Botley West Solar Farm

Response to ExA s51 matters

Supplementary Statement of Need

May 2025

PINS Ref: EN010147

Document Ref: EN010147/APP/8.5
Revision P0

Approval for issue

Jonathan Alsop	2 May 2025

Prepared by:

RPS
101 Park Drive,
Milton Park, Abingdon,
Oxfordshire, OX14 4RY
United Kingdom

Prepared for:

Photovolt Development Partners GmbH,
on behalf of SolarFive Ltd.

Contents

Figures

Glossary

Term	Meaning
BSP	Bulk Supply Point
CCC	Climate Change Committee
DUKES	Digest of UK Energy Statistics
GB	Great Britain
GSP	Grid Supply Point
LAEP	Local Area Energy Plans
LULUCF	Land Use, Land Use Change and Forestry
NETS	National Energy Transmission System
NPS	National Policy Statement
The Applicant	Photovolt Development Partners (PVDP), on behalf of SolarFive Ltd

1 Introduction

1.1 Purpose

1.1.1 Photovolt Development Partners (PVDP), on behalf of SolarFive Ltd (the Applicant), submitted its application for a Development Consent Order (DCO) for the Botley West Solar Farm (the "Project") on 15 November 2024 (the "DCO Application"). The DCO Application was accepted for examination by the Planning Inspectorate (PINs) on 13 December 2024.

1.1.2 Following the notification of the decision to accept the application for the Botley West Solar Farm for examination [**PD-002**], the Applicant received initial observations and advice from the ExA under section 51 of the Planning Act 2008, by letter dated 13th December 2024 [**PD-003**].

1.1.3 That section 51 advice included a request for the Applicant to submit a 'Statement of Need' as a standalone document. Specifically, PINs stated:

"The Inspectorate acknowledges that the Statement of Reasons (SoR) and Planning Supporting Statement (PSS) contain some justification as to the need for the project. Whilst it is not a statutory requirement, it would be useful for all parties if the Applicant could submit a 'Statement of Need' as a stand alone document. This document should consolidate relevant points from the SoR and PSS, but it should also address amongst other things, the following points:

• UK future electricity requirements and what role would solar farms play, if any, in helping to meet any increases in demand.

• Additional detail on the reasons for the scale of the proposed solar farm.

• Information on the efficiency and how economically attractive solar generation in the U.K is, compared to other forms of renewable generation, would also be helpful. "

1.1.4 In its response to the section 51 advice dated 5th March [**AS-001**], the Applicant stated that:

*" The Applicant notes the suggestion from PINS to submit a standalone 'Statement of Need' document. As PINS has acknowledged, this is not a statutory requirement. The Applicant took the view at the time of submission that a further standalone document was not necessary due to the unequivocal need case established in the latest National Policy Statements (November 2023). The Applicant's need case is therefore set out in the Applicant's Statement of Reasons [**APP-021**] and Planning Supporting Statement [**APP-225**]. "*

1.1.5 Nevertheless, the Applicant has agreed to prepare a separate document to address the specific matters raised by PINS in its section 51 Advice letter, to supplement the need case in the existing application documents.

1.1.6 This Supplementary Statement of Need report responds directly to the specific queries raised by PINS whilst demonstrating the important benefits that the Project will bring towards delivering the three national energy policy aims:

- Net zero and the importance of urgently deploying low-carbon generation assets at scale;
- Security of supply (geographically and technologically diverse supplies); and
- Affordability and reducing exposure to volatile international markets.

1.1.7 This report compliments the references made to need made by the Applicant in other documents, in particular its Planning Supporting Statement e.g. section 3.5 **[APP-225].**

1.1.8 This report is authored by Mr. Si Gillett, a UK energy market professional with over 20 years' experience including integrated oil majors, integrated electricity utilities, and independent consultancy and has focussed on large-scale renewable generation developments since 2018.

1.1.9 Mr. Gillett has provided electricity market expertise to over 12,000MW (MW=megawatt) of development-phase renewable generation developments across the UK, including over 3,000MW of ground mount solar. He has authored Statements of Need for many Nationally Significant Infrastructure Projects (NSIPs) and holds master's degrees in mathematics, and in nuclear regulation.

1.2 Structure of this Report

1.2.1 The subsequent sections of this report are set out as follows, to align with each of the points raised by PINS in its section 51 advice letter:

- Section 2: UK future electricity requirements and what role would solar farms play, if any, in helping to meet any increases in demand.
- Section 3: Additional detail on the reasons for the scale of the proposed solar farm.
- Section 4: Information on the efficiency and how economically attractive solar generation in the UK is, compared to other forms of renewable generation.

2 UK future electricity requirements and what role would solar farms play, if any, in helping to meet any increases in demand of Changes and Rationale

2.1 Projections of electricity demand

2.1.1 It is well documented (for example see paragraph 2.1.11) that the UK's approach to delivering net zero and enhancing UK energy security is by creating a supply of low-carbon electricity of a sufficient capacity to facilitate the application of that electricity to a wider use.

2.1.2 Carbon has a cumulative warming effect, and it is well understood that decarbonisation progress to date must accelerate in all countries to limit the associated temperature increase to 1.5°C above pre-industrial levels. The need to deliver decarbonisation measures is therefore urgent.

2.1.3 Energy final consumption in the UK in 2023 was 1,506 terra-watt hours (TWh, 1TWh = 1,000,000 MWh), with 18% (269TWh) in the form of electricity [DUKES, Table 1.1au]. Electricity demand will grow as carbon-intensive sources of energy are displaced by low-carbon electricity. Energy efficiency measures may mean that total UK energy consumption decreases in the future, but all of that consumption must come from low-carbon sources to achieve net zero by 2050.

"[Government] analysis suggests that even with major improvements in overall energy efficiency, and increased flexibility in the energy system, demand for electricity is likely to increase significantly over the coming years and could more than double by 2050 as large parts of transport, heating and industry decarbonise by switching from fossil fuels to low carbon electricity" [EN-1, Para 3.3.3].

2.1.4 Government's Clean Power 2030 Action Plan, published in December 2024 (CP2030), reinforces the urgent need for low carbon generation schemes to come forward to achieve these aims.

2.1.5 In April 2025, government published draft updated National Policy Statements incorporating government's Clean Power strategy as "a core priority in updated planning policy vehicles and guidance" to steer the creation of a new energy system by 2030.

2.1.6 The draft updated EN-1 includes transitional provisions such that they "are potentially capable of being important and relevant considerations in the decision-making process" for the Botley West development consent application.

2.1.7 The Clean Power 2030 Action Plan also confirms that the need for new clean power will not stop at 2030. The continued delivery of low-carbon generation facilities beyond 2030 is necessary to meet future electricity demand growth and achieve essential wider societal carbon savings.

"By 2050, annual electricity demand is likely to at least double. Clean power by 2030 prepares the UK for the rapid growth in power demand expected over the 2030s and 40s." [CP2030, p11].

2.1.8 Government's Clean Power target means transitioning to an electricity system with the following characteristics in a typical weather year:

- Clean sources produce at least as much power as Great Britain consumes in total (clean sources produced 56% of GB consumption in 2023) and;
- Clean sources produce at least 95% of Great Britain's generation (clean sources produced 60% of GB generation in 2023) [CP2030, pp25-26]

2.1.9 The draft updated National Policy Statement EN-1 clarifies that:

"Meeting the Clean Power 2030 Mission is driven through increased deployment of low carbon generation, flexibility infrastructure, and electricity transmission infrastructure. We need to rapidly increase deployment of all relevant infrastructure to meet the Clean Power 2030 Mission capacity ranges and decarbonise the power sector" [d-EN-1, para 2.3.4].

2.1.10 Further, draft updated National Policy Statement EN-3 states that:

"The UK has huge potential for solar power: it is a cheap, versatile, and effective technology.

Solar energy is at the heart of our Clean Power 2030 Mission …

The Clean Power 2030 Action Plan sets out a deployment range for solar PV of between 45 – 47GW by 2030 with scope to exceed the clean power capacity range, subject to system need, noting the potential of rooftop solar to boost deployment. [d-EN-3, paras 2.10.1 – 2.10.3]

2.1.11 The Government is also clear that the Clean Power target is not an upper limit to their ambition for the delivery of low-carbon generation:

"To achieve the [Clean Power] mission, we will aim to deliver above this ambition [i.e. the Clean Power target] where the system and consumer benefits align so that potential challenges in some areas of clean power delivery can be compensated by deployment elsewhere." [CP2030, p25].

"It is not the government's intention in presenting any of the figures or targets in this NPS to propose limits on any new infrastructure that can be consented in accordance with the energy NPSs. A large number of consented projects can help deliver an affordable electricity system, by driving competition and reducing costs within and amongst different technology and infrastructure types" [d-EN-1, para 3.2.6].

2.1.12 Delivering the Clean Power target will also deliver energy security benefits.

2.1.13 In an era of heightened geopolitical risk, switching fossil fuelled generation for homegrown clean energy from renewables and other clean technologies offers us security that fossil fuels simply cannot provide [CP2030, p23]

2.1.14 By accelerating the switch to domestic renewable electricity sources and accelerating the application of clean electricity to the wider energy system, the UK's reliance on fossils fuels will be reduced more quickly.

"This enhances energy security, making the UK less vulnerable to global market disruptions or geopolitical tensions that affect energy prices." [CP2030, p21].

2.1.15 The majority of GB electricity usage projections are for a significant increase in demand to 2050:

- The NPSs foresaw a doubling of current demand [EN-1, Para 2.3.7], i.e. to circa 600TWh
- Draft updated NPS EN-1 is consistent on this point [d-EN-1, Para 3.3.3]
- The National Infrastructure Commission forecasts 465 – 595TWh [NIC, p35]
- The Energy Systems Catapult forecasts 525 – 700TWh [ESC, pp23 & 27]
- The CCC's sixth carbon budget presents a range from 550 – 680TWh [CCC_6CB, Table 3.4.a]
- The government's impact assessment for Carbon Budget 6 (CB6) presents a range from 610 – 800TWh [EN-1, Para 3.3.3], [6CB_IA, p29]
- The 2020 Energy White Paper presents a range from 575 – 665TWh [EWP, p42]
- Mission Zero suggests that "electricity demand by 2050 could be roughly double today's level of total electricity demand" [MZ, Paras 287 & 299]
- The Connections Action Plan projects electricity demand of between 570-770 TWh by 2050 depending on how net zero is met [CAP, pp68 – 70]
- The Clean Power 2030 Action Plan states that "annual electricity demand is likely to at least double" by 2050 [CP2030, page 11]

2.1.16 The annual National Energy System Operator (NESO) Future Energy Scenarios (FES) documents [FES] are annual publications which explore strategic, credible choices to propel GB on the route to decarbonisation. The documents provide an objective assessment of how net zero could be reached by assessing how much electricity GB might need and how it could be generated.

2.1.17 NESO's FES(2024) presents a range of GB electricity demand in 2050 from 667 to 700TWh for three pathways which reach net zero [FES(2024), p26].

2.1.18 Figure 1 shows how NESO's FES GB electricity demand projections developed from 2019 (prior to the UK's 2019 commitment to net zero), through 2023 to 2024. Each annual forecast is shown as a shaded area ranging from the lowest forecast demand pathway to the highest pathway per delivery year, for those pathways which NESO assess would reach net zero.

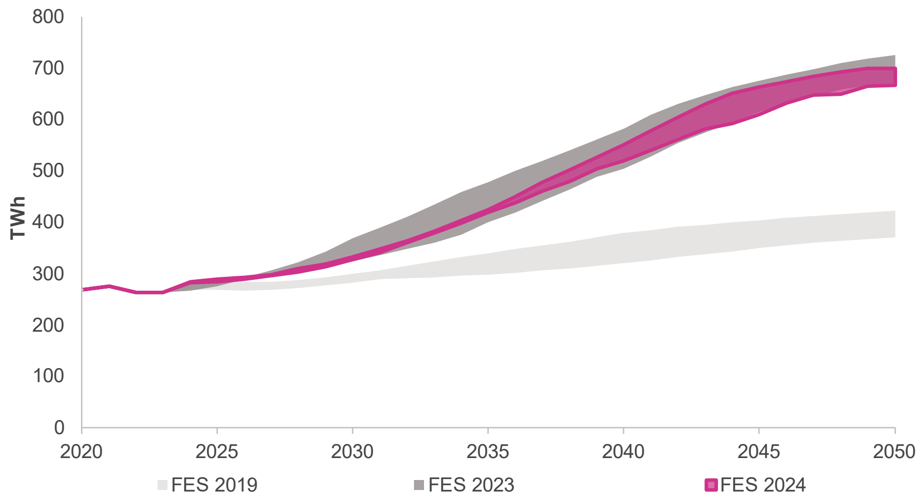

Figure 1: Evolution of UK electricity demand projections [Adapted from FES(2019, 2023 & 2024)]

2.1.19 In 2023, 285TWh of consumer electricity demand was met by 166TWh of low-carbon generation and 119TWh of carbon emitting generation.

2.1.20 Figure 2 shows how the growth and decline of electricity demand in different sectors contributes to NESO's total GB demand projections for its Holistic Transition pathway. Currently, electricity demand in the UK is broadly evenly split between the three main demand sectors: residential ('Resi Base'), commercial ('Com Base') and industrial ('Ind Base').

2.1.21 Industrial base electricity demand is not shown because it is projected to remain broadly flat over the next twenty-five years. However, over the same horizon, residential and commercial base electricity demand is projected to decrease, due in part to the introduction of energy efficiency measures. Reductions are projected to reduce annual base electricity demand in the residential and commercial sectors by more than one third of current electricity demand by 2050.

2.1.22 More than offsetting these reductions is a projected increase of over 180TWh annually by 2050 (two thirds of current electricity demand) from heating and transport across the commercial and residential sectors.

2.1.23 NESO's Holistic Transition pathway also projects nearly 130TWh of annual electricity demand by 2050 for the electrolysis of water to produce hydrogen and nearly 90TWh of annual electricity demand by 2050 for data centres.

2.1.24 Consumer electricity demand across the three net zero FES pathways in 2030 averages 330TWh. Therefore low-carbon capacity will need to generate an additional ~164TWh per year in 2029 vs. 2024 to deliver ‘Clean Power by 2030’.

2.1.25 Consumer electricity demand across the three net zero FES pathways in 2040 averages 530TWh. Therefore low-carbon generation will need to generate an additional ~200TWh per year in 2039 vs. 2030 to keep power clean through the 2030s.

2.1.26 The capacity of new low-carbon schemes which will need to come on-line prior to 2030 to achieve ‘Clean Power by 2030’ is unprecedented. However, an even greater capacity of new low-carbon schemes will need to come on-line in the 2030s to keep power clean through to 2040 and beyond as other sectors also decarbonise.

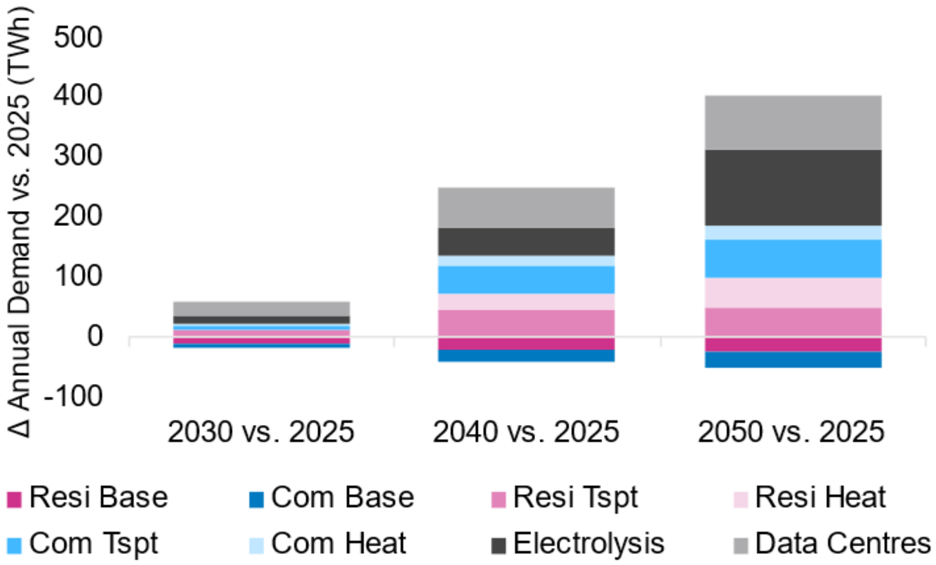

Figure 2: Change in projected annual electricity demand in 2030, 2040 & 2050 vs. 2025 baseline by sector. Adapted from [FES(2024), Table ED1 ‘Holistic Transformation’]

2.2 Projections of peak electricity demand

2.2.1 Peak electricity demand is also expected to grow from as early as 2025, driven by underlying industrial and commercial demand growth (through substitution of other energy sources) and the electrification of heating and transport. Estimated peak demand (its highest instantaneous level) remains a key determinant of required installed generation capacity.

2.2.2 Figure 3 illustrates the FES 2024 projections of peak GB power demand using NESO’s standard evaluation methodology out to 2050. In NESO’s net zero compatible pathways, peak demand is projected to increase from 58GW (gigawatts, 1GW = 1,000MW) in 2023 to between 62GW and 65GW by 2030; between 89GW and 103GW in 2040, and between 104GW and 119GW in 2050 [FES(2024), Figure ES.03].

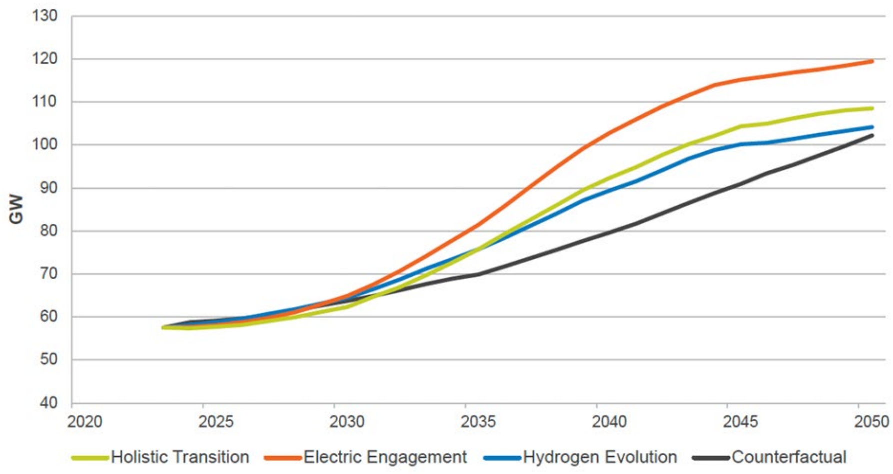

Figure 3: Electricity average cold spell peak demand (GW, including losses) [FES(2024), Figure ES.03]

2.2.3 Historically, electricity peak demand has tended to occur on winter weekday evenings, when industrial and commercial demand overlaps with residential. However, NESO state that “as the share of renewable electricity supply increases, electricity peaks could occur at other times” [FES(2024), p101]. GB’s electricity generation will need to meet high levels of demand, whenever they occur. Maintaining and growing a geographically and technologically diverse mix of generation capacity will increase GB’s ability to meet demand to the required reliability and carbon emissions standards.

2.2.4 A range of technologies with different characteristics can, in combination, help deliver secure, affordable low carbon electricity supplies and harness the potential of domestic renewable resources. More electricity from wind and solar is vital to help UK meet its target for net zero by 2050” [FES(2024), Energy Background Document, p15].

2.2.5 National Policy Statement EN-1 also states that "a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar" [EN-1, Para 3.3.20].

2.3 Meeting electricity demand

2.3.1 Figure 4 shows NESO FES(2024) projections of operational capacities of offshore wind, onshore wind and solar at five-yearly intervals out to 2050. The colour-coded ‘Xs’ marked on the chart show the government’s Clean Power 2030 Capacity Ranges for each technology. For solar, government’s range is 45 – 47GW.

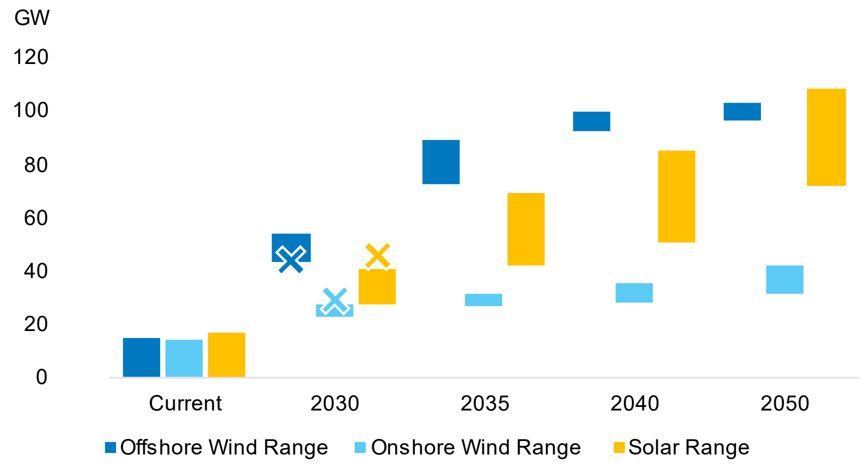

Figure 4: NESO FES(2024) capacity projection ranges for GB's main renewable generation technologies, and government's Clean Power 2030 Capacity Ranges (crosses)

2.3.2 NESO's pathways which meet net zero by 2050 include a four to six-fold increase in solar capacity over the next twenty-five years, alongside a two to three-fold increase in onshore wind capacity and over six-fold increase in offshore wind capacity. Alongside this, NESO pathways include an increase in other low-carbon generation technologies, including abated gas, interconnectors, long duration storage and nuclear and a reduction in the c.40GW of gas-fired generators currently operational in the UK.

2.3.3 In all pathways, solar plays a significant role in GB's future low-carbon electricity system. NESO's FES(2024) analysis shows that if GB solar capacity follows the trajectory set out in each of the three net zero pathways, the technology will account for 8% - 10% of GB generated electricity in 2030, 9% - 14% in 2040 and 11% - 15% in 2050.

2.3.4 Solar is a deliverable technology at all scales. Figure 5 shows how solar capacity has grown in the UK each year since records began in 2010.

2.3.5 Annual installations are shown by the red line. Annual installations peaked at 4.2GW in 2015 and averaged 1.1GW over the period 2010 to 2024. Solar has undergone significant technological advances in scale and commercial efficiency, and the UK has many areas of commercially viable solar irradiation. It is therefore important to make best use of this natural, renewable energy resource to meet the UK's legal carbon emission reduction obligations. The red line shows that although solar capacity growth has started to accelerate in the UK this decade compared to a stagnation through the late 2010s, growth must continue to accelerate to reach back to historical deployment levels to support government's decarbonisation plans. Bringing forward large-scale schemes for consent will provide opportunities for that acceleration to be realised.

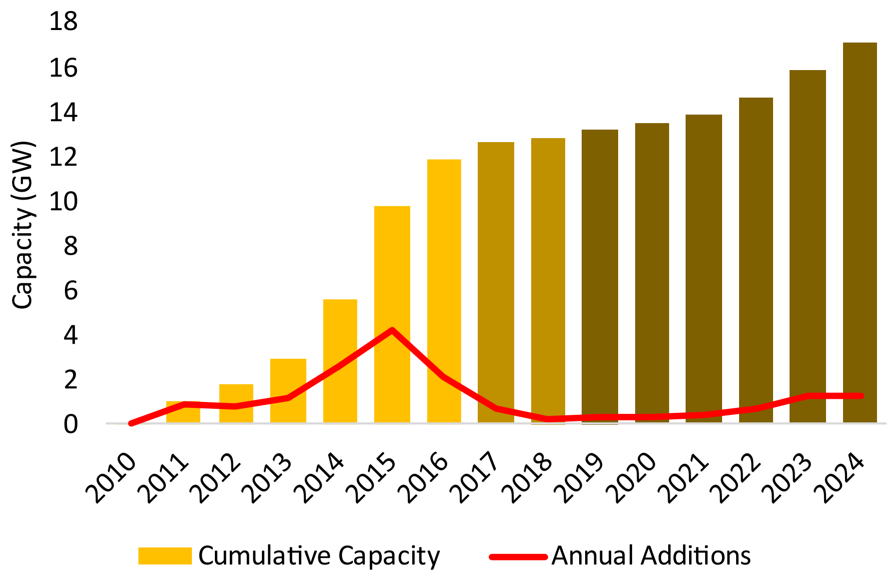

Figure 5: Cumulative and annual installed solar capacity in the UK (GW, 2010 – 2024), [UK_Solar, Applicant Analysis]

2.3.6 Government also recognises, however, that delivering new generating capacity could be more challenging for some new technologies or technologies with longer lead-times.

2.3.7 For example, Hinkley Point C, the UK's first new nuclear plant in a generation, secured funding in 2016. Construction remains ongoing and the first generating unit is currently forecast to commission between 2029 and 2031. Government notes that "there are uncertainties associated with having Hinkley Point C online by the end of the decade, given delays in the past few years" [CP2030, p81].

2.3.8 Carbon Capture Usage and Storage (CCUS) has a key role in government's Clean Power plans. Previously it has been recognised that "the technology has not been delivered at scale and significant risks remain" [NIS, p53]. Recent progress has been made in developing and consenting projects as well as developing a commercial framework to support the technology. The government's CCUS Deployment Pathway seeks to secure an option to deploy CCUS at scale during the 2030s, subject to costs coming down sufficiently.

2.3.9 Therefore, if capacities of other technologies increase more slowly than the projections made in NESO's FES, additional capacities of proven and deliverable technologies – such as solar – may need to increase to keep on track to achieving net zero 2050.

2.3.10 Government's Clean Power 2030 Action Plan states that "there is no singular path to achieving clean power, but instead, that there are a range of scenarios that could get us there." [CP2030, p31]. Clarity on which scenarios are most likely is expected to improve in time. Until that time, government is retaining optionality in the technology-specific ranges it sets for the deployment of renewable capacity.

2.3.11 Government also states that "onshore renewable … projects typically have shorter construction timelines [than new transmission network and offshore wind projects]" [CP2030, p52] which explains why it is important for these projects, including large-scale solar projects, to come forward without delay to address the urgent need to fight back against climate change.

2.4 Meeting future demand with a multi-technology electricity supply

2.4.1 Figure 6 illustrates the collective capability of solar and wind generation towards meeting seasonal demand for electricity in the UK on a month average basis. The requirement to balance supply and demand on a short-term basis is not taken into account in the analysis.

2.4.2 The analysis draws on government's Clean Power 2030 capacity ranges, NESO FES demand projections (consistent with the data shown in Figure 4) and NESO operational data on the average contribution of renewable sources of generation through the year.

2.4.3 Figure 6 shows that government's Clean Power 2030 capacity ranges would likely generate sufficient energy to meet average estimated demand during winter (October to March) months. This can be seen by noting that the tops of the stacked columns (total generation) are near to or above the red dashed line (total demand) in October, November, and March and are within reach of the red line in December, January, and February. The chart shows the important contribution solar generation would make to meeting demand in winter (yellow part of stacked columns).

2.4.4 Figure 6 also shows that the seasonality of UK wind means that delivering government's 2030 capacity range for offshore and onshore wind would not meet summer (April to September) demand. However, the gap would be closed by the delivery of government's 2030 capacity range for solar generation.

2.4.5 Approximately 46GW of solar (an increase of 29GW on late-2024 levels, consistent with government's 2030 capacity ranges) would provide additional low-carbon energy to help meet the UK's electricity needs throughout the year, and specifically in the summer months when wind energy yields are lower.

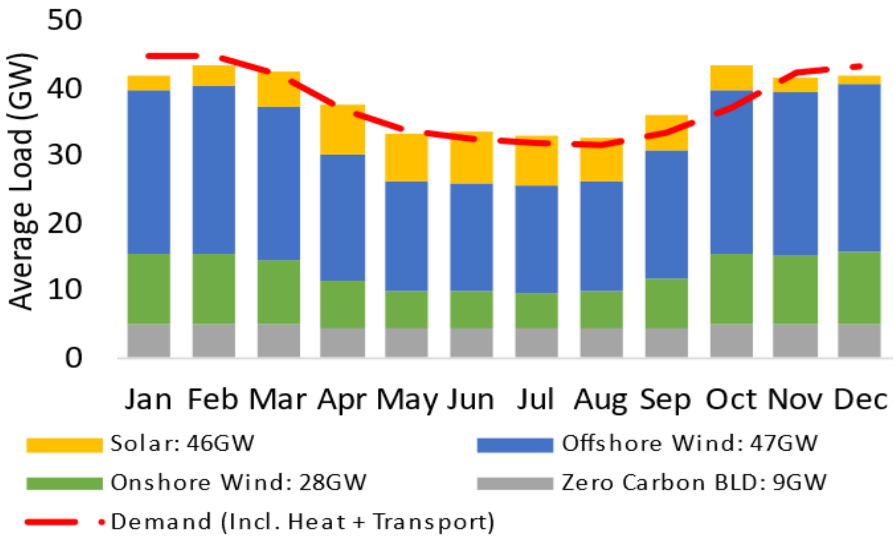

Figure 6: Deploying RES to the midpoint of government's 2030 capacity ranges meets anticipated seasonal demand levels [FES(2024), Tables ES1 & ED1, CP2030, Connections Reform Annex, Table 1, Author analysis

2.4.6 However, demand must be met under a wide range of supply scenarios, including when renewable supplies are low. This analysis should not therefore draw the reader to the conclusion that the government does not seek more renewable generation capacity either before or beyond 2030. Indeed, NPS EN-1 states that "it is prudent to plan on a conservative basis to ensure that there is sufficient supply of electricity to meet demand across a wide range of future scenarios" [EN-1, Para 3.3.10].

2.4.7 Government's Clean Power 2030 Action Plan shows government's current thinking is consistent with this advice: "To achieve the mission, [government] will aim to deliver above [the Clean Power 2030 ambition] where the system and consumer benefits align so that potential challenges in some areas of clean power delivery can be compensated by deployment elsewhere" [CP2030, p25].

2.4.8 By over-relying on one technology, or under-delivering on another, the resulting energy system may be less secure, less efficient and/or higher cost than one which consists of an appropriate mix of different generation technologies.

2.4.9 Figure 6 shows that a portfolio of low-carbon generation which includes large capacities solar, onshore and offshore wind, and a low-carbon base, if delivered, is capable of closely matching a future projection of national electricity demand on a month-average level.

2.4.10 A high degree of certainty may be attached to this conclusion because of the horizon of data used to inform variable inputs to the model, and consistency of these and other assumptions with those made in government's Clean Power 2030 Action Plan.

2.5 Conclusions

2.5.1 Government's plan to meet its legal carbon reduction obligations and increase national energy security is to use renewable sources to reduce the use of carbon intensive fuels in generating electricity. By generating an abundance of clean electricity, that energy can then be used to displace carbon intensive fuels from other sectors.

2.5.2 Government and many other dependable sources estimate that electricity use will need to double by 2050 to reach net zero.

2.5.3 This calls for an urgent and unprecedented expansion of UK low-carbon electricity generation capacity, as supported by Government's Clean Power 2030 Action Plan and incorporated into Government's draft updated National Policy Statements for energy (April 2025).

2.5.4 All technologies will be required to play their part in delivering the UK's future energy system, although government expects that the system will consist predominantly of wind and solar. Although driven by variable and uncontrollable natural energy sources, in combination with and in the right proportions to one other, and with the support of other flexible technologies, wind and solar are able to deliver the UK's energy needs throughout the year.

2.5.5 The data shows that UK solar generation capacity is starting to accelerate, providing confidence that the technology can deliver to the urgency of the need for low-carbon generation to increase. Some other technologies which are also included in government's plan for a future energy system are not yet able to demonstrate that confidence, further underpinning the need for solar generation in the event of shortfalls in the development of other technologies.

2.5.6 NESO's net zero pathways indicate that solar generation could account for 8% - 10% of GB generated electricity in 2030, 9% - 14% in 2040 and 11% - 15% in 2050.

3 Additional detail on the reasons for the scale of the proposed solar farm

3.1 Considerations for siting solar farms

3.1.1 Solar developments must be located where three fundamental attributes align: sufficient available and suitable land, a point of connection to the electricity system, and sufficient solar irradiation levels.

3.1.2 The need for low-carbon generation capacity is urgent and is unprecedented in scale. All locations which are in possession of these three fundamental attributes must be taken forward for consideration for development.

3.1.3 Given the unprecedented scale of the need for low-carbon generation, the Applicant sought to bring forward a scheme which would deliver a significant benefit in terms of contributing to meeting the identified need.

3.1.4 Solar schemes can connect to the National Electricity Transmission System (NETS) – the UK's existing infrastructure which facilitates the bulk transmission of power across the country. Schemes can also connect to lower-voltage distribution grids, and facilitate the distribution of power from the NETS to consumers in local areas. Schemes can also be connected 'behind the meter' on domestic or commercial properties.

3.1.5 Grid Supply Points (GSPs) are substations where the NETS connects to local distribution systems. At these points, voltage is reduced from the NETS high-voltage cables to lower voltages for more local transmission via Bulk Supply Points (BSPs) and Primary substations, then on to consumers. NETS substations and GSPs are able to host significantly larger schemes than BSPs and Primary substations because the systems to which they connect are designed to be able to facilitate the bulk transmission of power.

3.1.6 An approximate rule of thumb is that, subject to connection capacity being available, Primary substations are able to host generators up to 10MW in capacity. BSPs may be able to host generators up to c.50MW in capacity. GSPs and NETS substations may be able to host generators with capacities well into the hundreds of MW.

3.1.7 Schemes which connect to the NETS are therefore able to be larger than schemes which connect to distribution networks. The benefits individual schemes bring to decarbonisation and energy security are proportional to scale. Therefore, to connect a prescribed total generation capacity of a technology would require fewer, larger schemes connecting to the NETS than smaller schemes connecting to distribution networks or 'behind the meter'.

3.1.8 National capacity requirements are likely to be met through the delivery of a combination of schemes of different scales. The following evidence demonstrates that the Project, which is a large-scale scheme, is needed to help meet the demand for low-carbon electricity in Oxfordshire, because the capacity available for smaller schemes to connect to local distribution networks would not be sufficient to meet local demand on its own.

3.2 The local need for renewable electricity generation

3.2.1 All areas of the UK emit greenhouse gasses, and Government's Clean Power 2030 Action Plan expects that all of the UK will play a part in delivering the low-carbon supplies needed both locally and nationally to reduce those emissions to net zero.

3.2.2 It is the basis of the definition of the government's Clean Power target that power can be considered to be 'clean' in an area, if the amount of clean power generated in that area is greater than the amount of power consumed by that area.

3.2.3 In February 2025, Oxfordshire City Council announced a new plan to help power Oxfordshire using local renewable energy. Oxfordshire's local authorities will work with local communities and businesses to identify projects that will help manage the transition to cleaner energy. "The plans will identify specific actions for each district, together with more strategic projects to be delivered at the county level" [LAEP].

3.2.4 Figure 7 shows the government's official statistics for greenhouse gas emissions from Oxfordshire. In 2005, Oxfordshire consumed 19.3TWh of energy across all sectors, including land transport. 3.9TWh (20%) of this was consumed in the form of electricity. The remaining 80% was sourced from fossil fuels. By 2022, total energy consumption in Oxfordshire had fallen by 15% to 16.5TWh, 80% of which was sourced from fossil fuels.

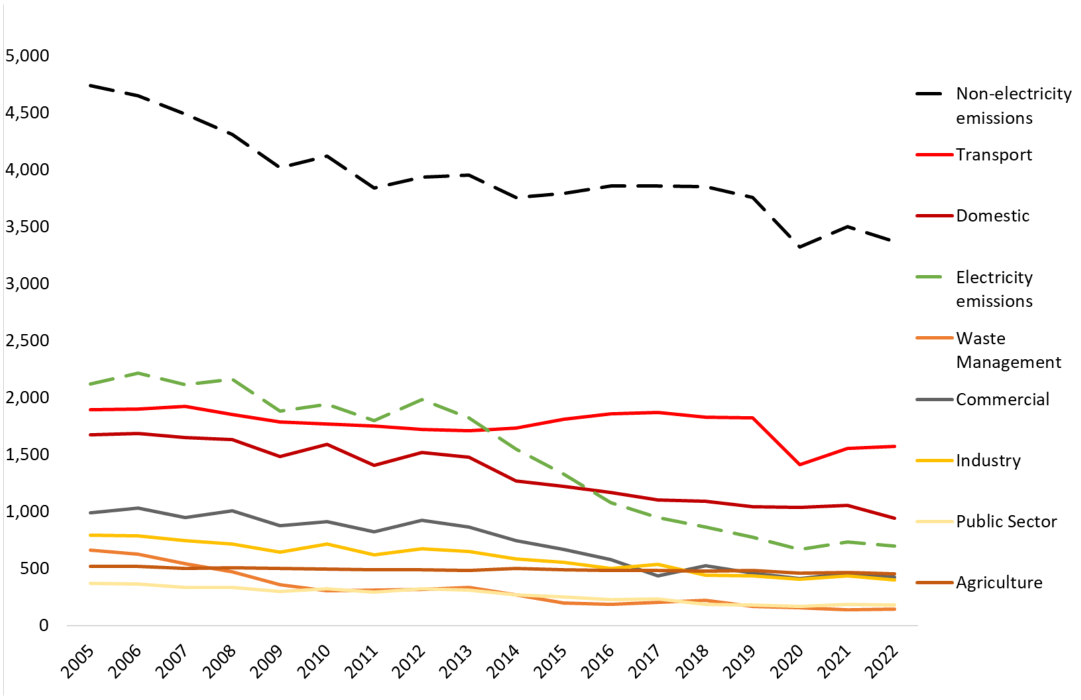

Figure 7: Oxfordshire Greenhouse gas emissions, 2005 - 2022 (kT CO2(e)/yr) (Benefit from LULUCF not shown) [LPA_Data]

3.2.5 Figure 7 shows that emissions from electricity consumption fell to one third of their 2005 value by 2022. This is due to a decline in total electricity consumption as well as a reduction in the carbon intensity of electricity consumed. Government's UK energy statistics [DUKES(2024), Table 5.14] show that by increasing renewable electricity generation capacity and closing carbon-intensive coal generation, the carbon intensity of electricity generated in the UK fell from 484g CO2(e)/kWh in 2005 to just 191g CO2(e)/kWh by 2022.

3.2.6 Other government statistics show that at the end of 2023, only 408MW of renewable generation capacity was operational across the five Local Authorities comprising Oxfordshire, generating 0.5TWh per year. Solar comprised 340MW of capacity, contributing 0.3TWh of low-carbon electricity generated.

3.2.7 To generate enough low carbon electricity ***to meet its current local electricity demand***, ***low-carbon generating capacity*** in Oxfordshire would need to ***increase seven-fold from 2023 levels – i.e. from 410MW to c.2.8GW***.

3.2.8 ***Maintaining the current ratios of installed capacity*** across technologies already operational in ***Oxfordshire would require 2.3GW of solar*** and 0.5GW in total of other technologies, including onshore wind, landfill gas and energy from waste, ***to meet local energy demand***.

3.2.9 To generate enough ***low carbon electricity to meet its current local energy demand through electricity alone***, low-carbon generating capacity in Oxfordshire would ***need to increase by a factor of over 30*** from today's levels.

3.2.10 Just maintaining the current ratios of installed capacity (para 3.2.8) to meet local energy demand in Oxfordshire, would require 2.3GW of solar. There is no clear or obvious prospect that other forms of renewable energy could step up to meet this demand, so solar presents an obvious solution. Assuming a land use take of 1.5ha per megawatt of installed capacity, accommodating this level of deployment would require around 3,450 hectares of land.

3.2.11 If consented, Botley West Solar Farm would materially help address that local demand, but even then, there would still be a shortfall in capacity. Botley West would meet about one third of that demand (840MW of the 2300MW demand - 37%)

3.3 Site location considerations

3.3.1 The challenge to deliver net zero is a national challenge and Oxfordshire is not alone in facing the task ahead. Indeed, government's capacity ranges for 2030 indicate for national solar capacity to grow by 29–31 GW to 2030, i.e. government seeks to support the delivery of the equivalent of between five and six schemes the scale of the Project each year between now and 2030 to support the delivery of its Clean Power target.

3.3.2 However, this analysis illustrates the scale of the challenge in local terms. And with that as context, it is clear that the need for large capacities of low-carbon generation to come forward is great, and it is important that the size of each scheme is such that the decarbonisation and energy security benefit arising from those projects is maximised.

3.3.3 Figure 8 shows the location of the distribution network grid supply points in Oxfordshire.

Figure 8: SSEN Grid Supply Points and Bulk Supply Points (BSP) in Oxfordshire

3.3.4 Figure 8 indicates the location and availability of connections for electricity generators on SSEN's Oxfordshire distribution network as at 7 March 2025. The Grid Supply Point at Cowley is now constrained (coloured red), meaning that there is no ability to connect a generator at that location until distribution reinforcement is complete. SSEN indicate that such reinforcement is currently scheduled to complete in March 2031 [SSEN Capacity Map]. Four of the BSPs, shown by shields on the map, are also constrained (coloured red). Although the Oxford BSP is classified as partially constrained (coloured amber) the BSP information made available by SSEN shows that it is constrained for generation connections. Generation connections are also constrained at the Harwell and Culham BSPs (green).

3.3.5 SSEN's data shows that there is very little if any opportunity to connect new generation assets to the existing distribution grid in Oxfordshire in the next six years.

3.3.6 Figure 9 shows the approximate routes followed by NETS overhead lines and approximate locations of NETS substations in the Oxfordshire area. The Cowley GSP can be seen near the middle of the map.

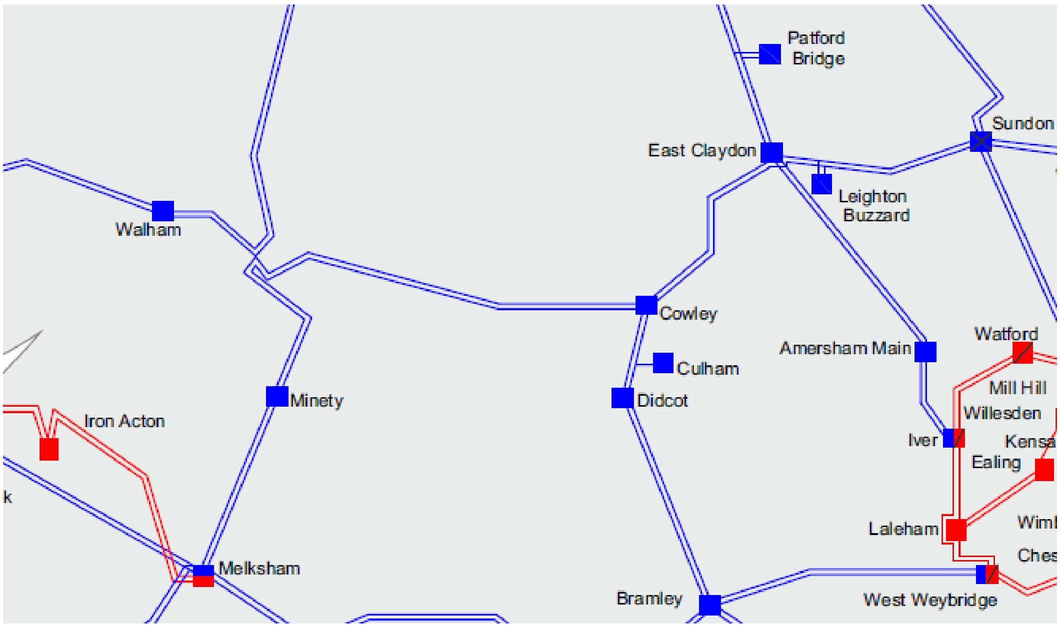

Figure 9: The National Electricity Transmission System in and around Oxfordshire.

3.3.7 Figure 9 shows that there are very few transmission lines running through Oxfordshire. This means that renewable generation schemes in the county must be located close to those lines unless new lines and new substations are also developed.

3.3.8 Where available land can be found close to an existing overhead line, as is the case with the Project, it is therefore rational for developers to propose schemes which deliver the greatest possible decarbonisation and energy security benefit from the available land and available grid connection.

3.3.9 In doing so, schemes are aligned with contributing to meeting the urgent need for renewable generation set out by the government in its National Policy Statements.

3.3.10 This is the approach which the Applicant has taken to the location and design of the Project.

3.4 Conclusions

3.4.1 The need for new renewable generation capacity is unprecedented and urgent, and all parts of the country will need to play a part in delivering that capacity. Yet there are limited opportunities nationally to locate and connect new generation schemes and the same is true in Oxfordshire.

3.4.2 Connections to the NETS can accommodate larger schemes than connections to the distribution networks. This means that NETS-connected schemes each bring forward a greater quantum of benefits to meet the urgent national need for low carbon energy and energy security.

3.4.3 The Project has been designed to deliver the greatest possible benefit from the available land and the available grid connection. The total area within the red line boundary encompasses approximately 1,290 hectares. Of this, 65% (839 ha) is designated for the installation of solar infrastructure, including panels and associated equipment. The remaining 35% of the site supports a diverse mix of uses that contribute to environmental enhancement, access, and site functionality. This includes 81 hectares (6.3%) of retained or enhanced hedgerows, 35 hectares (2.8%) allocated for archaeological preservation, and 42 hectares (3.3%) dedicated to maintenance roads to ensure ongoing site accessibility. Additional land uses include 9 hectares (0.7%) for tree planting, 5 hectares (0.4%) of dedicated skylark plots to support local biodiversity, and 2 hectares each for the substation (0.1%) and proposed public rights of way (0.2%). These allocations reflect a carefully considered balance between renewable energy generation and ecological, cultural, and community interests.

3.4.4 Delivering a smaller scheme would not deliver the greatest possible benefit from the available land (i.e. the land secured by the Applicant for the Project) and the available grid connection. In doing so, other schemes may be required to come forwards to deliver the net zero obligation, which may not have been required to come forward if the maximum benefit had been delivered from the Project.

3.4.5 Designing a scheme which delivers the greatest possible benefit from the available land and grid connection, while respecting local planning and environmental constraints, is consistent with government's policy as set out in NPSs EN-1 and EN-3.

4 Information on the efficiency and how economically attractive solar generation in the U.K is, compared to other forms of renewable generation

4.1.1 Levelised Cost of Energy (LCOE) is an important metric allowing all forms of generation to be compared with each other on a consistent basis. LCOE is calculated using a discounting methodology and is a measure of the lifetime unit cost of generation from an asset, including capital and operating costs. In-life cap capital and operating expenses, for example the re-powering of sites to manage anticipated degradation, are also anticipated.

4.1.2 Figure 10 shows the results of an analysis of the government's Electricity Generation Costs report [ElecCost 2023], with the range of values representative of different complexities of technical solution.

4.1.3 Figure 10 shows a "triple" of columns for each of five generation technologies. Each column within each triple shows the technology's anticipated LCOE for assets commissioning in 2025 (left hand column), 2030 (middle column), and 2035 (right hand column).

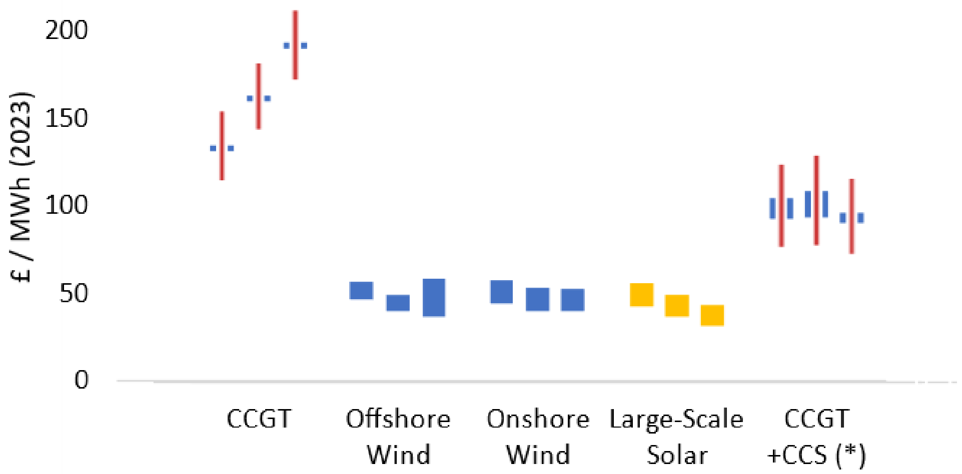

Figure 10: Levelised cost of energy comparison [ElecCost, Author Analysis]

Note: CCGT – Combined Cycle Gas Turbine. CCS – abated, Carbon Capture & Storage

4.1.4 Governmental modelling anticipates different projected operational lifetime, load factors (a measure of the output of the plant per year versus its theoretical maximum if availability is unconstrained), capital and operational costs, and development duration to derive a range of cost projections. The blue bars show that range while the red columns represent the LCOE range under different projections for input fuel costs for those technologies which require a non-zero cost input fuel.

4.1.5 The levelised cost ranges of large-scale solar (the governmental analysis assumes a capacity of 16MW) are highlighted in yellow. Figure 10 shows that renewable generation technologies maintain a significant levelised cost benefit when compared to technologies which are reliant on fossil fuels, even when fuel input costs are included at a low level.

4.1.6 The analysis illustrates that the LCOE of solar delivered in 2025 is lower than the LCOE of offshore wind delivered in a similar timeframe, and is comparable to the LCOE of onshore wind. However, predictions are that solar generation delivered in future years is likely to be cheaper than both onshore and offshore wind on an LCOE basis.

4.1.7 A project with a lower LCOE would allow consumers to benefit through market mechanisms. For example, a project with a lower LCOE may be able to bid into a future Contracts for Difference (CfD) Allocation Round at a lower strike price than a project with a higher LCOE. If such a project secured an agreement, consumers would also benefit versus the case that it did not, or versus the case that the strike price was higher.

4.1.8 Technological advances have also increased the efficiency of solar panels, as shown in Figure 11, and the useable lifetimes of panels used today is longer than earlier designs. At the same time, economies of scale through the global supply chain have reduced the cost of panels. Development costs have also reduced as efficiencies in the build process have been captured through prior experience.

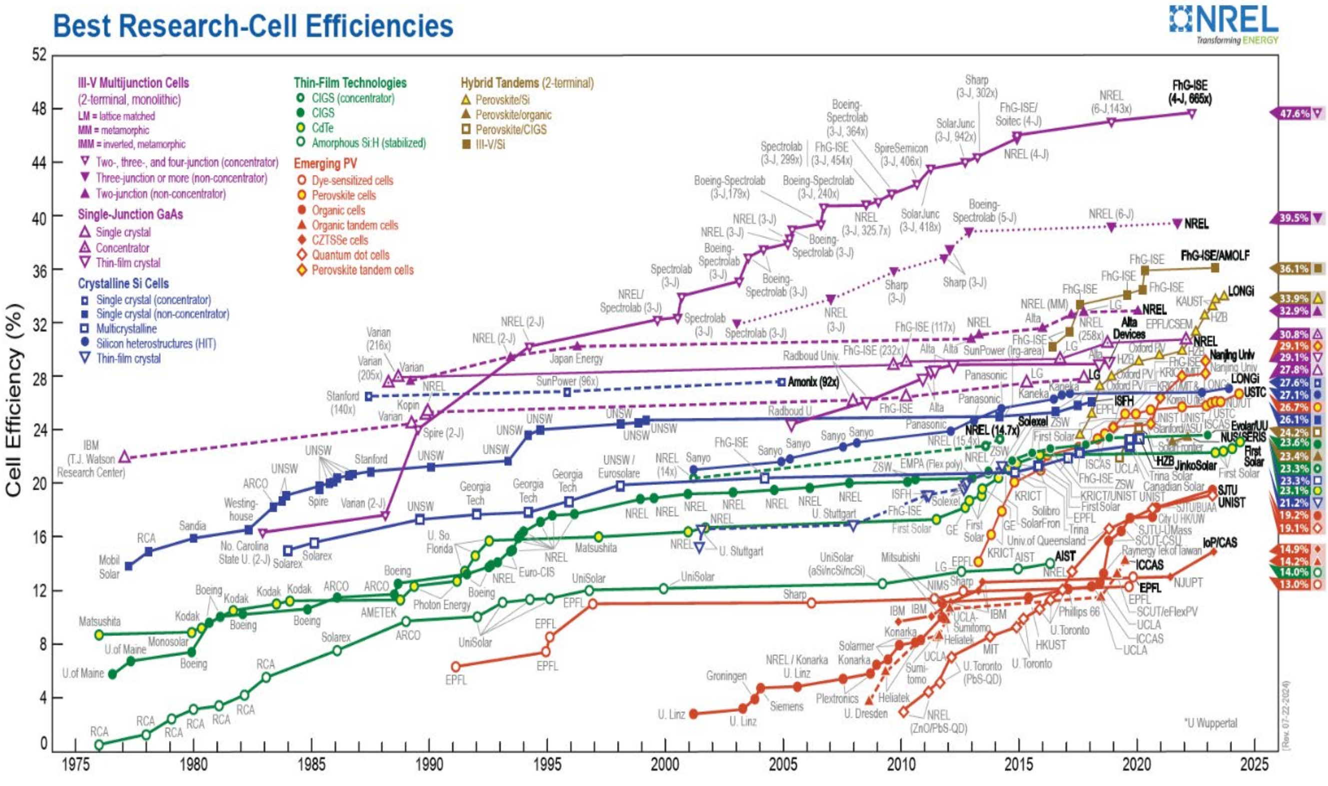

Figure 11: Evolution in solar cell efficiency 1975 – 2024 [Solar_Eff]

4.1.9 The government's Cost of Electricity Generation report series [ElecCost] also shows that solar LCOE has reduced significantly in the last decade. Solar, already being highly competitive against current conventional and renewable generation costs, is predicted to retain a cost advantage for the decades ahead.

4.1.10 Figure 12: Cost of Electricity Generation. An evolution of Levelised Cost forecasts [ElecCost, Author analysis]

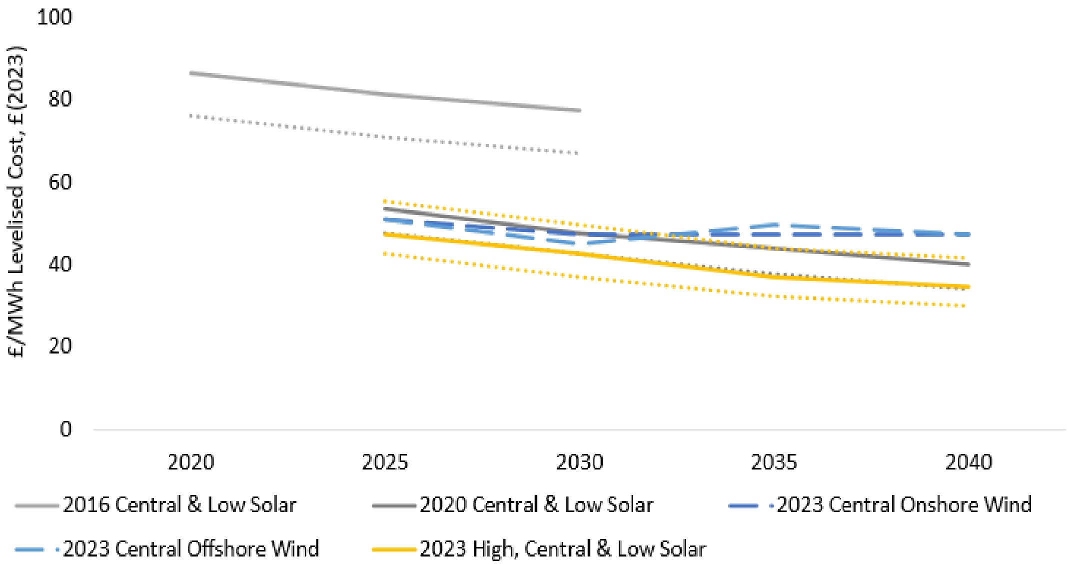

Figure 12: Cost of Electricity Generation. An evolution of Levelised Cost forecasts [ElecCost, Author analysis]

4.1.11 Solar costs have been driven down through the realisation of efficiencies in capital infrastructure, development and integration costs, and lifetime operational and maintenance (O&M). This includes working to reduce the effects of degradation of solar panels and inverters. Improvements in lifetime cost are likely to continue to be delivered.

4.1.12 Figure 12 shows the results of previous and current governmental analysis. The mid grey lines show the 2016 projections of the LCOE of solar commissioning in 2020, 2025, and 2030. The solid line shows the central case projection, and the dotted line shows the low case projection.

4.1.13 The 2013 projections (not shown in Figure 12) were approximately 70% higher on a consistent 2023 real price basis. Just four years later, the government's 2020 solar LCOE projection (shown in dark grey) was over 30% lower for sites commissioning in 2025 and 2030.

4.1.14 Their projections made in 2023 are shown by the yellow solid line (central cost) and are bounded by the high and low cases shown by the dotted lines. The 2023 solar LCOE estimate is a further 10% lower than the 2020 estimate on a consistent 2023 real price basis.

4.1.15 Solar was included in the 2021/22 CfD Allocation Round (AR4) to help "deliver a diverse generation mix at low cost" and to realise "the rate and scale of new projects needed in the near-term to support decarbonisation of the power sector and meet the net zero commitment" while providing other benefits such as diversity of supply through different resource requirements and a geographical separation from other significant renewable energy sources [CfD, pp16 & 20].

4.1.16 Many solar projects were successful in CfD AR4, AR5, and AR6 (2024). Auction results indicate that solar is an important and cost-competitive technology within the evolving GB electricity system [CfD_Data].

- In AR4, over 2.2GW of solar capacity across 66 projects (commencing in 2023/24 or 2024/25) secured CfDs at an initial strike price of £45.99 (2012 indexation, estimated to be equivalent to £64.18 in 2024 money)
- In AR5, over 1.9GW of solar capacity across 56 projects (commencing between 2025 and 2028) secured CfDs at an initial strike price of £47.00 (2012 indexation, estimated to be equivalent to £65.58 in 2024 money)
- In AR6, nearly 3.3GW of solar capacity across 93 projects (commencing in 2026/27 or 2027/28) secured CfDs at an initial strike price of £50.07 (2012 indexation, estimated to be equivalent to £69.87 in 2024 money)

5 References

[DUKES] UK Gov, Digest of UK Energy Statistics (DUKES): energy, available online: https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2024

[EN-1] UK Gov, Overarching National Policy Statement for Energy (EN-1), November 2023

[CP2030] UK Gov, Clean Power 2030 Action Plan: A new era of clean electricity

[d-EN-1] UK Gov, draft Overarching National Policy Statement for Energy (EN-1), April 2025

[d-EN-3] UK Gov, draft National Policy Statement for Renewable Energy Infrastructure (EN-3), April 2025

[NIC] National Infrastructure Commission, Net Zero: Opportunities for the power sector, 2020

[ESC] Energy Systems Catapult, Innovating to Net Zero, 2020

[CCC_6CB] Climate Change Committee, The Sixth Carbon Budget: The UK's path to Net Zero, 2020

[6CB_IA] UK Gov, Impact Assessment for the sixth carbon budget, 2020

[EWP] UK Gov, Energy White Paper: Powering our Net-Zero Future, 2020

[MZ] Rt Hon Chris Skidmore MP, Independent Review of Net Zero: Mission Zero, 2023

[CAP] The Department for Energy Security and Net Zero and Ofgem, Connections Action Plan, November 2023

[FES] NESO, Annual Future Energy Scenarios (2012 - 2024), available online:
[redacted]

[UK_Solar] UK Gov, Solar photovoltaics deployment, (December 2024 publication), available online: https://www.gov.uk/government/statistics/solar-photovoltaics-deployment

[NIS] National Infrastructure Commission, National Infrastructure Strategy, Fairer, Faster, Greener, 2020

[LAEP] accessed from New plan to help power Oxfordshire using local renewable energy in March 2025

[LPA_Data] UK Gov, Government energy use statistics at regional and local authority level, available online:

(a) https://www.gov.uk/government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2022

(b) https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics (2025 to 2023)

(c) https://www.gov.uk/government/statistics/regional-renewable-statistics (2014 to 2023)

(d) https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2022

[SSEN Capacity Map] accessed from Network Maps in March 2025

[ElecCost] UK Gov, Electricity generation costs, issued on three-year cycle (latest: 2023)

[Solar_Eff] National Renewable Energy Laboratory, Best Research-Cell Efficiency Chart, available online: https://www.nrel.gov/pv/cell-efficiency.html

[CfD] UK Gov, Contracts for Difference for Low Carbon Electricity Generation - Consultation on proposed amendments to the scheme, 2020

[CfD_Data] UK Gov, CfD Allocation Round results are available online:

(a) Round 4 https://www.gov.uk/government/publications/contracts-for-difference-cfd-allocation-round-4-results

(b) Round 5 https://www.gov.uk/government/publications/contracts-for-difference-cfd-allocation-round-5-results

(c) Round 6 https://www.gov.uk/government/publications/contracts-for-difference-cfd-allocation-round-6-results