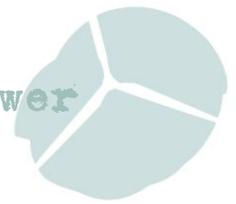


No.73 April 2015

1. **More Problems for the EPR**
2. **Work at Hinkley Suspended**
3. **Intermittency, Baseload, Energy Security and 100% Renewables**
4. **Go 100% Renewable**
5. **Energy Storage**
6. **THORP – a huge financial drain on the nation**
7. **Alternatives to MOX**
8. **Moorside & AP1000s**
9. **Wylfa opponents flabbergasted**
10. **Offshore wind costs falling – latest Danish windfarms 40-60% cheaper than Hinkley**
11. **Radwaste Voluntarism Dumped**

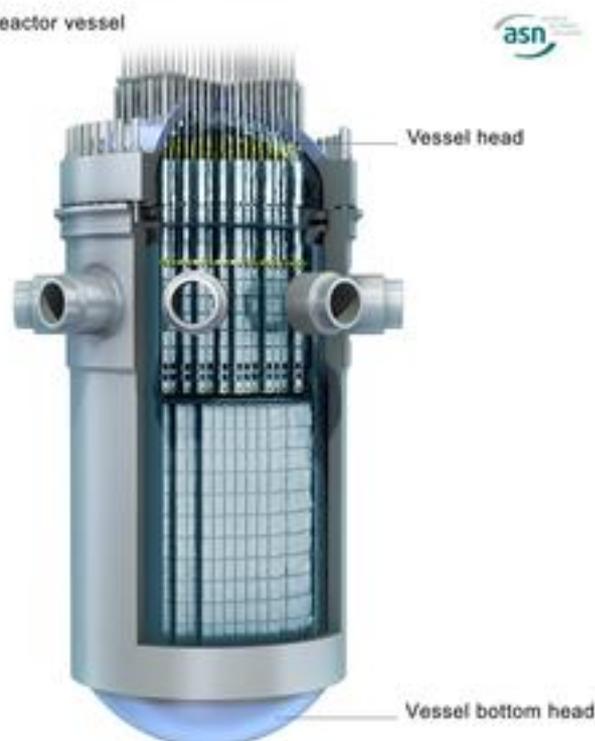


## 1. More Problems for the EPR

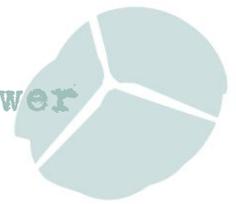
The French Nuclear Safety Regulator, ASN, announced on 7<sup>th</sup> April that it had been informed by AREVA of an anomaly in the composition of the steel in certain zones of the reactor vessel head and reactor vessel bottom head of the Flamanville EPR. (1)

These fabrication defects are very serious mechanical faults. Quality inspectors found an abnormally high concentration of carbon in steel parts capping the reactor vessel's top and bottom during a series of tests carried out by French nuclear company Areva, which is building the reactor. The excessive carbon would lead to "*lower than expected mechanical toughness values*", nuclear regulator ASN said in a press statement on its website. This obviously raises a question-mark over the safety case for the EPR (European Pressurized Water Reactor) currently under construction in Normandy. The reason why a well-known material heterogeneity problem was not mastered during the forging of the pieces at Areva's Le Creusot plant has yet to be investigated. The reason why the defects were detected or publicly released so late, at a moment when the pressure vessel was already in place in the reactor building, also needs to be scrutinised.

EPR 1650 MW reactor vessel



Areva will face a very difficult challenge in justifying the safety case of the flawed pressure vessel. The only alternative to demonstrating safety in spite of the faults would be to repair or replace the faulty components, which appears hardly feasible and particularly expensive in the case of the bottom piece. Therefore the future of the entire Flamanville-3 project is at stake. The



problem has also international implications, since at least some of the upper and/or lower heads of the Taishan-1 and 2 EPRs, under construction in China, are apparently also concerned.

There is no particular reason to believe that any vessel head and bottom which has been forged by Japan Steel Works would present the same defect. This means the same problem is unlikely to be found at the Olkiluoto EPR in Finland. However, it remains to be clarified, whether head(s) and bottom(s) have already been forged for the Hinkley Point-C project at Le Creusot. (2)

France's nuclear safety authority (ASN) has warned that two nuclear reactors nearing completion in Guangdong (Taishan 1 and 2) could face similar safety problems after weaknesses were found in steel supplied to a French reactor by the same manufacturer. (3)

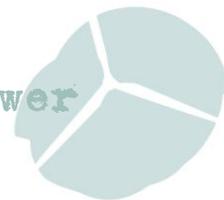
EdF recently estimated the construction costs of Flamanville at €8 billion (US\$8.7bn) compared with an original estimate of €3.3bn, and that was before this setback. The plant was due to have been working by now, but its start date had already been put back to 2017 – which is now looking optimistic.

One problem is the pressure vessel's sheer size and the fact that it was already in place when the fault was detected. The vessel weighs 410 tonnes and cannot now be removed, and it is hard to see how it could be repaired or modified.

Writing on the *Climate News Network* website, Paul Brown speculated that the decision on whether to go ahead with the two reactors at Hinkley Point now seems certain to be postponed yet again until the issue of the safety of the French and Chinese pressure vessels has been resolved. (4)

Dr Andy Hall, Chief Nuclear Inspector at the UK Office for Nuclear Regulation (ONR) confirmed that ASN has brought these findings to ONR's attention and that discussions with EdF over the implications for Hinkley Point C are ongoing. ONR said the findings reinforce the need for proper quality management systems, so that plant and components installed during construction are confirmed to meet the specifications required by the safety case. (5)

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1. ASN 7<sup>th</sup> April 2015 <http://www.french-nuclear-safety.fr/Information/News-releases/Flamanville-EPR-reactor-vessel-manufacturing-anomalies>
  2. WISE Paris 12<sup>th</sup> April 2015 <https://dl.dropboxusercontent.com/u/25762794/20150412Fabrication-Flaws-EPR-Flamanville-v2.pdf>
  3. South China Morning Post 10<sup>th</sup> April 2015 <http://www.scmp.com/news/china/article/1762861/french-warning-nuclear-reactors-being-built-guangdong> and Reuters 8<sup>th</sup> April 2015 <http://af.reuters.com/article/energyOilNews/idAFL5N0X540W20150408>
  4. Climate News Network 13<sup>th</sup> April 2015 <http://www.climate-news-network.net/unfinished-nuclear-plants-raise-safety-doubts/>
  5. E-mail from Dr Andy Hall to Sean Morris at Nuclear Free Local Authorities 13<sup>th</sup> April 2015



## 2. Work at Hinkley Suspended

As many as 400 workers at the Hinkley Point C site face being laid off while EdF Energy decides whether to make an investment of up to £24.5bn. Phil Whitehurst, the GMB union's national officer, described the news as devastating. *"The problem seems to be the stalled final investment decision. This should now be a wakeup call for the next UK government to take charge and manage the failing energy policy we have in place,"* he said. *"We cannot tolerate our energy new-build destiny being managed by companies who are in such disarray on funding when so deep into a project's development. If we do, then the lights will surely go out."*

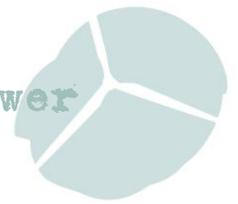
EdF, however, is still negotiating with UK authorities about government debt guarantees for the project, along with decommissioning costs and other details. It is also negotiating with two Chinese utilities about their role in Hinkley Point and possible future UK nuclear projects with EdF.

Kevin Coyne of the Unite union said: *"The growing energy needs of the UK demand a clear and coherent strategy to provide enough capacity for industry and consumers. It is important, therefore, that the final investment decision is made as soon as possible and the announcement today of a delay in that process is disappointing, not least to those who are working on-site preparing the ground."*

In response, former TUC Research Officer Dr Ian Fairlie noted that Britain has no *"growing energy needs"*: UK electricity demand has declined 14% since 2000, while GDP has increased 18%. He said that although temporary site-clearing workers will be laid off, this isn't a good reason for continuing with a grossly uneconomic project. For more jobs, Coyne should look to Germany whose non-nuclear energy policies have resulted in 440,000 direct jobs in its burgeoning renewable energy industries in recent years. Wouldn't it be nice to have 440,000 new jobs here? It's about time the union movement and the Labour Party looked to the future than the past on energy policy. (2)

Prime Minister David Cameron gave the French Government a stark message over the stalled reactor project by telling them: *"we've done our bit, now you do yours"*. Mr Cameron urged the French Government to seal the deal to build the *"the sooner the better"*. Mr Cameron told the *Western Daily Press* that his Government had *"put everything in place"* that it could to ensure the £25 billion power plant would be built – but were now waiting for the French Government and its nationalised electricity firm EdF to secure the investment needed to start the project. Speaking on a campaign visit to Bristol, Mr Cameron said Hinkley Point C was a 'win-win' for everyone involved – including the French Government.

EdF Energy said an investment decision should be forthcoming in the next few months, but for the time-being because the next phase of work requires a substantial increase in spending which it doesn't want to begin until an investment decision has been made, it has issued a 45-day redundancy consultation. (4)



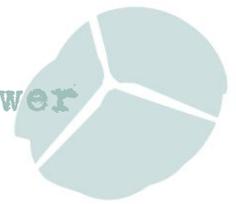
Negotiations with potential investors continue. EDF Energy says it is “*working hard*” to finalise a deal and “*making progress*” in discussions with possible partners, including with the Chinese companies involved. There were signs that negotiations with the partners — China General Nuclear Power Corp, China National Nuclear Corp, France’s Areva, Saudi Electric and several pension funds — had stalled over Chinese demands. The Chinese energy companies, which are rivals, have been at odds over their precise share of the project. Both have been pushing for a substantial share of the supply chain contracts — a demand that has held up negotiations, although it is now understood to have been met. They are also interested in buying into proposed reactor projects at Sizewell and Bradwell, the second of which they want to use to pioneer their own reactor design. This has been a stumbling block. Potential investors are also understood to want to see government agreement on the contract for difference, or price at which the power will be sold, before making a final commitment. (5)

The Chinese nuclear interests, who are needed to provide a large part of the equity investment in the project, are demanding that the French Government agrees to carry the can and pay for cost overruns on the project. Given the delays and thus cost overruns in the four EPR projects currently being built in Finland, France and China, cost overruns seem a racing certainty if Hinkley C goes ahead. So in this way the Chinese are only being rational. Chinese nuclear interests are demanding that, in effect, the British Government give them the go-ahead to build a Chinese reactor design at a future power project at Bradwell. There are big problems with the idea that either the French or the British government will or can agree to these demands. In the case of France, it is already trying to fund the massive deficit in an effectively bankrupt (albeit state owned) nuclear industry, including the massive debts accrued by constructors AREVA in its development of the EPR reactor. The nuclear interests are very strong in the French state. But are they really going to persuade the French taxpayer to effectively pay for a large chunk of a very expensive power station for the alleged benefit of British consumers? (6)

Meanwhile the government executive in charge of attracting investors to Britain’s struggling nuclear industry has been replaced by an animal health expert, according to *The Sunday Times*. Hergen Haye’s departure from the Office for Nuclear Development will add to the perception that the Department of Energy & Climate Change has fallen into disarray at a crucial time.

Speculation is growing that energy department’s days of independence could be numbered if David Cameron is re-elected, he is likely to fold it into the Department for Business, Innovation & Skills, where the government has more staff with commercial experience. Getting Hinkley off the ground is a priority. Civil servants at the Treasury are believed to have discussed the possibility of the government taking equity stakes in nuclear projects in an effort to speed them up. They are believed to have advocated taking stakes of 10%-20% as a natural extension of the government’s debt guarantee and long-term strike price. However, an industry source described the talks as “lunacy” and said state equity would spook investors and create uncertainty. The Treasury denied talks have taken place. (7)

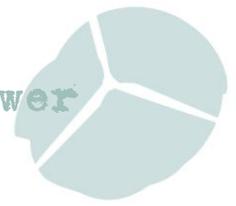
Meanwhile, a conference held in London on 5th March 2015 was hosted by the Green MEP for South-west England Molly Scott Cato and three other Green MEPs: Rebecca Harms, Claude Turmes and Michel Reimon. The conference brought together experts from all over the world to discuss the impacts of Fukushima and nuclear power on Europe in light of the recent decision of



the European Commission to allow the UK government to heavily subsidise a new nuclear reactor at Hinkley Point C. (8)

One of the presentations, by Andrew Clarke at the Resilience Centre in Gloucestershire, looked at the alternatives to Hinkley for the South-west. He said the South west has the renewable energy resources to meet more than 100% of its total energy needs, including replacement of liquid fuels and electrifying its railways. Approximately 103% of our total energy need can be readily achieved. The main barrier to achieving this is positive political support. 26% of South west energy needs can be met from Marine and inshore estuarine tidal energy, and 74% from Onshore Renewable Energy. Intermittency of renewables can be overcome by installing 11,440 MWe Capacity of Smart Grid Energy Storage & develop demand led local Smart Grids to match & respond to communities energy needs. The equivalent cost of delivering 100% of the South west Energy needs from Nuclear is £82,510m or 132% of the equivalent cost of delivering with renewable energy. (9)

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  2. Guardian 9th April 2015 <http://www.theguardian.com/environment/2015/apr/09/faith-fossil-fuel-divestment>
  3. Western Daily Press 6th April 2015 <http://www.westerndailynews.co.uk/Cameron-tells-French-sort-Hinkley-C-sooner-better/story-26291195-detail/story.html>
  4. Business Green 7th April 2015 <http://www.businessgreen.com/bg/news/2402784/hinkley-nuclear-workers-face-layoffs-without-investment-decision>
  5. FT 2nd April 2015 <http://www.ft.com/cms/s/0/644db33e-d91a-11e4-b907-00144feab7de.html>
  6. Dave Toke's Blog 3rd April 2015 <http://realfeed-intariffs.blogspot.co.uk/2015/04/chinese-demand-high-price-for-funding.html> and Times 3rd April 2015 <http://www.thetimes.co.uk/tto/business/industries/utilities/article4400549.ece>
  7. Sunday Times 5th April 2015 <http://www.thesundaytimes.co.uk/sto/business/Industry/article1539817.ece>
  8. Molly Scott Cato 12<sup>th</sup> March 2015 <http://mollymep.org.uk/2015/03/12/from-fukushima-to-hinkley-conference-dismantling-the-nuclear-argument-for-a-sustainable-energy-future/>
  9. See [http://mollymep.org.uk/wp-content/uploads/Presentation\\_Andrew-Clarke.pdf](http://mollymep.org.uk/wp-content/uploads/Presentation_Andrew-Clarke.pdf)



### 3. Intermittency, Baseload, Energy Security and 100% Renewables

The announcement that the 2.4GW Longannet coal-fired power station in Fife is likely to close early next year has raised a range of issues about the need for baseload power in Scotland, the intermittency of renewables and whether or not the lights are now more likely to go out. The outcome of the debate will be relevant to all parts of the globe with an ambition to go 100% renewable for electricity supplies. (1)

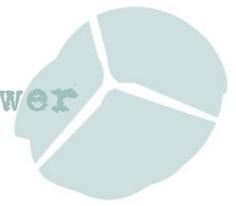
Tory and Labour politicians lined up to blame the SNP's "*obsession*" with renewables for helping to seal Longannet's fate. Former British Nuclear Fuels Ltd Press Officer, Thomas Docherty, the Labour MP for Dunfermline and West Fife, said that the SNP's infatuation with renewables had helped to drive Longannet out of the energy market. Murdo Fraser, the Scottish Conservatives' energy spokesman, said that the news "*illustrates once again why the Scottish government has to change tack on energy policy*". (2)

WWF Scotland, on the other hand, said Longannet's commercial future has been undermined by the European Union's Industrial Emissions Directive (IED), the UK carbon price and transmission charges. The argument that renewables are undermining its profitability is utter nonsense.

The Scientific Alliance Scotland (SAS) said the Scottish government's green energy dash will generate massive amounts of wasted electricity that cannot be used, sold or stored and will cost the taxpayer billions of pounds. By 2020 it says wind farms will produce far greater levels of heavily subsidised power than needed. A lack of infrastructure will prevent excess energy being exported to other countries but generous compensation payouts for wind farm owners who cannot find a buyer for their energy will continue to be borne by the consumer via their energy bills. (3)

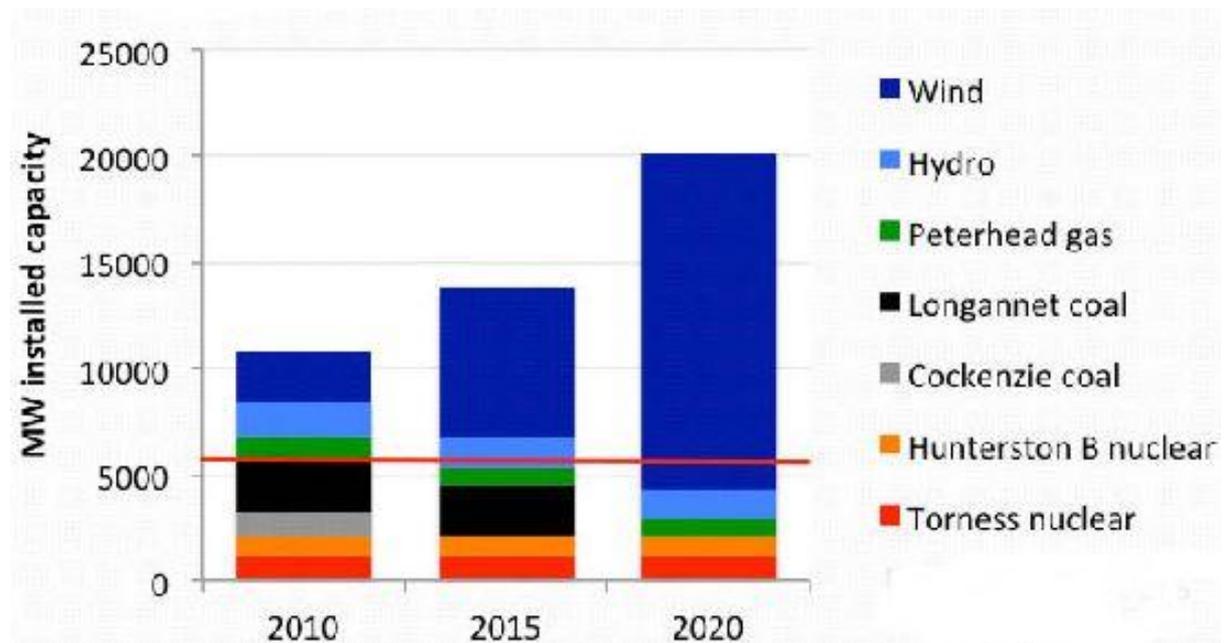
During 2014 £53.2m was paid out to wind farm companies across the UK to switch off their turbines because their electricity was not needed or would have overloaded the grid. These are known as constraint payments. But the Department of Energy and Climate Change point out that "*National Grid has been paying coal and gas generators – and others – to change their planned output well before wind farms joined the mix. The impact on energy bills is negligible.*" National Grid say the cost passed onto consumers was "*only a few pence*" per year.

Maf Smith, Deputy Chief Executive of trade body RenewableUK, said: "*National Grid's latest figures show that the costs of varying the output of gas are four times higher than the cost of constraining wind so far this financial year. Just to put these figures into their proper context, less than 3% of potential wind generation was called off by National Grid in 2014, which means that more than 97% was generated as planned. By using more of the cheapest form of renewable energy we have, onshore wind, we can actually drive down the cost of producing electricity and cut people's bills*". (4)



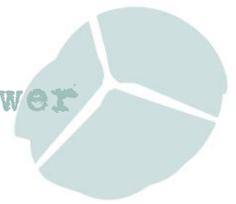
By 2020, Scotland will be generating a huge surplus of heavily subsidised renewable electricity that it cannot use, sell or store, according to the Scientific Alliance's Professor Jack Ponton. He says the cost implications of producing this surplus will run into billions of pounds, just as Scotland's cheapest source of electricity – Longannet coal-fired power station - is closed. He says this crisis is entirely a consequence of reducing Scotland's ability to balance electricity demand by rapidly increasing the variable supply from wind generated power. Wind power is intermittent, it is not secure, and it cannot be stored in the quantities required. (5)

Ponton points out that in 2010, Scotland had a secure and balanced electricity supply, comprising one gas, two nuclear, and two coal-fired power stations and a suite of hydroelectric stations providing power on demand of about 8.4GW. There was a nominal wind capacity of just over 2.5GW. With approximate peak demand of 6GW, Scotland's electricity needs were "safe and secure".



By 2020, assuming that consented wind farms totalling 8.68GW are built, the Scottish Government will have surpassed its 100% renewable generation pledge by nearly 20%. But the closure of Longannet will mean Scotland will only be capable of providing 4.4GW of power at the "flick of a switch", 1.6GW below the safe threshold. Although the 15.8GW of wind capacity operating above 10% capacity should cover the shortfall, in periods of low wind when wind farms operate below expected capacity, "significant shortfalls will occur".

Rather oddly anti-independence MP Tom Greatrex, Labour's shadow energy minister, says there is an increasing imbalance in energy generation mix north of the border, meaning Scotland is more reliant on importing energy during spikes in demand or when the wind was not blowing. (6) But as Dave Toke, reader in Energy Policy at Aberdeen University points out the UK has a single electricity system so it doesn't matter one iota if a coal plant in Scotland stops generating because balancing supply and demand occurs on a GB level, not a Scottish level - that would not have changed even if Scotland had voted yes in the referendum.



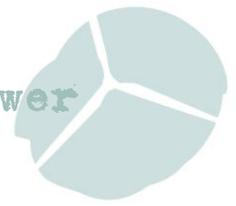
The National Grid, in evidence to the Scottish Parliament's Economy, Energy, and Tourism Committee, made it absolutely clear that the notion that Scotland would in some way be insecure when Longannet closes is wrong. In evidence to the committee National Grid made clear that once the western bootstrap (an undersea grid connection between Hunterston and Deeside) is in place, there won't be a need for any fossil fuelled generation in Scotland, even for voltage control. (7)

The Longannet closure announcement was made after its owner Scottish Power failed to win a crucial contract from National Grid to balance demand in Scotland between April 2016 and September 2017. National Grid confirmed that it had awarded a £15m contract to SSE's Peterhead gas-fired power station to provide voltage support services. The deal will see Peterhead provide services before the upgrades to the high-voltage transmission network are completed in 2017, but after that even Peterhead won't be necessary. (8)

As far as Ponton's accusation that wind in Scotland is heavily subsidised and will cost taxpayers billions of pounds is concerned - renewables energy play a tiny role in energy bills - support for them represents about 4% of energy bills, according to the Committee on Climate Change. (9) The single biggest driver of energy bills in recent years has been the volatile wholesale price of fossil fuels.

Addressing fears of what would happen when Hunterston B closes in 2023 and perhaps Torness if it cannot secure a life extension, (It was announced at this year's Torness Local Liaison Committee Meeting on 19<sup>th</sup> March 2015 that EDF Energy has already started the process of applying for a life extension and the Office for Nuclear Regulation expects to give them the go-ahead later this year.) both National Grid and Ofgem emphasised to the Scottish Parliamentary Committee that the electricity system is evolving. They stressed that by the mid-2020s there will be more diversity in types of renewables, more demand response, and interconnection, so less need for local generation. Carbon Capture and Storage (CCS) might also be available for baseload. But they also stressed that market signals (including transmission, capacity market etc.) would change if there are genuine risks to security of supply in Scotland.

The role of old baseload power stations is being eroded with every new MW of renewable capacity built around the world. Already in Germany we are seeing periods when fossil fuel power is scarcely required. In January, WWF Scotland launched a report *Pathways to Power*, exploring alternative pathways for meeting the Scottish Government's power sector decarbonisation target of 50g CO<sub>2</sub>/KWh by 2030. Based on independent technical analysis by DNV-GL - a leading engineering consultancy - the report showed that Scotland could very credibly have almost entirely renewable generation, without coal, gas or nuclear in Scotland (except for 340MW of CCS at Peterhead), as long as it remains part of the GB grid. Security of supply would be assured and Scotland could maintain and build on its position as a net power exporter. Greater emphasis on demand reduction, flexible pumped storage, demand side response and interconnection would all play an important part in achieving this goal. Indeed more emphasis needs to be placed on demand reduction and storage in particular, by both the UK and Scottish governments, to build resilience and reduce the need for new generation capacity. (10)



So how could a renewable dominated system operate without baseload? In fact, what a renewable system needs is not baseload but flexible back-up which can be turned on and off quickly to provide electricity at peak times when renewables are not producing much. There are at least five ways this can be done:-

1. By using the right mix of renewables intermittency can be reduced;
2. By increasing grid connections to other countries so that electricity can be imported at peak times when indigenous renewable production is low, and so that surpluses can be exported;
3. By storing surplus renewable electricity which can be called upon when wind and solar production is low;
4. Demand management – using various techniques to reduce demand at peak times;
5. By calling on combined heat and power stations working in conjunction with heat storage to generate electricity at peak times.

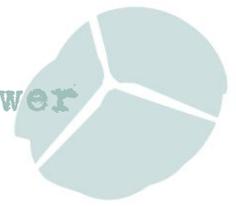
Michael Liebreich, CEO of Bloomberg New Energy Finance agrees “...there are plenty of ways of managing intermittency in renewables without resorting to expensive backup power.”

*“First, you improve your resource forecasting. Second, by interconnecting the grid over larger areas, much of the variability of renewable energy can be evened out. Third, just when an increased proportion of renewable energy means you start losing control over supply, the introduction of digitally controlled smart grids gives you better control of demand. Finally, there is power storage, currently mainly in the form of pumped hydroelectric power but, in future, most likely in the form of batteries for electric vehicles. The cost of each of these techniques is coming down just as rapidly as the cost of renewable energy.” (11)*

According to UBS Bank, “Large-scale power generation ... will be the dinosaur of the future energy system: Too big, too inflexible, not even relevant for backup power in the long run.” The bank expects a rapid decline in battery costs of more than 50% by 2020 which will spur not just the sale of electric vehicles, but also lead to an exponential growth in demand for stationary batteries to store excess power. In turn this will lead to a much higher share of renewables in the electricity mix. (12) Similarly HSBC Bank predicts that conventional generators will be the biggest losers from an upcoming energy storage boom. (13)

Large baseload power stations, such as nuclear and large coal-fired power stations are not flexible because they are hard to turn on and off. So building more baseload power stations would actually undermine moving towards a clean energy future. It would simply mean that during peak times when renewables are supplying lots of electricity, some of that power will go to waste. (14)

Instead combined heat and power (CHP) generators could be the backbone technology in an energy system dominated by renewables. These can produce both saleable heat and electricity and can rapidly ramp up and down over short periods of time. This means they can be used to balance power grids in order to compensate for fluctuating renewables like wind and solar power. (15) CHP plants could be used in conjunction with heat pumps and additional storage capacity to store additional energy on windy days. (16) So district heating systems could absorb large quantities of surplus wind-generated electricity by using heat pumps and electric heaters for heating of water. When demand for electricity is high, but the wind is low, CHP plants could sell electricity but store heat if there is no demand for it at the time. (17)

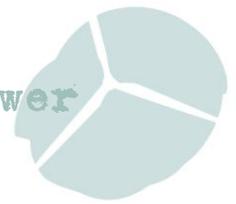


Prof Keith Barnham in his book, *"The Burning Answer: A User's Guide to the Solar Revolution"*, discusses the evidence from Germany that the whole UK could have an all-renewable electricity supply before 2035 without large coal or nuclear stations. Renewables can also greatly reduce the demand for natural gas for heating. German experience has shown that wind, solar and biogas can reliably meet electricity demand 24/7, all year. Their contributions are already reducing the wholesale price of German electricity. (18)

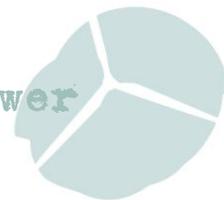
The Scottish Parliament's Economy, Energy and Tourism Committee has launched an investigation into the future security of the country's energy supply, and wants submissions by 6<sup>th</sup> May. The parliamentary inquiry will consider supply, demand, the transmission network and market functioning as well as seeking to answer questions about the role of new generation on meeting demand and the impact of demand-side response on peak demand. Scottish select committee convener Murdo Fraser said: *"It is imperative that this inquiry starts a debate in Scotland about how we can secure Scotland's energy supply and looks at the implications of the likely early closure of Longannet. The committee will investigate whether or not there is sufficient generation to meet demand to the end of the decade and if the tools are in place to facilitate the switch from fossil fuels to renewables."* (19)

Richard Dixon of Friends of the Earth Scotland says with solar power starting to come in cheaper than coal big energy companies in Germany were caught out by continuing to plan for the old ways of doing things. With Scotland aiming for the equivalent of 100% of the electricity we use to come from renewables by 2020, and more and more communities creating their own renewable energy schemes, we are one of the leading nations in Europe for clean energy. The government needs to work with the unions, the power industry and the oil and gas sector to plan for the changes that are coming to make sure that we manage a smooth transition from dirty energy jobs into clean energy jobs. (20)

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[http://www.thesundaytimes.co.uk/sto/news/uk\\_news/scotland/article1543182.ece](http://www.thesundaytimes.co.uk/sto/news/uk_news/scotland/article1543182.ece)
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  7. Scottish Parliament, Economy, Energy and Tourism Committee, 11<sup>th</sup> March 2015  
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  10. WWF Scotland report Pathways to Power: Scotland's route to clean, renewable, secure electricity by 2030. <http://assets.wwf.org.uk/downloads/pathwaystopower.pdf>

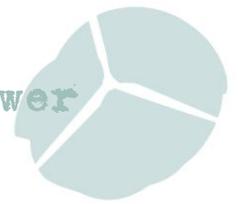


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13. Renew Economy 1st October 2014 <http://reneweconomy.com.au/2014/energy-storage-generators-biggest-losers-50615>
14. Clean Technica 4<sup>th</sup> Feb 2015 <http://cleantechnica.com/2015/02/04/big-expensive-power-plants-undermine-clean-energy-future/>
15. E&E Publishing 24<sup>th</sup> Feb 2015 <http://www.eenews.net/stories/1060013875>
16. Reve 26<sup>th</sup> August 2014 <http://www.evwind.es/2014/08/26/complete-independence-from-energy-generated-from-fossil-fuels-is-possible/47104>
17. Bach, Paul-Frederik, Wind Power and District Heating: New business opportunity for CHP systems – sale of balancing services, 9<sup>th</sup> May 2011 [http://www.pfbach.dk/firma\\_pfb/forgotten\\_flexibility\\_of\\_chp\\_2011\\_03\\_23.pdf](http://www.pfbach.dk/firma_pfb/forgotten_flexibility_of_chp_2011_03_23.pdf)
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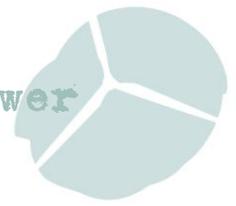
## 4. Go 100% Renewable

- A report written by the French Environment and Energy Agency (Ademe) has concluded that supplying the nation's electricity demand with renewables by 2050 would cost about the same as the plan currently favoured by the President and the Ministry of Ecology, Sustainable Development and Energy, which is to meet France's power needs with 50% nuclear, 40% renewables, and 10% fossil fuel by 2050. (1)
- Vancouver has become the latest city to commit to running on 100% renewable energy. The city of 600,000 on Canada's west coast aims to use only green energy sources for electricity, and also for heating and cooling and transportation. Cities and urban areas are responsible for 70-75% of global CO2 emissions and that's where "*real action on climate will happen*" said Park Won-Soon, Mayor of Seoul, South Korea at the ICLEI World Congress 2015, the triennial sustainability summit of local governments where Vancouver made the announcement. (2)
- Ile de Sein, a small island off the coast of Brittany, dreams of becoming powered by 100% locally-produced, community-owned renewable energies. The island has a permanent population of just over 100 inhabitants and over 40 of them are pushing for their homes and businesses to rely solely on renewables in the future. They show that by harnessing the natural resources of the wind, sea and sun they could power their homes and rid themselves of the fossil fuels on which they are currently reliant. Today, the island receives its electricity from three generators that use 420,000 litres of oil a year. If the project were to come to fruition, the Ile de Sein would be the first place in France to be powered 100% by renewable energy. However, before this can happen, the islanders have to convince the French government to change national legislation, which states that areas not connected to the mainland grid can produce no more than 30 per cent of their energy from renewable sources to avoid blackouts. The Ile de Sein is one of three Breton islands that remain off grid. Proposed changes to the law are being discussed by politicians and could be voted on this summer. (3)
- The adoption of targets for 100% renewables by 2050 could deliver combined energy savings of more than \$500 billion a year to the major economies of the EU, the US and China, and create millions of new jobs, a new study has found. The study, released this week by New Climate Institute and commissioned by Climate Action Network, also found that if all countries took action on renewables at this scale, global warming would not cross the 2°C threshold beyond which scientists predict would result in dangerous and irreversible changes to the earth's climate. (4)
- A city in Texas – home to the "Gusher Age" of American oil – is aiming to become 100% renewable within two years, after finalising a deal with SunEdison to supply it with solar power for 25 years. Georgetown – population 54,000 – will take the output from the 150MW solar plant and another 144MW from a new wind farm to source its needs from renewables. The local utility saying it has turned to wind and solar because it is cheaper and more reliable, and requires a lot less water. (5) The news sparked surprise in the oil-obsessed, Republican-dominated state where fossil fuels are king and climate change



activists were described as “the equivalent of the flat-earthers”. But when City staff examined their options last year, they discovered something that seemed remarkable, especially in Texas: renewable energy was cheaper than non-renewable. By January 2017, all electricity within the city’s service area will come from wind and solar power. (6)

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1. Go100%Renewable 12<sup>th</sup> April 2015  
[http://www.go100percent.org/cms/index.php?id=45&tx\\_ttnews%5Btt\\_news%5D=395&cHash=c49d899dff e50003b28e67bc8ffa6655](http://www.go100percent.org/cms/index.php?id=45&tx_ttnews%5Btt_news%5D=395&cHash=c49d899dff e50003b28e67bc8ffa6655)
  2. Guardian 10th April 2015 <http://www.theguardian.com/environment/2015/apr/10/vancouver-commits-to-run-on-100-renewable-energy>
  3. Renew Economy 7th April 2015 <http://reneweconomy.com.au/2015/modern-day-gauls-lead-100-renewable-energy-quest-58433>
  4. Renew Economy 31st March 2015 <http://reneweconomy.com.au/2015/100-renewables-target-could-save-major-economies-500bn-a-year-22893>
  5. Renew Economy 19th March 2015 <http://reneweconomy.com.au/2015/texas-city-to-go-100-solar-wind-because-its-cheaper-more-reliable-75098>
  6. Guardian 29th March 2015 <http://www.theguardian.com/environment/2015/mar/28/georgetown-texas-renewable-green-energy>



## 5. Energy Storage

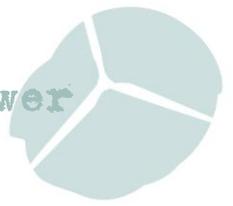
Everyone seems to agree that battery storage is the next big thing to affect global energy markets. What is not agreed upon is the timing. Some think this may happen in a few years, others in a decade or more. Some think it is happening now. The big question for many is how quickly battery storage costs will fall in coming years. Will it be as dramatic as that of solar PV, which took everyone but a few solar savants off-guard and cut costs 80% over a five-year period? Some – such as investment banking giants Deutsche Bank and UBS – say it will. Others say it is not possible. Ken Munson, the founder and head of smart energy systems start-up Sunverge – which is backed by an Australian government-funded investor – is in no doubt that storage costs will fall. In fact, he thinks they could fall three times as fast as solar costs did. (1)

Elon Musk, a South African-born entrepreneur who made a colossal pile from PayPal and has created Tesla, the company that makes high-end electric cars, is focused on solving the problem of storing electricity efficiently and cost-effectively. For some time, Musk has been building a huge factory to make such batteries and he is widely believed to be planning a major announcement on 30 April. Until recently, most people assumed that his new factory would be making improved batteries merely for powering electric vehicles. But if the rumour mill is correct, Musk has set his sights higher – on new battery technology that would make it possible efficiently to store the quantities of electric power needed to run modern homes. If he has indeed managed to do something like that, then it would be a game-changer on an epochal scale. (2)

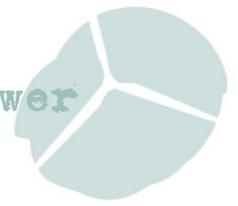
The Rocky Mountain Institute has released *The Economics of Load Defection*, a new report that analyzes how grid-connected solar-plus-battery systems will become cost competitive with traditional retail electric service; why it matters to financiers, regulators, utilities, and other electricity system stakeholders; and possible paths forward for the evolution of the electricity grid. (3)

Meanwhile a flywheel plant being built in Ireland with potentially unlimited storage capability could solve the problem of clean energy supply shortfalls when there is insufficient sun or wind. Foundations for an energy storage plant in Ireland that could “revolutionise” the integration of renewable power into electricity supplies will be laid within weeks. The plant will use a motor-generated flywheel to harness kinetic energy from the grid at times of over-supply. This will then be released from submerged turbines at times of supply shortfalls. The project in Rhode, County Offaly, is expected to launch commercially in 2017, with an operating capacity of 20MW. Although the system will initially feed off all energy in the grid – clean and dirty alike – it has the potential to resolve the transmission system operators’ dilemma of how to store large amounts of energy created during windy or sunny conditions for instantaneous use when the weather changes. (4)

- A new briefing on Energy Storage for MPs has been published by the Parliamentary Office of Science and Technology. See <http://www.parliament.uk/briefing-papers/POST-PN-492/energy-storage>



1. Renew Economy 20<sup>th</sup> March 2015 <http://reneweconomy.com.au/2015/why-battery-system-costs-may-fall-3x-faster-than-solar-pv-84344>
2. Guardian 11th April 2015 <http://www.theguardian.com/commentisfree/2015/apr/11/super-battery-elon-musk-tesla-renewable-energy>
3. RMI 7th April 2015  
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4. Guardian 8th April 2015 <http://www.theguardian.com/environment/2015/apr/08/new-energy-storage-plant-could-revolutionise-renewable-sector>



## 6. THORP – a huge financial drain.

THORP chopped up its first batch of spent nuclear fuel on 27th March 1994. The £2.85bn plant had been dubbed by British Nuclear Fuels Ltd (BNFL) as the Jewel in Sellafields's Crown and a World Beating Flagship Plant that would reprocess 7000 tonnes of fuel in its first ten years, win more overseas business and make a profit of £500m in its first decade. Now scheduled to close in 2018, the Jewel has been tarnished beyond recovery by a catalogue of accidents, poor performance and business loss. A briefing by Cumbrians Opposed to a Radioactive Environment (CORE) looks at what THORP has achieved. (1)

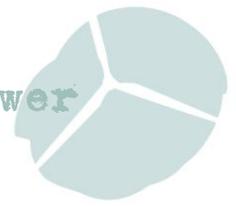
THORP missed its target of reprocessing 7,000 tonnes in its first decade by about 2,000 tonnes. Accidents and unplanned stoppages, added to planned outages, have contributed to a major loss of operational time over the last 20 years. Three lost years are attributed to a 2005 leak of 18,000 litres of dissolved fuel which, despite warnings and alarms, was ignored by workers for nine months before action was taken. Overseas customers from whom two-thirds of the plant's baseload order book had been secured, soon lost faith in THORP.

In the 1980s the industry insisted that investment in the giant reprocessing plant was vital because by the millennium there would be 4,000 nuclear reactors worldwide, with too little uranium to fuel them all. In fact, by the end of the century there were only 434 reactors globally, and much more uranium had been found. Some governments, including those of the UK, France, Germany and the US, believed the industry's sales pitch, even though environmental groups like Friends of the Earth and Greenpeace never accepted it. Critics said the cost of building the reprocessing plants was too high, and feared the consequences of producing vast stockpiles of uranium and plutonium which might never be used in reactors. (2)

The Government and the Nuclear Decommissioning Authority have never revealed the losses THORP has incurred. But Harold Bolter - an ex-BNFL Director who was heavily involved in the battle to open THORP said in his book *Inside Sellafield*, "if the highly complex plant fails to operate to its projected standard, it will become a huge financial drain on the nation".

The UK seems to have a knack of building nuclear projects which turn out to be a huge financial drain. NFLA Chair Councillor Mark Hackett said: "*The 21st birthday of the Sellafield THORP plant is an appropriate time to consider the failings of the nuclear reprocessing industry, at great financial cost to the hard pressed taxpayer. The NFLA consistently raised concerns that these plants would turn out to be nuclear white elephants and we were absolutely correct in our analysis. I call on the next UK Energy Minister and politicians of all parties to reflect on these mistakes and direct future energy policy towards an ongoing renewable energy revolution.*" (3)

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1. 21 Today. Sellafield's THORP reprocessing Plant – A lame duck and a loser. CORE March 2015 <http://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2015/03/Briefing-THORP-21.pdf>
  2. Climate News Network 8th April 2015 <http://www.climate news network.net/unhappy-21st-birthday-for-uks-nuclear-white-elephants/>
  3. NFLA 9th April 2015 [http://www.nuclearpolicy.info/docs/news/NFLA\\_Thorp\\_21st\\_birthday.pdf](http://www.nuclearpolicy.info/docs/news/NFLA_Thorp_21st_birthday.pdf)



## 7. Alternatives to MOX

A new report by Frank von Hippel and Gordon MacKerron reviews programs in France, Japan, the UK and the US to dispose of large stocks of separated plutonium in nuclear power reactor mixed-oxide (MOX) fuel. Most of these efforts have suffered long delays and large cost increases and all have failed to reduce plutonium stockpiles. This has led some of these countries to consider alternatives.

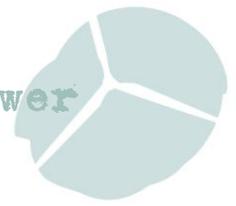
A less costly and more effective approach may be to treat plutonium as a waste to be processed into a stable form and deeply buried. These alternative approaches include disposal with radioactive waste or spent fuel or disposal down a 3-mile (5-kilometer) deep borehole.

The report recommends that more than one direct-disposal approach be pursued. It also recommends that the countries that share the problem of plutonium disposal collaborate on exploring direct-disposal options. Finally, it recommends that the quantities of plutonium disposed by the weapon states be verified by the IAEA.

The huge cost overruns in the under-construction MOX plant at the DOE's Savannah River Site in South Carolina led the Obama Administration to conclude in 2013 that plutonium disposal via MOX "*may be unaffordable.*" This has revived policy interest in the U.S. in the possibilities of direct disposal of plutonium as a waste. Efforts to convert foreign separated plutonium into MOX fuel encountered technical problems in the UK, forcing the abandonment of the Sellafield MOX Plant. The UK has therefore looked, in at least a *pro forma* way, at direct-disposal alternatives.

In the late 1990s, the U.S. studied in considerable depth a "can-in-canister" option in which immobilized plutonium would be embedded in some of the high-level reprocessing waste from which it had been originally separated. This was a way to create a radiation barrier around the plutonium like that around the plutonium in spent fuel, which makes plutonium inaccessible except via chemical and mechanical operations controlled remotely from behind thick radiation shields. The can-in-canister approach also shares the merit with MOX that it just adds marginally to the quantity of an already existing waste form for which a geological repository has to be found in any case. This option may still be of particular interest in the US, which will be disposing of reprocessing waste for several decades into the future. In France and the UK, where high-level waste vitrification has been ongoing in parallel with reprocessing, it may be impossible to pursue the "can-in-canister" option unless it is planned well before reprocessing ends. There are other options, however. One that appears increasingly attractive is deep borehole disposal. It does not involve a radiation barrier, but retrieval would be much more difficult than from a closed geological repository.

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1. Alternatives to MoX by Frank Von Hippel and Gordon Mackerron, The International Panel on Fissile Materials, April 2015 <http://fissilematerials.org/library/rr13.pdf>



## 8. Moorside & AP1000s

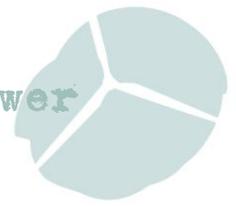
Nuclear engineer, Arnie Gundersen, writes that during the week he spent in the UK he spoke to hundreds of people in London and Cumbria who are committed to a new energy future for Europe. They know that the dated model of big business centralized electricity production is ending, and they see a clean, disaster free viable alternative in locally distributed generation. (See [www.cumbrianenergyrevolution.org.uk](http://www.cumbrianenergyrevolution.org.uk) )

Still, it seems that the established British utilities are so fixated on nuclear power that they just offered to charge their customers twice the current market price for electricity for the next 35-years, so that a French nuclear company could build a fancy and untried new nuclear design at Hinkley Point.

Three new AP1000 reactors are proposed to be built in Cumbria within sight of “Cockcroft’s Folly”. Since 2010, Gundersen has repeatedly warned that the AP1000 design suffers the same design flaw as the old Windscale reactor. Like Sir John, I believe that filters must be added to the top of the AP1000 shield building to prevent huge amounts of radiation from being released during a meltdown. This problem is called “the chimney effect”. The Independent newspaper, courageously wrote about my concerns with the headline: Gundersen warns of a ‘*Chernobyl on steroids*’ risk in UK from proposed Cumbria plant. (1)

Yet the NuGen consortium ploughs onwards with its proposals and is now finalising plans for a public consultation. The 10-week consultation will start in mid May. NuGen has also started meetings with technical and planning representatives, to help them understand more about the project and identify potential issues.

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1. Fairwinds 19th March 2015 <http://www.fairewinds.org/fairewinds-nuke-truth-at-house-of-commons/>
  2. Cumberland News 1st April 2015 <http://www.cumberlandnews.co.uk/public-consultation-into-new-nuclear-power-station-plans-1.1202879>



## 9. Wylfa opponents flabbergasted

The proposed Wylfa Newydd nuclear plant could be worth £5.7 billion to the Welsh economy and create 6,800 jobs at its peak, according to a new report produced by Miller Research for the Welsh Government. It is a “*once in a generation opportunity*” according to Welsh economy minister, Labour AM, Edwina Hart.

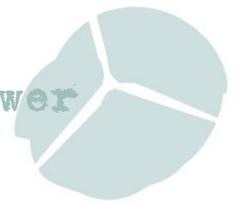
Hart said “*This report clearly illustrates the scale of the potential investment, the opportunities for Welsh businesses and some of the issues and perceptions that need to be addressed in order to maximise the potential benefits. Businesses need to be fully involved if they want to reap some of the potential benefits and a range of support is available through the Welsh Government to help them up their game...*” (1)

Anti-nuclear campaigners rubbished the claims. Dylan Morgan, of Anglesey anti-nuclear group PAWB, says the costs of decommissioning redundant plants and heavy subsidies required to build new ones mean their value is over-stated. Mr Morgan said: “*What is obvious in all this is that the British state is totally unable to manage the nuclear waste problems from the waste produced over the last 60 years, let alone create even more dangerous, even more radioactive waste from possible new reactors*”. (2)

Caerphilly Labour Councillor Ray Davies says he was flabbergasted when he read the reports about the wonderful economic benefits of Wylfa B. You wouldn’t think the ex-Prime Minister of Japan had recently visited Anglesey specifically to warn us against the trap of relying on nuclear power. He held meetings throughout Wales, speaking from personal experience of the tragic disaster in Fukushima and begging Wales not to go down the nuclear road.

The economic arguments are clear. It will take at least £14m of private finance to develop Wylfa B. No-one wants to invest their money into expensive and dangerous nuclear, when renewable energy is the only long-term answer for Wales. There are major investments in renewable energy, such as the £1m pledged for the tidal lagoons in Swansea Bay. The cost of harnessing offshore wind and tidal power has fallen, making them a far more cost effective way to develop Wales’ future energy infrastructure. The nuclear industry loves to trumpet the jobs bonanza of new nuclear, but based on the experience of Finland and elsewhere less than a third of the supposed economic benefits of Wylfa B will come to Wales. Two-thirds will go into the pockets of Japanese and European investors and employers. Anglesey would be far better served if, instead of pouring huge sums of money into new nuclear, it followed Germany’s example, where local, renewable sources provide the majority of their energy.

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1. News North Wales 7th April 2015 <http://www.newsnorthwales.co.uk/news/146377/wylfa-newydd-is-a-once-in-a-generation-opportunity-worth-5-7-billion.aspx>
  2. Daily Post 8th April 2015 <http://www.dailypost.co.uk/news/north-wales-news/anglesey-anti-nuclear-campaigners-hit-back-9002801>
  3. Western Mail 13<sup>th</sup> April 2015 <http://www.walesonline.co.uk/incoming/western-mail-letters-monday-13-9030605>



## 10. Offshore wind costs falling – latest Danish windfarms 40-60% cheaper than Hinkley

A report published recently by the Offshore Wind Programme Board shows that the cost of energy from offshore wind farms has fallen by almost 11% over the past three years. The achievement is ahead of schedule on its path to delivering the UK Government's target of £100/MWh by 2020, and is cited as clear evidence that offshore wind can play a significant role in the UK's sustainable energy mix in the coming decades.

Analysing public data on offshore wind in Denmark, energy consultant Mike Parr concludes that existing offshore wind is already cheaper than gas-fired power plants. Future offshore wind farms will be cheaper still – and up to 60% less expensive than the proposed nuclear power plant at Hinkley Point C in the UK. This means that government support for offshore wind can be quickly and substantially reduced. Offshore wind is routinely criticized for being too expensive. It is true that some offshore wind farms are getting large subsidies. But that does not mean they are expensive. It rather means that their operators are making a lot of money. In fact subsidies can go down considerably and probably will. (2)

Vattenfall recently won the competition to build Horns Rev 3 (400MW) in the North Sea with a bid price of €103/MWh for 10 years. This is the amount that Vattenfall will get from the Danish government for that period. Furthermore there are plans for more farms both in the Kattegat (Saeby – 200MW) and the Baltic proper (Kriegers Flak – 600MW). The Danish offshore wind target is 1350MW by 2020.

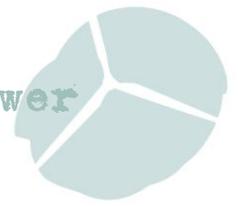
If we compare the offshore wind farms to the cost of the nuclear power project proposed at Hinkley Point, which will get £92.50 (about €125) per MWh for 35 years, Anholt – a Dong project in the Kattegat - delivers electricity that is 40% cheaper, Horns Rev3 will deliver electricity that is 58% cheaper and Saeby 60% cheaper.

The only uncertainty in this is how wholesale prices in Denmark will evolve in the next 25 – 30 years. What is certain is that once 10 years have elapsed, the owners of Danish wind farms will be at the mercy of the markets and the wind. By contrast, owners of UK nuclear plants seem to have been granted certainty on both price and market access. Whilst the UK talks about energy markets, the socialist Danes seem to have implemented them. Funny that.

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(1) Scottish Energy News 8th April 2015 <http://www.scottishenergynews.com/cost-of-offshore-wind-energy-falls-by-more-than-10-in-three-years/>

(2) Renew Economy 2nd April 2015 <http://reneweconomy.com.au/2015/the-myth-of-expensive-offshore-wind-its-already-cheaper-than-gas-fired-and-nuclear-99353>



## 11. Radwaste Voluntarism Dumped

In the last act of the dying Parliament, MPs quietly voted to dump democratic planning processes to expedite a 'facility' for the high level nuclear waste. (1)

Nuclear waste dumps can now be imposed on local communities without their support under a new law rushed through in the final hours of parliament. Under the latest rules, the long search for a place to store Britain's stockpile of 50 years' worth of radioactive waste can be ended by bypassing local planning. Sites are now officially considered "*nationally significant infrastructure projects*" and so will be chosen by the secretary of state for energy. He or she would get advice from the planning inspectorate, but would not be bound by the recommendation. Local councils and communities can object to details of the development but cannot stop it altogether. The move went barely noticed as it was passed late on the day before parliament was prorogued for the general election, but has alarmed local objectors and anti-nuclear campaigners. (2)

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1. Ecologist 2nd April 2015

[http://www.theecologist.org/blogs\\_and\\_comments/commentators/2816566/to\\_dump\\_nuclear\\_waste\\_first\\_they\\_must\\_dump\\_democracy.html](http://www.theecologist.org/blogs_and_comments/commentators/2816566/to_dump_nuclear_waste_first_they_must_dump_democracy.html)

2. Guardian 5th April 2015 <http://www.theguardian.com/environment/2015/apr/05/law-changed-so-nuclear-waste-dumps-can-be-forced-on-local-communities>