Written evidence submitted by Solar Energy UK

About us

Solar Energy UK represents more than 300 members of the UK solar and energy storage industry, including solar installers, manufacturers, distributors, developers, and investors, operations, cleaning, maintenance and asset management specialists, and technical, legal, and professional advisors. Our goal is to enable the deployment of 40GW of solar energy capacity in the UK by 2030, rising to 70GW by 2035, in line with the British Energy Security Strategy

Respondent details

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Would you like this response to remain confidential? No

Solar Energy UK response

Summary

Solar Energy UK welcomes the Environmental Audit Committee's inquiry on solar technology. Solar will play a major part in the UK's clean energy future.

We have responded to all the questions asked by the Committee and are available to discuss this in detail at the Committee's convenience.

1. What role can developments in solar panel technology play in the UK's transition to net zero?

Solar Energy UK estimates that by 2035 – the target year for the UK to decarbonise its power grid – solar could contribute up to 17% of the UK's electricity. This based on a five-fold increase in current deployed solar capacity, to 70GW by 2035, with an interim target of 40GW by 2030.[1] In addition, solar thermal and PV have a substantial role to play in the decarbonisation of UK heat supply. Heating is currently responsible for around a third of UK emissions, solar technologies (including solar thermal) offer an affordable and reliable method to transition to clean heat.

To date, there been approximately a 3-4% increase in the efficiency of solar panel technology every 10 years, and we can continue to expect incremental improvements. Further improvements are being made on a rolling basis in cable technology, the quality of industrial grade glass, inverters, and other solar system components, all of which are helping to reduce electrical losses and ultimately improve performance. These improvements make a more attractive business case for solar, driving investments towards a clean technology, whilst also supporting economic growth and the delivery of net zero. Further, improvements

[1] In addition to this response, see https://solarenergyuk.org/wp-content/uploads/2021/06/Lighting-the-way-report.pdf for a detailed discussion of policy measures which the Government could adopt to ensure this target is reached. Solar Energy UK is available to discuss the present response in detail at the convenience of the Environmental Audit Committee.

in efficiency allow utility scale solar PV projects to achieve net zero in a sustainable manner as less land is needed to produce the same output of electricity.

The lifespan of a new solar panels is also increasing. The typical operational lifespan of a new solar panel can now be 35 years or longer, with peak power warranties offered by manufacturers typically around 25-30 years.

UK businesses are directly involved in solar research, development and manufacturing, including for technologies such as thin-film, n-type bifacial panels, flexible solar, and new chemistries such as perovskite solar.

Given the enormous global solar deployment targets now being set in response to the energy crisis (prompted partly by the Russian invasion of Ukraine), this means there may also be export opportunities for British businesses in the future.

2. To what extent is the contribution of onshore solar technologies to the UK's renewable energy mix limited by storage and distribution capacity?

The lack of distribution network capacity is a major limitation on the deployment of solar (and other onshore generation technology) in the UK. There is not enough physical electricity network infrastructure (such as cables, transformers and substations) available to distribute electricity to where it is needed. The solar industry is collecting extensive evidence on this and can confirm that it is a problem for projects connecting at all scales: residential rooftop, commercial scale, and solar farms.

This is a challenge that is now recognised by other sectors as well. For example, the UK Warehousing Association has noted that there is as much as 15GW of solar capacity available on warehouse roofs alone, but that access to grid capacity at distribution level is "holding back the businesses that could invest hundreds of millions of private sector funding into clean renewable power."[2] The shortage of grid capacity is therefore pro-longing dependence on expensive fossil fuels for businesses across the country.

Similarly, the business press has started reporting on how, for example, new housing developments are also being constrained by the lack of grid capacity.[3] It is vital to understand the challenges the solar and broader energy sector faces are also an obstacle to making progress on other policy priorities (such as, for example, ensuring the construction of more affordable housing).

REMA

The ability to store and provide energy once called upon is inherently valuable and should be reflected in the design of future electricity markets. Solar Energy UK discussed this in detail as part of its response to BEIS' initial consultation on the Review of Electricity Markets Arrangements (REMA), which ran over summer 2022. We have attached our response to this, should the Environmental Audit Committee wish to consider it, and Solar Energy UK is available to discuss this topic in more detail.

[2] https://www.ukwa.org.uk/market-intel/time-to-act-on-extortionate-and-obstructive-electricity-grid-if-we-are-to-tackle-the-energy-crisis-say-uk-warehouse-owners/
[3] https://www.ft.com/content/3f3535b8-02ed-4789-86dd-68283bfe2901

Furthermore, thermal storage will be essential to ensuring the decarbonisation of heat. Solar thermal systems can be paired with inter seasonal storage to deliver clean and affordable heat year-round. At district scale, solar heat projects can provide renewable heat at a levelised cost which is competitive with that of more conventional heat sources (like gas or heat pumps), even including the cost of seasonal storage.

The REMA process must ensure that new electricity markets include mechanisms to send market signals for the co-location of storage and generation at a single site. This would optimise the utilisation of a given connection to the grid in the most cost-effective way, and help overcome some of the grid challenges in the UK's electricity system. This applies to both short and long-duration storage, which provide equally important complementary grid services.

Expanding on the point above, co-locating solar and storage can also improve the financial case for solar and help to drive investment. Co-location of new solar assets with battery systems can unlock additional revenue streams for the project and reduce the risk of merchant business models. Lastly, co-location of energy storage with solar projects would hedge the risk of price cannibalisation, which can occur when the mass deployment of merchant solar drives down wholesale power prices, which could influence investor returns.

VAT on Domestic Batteries

Other key measures would include, for example, ensuring that VAT on domestic batteries is zero-rated when these are installed as a standalone product. As part of the Spring Statement 2022, the Chancellor made the welcome announcement that from 1 April 2022 until 31 March 2027 VAT on installing energy-saving materials (ESMs) in residential properties in Great Britain, including solar panels, would be 0%. This represents a cut from the previous rate of 5%, and a pro-growth policy change that will incentivise the take-up of residential solar in line with the government's net zero objectives.

However, the 0% rate of VAT only applies to batteries where these are installed as part of a solar system – in other words, not when retrofitted to a property which already has a solar system. This unfairly penalises homeowners and occupants who do not have the money available to install a solar system and battery at once, and we strongly encourage the Environmental Audit Committee to recommend to the Government, as it has in the past, that all relevant green measures – including batteries when installed as a standalone measure – benefit from the reduced rate of VAT. This would significantly increase the capacity of the UK's residential building stock to benefit from onsite solar generation.

Please also see our response to question 4 regarding grid and network capacity.

3. How significant are current technological developments in solar energy storage and distribution for the potential contribution of onshore solar to the UK's renewable energy mix?

There is significant potential for solar energy storage to contribute to the UK's renewable energy mix. The nature of the solar generation curve (which peaks in the middle of the day) means than solar generation is a natural complement to storage, because surplus produced during the day can be stored and used at night.

Evidence from solar technology wholesalers and distributors in the UK indicate that

approximately 80% of new residential solar systems are now installed with a home energy storage system, such as a battery. The aggregate value of millions of home batteries is huge and can make a major contribution to the UK's grid balancing requirements, as we detail in our response to question 5.

Similarly, many solar farm developers are now seeking to "co-locate" grid-scale battery storage systems with their projects, or to retrofit large batteries to existing solar farms. This helps maximise the energy and economic value of the grid connection, and to overcome some of the grid congestion challenges outlined in this response.

Equally, thermal storage offers a flexible solution to deliver clean heat. Thermal storage is particularly beneficial for optimising heat consumption in industrial processes, this will be essential to the UK achieving its climate goals.

4. What are the current barriers (regulatory, technological or otherwise) to expanding the number of small and large-scale solar installations in the UK?

Barriers to expanding solar installations in the UK include:

- Grid and network capacity.
- Regulatory uncertainty – for example, relating to fiscal and planning policy.
- Building regulations and related policy.
- The availability of labour.
- Access to finance
- Resourcing for Network operators, Local Planning Authorities (LPAs) and Planning Inspectorate

We discuss these in turn below.

Grid and Network capacity

The transition to net zero requires major investment and engineering work to ensure network infrastructure is in place on a sufficient scale to facilitate the electrification of the economy. This is true for all forms of electricity generation which will connect to the grid, including solar, wind and nuclear. While recent policy announcements have recognised the need for network reinforcement, the scale of this has not yet been properly acknowledged. The challenges this presents is immense, and the problems are already here.

For example, Solar Energy UK has received extensive reports of existing connection offers for solar projects being delayed – sometimes into the 2030s. For example, from a dozen responses alone to a member survey in early 2022, Solar Energy UK knows of more than 40 projects and 3.5GW of capacity which have been impacted or delayed by grid connection problems, representing at least £1.37 billion in capital investment blocked.

These figures can now be expected to be far higher, and the challenge is at every scale of project, from solar farms to residential and commercial rooftop solar systems. Solar Energy UK is gathering further detailed evidence on this to inform the Net Zero strategy and other infrastructure development work and will discuss this readily with the Environmental Audit Committee, BEIS, and other relevant stakeholders.

The importance of this cannot be stressed highly enough. Without being able to connect to the grid, renewable assets will not be able to sell the electricity they generate, and hence will

not get built. We therefore suggest that Environmental Audit Committee explicitly consider how cost recovery for network upgrades, and network congestion more broadly, is built into all discussions of the future energy system. This should take into account the roles and responsibilities of other relevant bodies such as Ofgem, the future system operator, and network operators, alongside who should bear the cost of reinforcement, (which represents a barrier to project development) given that the electricity network is a public good.

We would note on this topic that onsite generation, such as residential and commercial rooftop solar PV – as well as long-duration, co-located storage, such as utility-scale batteries – provide a way to mitigate some of the short-term costs of grid upgrades.

In addition, co-locating electricity supply and demand means that electrified residential and industrial heating, for example, will be able to draw on power generated at the point of use. This helps alleviate pressure on high-voltage networks, reducing the need for significant re-engineering. Further, there are opportunities associated with co-locating complementary technologies – such as onshore wind and solar – to reduce infrastructure challenges and make best use of new and existing grid connections.

Regulatory uncertainty

UK solar is a major success story. The current pipeline of solar farm projects represents the potential deployment of £30 billion of private capital in the UK energy sector. This reflects the fact that solar technology offers highly predictable, highly stable financial returns that are helping to decarbonise the UK's economy.

In this context, the regulatory uncertainty caused by the announcement in the Autumn Budget to impose a levy on electricity generators is a major barrier to solar deployment. Whilst the details are to be confirmed, as it stands, the Electricity Generator Levy looks set to disproportionately tax solar technologies whilst continuing to offer investment support for the oil and gas industry. This levy creates a perverse incentive for investors to move future investments away from green, renewable energy generation and back into damaging fossil fuels.

Secondly, Government has raised concerns relating to the use of land by solar farms for clean energy generation. In this context, it was reported that the Minister for the Department for Environment, Food and Rural Affairs (DEFRA) is looking to reclassify the definition of Best and Most Versatile (BMV) Land to include grade 3b.

Solar Energy UK members have expressed concerns that the proposed changes to BMV have already impacted planning applications despite no formal change to the classification.

If this were to be implemented, it could substantially and unduly reduce the scale and rate of solar deployment in the UK, impeding the Government's ability to reach its net zero target and deliver tangential benefits such as reduced energy bills and opportunities to increase biodiversity. As it stands the Government is at risk of damaging investor confidence in solar projects with billions of pounds poised to be injected into the UK economy to fuel much needed growth. We expand on this further in question 6.

Availability of labour

The solar industry could support at least 60,000 jobs by 2035.[4] In Scotland, a 4-6GW

ambition of solar could deliver between 5,500 and 8,500 good green jobs in Scotland, across the supply chain and in a variety of industries.

Solar Energy UK member companies all have overflowing project pipelines and are creating jobs across a very wide range of sectors. Because all new solar is fully subsidy-free and developed on merchant risk alone, the job creation figure cited is also likely to be conservative.

The UK must implement a nationwide programme to ensure the wide variety of roles available in the solar sector can be fulfilled. These roles include solar installers and project developers, site planners, component and other manufacturing technicians, software and system designers, electrical and design engineers, construction and trade roles, and legal, communications and finance specialists.

It cannot be stressed enough that UK solar is a major economic success story. Record residential rooftop, commercial scale and solar farm deployment is helping to cut bills for homeowners and businesses, decarbonise the British economy, and increase our energy security.[5] This is why British solar businesses are creating as many jobs as they are, which are full-time, permanent and high-quality, and there is a significant opportunity for the UK to capitalise on this.

The solar industry has been pro-active in seeking to address the skills challenge, and, for example, is running a pilot skills training project, Solar Skills London, in the capital. This includes a training grant scheme for employers and the development of a 120-hour pre-apprenticeship bootcamp programme, launching in November 2022. The bootcamp will enable young people from underprivileged backgrounds in the capital to learn about careers in solar, with some progressing to guaranteed interviews with solar employers for apprenticeships and early-career roles in 2023.[6]

We must also ensure as a nation that, as the UK transitions to net zero by 2050, those from fossil fuel based industrial backgrounds are supported. For example, we note and support the fact that the Government's Net Zero strategy acknowledges the need to support and retrain workers to build low carbon industries. However more can be done to secure strong UK supply chains. The Government must increase efforts to provide appropriate skills, training and vocational support. This could see those in the oil and gas sector retrained and contributing to the delivery of a low carbon future. The solar industry warmly welcomes those with technical and other experience from different generation technology backgrounds. These can be used by the solar sector to support the transition to net zero.

Access to finance

Grants, zero loan interest rates and other financing mechanisms have been readily accepted by solar and storage technologies, stimulating investment in renewables. To date, access to finance for consumers and businesses to support the delivery of home upgrades has been turbulent. Over the past few years there have been several short-term grants promising home upgrade opportunities, most notably the Green Homes Grant (GHG). However, whilst the GHG had significant potential to contribute to the decarbonisation of the UK's housing

[4] Based on modelling carried out for https://solarenergyuk.org/wp-content/uploads/2022/05/Solar-Skills-Scotland-Briefing_May2022.pdf.
[5] https://solarenergyuk.org/news/energy-price-crisis-drives-massive-growth-in-uk-solar-power/
[6] https://solarenergyuk.org/solar-skills-london-resource-portal/

stock, the lack of clarity, short running time and premature funding cut off, resulted in thousands of frustrated customers and businesses. The Government must work with industry to develop new methods of financing the decarbonisation of buildings that reflect real world project installation time frames. There is enormous potential for zero carbon home upgrades, and the solar and storage industry is willing to supply it, but previous short-term cycles of financial support for households have tempered consumer confidence.

We encourage the EAC to work with industry as part of this consultation and others subsequent, to design a long-term scheme for retrofitting homes and businesses in line with the delivery of net zero by 2050. This should integrate incentives for green mortgages, rolling out smart metering, EV charging and network upgrades.

A further consideration could be the rollout of green mortgages or a solar mortgage could facilitate greater rooftop solar installations. At present some mortgage providers offer additional lending which could be used for home upgrades such as solar PV however this is often shorter term with higher interest than their mortgage loans. A solar mortgage could differ with the term and interest rate the same as the agreed main mortgage. This aligns well, as average mortgage term and operational lifespan of a solar panel being approximately 25 years. As mentioned in question 5, the installation of rooftop solar provides a host of benefits; driving down the cost of energy bills for consumers, reducing carbon emissions and increasing the property's value by up to £2000.[7]

The Scottish Government's Home Energy Scotland and Business Energy Scotland programmes may offer an example for the EAC. Each programme offers interest free loans to homeowners and SMEs to invest in energy efficiency or renewables.

Resourcing for Network Operators, Local Planning Authorities (LPAs) and Planning Inspectorate (PINS)

To help address the issues around grid and network capacity, we strongly recommend that resourcing is improved for Network Operators, Local Planning Authorities and PINS. With regards to Network Operators, there is an evident lack of resourcing for securing grid connections and completing impact assessments of proposed connections. Developers are experiencing timescales of between 12-18 months, and sometimes 2 years, to receive impact assessments when it should take 3-6 months. In respect to LPAs and PINS, if the 70GW target for solar is to be met in the next 13 years then improved resourcing for timely planning consents must be implemented to provide the capacity to progress new solar projects out to 2035.

5. Are government support schemes sufficient to encourage small-scale solar technology deployment by consumers? What role does the pricing of energy under these schemes play in the uptake of solar technology by domestic and commercial properties?

Domestic scale solar

[7] Ibid

Historic government support schemes have been a major success in encouraging small-scale solar technology deployment, and there are now 1.2 million residential solar systems. However, more can be done to support residential solar uptake.

First, the government must ensure that the full Future Homes Standard (the building regulations which will govern how new homes in England are built from 2025), is designed in such a way that solar comes as standard on all new homes. Doing so could directly support the deployment of at least 100,000 new solar homes as a result of this policy change alone, representing 400MW per year of new solar capacity.[8] Regulation proved effective in Scotland; changes were made to building standards in 2015 that incentivised solar on new build properties, and EPC data in 2020 showed that 60% of new build homes had solar. Anecdotal evidence from our members suggests this may be closer to 80%.

The economic benefits are huge. Doing so would increase what is already a thriving new-build solar installation market and would deliver major reductions on consumer bills. Solar Energy UK research published in October 2022 shows, for example, that combining solar power and a heat pump can save as much as £3,000 a year on home energy bills.[9] The report also describes the benefits of solar thermal systems, such as using the sun's heat directly for space heating and hot water, alongside battery storage.

This work builds on previous Solar Energy UK modelling – carried out with Cambridge University and based on nearly six million property transactions – which shows that installing solar on a home can increase its value by more than £2,000.[10] Solar is a proven way to increase the quality, and hence value, of a home, while reducing bills for occupants.

There are, in addition, major system-level benefits to domestic solar. Previous Solar Energy UK research, carried out in collaboration with the Centre for Renewable Energy Systems Technology at Loughborough University, shows how 4.4 million homes with solar PV and a battery could eliminate the winter 'peak' in electricity demand on the national grid.[11] This would be a major benefit and help overcome some of the network constraints previously discussed.

Lastly, we note that price volatility matters, in particular for consumers, given the nature of current markets. In recent events, this has been because of the way international events feed into pricing and the impact of the international price of gas on GB electricity pricing. Consumers are now being faced with increasingly high energy bills; disproportionately impacting low-income households. Government should recognise the opportunities that solar technologies present to reduce volatility of pricing (as outlined above) for consumers. This could be achieved by extending successful schemes for both new and retrofit properties. Programmes such as Home Energy Scotland, Warmer Homes Scotland, and Nest in Wales have all been successful in reducing consumer bills through retrofit, and may offer valuable lessons for a similar programme in England.

Commercial scale solar

[8] Deployment modelling carried out for https://solarenergyuk.org/wp-content/uploads/2021/06/Lighting-the-way-report.pdf.
[9] https://solarenergyuk.org/resource/the-value-of-solar-heat/
[10] https://solarenergyuk.org/resource/the-value-of-solar-property-report/
[11] https://solarenergyuk.org/resource/smart-solar-homes/

As with the Future Homes Standard, the Government must ensure that the Future Buildings Standard ensures new non-domestic buildings come with solar as standard.

Commercial solar is a very popular improvement for businesses, which is reflected in the record deployment of the sector. This is because a keyway to mitigate long term energy price risk for businesses is via the installation of onsite generation, such as solar and energy storage systems. These enable businesses to meet their own demand for heat and power, providing them with a lower and more stable cost of energy.

Solar can also meet commercial scale heat demand. Solar thermal is especially well suited to the hospitality sector and public buildings such as leisure and health centres, given their available roof space, and typically high hot water demand for cooking, cleaning and facilities such as swimming pools.

However, for some businesses, the upfront cost may still be a barrier, given the broader challenges in the UK economy. One way to address this is through capital allowances. Solar Energy UK has responded previously to Government consultations on this, noting, for example, that the current special rate First Year Allowance (FYA) covering solar has been a welcome boost for businesses looking to reduce their expenditure on energy, while meeting their sustainability goals, through installing onsite generation.

Solar Energy UK has previously called for the extension of capital allowances until at least 2030, and so we would support the continuation of the FYAs currently in place for qualifying expenditure. Our preference would be to introduce a general FYA. Doing so would provide businesses with the flexibility to invest in the plant and machinery most relevant to their operations, and so the allowance should also ensure eligibility for all relevant solar and energy storage equipment. This should be in addition to any other investment allowances. We would propose that the figure be maintained at its current rate of 50%. This would provide continuity with the existing allowances and ensure the relevant accounting and other calculations are as simple as possible.

There are many benefits to solar energy, and Solar Energy UK members have indicated that given supply chain pressures the capital allowances have helped ensure projects go ahead.

Solar Energy UK has produced an introductory guide to commercial rooftop solar.[12] This guide provides an introduction for corporate energy buyers interested in onsite solar PV power and heat generation. We strongly encourage the Committee to review this document, at length.

6. Does Government policy and current planning guidance adequately address the issues raised by proposals to install solar farms on land with high agricultural or ecological value?

Yes we agree. Government policy and planning guidance adequately addresses these proposals and should not be altered without extensive and detailed consultation with the solar industry and all other land developers.

[12] https://solarenergyuk.org/resource/corporate-buyers-guide/

The industry is aware of the fact that solar farms are in some cases installed on agricultural land and has engaged extensively with the issues relating to this with agricultural sector stakeholders, academia, the government, industry and in the media.

This includes the development of industry-leading best practice on natural capital and biodiversity management as part of solar farm development, operation and decommissioning, which was published prior to reports in October 2022 that the then-Secretary of State for the Environment was considering changes to the land classification system, based on the apparent perception that solar farms pose a threat to food security. Any such change would have had the effect of severely restricting solar farm development and so would not be consistent with the growth, decarbonisation and energy security vision of the government.

It would also be based on the demonstrably incorrect claim that solar is a threat to food security. Solar Energy UK analysis shows the level of solar farm deployment consistent with delivering a five-fold increase in solar farms – in line with the British Energy Security Strategy – would account for around 0.3% of UK land.

Installing a solar farm is a reversible form of land use, and helping to meet the UK's energy security and climate change objectives through their deployment will have minimal if any impact on Britain's food security. The opposite is true: solar farms directly address climate change, which Defra has identified as the most important threat to UK food security[13]. Solar farms also generally utilise previously developed land, such as brownfield sites, and land of lower agricultural quality. This stands to reason – there is no economic incentive for solar developers to propose sites on the highest quality land in the first instance, precisely because it would imply higher leasing and other costs.

The UK farming industry also benefits from both rooftop and groundmount solar and there has been extensive public support for solar farms from the farming community. This is because the rental income a solar farm provides directly supports income diversification for British farmers, who operate in a challenging economic context. The solar industry works closely with farmers and landowners: to manage land under solar farms for continued agricultural use, to improve soil quality, and to provide flood mitigation, biodiversity gains and other ecosystem services. Solar farms in the UK can be used for sheep grazing and solar developments installed on land previously used for arable cropping can diversify local land use, adding ecosystem services such as pollinator habitats and contributing to nature recovery networks.

As well as supporting the reduction of carbon emissions and improving long-term land quality, solar farms can also deliver significant local environmental benefits. Well designed and well-maintained solar farms have been shown to support thriving wildlife habitats, providing a range of biodiversity gains for the duration of their lifespan.

This has been extensively discussed by the UK solar industry, which in collaboration with the National Farmers Union, ecological consultants, academia, and other stewards of the countryside, has developed a Natural Capital Best Practice guide to help ensure solar farms deliver these benefits.[14] The guide provides a clear framework to ensure good practice on all

[13] United Kingdom Food Security Report 2021: Theme 2: UK Food Supply Sources - GOV.UK (www.gov.uk)
[14] https://solarenergyuk.org/resource/natural-capital-best-practice-guidance/

solar farms, facilitating multipurpose land use, and supporting income diversification for farmers. The guide has been endorsed by Natural England, the UK Government's adviser for the protection and restoration of the natural environment.

Solar farms, which as noted can provide an important additional revenue stream that helps provide financial stability for UK farmers, are also one of the most affordable, efficient, and population net zero carbon electricity generation technologies available. This has been repeatedly demonstrated by a range of industry, government and private sector polling, which shows the huge population of solar farms across all demographics. A range of evidence on this is summarised below. For example:

- 17% of people who self-identify as living near a solar farm become more supportive of the technology over time (with only 2% becoming more opposed).[15]
- 81% of people would support or not mind a solar farm in their area.[16]
- 89% of Conservative voters support solar.[17]

We are committed to ensuring that our countryside remains a dynamic space, producing food and energy for the nation while supporting environmental benefits. The solar industry and our countryside communities stand ready to work together in support of this: promoting multi-functional land use, creating jobs, increasing biodiversity, reducing bills, and addressing climate change. Solar farms help achieve all these goals.

Solar Energy UK has produced a wide a variety of information on this topic, including a briefing on solar farms and food security, and is available to discuss the issue in detail with the Environmental Audit Committee at its convenience.[18] External outlets have also published, for example, fact checkers on solar farms and land use, and described the support of landowners for solar farms.[19]

7. How sustainable is the supply chain for solar panel manufacture? Do levels of sustainability differ between mature and emergent technologies?

Multiple industries operate globally, with complex supply chains and involvement from various entities. This includes the solar industry.

The global supply chain for solar includes the extraction and processing of raw materials, the transformation of these materials into solar ingots, wafers and cells, their assembly into solar panels, and their shipment and installation in relevant markets.

Diversification, transparency, traceability and due diligence are all tools to manage sustainability in the supply chain. It is in this context that in partnership with Solar Power

[15] https://solarenergyuk.org/wp-content/uploads/2022/01/Copper-Consultancy_Solar-Energy-UK_Public-attitudes-to-solar_January-2022.pdf
[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1082719/BEIS_PAT_Spring_2022_Energy_Infrastructure_and_Energy_Sources.pdf
[17] https://www.blog.renewableuk.com/post/support-for-investment-in-renewables-to-lower-energy-bills-is-overwhelming
[18] https://solarenergyuk.org/wp-content/uploads/2022/09/Briefing-Solar-Farms-Food-Security_The-Facts_Sept2022.pdf
[19] See, eg https://www.carbonbrief.org/factcheck-is-solar-power-a-threat-to-uk-farmland/ and https://www.theguardian.com/environment/2022/oct/22/landowners-call-for-scrapping-of-plans-to-ban-solar-energy-from-englands-farmland.

Europe (the European solar trade body), in 2022 Solar Energy UK launched the Solar Stewardship Initiative.[20] This is designed to further develop supply chain transparency and strengthen confidence in how, where, and by whom products and solar components are manufactured.

The Initiative will work to establish and access verifiable information on current levels of transparency, and on overall sustainability performance standards in the solar supply chain.

The Solar Stewardship Initiative Roadmap outlines a clear path for the development of these standards, and Solar Energy UK has extensively briefed BEIS and other relevant government departments on the Initiative.

Lastly, delivering high sustainability and Environmental Social Governance (ESG) practices is more likely to be based on the supplier maturity rather than the technology type.

8. Does the concentrated global distribution of solar panel supply chains (80% manufacture in China) pose a risk to solar technology expansion in the UK? If so, how could this be mitigated?

The current importance of China for the global solar supply chain is well documented. Whilst we acknowledge that a significant proportion of panels are being manufactured in China; the expansion of the solar industry and the addition of large solar deployment targets globally, means there is strong demand and competition for solar products, all over the world. This increase in demand, could see a greater distribution of solar manufacturing facilities across the world, with less reliance on China.

Commercial motivation for non-Chinese solar supply chains are being developed and expanded. For example, the American Inflation Reduction Act could lead to 50GW of solar manufacturing capacity in the US by 2030, while the European Solar Initiative aims to ensure there is 20GW of solar PV manufacturing capacity in Europe by 2025.[21] India and other states have also announced their intention to develop significant solar supply chains.[22] The UK is developing significant capability in energy storage technology, in particular, and we would support measures to enable this and UK solar companies to further develop the contribution they can make to diversifying the global solar supply chain.

9. What needs to be done to facilitate solar farm access to grid connection, to enable wider distributed energy generation from solar installations?

The transition to net zero requires major investment and engineering work to ensure network infrastructure is in place on a sufficient scale to facilitate the electrification of the economy, which the government has indicated is a priority. While recent policy announcements have recognised the need for grid reinforcement, the scale of this has not yet been properly acknowledged. The challenges this present for all forms of generation – including solar, wind

[20] https://solarstewardshipinitiative.org/
[21] https://seia.org/sites/default/files/2022-08/SEIA%20Manufacturing%20Roadmap%202022_4.pdf and https://www.solarpowereurope.org/advocacy/european-solar-initiative.
[22] https://www.pv-magazine.com/2022/09/22/indian-government-approves-second-phase-of-solar-manufacturing-incentive-scheme.

and nuclear – are immense.

These problems are already here. Solar Energy UK has received extensive reports of existing connection offers for solar projects being delayed – sometimes into the 2030s. For example, from a dozen responses alone to a member survey in early 2022, Solar Energy UK knows of more than 40 projects and 3.5GW of capacity which have been impacted or delayed by grid connection problems, representing at least £1.37 billion in capital investment blocked. These figures can now be expected to be far higher.

This is a challenge at every scale of solar, from utility scale through to residential and commercial rooftop systems. Without being able to connect to the grid, renewable assets will not be able to sell the electricity they generate, and hence will then not get built. We therefore suggest that the committee include our considerations of how cost recovery for network upgrades, and network congestion more broadly, is built into all discussions of the future energy system. This should take into account the roles and responsibilities of other relevant bodies such as Ofgem, the future system operator, and network operators, and who should bear the cost of reinforcement, given that the energy network is a public good.
We would note on this topic that onsite generation, such as residential and commercial rooftop solar PV – as well as long-duration, co-located storage, such as utility scale batteries – provide a way to mitigate some of the short-term costs of grid upgrades.

Finally, co-locating electricity supply and demand means that electrified residential and industrial heating, for example, will be able to draw on powered generated at the point of use. This helps alleviate pressure on high-voltage networks, reducing the need for significant re-engineering. Further, there are opportunities associated with co-locating complementary technologies – such as onshore wind and solar – to reduce infrastructure challenges and make best use of new and existing gird connections.

10. Are emerging proposals to utilise solar energy overseas capable of supplying additional sustainable grid capacity via interconnectors to the UK?

Interconnectors are well established and have a clear framework for connection into the GB system. One of the most ambitious recent proposals being the Xlinks that could transport solar energy between the UK and Morocco.

However, it is likely that interconnector proposals will be subject to the same challenges imposed by existing grid constraints and network congestion. To alleviate this concern, a major programme of investment would be needed. By doing so, this would unlock huge economic benefits, environmental and societal benefits from utilising affordable, clean and secure solar energy supplies.

The main value of interconnectors is to help manage the variable output from wind and solar, so at times of excess renewables on the grid, that power can be exported to neighbouring markets. As the total capacity of solar grows in the UK and the rest of Europe, these links will become more important. In this way, solar energy projects overseas are capable of providing additional generation volumes to the UK via interconnectors, in the same way as the UK currently imports electricity from wind, hydro and other sources from North Sea states. At other times the Uk may be selling excess power into the European grid.

Further thoughts

In addition to the questions included in the inquiry, we would like to propose the following questions be considered for inclusion in the terms of reference:

- What can be done to increase the productivity of existing solar plant?
- How does existing policy and planning guidance inhibit the repowering of existing solar farms?
- Will the ongoing Ofgem funded Strategic Innovation Fund (SIF) and Network Innovation Allowance (NIA) programmes be effective in supporting a higher level of renewable energy generation?

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ENDS