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# 1. The Hinkley Saga is a National Embarrassment

Two of the world's biggest ratings agencies have warned that EDF and its Chinese partners face credit-rating downgrades if they press ahead with the £24.5 billion Hinkley Point C nuclear project, according to *The Times*. And the Chinese appear to be refusing to take a 40% equity stake in the project - opting instead for 30% or less.

Disagreements between the two Chinese groups – China General Nuclear Power Corp and China National Nuclear Corp - and EDF over terms are said to be so wide that there was little hope of a final investment decision by both sides in time for a visit by Chinese Premier, Xi Jinping, to Britain on October 20. Instead, a “heads of agreement” may be announced, which would fall some way short of a final go-ahead for the scheme. (1)

EDF Energy Chief Vincent de Rivaz says he believes the two state-backed Chinese investors will increase the size of their stake allowing Hinkley to go ahead. (2) But if the Chinese stick to their demands the financially challenged EDF will be left trying to fund at least 70% of the project representing an initial outlay of more than £11 billion. EDF and its partners will also have to accept all of the construction risk associated with the project.

Moody's, in particular, pointed to delays and cost overruns at Flamanville saying there is a question-mark over the ability of the consortium to deliver on time and to budget. (3) Ballooning costs and further delays to the plant in Normandy mean the start date for Flamanville has now been pushed back to the end of 2018, 11 years after construction began, and costs have more than tripled from 3 billion euros to 10.5 billion euros. (4)

According to *The Ecologist* delays at Flamanville are threatening to sink the Hinkley project. French regulators are to demand another lengthy round of tests on Flamanville's flawed reactor vessel. And if Flamanville isn't working by 2020, £17 billion of UK finance guarantees for Hinkley C will collapse.

A meeting of French nuclear safety experts, which took place at the end of September, determined that there are still important safety questions to be resolved. The concerns centre on the steel reactor vessel at the heart of the reactor, which as it was revealed last year, is metallurgically flawed owing to large areas of excess carbon in the steel causing structural weaknesses. Similar problems apply to the vessel head. ASN, the French nuclear safety inspectorate, is now expected to follow the advice of the Permanent Group of Experts on Pressurised Nuclear Equipment (PGEPNE) and, within weeks, order another round of safety tests that could take until mid-2016 to complete. The last thing EDF needs is yet another delay, additional cost and more uncertainty – but that is exactly what it is getting. It also forces the company to make a very dangerous decision. Should it cut its losses, put construction on hold, send its armies of workers home - and in the process lose critical momentum that will assure that its completion targets will be missed? Or should it push ahead with construction at the site, and risk throwing good money after bad in the event of the 'nightmare' possibility: that at the end of all the tests on the Flamanville reactor vessel, it will be found irretrievably deficient and require total replacement.



Chinese president Xi Jinping will be on a state visit to Britain this month from 20th to 23rd October during which EDF is hoping a complex multi-party deal will be signed between itself, Xi Jinping, Chinese state nuclear companies and the UK government to fully finance Hinkley C's construction, estimated to cost almost £25 billion. But the continuing problems with the Flamanville reactor vessel could turn the Chinese off altogether.

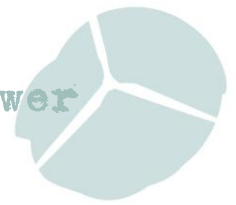
The Chinese are increasingly worried about their own two EPR reactors under construction at Taishan 1 and 2. Their reactor vessels and heads were also forged by Le Creusot and while test results have not been released, they probably suffer from the same or metallurgical defect of 'carbon aggregation' would result in long delays and cost escalations. In which case the last thing they would want is yet another failed EPR project on their hands!

As part of its support package the UK has offered investors in bonds to finance Hinkley C construction £17 billion in finance guarantees - meaning that they will get their capital and interest paid no matter what, at British taxpayer expense, even if the Hinkley C project and its shareholders all go belly up. The finance guarantees have been approved by the European Commission - but subject to a number of important conditions. One condition is that if the Flamanville reactor is not complete and operational by the end of 2020, the guarantees become invalid and bond holders must be repaid out of shareholder equity. At the time all this was being agreed the idea that Flamanville might not be completed by the end of 2020 would have been regarded as the height of improbability. However it now looks increasingly probable. But with the completion date now set as the fourth quarter of 2018, which is probably code for early 2019, it is getting painfully close to the 2020 cut-off date. Now the requirement to be imposed on EDF and Areva to carry out yet more tests on the Flamanville reactor vessel is certain to cause further delays. (5)

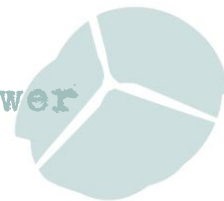
Other press reports have taken a slightly more optimistic view with *Building Magazine*, for instance asking whether the industry can finally start believing it will happen? George Osborne told the House of Lords' economic affairs committee that he was "pretty confident" a deal, with the two Chinese companies will happen, and Alistair Smith, chairman of the Institution of Mechanical Engineers' (IME) power division, said he is now "pretty sure that [Hinkley] is going to go ahead".

But even pro-nuclear Malcolm Grimston, senior research fellow at the Centre for Environmental Policy, Imperial College, says there are still significant doubts about it going ahead. It still depends on the decision of a financially-challenged EDF, which has seen its share price fall by 40% in the last year. Meanwhile disquiet about the costs of the project and its technical feasibility mean the scheme, which has previously been given cross-party support, is attracting increasingly influential opponents (see table). Another pro-nuclear academic, Ian Fells, emeritus professor of energy conversion at Newcastle University (and Small Modular Reactor supporter), says, all the government support can't mask the fact that the Hinkley project is in "something of a pickle." (6)

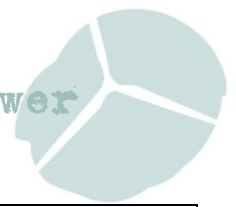
Since the Sunday Times declared on 21<sup>st</sup> June this year that there is a "real risk that Hinkley will come to be seen as a monumental blunder, the most expensive white elephant in British history" (7) there have been growing calls for it to be cancelled. Here's a selection of critical remarks made since the last nuClear News:



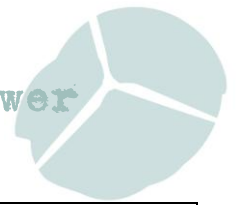
What they said	Who said it	Position	Source: Date
"...every sensible investor decided long ago to give this troubled project a wide berth."	Editorial	Observer	Observer 27 <sup>th</sup> Sept 2015 <a href="http://www.theguardian.com/business/2015/sep/27/hinkley-point-what-price-avoiding-humiliation">http://www.theguardian.com/business/2015/sep/27/hinkley-point-what-price-avoiding-humiliation</a>
"Hinkley: a truly major national scandal ... as absurd a project as any government has ever fallen for."	Christopher Booker	Columnist	Telegraph 26 <sup>th</sup> Sept 2015 <a href="http://www.telegraph.co.uk/comment/11893698/Hinkley-a-truly-major-national-scandal.html">http://www.telegraph.co.uk/comment/11893698/Hinkley-a-truly-major-national-scandal.html</a>
"Already the £24.5 billion project ... is expected to finish over-budget and beyond the projected start date of 2023, if it ever starts at all ...Mr Osborne may ... calculate that Hinkley Point will create numerous jobs and building opportunities [but] the costs, meanwhile, would not become apparent until the plant is completed and bills rise. Future governments would reap the fallout, not this one."	Editorial	Economist	Economist 26 <sup>th</sup> Sept 2015 <a href="http://www.economist.com/news/britain/21667932-britains-nuclear-plans-look-over-expensive-and-over-reliant-china-china-syndrome">http://www.economist.com/news/britain/21667932-britains-nuclear-plans-look-over-expensive-and-over-reliant-china-china-syndrome</a>
The UK government's deal with EDF, backed by Chinese investment, to construct new nuclear power plants at Hinkley Point, is too expensive, uses unreliable technology and is unlikely to be delivered to programme.	Lady Barbara Judge	Institute of Directors chairman, and former chairman of the UKAEA.	Infrastructure Intelligence 25 <sup>th</sup> Sept 2015 <a href="http://www.infrastructure-intelligence.com/article/sep-2015/french-nuclear-technology-too-expensive-and-unproven-says-iod-boss">http://www.infrastructure-intelligence.com/article/sep-2015/french-nuclear-technology-too-expensive-and-unproven-says-iod-boss</a>
"...there is more to Britain's national interest than a few billions of Chinese investment in a dodgy nuclear energy programme."	Editorial	Financial Times	FT Sept 24 2015 <a href="http://www.ft.com/cms/s/0/4d8cdea2-6210-11e5-9846-de406ccb37f2.html">http://www.ft.com/cms/s/0/4d8cdea2-6210-11e5-9846-de406ccb37f2.html</a>
"Only China wants to invest ...because no-one else thinks it will work."	Paraphrasing EDF	Indep'dent	Independent Sept 23 2015 <a href="http://www.independent.co.uk/news/business/only-china-wants-to-invest-in-britains-new-2bn-hinkley-point-nuclear-plant-because-no-">http://www.independent.co.uk/news/business/only-china-wants-to-invest-in-britains-new-2bn-hinkley-point-nuclear-plant-because-no-</a>



			one-else-10513752.html
“It is the costliest white elephant in history”	Simon Jenkins	Guardian Columnist	Guardian Sept 23 2015 <a href="http://www.theguardian.com/commentisfree/2015/sep/23/hinkley-point-squandermania-george-osborne-china">http://www.theguardian.com/commentisfree/2015/sep/23/hinkley-point-squandermania-george-osborne-china</a>
“We must avoid sleepwalking into commercial dependency on Chinese companies that are quasi-state owned. The national grid is essential for the survival of the nation. It does not have to be put up for sale to the highest bidder”	Editorial	The Times	The Times Sept 22 2015 <a href="http://www.thetimes.co.uk/tto/opinion/leaders/article4563849.ece">http://www.thetimes.co.uk/tto/opinion/leaders/article4563849.ece</a>
The Guardian view on Hinkley Point C: overcomplicated, overpriced and overdue	Editorial	Guardian	Guardian Sept 21 2015 <a href="http://www.theguardian.com/environment/damian-carrington-blog/2015/sep/21/hinkley-point-nuclear-station-enemies">http://www.theguardian.com/environment/damian-carrington-blog/2015/sep/21/hinkley-point-nuclear-station-enemies</a>
“(has) the chancellor ... seen and read internal reports from EDF and Areva, the two state-owned French nuclear firms, on what has gone wrong with the construction of the two “EPR” European pressurised reactors?”	Editorial	FT	FT Sept 21 2015 <a href="http://www.ft.com/cms/s/d0c8d010-6043-11e5-9846-de406ccb37f2.html">http://www.ft.com/cms/s/d0c8d010-6043-11e5-9846-de406ccb37f2.html</a>
Chancellor George Osborne and his Treasury cannot be trusted to run the UK’s energy policy	Editorial	The Ecologist	The Ecologist Sept 21 2015 <a href="http://www.theecologist.org/News/news_analysis/2985499/nuclear_madness_2_billion_for_hinkley_c_why_the_treasury_must_get_its_hands_off_energy.html">http://www.theecologist.org/News/news_analysis/2985499/nuclear_madness_2_billion_for_hinkley_c_why_the_treasury_must_get_its_hands_off_energy.html</a>
Hinkley is not just poor value for money – it’s an outrage	Editorial	Daily Express	Daily Express Sept 21 2015 <a href="http://www.express.co.uk/comment/expresscomment/607008/Ross-Clark-energy-climate-change">http://www.express.co.uk/comment/expresscomment/607008/Ross-Clark-energy-climate-change</a>
“Hinkley's prospective electricity looks scarily expensive.”	Robert Peston	BBC Economics Editor	BBC 21 <sup>st</sup> Sept 2015 <a href="http://www.bbc.co.uk/news/uk-england-somerset-34306997">http://www.bbc.co.uk/news/uk-england-somerset-34306997</a>
“Hinkley C bears all the distinguishing features	Messrs	Pro_nuclear	Guardian Sept 19 2015



of a white elephant: overpriced, overcomplicated and overdue. The delay that was announced recently should be the final straw. The government should kill the project”	Monbiot, Lynas, Goodall	columnists	<a href="http://www.theguardian.com/environment/2015/sep/18/we-are-pro-nuclear-but-hinkley-c-must-be-scrapped">http://www.theguardian.com/environment/2015/sep/18/we-are-pro-nuclear-but-hinkley-c-must-be-scrapped</a>
“We have just done this absolutely crazy deal with the French, EDF Energy, to produce nuclear energy which shows no sign of working and looks like being unbelievably expensive.”	Boris Johnson	Mayor of London	London Assembly 16th Sept 2015 <a href="http://questions.london.gov.uk/QuestionSearch/searchclient/questions/question_283622">http://questions.london.gov.uk/QuestionSearch/searchclient/questions/question_283622</a>
Hinkley Point is close to being another version of Kid’s Company ... the earnings before income and tax that will accrue to EDF if the deal goes ahead ... will exceed those of all the current big six electricity providers (including EDF itself) combined in 2014.	Nick Butler	Energy columnist	FT 14 <sup>th</sup> September 2015 <a href="http://blogs.ft.com/nick-butler/2015/09/14/new-nuclear-time-for-serious-renegotiation/">http://blogs.ft.com/nick-butler/2015/09/14/new-nuclear-time-for-serious-renegotiation/</a>
Five reasons NOT to build Hinkley C	Editorial	Bloomberg	Bloomberg New Energy Finance 13 <sup>th</sup> Sept 2015 <a href="http://about.bnef.com/landing-pages/five-reasons-build-hinkley/">http://about.bnef.com/landing-pages/five-reasons-build-hinkley/</a>
Consumers could end up paying more than £40 billion in subsidies to support Hinkley Point C	Antony Froggatt	Senior Research Fellow at Chatham House	Times 10 <sup>th</sup> September 2015 <a href="http://www.thetimes.co.uk/tto/business/industries/utilities/article4552404.ece">http://www.thetimes.co.uk/tto/business/industries/utilities/article4552404.ece</a>
“Shouldn’t we really go back to the drawing board, rather than plumping for what I think will be a kind of bottomless pit and a big white elephant?”	Lord Turnbull	Cabinet Secretary 2002 -05	Independent 9 <sup>th</sup> September 2015 <a href="http://www.independent.co.uk/news/business/news/hinkley-point-branded-nuclear-white-elephant-by-former-civil-service-chief-10492412.html">http://www.independent.co.uk/news/business/news/hinkley-point-branded-nuclear-white-elephant-by-former-civil-service-chief-10492412.html</a>
“UK should think again about Hinkley Point nuclear power station. The economics of EDF’s project looks less and less desirable ... The government should seize the chance ... to look at the whole misconceived project again ... If the economics does not make sense, it should	Editorial	Financial Times	FT 9 <sup>th</sup> September 2010 <a href="http://www.ft.com/cms/s/0/b07291aa-56ef-11e5-9846-de406ccb37f2.html">http://www.ft.com/cms/s/0/b07291aa-56ef-11e5-9846-de406ccb37f2.html</a>



consider scrapping the deal ..."			
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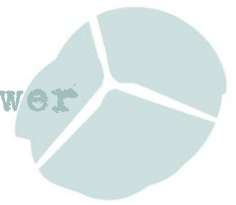
- “*We are pro-nuclear, but Hinkley C must be scrapped*” say George Monbiot, Mark Lynas and Chris Goodall. Overpriced, overcomplicated and overdue, the Hinkley project needs to be killed off and the money invested into other low-carbon technologies. The greatest problem Hinkley C imposes is energy blight. As the project is delayed, the power it would otherwise have generated is likely to be supplied instead by fossil fuel plants. If it does indeed turn out to be unconstructable, the result is likely to be a panicked scramble back into gas and even, perhaps, coal. The three urge the government to scrap Hinkley, and use the money promised to its investors to accelerate the deployment of other low carbon technologies, both renewable and perhaps small modular reactors. Apart from the support for SMRs (which would probably waste another decade) Greenpeace was saying more or less the same thing ten years ago. Why did it take these guys so long?
- Chris Goodall says UK support for low-carbon energy technologies is running at £250 million a year. Yet the government wants to throw four times more, every year for 35 years, at the Hinkley C which could take almost as long to build as Salisbury Cathedral. The UK is saddling itself with a billion pound burden each year for more than a generation. Unfortunately, the main competing design [to the EPR] also vying for permission to construct nuclear plants in the UK, Toshiba's AP1000, is also experiencing huge construction problems in China and the US. Electricity consumers in the state of Georgia have just had another 6% added to their bills to pay for the delays in the completion of the power station at Vogtle. If Hinkley takes until 2025 to finish, a baby born today will be 45 years old when the subsidy ceases. In many parts of the world, solar and wind are now costing little more than half what the UK government is promising EDF for its risky Somerset plan. Solar, in particular, is now priced at less than a quarter of five years ago and the cost reductions are continuing. Construction is 50 times faster. (9)
- Lisa Nandy, Labour’s new Shadow Secretary of State for Energy and Climate Change has written to Meg Hillier, the Chair of the Public Accounts Committee asking her and the committee to investigate the Chancellor’s proposals for paying for a new nuclear power station at Hinkley Point C. Nandy says she has serious concerns about the value for money this deal provides for bill payers, the likely impact of such a deal on the most vulnerable in society, and have serious questions about the bid process itself. (10) The Hinkley deal now faces a potentially damaging investigation by the National Audit Office followed by public hearings, according to *The Independent*. The investigation is likely to focus on whether the Government has chosen the right type of reactor to build and whether it would have made more sense to pay for the construction costs upfront through taxation rather than use private finance that will be paid back through bills. (11)

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1. Times 3rd Oct 2015

<http://www.thetimes.co.uk/tto/business/industries/utilities/article4574734.ece>





2. China Daily 2nd Oct 2015 [http://www.chinadaily.com.cn/world/2015-10/02/content\\_22051711.htm](http://www.chinadaily.com.cn/world/2015-10/02/content_22051711.htm)
3. Times 3rd Oct 2015  
<http://www.thetimes.co.uk/tto/business/industries/utilities/article4574734.ece>
4. Bloomberg 4th Sept 2015
5. <http://www.bloomberg.com/news/articles/2015-09-04/edf-s-latest-reactor-delay-adds-to-pressure-on-u-k-nuclear-plan> & Stop Hinkley 3<sup>rd</sup> Sept 2015  
<http://www.stophinkley.org/PressReleases/pr150903.pdf>
6. Ecologist 2nd Oct 2015  
[http://www.theecologist.org/News/news\\_analysis/2985650/flamanville\\_nuclear\\_safety\\_fail\\_sounds\\_death\\_knell\\_for\\_hinkley\\_c.html](http://www.theecologist.org/News/news_analysis/2985650/flamanville_nuclear_safety_fail_sounds_death_knell_for_hinkley_c.html)
7. Building 2nd Oct 2015 <http://www.building.co.uk/nuclear-haste/5077870.article>
8. Sunday Times 21<sup>st</sup> June 2015 <http://www.thesundaytimes.co.uk/sto/business/Industry/article1571248.ece>
9. Guardian 18th Sept 2015 <http://www.theguardian.com/environment/2015/sep/18/we-are-pro-nuclear-but-hinkley-c-must-be-scraped>
10. Ecologist 19th Sept 2015  
[http://www.theecologist.org/blogs\\_and\\_comments/commentators/2985491/hinkley\\_point\\_must\\_be\\_stopped\\_even\\_if\\_you\\_believe\\_in\\_nuclear.html](http://www.theecologist.org/blogs_and_comments/commentators/2985491/hinkley_point_must_be_stopped_even_if_you_believe_in_nuclear.html)
11. Labour List 28th Sept 2015 <http://labourlist.org/2015/09/we-need-an-investigation-into-osbornes-plans-for-nuclear-power-stations/> and Business Green 29th Sept 2015  
<http://www.businessgreen.com/bg/analysis/2427906/labour-demands-probe-into-hinkley-point-costs-to-taxpayers>
12. Independent 28th Sept 2015 <http://www.independent.co.uk/news/uk/politics/hinkley-point-c-plans-to-spend-billions-building-uk-nuclear-power-station-to-be-investigated-by-a6669881.html>





## 2. The National Infrastructure Commission

At the Conservative Party Conference George Osborne announced the establishment of a National Infrastructure Commission (NIC). (1) It looks as though this will take control over the entire energy policy brief out of the Department for Energy and Climate Change. Oliver Tickell, writing in the Ecologist, asks if this could be a way out of the Hinkley C debacle for the Government. (2)

Osborne told the Conference that he wants the NIC and its chairman Lord Adonis to begin work immediately: *"to make sure Britain has the energy supplies it needs."*

Tickell says: *"It was notable that in his speech on Monday Osborne had absolutely nothing to say about nuclear power or Hinkley C - even though he had only just returned from a trip to China to drum up controversial Chinese investment in Hinkley C and other nuclear power stations. That could reflect that fact that there is still no agreement over key elements of the proposed deal. Meanwhile questions proliferate - over safety fears, ballooning costs, why the UK energy consumer should be financing the Chinese Communist Party, and the wisdom of having the very company that makes China's nuclear weapons running nuclear plants in the UK."*

The first casualty of handing over decisions about energy to the NIC, which is answerable to the Treasury, could be Hinkley Point C.

The Treasury's information page on the NIC indicates some welcome strategic thinking on energy - something that has been almost entirely lacking in recent government policy. *"The UK's power sector has a growing problem in matching demand and supply, meaning that keeping the lights on requires a level of redundancy in the system - generation which is not always used. The NIC will look at how to optimise solutions to this problem, including through large scale power storage - where innovation is needed to bring down costs; demand management - how to incentivise flexibility in demand so we don't need as many power stations; and interconnection - how we best link the UK to the markets in the rest of Europe."* (3)

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1. Guardian 5<sup>th</sup> Oct 2015 <http://www.theguardian.com/politics/2015/oct/05/lord-adonis-to-resign-labour-whip-and-chair-george-osbornes-infrastructure-body>
  2. Ecologist 7th Oct 2015 [http://www.theecologist.org/News/news\\_analysis/2985705/uks\\_energy\\_revolution\\_deccs\\_role\\_usurped\\_by\\_new\\_infrastructure\\_commission.html](http://www.theecologist.org/News/news_analysis/2985705/uks_energy_revolution_deccs_role_usurped_by_new_infrastructure_commission.html)
  3. Treasury 5th Oct 2015 <https://www.gov.uk/government/news/chancellor-announces-major-plan-to-get-britain-building>



### 3. Is China really the sort of trading partner we want?

In return for investing in Hinkley it is thought the Bradwell site in Essex, next to the former nuclear power station, could be given over to a Chinese firm to build and run its own nuclear reactor design. (1) The China General Nuclear Power Group (CGN) has said it intends to apply in 2016 for a Generic Design Assessment (GDA) (2) to be carried out by the Office for Nuclear Regulation and the Environment Agency for the 1150 MWe Hualong One reactor design, with a view to building it at Bradwell. (3)

According to Amnesty International:

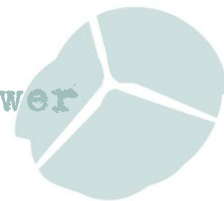
- China is the world's worst executioner – putting to death more people than the rest of the world put together;
- The country has some of the most brutal internet and press censorship in the world, and anyone who threatens that control is promptly stifled;
- More than 230 lawyers and activists have been targeted and branded as a 'criminal gang' by the Chinese authorities;
- Speaking out or criticising the government is a dangerous business;
- China has a depressing track record when it comes to arresting and jailing the lawyers who defend activists, dissidents and even ordinary people attempting to get justice;
- China is one of the major players in a booming torture trade which should have been confined to history. (4)

Writing in *The Observer*, columnist, and chair of the Big Innovation Centre, Will Hutton said:

*“Britain must be an open trading nation, welcoming inward investment just as it seeks to invest in others. But prostituting one's security and economic interests to a country whose values, practices and interests are wholly at odds with one's own is not openness but recklessness.”*

We are basically asking the Chinese Communist party to build nuclear power stations for us. And we cannot expect them to make sure as much work as possible is sourced in Britain. Hutton said Chinese state-owned companies are a byword, not least in China, for inefficiency, loss-making and politicisation of decision-making. He continues:

*“Transparency International [has] declared that China's companies were the least transparent of any it surveyed. The Chinese nuclear industry is a black box unpenetrated by independent Chinese scrutiny, let alone foreigners. But you can be certain that the regulatory processes and decision-making will be as politicised as everything else. This is China's strategic and military heartland, central to one-party control.”* (5)



## Poor Health and Safety Record

But it is China's poor health and safety record which is most worrying. With the power of the Chinese Government and the UK Government's enthusiasm for Chinese money the concern is that the UK's nuclear regulators will be sidestepped.

China's health and safety standards have been thrust into the spotlight this year by a series of chemical explosions. An explosion at a chemical plant in the eastern Chinese province of Shandong shortly before midnight on 31<sup>st</sup> August 2015 was the second to occur at a chemical plant in Shandong province in a matter of days. Although no casualties were reported, the blast happened about a fortnight after explosions in the port city of Tianjin, northern China, which killed over 145 people. In the wake of the Tianjin blast, the Communist Party has sacked the head of China's safety regulator, who was previously the vice mayor of the city. Shortly after, 12 government officials and company executives were detained. (6)

According to Ben Chu, author of *'Chinese Whispers: Why Everything You've Heard About China is Wrong'*, the disaster in Tianjin was the latest consequence of a system that places personal profit before public safety. He says in China today behind every industrial accident lies a reeking morass of corruption. Chinese state media reported that the son of a former local police chief was secretly a joint owner of the Tianjin warehouse that went up in a devastating fireball last week, killing 145 people, injuring 674 and damaging some 17,000 homes. He used his official connections to obtain licences for the warehouse, even though it flagrantly breached regulations prohibiting the storage of hazardous chemicals (sodium cyanide in this case) near residential areas. (7)

Does this also apply to nuclear safety? In May leading Chinese scientist He Zuoxiu described China's plans for a rapid expansion of nuclear power plants as "insane". He said the country had not invested enough in safety controls after lifting the post-Fukushima disaster moratorium on new reactor construction. He particularly criticised plans to build reactors inland, because if there was an accident it could contaminate rivers that hundreds of millions of people rely on for water and taint groundwater supplies to vast swathes of important farmlands. He also spoke of risks including "*corruption, poor management abilities and decision-making capabilities. China currently does not have enough experience to make sound judgments on whether there could be accidents,*" he said. Rather than encouraging debate to expose weaknesses, the government tries to stamp it out, and in a country where challenging officials is risky, there is no mechanism to encourage or protect whistleblowers. The safety watchdog is not independent. (8)

Jeffrey Henderson, Professor of International Development at Bristol University says the company which is planning to apply for a GDA of the Hualong One reactor – the China General Nuclear Power Corporation (CGN) used to be called the China Guangdong Nuclear Power company which was responsible for building and running China's first nuclear station, Daya Bay, near Hong Kong. It was initially improperly built – with reinforcement rods missing from the concrete base under the reactor – and there have since been reports of minor leakages of radioactive materials (though this is difficult to check, given China's lack of transparency). (9)

The Chinese Government has now ordered nuclear companies to undertake safety inspections into all the existing nuclear power generation facilities, following the Tianjin explosion. The Ministry of Environmental Protection said that the inspections are intended to make sure that



the manufacturing and utilization of nuclear equipment and technology, equipment used at uranium mines, and nuclear radiation are safe and under control. The safety checks on more than 50 nuclear power generating units, which are currently in operation or under construction in the country, are scheduled to be carried out by November. (10)

Whilst some might say that health and safety failings in China should not affect reactors in the UK, it is also worth noting that as far as Hinkley Point is concerned the participation of Chinese companies in the project will not be purely financial. EDF has already signed agreements with Chinese firms who will supply equipment for the nuclear station. (11) Henderson says the deeply corrupt environment in which many Chinese companies operate compounds the possibility of these companies being lax on safety measures and it's simply not good enough to say that Britain has one of the tightest nuclear safety regimes in the world. Confronted with the power of the Chinese government and the British government's enthusiasm for unceasing flows of Chinese investment, the risk must be that the regulatory agency will be sidestepped or unable to cope.

### A pernicious kleptocracy

Ben Chu gives several other examples of corruption leading to health and safety breaches. In 2008 a massive earthquake struck the western Sichuan region. Many rural school buildings collapsed, crushing hundreds of children to death. It emerged that many of the schools had been built with substandard materials. Local officials had apparently cut costs when they commissioned the buildings, pocketing the saving from the public budget for themselves.

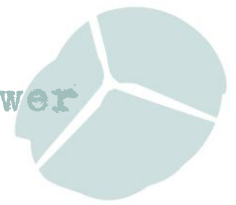
Chu says Corruption is endemic. Officials the length and breadth of the country have used their position to extort money for personal profit. He quotes Minxin Pei, an expert on governance in the country who says "*a pernicious kleptocracy has taken root in China.*"

One point which emerges from many of these stories is that to Chinese officials it is not the quality of investments that is important but the GDP growth which they promote. This is an attitude which seems to apply to Chinese investments abroad too. So, for instance roads constructed in Cambodia are badly built and the bridges are already cracking. Not a good attitude for would-be nuclear operators.

### Why do the Chinese want to invest in the UK?

The UK Government appears to be so desperate to get Hinkley Point C built that it is prepared to accept finance from a country whose values, practices and interests are wholly at odds with our own. When people as diverse as the Chancellor's father-in-law and the editors of the *Financial Times* are telling them the project is misconceived it is difficult to fathom their motives. (12) Perhaps at this late stage it is just a question of saving face.

Henderson says the £2 billion guarantee to the Chinese companies announced by George Osborne on his recent trip to China – and the undoubtedly far higher sums that will follow – will effectively result in the British taxpayer subsidising the Chinese Communist Party. *The Times* points out that the Government seems to be itching to give away billions of pounds we don't have to France and China. (13) The motives for the Chinese are clear – UK electricity consumers could end up sending a share of £40 billion in subsidies in their direction over the next 35 years.



(14) But the real prize for the Chinese will be if in return for financing an EPR reactor at Hinkley they can get their indigenous reactor design - the Hualong One – through the UK's Generic Design Assessment, and built at Bradwell in Essex. The hope is that by gaining the imprimatur of the UK's Office for Nuclear Regulation they can go on to sell their reactor design across the globe.

The Stop Hinkley China File is available at

[http://www.stophinkley.org/PressReleases/pr150922China\\_File.pdf](http://www.stophinkley.org/PressReleases/pr150922China_File.pdf)

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## 4. Baseload Renewables?

Nuclear power advocates cling to the idea of 'baseload' power like limpets, writes Michael Mariotte in *The Ecologist*, but the idea is obsolete. Variable renewables combined with stronger grids, energy storage and responsive demand can do a better job for less money. The old grid, beholden to massive, polluting baseload power plants, is being replaced by a nimbler, high-tech 21st century system oriented toward variable renewable energy. A grid based on smaller, distributed variable power sources can be just as reliable, and even more resilient and secure, than a grid reliant on baseload power. Variable does not mean unreliable: as long as it can be reliably projected with sufficient advance time what the wind will do and thus how much wind power will be available where, and the same for the sun, then a variable grid can be highly reliable. And those can be and are, in fact, reliably projected. Small Modular Reactors (SMRs) will be obsolete before they even exist. (1)

Keith Parker of the Nuclear Industry Association continues to claim that we need new nuclear power stations to help manage a system with an increasing amount of intermittent renewable generation. He says nuclear power can match output to demand and so save money by providing power when we need it – a very odd way of describing what baseload power does. He says nuclear is the only large-scale low-carbon option able to do this.

There is a role for gas in this system, he says, providing flexible generation at peak times. But it is not low-carbon and too much will leave UK consumers exposed to volatile gas prices and a reliance on foreign imports. The agreed price of £92.50/MWh for Hinkley Point C provides the certainty needed for EDF and its partners to make the largest inward investment in the UK's history.

Parker also points to the likelihood of increased demand from economic growth and increased electrification of transport and heating infrastructure in the near future. Even with flat or declining demand, we still need to replace infrastructure, or else we will become dependent on importing energy from sources, and at a cost, which is out of our control. (2)

Vincent de Rivaz, the chief executive of EDF, says nuclear energy is worth the investment because it provides “baseload” power which is available round-the-clock. (3)

Secretary of State for Energy, Amber Rudd, used a similar argument when giving evidence to the Energy and Climate Change Committee. She said “*We have to have secure baseload [electricity] so you should not be surprised that we are prepared to pay for it.*” (4)

A very different vision of an electricity network was put forward at a seminar hosted by the Energy & Climate Intelligence Unit. (5) A project called kombikraftwerk (6) based in Germany has shown how a 100% renewables system can be made to work - variable technologies like wind and solar backed up by despatchable ones such as hydro, biogas or biomass (and in the UK we could add tidal), reinforced by a variety of storage methods, with demand-side measures reducing overall demand and flattening peaks.





Steve Holliday, CEO of National Grid, the company that operates the power transmission networks in the UK and in the northeastern US, says the idea of large nuclear power stations to be used for baseload power is outdated:

*"The world is clearly moving towards much more distributed electricity production and towards microgrids. The pace of that development is uncertain. That depends on political decisions, regulatory incentives, consumer preferences, technological developments. But the direction is clear." (7)*

The other part of the pro-nuclear argument is that electricity consumption will increase because of the need to electrify heat and transport. Germany, which is planning an entirely non-nuclear route, even with the same 2050 objective of an 80% reduction in greenhouse gases, expects electricity demand to be 25% below present levels by 2050 whereas the UK Government has talked about a possible doubling or tripling of demand. If, instead the UK Government planned for a reduction of 25%, as in Germany, then the capacity required by 2025 would fall by around 15%, removing the need for new reactors. (8)

In fact, as we pointed out in nuClear News No.76 the claims that electricity demand will double 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%. Together Against Sizewell C (TASC) shows that it is possible to meet carbon targets without building new nuclear stations by relying more heavily on demand-side measures. 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.

In any case, Paul Dorfman, writing in *The Ecologist* argues, according to Ofgem any 'generation gap' is likely to happen before 2020 well before Hinkley could begin generation. (9)

Dorfman says there is good evidence to predict that UK onshore wind and PV will be at zero operational cost by 2025, and offshore wind will have a far lower operational cost than nuclear. (10) The pro-nuclear case is that we need a balanced portfolio of power sources. But the flip side to investment in Hinkley is low investment in renewable energy generation. This is because the government Levy Control Framework imposes a strict cap on low carbon energy financed from the public purse (from levies on the bills of energy consumers). (11)

And because the government will be contractually obliged to provide on-going State Aid for the incredibly long 35 year Hinkley contract, there will simply be very little money left over for renewables - as the Levy Control Framework budget will have been already consumed by nuclear. So Hinkley will crowd out investment in renewables. Greedy nuclear will have 'eaten all the pies' before renewables get a look in, and progress towards achieving overall targets for low-carbon renewable energy will inevitably falter.

All this being so (which it is), we can see why the government has been chopping and slashing at UK renewable funding, and why there is widespread concern at the failure to consider a purposeful energy efficiency stimulus for real diversity of supply.





In nuClear News No.73 we asked how a renewable dominated system could 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:-

- By using the right mix of renewables intermittency can be reduced;
- 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;
- By storing surplus renewable electricity which can be called upon when wind and solar production is low;
- Demand management – using various techniques to reduce demand at peak times;
- By calling on combined heat and power stations working in conjunction with heat storage to generate electricity at peak times.

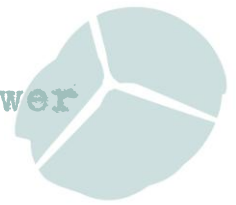
Professor Phil Taylor of Newcastle University and Dave Holmes of the Quarry Battery Company writing in Utility Week (18<sup>th</sup> – 24<sup>th</sup> September 2015) say that grid-scale storage could obviate the need for back-up fossil fuel power plants and effectively make wind and solar power baseload generation. If the surplus electricity from renewables can be captured for use later when the sun fails to shine or the wind fails to blow then we could manage without conventional baseload generating stations. At the moment we are stuck with a wasteful system which pays renewable generators to reduce output when there is a surplus, and then we have to use fossil fuels to meet demand when weather conditions result in low renewable generation.

Britain already has 2.8GW of pumped hydro electricity storage (PHES). Increasing the PHES capacity would be part of a more flexible grid system which exploited other storage technologies as well as demand management techniques. A UK survey has identified suitable locations with low planning risk for 10-50GWh of PHES.

Taylor and Holmes look at two scenarios – one in which a further 10GW of offshore wind is added to the 28-30GW that is already likely to be deployed by 2020 and backed up by 10GW of fossil fuelled generation. The second scenario halts offshore wind development at 31GW and the fossil fuelled back-up is replaced by 10GW/50GWh of PHES storage. Both scenarios deliver the same amount of useful electricity, but the second scenario is £3.6billion a year cheaper and produces 5million tonnes of carbon dioxide less.

Also especially interesting just now are batteries, an area of rapid technological development - and grid-linked battery systems in particular. Distributed energy-storage systems like Tesla's Powerwall or Moixa's Maslow will enable a new paradigm for how energy can be generated, distributed and used. Both battery systems have the potential to more than double the proportion of electricity generated by PV panels which can be used by the owner of the panels. Systems are being developed which can take control away from the big six fossil fuel energy companies and give it to the homes and businesses which use and generate the energy. (12)

Time, perhaps, to be demanding a National Policy Statement for energy storage.



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## 5. Radioactive waste “disposal” back to where it was around about 1977?

As Radioactive Waste Management Ltd launches yet another consultation there are still no potential sites for a so-called Geological Disposal Facility on the horizon, so it could be argued that the nuclear waste management programme is somewhere around about where it was in 1977. Yet the UK Government wants a new nuclear programme of at least 16GW, (See <http://www.no2nuclearpower.org.uk/radwaste/history-of-nuclear-waste-disposal-proposals-in-britain/>)

The latest consultation – “Providing Information on Geology” – is seeking views on proposals for assembling, and presenting to the public, information on the geology of England, Wales and Northern Ireland. These proposals are in effect the draft National Geological Screening (NGS) Guidance. RWM Ltd says the 12 week consultation, which runs until 4<sup>th</sup> December, is an important step to ensuring that the public plays a central role in the government and RWM programme of work to plan for, build, and operate a geological disposal facility (GDF). (1)

A series of public consultation workshops will be held across the country during October and early November. (2)

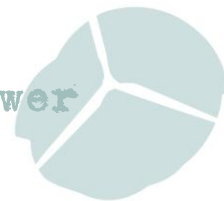
But this current consultation is only about bringing together existing relevant information to help inform early discussions with communities about their potential suitability to host a GDF. It won't rule all areas as suitable or unsuitable, but it is possible that it might rule out some areas.

RWM Ltd says the “*geological barrier has an important role in providing safety in the very long term*”. Cumbria Trust (CT) says this downplays the role of geology – its role is vital. (3) CT says that since all ‘engineered solutions’ will fail on geological timescales – only the best geological solutions should be considered. It must inevitably follow that a national search for the optimum location for a GDF should be undertaken before seeking community support for such an undertaking. (4)

A previous consultation (5) by DECC which closed on 5<sup>th</sup> December 2013 looked at how to take forward the Managing Radioactive Waste Safely Programme. This document claimed that:

*“There is a large range of potentially suitable geological settings in the UK (e.g. the Environment Agency have identified 9 potentially suitable generic settings). Due to this wide range, it is difficult to define simple high level criteria which could be applied effectively at a national level. Different sites will have different potential advantages, and the engineered elements can be tailored to these. It will not be possible to say, in advance of any work being carried out, that one is ‘better’ than another.”*

Yet it was clear in the West Cumbria Managing Radioactive Waste Safely Partnership Report that the Nuclear Decommission Authority’s (NDA) Radioactive Waste Management Directorate (RWMD) was only looking for a site which was “*sufficiently good*”. RWMD’s view was that “*although characterising and demonstrating safety is more challenging for a comparatively*



*complex site [as sites in West Cumbria would be geologically speaking] than for a simpler site this does not prevent complex sites from being considered". (6)*

The Nuclear Free Local Authorities called for a national debate about whether the objective is to look for the best available geology for the job or whether to use mediocre geology and rely more heavily on engineered barriers. The heavy additional costs – quite likely to be in the billions of pounds category - of an engineered solution should also be calculated and publicised before undertaking such a solution as well. (7)

Greenpeace's submission to the 2013 consultation expressed concern that a community's right to withdraw from the process could be removed before detailed information about the geology had been obtained. (8)

Following the 2013 Consultation the Government published, in July 2014, a renewed process for siting a Geological Disposal Facility. The Implementing Geological Disposal White Paper outlined an approach based on working with interested communities, beginning with two years of initial actions overseen by Government and intended to address issues raised by the public and stakeholders. (9)

The White Paper is unclear about when the right to withdraw will be removed. A Community Representation Working Group is expected to provide "*greater clarity around the point at which a test of public support might be considered appropriate, and the method by which such a test could be carried out.*" The right to withdraw would end after a positive result from a test of public support. (10) The White Paper says:

*"Once the developer is satisfied that it has sufficient information to demonstrate that a site is suitable then, subject to a test of public support then the granting of development consent and the approval of the independent regulators, construction of a GDF could proceed."*

Nevertheless the following concerns also remain:

- How public support will be tested given the poor precedent set during the West Cumbria Partnership process;
- The lack of funding for independent third party advice for communities;
- The use of the undemocratic National Infrastructure Planning Process

Earlier this year the Department of Energy and Climate Change held a consultation on Working with Communities. (11) The Cumbria Trust Response to this consultation called for only areas with "good" geology to be eligible to volunteer to host a GDF. The Trust's concerns were encapsulated in the following statement:

*"Conflicting information from representatives of RWM is already evident. In a radio broadcast on Radio Cumbria (18.8.15) we were being assured that volunteer host communities will have the right to withdraw right up to late in the process whilst the previous day it was reported in the national press that another representative had stated: "Whilst the opinions of local communities would be taken into account he accepted that ultimately the Secretary of State now had the power to override communities". (12)*



The Response from No Nuke Dumping says there is no guarantee that a geological disposal facility can contain radionuclides long-term. The group does not therefore support the context of this “call for evidence” as we believe it is scientifically, morally and environmentally un-sound to dispose of high-level radioactive waste in a GDF, under the terms of a Nationally Significantly Infrastructure Project (NSIP) (13).

- Meanwhile because the Energy Act 2004 requires the NDA to review, update and consult on its Strategy every 5 years the NDA has released a document to give stakeholders the opportunity to provide their input whilst its review is being completed. The NDA wants to know if it is “asking the right questions?” (14)
- The Environment Agency and the Office for Nuclear Regulation have published a Summary of work carried out to scrutinise the work of Radioactive Waste Management Limited (RWM). (15)
- DECC has published “The UK’s National Programme and Report to the EU Commission on the responsible and safe management of spent fuel and radioactive waste.” (16)

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## 6. Will Bradwell get a Chinese Reactor?

It is now pretty clear that David Cameron will sign an agreement with the Chinese Government, at the time of the State Visit of President Xi Jinping on 20<sup>th</sup> October, that will enable two Chinese state-owned nuclear companies to develop the site at Bradwell which is currently owned by EDF, says the Blackwater Against New Nuclear Group. (BANNG)

The development could happen rather quicker than anyone might have imagined, says the group because of the financial problems and delays with Hinkley Point.

*“Cameron’s folly means the sacrifice of the Blackwater estuary,”* said Professor Andy Blowers, Chair of the Blackwater Against New Nuclear Group (BANNG). *“Basically, the estuary will be trashed if this goes ahead.”*

*“This love-in between the British and Chinese Governments takes absolutely no account of the impact and implications that will be unleashed on the Blackwater estuary. The obstacles, including the problems of cooling water from such a shallow estuary, are massive”.*

Barry Turner, Vice Chair of BANNG, commented: *“For BANNG, the simple fact is that the Bradwell site is totally unsuitable for a new power station no matter who the developer might be. The delicate Blackwater estuary cannot cope with the demands of a new nuclear power station without its effective destruction. The long-term risks from rising sea-levels and coastal change will be phenomenal leaving not only a power station with all its inherent dangers but an everlasting residue of dangerous radioactive wastes on a site that is likely to disappear over the next two centuries. There is no thought for the future in this and it is immoral to be undertaking such an enterprise on such a location. Bringing such a monster to the Blackwater is nothing short of monstrous”.*

In return for helping out with the increasingly expensive Hinkley Point plant in Somerset, the Chinese have been told they can use the site of an old nuclear power station at Bradwell-on-Sea, on the Blackwater estuary, to build a reactor of their own design. *“I am not worried about the Chinese. I am worried about us”*, says Charles Clover writing in the *Sunday Times*. For it is an open question whether British standards of regulation are up to the expectations of people who live in places such as West Mersea, just across the water from Bradwell.

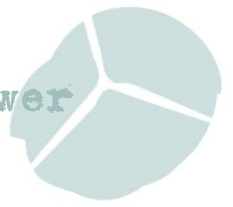
*“We have some excellent regulations in Britain, but the problem is that all too often we choose to ignore them. I believe the public can live with the risks of the nuclear industry as long as there is transparency, and that there is not an instant return to the culture of secrecy and political influence over regulators that some of us remember from Sellafield in the bad old days. For if we wish to have both electricity and oysters, the problem is ourselves, not the Chinese.”* (2)

A peaceful protest including a flotilla of boats was held on Mersea Island by campaigners on 4<sup>th</sup> October. (3)

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1. BANNG 17th Sept 2015 <http://www.banng.info/>





2. **Sunday Times 27th Sept 2015**  
<http://www.thesundaytimes.co.uk/sto/comment/columns/charlesclover/article1611978.ece>
3. **Maldon Standard 5th Oct 2015**  
[http://www.maldonandburnhamstandard.co.uk/news/13804667.We\\_dont\\_want\\_risk\\_of\\_power\\_plant\\_here/](http://www.maldonandburnhamstandard.co.uk/news/13804667.We_dont_want_risk_of_power_plant_here/)



## 7. Energy Costs

Chancellor George Osborne told Parliament in September that electricity from Hinkley C nuclear plant would be cheaper than onshore wind. That could be true on Planet Zog, says Doug Parr, but here on Earth the reverse is the case. Exactly what are Osborne and his Treasury mandarins smoking?

In contrast the *Financial Times* has joined environmental campaigners in saying that Hinkley should be abandoned because *"the cost of alternative low carbon sources, such as solar, and better battery technology, is falling fast."* (1)

Osborne is quite wrong about the cost of onshore wind. IRENA, the International Renewable Energy Agency, has already done a UK-specific calculation on this which finds the cost of onshore wind to be far lower - well under £80 per MWh even after all the costs of managing intermittency are included.

The results of the first government contract for difference auction for renewables were published in February this year. They showed: Onshore wind – average price of £82/MWh; Large scale solar – £79.2/MWh; Energy from waste with combined heat and power - £80/MWh. (2)

In fact, onshore wind energy has now become cheaper than electricity from any other source in the UK for the first time, in what could be a landmark moment for renewable energy in Britain. New figures show onshore wind is cheaper energy than coal, oil or gas. Onshore wind farms currently produce about 60 per cent of the UK's wind power output. Although they are set to remain the predominant form of renewable energy in the next few years despite opposition in Westminster - which has stopped subsidies and given the final say on whether a project should go ahead to local residents - supporters of green energy say the country is missing a chance to maximise their potential. (3)

According to Bloomberg New Energy Finance (BNEF) onshore wind costs have dropped to £55/MWh compared with £74/MWh for constructing coal or gas-fired plants. (4)

The government should offer "subsidy free" contracts to onshore wind farms, instead of scrapping financial support for the sector if it wants to decarbonise the economy at the lowest possible cost to consumers, according to the centre-right think tank Policy Exchange. The PE report claims that offering "subsidy-free" contracts would divert all new onshore wind developments to Scotland and halt deployment in England, potentially providing a political win for Conservative MPs in England who have campaigned against new projects in their constituencies, at the same time as the SNP has attacked plans to halt onshore wind farm development. Policy Exchange's report, *Powering Up: The future of onshore wind in the UK*, argues onshore wind should continue to receive contracts but without subsidies. Payments should be capped and reduced over time, so that they effectively become 'subsidy free' by 2020, the report says. Policy Exchange predicts such a move would help the onshore wind industry reduce costs from £85/MWh to approximately £60/MWh by 2020, putting it on a par with new gas plants, which are currently the cheapest form of new generation. (5)



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1. Ecologist 10th Sept 2015  
[http://www.theecologist.org/blogs\\_and\\_comments/commentators/2985371/osbornes\\_nuclear\\_fantasies\\_can\\_you\\_hear\\_me\\_major\\_tom.html](http://www.theecologist.org/blogs_and_comments/commentators/2985371/osbornes_nuclear_fantasies_can_you_hear_me_major_tom.html)
  2. Euractiv 9th Sept 2015 <http://www.euractiv.com/sections/energy/osborne-ridiculed-over-cheap-nuclear-claims-317497>
  3. Independent 7th Oct 2015 <http://www.independent.co.uk/environment/wind-power-now-the-cheapest-source-of-electricity-but-the-government-continues-to-resist-onshore-a6685326.html>
  4. Guardian 7th Oct 2015 <http://www.theguardian.com/environment/2015/oct/07/onshore-wind-farms-cheapest-form-of-uk-electricity-report-shows> and Scientific American 6th Oct 2015 <http://blogs.scientificamerican.com/plugged-in/report-onshore-wind-is-fully-competitive-versus-fossil-fuels-in-some-parts-of-the-world/>
  5. Business Green 28th Aug 2015 <http://www.businessgreen.com/bg/analysis/2423730/report-subsidy-free-wind-energy-contracts-offer-cheapest-route-to-decarbonisation>