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1. **The Energy White Paper**
2. **Climate Change Committee gives nuclear few mentions**
3. **Boris's Ten Point Plan**
4. **Nuclear Power is not Zero carbon (or even low carbon)**
5. **100% Renewables**
6. **The role of local authorities in achieving net zero**
7. **Nuclear Waste Notes**
8. **NDA has a perpetual lack of knowledge about on its 17 sites**



1. The Energy White Paper:

A view from Pete Roche and Ian Fairlie

The Government published its long-awaited Energy White Paper on 14th December. (1) After a string of earlier announcements including Boris Johnson's Ten Point Plan, (2) the National Infrastructure Strategy report (3) plus the Government's announcement of a new greenhouse gas target for 2030, there were relatively few surprises. The technical details are presented below, but first some overall conclusions.

Overall, this White Paper is unsatisfactory as it seems to be all things to all men and women, It appears to aim to please as many sectors as possible so as not to attract disapproval. But, of course, in the real world, choices have to be made...but the White Paper seeks to avoid this duty. Some parts of the White Paper are blithe statements devoid of any connection with reality eg the notion that the market is desperate to invest in nuclear developments when nothing could be further from the truth. Other parts of it are quite thoughtful however and will repay further study, eg the comments on a Green Industrial Revolution.

It's a proverbial curate's egg.

Nuclear Power

The accompanying response to the Regulated Asset Base consultation is a disrespectful slap in the face to those who oppose nuclear power "in principle". It seems to say if you are principled in your comments, then the Government will not listen to them. This is a nauseating state of affairs.

In addition, one could easily reply but what about the many respondents who opposed nuclear developments on the grounds of its exorbitant costs? Of market rejection? Or safety? Or health grounds? Or lack of sustainability? Or nuclear proliferation?

Hovering over the White Paper are a whole series of qualifications of ifs and buts, especially on nuclear developments which could mean that nothing actually will transpire on the nuclear front. This would be a good outcome.

Also hovering over the whole White Paper is a distinct air of unreality. Its ambitious proposals are not summed in monetary terms. So what does HM Treasury think of its commitments of many hundreds of millions of pounds, at a time when it has to fund over £400 billion in Covid-related payments, plus the ensuing economic recession, plus the fallout from a possible no-deal Brexit?

The White Paper in many ways seems like an unfinished work in progress, as many future reports are promised including the following:

- With Ofgem, the Government will publish a new Smart Systems Plan in spring 2021;
- The Government will publish an Industrial Decarbonisation Strategy in spring 2021;



- The Government will publish a dedicated Hydrogen Strategy in early 2021;
- The Government is consulting on phasing out coal in electricity generation a year early;
- The Government will further clarify measures to transform energy, and support a green recovery;
- A transport decarbonisation plan will be published in the spring of 2021;
- The Government will publish a dedicated Heat and Buildings Strategy in early 2021;
- The Government will complete a review of the existing energy National Policy Statements (NPS), with the aim of designating an updated NPS by the end of 2021;
- The Government will call for evidence on affordability and fairness before April 2021.

In other words, the White Paper is perhaps best seen as a loose framework of thoughts, some good and some bad, with most of the real choices and details to be left for yet-to-be published supporting documents.

The Details

(a) RAB

The Government's response to the Consultation on the Regulated Asset Base (RAB) method for funding new nuclear reactors was published alongside the White Paper. (4) This concludes that the RAB model has the potential to reduce the cost of raising private finance for new nuclear projects, thereby reducing consumer bills, while still preserving incentives for the private sector to complete nuclear projects to time and budget. Unfortunately, no justifications are provided for these optimistic statements, given that major investors are busy withdrawing from nuclear rather than seeking to enter them.

"The government will aim to bring at least one large-scale nuclear project to a Final Investment Decision (FID) by the end of this parliament, subject to clear value for money for both consumers and taxpayers and all relevant approvals." Following the consultation, Government will continue to explore a range of financing options with developers, including RAB. As noted in the consultation, raising the capital required for a new nuclear project is likely to be challenging given the significant investment commitment needed for a new nuclear project developer to reach a FID.

Alongside considering the RAB model we will also continue to consider the potential role of government finance during construction.

Any evidence submitted by people and organisations thought to be opposed to new reactors was rather disrespectfully dismissed: *"with broad agreement from industry and those members of the public who were not in-principle opposed to nuclear to our proposals, we believe that a RAB in line with the high-level design principles set out in the consultation remains a credible basis for financing large-scale nuclear projects."*



The Government's Consultation Document on RAB didn't give enough detail to provide a proper critique because the Government wanted to reveal details only to potential investors: *"Some respondents stated that in order to provide more granular feedback the Government should provide more details on the specific design of the RAB model. However, the stated purpose of the consultation was to seek views on the high-level design principles of a RAB model. We consider that the level of information provided was appropriate for this stage of the process. Further details will be developed in discussion with developers of specific projects."*

In other words, those seeking more information, including those opposed to RAB, are given short shrift.

(b) Possible Nuclear Plans

The Energy White Paper reiterates the plan to bring at least one further largescale nuclear project to the point of FID by the end of this Parliament, subject to clear value for money for both consumers and taxpayers and all relevant approvals.

"We are pursuing large-scale nuclear, whilst also looking to the future of nuclear power in the UK through further investment in Small Modular Reactors and Advanced Modular Reactors." (p12)

It says the Ten Point Plan highlighted the fact that a large-scale nuclear power plant could support a peak of around 10,000 jobs during construction, and says the Government remains *"open to further projects later if the nuclear industry demonstrates that it is able to reduce costs and deliver to time and budget."* (p.48)

"We expect the sector to deliver the goal it set for itself in our Nuclear Sector Deal, published in 2018, to reduce the cost of nuclear new build projects by 30 per cent by 2030."

On Advanced Reactors, the Government *"will provide up to £385 million in an Advanced Nuclear Fund for the next generation of nuclear technology aiming, by the early 2030s, to develop a Small Modular Reactor (SMR) design and to build an Advanced Modular Reactor (AMR) demonstrator."* (p.50)

£215m of this will be spent on developing a domestic SMR design that could potentially be built in factories and then assembled on site. The remaining £170m will be spent on an R&D programme on Advanced Modular Reactors (AMRs) – reactors which use novel cooling systems or novel fuels. The Government has also committed £400m to fund nuclear fusion with the aim of developing a commercially viable reactor by 2040. (Cumbria Local Enterprise Partnership is looking for the ideal site in Cumbria to house the first prototype nuclear fusion facility. (5))

The White Paper puts forward the view that nuclear sector makes a significant contribution to the UK economy - some £7 billion GVA in 2016. It alleges that the nuclear industry currently employs around 60,000 people. (p.56) The Government says it is working with the nuclear sector to develop a national and regional supply chain productivity improvement programme to achieve these objectives and target at least £2 billion of domestic and export contracts for UK companies by 2030. (p.58)



(c) Green Industrial Revolution?

“We are on the cusp of a green industrial revolution”, says the Energy White Paper. Following on from the Ten Point Plan and the National Infrastructure Strategy the White Paper says the Government will further clarify measures to transform energy, support a green recovery, supporting thousands of green jobs and creating a fair deal for consumers giving us warmer and more comfortable homes. In other words, more statements and plans have yet to come.

The Government says it is committed to making the transformation fair and affordable, and that many low carbon technologies are already cheaper than fossil fuel alternatives.

A transport decarbonisation plan is to be published in the spring of 2021.

Action on energy, it says, will be compatible with our wider environmental objectives. However, the RSPB says Sizewell C which, if approved, would be built next door to the RSPB’s Minsmere Bird Sanctuary would be catastrophic for wildlife (6)

In 2019, greenhouse gas emissions from electricity generation were down 13% from 2018 and 72% from 1990. Support for low carbon generation has seen sustained falls in the cost of renewables. There are early signs of some renewables being deployed without Government subsidies.

“Decarbonising the energy system over the next thirty years means replacing – as far as it is possible to do so - fossil fuels with clean energy technologies such as renewables, nuclear and hydrogen.” (p.9)

The White Paper says there will be potentially a doubling of electricity demand and consequently a fourfold increase in low-carbon electricity generation. This discrepancy is not explained. (p.10)

As set out in the National Infrastructure Strategy, delivering the volume of private investment will require multiple policy levers and the right market frameworks to encourage competition and drive down costs. (p.10) No justification is given for these optimistic statements.

The Government estimates the measures in the White Paper could reduce emissions across power, industry and buildings by up to 230 MtCO_{2e} in the period to 2032 – 40 from power and energy systems; 120 from buildings and 70 from industry - and support up to 220,000 jobs per year by 2030. No justification is given for these optimistic statements.

Key Government aims include:

- 40GW of offshore wind, including 1 GW floating;
- Supporting CCUS in 4 industrial clusters;
- Aiming to bring at least one new nuclear power station to final investment decision by the end of this parliament;
- Increasing heat pump installations from 30,000 a year to 600,000 by 2026;



- Developing 5GW of low carbon hydrogen production capacity by 2030;
- Requiring that all rented non-domestic buildings will be Energy Performance Certificate (EPC) Band B by 2030, barring lawful exceptions.

(d) Smart Meters

The White Paper states that smart meters can enable consumers to access innovative solutions such as smart tariffs, including 'time of use' tariffs. These tariffs reward consumers financially for using less electricity at peak times of demand or using more when overall demand is low and there is surplus generation available, for example on a sunny or windy weekend. Agile Octopus is a 'time-of-use' tariff. Sometimes prices even go 'negative' - meaning that consumers can be paid to use energy during that period. Octopus also cap prices at 35p/kWh to protect consumers during price spikes. Octopus is also trialling 323 Vehicle to Grid (V2G) chargers which allow consumers to charge their vehicle when prices are low, and sell electricity back to the grid at times of peak demand.

The White Paper says consumers can generate their own electricity through roof-top solar panels, store it in batteries, and even sell any excess power back to the grid to generate a profit at times of higher demand.

The White Paper says “Local Authorities are key to delivering [smart local] systems by combining energy into their wider statutory work on housing, transport, waste and planning, making delivery more cost-effective and preparing for a net zero future. Government provides funding for Local Authorities to deliver programmes that support decarbonisation and will continue to work with communities to enable projects to be tailored and delivered to meet local needs.” (p.25)

However, these statements re cooperation with local authorities fall far short of actual reality.

The White Paper says the switch to clean electricity has particularly profound implications. Separate networks for electricity, gas for heating and petrol or diesel for cars and vans, which today run independently of each other, will increasingly merge into one system, as electricity becomes the common energy currency. The electricity network is now becoming more decentralised, and there will be new sources of demand, as millions of EVs and heat pumps connect to the system. A previously one-directional system is transforming into something more dynamic. The transformation of the electricity system is an opportunity to exploit new forms of system flexibility in how energy is generated and consumed. (p.70)

In partnership with Ofgem, the Government will publish a new Smart Systems Plan in spring 2021, which will include a new framework for monitoring flexibility across electricity markets. The Ten Point Plan announced a further £100 million to address energy storage and flexibility innovation challenges, one of the key priority areas in the over £1billion Net Zero Innovation Portfolio. (p.73) Distribution Network Operators (DNOs) are already creating local flexibility markets. In 2020, they awarded contracts for around 1.2GW of flexibility services, including the first contracts to provide local services which pay households for using the aggregated electricity capacity from a collection of domestic batteries (p.74)



The Government is planning to legislate to enable competitive tendering in the building, ownership and operation of the onshore electricity network. It wants to see a competitive regime for onshore networks, where currently only incumbent network operators can build, own and operate network assets.

(e) Fairness

The members of the Climate Assembly UK identified "fairness within the UK, including for the most vulnerable" as one of the top two principles that should guide decisions around net zero. (p.30)

The Government agrees and will publish a call for evidence on affordability and fairness before April 2021.

Households which self-generate electricity and store it, even sell it back to the grid, are currently able to reduce how much they pay towards the fixed costs of the electricity system, while still relying on the system when they are not self-supplying. This could leave other consumers to pay a greater share, some of whom may not be able to take advantage of new technologies.

HM Treasury has already launched a review of how the transition to net zero would be funded and where the costs would fall. An interim report will be published in December 2020, with a view to completing the review in spring 2021.

(f) Electrical Power

On electricity, the Government says it will invest £1bn to develop "technologies of the future" including advanced nuclear and hydrogen.

The Government has published a consultation on phasing out coal-fired generation sooner than the current target date of 2024.

The White Paper says:

"We are not targeting a particular generation mix for 2050, nor would it be advisable to do so. We have already reduced power sector emissions 58 per cent between 2010 and 2018, and to stay on a course for a fully decarbonised system we will continue that progress through the 2020s and have an overwhelmingly decarbonised power system in the 2030s." (p.42)

But ensuring the system is reliable, means intermittent renewables need to be complemented by technologies which provide power, or reduce demand when the wind is not blowing, or the sun does not shine. Today this includes nuclear, gas with carbon capture and storage and flexibility provided by batteries, demand side response, interconnectors. (p.43) *"By 2050, we expect low-carbon options, such as clean hydrogen and long-duration storage, to satisfy the need for peaking capacity."*

We will need sustained growth in the capacity of renewables over the next decade. The next CfD auction in late 2021 will be open to onshore wind, solar photovoltaics and other established technologies, as well as offshore wind. We aim to deploy around 12GW of low-cost renewable



generation. Onshore wind and solar will be key building blocks of the future generation mix, along with offshore wind.

(g) Biomass Energy with Carbon Capture and Storage (BECCS)

By 2022, the Government will establish the role which Biomass Energy with Carbon Capture and Storage (BECCS) can play in reducing carbon emissions across the economy and, as part of a wider biomass strategy. The CCC has estimated 75MtCO₂ of negative emissions could be required annually in order to reach net zero greenhouse gas emissions by 2050.

(h) National Policy Statements

The Government says it will complete a review of the existing energy National Policy Statements (NPS), with the aim of designating updated NPS by the end of 2021. (p.55)

(i) Offshore Wind Jobs

The Government intends to introduce more stringent requirements for the CfD supply chain plan process in order to support the delivery of the industry's target of 60 per cent UK content in offshore wind projects by 2030. It has announced a £160 million scheme and launched a competitive process in early December to support the development of offshore wind manufacturing infrastructure. (p.55)

The Government wants to see a five-fold increase in exports of offshore wind goods and services to at least £2.6 billion a year by 2030. The sector could bring £3 billion GVA a year by 2030, of which £1 billion is export related. (p.56)

(j) Transport

The UK will end the sale of new petrol and diesel cars and vans by 2030, ten years earlier than planned. The sale of hybrid cars and vans that can drive a significant distance with no carbon emissions will continue until 2035. (p.77)

The Prime Minister has announced around £1.3 billion to accelerate the rollout of charge-points for EVs in homes, workplaces, streets and on motorways across England, so people can more easily and conveniently charge their cars. And around £582 million in grants for those buying zero or ultra-low emission vehicles to make them cheaper to buy and incentivise more people to make the transition. Nearly half a billion to be spent in the next four years for the development and mass-scale production of electric vehicle batteries. (p.92)

(k) Heat Pumps

The Prime Minister's Ten Point Plan also set an ambition to reach 600,000 electric heat pump installations per year by 2028 (up from around 30,000 per year currently), as one option to accelerate the decarbonisation of heating. (p.79)



(l) Buildings

The plan is to eliminate emissions from domestic and commercial buildings by 2050. Tackling emissions from buildings will take many years to deliver but it is a journey which must start now.

The Government will publish a dedicated Heat and Buildings Strategy in early 2021 which will set out our ambitious plans in further detail, including the suite of policy levers that we will use to encourage consumers and businesses to make the transition. (p.101) The Ten-point plan included £1 billion of funding to support for the decarbonisation of buildings through improved energy efficiency. This will be allocated across several existing government schemes, including the Green Homes Grant Voucher Scheme, the Public Sector Decarbonisation Scheme and Social Housing Decarbonisation Fund. (p.102)

The Government wants as many existing homes as possible to hit EPC Band C by 2035, where practical, cost-effective and affordable. The Ten Point Plan extended the Public Sector Decarbonisation Scheme for a further year.

The Government will extend the Energy Company Obligation from 2022 to 2026 to support fuel poor consumers. (p.108)

To achieve net zero emissions, we will have to transition completely away from traditional natural gas boilers for heating homes on the gas grid. There are currently around 1.7 million fossil fuel boiler installations every year, but by the mid-2030s we expect all newly installed heating systems to be low-carbon or to be appliances that we are confident can be converted to a clean fuel supply. There is no single technology alternative to fossil fuels. Electric heat pumps and hydrogen, green gas and shared heat networks all have their part to play. So, while we are clear on the eventual outcome, we will be flexible in how we achieve it, always looking for the most cost-effective, consumer-friendly approach and open to innovative solutions.

The Government consult in early 2021 over new regulations to phase out fossil fuels in off gas grid homes, businesses and public buildings, including a backstop date for the use of any remaining fossil fuel heating systems. (p.110)

We need to electrify heat in buildings in a way which reduces the need for additional generation and network capacity. This could mean using thermal, hot water or battery storage, potentially in combination with a smart time of use tariff, enabled by smart metering, to shift heating demand away from more expensive peak periods. (p.111)

(m) Green Gas

The Budget 2020 confirmed that a green gas levy would be imposed on gas suppliers to fund a new support scheme for biomethane. The costs of the levy are expected to be passed onto gas bill payers. We are considering the responses to our consultation on the green gas levy design and intend to publish a government response in early 2021. The Green Gas Support Scheme (GGSS) will probably be launched in autumn 2021. The GGSS can probably deliver 2.8TWh of renewable heat per year in 2030/31, the equivalent of the gas requirements roughly 230,000 homes. (p.112)



The Ten Point Plan said government and industry would evaluate hydrogen as an option for heating homes and workplaces and develop plans for a possible pilot hydrogen town before the end of the decade.

(n) Heat Networks

The Government is committing £122 million to fund a new Heat Network Transformation Programme and will implement local authority zoning by 2025.

Networks with low-carbon heat sources, such as waste-heat recovery, large heat pumps, solar thermal or possibly hydrogen boilers, will reduce emissions from heating and can help consumers with lower energy bills.

The Government will legislate in this Parliament for the regulation of heat networks to protect consumers and reduce carbon emissions. It will take powers to reduce the 90 per cent reliance on natural gas in heat networks, as well as enable consumer protection for heat network customers. (p.114) These powers will require heat networks to switch to low-carbon fuel sources as part of a natural replacement cycle, thereby minimising disruption to consumers connected to a network.

(p) Carbon Capture Utilisation and Storage (CCUS)

The White Paper wants to see the UK become a world leader in the deployment of carbon capture utilisation and storage (CCUS) and clean hydrogen supporting 60,000 jobs. The Government will invest £1 billion up to 2025 to facilitate the deployment of CCUS in two industrial clusters by the mid-2020s, and a further two clusters by 2030, supporting our ambition to capture 10MtCO₂ per year by the end of the decade.

The Government will publish an Industrial Decarbonisation Strategy in spring 2021 to set out the details of how the government will support the decarbonisation of manufacturing industry. (p.123)

(q) Hydrogen

The Government will publish a dedicated Hydrogen Strategy in early 2021 which positions the UK as a world leader in the production and use of clean hydrogen. The White Paper calls both hydrogen using carbon capture and storage and green hydrogen made by electrolysis “clean”. (p.127)

It says a variety of production technologies will be required to satisfy the level of anticipated demand for clean hydrogen in 2050. This is likely to include methane reformation with CCUS, biomass gasification with CCUS and electrolytic hydrogen using renewable or nuclear generated electricity. The aim is to develop 5GW of low-carbon hydrogen production capacity by 2030. (p.128)



(r) Oil and Gas

Finally, there' are some warm words about getting to net zero in the production of oil & gas, but nothing about continuing to dig the stuff out of the ground.

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2. Climate Change Committee gives nuclear few mentions

Three of the five Climate Change Committee (CCC) energy scenarios for 2050 in its 6th Carbon Budget report have only 5GW of nuclear power, including that with highest energy demand (with 90% renewables); that's less than Hinkley Point C and Sizewell C combined. The CCC also assumes nuclear will cost £85/MWh in 2050. (1) There wasn't much in the way of good news in Boris's 10 Point Plan either with only half a billion pounds for nuclear "to help develop large and smaller-scale nuclear plants, and research and develop new advanced modular reactors". Nothing on Sizewell. (2) But we'll have to wait for the imminent Energy White Paper and response to the RAB funding consultation before we crack open the champagne.

Table 3.4.a
Summary of key differences in the electricity generation scenarios (2050)

	Balanced Net Zero Pathway	Headwinds	Widespread Engagement	Widespread Innovation	Tailwinds
Demand (TWh)	610	550	610	680	620
Extent of electrification	Cars & vans Partial heating Partial manufacturing	Cars & vans Partial heating Partial manufacturing	Cars & vans* HGVs Heating Partial manufacturing	Cars & vans HGVs Partial heating Partial manufacturing DACCS	Cars & vans* Partial heating Partial manufacturing DACCS
Renewable generation & capacity**	80% of total Wind: 125 GW Solar: 85 GW	75% of total Wind: 90 GW Solar: 85 GW	85% of total Wind: 130 GW Solar: 80 GW	90% of total Wind: 175 GW Solar: 90 GW	90% of total Wind: 160 GW Solar: 75 GW
Dispatchable generation & capacity***	10% of total 65 GW	15% of total 50 GW	10% of total 55 GW	8% of total 65 GW	7% of total 65 GW
Nuclear capacity	Multiple projects 10 GW	Multiple projects 10 GW	Contracted capacity 5 GW	Contracted capacity 5 GW	Contracted capacity 5 GW
Phase out of unabated gas	2035	2040	2035	2035	2035

The CCC report barely mentions nuclear power, nor does the accompanying 209-page "Policies for the Sixth Carbon Budget and Net Zero". CCC recommends that the UK sets a Sixth Carbon Budget to require a reduction in UK greenhouse gas emissions of 78% by 2035 relative to 1990. The 14-page electricity generation section considers how to reduce emissions from electricity generation to near-zero. "This will require a significant expansion of low-carbon generation, in particular low-cost renewables and decarbonised back-up generation, in conjunction with more flexible demand and use of storage," it says. "Our Balanced Net Zero Pathway decarbonises electricity generation by 2035, with action thereafter focused on meeting new demands in a low-carbon way." (3)



So, by the time Sizewell C could potentially come on-line in 2034, it won't be saving any carbon emissions.

The key features of the scenario are “an increasing demand for electricity, decreasing carbon intensity of generation, and a more flexible system”. Decreasing carbon intensity of generation includes: Phasing out unabated fossil fuel generation by 2035; increasing variable renewables to 80% of generation by 2050; and dispatchable low-carbon generation (gas with carbon capture and storage – CCS, bioenergy with CCS, and hydrogen). It also includes nuclear, noting: “Despite retirements of existing nuclear plants in the 2020s, this scenario sees new nuclear projects restore generation to current levels by 2035. The Balanced Pathway reaches 10GW of total nuclear capacity by 2035, with 8GW of new-build capacity.”

Chris Stark said at the press conference that renewable electricity will account for up to 90 per cent of power generation there would be “enough room” for another new nuclear station. (4)

Business Green (5) says the unifying thread that runs through the CCC's 1,000 pages of analysis is how the costs of decarbonisation have fallen far faster than even advocates of clean technologies expected. Renewables and energy storage costs have plummeted, there are very good reasons to think hydrogen, heat pumps, and electric vehicles can follow suit. Just a year ago the CCC estimated the UK would need to invest around one per cent of GDP a year to deliver net zero by 2050, but it now believes it may require investment equivalent to around 0.6 per cent of GDP in the 2030s before falling to just 0.5 per cent by 2050. These surprisingly rapid cost reductions have opened up remarkable possibilities. *"That's one of the most important messages this year - costs are lower than we previously thought they would be over the next 30 years,"* observes CCC chief executive Chris Stark. *"And in reality those costs are probably closer to zero overall, if we can capture all the benefits of that transition."*

The recommended 78% cut in emissions by 2035 - moving faster, would provide a major economic boost as the UK labours to recover from the coronavirus crisis.

Carbon Brief (6) summarises the recommendation on electricity generation:

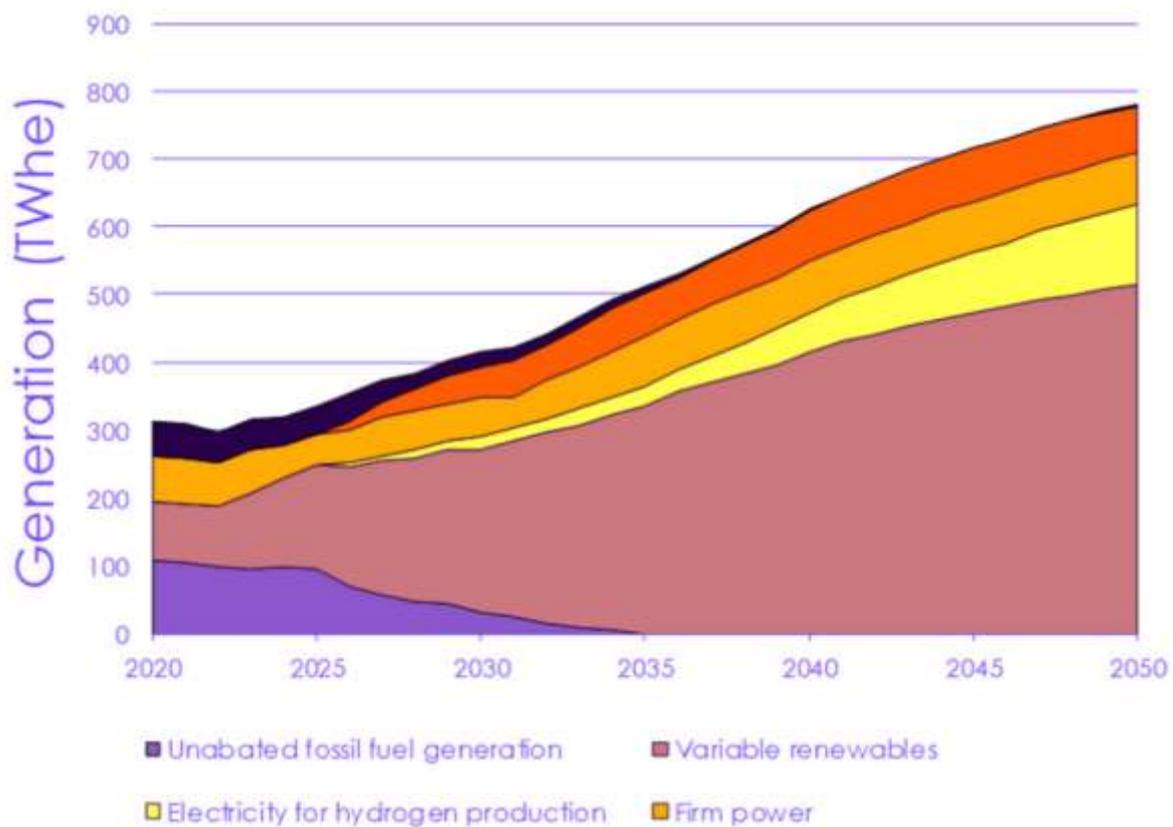
- Delivering 485TWh of generation by 2035, which should all be low-carbon. This will require 400TWh of new low-carbon generation.
- Deploying variable renewables at scale, including 40GW of installed offshore wind capacity by 2030 and sustaining that build rate to support deployment of up to 140GW by 2050.
- Deploying at least 50TWh of dispatchable and flexible generation (eg gas CCS and hydrogen) by 2035 that can balance a system driven by renewables at low emissions.
- An increasingly flexible system, including from demand-side response (with 20% of demand being flexible in 2035), storage, hydrogen production and interconnection.

The CCC also urges the government – by the end of 2021 – to “commit to phasing-out unabated gas generation by 2035, subject to ensuring security of supply”.

Carbon Brief continues:



“...the CCC does not offer much in the way of advice about new nuclear power, other than to say: “The government should consider contracting models which help make new nuclear projects commercially viable for private developers.” It adds: “The BNZ pathway reaches 10GW of total nuclear capacity by 2035, with 8GW of new-build capacity.”



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3. Boris's Ten Point Plan

The Nuclear Free Local Authorities (NFLA) described the Ten Point Plan for a Green Industrial Revolution as a “*missed opportunity*” when radical, appropriately funded action to tackle the climate emergency is sorely needed.

Some of the 10 points include some welcome areas of support – for example a major increase of offshore wind, supporting the development of electric vehicles in conjunction with support for public transport, cycling and walking strategies, laudable aims on energy efficiency (despite completely inadequate resource for it), protecting and restoring the natural environment and looking at ways to increase green finance across the country.

However, the amount of new money committed to such work is totally inadequate to claim this to be part of a new green industrial revolution.

The Government's commitment to new nuclear will have next to no positive low carbon impact in the time required to be getting to zero carbon. The amount of public money required to deliver both small modular reactors, a nuclear fusion experimental reactor and new large nuclear reactors at sites like Sizewell and Bradwell is massive. Hinkley Point C alone is coming in at around £22.5 billion. Small modular reactors could require similar figures given there is no agreed or approved design for them, or an established supply chain that can deliver them in a cost-effective way. An experimental nuclear fusion reactor requires billions more. In all three cases the delivery of such projects is years away and completely diverts attention for more effective alternatives.

With local authorities facing yet further deep cuts in their budgets though, there is little detail provided on how this plan will help support them in delivering decentralised energy or the sort of resource that can have the transformative approach that we all surely want such a plan to deliver. For example, the Conservative election manifesto in 2019 gave a pledge to “help lower energy bills by investing £9.2 billion in the energy efficiency of homes, schools and hospitals”. Earlier this year, though an energy efficiency programme was announced of around £2.5 billion over a six-month period.

There is also no specific support provided for onshore wind or solar in the plan, or wave, marine and tidal power either. None of this looks impressive for the type of transformative green industrial revolution we need. It has been renewable energy providers that have led the way in recent years, and yet again, this has been largely ignored by the UK Government. (1)

Sir David King, a former government chief scientist and chair of the Centre for Climate Repair at Cambridge University, says the £12bn of public investment proposed “...is nowhere near enough either to manage the commitment to net zero emissions by 2050 or to provide a safe future. As we emerge from the Covid-19 pandemic and its impact on our economy, there needs to be an understanding that this is the opportunity to grow our economy in a direction that is fit for purpose in this century.”



PwC has estimated that £400bn of investment in green infrastructure is required in the next decade to meet the net zero target. Steve Jennings, the head of energy and utilities at PwC, said: *“Government is signalling an intent and an ambition which is really positive, but the £12bn investment is the significant point. This may not be enough. It will be the private sector that has to invest significantly and create and support these green jobs, and the private sector will look for a compelling investment case to invest the sums required.”*

The solar industry pointed out that the government had missed out solar from its green plans. £500m for mass-scale production of batteries does not compare to investment in countries such as Germany, where figures are in the billions for new battery manufacturing plants. Keith Anderson, the chief executive of Scottish Power, which plans to invest £10bn in green projects in the UK, said the government did not need to spend more taxpayer money to reach its goals, if it set up the right investment frameworks to galvanise private capital. (2)

Ed Miliband, shadow business secretary, said the funding cannot meet the scale of what is needed to deal with the environment crisis. Germany features a 40bn environment plan, while France has determined that 30bn of its spending plan have a confident ecological impact. At the least two-thirds for the UK headline figure of 12bn in financing is recycled announcements, with only 3bn being new responsibilities. (3)

The plan backed nuclear energy with £525M *“to help develop large and smaller-scale nuclear plants, and research and develop new advanced modular reactors”*. However, according to the Energy & Climate Change Intelligence Unit (ECIU) the investment in small modular reactors (SMRs) is less than expected. *“If I was in the SMR game I’d be disappointed with this because that £2bn support for a small initial fleet of reactors has been paired back to just over £500M,”* says Jonathan Marshall *“...it feels a bit like SMRs have been put on the backburner now. For a while it felt like the government was believing that the SMR industry could be the future.”*

Marshall attributed this change to the increasing support for renewables. *“The EU has set out huge ambitions to boost offshore wind capacity, the UK has already done that, all the rest of the world is investing in renewables whereas not many are investing in nuclear now,”* he said. *“None of these cost reductions that were touted for years for nuclear industry seem to be happening whereas the evidence shows the cost of renewables is plummeting and the cost of what’s needed to balance the grid is plummeting too.”* (4)

The £4bn of new money was described as “beyond inadequate”, by Green Party co-leader Sian Berry. She said it pales in comparison to the government’s £27bn road building programme. (5)

Personally, I don’t like everything on Boris Johnson’s ten-point shopping list, says Ambrose Evans-Pritchard in *The Telegraph*. It makes no sense to keep building big nuclear plants. *“It is lunacy. The markets have already decided that new nuclear is not worth the risk,”* says Tom Burke, chairman of E3G. Costs cannot be brought under control. The strike price for Hinkley Point is £92.50 per megawatt hour (2012 prices) compares to £39.50 for the latest North Sea wind auctions. As EDF’s former finance chief candidly admitted, the purpose of Hinkley was to save the insolvent French nuclear industry and get the British to pay for it. There is a national security case for small modular reactors, says Evans-Pritchard, as a way of shoring up the defence industry. There is no commercial case for two 1.6 gigawatt reactors at Sizewell C.



Nobody is willing to build them without nosebleed subsidies. Much is made of the need for nuclear baseload power, but this concept is outdated. Mr Burke says nuclear increasingly gets in the way because the imperative is shifting to “flexibility”, requiring near instant response, meshed together with data analytics and digital demand management. (6)

The 10-point plan won't do enough, according to an analysis by Cambridge Econometrics which suggests the plan will only reduce emissions by 59% by 2030. (7) Analysis by energy consultancy Aurora says the plan would leave emissions at 5 per cent below even the previous reduction target. The Government says the new strategy will shave 180 million tonnes of carbon dioxide equivalent (Mt CO₂e) off the UK's emissions between 2023 and 2032. But its own projections say 331 Mt CO₂e of emissions savings were needed to put the UK on course to meet interim climate targets before the net zero emissions goal was announced. (8)

On 3rd December, Boris Johnson announced a new ambitious target to reduce the UK's emissions by at least 68% by 2030, compared to 1990 levels. (9) This is the UK's nationally determined contribution which will be submitted to the UN as part of the UK's pledge under the 2015 Paris climate agreement. It is a significant increase on the previous target of about 57% reductions, which was based on a 2050 target of 80%, rather than the current net zero target. Environmental and poverty campaigners wrote to Johnson last month urging a target of 75% cuts, which they said were a stretch but feasible. Research by WWF and Imperial College London suggested a 72% target would stimulate the UK's green economy. (10)

One of the UK's leading climate scientists, Prof Sir Brian Hoskins said the “*target is ambitious – but we need action to back it up, right now.*” He noted that Chancellor Rishi Sunak recently committed £127bn to the HS2 rail link and new roads - which will both increase emissions - while offering just £1bn to home insulation, which would reduce emissions. (11)

One of the trickiest areas will be to improve energy efficiency and switch heating systems in the UK's draughty homes. *The Telegraph* says installing a heat pump is expected to cost between £8000 and £17000. A £2bn Green Homes Grant to encourage insulation measures has so far had fewer than 300 successful applicants. And there will need to be a significant reduction in the amount of traffic on the roads, despite the switch from petrol and diesel to EVs. A new ‘behaviour change and public engagement team’, within BEIS, is focused on how to get public buy-in for further emissions cuts, which will be targeted at what we eat and how we travel and heat our homes. BEIS will also work to ensure that green policies do not unfairly impact one area of society. The Government has not made any calculations for how much reaching net zero will cost, but the National Audit Office (NAO) said it could ultimately reach hundreds of billions, but the cost of inaction would be far greater. (12)

Also, in November, the Treasury outlined its position towards new nuclear in two documents – Response to the National Infrastructure Assessment and National Infrastructure Strategy According to World Nuclear News the Treasury rejected the advice of the National Infrastructure Commission that the government should not agree support for more than one nuclear power station beyond HPC, before 2025. (13)



1. NFLA 18th Nov 2020 <https://www.nuclearpolicy.info/news/nfla-comment-uk-governments-10-point-plan-green-industrial-revolution-missed-opportunity/>
2. Guardian 18th Nov 2020 <https://www.theguardian.com/environment/2020/nov/18/is-12bn-enough-to-get-uk-on-track-for-net-zero-carbon-emissions>
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12. Telegraph 4th Dec 2020 <https://www.telegraph.co.uk/news/2020/12/04/government-sets-secret-green-nudge-unit-persuade-britons-install/>
13. World Nuclear News 26th Nov 2020 <https://www.world-nuclear-news.org/Articles/UK-Treasury-underscores-value-of-new-nuclear>



4. Nuclear Power is not Zero carbon (or even low carbon)

Business, Energy and Industrial Strategy (BEIS) Department accept that nuclear is not a 'zero carbon' source of electricity.

EDF Energy has been justifying its TV ad claim that it is the '*biggest producer of carbon free electricity*' by referencing a BEIS website in which the claim of 'zero carbon' was made for renewables and nuclear. In a response to a letter from Together Against Sizewell C (TASC), BEIS says:

"...we agree with your argument that the environmental impact table of the Fuel Mix Disclosure report could cause confusion. I have asked for the report to be amended with a line that explains that the table relates only to generator emissions in the operational phase and does not include emissions related to the fuel supply chain or maintenance activities." (1)

In 2008, the journal Energy Policy published an article by Benjamin Sovacool (now Professor of Energy Policy at the Science Policy Research Unit at Sussex University). The article looked at 103 lifecycle studies of greenhouse gas-equivalent emissions for nuclear power plants. It calculates that while the range of emissions for nuclear energy over the lifetime of a plant, reported from qualified studies examined, is from 1.4g of carbon dioxide equivalent per kWh (gCO₂e/kWh) to 288gCO₂e/kWh, the mean value is 66gCO₂e/kWh. This compares to 9gCO₂e/kWh for offshore wind and 32gCO₂e/kWh for solar PV. (2)

Along the same lines Professor Keith Barnham said:

"Claims that nuclear power is a 'low carbon' energy source fall apart under scrutiny" (3)

He looks at various research, including that of Benjamin Sovacool. He highlights the fact that according to the Climate Change Committee (CCC), if we are to avoid the worst effects of climate change, by 2030 all electricity should be generated with less than 50 grams of carbon dioxide emitted for each kilowatt-hour (50 gCO₂/kWh). Barnham concludes that:

"...the balance of the evidence of the six most robust LCAs [Life Cycle Analyses] is that the carbon footprint of nuclear power is above the CCC's recommended limit."

Taking a different approach, a new report from Professor Steve Thomas and Alison Downes for the Stop Sizewell C Campaign, (4) point out that although construction of Sizewell C (SZC) is expected to begin in 2022, it won't be online until 2034. EDF's Sustainability Statement for SZC gives the carbon content of construction at 5.74 million tonnes (Mt) of carbon equivalent (CO₂e). This is broken down into 84% from the materials used, 4% construction activities, 5% materials transport and 5% worker transport.

EDF claims that the lifecycle CO₂ of SZC from the fuel cycle will be 4.5g CO₂e/kWh. Using the BEIS carbon intensity forecast to the mid-2030s, EDF claims SZC will reduce the UK's carbon emissions by 1Mt carbon in 2034 (excluding the contribution of construction to emissions) and



projecting that trend forwards states (emphasis added) *“it is conservatively estimated that GHG emissions from the construction of Sizewell C will be offset within the first six years of operation assuming the equivalent energy were otherwise to be generated by the anticipated mix of grid electricity generation sources.”*

So, even using EDF’s figures, Sizewell C cannot make a positive contribution to the UK’s net zero target until at least 2040.

BEIS’s figures do not look beyond mid-2030s, but EDF assumes a grid intensity of 20g in 2050 despite the UK government’s legally binding commitment to *‘to bring all greenhouse gas emissions to net zero by 2050.’*

EDF claims that *“By 2050, SZC will have displaced a cumulative total of approximately 12 million tCO₂e compared to the estimated future energy mix for generation.”* Deducting 5.74Mt CO₂ from construction, SZC will therefore displace net 6.26Mt of CO₂ by 2050.

Alternative assumptions from authoritative sources such as National Grid show that grid intensity will be much lower than forecast by BEIS and EDF and, far from reducing emissions, SZC will actually increase them from the construction process and from the emissions associated with the nuclear fuel.

Uranium Ore Grade & and Back-end emissions.

In 2012, Warner and Heath said in a paper in the Journal of Industrial Ecology that:

“LCA literature indicates that life cycle GHG emissions from nuclear power are a fraction of traditional fossil sources, but the conditions and assumptions under which nuclear power are deployed can have a significant impact on the magnitude of life cycle GHG emissions relative to renewable technologies.”

After harmonizing methods to use consistent gross system boundaries and values for several important system parameters, Warner & Heath found LWR life cycle GHG emission estimates of 12, 17, and 110 g CO₂-eq/kWh. The variability was caused by various factors including the primary source energy mix, uranium ore grade. A scenario analysis of future global nuclear development examined the effects of a decreasing global uranium market-average ore grade on life cycle GHG emissions. Depending on conditions, median life cycle GHG emissions could be 9 to 110 g CO₂-eq/kWh by 2050.

Uranium ore goes through an extensive extraction and conversion process that requires significant energy inputs that can generate significant indirect GHG emissions. Warner and Heath conclude that if the global uranium market-average ore grade decreases overtime, lifecycle GHG emissions could increase for the average nuclear power plant due to higher energy demand for uranium recovery. So, though uncertain, it is possible that nuclear power will emit more GHGs in the future. Therefore, nuclear power may be considered to involve an added level of risk for delivering GHG emissions mitigation relative to other technologies. (5)

Also not adequately represented in LCA estimates is the back-end of nuclear energy: the CO₂ required in treating, storing and safeguarding the enormous amounts of radioactive waste from



uranium mining, chemical refinement of uranium and decommissioning nuclear power plants. (6)

Length of time to build

Marc Jacobson points out that the average time to build a nuclear power station is around 14.5 years, from the planning phase all the way to operation. Utility-scale wind and solar farms, on the other hand, take on average only 2 to 5 years, from the planning phase to operation. Rooftop solar PV projects are down to only a 6-month timeline. Assuming that fossil fuel generation, is being replaced, transitioning to 100% renewables as soon as possible would result in cuts to emissions 9.5 to 12.5 years earlier. Average grid emissions over that period of time would have to be added to the LCA emissions from nuclear power to give a fair comparison between the two options.

Jacobson also says all nuclear plants emit 4.4 g-CO₂e/kWh from the water vapor and heat they release. This contrasts with solar panels and wind turbines, which reduce heat or water vapor fluxes to the air by about 2.2 g-CO₂e/kWh for a net difference from this factor alone of 6.6 g-CO₂e/kWh. (7)

Sea Level Rise

“There is an exquisite paradox here”, says Professor Andy Blowers, “While nuclear power is hubristically presented as the ‘solution’ to climate change, the changing climate becomes its nemesis on the low-lying shores of eastern England.” Apart from Hinkley Point C, there remain two projects – Sizewell C and Bradwell B – still in the frame, although precariously so. Yet, for both sites, climate change may prove the showstopper. These coastal, low-lying sites are highly vulnerable to the impacts of climate change, including sea level rise, flooding, storm surges, and coastal processes. This was recognised as an issue in the rather equivocal statement that accompanied designation of the sites in 2011. Referring to Bradwell (similarly to Sizewell), it was considered *“reasonable to conclude that any likely power station development within the site could potentially be protected against flood risk throughout its lifetime, including the potential effects of climate change, storm surge and tsunami, taking into account possible countermeasures”*.

Lifetime protection was envisaged as a process of *“managed adaptation”*, requiring developers *“to demonstrate that they could achieve further measures for flood management at the site in the future, if future climate change predictions show they are necessary”*.

There are two problems with managed adaptation. The first is the increasing uncertainty of predictions of climate change and related sea level rise, and especially storm surges which greatly increase the impact, by the end of this century. If present trends continue, global warming could reach 3°C-4°C by the end of the century and, even if it can be reduced to 2°C based on the Paris accords of 2015 or, better still the 1.5°C urged by the IPCC (Intergovernmental Panel on Climate Change) (now looking increasingly unlikely), sea level rise of around 1 metre will occur, and rising seas are inevitable beyond 2100.



Climate predictions have focused especially on the period up to the end of the century, by which time planned new nuclear power stations starting up in the 2030s will only just have ceased operating. At the turn of the next century the legacy of today's new build will become the decommissioning wastes of tomorrow, adding to that already piled up in coastal locations. Nuclear energy raises moral issues about security and potential destruction and danger to the environment and public health in nuclear communities down the generations. The moral question becomes all the more acute in the very specific circumstances of developing unsustainable nuclear power stations on the crumbling shores of East Anglia and the West Country. (8)

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 2. Sovacool, B *Valuing the greenhouse gas emissions from nuclear power: A critical survey* Energy Policy 36 (2008) 2940– 2953 <https://www.nrc.gov/docs/ML1006/ML100601133.pdf>
 3. Ecologist 5th February 2015 <https://theecologist.org/2015/feb/05/false-solution-nuclear-power-not-low-carbon>
 4. Steve Thomas and Alison Downes, *How much Carbon would Sizewell C save?* Stop Sizewell C August 2020 <https://stopsizewellc.org/sizewell-c-and-climate-change/>
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 7. Marc Jacobson, The 7 reasons why nuclear energy is not the answer to solve climate change <https://www.leonardodicaprio.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/>
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5. 100% Renewables

The U.K. could save money, reduce the risk of blackouts and more quickly achieve its carbon-cutting goals by abandoning plans to build more nuclear power facilities and instead invest in a flexible electricity grid, new analysis has found.

Investment in flexible energy technologies, such as battery energy storage and advanced flexible gas, can rapidly increase the share of renewable generation in the UK by 2030 at a lower overall cost to consumers.

“Optimising the UK’s shift to a renewable-powered economy” models the impact of current UK ambitions for renewable energy and shows that adding 7GW flexibility to the UK power system by 2030 can deliver a higher share of renewable generation (62%) than could be possible by adding wind and solar without flexibility. (1)

This flexible scenario could power more than 710,000 more households with renewable energy, cut 2 million tonnes of CO₂ emissions and cost the £270m less every year by 2030. It could also save the UK economy £660 million a year when compared with installing another new nuclear plant alongside renewable generation. This is due to the high upfront costs and substantial market interventions required for more nuclear.

Crucially, the analysis revealed that even if energy generation was to remain the same as it is today, Britain could increase renewables’ share of that generation to 62% simply by adding more flexibility (renewables currently account for around 47% of electricity used, according to the government).

The report also raises questions about the necessity of building Hinkley Point C.

Flexibility unlocks more renewable energy by balancing the intermittency of wind and solar power to ensure the power supply always matches demand. For example, when more power is generated than needed, you can store the surplus in batteries to be used later. The alternative is paying renewables to switch off, which is expensive and inefficient. On the other hand, investing in nuclear power could, according to Wärtsilä, entrench an inflexible grid while making renewables such as solar and wind less cost-effective. (2)

Similarly, a report in Nature Energy by Benjamin Sovacool, Andy Stirling, Gordon MacKerron and others says countries wishing to reduce carbon emissions should invest in renewables, abandoning any plans for nuclear power stations because they can no longer be considered a low-carbon option. The study provides evidence that it is difficult to integrate renewables and nuclear together in a low-carbon strategy, because they require two different types of grid. Because of this, the authors say, it is better to avoid building nuclear power stations altogether. (3)

Consumers can play a significant role in the energy transition as distributed energy resources and the electrification of heating and transport increase on the system, says Zsuzsanna Pató from the Regulatory Assistance Project. Increasing demand-side flexibility and involving the customer is often cheaper than strengthening grid infrastructure. Consumers want to be part of



the energy transition. They have rooftop solar, electric vehicles, heat pumps and the like. This can cause headaches for network companies, but policymakers and system operators are not used to viewing customers as part of the solution. There are a variety of ways consumers can modify their demand to save money and allow the system as a whole to be more efficiently used. Well-designed, economically efficient network tariffs—the charges for the delivery of electricity to our homes and businesses—can induce customers to align their energy use with the needs of the grid. The value of flexibility rises with each new variable renewable unit, electric vehicle and heat pump connected to the grid. But consumers will only provide flexibility if they receive ample compensation for the value they create not only to grid operators but also to the power system. They are not simply consumers but agents of change. (4)

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 4. Foresight 16th Dec 2020 <https://foresightdk.com/it-is-time-to-bring-consumers-on-board-the-energy-transition/>



6. The role of local authorities in achieving net zero

The Energy White Paper says “Local Authorities are key to delivering [smart local] systems by combining energy into their wider statutory work on housing, transport, waste and planning, making delivery more cost-effective and preparing for a net zero future. Government provides funding for Local Authorities to deliver programmes that support decarbonisation and will continue to work with communities to enable projects to be tailored and delivered to meet local needs.” (p.25)

Yet a new report from the Green Alliance says a lack of funding and strategic support from central government is making it difficult for local authorities to support the drive for net zero emissions.

More than three-quarters of English local authorities have made “climate emergency” declarations, and many have also pledged to reach net-zero emissions by 2030, ahead of the national target of 2050. However, a cash shortfall caused by the Covid-19 pandemic, little support from central government and years of austerity has left councils unable to make the changes they want to, according to the Green Alliance report.

Government is missing a trick here because local authorities have influence over transport and housing, two sectors that are really important to decarbonise and that the central government so far hasn’t done a particularly good job on. (1)

Local authorities are best placed to support local people, communities and businesses to make the local changes necessary to reduce emissions and tackle climate change. With high levels of public trust, the Green Alliance argue that a new approach is needed in which local authorities are seen by government as crucial partners in the drive to achieve the national net zero goal. (2)

- Meanwhile, work is set to begin on one of the UK’s largest energy retrofit projects of its kind. Individual or communal batteries will be installed for the homes, allowing them to harness power generated via linked solar panels. The scheme will see almost 650 existing homes in Penderry, Swansea, installed with energy storage and smart energy management technology. Social housing provider Pobl is behind the project, which is backed by £3.5m in European Union funding. It is hoped the upgrades will allow the homes to generate up to 60% of their own electricity. (3)

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7. Nuclear Waste Notes

A Working Group has been formed in Copeland is a first step towards the construction of a 'Geological Disposal Facility' for higher-activity radioactive waste. (1)

This is the first stage of the search for a site and to understand the views of people across Copeland regarding the possible hosting of a GDF. The Working Group, which will include Copeland Borough Council and Radioactive Waste Management (RWM), will begin to engage with people in Copeland to canvass and listen to their views. It will not be making any commitments on the siting of a GDF.

"Establishing a Working Group is just the starting point for engaging with the community in a process that will take several years. It does not presuppose support for any potential site; it's about starting work to see if there are any areas that would be worth investigating further. If there are, any decisions made will be subject to community support."

Members of the Working Group include an independent Chair along with representatives from the three interested parties, RWM and Copeland Borough Council. Other groups and bodies could be invited to join, including representatives from the Cumbria Association of Local Councils (CALC).

The geographical area to be discussed will initially cover the whole of Copeland borough, but would exclude the Lake District National Park at the request of Copeland Borough Council and the three interested parties. The potential for underground facilities off the coast, accessed from land, will also be considered.

Trudy Harrison, MP for Copeland continues to repeat the old mantra that: *"Most of the material that would go into the GDF is already based here in Sellafield."* In fact, Radioactive Waste Management Ltd, says the radioactivity from existing waste (i.e. not including new reactors) is expected to be 4,770,000 Terabecquerels (TBq) in the year 2200, but the amount of radioactivity in the spent fuel from Hinkley Point C in the year 2200 would be 3,800,000TBq – or about 80% of the radioactivity in existing waste. (2)

As part of the process to identify a suitable site for a GDF within a willing community, RWM has undertaken initial discussions with four interested parties, which each proposed an area of interest in Copeland. RWM carried out initial evaluations for each area proposed to determine if they have any potential to host a GDF. These are available below:

Inshore area near to the Low-Level Waste Repository.

<https://copeland.workinginpartnership.org.uk/wp-content/uploads/2020/10/Inshore-Area-IER-Report.pdf>

Ghyll Scaur Quarry and associated coastal plain together with the adjacent inshore area.

<https://copeland.workinginpartnership.org.uk/wp-content/uploads/2020/10/Ghyll-Scaur-Quarry-IER-Report.pdf>



Copeland Area together with the adjacent inshore area. (for Copeland Borough Council)

<https://copeland.workinginpartnership.org.uk/wp-content/uploads/2020/10/Copeland-Area-IER-Report.pdf>

Copeland Area together with the adjacent inshore area (fore a private company)

<https://copeland.workinginpartnership.org.uk/wp-content/uploads/2020/10/Copeland-Area-Private-IER-Report.pdf>

RWM has concluded there may be potential to host a GDF in all of the proposed areas of interest. Therefore, both RWM and all interested parties have agreed to open discussion more widely in the community and formed the Copeland Working Group. The Copeland Working Group will initially consider the whole of the Borough of Copeland and adjacent inshore area up to 22km from the coastline, with the exclusion of the area within the boundary of the Lake District National Park and any future extension. In time, the Working Group will propose an area for further investigation. (3)

ONE of the interested parties involved was Irton Hall Ltd, which is interested in understanding the potential for inshore development, extending below the seabed, accessed from the coastal strip near the area of the Low-Level Waste Repository site in Drigg. Steve Cotterill, owner of Irton Hall Ltd said *“Our idea was the entry point to get the waste into the GDF as close as possible to Sellafield and we should look at the potential for the construction of the GDF itself, to be away from the coast and in rocks beneath the seabed.”* (4)

Irton Hall Ltd, run various hospitality businesses, including Irton Hall. *“They came with an interest to understand if there was the potential to develop the GDF deep in the geology under the seabed – in what we call the inshore area,”* explained RWM. *“This big corridor, 20-odd kilometres off the coastline. So for the underground element to be below the seabed, deep in the geology below the seabed, but accessed from a surface facility. Initially they said around the LLWR (near Drigg) area, that coastal strip, but we considered a wider area.”*

Apart from Copeland Borough Council, the other interested parties are reported to be GenR8 North Ltd and Dave Faulkner (Copeland resident and ex-Sellafield manager).

Dave Faulkner suggested the area around a quarry near Millom. The wider area down to the coastal plain towards Haverigg was also considered. RWM said: *“Again it led us very much to look at the geology of the inshore area in that big wide 20km corridor off the coastline, accessed again from land.”*

Meanwhile, Genr8 North Ltd had general interest in seeing the GDF programme given proper consideration in West Cumbria as part of future infrastructure developments in the area. (5)

- A Joint Environment Agency and Office for Nuclear Regulation (ONR) group scrutinises RWM’s work on geological disposal. The group publishes an annual report, with 2019 to 2020 just out. (6) The regulators say: *“We are engaging with RWM early, before regulation starts, so that when a site is identified RWM already clearly understands what it needs to do as part of the regulatory process.”* This year’s Annual Report concludes that: *“RWM has progressed in a number of areas, such as its work on site characterisation,*



modelling non-radiological contaminants and identifying relevant radionuclides, but further work is still needed. RWM's high-level and strategic 'organisational development' work needs a clear plan in place to show how and when it will establish itself as an organisation suitable for holding a [environmental] permit, and subsequently a nuclear site licence." It also needs to present an integrated work plan and a targeted and prioritised research programme. (7)

- Earlier Annual Reports going back to 2008-9 are available here: <https://www.gov.uk/government/publications/geological-disposal-scrutiny-of-rwms-work-annual-reports>
- *"Let's get one thing clear right off the bat", says Linda Pentz Gunter writing on the Beyond Nuclear website, "You don't "dispose" of nuclear waste. The ill-suited, now cancelled, but never quite dead radioactive waste repository at Yucca Mountain was not a "disposal" site. The radioactive mud being dredged from the sea bed at the Hinkley C nuclear site in the UK, is not going to get "disposed of" in Cardiff Grounds (a mile off the Welsh coast). When Germany dumped radioactive waste in drums into the salt mines of Asse, it wasn't "disposed" of. Taking nuclear waste to Texas and New Mexico border towns and parking it there indefinitely is not "disposal". To talk about radioactive waste "disposal" is simply dishonest. It's disingenuous at best and deliberately misleading at worst. "Once you have made radioactive waste, then you are looking at long-term isolation, not disposal," (8)*

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1. Working in Partnership 4th Nov 2020 <https://copeland.workinginpartnership.org.uk/copeland-gdf-working-group-formed-to-discuss-geological-disposal-of-radioactive-waste/>
 2. See Hinkley Point C and Nuclear Waste <http://www.stophinkley.org/WManDecom/HinklCWaste.pdf>
 3. See <https://copeland.workinginpartnership.org.uk/working-group-area/>
 4. In Cumbria 10th Dec 2020 <https://www.in-cumbria.com/news/18933996.irton-hall-discuss-possible-copeland-nuclear-disposal-facility/>
 5. Whitehaven News 2nd Dec 2020 <https://www.whitehavennews.co.uk/news/18912358.inshore-areas-explored-copeland-nuclear-waste-disposal/>
 6. <https://www.gov.uk/government/publications/geological-disposal-scrutiny-of-rwms-work-annual-reports/regulatory-scrutiny-and-engagement-for-geological-disposal-annual-report-2019-to-2020>
 7. See <https://environmentagency.blog.gov.uk/2020/11/30/regulating-radioactive-waste-what-we-do-and-why/>
 8. Beyond Nuclear 29th Nov 2020 <https://beyondnuclearinternational.org/2020/11/29/all-casked-up-with-nowhere-to-go/>



8. NDA has a perpetual lack of knowledge about on its 17 sites

The Nuclear Decommissioning Authority has admitted that it still doesn't have a full understanding of the condition of its sites, including its 10 closed Magnox stations. Its most recent estimate of the cost of decommissioning its sites is £132bn with the work not being completed for another 120 years. This is an increase of £8bn from last year. This was driven by a £5bn increase to the estimated cost of decommissioning the Magnox sites, which is now put at almost £20bn, and a £2.5bn increase in costs at Sellafield, taking the costs at the reprocessing site to £97bn. (1)

This was revealed by the house of Commons Public Accounts Committee whose report said the NDA has a perpetual lack of knowledge about the state and location of waste on its 17 sites. This results from decades of poor record keeping and weak government oversight. Combined with a "sorry saga" of incompetence and failure, this has left taxpayers footing the bill for "astronomical sums".

The MPs recommended the NDA speed up its work: "It may be possible to reduce the time it will take to fully decommission the sites from around 85 years to more like 40-45 years. This could significantly reduce the long-term cost." They also said taxpayers' money could be saved by accelerating the programme to create a geological disposal facility to permanently store highly radioactive waste currently held in interim facilities.

The lack of knowledge of the sites was a significant factor in the failure of a 2014 contract the NDA signed with Cavendish Fluor Partnership to decommission the Magnox sites. The government was forced to take back the contract in 2018 and the botched tender has now cost taxpayers £140m, the MPs found. The Magnox clean-up contract was wrongly awarded to the Cavendish Fluor Partnership in 2014. A High Court judge then ruled that the losing bidder, Energy Solutions and its partner, Bechtel, should have won the 14-year contract to bring the plants to a state of "care and maintenance". (2)

Sir Geoffrey Clifton-Brown, deputy chair of the public accounts committee (PAC), said: *"Although progress has been made since our [2018] report, incredibly, the NDA still doesn't know even where we're currently at, in terms of the state and safety of the UK's disused nuclear sites. Without that, and after the Magnox contracting disaster, it is hard to have confidence in future plans or estimates."* (3)

Estimates of the cost of getting the Magnox sites to a "care and maintenance" stage, which is cheaper than clearing them entirely, were questioned by the committee. It warned that the cost of getting to a care and maintenance stage of the decommissioning process had risen by between £1.3bn and £3.1bn since 2017, to as much as £8.7bn. The committee also suggested the costs could rise again. (4)

The Public Accounts Committee (PAC) Report is available here:

<https://committees.parliament.uk/publications/3703/documents/36067/default/>



- The NDA has published its Draft Business Plan on work it intends to carry out on clean-up and decommissioning over the next 3 years, and what funding will be available. The Authority is consulting on the plan until 1st February 2021. It says it wants to hear from anyone who has a comment on any aspect of this document. The document seems to take no account of the PAC report. It looks like deliberate avoidance of what the PAC said. Perhaps the “perpetual lack” of knowledge has now become a “perpetual lack” of regard to criticism.

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1. Times 27th Nov 2020 <https://www.thetimes.co.uk/edition/business/nuclear-wastes-130bn-bill-qpjqmj83n>
 2. Times 27th Nov 2020 <https://www.thetimes.co.uk/edition/business/nuclear-clean-up-bill-needs-scrutiny-h7c3xcz27>
 3. Guardian 27th Nov 2020 <https://www.theguardian.com/environment/2020/nov/27/uks-nuclear-sites-costing-taxpayers-astronomical-sums-say-mps>
 4. Telegraph 27th Nov 2020 <https://www.telegraph.co.uk/business/2020/11/27/taxpayers-face-132bn-bill-cleaning-unwanted-nuclear-sites/>