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1. Committee on Climate Change sinks Nuclear

Dave Toke, reader in energy politics at Aberdeen University, says the Committee on Climate Change's (CCC's) recent technical report has effectively sunk nuclear power in the UK. (1)

A careful reading of the evidence produced by the CCC completely upends the former received wisdom that renewable energy could not, on its own, achieve the UK's long term carbon emission reduction targets. The old argument that large quantities of nuclear power are necessary has been quietly side-lined. Rather, the evidence presented by the CCC says that not only can renewables do the whole job, along with energy efficiency, on their own, but they can do things much more cheaply than either nuclear power or carbon capture and storage. (2)

The CCC argues that investment in renewable energy will save consumers money, whilst investment in nuclear power and carbon capture and storage will cost a lot more. (3)

The CCC estimate renewable energy resources to be very large - 29-96 of GW of onshore wind, 145-615 GW of solar power and 95-245 GW of offshore wind. (4)

Using the lower end of the range, the electricity would be enough to provide all of the electricity needed for a net zero energy economy in the UK. That's not even counting other renewable energy sources, including biomass and marine renewables.

Analysis of Committee of Climate Change estimates for potential renewable energy generation in UK

	Offshore wind	Onshore wind	Solar PV	Total
Low capacity estimate (GWe)	95	29	145	269
High capacity estimate (GWe)	245	96	615	954
Assumed capacity factor	63%	30%	14%	N/A
Low estimate for generation (TWh/year) (3)	524	76	178	778
High estimate for generation (TWh/year)	1352	252	754	2358

The CCC estimated that total UK electricity demand to be, under its carbon reduction plan, 365 TWh in 2030 and 645 TWh in 2050 This compares to 335 TWh in 2018. Hence, under the 'high' estimate for wind and solar, renewable energy could supply nearly four times the total electricity requirement in a net zero energy economy. That is one under which transport and heating services are supplied through electricity as well as other services.

Of course there's a crumb of comfort offered for nuclear power. The Technical Report (page 41) says: "A 3.2 GW nuclear plant is currently under construction at Hinkley Point C and can be



expected to operate well beyond 2050, implying a minimum nuclear contribution of 26 TWh (4% of generation) in 2050. New nuclear sites at Sizewell C and Bradwell could increase this to 11%".

The Committee assumes that nuclear costs will fall from £98/MWh in 2025 to £71/MWh in 2050, but Toke points out nuclear costs have not gone down for decades.

Any new nuclear power stations would crowd out new renewable energy. This is because electricity contracts given to nuclear power give them 'dispatch priority' over renewable energy, causing windfarms and solar farms to be turned off to give priority to nuclear power. Indeed, this is already happening with our current levels of nuclear and renewables, with, ironically, renewable energy detractors blaming the problem (and the compensation paid to the windfarms) on the windfarms themselves. So not only, in the future are we going to sink into an amazing public morass of handouts to fund these nuclear power stations, but in the process, at best, we are going to be ordering the turning off of renewable energy and paying the operators compensation for this! Of course this is crazy, and the result will be that many windfarms and solar will not be built. (5)

Last September, Rebecca Long Bailey, Labour's Shadow Business Secretary talked about 52GW of offshore wind by 2030 along with a doubling of onshore wind farms, and a tripling of solar power. With the next generation of offshore wind delivering a 60+% capacity factor this could mean more than 250 TWh of energy from offshore wind alone. (6) That probably means in the region of 90% of the CCC's project demand of 365TWh coming from renewables in 2030.

Any new nuclear stations planned now would be extremely unlikely to come on-stream before 2030, so would be in direct conflict with much cheaper renewables. For instance as the CCC shows, offshore wind alone could provide another 270TWh after 2030, which would be almost enough to get us up to the CCS projected 645TWh by 2050. Even then this rather high demand figure depends on whether the CCC has got its estimate of energy efficiency savings and future demand increases correct.

The UK government is preparing to announce that it will broadly embrace the recommendations of the Committee on Climate Change, according to the *Business Green* and *Bloomberg* websites. It will introduce a new target to cut emissions to net zero by 2050. The new target is likely to be announced within two months. Such a fast tracked timetable could potentially allow for amendments to the Climate Change Act to be passed before Parliament's summer recess, especially given the limited nature of the government's legislative agenda in the wake of the delay to Brexit. Since the CCC's wide-ranging report was released, leading Ministers have repeatedly hinted they want to see the government adopt the target as quickly as possible and ensure the UK becomes the first major economy to embrace a legally-binding net zero emissions goal. (7)

Any move to adopt a net zero emission target would lead to increased pressure on the government to introduce new policies and programmes as soon as possible to accelerate the rate of decarbonisation through the 2020s and ensure the UK meets medium term emissions targets that it is currently on track to miss.

However, Michael Gove refused to commit to reduce greenhouse gas emissions to zero by 2050 when he appeared before Holyrood's environment committee, via video link. He said: "*there are*



overlapping and separate responsibilities between mine and Greg Clark's department [business, energy and industrial strategy], and his is the lead department when it comes to responding to this report." When asked by Scottish Green MSP Mark Ruskell if all UK government policies should be reviewed in light of the climate emergency, as has been announced by the Scottish Government, Mr Gove agreed. (8)

Meanwhile the National Infrastructure Commission Chair Sir John Armitt has called on the Chancellor of the Exchequer to use this autumn's Spending Review to commit to a once-in-a-generation transformation of the UK's transport, energy and technology networks. The Commission published the country's first National Infrastructure Assessment last year and the government is required to formally respond with its own strategy. Among its main recommendations were: Aiming for 50% of the UK's electricity to come from renewable sources by 2030, with the government offering support for no more than one nuclear power station after Hinkley Point C between now and 2025. (9)

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 3. e.g. see Table 2.3 page 45
 4. page 26
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2. Electricity Demand and decarbonisation of Heat and Transport

In a typical UK household 80% of energy consumed is to provide heating and hot water, with an annual cost of approximately £750 per year, using gas. Notionally replacing a gas boiler with a heat-pump and a car with fully electric ones would add around 5,000 kWh of additional electricity consumption for heat and 3,000 kWh of vehicle charging to the existing 3,100 kWh for other domestic uses of electricity. This level of electrification presents entirely new challenges, outside the historic experience of the current energy industries. (1)

The Committee on Climate Change's (CCC's) central scenario to 2030 anticipates electricity demand of 365TWh, up around 8% on 2018 levels (335TWh of electricity was generated in the UK in 2018). This allows for 2m heat pumps and 20TWh for EVs. Demand from road transport could eventually reach more than double this level, if the whole UK fleet switches to EVs.

But electricity generation in 2018 was some 63TWh (16%) lower than 2005, a reduction equivalent to 2.5 times the output of Hinkley Point C, despite the UK population increasing by 10% from 60 to 66 million. Overall, the amount of electricity generated per person in the UK has fallen by 24% since 2005 (2)

Electric Vehicles

Forecasting electricity demand increases as a result of low carbon transport should, in theory, be relatively straightforward.

In 2018 National Grid said there could be up to 25m EVs by 2035 and 36m by 2040 - saturation point, with all possible vehicles electrified and new EVs replacing old ones as they retire. But the scenarios anticipate that most consumers will avoid peak time charging using of smart chargers and vehicle-to-grid technology. National Grid says a number of energy suppliers have launched EV specific tariffs that have a time of use element [pricing to encourage off-peak charging]. (3)

National Grid inadvertently caused alarm in 2017 by suggesting that electric vehicles could, hypothetically, add as much as 30GW to national peak electricity demand by 2050. That would have been a 50 per cent increase on today's peak, if nobody agreed to use "smart" chargers that charged at off-peak times. National Grid now says peak electricity demand could be increased by between 3-8 GW in 2030 (4-14%) and by 3-13GW in 2050 (6-22%). These latest projections assume that smart chargers will be used and that some vehicle batteries will supply power to the grid at peak times, resulting in a "net" maximum increase in demand as a result of electric vehicles of 12.7GW by 2050. (4)

An alternative take on the issue came from a recent report by Redburn, a UK research and investment company. This suggests the increase in demand as a result of the electrification of transport may be very limited and that electrification of cars will not dent the established trends towards reduced electricity consumption because ever more energy-efficient lighting and motors will offset any increases in electricity consumption due to EVs. Motors are the world's biggest electricity-using product, ahead of lighting, accounting for an astonishing 30-



35% of world's electricity consumption. Not surprisingly, as motors get more efficient, demand for electricity can be expected to fall, all else being equal. New motors that save as much as 13% depending on the size of the motor will take roughly 15 years to replace the entire installed motor base, which will reduce global electricity demand by 0.7% per annum.

A similar scenario applies to lighting – currently accounting for roughly 22% of the global electricity demand. Here again, significant reductions in consumption can be achieved by switching to more efficient types of lighting, such as light emitting diodes (LEDs), which currently account for 20% of new global lighting unit sales. The savings can be significant. With incandescent light bulbs expected to fall from the current 80% of the installed base to 20% by 2023, Redburn expects the global lighting electricity consumption to halve in the next five years. This alone should reduce global electricity demand by 2.3% per annum. Combined, these two end uses alone can reduce global annual electricity demand growth to roughly 3% below global real GDP growth in the coming five years. Of course, that is not the end of energy efficiency improvements.

Examining several studies on the impact of EVs, Redburn expects average global electricity consumption by EVs to grow from around 8TWh in 2017 to 1,800TWh by 2040. While this is a massive increase, it represents only 5% of projected global electricity consumption in 2040 – not a huge percentage. EVs are incredibly efficient, certainly compared to internal combustion engines (ICEs). According to Redburn: *“While the ‘peakiness’ of fast-charging load profiles of EVs will need to be managed by utilities, we only expect EVs to add 3% to global electricity demand by 2035, the equivalent of 0.2% per annum demand growth. As such, while many players in the power industry talk about EV as the next big thing, we do not expect the electrification of the car to in any way dent the electricity consumption reduction caused by more energy-efficient lighting and motors.”* (5)

Solar Car Ports

The introduction of EVs is likely to encourage the construction of a new generation of solar-powered charging stations across Britain. Plans have been drawn up for a network of more than 100 forecourts tailored to charge cars, vans and buses quickly. Gridserve, the green energy company behind the plan, says that it had secured 80 sites on busy roads and near powerful grid connections. Under the plan new solar farms will be built next to most forecourts to supply energy directly. Work is due to start on the first two sites in York and Hull this year. (6)

In Scotland Flexitricity, Turbo Power Systems, Flexisolar and Smart Power Systems are looking for sites for special solar-powered car parks where electric vehicles can be charged. The consortium is already considering several potential sites across the country, including council facilities, park and ride schemes, airports, offices and train stations. The group has now secured millions of pounds in funding for the scheme, which will use solar panels and battery storage to charge cars and buses. Revolutionary vehicle-to-grid (V2G) technology will also be employed at the hubs, allowing charged cars to feed electricity back to the smart grid where it can be used to power homes and businesses.(7)



Nottingham City Council is set to trial new electric vehicle (EV) infrastructure, including battery storage and bi-directional chargers, as part of an EU-funded vehicle-to-grid (V2G) project. The Council has purchased 40 new EVs to trial the concept. The project combines three main elements: solar panels to generate electricity, a large battery to store energy until required, and a fleet of EVs for additional storage and operational purposes. The Council has also said that it plans to use the system to bid into ancillary services and trial selling flexible power. On average, domestic cars sit idle for 95% of the time, and this project allows them not only to be charged, but also to feed electricity stored within their batteries back to the grid or nearby buildings. (8)

If drivers keep their vehicle plugged in for most of the day V2G technology could reduce electricity bills by more than £500 per year. (9)

Meanwhile, Dutch electric vehicle (EV) company Lightyear is expected to unveil a prototype of the world's first long-range solar-powered passenger car in June, claiming that the vehicle will have a range of up to 800km (nearly 500 miles). The car, called the Lightyear One, is fitted with a solar roof and a battery system which enables 600-800km of range, depending on the speed at which the vehicle travels and the terrain which it travels along. Lightyear claims that the car will be the world's first solar model with long-range capabilities. Lightyear is one of several automakers to have begun exploring cars with solar roofs in a bid to help motorists overcome "range anxiety" and concerns about charging costs. In the UK, the drive for a commercially-available solar car is being led by a partnership between Aston Martin and solar giant Hanergy. (10)

Low Carbon Space and Water Heating

Unlike forecasting electricity demand increases resulting from the introduction of EVs, forecasting the impact of heat decarbonisation is much more complex. Even the majority of MPs think erroneously that energy demand has increased since 2008 whereas in fact the amount of electricity and gas used by the average British household has fallen by 17% and 23% respectively. (11)



But forecasting future electricity demand for heating depends on technology and energy source - ground source heat pump, resistance electric or biogas. Second, and crucially, it depends on what you do to upgrade the housing stock. Ground source heat pumps are unaffordable or infeasible to the majority but resistance heating would send household bills through the roof, electricity costs 4 times what gas costs per kWh. The only way to make the transition to low-carbon for space/water heating is with a massive energy efficiency programme.

Total UK gas demand for heat is currently around 500TWh. Decarbonising via electrification could prove to be an extremely expensive way of decarbonising. Providing electricity at peak times during the winter could place enormous strains on the electricity network. The current UK distribution network could not cope and would require expensive upgrades.

On the other hand a new study from the European Climate Foundation (ECF) says smart electrification supported by improvements in energy efficiency would be the cheapest way to decarbonise heat across Europe. It says the use of hydrogen gas should be limited to providing seasonal energy storage and meeting peak power demand, even in countries with colder climates such as the UK. (12) Sunamp, for example, which manufactures heat batteries, reckon combining an Air Source Heat Pump using off peak electricity with their heat battery can cut the cost of heating to half the cost of gas central heating.



Converting the gas grid to hydrogen could use hydrogen produced through electrolysis from renewable electricity (green hydrogen), or hydrogen produced via a process called Steam Methane Reforming (SMR) combined with Carbon Capture and Storage (CCS). According to the gas industry it would not be possible to provide all of the gas needed through electrolysis. Cost-effective hydrogen heating is highly likely to be reliant on carbon capture and storage (CCS), which is also as yet unproven, and carries substantial cost uncertainty. And there is still uncertainty about whether hydrogen can be delivered safely to millions of buildings. (13)

The Committee on Climate Change (CCC) recommended the adoption of hybrid heating systems combining electric heat pumps and hydrogen boilers as the best way to decarbonise heat in the UK. Under this model, the heat pumps would meet “baseload” demand throughout most of the year, whilst the hydrogen boilers would step in to meet peak demand on the coldest winter days. The CCC said low-carbon hydrogen cannot be produced in large enough quantities to



completely replace natural gas and that full electrification is not feasible due to the huge amounts of backup generation that would be needed during periods of high demand. (14)

But now a new paper published in Nature Energy challenges this view. There is a growing body of literature arguing that the falling cost of renewables combined with the significant cost reduction potential of power-to-gas technology could lead to much cheaper electrolytic hydrogen production than many have previously thought. The research says renewable hydrogen will become competitive with current large-scale industrial supplies from fossil fuels in the next decade or so. Hydrogen is “*the single most important remaining question in the energy transition*”, energy commentator Chris Goodall told Carbon Brief in response to the paper. He adds: “*Cost competitive hydrogen from renewables makes full decarbonisation possible through power-to-gas and power-to-liquids.*” (15)

German think tank Energy Brainpool claimed hydrogen produced by surplus wind and solar energy could be cheaper than natural gas as an energy source itself by the 2030s. (16)

In the absence of a final decision on the decarbonisation of the gas grid there are a number of low or no regrets options which can be implemented:

Energy efficiency measures, which could save around 130TWh (17)

District heating networks could provide 50-125TWh by 2050. In all of the indicative scenarios set out in the Clean Growth Strategy, heat networks are projected to meet 17% of heat demand in homes and up to 24% of heat demand in industrial and public-sector buildings by 2050, whereas they currently only supply around 1% of buildings heat demand. (18)

Biomethane produced by anaerobic digestion and BioSNG could provide around 183TWh. (19)

Power to Gas projects can continue to be developed. Any hydrogen generated using surplus renewable electricity for the electrolysis of water, can always be used to generate electricity or to power vehicles.

Biomass heating from sustainable sources in off-gas grid areas also represents another low regret opportunity

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3. Labour's Solar & Grid Plans

The Labour Party has announced plans to fit solar panels to 1.75m homes lived in by socially housed or low-income households as part of its promised “*green industrial revolution*”. The plan would involve solar panels being fitted to a million social homes as part of scheduled updates to social housing. Labour said this would provide enough power to give them free energy, saving an average of £117 a year on bills. Any spare power would be put into the national grid. Another 750,000 low-income households would have the chance to have the panels fitted through interest-free loans or grants. The party estimated the policy would create 16,900 jobs and save 7.1m tonnes of CO₂ a year, equivalent to taking 4m cars off the roads. (1)

Assuming an average solar array of 2kW this would amount to an increase in solar capacity of 3.5GW.

Labour pledged last autumn to treble the UK's current solar capacity and create more than 400,000 green jobs by 2030. (It also wants to see a seven-fold increase in offshore and a doubling of onshore wind capacity.) Rebecca Long Bailey said then that a near trebling of the UK's solar capacity would equate to around 39GW of operational solar in the UK. (2)

Labour's proposals would see the number of UK homes with solar panels treble from just over 900,000 today. (3)

The solar plan came as Labour published plans to hand responsibility for the UK's power networks to streets, villages and housing estates. (4) But the move is controversial because shareholders that own the National Grid would be unlikely to be paid the market value for their assets - estimated at £64 billion. Matthew Fell of the Confederation of British Industry said: “*As drafted, these proposals amount to hanging a closed sign above the UK.*” He warned that renationalisation could hit the pockets of nearly six million pensioners whose funds would be affected by speculation. A National Grid spokeswoman said the proposals would delay progress already being made to move to green energy. (5)

Heating and electricity will become a “human right” under the plan. Labour will take the national grid out of the hands of private shareholders and prevent consumers being ripped-off, according to shadow business secretary Rebecca Long Bailey. Under Labour's plan, companies that control the UK's £62bn energy infrastructure – the pipes and cables that supply homes and businesses with gas and electricity – would be taken back into state control soon after a Labour election win. Around £13 billion in dividends has been paid out to shareholders in the last five years, according to a review of network owners' company accounts from 2014 to 2018. Under Labour's plans, new public agencies would have the power and responsibility to tackle fuel poverty, protect energy as a human right and ensure that targets to reduce climate change are met.

The plans also include the creation of a new national energy agency (NEA) to replace the National Grid, while 14 regional energy agencies (REAs) would assume the functions of the existing distribution network operators. Where local authorities want to accelerate the energy transition, they would be able to set up municipal energy agencies (MEAs) and take over responsibility for ownership and operation of distribution networks from the REAs. In addition,



a Labour government would support the establishment of local energy communities (LECs). This would develop small-scale energy generation and engage with distribution at the micro level of housing estates, streets or small villages. LECs will be community-owned and non-profit-making. (6)

The national energy agency and 14 regional energy agencies would be given statutory responsibility to decarbonise electricity and heat, ensure all households have access affordable energy, roll out electric vehicle charging infrastructure and reduce fuel poverty, thus combining the battle against climate change with the fight for social justice. Labour is making the case that cleaning up the world needn't come at the expense of living standards but can be part of a strategy of national renewal that creates jobs, warms homes and saves lives.

National Energy Action notes that the winters of 2017-18 and 2018-19 each saw over 10,000 people die as a result of living in a cold home. Fuel poverty is a crippling problem for millions. The organisation noted that "the number dying through cold each year is similar to the amount who die from prostate or breast cancer" and that a higher proportion of British people die from cold each winter than in any other European country except Ireland — a scandal when many European countries face far harsher winters. (7)

The CBI said Labour's plans would make the country poorer, hinder efforts to tackle climate change and threaten a return to the frequent power cuts of the past. Matthew Fell, the business lobby group's chief UK policy director, said: "Much-needed investment is drying up under Labour's threats, which seriously risks hampering efforts to tackle climate change and puts in doubt the innovation that will deliver a net-zero carbon economy. These plans would threaten significant improvements in network resilience made since privatisation. No one wants a return to the frequent power cuts that were a feature of nationalised industries of yesteryear." (8)

The Telegraph said "the sweeping strategy goes far beyond the City's worst fears." (9)

The jury is still out on Labour's plans, according to the *Business Green* website. Is it an 'enormous distraction' or an essential step in an energy revolution?

Not for the first time, the private companies running the UK's energy networks stand accused of profiteering from ordinary bill-payers, and of systematically under-investing in UK energy infrastructure at just the time investment needs to tick up in order to accelerate the low-carbon transition. Critics of the current system argue since network companies were privatised firms have been quick to curtail investment in new infrastructure, instead prioritising shareholder dividends. They argue this is why some parts of the grid are unable to cope with the influx of green technologies that would help cut carbon - in Cornwall, for example, the network is overloaded with solar and wind making new connections hugely difficult to obtain. For the UK to further increase its share of green energy, flexibly manage demand, and usher in the electric vehicle revolution, the networks must be backed by adequate investment to reinforce their capabilities, or so the argument goes.

For many businesses that are keen to see the low carbon transition accelerated and are pretty indifferent to the precise ownership structures that achieve such a step change in decarbonisation, there is a risk that an entirely new system of managing the grid becomes a time-consuming distraction. "At a time when there is increased urgency to meet the challenges



of climate change the last thing that is needed is the enormous distraction, cost and complexity contained in these plans," argued National Grid.

Others will concur, noting that flaws in the current system - and there are definitely areas that need improving - could be better addressed through a more robust regulator than a sweeping programme of nationalisation. Free marketeers will also argue, again with some justification, that while energy networks should operate under stringent regulation and controls in order to ensure security of supply and stop price gouging, if you are engaged in a wide-ranging technology revolution then there is a lot to be said for harnessing competitive forces to trial different technologies and drive rapid innovation. What also sparked ire among commentators was the plans to allow Parliament to pay under the market price in compensation to network company shareholders, in recognition of "asset stripping since privatisation" among a number of other reasons. (10)

The FT declared "*Labour is right: Britain's private utility model is broken.*" It says the National Grid has been delivering total returns of 12 per cent annually since privatisation and yet the risk in these natural monopolies is minimal. (11)

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4. Wylfa Suspended

In January 2019, work was suspended on the development of the Wylfa Newydd nuclear power station on Anglesey. The House of Commons Welsh Affairs Committee has been looking at the implications and what might be done to restart development. (1)

The Committee recommended that the UK Government, Welsh Government, local authorities and other partners should work together to ensure that other projects in the North Wales Growth Deal bid can be accelerated to minimise the damage to the local economy.

The report stresses the importance of capitalising on the geological benefits of the Anglesey site, and the skills of people working in the area, by considering a range of possible energy projects. They also want the two Governments to work on a proposal for a small modular reactor at Trawsfynydd - site of the now-decommissioned Magnox nuclear power station in the Snowdonia National Park in Gwynedd.

The MPs argue that if Hitachi is not prepared to resume development, the UK Government should encourage it to sell the site to another developer that might be willing to reactivate the project. The report also proposes that the UK Government should also seek out companies to develop alternative low-carbon energy projects. (2)

The Committee says the Wylfa Newydd site is one of the best sites in the country for nuclear development, not least because of the geology and supply of cooling water. It was suggested that Hitachi, the owners of the site were concerned about the financing arrangements, and that a new model might help to get development back underway.

Ken Skates AM, Minister for the Economy and Transport in the Welsh Government, told the Committee that stopping work on Wylfa had *“the potential to inflict a major blow on the economy of north Wales if it is permanent”*.

The report talks about *“plans for alternative sustainable energy projects”*. But it is not entirely clear whether this goes much beyond building an SMR at Trawsfynydd. The MPs say Trawsfynydd is an ideal site for a first-of-its-kind small modular reactor. The suspension of work on Wylfa Newydd makes it all the more important that plans for Trawsfynydd are brought forward at the earliest opportunity. They want the UK Government and Nuclear Decommissioning Authority to explore opportunities for the apprentices taken on by Horizon to complete their training, so that the skills are available to maintain North Wales as a centre for the nuclear industry.

The Committee noted that witnesses spoke positively about the potential for resuming work at Wylfa Newydd. The site clearly offers a number of advantages that make it favourable for the development of a nuclear power station. Hitachi’s concerns about the financing of the project are critical to resuming work. Horizon explained that it was a question of *“the structure of how the shareholder was being asked to participate”* and said that a particular issue *“was the timing of returns to the shareholder”*.

Following the suspension of work Greg Clark announced that the UK Government was *“reviewing the viability of a regulated asset base model and assessing whether it can offer value*



for money for consumers and taxpayers". He said that the UK Government would publish its assessment of the model by summer 2019.

The Committee said: *"The regulated asset base model appears to offer a potential means of addressing Hitachi's concerns about the financing structures. [but] If Hitachi is not prepared to resume development of the site, it is possible that another developer might wish to take the work forward."*

Welsh First Minister, Mark Drakeford, says the UK government's energy white paper, which is expected to be published in the summer will mark a very big moment in the Wylfa story. *"Wylfa, I think, really depends on the energy white paper ... because it is going to propose a new financing model for nuclear power across the United Kingdom. At that point we will see whether that model is attractive enough to those companies who are temporarily paused on Wylfa [and] whether that new model would be sufficient to bring people back to the table. If it does, we will be there, and we will, as a Welsh Government, do what we can to assist in that process."* (3)

He also says that while he is "supportive" of the Wylfa Newydd plan he doesn't want the area to suffer because of the influx of workers. He said the developers had the responsibility of making sure there were enough local services for those who already live on the Island and newcomers *"I am committed to renewables, as a contribution Wales will make to our future energy needs, but renewables in the medium term are unlikely to supply everything we need. My party's policy is that nuclear has its part to play and I will be supporting it."* (4)

Meanwhile Horizon has dropped an option to buy a former oil depot on Anglesey. The 200 acre site was one of three sites in north Anglesey that would have housed up to 10,000 workers during construction. An option agreement was signed between Horizon and Conygar Investment Company in 2017 with hopes the site could be transformed into a holiday park once the plant was built. Robert Ware, Chief Executive of The Conygar Investment Company, said while Horizon had cancelled the option hasn't given up hoping the plans will eventually go-ahead. (5)

Trawsfynydd

A group called CADNO was founded in 1987 and was active until Trawsfynydd closed. CADNO is an acronym in Welsh meaning Society for the Prevention of Everlasting Nuclear Destruction. It is also the Welsh word for fox. Now the group is slowly gearing back up, because the site is being talked about as a possible location for a new, small modular reactor (SMR).

Local politicians, including in Gwynedd, the county in which the Trawsfynydd reactors sit, view the project as an easy jobs handout for a region struggling to employ people. It's false hope, of course, because the likelihood of SMRs coming to fruition is slim and would provide only a handful of jobs. The area is ripe for more wind power but the UK government remains eager to subsidize new nuclear instead, the only way new nuclear power plants will ever get built. (6)

National Grid

The National Grid has reported a plunge in annual profits which it blames partly on the impact of two abandoned nuclear projects – Wylfa and Moorside. Shares in the company slipped after



pre-tax profits sank by 31% to £1.8 billion for the year to March 2019. The Company has written off £137 million as a result of nuclear energy projects being shelved.

National Grid said it had concluded there was "*no realistic prospect of these schemes continuing in their present form*". For Moorside National Grid spent years consulting on proposals before alighting on a £2.8 billion plan that involved burying the lines through a 14-mile stretch of the Lake District and a 13-mile tunnel under Morecambe Bay. (7)

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1. The suspension of work on Wylfa Newydd nuclear power station, Welsh Affairs Committee, 3rd May 2019 <https://publications.parliament.uk/pa/cm201719/cmselect/cmwelaf/1938/full-report.html>
 2. Planner 10th May 2019 <https://www.theplanner.co.uk/news/mps-urge-action-after-nuclear-hiatus-blights-north-wales-growth-deal-prospects>
 3. North Wales Chronicle 17th May 2019 <https://www.northwaleschronicle.co.uk/news/17648056.energy-white-paper-to-mark-big-moment-in-wylfas-future/>
 4. Daily Post 16th May 2019 <https://www.dailypost.co.uk/news/north-wales-news/what-first-minister-say-brexit-16287718>
 5. Daily Post 14th May 2019 <https://www.dailypost.co.uk/business/business-news/wylfa-newydd-developer-drops-option-16272092>
 6. Beyond Nuclear 12th May 2019 <https://beyondnuclearinternational.org/2019/05/12/the-fox-we-need-to-guard-this-henhouse/>
 7. Times 17th May 2019 <https://www.thetimes.co.uk/article/ffc46bf6-7816-11e9-a793-a173e7c642f8>



5. Storage Revolution

The cost of lithium-ion batteries has plunged 85% in a decade, and 30% in just the past year. Electricity storage will reshape the grid in many ways, but the most important is its potential to accelerate the already explosive growth of renewable energy—and that will have political implications. Now grid storage is poised to grow at a faster pace than the electric cars that made it cost-effective, and even faster than the renewables it will help to accommodate on the grid.

The forecasters at Bloomberg New Energy Finance expect more than \$600 billion in global investment in battery storage by 2040. *“Every time we do a new forecast, we have to revise it up for deployment and down for cost,”* says Ravi Manghani, head of energy storage research at Wood Mackenzie. *“We’ve been proven wrong again and again.”* Kelly Speakes-Backman, CEO of the Energy Storage Association that represents the industry in the US: *“It’s funny, people have always talked about how it would be awesome if storage happened someday - It’s happening now.”* (1)

Solar power in combination with batteries is now a cheaper way than gas to produce electricity in the United States. (2)

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1. Politico 29th April 2019 <https://www.politico.com/magazine/story/2019/04/29/trump-wrong-about-wind-power-electricity-battery-storage-226755>
 2. Climate News Network 30th April 2019 <https://climatenewsnetwork.net/fossil-fuels-outbid-by-renewable-revolution/>



6. Energy Efficiency

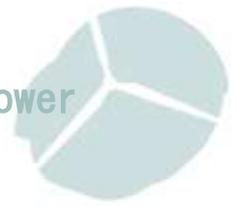
To improve the UK's housing stock to energy performance certificate (EPC) band C level will require up to £65 billion worth of investment, Claire Perry has revealed. The minister of state for energy and climate change told MPs last week that the Department for Business, Energy and Industrial Strategy (BEIS) has estimated that bringing all homes up to the EPC band C standard would cost between £35 billion and £65 billion. The government has committed to bring as many homes as feasible up to EPC band C by 2030.

Giving evidence to the select committee last week, she said that this figure is similar to how much the government has so far spent on decarbonising the power sector. But Perry said that the overall figure could be “much lower” if a stronger energy efficiency push from government helps to drive down the cost of energy efficiency measures.

Questioned over whether house builders should use the building regulations in place when the home is being built rather than when it received planning permission, which can be several years old, she said: *“I'm fed up with developers saying that they can't possibly change specifications when they are able to change the supplier of a steel contract overnight. I'm fed up with people trying to hide behind outdated regulations. We all have an obligation to supply homes that are affordable to buy and run.”* (1)

Moat Homes has launched a five-home pilot project in Essex to create zero-carbon retrofit homes in the UK, fitting the buildings with solar photovoltaics (PV) and battery storage systems. The pilot scheme will be located in Maldon, Essex, and has been set up in partnership by Moat Homes and energy and services firm ENGIE. The homes are renovated using the “Energiesprong” model that is designed to deliver a net-zero energy performance in short time frames at affordable costs. The Energiesprong approach upgrades homes with a new exterior, fitting the outside of the building with new walls, windows, a solar roof and new electrical heating systems. Moat Homes has installed roof-mounted solar PV, battery systems, airtight wall-mounted panels, new energy efficient pitched roofs and MVHR (Mechanical Ventilation with Heat Recovery) units to heat and ventilate the buildings. New triple-glazed windows and new electric cookers have also been added to the properties. The company claims that the final energy performance of each property will be near net-zero carbon. The project is being supported by funding from the European Union. (2)

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1. Utility Week 29th April 2019 <https://utilityweek.co.uk/energy-efficiency-upgrades-require-65bn-investment/>
 2. Edie 26th April 2019 <https://www.edie.net/news/6/Moat-Homes-launches--Energiesprong--retrofit-pilot-to-create-zero-carbon-houses/>



7. Flamanville

The EPR Reactor being built at Flamanville in Normandy – the same type of reactor as the two being built at Hinkley Point C – began construction in 2007. It was originally expected to start generating in 2012 and cost 3.5 billion euros. The bill has now reached nearly 11 billion, and it could be delayed yet again until 2022. While construction has almost finished, substandard quality welds were discovered in February and April 2018, in the secondary circuit which discharges steam to the turbine. (1)

EDF agreed to redo 58 welds, but asked the French Nuclear Regulator ASN to allow them to leave eight others because they are integrated in the containment. Having to redo these would force EDF to completely revise its schedule and delay the opening the reactor “*by at least two years*”. (2)

A final announcement by ASN is expected soon, but ASN’s president Bernard Doroszczuk has provided some comments while reporting to the French parliament. He said EDF would have to repair the welds or reinforce the new reactor. While repairing the welds was “quite feasible”, reinforcing the 1.6 GW plant could be a “complex operation” for which the unit was not necessarily conceived, said Doroszczuk. But repairing the welds could push back the planned start-up of the reactor early next year by two years to 2022. (3)

ASN said a meeting is scheduled on 29 May for EDF to present it with its technical proposal. A decision is now expected shortly after.

If EDF is required to repair the welds, it is likely to put completion back to 2022/23. Given that it has to replace the vessel lid in 2024, (4) it doesn't seem to make sense to start up in 2022/23 and run for one fuel cycle given that it will make vessel head replacement much dirtier and more expensive so that could put completion back even further to 2024.

When the European Union signed off on the Treasury’s loan guarantees for Hinkley Point C, it insisted it be conditional on Flamanville having “*completed the trial operation period*” and other operational milestones by December 2020. If Flamanville misses that deadline, it seems the UK Government won’t be able to offer up to £17bn in loan guarantees. (5)

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1. Le Monde 10th April 2019 https://www.lemonde.fr/economie/article/2019/04/10/nucleaire-l-epr-de-flamanville-risque-de-connaître-de-nouveaux-retards_5448479_3234.html
 2. Actur.fr 10th April 2019 https://actu.fr/normandie/cherbourg-en-cotentin_50129/epr-flamanville-vers-nouveau-retard-deux-ans_22868953.html
 3. Montel News 17th May 2019 <https://www.montelnews.com/en/story/edf-must-repair-welds-or-reinforce-new-reactor--asn-/1010344>
 4. France Info 29th June 2017 <https://france3-regions.francetvinfo.fr/normandie/manche/nord-cotentin/feu-vert-cuve-epr-decision-aberrante-irresponsable-greenpeace-1288763.html>
 5. Forston, D. New threat to Hinkley power plant cash, Sunday Times 31st January 2016 <https://www.thetimes.co.uk/article/new-threat-to-hinkley-nuclear-plant-cash-gzntmz5jlln>

