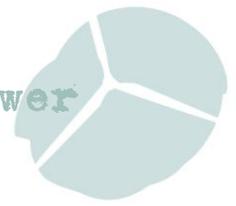


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1. Hinkley Point C - Mothballed and in its Death Throes

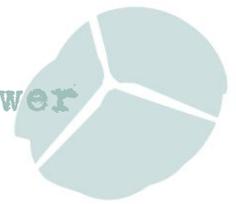
More delays are being predicted for the Hinkley Point C nuclear project - originally expected to be generating electricity by Christmas 2017. As revelations emerge that the site has been effectively mothballed since 1st July this year, the Stop Hinkley Campaign is calling for the project to be cancelled now, rather than waiting for its slow death.

Hinkley C is now delayed by more than five years, and will probably be delayed further, according to Alan Whitehead MP – it probably won't produce power until 2025. The Government wants 35% of our electricity to be supplied from nuclear by 2028, so all the other sites will have to be magically, completed by then. *“Not a snowballs chance in hell that all this will happen”*, he says. Instead of a complete nuclear programme by 2025, the likelihood is that there will be one plant and maybe not even that operational at that point. Time, you might think, for a plan B. What about filling in now almost certain low carbon generation gap, at the very least, with much more easily deployable, speedily buildable, better financeable, lower subsidisable real renewables? Oh, we've just taken most of those programmes out and shot them. Bit of a mess then, really. (1)

As recently as three weeks ago the media was predicting that David Cameron and China's president, Xi Jinping, would sign a deal at a meeting in the UK in October which would signify that a Final Investment Decision on Hinkley Point C had been made. The Chinese are expected to fund two thirds of the scheme. (2)

In those three weeks there has been a chorus of voices calling for Hinkley C to be cancelled, or at least re-examined. (3) Paul Massara, Chief Executive of RWE nPower said nuclear was *“an expensive mistake”*. (4) A Daily Telegraph Editorial said *“there is a risk of being lumbered with a white elephant under current plans. Amber Rudd, the energy secretary, needs to reassess them before committing taxpayers to what may be an unsustainable project at Hinkley Point.”* (5) Peter Atherton of Jefferies Investment Bank calculated that we could build around 15 gas-fired power stations replacing the whole thermal generation fleet for the same price. (6) HSBC Energy Analysts said Hinkley is becoming harder to justify and there is ample reason to cancel the project. And the Chancellor's father-in-law former Conservative Energy Secretary Lord Howell of Guildford described Hinkley as *“one of the worst deals ever for British households and British industry”*. He told the House of Lords that while he was personally *“very pro-nuclear”*, he would *“shed no tears”* if the *“elephantine”* scheme was to be abandoned *“in favour of smaller and possibly cheaper nuclear plants a bit later on”*.(7)

Perhaps all of this had something to do with Amber Rudd launching a project to examine the actual cost of electricity generation - including not just the cost of constructing offshore wind farms, for instance, but also of connecting them to the national grid. It will also examine nuclear power and conventional energy. The study is being conducted by Frontier Economics, the consultancy chaired by former Cabinet Secretary Lord O'Donnell. (8) Although this might also have more to do with the Tories ongoing attack on renewables. One source told the Daily Mail:



“We might conclude we need less renewable energy than we thought because there are other ways of doing it cheaper – by using technology to reduce consumer demand, for instance”. (9)

Now the Construction Products Association (CPA) is predicting that the start of the main works on the nuclear site will be delayed until 2018. (10)

Two very recent articles in Click Green and Professional Engineer indicate that Hinkley Point C is now officially mothballed. Indeed the project seems to be in its death throes.

We already knew that site preparation work at Hinkley Point C was stopped in April 2015, up to 400 construction workers were laid off, and the Final Investment Decision was delayed until the autumn. (11) What wasn't clear at the time was that NNB Genco – the consortium planning to build the reactors which consists of EDF Energy, China General Nuclear Corp and other investors - put a cap on future spending on the project. (12)

On 1st July the site entered Care and Maintenance which means that activity at the site is limited to the management of material stockpiles and water management zones, remediation of asbestos contaminated land and archaeological surveys. (13)

The budget cap seems to have been more severe than the Office for Nuclear Regulation (ONR) was expecting. ONR, of course, charges NNB Genco for all the work it carries out to regulate its activities.

ONR says it has taken the decision to suspend the production of future inspection reports until a Final Investment Decision is made. It has also suspended attendance at the local liaison committee – the Community Forum. These suspensions are most likely because NNB Genco no longer has the budget to pay for them, so the consortium will have asked ONR to stop visiting the site to do inspections and stop attending the forum because it can't afford to pay.

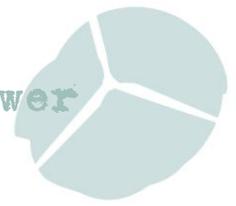
In retaliation ONR says it is *“monitoring the impact of the budget constraint upon NNB Genco's competency and capability”*. In other words NNB Genco had better watch out or it will lose its status as an organisation competent and capable of holding a nuclear license.

ONR says its inspectors *“continue to engage with the programme of design and safety case activities”* related to the start of nuclear safety related construction. Its August newsletter said that further submissions are expected in September this year and the Pre Construction Safety Case related to nuclear island construction was ready for ONR to begin initial engagement at the end of July this year. (14)

So while some desk work appears to be continuing all major work on-site appears to have stopped and NNB Genco is so uncertain that the final investment decision will be positive it has asked ONR to stop as much work as possible to save money – even to the point of threatening its own status as a nuclear capable organisation. The Click Green website says:

“Despite recently publishing a list of preferred suppliers for the £24 billion project, the French firm were in behind-the-scenes talks with the Office for Nuclear Regulation (ONR), during which they informed them of their decision to mothball the site.”

It looks as though it may be all over for Hinkley Point C bar the shouting.



Stop Hinkley Spokesperson Roy Pumfrey said:

“With the Chinese stock market in turmoil it is hardly surprising that the construction industry is predicting yet more delays to this £24.5 billion project. But we think the CPA is being overly optimistic. By 2018 the renewable industry will have had another 2 or 3 years of falling costs and innovation, whereas nuclear costs just keep rising and technical problems mount up. Somerset should kick EDF out now so that we can get on with building the sustainable industries we need to tackle climate change, capture the jobs required and transform our energy and transport system into one over which communities have more control.”

The Western Daily Press (26th August) gave an alternative view. It said EDF Energy played down the ONR's decision to suspend work on future inspection reports. And they reported some analysts who felt the Chinese financial turmoil would actually make an investment in Hinkley more likely. The newspaper reports that the Final Investment Decision is likely to be made in Paris after the August holidays are over, and then an announcement will be made during Chinese President, Xi Jinping, visit in October. The announcement could even see the President visit Hinkley.

The Ecologist reports that there has probably been some heavy EDF spinning in recent weeks in response to the negative coverage about the HSBC report and other bad news afflicting the Hinkley C project. As part of its media offensive, EDF has also put the word out that it is placing £1.3 billion in contracts to the mainly UK based contractors, and that a deal with China should be finalised within weeks.

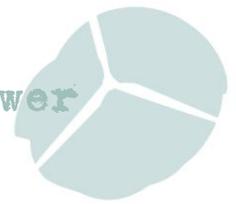
So what's the real situation? For a start, says *The Ecologist*, it would be extremely unwise for the UK to commit any serious money to the Hinkley C project until there is a single example of a working reactor of the EPR design and legal challenges in the European Court have been safely dealt with. So until both of those major obstructions are out of the way, it's hard to imagine any meaningful deal being signed.

Now maybe the government itself has turned against the project altogether. The mood in government is increasingly towards bypassing the Hinkley C project and its failed EPR design altogether, and going straight for the more affordable AP1000 design (which has problems of its own). And EDF is desperately fighting back.

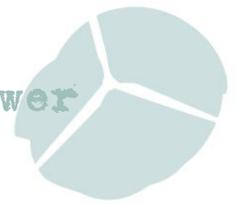
The Ecologist concludes very possibly David Cameron and Xi Jinping will sign a piece of paper in October, but will Hinkley C ever be built? The smart money says no. (15)

The Western Morning News said there's a big elephant in the room – Hinkley Point C - and some say the big creature in the room is actually a vast, unaffordable white elephant. When it comes to something as vast and vital as future energy generation, we can't have any elephants stalking around the room. (16)

Meanwhile EDF-Areva has confirmed that it will bear the cost of any over runs associated with the Hinkley Point C nuclear power project. After Olkiluoto, Flamanville and Taishan this represents a big risk for the newly merged French state-owned company as all three of those projects have experienced costly delays. (17)



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2. Guardian 4th August 2015 <http://www.theguardian.com/environment/2015/aug/04/deal-to-build-uk-nuclear-plant-should-be-finalised-within-weeks>
3. See Stop Hinkley Press Release 13th August 2015 <http://www.stophinkley.org/PressReleases/pr150813.pdf>
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8. H&V News 24th Aug 2015 <http://www.hvnplus.co.uk/news/government-to-calculate-cost-of-generating-electricity/8687992.article>
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10. Construction Products Association Press Release 24th August 2015 <http://www.constructionproducts.org.uk/news/press-releases/display/view/cpa-forecasts-strong-growth-for-construction-despite-public/>
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12. Click Green 20th Aug 2015 <http://www.clickgreen.org.uk/news/national-news/126381-exclusive-edf-mothballs-planned-hinkley-c-nuclear-power-site.html>
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2. National Policy Statement on Energy should be reviewed

There was no proper assessment of whether new infrastructure was required before Hinkley C was approved, according to a document called 'Nuclear Power: New Evidence' which Together Against Sizewell C (TASC) has sent to Secretary of State for Energy and Climate Change, Amber Rudd. Nor was there an assessment of the potential for energy efficiency and energy saving which the government itself says is the cheapest and most cost effective way of delivering its energy policy objectives.

The Government has repeatedly claimed that electricity demand is likely to double by 2050 thus requiring new nuclear power stations. But these claims are not borne out by the latest information from DECC. The pathways evidence on the DECC website in 2014 shows circumstances have changed radically since 2010. In fact the four latest government scenarios show increases in demand of only 29.6 to 52.9%.

TASC has drawn up eight pathways, using DECC's model, all of which are cheaper than the cheapest of the four Government scenarios. The total savings to the UK economy could be very large indeed. A non-nuclear, more demand-side-led energy policy would save money and more successfully achieve other government energy policy objective. In fact new nuclear power stations will hamper the achievement of government energy policy objectives.

TASC argues that Secretary of State is under a legal duty pursuant to section 6 of the Planning Act 2008 to review those parts of the Overarching National Policy Statement for Energy (EN-1) presented to Parliament 'for approval' in June 2011 that relate to 'the role of nuclear electricity generation'.

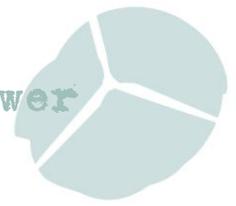
Since EN-1 was first published there have been significant changes in the circumstances the need for new nuclear power stations was based on; and on future increases in electricity demand.

For instance para 3.3.14 of EN-1 explains that 'electricity generation may need to more than double' by 2050 and so '*the government therefore anticipates a substantial amount of new generation will be required.*' Hence the need for new nuclear power stations. In 2010 the Government explained that while it might be possible to meet carbon reduction targets without nuclear, it was not desirable. But since then circumstances have significantly changed.

Using DECC's 2014 pathways, rather than the 2010 figures used by DECC it is possible to show that pathways which rely more heavily on demand-side measures do not need nuclear power stations to meet carbon targets. These 'demand-side-led' pathways, which are all non-nuclear, *more successfully* achieve government policy objectives than all the government pathways, all of which involved more nuclear power stations.

These government policy objectives include:

(a) reducing demand for oil and gas imports specifically (as distinct from fossil fuels overall);



(b) reducing demand for electricity;

(c) diversity of energy supply;

(d) the issue of 'balancing' – i.e. ensuring that there are sufficient energy supplies (particularly electricity) at times of peak demand and cold windless weather; and

(e) the issue of urgency.

TASC's eight pathways all:

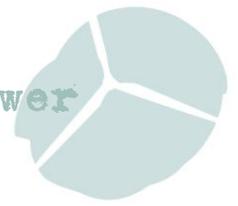
- Set home insulation at level 4 – meaning that 24 million homes will be properly insulated by 2050. Three government pathways, including the Government's most cost effective option, leave 6 million homes uninsulated and leaking heat and so with higher fuel bills.
- Set 'average temperature of homes' at level 4, which means that it will drop slightly. However, it is emphasized that this does NOT mean that people are expected to be colder. It is the **average** of the **premises** that will drop NOT that of rooms being used. This can be achieved by timers and sensors: meaning that people will still be warm and comfortable but use less energy and so have lower bills.
- Make greater use of solar power in buildings than all of the government pathways – again reducing fuel bills.
- Make considerable efforts to reduce fuel use and emissions from aviation and shipping. But we emphasise this is to be achieved by more efficient technology – NOT by any prohibition from going on holiday.
- NONE of the pathways involve any further nuclear power stations.

Non-nuclear pathways rely on less imported energy, often from what the Prime Minister himself has called 'dangerous parts of the world' than the government's proposed pathways which include nuclear power. Non-nuclear pathways achieve a greater diversity of energy supply than the government's proposed pathways involving a nuclear component. Non-nuclear pathways more successfully balance supply and demand of electricity at peak times and in cold, windless weather than the government's proposed pathways involving a nuclear component,

In short non-nuclear pathways ensure warmer homes at less cost. They will rely on less fossil fuels than the nuclear pathways and provide a cleaner atmosphere.

Nuclear Power: New Evidence, Together Against Sizewell C, 2015

<http://www.tasizewellc.org.uk/images/publications/reports/Nuclear-New-Evidence-final.pdf>



3. Alternatives to Hinkley

The Preface to the paperback edition of Keith Barnham's book – 'The Burning Answer' (1) – hails the expansion of offshore wind power installations around the UK. They have been expanding at a rate not far short of that achieved by PV in Germany in the halcyon years of their feed-in tariff. This rapid expansion is typical of small semiconductor devices, like mobile phones, that can be prototyped and mass produced quickly. But offshore wind turbines are massive structures of novel design, installed in a challenging environment. Such a rapid expansion of wind power is an extremely impressive achievement. If this rate of expansion continues, the UK could achieve the level of offshore wind contribution required for an all-renewable electricity supply soon after 2020.

PV installations could also achieve a level commensurate with that needed for an all-renewable UK electricity supply by the same date.

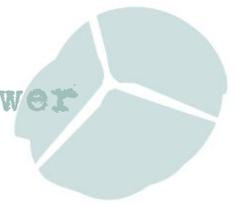
Environmentalist Jonathan Porritt says 'the overwhelming impression I take away from *The Burning Answer* is one of a slowly building but completely unstoppable momentum behind this solar revolution'. These developments contrast dramatically with the lack of progress on new nuclear reactors. The two prototypes for the European Power Reactor (EPR) planned at Hinkley Point are still years away from operating. If offshore wind and PV maintain their current rates of expansion, they will each provide well over 20 times as much power as one EPR before the latter's earliest operation date of 2023.

The Burning Answer shows that renewable alternatives to Hinkley Point C are cheaper, have a lower carbon footprint and can be built much faster. Why the UK government is so obsessed with nuclear power is one of a number of political and scientific mysteries that the book sets out to solve. A tidal lagoon off Hinkley Point could generate more power than the two planned EPRs together, and operate earlier. Its power generation is completely predictable. It would also alleviate flooding on the Somerset levels.

There have been setbacks for the solar revolution in the past year, but for every depressing news story there has been at least one, less well-publicised, success story. The support for wind and solar power is considerably higher than the support for nuclear and more than double the support for fracking.

There has been excellent news on biomethane. The first anaerobic digestion (AD) plant in the UK, which produces biomethane from agricultural and food waste, was connected to the gas grid in 2012. By the end of 2014, twenty-eight plants were in operation and these were capable of injecting enough biomethane to heat 100,000 UK homes. By 2016 there should be sufficient biomethane for companies that provide all-renewable electricity to offer renewable gas as well.

Writing in the Ecologist Barnham says in its haste to get fracking, the Government is neglecting biomethane and other sources of renewable heat. Ground source heat pumps use heat energy from the sun stored a few metres below ground. Air source heat pumps take heat energy from the atmosphere. The latest drilling technology allows boreholes to be sunk vertically and then



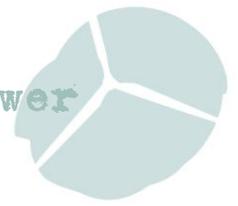
splay out at an angle, much deeper than for ground source systems but a lot shallower than fracking wells to capture geothermal heat. (2)

All three of these alternatives – heat pumps, geothermal energy and biomethane - could expand faster and generate cheaper energy if some of the current massive government subsidies for natural gas (larger than for all the renewables together) were switched to these technologies.

The UK anaerobic digestion industry now delivers an electrical equivalent capacity of 514MW across 411 plants in the farming, waste and water sectors – more than the Wylfa Magnox station. The Anaerobic Digestion and Bioresources Association ADBA says further growth in capacity is being hindered by the government's decisions to remove Levy Exemption Certificates in the summer budget – a cut that ADBA estimates will cost the AD industry £11 million – and to fast-track a four week consultation aimed at removing pre-accreditation from the feed-in tariff (FiT). *“To continue to expand the industry needs viable support in the forthcoming FiT review, and an RHI budget which will support new green gas.”* (3)

The rapid expansion of offshore wind appeared to be continuing after the government granted planning consent for the proposed development of the world's largest offshore wind farm. DECC announced at the beginning of August that approval has been given to the Dogger Bank Teesside A and B Offshore wind project, which is expected to deliver up to 400 offshore wind turbines boasting 2.4GW of clean power capacity. However, as with other offshore wind farms currently in the development pipeline, a degree of uncertainty remains over whether the new facility can secure the level of financial support required to trigger a positive final investment decision. The government recently confirmed it has postponed the next round of auctions for clean energy price support contracts, which were expected to deliver price guarantees to a number offshore wind projects. Ministers said the move was necessary as part of the government's efforts to address concerns the costs associated with renewable energy subsidies could lead to a breach of the UK's clean energy subsidy budget, known as the Levy Control Framework. Industry insiders remain concerned there are insufficient funds currently available in the LCF to ensure the full pipeline of current offshore wind projects is delivered. (4)

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4. ABWRs – one of the least reliable reactors in the world

Introduction – Anglesey: a victim of Abenomics?

Exporting nuclear technology is a key element of Japanese Prime Minister Shinzo Abe's economic strategy - "Abenomics". Nuclear exports are seen as a way to rev up Japan's long-struggling economy, and tackle the persistent trade deficit made worse by the need to import energy – especially Liquid Natural Gas - to replace reactors shutdown after Fukushima.

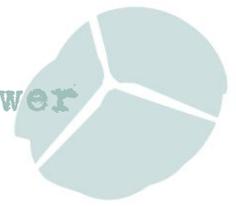
Japan's top three nuclear engineering companies — Hitachi, Mitsubishi Heavy Industries and Toshiba — which had a combined profit in their energy and infrastructure businesses of about 242 billion yen (\$3.14 billion) in the fiscal year 2010/11, were keener than ever to look overseas for business after Fukushima put the domestic nuclear industry on hold. The Japanese government, at least in the immediate aftermath of the Tsunami, made it clear that it would be difficult for new reactors to be built at home, so a gradual phase-out of nuclear power is inevitable, as old reactors are retired. But when former Prime Minister Naoto Kan tried to shut down efforts to continue nuclear exports in July 2011, many within his own party urged him to reconsider. (1)

Hitachi has made no secret of its motive for trying to export reactor technology saying it needed a fresh outlet for reactors after Tokyo shut down Japan's nuclear plants and cancelled plans for twelve new reactors following the Fukushima disaster in 2011. But under Mr Abe's pro-nuclear Government the pressure has been taken off Hitachi at home, and may make it less willing to accept thin pickings in Britain. (2)

However, pro-nuclear commentator Steve Kidd writing in Nuclear Engineering International says:

"...doubts remain about whether the (Japanese nuclear) industry has a future. The Japanese public is now afraid of nuclear power, and the government and regulators have lost their confidence. It will take a long time to restore this and without it there is little prospect of a prosperous future.

There were 54 reactors operating before Fukushima. This number has been reduced to 43 by the demise of the six units at Fukushima Daiichi and five other older units that have commenced decommissioning. Of the 43 remaining, there are some that are very unlikely to restart owing to either serious seismic issues or adverse local public opinion (for example, the four units at Fukushima Daini). However, 24 units have already applied to the new Nuclear Regulatory Agency (NRA) to go through the stages necessary to gain approval for restart. Once this is gained, the reactors have to get the approval of the local prefectural authorities to recommence operation. This second stage may, in fact, be more difficult than the first. Getting local approvals will be challenging for many of the reactors arguably best-placed to come back online. For example, the two advanced boiling water reactors (ABWRs) at Kashiwazaki-Kariwa are newish, large units but suffer from Tepco's very poor public image. Kidd says if more than half of the 43 operable units return to service, it may be regarded as a good result. Some observers doubt that



even this is achievable given the possible barriers. At best, maybe four units will return in calendar year 2015, with a similar rate for the next few years. It may take until the early 2020s before the final unit that can return to service actually does so.

Assuming that the current commitment to providing 20% of Japan's electricity with nuclear remains in place new reactors will also be required. At the moment, only Ohma 1 – an ABWR - is under construction. It should come into service in the early 2020s and will be the first reactor to be 100% fuelled by MOX fuel. The other unit under construction at the time of Fukushima, Shimane 3 (also an ABWR), has been suspended until Shimane 2 achieves the NRA's approval for restart after a 15m high sea wall has been constructed to protect the site. Beyond these two, there are another nine ABWRs planned or proposed, and three Advanced PWRs, but further progress on these is surely dependent on the current reactor restart programme being successful. (3) (4)

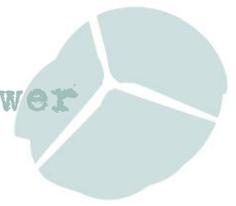
Japan argues that its latest technology includes safeguards not present in the decades-old reactors at the stricken Fukushima Daiichi plant, which continues to leak radiation. Officials argue, their nation has learned valuable lessons — and has a good nuclear track record withstanding most earlier earthquakes. They need foreign buyers so that they can showcase this new technology. Clearly demonstrating that ABWR technology is acceptable abroad will be a key part of the Japanese industry's strategy to regain acceptance at home. It could help improve TEPCO's image and ease the re-start of two ABWRs at Kashiwazaki-Kariwa, and allow the new reactor at Ohma 1 to come on-line, and perhaps eventually allow some of the nine planned or proposed ABWRs to start construction.

In 2013, Abe concluded Japan's first nuclear reactor export agreement with Turkey for \$22 billion and others are pending with Saudi Arabia and the United Arab Emirates, while the prime minister has also lobbied governments in Central Europe, Vietnam and Indonesia. Three major nuclear vendors with significant Japanese stakes have bagged contracts in India estimated at roughly \$60 billion - GE/Hitachi, Westinghouse/Toshiba and Areva/Mitsubishi — and all produce key reactor components in Japan. This is a remarkable turnaround from 2011 when the prospects for post-Fukushima Japan relying on nuclear energy, let alone exporting it, looked unlikely. (5)

ABWRs

According to *World Nuclear News* (WNN) there are four operable Advanced Boiling Water Reactors (ABWR) in Japan while two more are under construction. Another two are being built in Taiwan and two planned for Lithuania, although another two have been shelved in the USA. The design is already licensed in Japan and the USA. WNN points out, disturbingly that ABWRs can run on a full core of mixed oxide (MOX) nuclear fuel, raising the prospect of armed plutonium shipments travelling from Sellafield to Anglesey and Gloucestershire. (6)

New Civil Engineer says the four Japanese ABWRs were built to time and budget. (7) But none of these have a capacity factor above 73% and two have capacity factors of less than 40%. A capacity factor is the amount a plant generates compared to the amount that would be generated if it was operating at full power all of the time. Nuclear power plants are costed on the basis that they will achieve capacity factors of 80 – 90%. With a capacity factor of 45% any nuclear power project comes out needing twice the power price to be an economic proposition.



In fact figures given by the IAEA show that all four reactors had average energy availability factors of less than 50% for the period 2007 to 2011. (8) This makes the ABWR one of the least reliable reactors in the world.

The ABWR at Longmen in Taiwan is still under construction and is over budget and subject to large delays. There are also serious concerns over the safety of the plant both from the risk of earthquakes and Tsunami as well as poor construction and design. This concerns have given a rise to a large number of people opposing nuclear power in Taiwan with the BBC reporting over 200,000 people taking part in anti-nuclear protests. (9)

Hitachi-GE

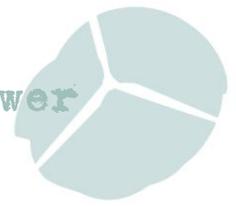
The development of the modular ABWR design was unique, and has led to an unusual situation where it can be offered by three different companies. The ABWR was co-developed by Toshiba and GE, which then worked with Hitachi to construct the first two units in the late 1990s. GE and Hitachi went on to form joint ventures of their nuclear businesses, resulting in two daughter firms: GE-Hitachi and Hitachi-GE. Both those joint ventures can build ABWR, as can Toshiba, although its version differs in some technical respects due to intellectual property issues. (10)

Even assuming Hitachi receives approval for its ABWR reactor it will still need to attract financial backers before it builds reactors at its sites on Anglesey and in Gloucestershire. (11) Dr Tim Fox, head of energy at the Institution of Mechanical Engineers reckons that Hitachi might have a more readily available supply of credit than EDF. He said the fact that eight ABWRs had already been built across the world would be attractive to investors and in all likelihood speed up the licensing process. (12) Given that only four have ever operated this is likely to prove rather an overoptimistic assessment.

Hitachi-GE Nuclear Energy, Ltd." was founded on July 1st, 2007 as a strategic global alliance by Hitachi, Ltd. and General Electric Co. (Its US counterpart is "GE Hitachi Nuclear Energy)" Hitachi-GE Nuclear Energy, Ltd. offers nuclear power plant construction and maintenance in cooperation with GE Hitachi Nuclear Energy.

GDA Process

Concerns about reactor chemistry issues related to ABWRs have been raised by UK regulators in their assessment of the design. As part of the generic design assessment (GDA) of the ABWR, the Office for Nuclear Regulation (ONR) and the Environment Agency (EA) raised a regulatory observation in April 2014 requesting Hitachi-GE to define and justify the reactor design's source terms, amongst other related matters. According to the regulators, "*The definition of the radioactive source term; the nature and amount of radioactivity, is a fundamental part in understanding and therefore being able to control the hazards associated with any nuclear facility. Once defined, it is important that the requesting party is able to demonstrate and justify that this source term is appropriate to be used as the basis for the safety and environmental cases. Failure to adequately define or justify the source term could ultimately mean that the design, operations or controls specified for the UK ABWR may not be soundly based.*"



Hitachi-GE responded with its definition and justification in January 2015. However, the regulators said the responses "*do not meet our expectations*". This, they said, "*is considered to be a serious regulatory shortfall*". (13)

A second regulatory issue was raised by the regulators in July regarding a series of "shortfalls" in the probabilistic safety analysis (PSA) of the ABWR. The regulators consider a "suitable and sufficient" PSA to be an integral aspect of the UK ABWR's safety analysis within GDA. "*Overall, the UK ABWR PSA information received so far does not provide ONR with confidence that Hitachi-GE, without further work and changes, will be able to deliver a modern standards full-scope PSA for the UK ABWR, which is suitable and sufficient for ONR to carry out a meaningful assessment within the project timescales,*" ONR said. "*This is considered a serious regulatory shortfall which ONR, in line with our Guidance to Requesting Parties, is now escalating to a Regulatory Issue.*" (14)

Justification

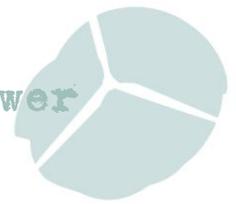
Horizon Nuclear power received approval from the Secretary of State for Energy and Climate Change on 28th January 2015 under the regulatory justification process for the ABWR reactor-type. (15). Under this process the operator has to show that the benefits of building a nuclear facility of that type outweigh any detriment that might be caused by discharges of radioactivity into the environment.

On 21 January 2015, a committee of the House of Commons (The 9th Delegated Legislation Committee) spent a grand total of 17 minutes examining the decision in favour of the merits of Wylfa Newydd on Anglesey. A few days later, on 27 January, the matter was "examined" in the House of Lords, led by junior energy minister, Baroness Verma, who observed of the project: "*it must first undergo a high-level assessment to determine whether its economic, social or other benefits outweigh the health detriment that it may cause.*" The entire Lords examination lasted 12 minutes. That's a total of less than half an hour between two Houses of Parliament. That is surely a scandal! (16)

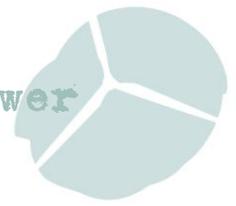
Does Wylfa depend on Hinkley?

Hitachi is said to be monitoring the Government's fractious talks with the French nuclear group EDF over the Hinkley Point C project. "*EDF is the front-runner for us. We're watching the strike price conditions very carefully,*" said a senior Hitachi executive in Tokyo in April 2013. According to the Nuclear Industry Association failure to agree a final deal between EDF Energy and the Government on Hinkley "*threatens not only the first new nuclear power station for a generation, but potentially all those that will come in its wake,*" he said.(17)

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1. New York Times 10th Oct 2011 <http://www.nytimes.com/2011/10/11/business/global/shunning-nuclear-plants-at-home-japan-pursues-building-them-overseas.html>
 2. Telegraph 14th April 2013 <http://www.telegraph.co.uk/finance/newsbysector/energy/9993564/Hitachi-reluctant-about-UK-nuclear-reactor-plan.html>
 3. Nuclear Engineering International 24th June 2015 <http://www.neimagazine.com/opinion/opinionjapan-what-is-the-future-for-nuclear-power-4608426/>



4. World Nuclear Association Country Report <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Japan/>
5. Japan Times 25th Jan 2014 <http://www.japantimes.co.jp/news/2014/01/25/world/abe-genda-nuclear-export-superpower/>
6. World Nuclear News 15th Jan 2013 http://www.world-nuclear-news.org/NN-ABWR_set_for_UK_assessment-1501134.html
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11. Telegraph 5th Feb 2013 <http://www.telegraph.co.uk/finance/newsbysector/energy/9848817/Centrica-raises-more-questions-than-answers-over-UKs-nuclear-future.html>
12. Professional Engineer 4th June 2013 <http://www.imeche.org/news/engineering/hinkley-point-c-'may-deliver-power-later-than-horizon>
13. World Nuclear News 22nd June 2015 <http://www.world-nuclear-news.org/NN-UK-regulators-raise-issue-with-ABWR-design-2206155.html>
14. World Nuclear News 17th July 2015 <http://www.world-nuclear-news.org/RS-Second-regulatory-issue-raised-with-UK-ABWR-17071501.html>
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16. David Lowry's Blog 29th Jan 2015 <http://drdavidlowry.blogspot.co.uk/2015/01/how-not-to-scrutinise-multi-billion.html>
17. Telegraph 14th April 2013 <http://www.telegraph.co.uk/finance/newsbysector/energy/9993564/Hitachi-reluctant-about-UK-nuclear-reactor-plan.html>



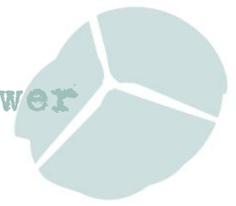
5. AP1000s – the phrase “staggeringly expensive” just doesn’t cut it.

When the Vogtle project was first announced Southern Company said the two reactors would cost about \$14 billion and would be online in 2016 and 2017. That was back around 2008. Vogtle got its taxpayer loan promise in February 2010 and its construction permit in February 2012. Three and a half years later, Vogtle is 39 months behind schedule. And the cost of building Vogtle has, not surprisingly, gone up. Way up. Right now, it’s somewhere around \$16 billion and rising fast—the over-budget portion caused by the delays alone is \$2 million per day.

The economics of nuclear construction are just too staggeringly awful. But it gets worse. Because, as former Public Service Commission (PSC) Commissioner Baker says, the total lifetime cost of Vogtle, including construction, is now estimated at \$65 billion—a number too high for “staggering” to apply anymore.

Green World 3rd Aug 2015

<http://safeenergy.org/2015/08/03/vogtle-at-65-billion-and-counting/>



6. Plutonium Conundrum

A US Energy Department-commissioned study, which has been leaked to the Union of Concerned Scientists, concludes that it would be cheaper and far less risky to dispose of 34 metric tons of U.S. surplus plutonium at a federal nuclear waste repository in New Mexico than convert it into mixed-oxide (MOX) fuel for commercial nuclear power plants at the MOX Fuel Fabrication Facility in South Carolina.

The unreleased report describes in detail the delays and massive cost overruns at the half-built MOX facility, located at the federal Savannah River Site. High staff turnover, the need to replace improperly installed equipment, and an antagonistic relationship between the local federal project director and the contractor are only some of the factors undermining the project. The new report also notes that there are “no obvious silver bullets” to reduce the life-cycle cost of the MOX approach.

According to UCS, a better alternative to turning the surplus plutonium into commercial nuclear fuel would be to “downblend” it, a method the Energy Department has already used to dispose of several metric tons of plutonium. It involves diluting the plutonium with an inert, nonradioactive material and then sending it to the nuclear waste site in New Mexico, the Waste Isolation Pilot Plant (WIPP), for burial. The new report’s analysis supports that assessment.

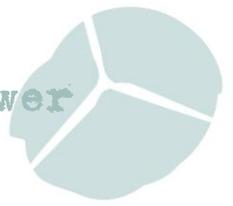
Although WIPP is currently not accepting waste as a result of two accidents in February 2014, the report authors are confident that it will be fully operational within five years, which would not significantly delay downblending. *“The time for studies is now over,”* said Edwin Lyman, a UCS senior scientist and author of the organization’s January report. *“Congress should stop obstructing the Energy Department from shutting down the MOX program and allow it to ramp up the downblending program at the Savannah River Site. Otherwise, the government will continue to waste hundreds of millions of taxpayer dollars every year.”* (1)

The US report is bound to have a negative impact of the UK Government’s preferred management option for its plutonium stockpile which is to convert it into Mixed Oxide (MOX) fuel. (See ‘Slow Progress on Plutonium Stockpiles’ Nuclear News No.76).

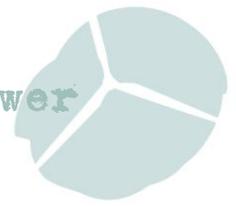
The US DoE report says that using the repository in New Mexico would cost about \$400 million per year. The MOX facility in South Carolina has already cost \$4.9 billion and is only about 60% built. It would take \$700 million to \$800 million per year to see that program through. (2)

Don Hancock of the Albuquerque-based Southwest Information and Research Center, which closely monitors WIPP, also opposes the MOX project. But he’s sceptical about WIPP as a viable alternative and said the Energy Department should review other options, including storing the plutonium at the Savannah River Site or the Pantex Plant near Amarillo, Texas, where thousands of plutonium pits are already warehoused. He said:

“The [DoE and] the Union of Concerned Scientists may be confident that WIPP will reopen in a few years, but I don’t see any real basis for that,” Hancock said. *“Going from one bad idea to another bad idea is not the solution to this problem.”* (3)



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1. Union of Concerned Scientists 20th Aug 2015 http://www.ucsusa.org/new/press_release/doe-mox-study-0521
 2. Nuclear Street 24th Aug 2015
https://nuclearstreet.com/nuclear_power_industry_news/b/nuclear_power_news/archive/2015/08/24/leaked-report-underscores-high-costs-of-mox-facility-082402.aspx
 3. Sante Fe New Mexican 22nd Aug 2015
http://www.santafenewmexican.com/news/local_news/report-pressures-congress-to-kill-plan-for-nuclear-fuel-ship/article_384a4c85-b3a1-52b7-a5dc-bbb74add8bad.html



7. Tories Energy Policy Doesn't Add Up

As we pointed out last month (See the 'Worst Period for Environmental Policy in 30 years') Amber Rudd says carbon reduction targets are a bigger priority than renewables. Building more nuclear power stations or carbon capture and storage plants might be alternative ways of reducing carbon emissions. But as the Tories slash support for renewables a closer look at their policies show that they just don't cut the mustard.

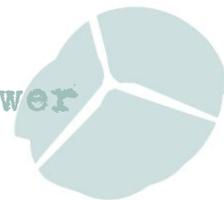
Focusing on carbon reduction as an end goal might be sensible, says ENDS, but DECC is thin on answers about how it should be achieved without a push for renewables. Nuclear could be one option. Rudd is firmly behind Hinkley Point C, but even if it goes according to plan is still years away from completion and even now it is not cost-competitive with many renewable technologies. (1)

Carbon capture and storage is another possibility, but that too is years away from being a functional and affordable solution, by which time many coal plants should have closed. Greenpeace's 2008 assessment of the technology concluded it was an ineffective way of tackling climate change. Since then the situation has got even worse than expected. In the last five years 692MW of coal generation has been – or is being – fitted with carbon capture technology with a further 10GW proposed (though it may never happen). That compares to around 300GW of wind and solar installed over the same period. Even allowing for the fact that the sun doesn't always shine nor the wind always blow, in deployment terms renewable technologies are out-competing CCS (and nuclear) by more than a factor of ten. It doesn't make sense as a way of tackling climate change. Rather than discussing new technological solutions to absorb CO₂ from atmosphere, it is perhaps more pragmatic to tackle the big white elephant in the room – improving energy efficiency. (2)

Attempting to cut carbon without supporting and promoting some of the cheapest forms of energy – onshore wind and solar - is akin to cutting off one's nose to spite one's face. ENDS Deputy Editor, Isabella Kaminski says: *"More changes are about to come with the Treasury's spending review, DECC's review of renewable subsidies and decisions over a future contracts for difference round. Where Rudd's conviction takes her and whether she can resolve the apparent contradictions in her statements has yet to be seen."* (3)

Jim Skea, Professor of Sustainable Energy at Imperial College says a high-level ministerial level clarification of the overall philosophy and strategy is sorely needed. How are the three strands of energy policy – climate, affordability and security – woven together? Is there one that trumps all the others or is there a balance? This clarification would be helped if policies perceived as perverse are reviewed. (4)

Professor Catherine Mitchell says Britain should be looking at scenarios in which we find that at most only a couple of nuclear power plants will be built by 2030, and CCS is not available for industry at all before 2025, and then for only small incremental levels thereafter and not for power plants; fracking is widely unpopular and produces minimal output; solar continues to be the technology of choice for households; non traditional business models (including local authority energy companies) continue to develop rapidly; demands for local tariffs and local



energy markets also increase rapidly. This is now beginning to look like quite a realistic scenario, but do the Minister and Regulator have that kind of information? It seems not. (5)

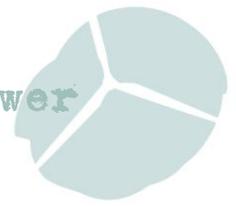
Doug Parr, Chief Scientific Officer at Greenpeace, says there will be some very stressed civil servants at DECC just now. Those who aren't currently seeking alternative employment face what may be an even harder task; making the government's energy sums add up in the face of changes to just about everything from the gas price to the UK's willingness to build any more wind turbines. The gas price has fallen – which makes subsidising nuclear (and offshore wind) much more expensive. Cheaper options for cutting emissions – like onshore wind and efficiency measures have, for various reasons, been parked. The spreadsheet must be all over the shop.

DECC has to demonstrate how the various policy changes and roll-backs recently announced – such as the end in support for onshore wind and solar power – can be squared with Prime Minister Cameron's commitment to deliver on carbon budgets and Climate Change Act. We don't know what DECC is estimating for the price of gas in 2020s. In fact, we don't know a lot about how DECC justifies its actions because a lot of it is kept secret.

A lot of modelling was apparently done by DECC to justify why going for a 35% contribution from nuclear by 2028 was a good deal for the consumer, saving households £75 a year and to justify to EU why it should be getting so much support from bill payers. Unfortunately the modelling is being kept secret, and Freedom of Information requests submitted to see what modelling justified the investment have been rejected, so the data is being kept secret until the contract is signed. It is not reassuring to know that when a 35 year contract involving payments of around £80 billion from UK consumers is irrevocably signed, we'll be able to see the justification. It could be brilliant, of course, or it could be delusional.

The high cost of the new nuclear programme is justified by Rudd on the basis that it provides reliable supply unlike that from renewables: this is undoubtedly an important additional value provided by nuclear, but because policy appears to be being made up as they go along, there is no underpinning justification to it. So how valuable is that reliability, and what would the alternatives be to nuclear baseload? The International Renewable Energy Agency has already looked at this for 30-40% power provided by wind and concluded that, even including all the extra costs of ensuring you can keep the lights on when the wind doesn't blow, onshore wind is still cheaper than Hinkley. And note that big stations like Hinkley also impose costs on the grid which all consumers have to bear (and are generally much less talked about). (6)

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4. ENDS 21st July 2015 <http://www.endsreport.com/49036/renewable-targets-not-a-priority-says-rudd>
 1. Energy Desk 24th Aug 2015 <http://energydesk.greenpeace.org/2015/08/24/comment-whats-gone-wrong-for-carbon-capture-and-storage/>
 2. ENDS 25th Aug 2015 <http://www.endsreport.com/49431/carbon-chameleon>
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 4. IGov 3rd Aug 2015 <http://projects.exeter.ac.uk/igov/no-resource-is-100-reliable-a-realistic-what-if-model/>
 5. Energy Desk 20th Aug 2015 <http://energydesk.greenpeace.org/2015/08/20/analysis-do-the-uk-governments-sums-on-hinkley-and-climate-change-add-up-any-more/>



8. Renewables – The Cuts Keep Coming

The bad decisions keep coming, and don't add up to a policy strategy consistent with the UK's emissions and efficiency targets, and more generally with fighting climate change. (1)

The latest news is that DECC is proposing to cut the feed-in tariff rates for solar PV installations by as much as 87%. Publishing the outcome of the long-awaited feed-in tariff review, the government is proposing deep cuts to all bands from 1 January 2016. (2) In addition to the swingeing cuts to the tariff rate, DECC is also looking to enforce default degeneration each quarter which would see FiT support for some scales of solar end on 1 January 2019. DECC will still implement a contingent degeneration mechanism that could degenerate tariff rates by a further 10% depending on deployment.

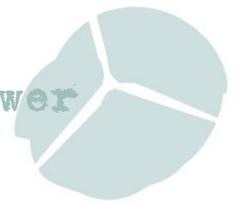
DECC states: *“There is a risk that these changes – combined with the separate consultation proposals to remove pre-accreditation – may result in significantly reduced rates of deployment...However, industry has proven resilient to previous significant changes to FITs, and has been able to adapt to previous tariff reductions and the introduction of degeneration. The risk of reduced deployment has to be seen in the context of this and of the need to have more robust controls on spend to enable the FiT's scheme to continue. More broadly, it should be seen in the light of most of the technologies in the scheme having already deployed more now than had been expected by 2020.”*

The Business Green website said the future of Feed-in Tariffs had been thrown into doubt by the consultation proposing drastic cuts and threats to close a key part of the scheme to new entrants.

The consultation document proposes deep cuts to the levels of support provided to solar PV, wind and hydropower from January next year in a bid to cap government spending on feed-in tariffs at £75m to £100m from 2016 to 2018/19. However, the Department of Energy and Climate Change (DECC) said that it would close the scheme in four months' time if it thinks it will be unable to meet the new spending cap. (3)

“These absurd solar cuts will send UK energy policy massively in the wrong direction and prevent almost a million homes, schools and hospitals from plugging in to clean, renewable energy,” said Friends of the Earth. Mike Landy, head of policy at the Solar Trade Association, added: *“This is the antithesis of a sensible policy for achieving better public value for money while safeguarding the British solar industry.”* (4)

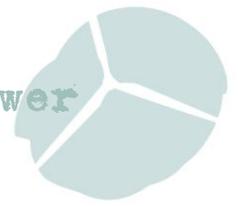
DECC has just finished consulting on removing the pre-accreditation system for the FiT scheme. The UK's renewable energy trade bodies formally complained to DECC that it was rushing through these "damaging" changes. Renewable UK, the Renewable Energy Association (REA), British Hydropower Association, and Anaerobic Digestion and Biogas Association (ABDA), have all accused DECC of failing to comply with Whitehall best practices, when the department launched a four-week consultation during summer recess without publishing an impact assessment alongside it. The government wants to remove pre-accreditation as an emergency measure to reduce the attractiveness of small-scale renewable energy technologies. (5)



Scottish and Welsh Ministers have warned that this will hit community energy schemes the hardest. Scotland Energy Minister Fergus Ewing and Wales Natural Resources Minister Carl Sargeant have co-authored an open letter to Rudd urging her to consider new ways to support community schemes. The Ministers warn that community projects would fail to raise the investment needed to begin development if confidence in the government's clean energy subsidy schemes is eroded. (6) Pre-accreditation essentially gives renewable energy generators a guaranteed tariff level in advance of commissioning their installation. The letter said that community groups had less capital and were therefore more likely to be risk averse. They also have limited ability to progress projects quickly, making them more likely to be hit by Rudd's rule changes than commercial groups. (7)

Alan Whitehead MP says questions about what will happen to renewables over the coming weeks and months boil down to one central question: does the government want to fix the problems now being encountered by the operation of the Levy Control Framework (LCF), or does it intend to see it just fade away and take the renewables industry with it? The Chancellor could without any effect on his overall spending plans, change the way the LCF functions and create the room within it to 'fund' new deployment. Or he could, with at most a notional effect on bills (offset by energy price differences anyway) raise the ceiling on the cap and create headroom for new projects immediately. (8)

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1. SPRU 12th Aug 2015 <http://blogs.sussex.ac.uk/sussexenergygroup/2015/08/12/tory-energy-policies-undo-effort/>
 2. Solar Power Portal 27th Aug 2015 http://www.solarpowerportal.co.uk/news/decc_proposing_to_cut_solar_feed_in_tariff_rates_by_87_2324
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 4. Independent 27th Aug 2015 <http://www.independent.co.uk/environment/solar-power-subsidy-cut-will-stop-one-million-buildings-installing-rooftop-panels-10475582.html>
 5. Business Green 20th Aug 2015 <http://www.businessgreen.com/bg/analysis/2422847/renewables-industry-accuses-government-of-running-flawed-feed-in-tariff-consultation>
 6. Business Green 12th Aug 2015 <http://www.businessgreen.com/bg/news/2421629/scottish-and-welsh-governments-warn-against-alarming-proposals-to-shake-up-renewables-subsidies>
 7. Edie 12th Aug 2015 <http://www.edie.net/news/6/Community-energy-will-take-brunt-of-subsidy-cuts--warn-Scotland-and-Wales/>
 8. Business Green 20th Aug 2015 <http://www.businessgreen.com/bg/opinion/2422334/sort-the-levy-control-framework-out-a-message-from-the-beach>



9. Fukushima Health Impact Summary

New emerging evidence from Fukushima shows that nuclear disasters *and their aftermaths* can kill thousands of people due to necessary evacuations. Between 2011 and 2014, about 2,000 Japanese people, including many old people, died from ill-health and suicides connected with the evacuations. Some nuclear advocates, including government officials, have said these deaths are the fault of the evacuations, as if they were unconnected with the nuclear disaster. This is incorrect: the evacuations were necessary to avoid large radiation exposures from the radioactive fallout due to the plumes from the Fukushima explosions and meltdowns. In future, such deaths should be included in assessments of the fatalities from nuclear disasters.

In sum, the human toll from Fukushima is horrendous: 2,000 Japanese people have died from the evacuations and another 5,000 are expected to die from future cancers

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1. Ian Fairlie's Blog 16th Aug 2015 <http://www.ianfairlie.org/news/summing-the-health-effects-of-the-fukushima-nuclear-disaster/>