do this, and it soon became clear that this was the case. Nuclear would have to be subsidised.

• *So is nuclear subsidised?*

No – that is, yes. The s-word was avoided at first, but

largest construction and civil engineering group) and the Japanese JGC Corporation. Hitachi and friends are builders. It seems likely that Hitachi will sell on the operation once the reactors are up and running. Horizon as a Hitachi subsidiary has no operating experience. So who would actually operate Wylfa B once it was built? The answer is as yet unknown.

• *So, remind us again, who are these guys?*

The choice of Bechtel as partners raised some eyebrows. Bechtel's history goes back to the Manhattan Project which developed the first atomic bombs; to nuclear testing in the Nevada desert; to civil nuclear and radioactive waste disposal and oil pipeline construction.

Bechtel became notorious during the Iraq War, in which they were accused of

effective subsidies included the government promising to carry liabilities in the case of an accident, fixing a generous strike price and bailing out decommissioning costs. By early 2017 the UK government was considering the option of direct subsidies. As ever, the public covers the cost, while a favoured private company skims off the profits. Watch this space.

• *Is Wylfa B a done deal?*

Not at all. As recently as January 2016 Hiroaki Nakanishi, chair of Hitachi, warned that his company might still pull out of Wylfa B if the money wasn't right. As of 2017 the nuclear industry around the world is looking sick, the global economy is unpredictable, the post-Brexit British economy is an unknown, geopolitical tensions are running high. Place your bets.



Radioactive waste - from here to eternity

• **What happens to it at the moment?**

Legacy radioactive waste from Wylfa A as it is decommissioned is taken by road to the Valley railhead, enclosed in large white containers called 'flasks'. There it is loaded on to the trains of Direct Rail Services (DRS), which are operated by the Nuclear Decommissioning Authority (NDA). It is transported across Anglesey and along the North Wales coast line, passing through busy towns on its way to Sellafield in Cumbria. DRS trains have derailed in the past, and in some flasks, radioactivity has been known to migrate (or 'sweat') to the external surface.

• **How much on-site and for how long?**

The new highly radioactive waste from the proposed ABWRs would have to be stored on-site for well over a century. At an environmental consultation in 2017 one ONR official said the proposed capacity for on-site storage of nuclear waste could not yet be confirmed. So we all are dancing in the dark.

• **What's the long-term disposal solution?**

There is no satisfactory solution. That really is the fatal flaw in all nuclear planning. After on-site storage at Wylfa for many generations, the proposed next step is deep storage in underground tunnels (geological depositories), but as yet none exist in the UK and no sites have been agreed. The body which advises the government on these issues is the Committee on Radioactive Waste Management (CORWM). Those who say, 'We want Wylfa B but we don't want a long-term depository in Wales' are entering an ethical minefield – letting

someone else's grandchildren bear the consequences of their actions.

• **How long is long-term?**

We're talking about 10,000 years or more here – the sort of period between now and the Stone Age. Nuclear scientists may be very good on questions of technology, but seem unable to stand back to gain an historical perspective. Over ten millennia, patterns of technology, civilization, climate change, economics, government, warfare may change utterly. Given that radioactivity was only discovered 120 years ago, to believe that current solutions will isolate radioactivity and can be maintained over that period is both arrogant and a dangerous gamble.

• **Is there such a thing as a safe level of radiation?**

Of course we all receive ionising radiation daily from the natural environment, and may voluntarily expose ourselves to radiation for medical purposes. But according to the US National Academy of Sciences, no dose of radiation can be considered 'safe'. Radiation has a cumulative effect, heightening risk of cancers.

• **Does the science stack up?**

Nuclear industry standards of what can be considered a 'safe' dose are still largely based on data about the effects of external exposure caused by nuclear weapons.

They tend to underestimate the danger from internal radiation, when very small doses of contaminated particles enter the body by swallowing, inhalation or absorption through the skin and then irradiate the body from inside. These may affect thyroid, liver, bone and brain.



The damage done

• *What are the medical risks from nukes?*

Reports of an increase in childhood leukemias near nuclear plants in the UK In the 1980s were dismissed by COMARE (the governmental Committee on the Medical Aspects of Radiation in the Environment) as probably being unconnected to exposure, because of the 'low levels' of radiation involved. However...

• *What was the Kikk report?*

An extensive study commissioned by the German Government in 2003, the so-called Kikk report, concluded that there was a significant increase in the number of solid cancers and leukemia in children under 5 years old living within 5 km of German nuclear power plants. Its findings were accepted by the German government. Later reports from England and France also found increases, but this research was less extensive.

• *What's the form – did Wylfa A have a good safety record?*

It won shiny awards, but the truth was rather different. In 1993 a steel crane grab fell into the Magnox reactor and blocked a fuel channel. The reactor was not shut down for 9 hours. Operators Nuclear Electric were later fined £250,000 for their carelessness, with £138,000 costs.

• *How likely is another nuclear disaster?*

Many forms of power production involve a risk to human life. In Wales, terrible coalmining accidents are a tragic part of our history. Nuclear power can seem pretty safe, but when it goes

wrong, the implications may be catastrophic, global and long-term. Major disasters worldwide seem to occur on average about once every 12 years.

• *Why do nuclear disasters happen?*

Even a simple problem such as a leaking gutter can set off a chain of problems if unchecked. Human error is always possible and political or economic pressures may lead to corners being cut, lax inspection regimes or cover-ups.

• *Could a serious disaster happen here?*

Extreme natural disasters such as earthquakes, tsunamis, storms or floods may overwhelm systems, but as at Fukushima these may exacerbate an existing organisational problem that could have been foreseen. North Wales might not be able to match the seismic magnitudes of Japan, but it did experience Britain's biggest recorded earthquake (5.4 on the Richter scale, 1984). The Wylfa coast has experienced some historically severe storms.

• *What are the external security threats?*

Terrorism is a threat to nuclear power

stations, and today drone technology presents an airborne threat. Mona airfield and RAF Valley with its fighter jet training programme are a matter of seconds away should a trainee fighter pilot wish to crash into a power station. A major threat these days is cyberterrorism or cyberwarfare by a hostile power, such as the Stuxnet virus attack on Iran's nuclear centrifuges by the USA and Israel.



Nuclear aftermath

• *How big are the emergency zones?*

Current emergency procedures relate to the Magnox reactors of Wylfa A. An immediate emergency zone of 2.5km exists around the site, including the villages of Cemaes and Tregale. Before 2016 it was even tinier, just 1.6 km. Since decommissioning began, iodine tablets are no longer issued to local residents. The US equivalent is 16km. After the Fukushima accident, the initial evacuation zone was 20 km, which was then enlarged.

• *Are we prepared?*

County councils and police are responsible for emergency procedures and drills. It must be said that during the lifetime of Wylfa A most of the public had little clue about what they should do in a nuclear emergency and calls to North Wales



Police or council offices were not that helpful. See <http://stop-wylfa.org/wp/wp-content/uploads/2013/09/Wylfa-Off-site-Plan-June-2013.pdf>

• *How could the island be evacuated?*

In 2014 Horizon declared: 'It is almost impossible to see a scenario in which the island would be evacuated'. Maybe they should try harder and

consider the situation at Fukushima. The traffic bottlenecks at the island's bridges would be a sight to behold. Would people even be allowed to leave the island?

• *How large an area might be affected?*

The area immediately affected by a disaster at Wylfa B could range over a 20 to 50 km radius, taking in much of Anglesey, Gwynedd and Conwy County. In addition to radiation risk, the Fukushima experience suggests an increase in depression and

suicides amongst the displaced population would be likely. A radioactive explosion at the plant could affect North Wales, Chester, Liverpool, Manchester, Cumbria or Dublin, depending on wind direction. The Irish Sea, shallow and fairly contained, has been notorious for industrial and radioactive contamination for many years.



Impact on land and lives

• *How would Wylfa B affect northern Anglesey?*

Drilling took place in 2016 to assess Porth y Pistyll, where Horizon intends to construct a seawater coolant intake for Wylfa B, and a wharf where ships can unload building materials or reactor components made in Japan. Much of the new site will be encased in concrete. Anglesey's north coast includes the island's Coastal Path, an Area of Outstanding Natural Beauty, Sites of Special Scientific Interest, the Cemlyn Bay NWWT Nature Reserve, historical gardens and important archaeological sites. Anglesey's complex geology has UNESCO Global Geopark status.

• *What about farming?*

A major disaster at Wylfa B could spell an end to farming in the region, contaminating pasture, milk and crops. Memories of how the Chernobyl catastrophe affected sheep farming in Wales still arouse public concern. In 2011 local farmer Richard Jones of Caerdegeg ordered Horizon off his land, part of which they wanted to purchase. The Jones family had farmed there for centuries, and to many this action came to symbolise the struggle. The family's stand inspired 300 people to march through Llangefni and a supportive visit to the farm by former Japanese PM Naoto Kan.

• *What about tourism?*

Tourism is very important for the economy of northern Anglesey, and this is supported by the County Council with projects such as Amlwch's 'Copper kingdom'.

However the Council has also supported the nuclear proposals, an uneasy mix of priorities. The Cemaes area includes many

guesthouses and hotels which could now find themselves in close proximity to a radioactive dump. That's not good for business.

• *Where would pylons be routed?*

Giant superpylons are proposed to march across the green fields of Anglesey and onwards across Snowdonia. Transmission cables are supposed to pass through a tunnel under the Menai Strait which will cost us a cool £100 million, in this age of supposed austerity. If people don't want the pylons, then they just have to stop Wylfa B.

• *How would Wylfa B affect housing, infrastructure and roads?*

Road alterations are already taking place to the A5025, with compulsory purchase of adjoining land. Big new housing developments are planned at Amlwch and Holyhead, as most new workers will not be local. There is worry about the increased strain that will be placed on NHS services, education and social services.

• *Would Wylfa B impact on Welsh language and culture?*

Anglesey is a stronghold of the Welsh language, spoken by about 57 percent of the island's population. It is the everyday language of the supermarket, the farm, the garage, the chapel. In 2016 Horizon Nuclear asked for language protection measures to be deleted from the Gwynedd and Anglesey Local Development Plan, a move which angered many councillors who had until then supported the nuclear project.

The construction of Wylfa A is believed to have contributed to a local decline in spoken Welsh in the 1960s. Wylfa B is opposed by three Welsh language campaigning groups: Cymdeithas yr Iaith Gymraeg, Dyfodol yr Iaith and Cylch yr Iaith.



Jobs, jobs, jobs

• *How many people live and work on Ynys Môn?*

The estimated population of the island in 2016-2017 is about 70,400. Those in employment number about 31,200. Unemployed are estimated at 1,600.

• *Does Wylfa B offer jobs for local people?*

All sorts of figures have been bandied about in attempts to promote nuclear new-build. It is now claimed that 10,000 people will be needed for construction, and that permanent staff will number about 850. Hooray, local jobs! Well no, not really. In 2016 Horizon said that only 25 percent of construction workers would be recruited in North Wales, and only 45 percent of permanent staff. So have the councils been led by the nose? Horizon say they will take another look at these figures.

• *Would a new nuclear power station benefit the local economy?*

We know the answer to that one already. Construction of Wylfa A began in 1963 and the plant operated until 2015. Despite this, the north of the island has remained one of the poorest regions in Wales.

• *Why do some trade unions support new-build?*

GMB and Unite understandably want to protect their members' jobs in nuclear engineering. But it could be argued that they should be moving forward with the times. Globally, renewable energy sources are surging ahead. The unions should be

securing their position in these new sectors, and smaller firms, as a priority, instead of consolidating power in an industry that is not only on the way out, but diverting investment from the development of incoming renewables. As for using current nuclear skills, it must be remembered that decommissioning Wylfa A will employ similar numbers to the former operational workforce for many years to come.

• *What other job opportunities are out there?*

An island economy centred on one monolithic giant is not a safe bet for job security, especially in these uncertain times. It needs many eggs in smaller baskets. Anglesey is the ideal place not just for renewable energy, but for renewable engineering and for all kinds of other enterprises of various sizes. In 2012 campaign group People Against Wylfa B (PAWB) published Manifesto Môn by Dr Carl Clowes, a blueprint for an alternative economic strategy for the island. Download at <http://stop-wylfa.org/wp/manifesto-for-mon-a-realistic-solution-for-job-creation/>. It is currently being updated.

• *What is the Energy island programme?*

Ynys Ynni (Energy Island) is a partnership between Anglesey County Council, industry and educational institutions, intended to boost the local economy. Whilst it has been involved in marine energy and offshore wind projects, its critics believe its agenda has largely been hijacked by the nuclear lobby.



Green alternatives

• *Is nuclear power zero-carbon?*

No. Nor are many renewable energy sources either. Nuclear power production is low-carbon, but then the nuclear cycle as a whole has to be factored in. This may include uranium mining (uranium is of course a finite fuel resource), milling the raw material, transportation, component manufacture, construction. The cement industry is a major producer of carbon dioxide and 6.5 percent of CO₂ emissions come from iron and steel production. Decommissioning is another high-carbon process.

• *Is nuclear fusion a worthwhile alternative?*

Nuclear fusion (as opposed to fission) power, replicating the energy release of a star, has long been a holy grail for nuclear physicists. Despite massive research, it has yet to be achieved. Even if that happens, it still leaves radioactive waste, and tritium could be a dangerous environmental pollutant. For more information see <http://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-fusion-power.aspx>

• *Does nuclear help against global warming?*

Yes, up to a point. Does that justify new build? Some environmentalists believe so, some of them claiming that the problems with radioactivity are exaggerated. Others believe in focusing on new renewables, and doing away altogether with a nuclear industry that is unnecessary, toxic and dangerous in so many ways. But then of course the crucial development of renewable energy will be starved of funding because new nukes eat public money. A 2006 study by the International Energy Agency, at the time when new nuclear was being promoted in the UK, found that of

all the likely measures designed to reduce CO₂, increased nuclear power was the least effective. By far the most important measures were making the end-use of fossil fuels and of electricity more efficient.

• *But won't new nuclear fill the gap until renewables are ready?*

That was the idea. But while new nukes such as the EPRs have become bogged down in endless delays, renewables have been streaking ahead, as have energy storage systems.

• *Which renewable energy sources are best for Wales?*

Wales has massive potential for hydro, wave, tidal, offshore and onshore wind. Major projects such as the Swansea Bay tidal lagoon project raise interesting new possibilities. A 2016 poll for the WWF found that nearly two-thirds of people in Wales wanted all of their electricity to come from renewable energy.

• *Can renewables keep the lights on?*

Increasingly, they can. Many politicians still insist that only nuclear can provide 'baseload', the permanent minimum load that is necessary to deliver our needs. However new smart grids are now being designed which can cope effectively with multiple sources and fluctuations in supply. Maintaining baseload is no longer a priority.

• *Keep it smart, keep it local*

Gigantic power plants are increasingly looking like dinosaurs. Smart technology now means that windows and even roads can generate their own electricity. Long transmission lines between generation and consumption waste energy all the way, so a localised energy policy based on insulation and conservation, on home and community, is making more and more sense. Community Energy Wales and ventures such as Ynni Ogwen in Bethesda are already getting there.

Decommissioning

• *How many sites are being decommissioned in Wales?*

Two, under the National Decommissioning Authority. The first is Trawsfynydd in Meirionnydd. Construction began there in 1959 and its two Magnox reactors went into action in 1965. Trawsfynydd was unusual in that its water supply was the lake rather than the sea. There was public concern locally that the enclosed geography of the lake made it more likely to be contaminated (as radioactive particles couldn't "escape" to the sea). Radioactive waste was transported to Sellafield via the Bala to Blaenau Ffestiniog light railway.

• *Is Trawsfynydd finally clear?*

No way. Trawsfynydd was shut down in 1991 and decommissioning started in 1995. Twenty years later it was announced that no nuclear hazards remained on site and that the emergency zone would be lifted. The site will be kept protected (in 'safe enclosure') while radioactivity levels gradually drop over many decades.

• *How long will it take to clean up Wylfa A?*

The same process will be used to decommission Wylfa A's twin Magnox reactors, shut down in 2012 and 2015. This job too will take nearly a century. It will provide employment for many years to come.

Trawsfynydd and the SMR

SMR stands for Small Modular Reactor.

SMRs are small (well, not that small) compact nuclear reactors (300 Mw or less) which can be factory produced and transported onto site.

Just as you thought it was safe to get back in the water at Llyn Trawsfynydd, nuclear lobbyists and local politicians are saying, 'Let's put some SMRs into the old Trawsfynydd site'. Yet again they are promoting a questionable jobs agenda claiming 300 new jobs on site and 300 subsidiary.

This, in 2017, seems like a last throw of the dice by an increasingly desperate nuclear lobby. SMRs have been around for some time and got nowhere.

They still produce radioactive waste, they are extremely expensive, they proliferate nuclear materials which are a security risk. Let's not go down that route in the mountains and lakes of Snowdonia.



Military links

• *Why does CND Cymru oppose civil nuclear power?*

The chain reaction inside a nuclear reactor core produces plutonium, which can be separated out by reprocessing the spent fuel to make weapons of mass destruction. The UK government's Atoms for Peace project in the 1950s was actually a secret plan to produce plutonium for the first nuclear bombs. It has now been confirmed that both Trawsfynydd and Wylfa A were also used for this purpose. From the start, military and 'civil' nuclear power were two sides of the same coin.

• *Are UK power stations currently producing material for nuclear warheads?*

No, because the UK already has large stockpiles of fissile materials, military plutonium and highly enriched uranium. These are more than sufficient for its military programmes.

• *So what's the problem?*

Internationally, the problem of cross-over from civil to military use is still a pressing problem. The spreading of nuclear weapons is supposed to be checked by the Nuclear Non-Proliferation Treaty (NPT), as enforced by the International Atomic Energy Authority (IAEA). However some nuclear powers, such as Israel, India, Pakistan and North Korea, are not signed up to the NPT. Inspecting countries in order to detect illegal nuclear weapon enrichment programmes can be difficult and dangerous, especially if countries have supposedly 'civil' nuclear enrichment programmes. Lax procedures at nuclear power stations mean that nuclear materials often simply 'go

missing', potentially a gift to terrorist groups wishing to create a 'dirty bomb'.

• *What are DU weapons?*

Depleted uranium (DU) is a by-product of the uranium enrichment process. It is a dense metal used to make shells, bullets and armour plating. DU is toxic and radioactive, and has resulted in horrific birth defects in former battle zones of the Iraq War.

• *Is new-nuclear aimed at maintaining a nuclear skills base?*

Nuclear reactors are also found in nuclear powered submarines, research institutions and so on. Some people say that the illogical drive for new nuclear power stations is driven by a desire to maintain a large nuclear-savvy workforce for military security. The truth is that neither civil nor military nuclear make the world a safer place.

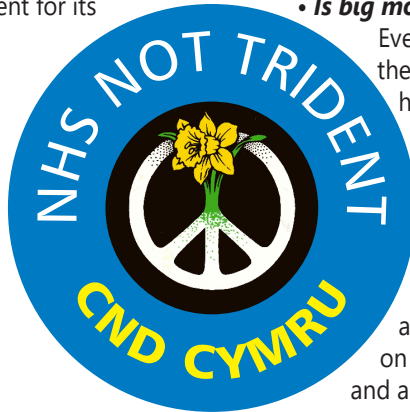
• *Is big money driving policy?*

Ever since World War II the big nuclear companies have been part of what US President Dwight D Eisenhower called, in 1961, the 'military-industrial complex'.

This transnational corporate alliance acts as a huge lobbying force on governments in the USA and around the world, with

vast resources at its disposal. It is a Goliath to any David.

Luckily there are many people in Wales, in CND and other peace groups and environmental groups, who together are capable of creating their own kind of chain reaction. Technology is moving on, and in both military and civil applications, the nuclear Goliath is on its last legs. We'll be there when it topples.



Contacts

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SOUTH WALES ANTI-NUCLEAR ALLIANCE:
 Facebook.com/groups/174867159196083/

LOW-LEVEL RADIATION CAMPAIGN:
 Web www.llrc.org

STOP HINKLEY:
 Web www.stophinkley.org
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www.nuclearsevernside.co.uk

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CND Cymru works to rid Britain and the world of all weapons of mass destruction; for peace and human and environmental justice.

Pictures:

Page 4: Japanese anti-nuclear campaigner and Buddhist monk Rev. Gyoro Nagase visits Wylfa in 2016. **Page 5:** South Wales joins the campaign against Hinkley C. **Page 6:** Veteran campaigner Donald Saunders, Conwy County Peace Group. **Page 8:** Protest camp at Wylfa, 2015. **Page 10:** PAWB members demonstrate on the Menai Bridge. **Page 11:** Llangefni rally for the Caerdegog family. **Page 14:** Trawsfynydd nuclear site.