

# **Policy & Need**

## **Written Representation by Stop Sizewell C**

This paper attempts to draw together elements from our other written representations, including on Finance and CO2 and to build on the issues raised in Stop Sizewell C's Open Floor Hearing contribution.

### **Summary:**

Sizewell C does not answer this government's policy imperatives and is not needed.

#### **A. Sizewell C does not answer this government's policy imperatives;**

- It is not the solution to net zero and faces a number of political and financial challenges to its target of delivering by the government's deadline for 78% reduction in CO2 by 2035.
- It will take 6 years to offset the CO2 from construction, meaning it will make no positive contribution to net zero until around 2040. Recent studies suggest the Life Cycle emissions of the EPR is underestimated.
- There are legitimate concerns about the reliability of delivery of the project, given the poor record of the nuclear industry generally and the EPR in particular.
- The cost is too high - indeed it may cost more than £20 billion - and investment would suck resources away from faster, green solutions such as offshore wind and hydrogen storage.
- It is unclear how the £20+ billion cost would be financed. EDF is pushing for a government stake or for consumers to pay for it through a nuclear tax (the RAB). We assert that it cannot offer value for money and that investors may not be forthcoming.
- The project is planned in a legislative policy vacuum with reviews of the National Policy Statements due and multiple government initiatives that prioritise protection of the natural environment.
- There are a range of ESG concerns for investors including environmental and social impacts and questions of governance.
- China's involvement remains mired in controversy.
- The location will not help level up the UK.
- It cannot be justified as a means to help economic recovery,

#### **B. Sizewell C is not needed..**

- The concept of baseload is outdated, and nuclear energy is not, in any case, "always-on". Nuclear is not a good fit with renewables.
- The majority of the Climate Change Committee's five energy scenarios in its 6th carbon budget had only 5GW of nuclear capacity, achievable by completing Hinkley C and life-extending Sizewell B.

- The government has underestimated the potential to store renewable energy in the form of green hydrogen. UK high level climate action champion Nigel Topping on 2 June supported efforts to increase hydrogen from renewable energy and to progress to a 100% renewables power system.
- EDF's efforts to find other roles for Sizewell C is an admission that its power will not always be needed. The exploratory functions associated with Sizewell C could be delivered by Hinkley Point C and other non-nuclear energy generation sources. This is a cynical attempt to strengthen what is a weak case for Sizewell C

## **A. POLICY. Sizewell C does not answer this government's policy imperatives**

### **a) Sizewell C is not the solution for net zero.**

**i) Sizewell C is too slow:** the government is committed to a 78% reduction in CO2 emissions by 2035, yet Sizewell C is only due to come online in 2034, and that is if there are no delays, for which EPR projects are notorious (see ii below). EDF's 2020 Annual report talks of a Final Investment decision being made mid-2022,<sup>1</sup> however EDF's Mike Lavelle told a meeting of the Whitehall Group on 27 May 2021 that the FID was expected end of 2022/early 2023,<sup>2</sup> putting even more pressure on EDF's timetable of both reactors being online by 2034. Any extension of the planning process - such as that suggested by MP Therese Coffey in order for statutory agencies to be able to fully review the material - must be decided upon on the basis of the needs of the process rather than the needs of the applicant, but would add further pressure on this timescale. Even if the project is consented and delivered on time, by 2034, so close to the UK's new legally binding target, the UK's energy landscape will be profoundly different, favouring cheaper renewables and green hydrogen and the grid will have been substantially decarbonised.

EDF admits it will take six years for Sizewell C to "pay back" the increased 6.2 million tonnes of CO2 generated in its construction,<sup>3</sup> compared to the expected energy mix at that time i.e. not until 2040 assuming there are no delays. Our dedicated written representation on carbon footprint - How much Carbon would Sizewell C save? - on this issue goes into more detail. We understand that EDF is expected to release a new Life Cycle Assessment of the Sizewell C project shortly. The contents are not yet known, but it is notable that EDF refused to release a similar "independent" assessment for the Hinkley C project, which concluded the LCA was 4.8g CO2/KWhr, despite its being described as "available" in the Hinkley C DCO application. Such a refusal suggests the findings cannot be relied upon. Meanwhile, a recently published study by Pomponi and

<sup>1</sup><https://www.edf.fr/sites/default/files/contrib/groupe-edf/espaces-dedies/espace-finance-en/financial-information/publications/financial-results/2020-annual-results/pdf/annual-results-2020-appendices-20210304.pdf>. Page 15.

<sup>2</sup> Contemporaneous notes. Stop Sizewell C participated in the meeting.

<sup>3</sup> <https://stopsizewellc.org/sizewell-c-and-climate-change/>

Hart,<sup>4</sup> uses publicly available data and builds on previous research to assess the carbon emissions associated with the construction and future operation of Hinkley C's twin EPR reactors. As well as using a traditional **process-based approach**: a bottom-up method, in which an inventory of materials used in the construction (e.g. concrete and steel) and operation (e.g. nuclear and liquid fuels) of the plant is compiled and assessed for carbon emissions, the scholars used an **input-output analysis**, in which the carbon emissions associated with spending in different sectors of the economy is assessed. The availability of data on Hinkley C lent itself to this analysis, whereby total emissions across an economy are allocated to different sectors, and then to specific projects within those sectors according to their share of economic activity. Using this method and a hybrid of both methods, most scenarios fell in the range 18 – 36 gCO<sub>2</sub>e/kWh.

**ii) Reliability of delivery:** The nuclear industry and the EPR in particular have a poor record. Since the then-Prime Minister Tony Blair's announcement 15 years ago that nuclear power was to undergo a renaissance, only Hinkley Point C is under construction, and projects at Moorside and Wylfa have collapsed. China General Nuclear's controversial Hualong reactor for Bradwell has yet to pass several regulatory hurdles and the project was recently paused.

Sizewell C's EPR reactors will be copies of those being built at Hinkley Point C (HPC), currently £2.9bn over budget and up to 15 months late. No country in Western Europe has any operating EPRs or new builds besides Hinkley C and the catastrophic Flamanville (France) and Olkiluoto (Finland) projects which are a decade behind schedule and multiple times overspent. Defective valves at Olkiluoto<sup>5</sup> and design deviations" at Flamanville could call the operation of the only two working EPRs in the world - at Taishan in China - into question. A Freedom of Information request to the Office of Nuclear Regulation concerning the design deviations revealed there had been no communication with Chinese and French regulators on this matter.<sup>6</sup>

There are legitimate grounds for concern that Hinkley C could be further delayed because of the ongoing controversy over EDF's attempt to remove of the Acoustic

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<sup>4</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0306261921002555> {Pomponi, F.; Hart, J. The greenhouse gas emissions of nuclear energy – Life cycle assessment of a European pressurised reactor. Appl. Energy 2021, 290, 116743.}

<sup>5</sup> <https://uk.reuters.com/article/finland-nuclear-construction-idUKL8N2D7147>

<sup>6</sup> FoI Reference HPGE202103180.

Fish Deterrent<sup>7</sup> and the need to secure permission to increase the size of the workforce - a necessity that pre-dates the covid-19 pandemic.<sup>8</sup>

The EPR is a failed design, described by Paul Dorfman of UCL as “too complex to build to time and budget”.<sup>9</sup> EDF aims to have a new EPR design by 2021, but Sizewell C would be the old design.<sup>10</sup> France will not make any decisions about possible new reactors until at least the end of 2022.<sup>11</sup>

## **b) The cost is too high**

### **i) Sizewell C is expensive**

EDF claims that Sizewell C will cost £20 billion, but at a recent webinar Stephen Vaughan of Rothschilds - EDF's financial advisers - said “The ambition for Sizewell C is to raise private financing and that means a big quantum of capital, **in excess of GBP20 billion**”, add that this required “the deepest pools of capital to be available”.<sup>12</sup> The EDF 2020 Annual report states “The construction cost included in the DCO is given for illustrative purposes and is non-binding”<sup>13</sup>

Every pound invested in Sizewell C could be spent on cheaper, faster renewables, investment in energy efficiency, storage, CCS, tidal and vital flexibility adaptations to the grid plus efficiency adaptations to our homes. The Prime Minister's target for offshore wind capacity to reach 40GW by 2030<sup>14</sup> has been estimated to cost £50bn,<sup>15</sup> but for 30GW - the equivalent of nine Sizewell Cs (@3.2GW) - this looks good value, especially as the power could deploy some years ahead of Sizewell C.

It is becoming increasingly clear that EDF is strapped for financial resources; desperate

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<https://infrastructure.planninginspectorate.gov.uk/projects/south-west/hinkley-point-c-new-nuclear-power-station-material-change-1/>

<sup>8</sup> Hinkley Point C Community Forum minutes January 2020: "David Eccles, EDF reported that conversations are at an early stage with the local authorities with regards to potential increase to workforce numbers. The current situation is that HPC are jointly working with the councils to look at various scenarios in relation to increase workforce and the potential impact of these."

<https://www.edfenergy.com/download-centre?keys=&tid=175&year%5Bvalue%5D%5Byear%5D=>

<sup>9</sup> <http://www.globalconstructionreview.com/sectors/expert-opinion-deeply-divided-c7ase-hin7kley/>

<sup>10</sup> <https://www.reuters.com/article/edf-nuclear/edf-plans-to-announce-new-epr-nuclear-reactor-by-mid-2021-idUSL8N2H62LR>

<sup>11</sup> <https://uk.reuters.com/article/france-nuclearpower/france-will-not-decide-on-new-nuclear-reactors-before-end-of-2022-idUSL8N29E2Z7>

<sup>12</sup> <https://www.world-nuclear-news.org/Articles/New-nuclear-needs-positive-taxonomies-says-Rothsch>

<sup>13</sup> See 3

<sup>14</sup> <https://www.gov.uk/government/news/new-plans-to-make-uk-world-leader-in-green-energy>

<sup>15</sup> <https://www.theguardian.com/environment/2020/oct/06/powering-all-uk-homes-via-offshore-wind-by-2030-would-cost-50bn>

to get Sizewell C off its balance sheet.<sup>16</sup> The 2020 Annual report says “In the event of postponement of the [FID] decision, an agreement would have to be reached on the financing of the additional costs incurred.”<sup>17</sup> It now looks like there will be such a delay, meaning Sizewell C could become a drain on taxpayers even before an FID has been made.

EDF’s 2020 Annual report states: “EDF’s ability to make a FID on Sizewell C and to participate in the financing of this project beyond the development phase could depend on the operational control of the Hinkley Point C project, on the existence of an appropriate regulatory and financing framework, and on the sufficient availability of investors and funders interested in the project. **To date, none of these conditions are met.**”<sup>18</sup>

**ii) Sizewell C is not competitive and dependent on a “nuclear tax”, government funding and unenthusiastic investors:** EDF cannot pay to build Sizewell C; it has been promoting a Regulated Asset Base (RAB)<sup>19</sup> model - essentially a nuclear tax on energy bills - or for the UK government to take a direct stake. Both remain under consideration, despite HM Treasury concluding that RAB would count as government debt. RAB had already been widely criticised for pushing the risk of overruns and overspends onto consumers. A RAB-type model for a cancelled plant in the US is costing ratepayers \$2.3bn.<sup>20</sup>

Our written representation on Finance - What would the RAB model mean for Sizewell C? - finds that EDF’s estimates of a £40-£60 per MWhr price range for Sizewell C’s electricity is unrealistic, even with consumers paying up front on their energy bills, years before any electricity is generated. We conclude that Sizewell C cannot show value for money, and it is entirely possible when the true cost to consumers is known that the government will realise its potential to be politically unpopular, and contravene this administration’s commitment to control energy bills.<sup>21</sup>

There is every indication that investors in Sizewell C will be hard to find, with three of the UK’s biggest asset managers - Legal & General, Aviva and Prudential - stating they

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<sup>16</sup> At the Westminster Energy and Environment Forum 10 October 2020, Humphrey Cadoux Hudson, Managing Director, Nuclear Development EDF Energy said: “We have to get this asset [Sizewell C] off our balance sheet” <https://www.youtube.com/watch?v=S74CNa5MVVM>

<sup>17</sup> See 3

<sup>18</sup> ibid

<sup>19</sup> <https://www.gov.uk/government/consultations/regulated-asset-base-rab-model-for-nuclear>

<sup>20</sup> <https://theintercept.com/2019/02/06/south-caroline-green-new-deal-south-carolina-nuclear-energy/>

<sup>21</sup> See 2019 manifesto <https://www.conservatives.com/our-plan> p 17 “For many families, energy costs are a major source of financial pressure. We will keep our existing energy cap and introduce new measures to lower bills”

are unlikely to invest.<sup>22</sup>

**c) The project is being planned in a Policy Vacuum.**

The relevant National Policy Statements for the Sizewell C application are EN-1 and EN-6 and these provide the framework for development consent decisions for new nuclear power stations capable of deployment by the end of 2025. Clearly Sizewell C cannot deploy by the end of 2025, and the NPSs have been well overdue for review and renewal for many years. In December 2020 the government finally made a commitment to complete such a review by the end of 2021 despite the original timetable for an already started EN-6 review having stalled and passed its original completion date of late 2019. Recent discussions with BEIS officials confirmed that these would be subject to public consultation, but even though we are now nearly halfway through the year there is no further information concerning when such consultations will take place and what their duration will be. It is to be hoped they will be a minimum of 12 weeks.

The 2017 Written Ministerial Statement on Energy Infrastructure (2017 WMS) confirms that for projects due to deploy after 2025, including the Sizewell C project, EN-6 is not considered to have effect under section 104 PA2008 but under section 105. However, the Secretary of State is required to have regard to the content of EN-1 or EN-6. It is the case that - provided the commitment to complete the review in 2021 is upheld, there should be, at least, new draft NPSs by the time the ExA makes its recommendation on the project to the Secretary of State. We are aware that an Appraisal of Sustainability (AoS) was conducted prior to an expected second round of public consultation on EN-6 which was due in 2019. We assert that this AoS may well be out of date given the legislative changes and policy recommendations that have been made in the last few years including the government's 25 year Environment Plan for 'Enhanced beauty, heritage and engagement with the natural environment',<sup>23</sup> the 2019 Landscapes Review, which called for AONBs to be "strengthened, with increased funding, governance reform, new shared purposes with National Parks, and a *greater voice on development*"<sup>24</sup> and Point 9 of the Prime Minister's 2020 10 Point Plan which pledges "we will safeguard our cherished landscapes, restore habitats for wildlife in order to combat biodiversity loss and adapt to climate change."<sup>25</sup>

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<https://www.telegraph.co.uk/business/2021/02/06/aviva-fears-environmental-fallout-backs-new-nuclear-reactors/>, <https://www.telegraph.co.uk/business/2021/02/20/sizewell-c-proves-aturn-off-city-giant-legal-general/> and <https://stopsizewellc.org/prudential-says-it-is-highly-unlikely-to-invest-in-sizewell-c/>

<sup>23</sup> <https://www.gov.uk/government/publications/25-year-environment-plan>

<sup>24</sup> <https://www.gov.uk/government/publications/designated-landscapes-national-parks-and-aonbs-2018-review>

<sup>25</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/936567/10\\_POINT\\_PLAN\\_BOOKLET.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf)

#### **d) ESG Concerns**

**i) Environmental:** In addition to the potential impacts of the project on protected landscapes, **there is no solution in sight for nuclear waste:** The spent fuel from an EPR is exceptionally hot, so fuel from Sizewell C would have to stay on Suffolk's eroding coastal site for 140 years - potentially until at least 2200 - before it could be moved. The UK has made no progress on building a "permanent" (100,000 yrs+) waste facility.

**ii) Social:** In addition to the social impacts of the project on local communities discussed in our Community Impacts written representation, our findings on the potential costs of Sizewell C under the RAB model could contribute to fuel poverty.

**iii) Governance:** It is not yet known who will own Sizewell C. EDF's comments on the Relevant Representations states "The ownership of SZC Co. for the construction period is expected to be made up of third-party investors (predominantly pension investment funds which may include foreign investment) but has not yet been fixed. Foreign investment has been used to enable infrastructure development throughout the UK and external finance (equity and debt) is expected to be required to fund the construction of the Sizewell C Project. Although EDF Energy and China General Nuclear (CGN) have funded the development phase of Sizewell C to date, this will change for construction and operation of Sizewell C."<sup>26</sup> This contrasts with EDF's stated aim last May for the project to be majority UK owned.<sup>27</sup>

EDF's own reputation has been further undermined by severe criticism from French regulatory body, Autorité des Marchés Financiers and public audit body, the Cour des Comptes, who exposed what was known perhaps as far back as 2016, that EDF has no credible means to finance the Hinkley Point C project. AMF handed down a fine of €5m to EDF and of €50,000 to then Chairman and CEO Henri Proglio.<sup>28</sup>

**iv) Political and Security concerns about EDF's controversial partner, China General Nuclear (CGN):** Like Comms giant Huawei, CGN is blacklisted by the US for

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<sup>26</sup> Page 37

[https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-003958-Sizewell%20C%20Project%20-%20Comments%20on%20Relevant%20Representations%20\(RR%20s\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-003958-Sizewell%20C%20Project%20-%20Comments%20on%20Relevant%20Representations%20(RR%20s).pdf)

<sup>27</sup> <https://www.edfenergy.com/media-centre/news-releases/sizewell-c-dco>

<sup>28</sup> <https://www.amf-france.org/en/news-publications/news-releases/enforcement-committee-news-releases/amfs-enforcement-committee-fines-edf-and-its-former-chairman-and-chief-executive-officer>

its military connections<sup>29</sup> and the Prime Minister is under pressure to remove CGN from the UK's nuclear build programme. There are legitimate concerns about putting our critical national infrastructure in the hands of a Chinese state-owned company.

#### **e) Other policy objectives**

**i) Sizewell C will not help to “level up” the UK.** In its claim of IROPI we see no evidence that EDF has attempted to fully assess whether it could build twin reactors at its other sites of Hartlepool and Heysham, merely saying ““all eight sites that made it through the NPS site selection appraisal are required””.<sup>30</sup> Unfortunately for EDF it is an open secret that Ministers consider multiple gigawatt nuclear projects to be unrealistic. According to a study we commissioned and have also submitted “New Nuclear potential to Contribute to local economies” both Hartlepool and Heysham have higher “levelling up” potential.<sup>31</sup>

**ii) Sizewell C has no place in the UK's green recovery:** Sizewell C is not shovel ready, being still around a year from planning consent or licensing and with no guaranteed funding. A mammoth project in a protected environment must have cast-iron justification, which Sizewell C lacks for all the reasons below. Large infrastructure projects are boom and bust and do not create lasting wealth as Leiston - host to Sizewell B - is evidence to. Sizewell C will damage Suffolk's resilient SME-based local economy for only 900 long-term jobs (costing £22million each).

#### **B. NEED.**

The Applicant states that all designated sites in the NPS are needed, yet the stated aim of government refers to “**aiming** to bring at least one large scale nuclear project to the point of Final Investment Decision by the end of this Parliament - [ie 2024], **subject to clear value for money and all relevant approvals**”<sup>32</sup> and it is an open secret that Ministers would be content with just one more.<sup>33</sup> Indeed, if the Wylfa project had proceeded, it is entirely possible that the government would not be in negotiations with EDF at this time, given the recognised sensitivities of the Sizewell site.

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<sup>29</sup><https://www.dailymail.co.uk/news/article-8326813/White-House-official-tells-Britain-Dont-hand-China-control-electricity.html>

<sup>30</sup> Page 49

[https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-001770-SZC\\_Bk5\\_5.10\\_V2\\_Shadow\\_HRA\\_Report.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-001770-SZC_Bk5_5.10_V2_Shadow_HRA_Report.pdf)

<sup>31</sup><https://stopsizewellc.org/core/wp-content/uploads/2020/06/Development-Economics-Nuclear-power-stations-potential-to-contribute-local-economic-benefits.pdf>

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/945899/2012\\_16\\_BEIS\\_EWP\\_Command\\_Paper\\_Accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/2012_16_BEIS_EWP_Command_Paper_Accessible.pdf) page 16

<sup>33</sup> According to information shared with Stop Sizewell C via multiple confidential sources close to government



**a) Sizewell C is not needed for energy generation.**

**i) Baseload is outdated.** In 2015 Steve Holliday, the then CEO of the UK's National Grid Company said, 'The idea of large power stations for baseload is outdated.'<sup>34</sup> His argument was that in the past, electricity systems were built around baseload plant with mid-load and peaking plants added to meet the hour by hour fluctuations in electricity demand. Holliday claimed, '*the solar on the rooftop is going to be the baseload*'. Renewables will therefore be at the heart of the system with other capacity added to ensure security of supply. The function of grid supplied power will be to fill in the gaps when renewables are not available. Holliday warned that large nuclear plants do not fit well with such a system: '*If you have nuclear power in the mix, you will have to think about the size of these plants. Today they are enormous. You will need to find a way to get smaller, potentially modular nuclear power plants.*'

Climate Change Committee (CCC) Chair Lord Deben describes nuclear as a "transitional" energy source whose need reduces as grid-balancing improves. "By the time you get to the need for the next nuclear power stations, there will be alternative ways of doing this. If we get better at balancing the grid and the amount of baseload energy, the need becomes smaller. "Nuclear isn't the best way of getting that base energy because you can't turn it on and off: you have to use it all the time."<sup>35</sup>

There are times however when nuclear power is not "always on", being regularly off for scheduled outages, and for unscheduled problems, such as with Sizewell B's current extended outage,<sup>36</sup> which ONR Chief Nuclear Inspector Mark Foy stated verbally at an NGO forum on 26 May would last "months, not days or weeks".

**ii) Legitimate debate about how much nuclear is needed.**

EDF claims there is a demonstrable need for Sizewell C. However, the government's main advisers - the Climate Change Committee - published five energy scenarios in its 6th Carbon Budget in December 2020, of which three had only 5GW of nuclear capacity. This includes the scenario which had the highest electricity output of all - Widespread Innovation - based on 90% renewables.<sup>37</sup> 5GW is achievable by finishing Hinkley Point C and extending the life of Sizewell B,<sup>38</sup> ie no more nuclear capacity is required other than that under construction or already built. The remaining two

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<sup>34</sup><https://energypost.eu/interview-steve-holliday-ceo-national-grid-idea-large-power-stations-baseload-power-outdated/>

<sup>35</sup> <http://www.utilityweek.co.uk/lord-deben-politicians-finally-grasped-reality-climate-change/>

<sup>36</sup> <https://www.thetimes.co.uk/article/sizewell-b-nuclear-plant-forced-to-stay-shut-over-safety-concerns-0d9l2mkkq>  
<sup>37</sup> <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

<sup>38</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/943714/MoDelling-2050-Electricity-System-Analysis.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943714/MoDelling-2050-Electricity-System-Analysis.pdf) page 9 "*With neither additional new nuclear (beyond the ~5GW provided by Sizewell B\* and Hinkley Point C)..*" (footnote) "*Sizewell B's current stated lifetime is to 2035, but EDF has expressed its aim to extend its life for 20 years beyond that to 2055, subject to regulatory approval.*"

scenarios contain 10GW; considerably less than other scenarios quoted by EDF. This additional 5GW is arguably achievable in a similar timeframe to Sizewell C with Rolls Royce's Small Modular Reactors. National Infrastructure Commission Chair John Armitt is quoted as saying: "Hopefully by 2025, we will be able to rely on much smarter systems and won't have to rely on nuclear".<sup>39</sup> The NIC said the potential for other non-intermittent technologies to complement renewables "weakened the case for committing to a new fleet of nuclear power stations".<sup>40</sup>

Doug Parr, Chief Science Officer for Greenpeace, has critiqued the government's 2050 modelling study<sup>41</sup> published in December 2020, which asserts that more nuclear than 5GW is needed, for making unreasonably pessimistic assumptions about storing renewable energy. Dr Parr writes<sup>42</sup> "a look at the modelling study suggests that with a burgeoning hydrogen sector, the cost difference between 'high nuclear' and 'low nuclear' scenarios is low to non-existent, because the 'firm power' that Mr Kwarteng wants is provided by the stored hydrogen. So the Modelling 2050 study does not require nuclear in the way he implies. Further, the Modelling 2050 study seems weighted *against* the uptake of hydrogen to provide this 'balancing' service to the grid. The modelled assumption on hydrogen availability and price, which is the basis of the scenarios explored, is found on p6, where it says: "*the main part of the paper we consider a scenario where the total amount of hydrogen-fired generation is constrained to 20 TWh or less, and hydrogen is twice as expensive as natural gas.*" In footnote 6 on that page we discover that: "overall costs of the necessary hydrogen infrastructure are included in our assessment of the hydrogen price. Our central gas price assumption in 2050 is £19.5/MWh (2012 prices). In our core hydrogen scenario (hydrogen price = 2x gas price) this equates to a hydrogen price of approximately £39/MWh [c. **£1.2/Kg in 2020 prices**]" (emphasis added). Thus the viability of green hydrogen to contribute to a very high renewables system is constrained by 2 assumptions of only 20TWh being available in 2050, and the cost being £1.2/kg in 2020 prices (or \$1.68/kg at today's exchange rate). These 2 critical assumptions contrast sharply with the Climate Change Committee where their central 'balanced pathway' scenario reaches nearly 100TWh by 2050,<sup>43</sup> with other scenarios going higher still. Meanwhile cost assumptions from the Head of BloombergNEF, the leading analysts in this space, say "By 2050, therefore, extrapolating long-standing trends in renewable power and electrolyzer costs.... BloombergNEF estimates that green hydrogen will be available at between \$0.8 and

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<sup>39</sup> <https://utilityweek.co.uk/treasury-still-unconvinced-rab-model-nuclear/>

<sup>40</sup> [https://www.thetimes.co.uk/article/advisers-raise-doubts-over-new-nuclear-plants-8hd85cr6d?fbclid=IwAR1lxogaZreJ4colG4tAlHKu3QstyAM2mt59U9Bx4q\\_dV00QE8OP78H-15c](https://www.thetimes.co.uk/article/advisers-raise-doubts-over-new-nuclear-plants-8hd85cr6d?fbclid=IwAR1lxogaZreJ4colG4tAlHKu3QstyAM2mt59U9Bx4q_dV00QE8OP78H-15c)

<sup>41</sup> <https://www.gov.uk/government/publications/modelling-2050-electricity-system-analysis>

<sup>42</sup> <https://100percentrenewableuk.org/government-rubbishes-hydrogen-in-bid-to-boost-new-nuclear-power>

<sup>43</sup> See note 4

\$1.0 per kilo. I would not be surprised to see it go below that.”<sup>44</sup>

On 2 June 2021, on BBC Radio 4's Today programme, UK High Level Climate Action Champion Nigel Topping was promoting the push for cost reductions on green hydrogen - which he spelled out as using renewable electricity to split water into hydrogen and oxygen - and highlighting the prospect of the UK power system becoming 100% renewable.<sup>45</sup>

**iii) EDF admits Sizewell C won't always be needed.** Currently EDF is attempting to justify building Sizewell C by exploring hydrogen production (not green), Direct Air Capture and the use of waste heat at Sizewell C. EDF admits that there is no space on the Sizewell C site for additional infrastructure and these ideas are not part of the project's application for Development Consent. However, it is notable that EDF is not talking about any of these ideas in relation to its Hinkley Point C plant (or renewables generation), for such projects could be applied to any power source. It is therefore impossible to avoid the conclusion that such discussions are both a cynical attempt to bolster the case for Sizewell C (revealing that EDF recognise their case is weak) and an admission that there would be times when electricity from Sizewell C would be surplus to requirement.

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<sup>44</sup> <https://about.bnef.com/blog/liebreich-separating-hype-from-hydrogen-part-one-the-supply-side/>

<sup>45</sup> <https://www.bbc.co.uk/sounds/play/m000wjlf> at 2 hours 37 minutes approx