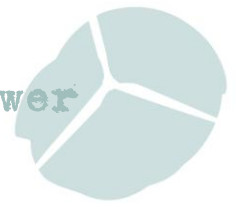


No.93 March 2017

1. **Failing New Nuclear Programme should be Scrapped**
2. **Decentralised Energy – it's the future**
3. **Hinkley Point C – “risky and poor value for money”**
4. **Brexatom – Bonkers or an Opportunity?**
5. **What if nuclear stations don't come to fruition**



1. Failing New Nuclear Programme should be Scrapped

Toshiba's announcement that it will not be involved in the construction of new nuclear reactors at the Sellafield 'Moorside' site in Cumbria has thrown into sharp relief the sorry state of the UK's new nuclear policy which is clearly failing to deliver. It is obvious now that it can only be delivered with huge public subsidies the country can ill afford at a time when public services are under intense strain.

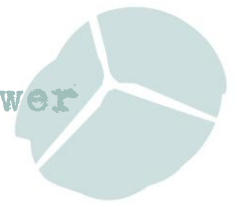
Toshiba announced on 14th February that it expects to book a €5.9bn write-down on Westinghouse – more than it paid to buy a majority stake in the Company from the British government's BNFL in 2006 – and it expects to report a net loss of €3.2bn in the fiscal year to March 2017. Audited figures are now due on March 14.

The mess has been caused mainly by the delayed and over-budget AP1000 reactors being built in the US. The cost to complete four AP1000 reactors – two each in South Carolina and Georgia – will "*far surpass the original estimates*". Combined, the cost overruns exceed US\$10 billion. And since there is still a long way to go before construction of the four reactors is complete, there is plenty of scope for further cost overruns. (1) There is now even talk of the possibility of bankruptcy for Toshiba. Former Westinghouse boss Shigenori Shiga, appointed as chair of Toshiba following a US\$1.3 billion accounting scandal in 2015, stood down from his position on February 14.

Toshiba says it would like to sell Westinghouse if that was an option – but there is no prospect of a buyer. The nuclear unit is, as *Bloomberg* noted, "*too much of a mess*" to sell. And since that isn't an option, Toshiba must sell profitable businesses instead to stave off bankruptcy. The company plans to sell most – perhaps all – of its profitable microchip business to prop up the nuclear carcass and avoid bankruptcy. The company might get €12.3–16.1bn by selling its entire stake in its microchip business, said Joel Hruska from *ExtremeTech*. "*That would pay off the company's immediate debts,*" Hruska said, "*but would leave it holding the bag on an incredibly expensive, underwhelming nuclear business with no prospects for near-term improvement.*" (2)

The ripple-effects of Toshiba's latest problems will be many and varied. Japan's ambitions to develop a large nuclear export business are in tatters. As recently as last year, Toshiba said it hoped to win 50 contracts to build new nuclear plants in India and China over the next decade. As well as Moorside reactor construction projects being planned in Turkey and elsewhere are up in the air.

But it is not just Toshiba that is in crisis. Over the past decade, international energy utilities E-on, RWE Npower, Iberdrola, SSE and Centrica have all confidently announced their commitment to building new nuclear power stations, whether at Hinkley Point, Wylfa or Moorside, but then had to pull out as they realise they cannot afford the huge levels of investment that such projects require. (3) In Europe, energy giants EDF, Engie (France), E.ON, RWE (Germany) and Vattenfall (Sweden), as well as utilities TVO (Finland) and CEZ (Czech Republic), have all been



downgraded by credit rating agencies over the past year. All of the utilities registered severe losses on the stock market.

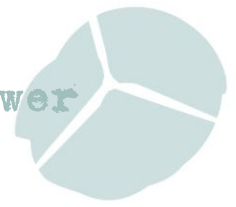
EDF

The French government is selling assets so it can prop up its heavily indebted nuclear utilities. EDF announced in 2015 that it would divest €10bn of assets by 2020 to ease its debt load – which now stands at €37.4bn. EDF, which is supposed to be building a new nuclear plant at Hinkley Point, issued three profit warnings last year following a string of unplanned nuclear plant shutdowns. EDF is contending with a government-directed restructuring of the French nuclear industry, and is being pushed by the French state, its controlling shareholder, to rescue reactor builder Areva by taking over the part of its struggling business that is behind EPR technology. The EPR reactor that EDF is building at Flamanville in France is already six years late and €7.2bn over budget. A large drop in French nuclear output over the winter due to safety inspections on 18 of its French reactors, at the request of the country's nuclear regulator ASN, was partly to blame for a sharp drop in profits. Furthermore, the company is saddled with debt and needs to spend €55bn upgrading its existing reactors in France. (4) A recent report for Greenpeace France suggests that if EDF has to close 17 of its 58 reactors to meet the government's requirement that nuclear power should provide 50% of the nation's electricity in 2025, then EDF will have to increase its provisions by more than €20 billion. The cost of handling nuclear waste will add at least €33.5 billion to that figure. (5)

A French parliamentary committee said that EDF would need a public bailout to meet the cost of closing ageing power stations. The warning was issued after unions expressed fury about an announcement that EDF plans to cut 3,900 jobs in France over the next three years. Jean-Marc Sylvestre, an economics commentator, said that the group was on the "*edge of a precipice*" and faced a choice between privatisation and bankruptcy. He described EDF's situation as a "*catastrophe foretold*". EDF's critics say that the company, which has debts of more than €37 billion lacks the financial resources to meet its commitments in France, let alone embark upon the Hinkley Point scheme. Their concerns were fuelled with the publication of a report by the committee for sustainable development, which accused EDF of failing to plan for the dismantling of its plants. (6) EDF has only set aside €36 billion to pay to clean up reactors at the end of their working lives, whereas it needs €75 billion. EDF disputes the figures. (7)

Hitachi

Meanwhile the Japanese company Hitachi which is planning to build the proposed plant at Wylfa on Anglesey, is set to lose tens of billions of yen this financial year after withdrawing from a uranium enrichment joint venture in the US. Hitachi is expected to report a 70 billion yen (\$620 million) non-operating loss by the time books are closed at the end of March. The deficit is largely attributed to the joint venture GE Hitachi Nuclear Energy Inc. withdrawing from the uranium enrichment project. Hitachi no longer expects any profits from the North Carolina-based company, of which it owns 40% and the rest by General Electric. Hitachi and GE were expecting more nuclear power plants to be built when they launched the joint fuel enrichment business, but orders have been sluggish across the globe, forcing the project to be shelved. Nevertheless, Hitachi says it will be sticking with its nuclear power business. The company said



that it plans to proceed with its project to build a plant in Britain by ensuring costs are thoroughly managed. (8)

In its favour is the fact that four ABWR reactors – the type of reactor it wants to build at Wylfa - have actually been built, in Japan. But their reliability has been poor. (9) The 2011 accident at Fukushima closed down all Japanese reactors, but according to IAEA the load factor - the proportion of time the reactors were generating power - for those ABWRs in the period between 2007-11 had been below 50%. (10)

Moorside Doubts

Plans for three new AP1000 reactors to be built at Moorside in Cumbria next to Sellafield are now at risk from the financial crisis engulfing Toshiba. Toshiba owns 60% of Nugen, the consortium working on the plans. Nugen has said it wants to take a final investment decision by the end of 2018 in order to generate the first power in about 2025. However, it already faces an uphill battle to secure financing in time. Toshiba and France's Engie, which owns the remaining 40% of NuGen, are believed to have been in talks for months with South Korea's Kepco and are also understood to be talking to the UK and Japanese governments about potential financial support. (11)

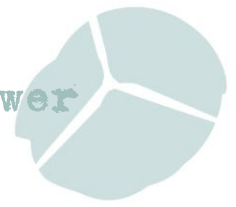
But Kepco told the FT that it was not in talks with Toshiba about participation in NuGen, although several people involved in the process said South Korean investment was the best chance of keeping the project alive. *"It's hard to see how Moorside can go ahead without Kepco,"* said one senior nuclear industry figure. It is thought that if Kepco were to get involved it would prefer to use its own reactor design, the APR-1400, rather than Westinghouse's AP1000. This would set the project back at least four years because the Korean technology would need approval from UK regulators, while Westinghouse's has nearly completed the clearance process. (12)

Cumbrians may be glad to see the back of corruption-plagued Toshiba – but corruption-plagued South Korean utility KEPCO wouldn't be much of an improvement. Cumbrians Opposed to a Radioactive Environment (CORE) commented: *"KEPCO is itself still emerging from a major scandal that surfaced in 2012 involving bribery, corruption and faked safety tests for critical nuclear plant equipment which resulted in a prolonged shut-down of a number of nuclear power stations and the jailing of power engineers and parts suppliers."* (13)

Engie has also sounded increasingly lukewarm about Nugen, with Isabelle Kocher, chief executive, saying last year that there was *"a place for nuclear new-build in the world, but less than before"*. In December it was reported that Engie would like to abandon its 40% share of Nugen. (14)

US nuclear firms can only deal with overseas companies if the countries have a nuclear co-operation agreement. The US holds such an agreement with Euratom but not with the UK, raising the possibility that Westinghouse could be unable to continue working on the project once Britain leaves Euratom until a new bilateral deal is signed.

After much speculation that Toshiba would withdraw from the NuGen consortium, it now says it will *"consider"* a continued role in the development, so long as it can avoid any involvement in



construction. Having completed a review of overseas nuclear operations, the company said it will seek to “*exclude risk inherent on construction work and focus on equipment supply and engineering*” in future. (15)

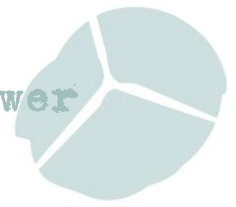
If NuGen is to make a final investment decision in 2018 and get the reactors up and running by 2025 there are huge challenges still to be overcome – a timescale many in the industry already think is highly unrealistic. The fact that Toshiba will no longer take on any of the financial risk of construction means Moorside is only likely to go ahead if new investors can be found to build the plant. (16)

Clamour for new Nuclear Subsidies

GMB national secretary for energy Justin Bowden reiterated his call for the government to bankroll the project. “*It is time for government to show leadership and take over the reins at Moorside,*” said Bowden. “*The fiasco with Toshiba shows exactly why relying on foreign companies for our energy needs is just plain stupid.*” Tim Yeo, a former minister and chairman of New Nuclear Watch Europe, a pro-nuclear group, said Moorside provided a “prime opportunity” for Theresa May’s administration to demonstrate its industrial strategy with support for the UK nuclear supply chain. He said that with lingering doubts over the viability of Hinkley Point and Wylfa “*the only way forward is if the government is willing to participate*”. This could involve the government taking a minority stake, or providing loans that would be repaid after construction was complete, added Mr Yeo. (17) The GMB says Moorside is vital as Sellafield’s workforce starts shrinking. By 2020 up to 3,000 jobs could be lost as the Thorp nuclear fuel facility closes and reprocessing of Magnox fuel ends. (18)

Ministers should also actively encourage investment from nuclear companies in China, South Korea and Russia where the industry is relatively insulated from the challenges faced by European companies thanks to strong state backing, says Yeo - there is a real danger that the pipeline of nuclear projects will fail to come on stream before 2030 unless Government agrees to intervene. The existing support regime, which guarantees a fixed price for each megawatt of power produced, does not go far enough to help investors who face billions in construction costs before the nuclear plant begins producing power. The Government should offer loans to developers which can be paid back once the plant comes on stream, or take an equity stake in the project which could be sold off to investors when construction is complete. “*In neither case would the Government’s support constitute a permanent subsidy. It would directly cut the cost of electricity produced by the new plant because the Government’s borrowing costs will be lower than those of any private investor,*” says Yeo. (19)

Right on cue, says Greenpeace Policy Director, Doug Parr, stories have begun to appear in the press saying that government is thinking about or even “*under pressure*” to inject huge amounts of taxpayers cash into new reactors in order to get them built. “*Neither proposed plant (Moorside and Wylfa) is crying out as a good bet for a private investor*” says Parr. “*So why would it be a better investment for a government? Or for British taxpayers?*” If the UK government takes stakes in these projects, it would be expensive. A 25% share in both Moorside and Wylfa on Anglesey could cost over £7 billion - and that’s before taking into account the cost overruns synonymous with nuclear projects. That would still leave over £20bn to find from other investors, but is a substantial commitment of public money. So it is worth spending a few



moments to consider why direct government funding of these nuclear stations is such an eccentric and ill-conceived idea. (20)

First, why do these projects need public funding? The obvious answer is that private investors think they are too risky and too poor a return, even at the high price of £92.50 (2012 prices) that EDF got for their Hinkley Point plant. So why are they risky? Well, one of key reasons Toshiba is in such deep financial trouble is that its reactor design, the AP1000, has never been completed and operated, and is actually more costly and difficult to build than it thought. Its four AP1000 reactors now under construction in the US are ruinously late and over-budget.

Tens of billions of taxpayers' money are at risk as pressure mounts to spend billions more on new nuclear, according to Dr Dave Toke, reader in energy politics at Aberdeen University. Giant portions of the public spending could be poured down a nuclear black hole as calls for the Government to make direct investments into new nuclear power plant intensify. Ultimately the sums at risk would be much larger than the Government's own estimates of the cost of Trident. There has been a flurry of demands for government investment in new nuclear projects in the wake of the near bankruptcy of Toshiba. In fact nuclear power is proving to be virtually undeliverable and ruinously expensive in western countries. Despite the manifest bankruptcy of the technology, rather than question whether it is right to continue with the new nuclear programme, its supporters are in effect wanting us all to bet the British economy on it. If the Treasury are forced against their will to sanction 'equity' stakes in new nuclear reactors, the losses and, eventually, all the liabilities will fall on the taxpayer. (21)

Companies vying to build nuclear power stations in the UK have been told they must offer a price for their electricity sharply lower than the £92.50/MWh approved for Hinkley Point C, according to the FT. Prices 15-20% lower are seen as crucial to maintaining political support for new nuclear plants. *"One of the biggest factors pushing up the strike price is the cost of capital. If government wants a low strike price, it is pretty clear that government has to think about a different kind of [financing] solution,"* said one of the industry leaders. The FT says the government remains cautious about the idea of investing taxpayers' money in nuclear power. One source told the FT there were signs the government wanted to pit NuGen and Horizon against each other in a competitive process, with no guarantee that both would go ahead. (22)

The *Sunday Times* said ministers are poised to admit that taxpayer cash will be used to fund a new fleet of nuclear power stations – reversing years of government opposition to direct public subsidy. Industry sources claim the business and energy secretary, Greg Clark, accepts that the hands-off approach cannot persist if the plants are to be built. They say Whitehall is preparing to launch a consultation, possibly this summer, on the government taking minority equity stakes in new nuclear projects to kick-start their construction. British taxpayer cash will probably be matched with funds from the Japanese government, possibly via the Japan Bank for International Co-operation and Nippon Export and Investment Insurance. Japan's Hitachi, which is behind the Wylfa project, is locked in talks with the British and Japanese governments over how to fund the 2.7-gigawatt station. The consultation on state equity is likely to be launched alongside an outline deal on funding Wylfa. Sources said the deal and the consultation are not certain and could yet collapse. (23)

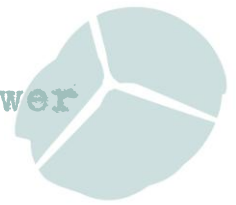


Treasury officials are still hostile to the direct state subsidy idea but Chancellor Philip Hammond, and business secretary, Greg Clark, have both taken part in talks over support for Wylfa and Moorside. Any deal would have to overcome opposition from parts of the Treasury, which has for decades resisted the idea of direct government investment in the expensive and risky business of building nuclear reactors. (24)

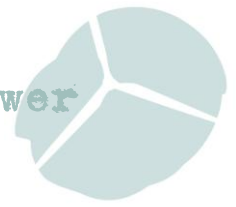
There are plenty of alternatives to new reactors, so the only reason the Government might be considering investing taxpayers' money is because it considers that nuclear has a "crucial role" in decarbonisation of the power sector. Because their own (unpublished and therefore unverifiable by informed external experts) *"analysis tells us that decarbonisation of the power sector can be achieved most cheaply, securely and reliably if nuclear remains a core part of the UK's energy system."* This is an increasingly contentious statement.

Stop Hinkley spokesperson Roy Pumfrey said: *"If you look around the country you find local authorities and communities that are still finding ways to take control of their own energy and make the economic case to install renewables despite cuts in subsidies. What we have in Somerset is a large hole in the ground and worsening traffic jams, with no guarantee that it will lead to anything because of the parlous state of the French nuclear industry. The Hinkley Point C site represents a huge missed opportunity. It is time we switched course and got on with the job of making Somerset fit for a low carbon sustainable future."* (25)

-
1. FT 17th Feb 2017 <https://www.ft.com/content/b7053ab4-f45e-11e6-95ee-f14e55513608>
 2. Energy Post 23rd Feb 2017 <http://energypost.eu/nuclear-safety-undermines-nuclear-economics/>
 3. NFLA Press Release 15th February 2017 <http://www.nuclearpolicy.info/news/toshiba-want-out-moorside-nuclear-project-uk-needs-new-energy-policy/>
 4. Ecologist 3rd Feb 2017
http://www.theecologist.org/News/news_analysis/2988607/not_just_toshiba_the_global_nuclear_industry_is_in_crisis_everywhere.html
 5. Times 18th November 2016 <http://www.thetimes.co.uk/edition/business/true-cost-of-reactors-would-bankrupt-edf-kh35gj7d0>
 6. Times 6th Feb 2017 <http://www.thetimes.co.uk/edition/business/edf-too-poor-to-clean-up-its-own-mess-z3dgd6tb0>
 7. World Nuclear News 2nd Feb 2017 <http://www.world-nuclear-news.org/WR-EDF-defends-reactor-decommissioning-plans-0202174.html>
 8. Asahi Shimbun 2nd Feb 2017 <http://www.asahi.com/ajw/articles/AJ201702020042.html>
 9. Ecologist 4th April 2014
http://www.theecologist.org/News/news_analysis/2343733/nuclear_power_the_hitachi_abwr_is_not_justified.html
 10. Nuclear Power Reactors in the World, IAEA, 2012 http://www-pub.iaea.org/MTCD/Publications/PDF/RDS2-32_web.pdf
 11. Times 28th Jan 2017 <http://www.thetimes.co.uk/edition/business/toshiba-cash-crisis-puts-cumbria-nuclear-project-under-threat-hj37z8b3t>
 12. FT 14th Feb 2017 <https://www.ft.com/content/flf77a62-f2ae-11e6-95ee-f14e55513608>
 13. CORE 2nd Feb 2017 <http://corecumbria.co.uk/news/moorside-or-doomrise-nugen-or-nogen/>



14. BFM Business 7th Dec 2016 <http://bfmbusiness.bfmtv.com/entreprise/engie-veut-sortir-dunucleaire-1067637.html>
15. Utility Week 14th Feb 2017 <http://utilityweek.co.uk/news/Toshiba-to-%E2%80%98consider%E2%80%99-continued-role-in-Moorside/1295792>
16. Times 15th Feb 2017 <http://www.thetimes.co.uk/edition/business/toshiba-crisis-risks-future-of-cumbria-nuclear-plant-5h5xnjk8>
17. FT 14th Feb 2017 <https://www.ft.com/content/f1f77a62-f2ae-11e6-95ee-f14e55513608>
18. FT 14th Feb 2017 <https://www.ft.com/content/bae9a6d8-f2c4-11e6-8758-6876151821a6>
19. Telegraph 25th Feb 2017 <http://www.telegraph.co.uk/business/2017/02/25/yeo-treasury-needs-pour-billions-nuclear-projects/>
20. Ecologist 14th Feb 2017
http://www.theecologist.org/blogs_and_comments/commentators/2988642/keep_uk_taxpayers_off_the_hook_for_moorside_nuclear_black_hole.html
21. Dave Toke's Blog 26th February 2017 <http://realfeed-intariffs.blogspot.co.uk/2017/02/tens-of-billions-of-taxpayers-money-at.html>
22. FT 15th Feb 2017 <https://www.ft.com/content/d6353f68-f38e-11e6-8758-6876151821a6>
23. Sunday Times 21st Feb 2017 <http://www.thetimes.co.uk/edition/business/ministers-forced-to-throw-taxpayers-cash-at-nuclear-plants-ptqs9w5jn>
24. FT 12th Feb 2017 <https://www.ft.com/content/323d972a-f109-11e6-8758-6876151821a6>
25. Stop Hinkley Press Release 17th Feb 2017 <http://www.stophinkley.org/PressReleases/pr170217.pdf>



2. Decentralised Energy – it's the future

2014 saw a spate of reports from Investment Banks and energy analysts which concluded that, amongst other things, conventional utility models are no longer fit for purpose. The reports highlighted the changes to the old centralised utility model which are on the horizon and the importance of new technologies. They suggested that decentralised energy supply will be increasingly important in the future. (See [nuClear News No.68](#) – Decentralised Energy Marches On).

UBS, for instance, declared that it is “*time to join the [solar] revolution*”. Citi Research predicted “*that solar, wind, and biomass continue to gain market share from coal and nuclear into the future*”.

As far back as 2012 Moody's said:

“What were once considered stable companies have seen their business models severely disrupted. Given that further increases in renewables are expected, these negative pressures will continue to erode the credit quality of thermal based utilities in the near to medium term .” (1)

At the beginning of 2016 the Chief Executive of Engie UK, Wilfrid Petrie, predicted “*...the emergence of a new type of organisation within cities,*” which don't want to sell a huge amount of energy but focus instead on the demand side. “*The future is going to be much more about decentralized energy,*” he said. (2)

Now finally EDF may be catching up. Les Echos, the French business newspaper, carried an extraordinary article from Senior Vice President Marc Boillot who said “*large nuclear or thermal power plants designed to function as baseload are challenged by the more flexible decentralized model*”. He says that the centralised model of power production is dying, to be replaced by local solar and wind, supplemented by batteries and intelligent management of supply and demand. Not only will this be cheaper in the long run but customers are actually prepared to pay more for solar electricity and actively work to reduce usage at times of shortage. His conclusion is that “*the traditional model must adapt to the new realities, thus allowing the utilities to emerge from ...hypercentralized structures in a world that is becoming more and more decentralized*”. (3)

-
1. See Annexe 1 here: <http://projects.exeter.ac.uk/igov/wp-content/uploads/2014/09/Post-stuttgart-1-final-paper.pdf>
 2. Times 2nd Jan 2016 <http://www.thetimes.co.uk/tto/business/industries/utilities/article4654409.ece>
 3. Carbon Commentary Newsletter 19th Feb 2017 <http://us9.campaign-archive2.com/?u=a336c39e55a6260d59adbff0&id=6945e1e273&e=59b188af48> and Les Echos 15th Feb 2017 <https://www.lesechos.fr/idees-debats/cercle/0211803366658-le-solaire-peut-il-tout-emporter-dans-lenergie-2065262.php>



3. Hinkley Point C – “risky and poor value for money”.

The Hinkley Point C nuclear plant is risky and poor value for money, according to a House of Lords committee that urged the government to set out a “plan B” in case the £18 billion project is not built on time. (1)

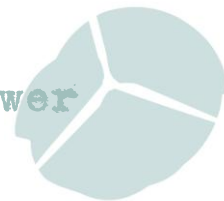
In a damning report on energy policy, the Lords economic affairs committee said that household energy bills had already soared by 58% since 2003 and the risk of blackouts had increased, in part due to “*poorly designed government interventions, in pursuit of decarbonisation*”. Ministers should abandon plans to award subsidies to future nuclear plants through bilateral deals like that given to Hinkley, the committee said. Instead such projects should be forced to compete against wind farms, solar power farms and gas-fired power stations to find the cheapest way of keeping the lights on and cutting emissions. The committee said that the government should ensure that “*the security of the UK’s energy supply is the priority of its energy policy*” and suggested that climate change targets be “*managed flexibly*”. Lord Hollick, the committee’s chairman, highlighted Hinkley – which was signed off by Theresa May in September – as “*a good example of the way policy has become unbalanced and affordability neglected*”, and described it as “*very, very expensive*”. (2)

The total cost to consumers for Hinkley Point C is estimated to be £30bn. The committee called for an independent Energy Commission to advise Government on how to achieve an optimum balance of its three key objectives to keep the lights on at low cost while cutting carbon. “*It would not be entirely different to the role that the OBR plays with regards to the Treasury. What it would do is provide a degree of transparency, not only for the Government itself to make its decisions but for industry and observers and analysts so that there is a greater degree of accountability as opposed to confusion,*” he said. (3)

On the other hand the report was slammed by some environmentalists and renewable energy advocates for calling for decarbonisation to be relegated in favour of security of affordable supply. Critics said its conclusions were ‘out of touch’ and ‘backward-looking’. The report was accused of arguing that generation of electricity from fossil fuels is cheaper than renewable sources and that subsidies provided to clean energy generation have resulted in considerably higher costs for consumers.

Paul Massara, chief executive of North Star Solar and former CEO of RWE npower, highlighted ‘out-of-date claims’ in the report. “*In reality, renewables like solar or onshore wind are already cost-competitive with fossil fuels in many parts of the world, as costs have plummeted with increasing deployment,*” he said

The Lords also question the costs of increased renewable energy sources on the UK system, calling for greater clarity on the issue. However, a number of opponents to the report’s findings have drawn attention to the recent work by the UK Energy Research Centre (UKERC), which found that greater grid flexibility can restrict possible system costs. And a report from consultants Aurora Energy Research late last year detailed how solar and storage together can actually have a negative cost to the grid, essentially providing a net benefit. Michael Grubb,



professor of international energy and climate change policy at University College London criticised the report for failing to acknowledge that the costs of backing up renewables, deemed too high by the lords, have proved far less than predicted with the capacity market mechanism serving to deliver low cost energy and ensure security of supply.

Despite these criticisms, commentators have picked up one of the report's recommendations, namely to allow all technologies to compete in a single auction for electricity generating capacity where the desired level of carbon emissions and capacity is fixed. Currently established, or 'pot 1', technologies are excluded from capacity market and contracts for difference (CfD) auctions. The Lords committee states a technology neutral mechanism would enhance security as well as competitiveness. Commenting on this recommendation, Massara said: *"It's a shame this is a backward-looking report with many out-of-date claims, because elsewhere, the peers make sensible recommendations. Boosting the use of market mechanisms for example, so that all-technologies can compete on a level playing, is a welcome proposal."* (4)

Carbon Brief unpicks the committee's report with the help of several climate and energy policy experts. They describe it as "confused", lacking nuance and "very disappointing". Others say the report summary is "very misleading" and the proposed auction "doesn't really make sense".

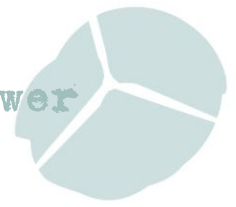
Massara told Carbon Brief:

"What the committee doesn't seem to understand is the wholesale transition that our energy system, like those of other countries, is undergoing. We're rapidly moving towards a smart, flexible grid dominated by clean sources of energy, and employing new technologies like storage and demand-side measures to boost security and cut energy waste."

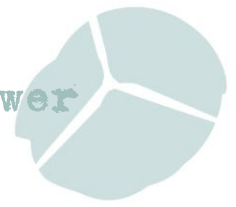
Jon Ferris, strategy director at consultancy Utilitywise told Carbon Brief: *"We do not have a capacity problem, we have a flexibility problem, and this generation-focused approach not only ignores that flexibility can and will increasingly be provided by other means, but will restrict UK participation in a growing global market."* (5)

Meanwhile the House of Commons Public Accounts Committee says that Government must do more to demonstrate the value for money of consumer-funded energy schemes. The recommendation comes in a report examining the Levy Control Framework (LCF), which is intended to help control the costs of three government schemes to support low-carbon generation. The Framework sets yearly caps on the forecast costs of the Renewables Obligation, Feed in Tariffs, and Contracts for Difference—schemes funded through levies on energy companies and ultimately paid for by consumers via energy bills. The Committee concludes the Framework has *"suffered from a lack of transparency, rigour and accountability"* and forecasting of its costs has been poor.

The government continues to expect to overspend the LCF budget. As a result, these costs are likely to add around £110 to the typical household's yearly energy bill in 2020, £17 more than budgeted for. The report states: *"In July 2014 Government agreed to provide Parliament with an annual report on the impact of policies on energy bills, but has not done so since 2014. The consumer-funded policies report which the Department published a few days before our evidence session on the Framework is not an adequate substitute for a full report on consumer bills: for example, it does not show the net impact of policies once cost-saving effects are included."* (6)



-
1. House of Lords Economic Affairs Committee 24th Feb 2017
<https://www.publications.parliament.uk/pa/ld201617/ldselect/ldeconaf/113/11302.htm>
 2. Times 24th Feb 2017 <http://www.thetimes.co.uk/edition/news/peers-condemn-risky-hinkley-point-deal-75lt59g3d>
 3. Telegraph 24th Feb 2017 <http://www.telegraph.co.uk/business/2017/02/24/hinkley-good-example-bad-policy-needs-urgent-plan-b-says-house/>
 4. Solar Power Portal 27th Feb 2017
http://www.solarpowerportal.co.uk/news/out_of_touch_house_of_lords_energy_report_calls_for_relegation_of_decarboni
 5. Carbon Brief 24th Feb 2017 <https://www.carbonbrief.org/house-of-lords-energy-report-slammed-confused-misleading>
 6. Parliament 8th Feb 2017 <http://www.parliament.uk/business/committees/committees-a-z/commons-select/public-accounts-committee/news-parliament-2015/energy-policy-levy-control-framework-report-published-16-17/>



4. Brexatom – Bonkers or an Opportunity?

A footnote in the Parliamentary Bill published on 26th January to authorise Brexit confirmed that the UK intends to leave EURATOM as well as the European Union. (1) Up until that point this was a grey area with disagreements over whether Brexit meant the UK would also have to leave EURATOM.

The balance of opinion seemed to confirm that, although EURATOM is legally distinct from the European Union, the UK would have leave both once Article 50 was triggered. (I wrote about this in November 2016 in nuClear News No. 89

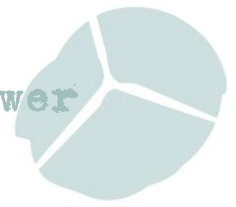
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo89.pdf>) This was confirmed at a meeting I attended at the Scottish Government last September when most of the nuclear industry representatives and regulators appeared to be resigned to leaving EURATOM. On the other hand, the European nuclear lobby group – Foratom – thought the UK could decide to negotiate to remain a member (or agree some form of associate membership). The EU has numerous association agreements with other countries. For instance Switzerland is an associate member of EURATOM and the Ukraine has joined the EURATOM Research and Training Programme. A blog on the Euractiv website goes even further saying that the idea that EURATOM is included in the exit clause of the Lisbon Treaties is false. (2)

The decision has wide-ranging implications for Britain's nuclear industry, research, access to fissile materials and the status of approximately 20 nuclear co-operation agreements that it has with other countries around the world. The UK is going to have to strike new international agreements with all these countries to maintain access to nuclear power technology - crucially with the US because several of the UK's existing and planned nuclear reactors use US technology or fuel. A new bilateral agreement will also be needed with the International Atomic Energy Agency. Nuclear co-operation agreements can take considerable time to agree and ratify. It may not be possible to complete them before Britain leaves the EU in 2019.

New Reactors in Jeopardy?

The concern now in the UK nuclear industry is that leaving EURATOM will complicate and delay the UK's plans to build a new generation of nuclear power stations. "*The new wave of British nuclear power stations was in jeopardy*" said *the Times*. Withdrawal could cause "*major disruption*" according to the Nuclear Industry Association (NIA) particularly for Horizon and Nugen, which are developing plans for reactors on Anglesey and in Cumbria because their plans involve co-operation with US nuclear companies. Former Labour MP Tom Greatrex, now chief executive of the NIA, said: "*The UK nuclear industry has made it crystal clear to the government before and since the referendum that our preferred position is to maintain membership of EURATOM.*" (3) Although Horizon, whose reactors would use US nuclear fuel, says it is reassured by the government's commitment to put new regulatory arrangements in place quickly. (4)

The Hinkley Point C station in Somerset could also face renewed problems. EDF has warned that Brexit could increase "*the costs of essential new infrastructure developments and could delay their delivery*". EDF, which also operates Britain's existing nuclear plants, has said it would prefer if



the UK stayed within EURATOM and that if not it would be “*essential that the UK establishes equivalent safeguards arrangements*”.

“However, if the UK ceases to be part of EURATOM, then it is vital the government agree transitional arrangements, to give the UK time to negotiate and complete new agreements with EU member states and third countries including the US, Japan and Canada who have nuclear co-operation agreements within the EURATOM framework.”

EDF is also worried that Brexit will affect the movement of people and delay the delivery of Hinkley Point C (5). It could also impact upon its costs. For the reactor builders, being outside the nuclear common market as well as the single market and having no freedom of movement may lead to higher prices if tariffs and customs checks are introduced or if restrictions are imposed on foreign nuclear scientists and engineers. (6)

Nuclear Safeguards Implications

Leaving EURATOM is also likely to add to the workload of the UK’s nuclear regulator, the Office for Nuclear Regulation (ONR), which is busy assessing designs for new nuclear reactors including the Chinese Hualong One design. *“The main burden of the UK leaving EURATOM will be the need for it to cover its nuclear non-proliferation safeguards commitment and for this it will have to either set up a separate, independent agency or bring these treaty responsibilities into the Office for Nuclear Regulation,”* says nuclear engineering consultant John Large.

The Green Party’s only UK MP Caroline Lucas raised the safeguards issue in Parliament last August when she asked the business and energy secretary *“what steps would be needed to replace EU Atomic Energy Community safeguards inspectors with International Atomic Energy Agency (IAEA) Inspectors to implement safeguards provisions.”* The reply did not address the fact that currently international inspections of UK nuclear plants and materials to ensure there is no diversion of materials to military misuse is verified by EURATOM on behalf of the IAEA. (7)

A quarter of all time spent on nuclear inspections throughout the EU is carried out in Britain, due to the scale of nuclear fuel fabrication and waste management facilities, such as Sellafield. Without EURATOM ONR will need to undertake many more inspections to meet IAEA requirements. The Government will have to find extra cash, but it will struggle to hire and train the necessary new staff especially when ONR is already struggling to keep up with the assessment of several new reactors designs (EPR, AP1000, ABWR and Hualong One) (8)

As proliferation expert Dr David Lowry puts it: *“It is now time energy and foreign ministers and their advisors turn their attention to what they are going to do to ensure nuclear safeguards continuity in the UK post Brexit to avoid the UK becoming a nuclear rogue state.”* (9)

Fusion – nuclear research scientists angry

Membership of EURATOM is also a condition for Britain hosting what is currently the largest nuclear fusion experiment in the world. Based at the Culham centre in south Oxfordshire, the Joint European Torus project involves some 350 scientists exploring the potential of fusion power, backed by funding from almost 40 countries in the EUROfusion consortium. According to *Nature*, scientists are shocked and angry about the EURATOM exit. Depending on whether and how the UK negotiates a way back in to the organization, the move could endanger British



participation in the world's largest fusion experiment, the International Thermonuclear Experimental Reactor (ITER) in southern France. It could also curtail operations at the Joint European Torus (JET), a nuclear-fusion facility in Culham. The facility is a half-sized version of ITER which currently receives around €56 million annually from EURATOM. Steven Cowley, a theoretical physicist at the University of Oxford who until last year was director of the Culham Centre described the decision to leave EURATOM as “bonkers”. (10)

According to the Trade Union representing nuclear scientists, the Culham Centre signed a €283m contract in 2014 for running the Joint European Torus facility until 2018, with similar contracts expected in the future. This accounts for more than a quarter of the overall European Fusion Programme budget over the same period – a budget funded in part by the EURATOM Horizon 2020 programme. The UKAEA also brings EURATOM money directly to the region and UK industry by winning ITER (global fusion project) contracts. (11)

Wider impact in Europe

The political impact in the EU remains equally unclear. Britain has been one of Europe's most active supporters of nuclear power. Brexit could tip the balance of member states towards an anti-nuclear majority. The complications around the UK withdrawal from EURATOM could also put a spotlight onto the EURATOM Treaty itself, whose legal status and many of its functions are out of step with the modern EU and may once again lead to calls for it to be abolished. (12)

EURATOM Mark II

The UK secretary of state for exiting the European Union, David Davis, told parliament on 31 January 2017 that the UK will seek an alternative agreement with the International Atomic Energy Agency (IAEA) if it fails to negotiate “*some sort of relationship*” with the European Atomic Energy Community (EURATOM) during Brexit negotiations. (13)

The idea of a new pan-European nuclear group is also being floated, according to former conservative MP Tim Yeo who chairs the trade group New Nuclear Watch Europe. The successor group is envisaged as a wider Europe-based pro-nuclear club including the 27 European Union member states as well as countries outside the bloc that are also developing new nuclear power plants. As well as the UK the group could include Turkey, Ukraine, Belarus and potentially Russia. (14)

Time for Reform

The UK nuclear establishment is going to have its work cut out to make sure that Brexatom does not add to the delays in its proposed new nuclear reactor programme already in prospect as a result of financial problems at EDF, Areva, Toshiba, Engie and Hitachi (See <http://www.no2nuclearpower.org.uk/news/campaign-update/nuclear-industrys-dead-cat-bounce/>)

There will be widespread support for efforts to avoid any hiatus in the safeguarding of the huge quantity of fissile material in the UK. But as Hans-Josef Fell, president of the Energy Watch Group and a former member of the German parliament for the Greens points out the UK's exit from EURATOM should be seen as an opportunity. It's a clear sign that it is possible for anti-nuclear countries like Austria, Ireland and Germany to unilaterally leave the Treaty – even a



unique chance to dissolve Euratom. He says the core task of EURATOM is to support the nuclear industry. After Chernobyl and Fukushima ending that support is long overdue. (15)

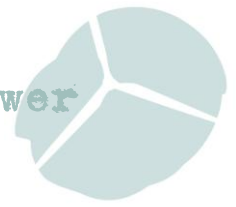
The UK Nuclear Free Local Authorities (NFLA) recently pointed out that it sees *“the EURATOM Treaty as one of the most direct ways the nuclear industry has promoted nuclear power in Europe over the past 60 years. It has often been the inside track from which pro-nuclear governments have ensured support for nuclear power within the European Commission”* (16)

For instance, in 2014 the European Union’s Competition Commissioner Margrethe Vestager had less leeway in evaluating the U.K.’s Hinkley Point C financial support scheme than it would have done for a non-nuclear project because of the EURATOM Treaty, which is meant to support and encourage investment in nuclear projects where needed.

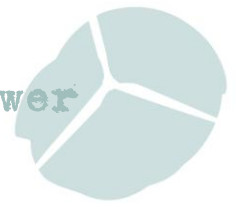
“This means that if member states choose to invest in nuclear energy, the EURATOM’s objective to facilitate that investment becomes an objective of common interest that the Commission should take into account in its state aid assessment,” she said. (17)

So the Commission approved the UK Government’s plans to subsidise Hinkley Point C despite the fact that even the UK government itself expects solar and wind power to be cheaper than new nuclear power by the time Hinkley Point C is completed. (18) Not surprising then that the NFLA sees *“this as an ideal time for a major and all encompassing reform of the EURATOM Treaty to take account of the changed energy market in the EU, where renewable energy is rapidly expanding and nuclear power is in decline.”* (19)

-
1. FT 26th January 2017 <https://www.ft.com/content/fe3b50a4-e3e1-11e6-8405-9e5580d6e5fb>
 2. Euractiv 16th June 2016 <http://democracy.blogactiv.eu/2016/06/16/euratom-after-brexit-votes-uk-will-remain-a-community-member-for-nuclear-non-proliferation/>
 3. Times 27th Jan 2017 <http://www.thetimes.co.uk/edition/business/britain-quits-european-nuclear-body-pgmq9m9fc>
 4. FT 26th January 2017 <https://www.ft.com/content/fe3b50a4-e3e1-11e6-8405-9e5580d6e5fb>
 5. Guardian 27th Jan 2017 <https://www.theguardian.com/business/2017/jan/27/uk-exit-eu-atomic-treaty-brexit-euratom-hinkley-point-c>
 6. Antony Froggatt in the Conversation 30th Jan 2017 <http://theconversation.com/brexatom-the-uk-will-now-leave-europes-nuclear-energy-authority-72136>
 7. David Lowry’s Blog 27th Jan 2017 <http://drdavidlowry.blogspot.co.uk/2017/01/how-brexit-britain-could-become.html>
 8. Antony Froggatt in the Conversation 30th Jan 2017 <http://theconversation.com/brexatom-the-uk-will-now-leave-europes-nuclear-energy-authority-72136>
 9. David Lowry’s Blog 27th Jan 2017 <http://drdavidlowry.blogspot.co.uk/2017/01/how-brexit-britain-could-become.html>
 10. Nature 27th Jan 2017 <http://www.nature.com/news/researchers-shocked-at-uk-s-plan-to-exit-eu-nuclear-agency-1.21388>
 11. FT 5th Feb 2017 <https://www.ft.com/content/d3d780bc-e7b5-11e6-893c-082c54a7f539>
 12. Antony Froggatt in the Conversation 30th Jan 2017 <http://theconversation.com/brexatom-the-uk-will-now-leave-europes-nuclear-energy-authority-72136>



13. Nucnet 2nd Feb 2017 <http://www.nucnet.org/all-the-news/2017/02/02/uk-could-seek-alternative-agreement-to-euratom-with-iaea-after-bexit>
14. Telegraph 4th February 2017 <http://www.telegraph.co.uk/business/2017/02/04/britain-proposing-wider-europe-based-pro-nuclear-club-article/>
15. Energy Post 5th July 2016 <http://energypost.eu/brexit-offers-chance-finally-put-end-euratom-treaty/>
16. NFLA Press Release 30th Jan 2017 <http://www.nuclearpolicy.info/news/nfla-uk-decision-withdraw-euratom-could-halt-new-nuclear/>
17. Politico 11th January 2017 <http://www.politico.eu/article/hungary-nuclear-approval-expected-thanks-to-uk-and-france-precedent/>
18. Guardian 11th August 2016 <https://www.theguardian.com/environment/2016/aug/11/solar-and-windcheaper-than-new-nuclear-by-the-time-hinkley-is-built>
19. NFLA Press Release 30th Jan 2017 <http://www.nuclearpolicy.info/news/nfla-uk-decision-withdraw-euratom-could-halt-new-nuclear/>



5. What if nuclear stations don't come to fruition

The problems at Toshiba prompted the Carbon Brief (CB) website to look at how important the new nuclear programme is to the UK's carbon emissions reduction plans.

CB says existing nuclear plants have a combined capacity of 8.9 gigawatts (GW). Last year, they generated 72 terawatt hours (TWh) of electricity, around a fifth of the UK total and their highest output since 2006. The UK plans to cut emissions to 57% below 1990 levels by 2030 and to close all coal plants by 2025. That's where new nuclear plants are supposed to come in.

The most recent government projections, published in 2015, suggest new nuclear power will play a growing role in the UK's electricity mix. The UK's nuclear capacity will begin to fall in the early 2020s, with the 1GW Hunterston B and 1GW Hinkley Point B closing in 2023.

CB says if each 1GW of new nuclear could be replaced with 2GW of offshore windfarm capacity or 3.2GW onshore, because windfarms have lower load factors than nuclear – this would require 28GW of offshore wind or 45GW onshore, compared to current capacities of 5.1GW and 9.4GW respectively. (it suggests the new nuclear programme is 14GW rather than the 16-18GW actually proposed)

CB concludes that these figures are far beyond current plans and could even push the limits of what is technically possible for the UK.

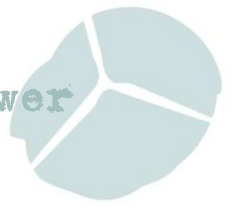
CB also says if the 14GW of new were replaced with gas, it would add 42MtCO₂, equivalent, or more than 8% of current UK greenhouse gas emissions. But it doesn't mention that these gas plants could be fuelled to some extent by bio-methane or bio-Synthetic Natural Gas (which contains hydrogen) thus reducing emissions significantly.

About 10 GW of OFFSHORE wind is expected to be up and running by 2020, from a near standing start in 2010. So it seems entirely reasonable to suggest that around 30 GW could be available by 2030. Turbines would be bigger (latest under test are 9 MW) floating schemes will be appearing soon and costs have fallen beyond expectation.

Dr Dave Toke says *"to suggest that 28GWe of offshore wind never mind anything else is pushing the boundaries of what is technically possible for Renewables is nonsense. The Dogger Bank project alone is nearly 5GWe."*

A 2009 study estimates that the UK has enough offshore wind capacity to generate 19,000TWh per year (2)

Andrew Warren points out that CB *"fail[s] to acknowledge that, in the ten years since Britain set out on this new nuclear path, actual electricity consumption has already dropped by over 15% - a trend entirely ignored by BEIS planners."*



1. **Carbon Brief** 15th Feb 2017 <https://www.carbonbrief.org/analysis-how-important-moorside-new-nuclear-plant-uk-climate-plans>
2. **See:** <http://www.claverton-energy.com/two-terawatts-average-power-output-the-uk-offshore-wind-resource.html>