

# Getting solar off the ground

**Driving a rooftop solar revolution**  
**October 2024**



# About the Centre for the South

This project was funded by the Centre for the South (CftS), a policy institute founded under the University of Southampton.

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# About the collaboration

This work is the result of a collaboration between the University of Southampton's Energy and Climate Change Division, and CPRE Hampshire and CPRE Sussex, with the generous support of the Centre for the South's New Things Fund. The project is centred around a new study mapping the opportunities for rooftop and car park solar across Hampshire and Sussex.

The researchers from the University of Southampton's Energy and Climate Change Division are Dr Luke Blunden, Ellis Ridett. The project leads from CPRE Hampshire, CPRE Sussex and the Centre for the South are Alison Talbot, Paul Steedman and Hannah Dagleish respectively.



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Man with solar panels  
Photo credit: Ashley Cooper / Alamy

# Summary

Solar energy has a critical role in replacing expensive fossil fuels and achieving Net Zero. Deploying PV panels on rooftops and car parks, could minimise the impact on productive farmland, landscape and nature, while meeting government ambitions to nearly quintuple solar capacity by 2035.

- **New buildings, existing large warehouse rooftops and car parks**, could provide at least 40-50 GW of capacity, contributing more than half of the total national 2035 target.
- **New mapping tools** can help local authorities, landlords and communities easily identify specific

rooftops with high potential for PV, to target installation and incentives. The project has mapped and analyzed every rooftop within **Hampshire, East and West Sussex** and **Brighton & Hove**, giving a theoretical capacity of 2000 MWp for Hampshire and 1950 MWp for Sussex. Overall, around 45% of building rooftops were found to have sufficient sunlight over the course of a year for solar PV installation to be effective.

- **Driving a rapid rooftop rollout** requires government action, through reformed planning and building regulations, enhanced financial incentives and reinforced distribution networks.

## SOLAR: A CRITICAL ENERGY TECHNOLOGY FOR THE UK

Solar energy has a vital role to play in replacing expensive fossil fuels and helping us reach Net Zero (when carbon dioxide is no longer added to the atmosphere faster than it is absorbed). Solar photovoltaic (PV) panels convert the sun's energy into electricity, which is either used locally or connected to the National Grid.

The government has a target to increase UK solar capacity to 70GW by 2035,<sup>i</sup> from a current level of 15.9GW,<sup>ii</sup> as part of its decarbonisation plans. The costs of solar have fallen rapidly and PV systems are predicted to get cheaper by 40%-50% by 2035. Research from the University of Surrey finds that large PV systems in 2021 were already cheaper than wholesale electricity and that even the smallest PV systems will break even by 2027.<sup>iii</sup>

## OPPOSITION TO LARGE-SCALE GREENFIELD 'SOLAR FARMS'

Large scale energy producers want to cover as big an area as possible with solar panels, at as low a cost as possible. The result: an increasing numbers of planning applications for 'solar farms' on green fields.

Local community opposition to these installations is focused on landscape intrusion, the loss of productive farmland, and concerns about effects on wildlife. Lack of public acceptance can lead to planning delays, increased costs and, in some cases, the abandonment of projects.<sup>iv</sup>

The new government has hinted that it will introduce a more strategic process, but the current approach to solar farm

location and scale is largely developer-led, with sites coming forward for planning permission piecemeal, rather than as part of an overall strategic plan, albeit with national and local planning policy providing some degree of control. However, research from the University of Exeter and Friends of the Earth found that more than enough solar power could be generated from the strategic use of only the 'most suitable' land, excluding protected habitats, grade 1 and 2 agricultural land, national parks and areas of outstanding natural beauty, greenbelt and more<sup>v</sup>.

## PRIORITISING 'GREY SPACE' OVER 'GREEN FIELDS'

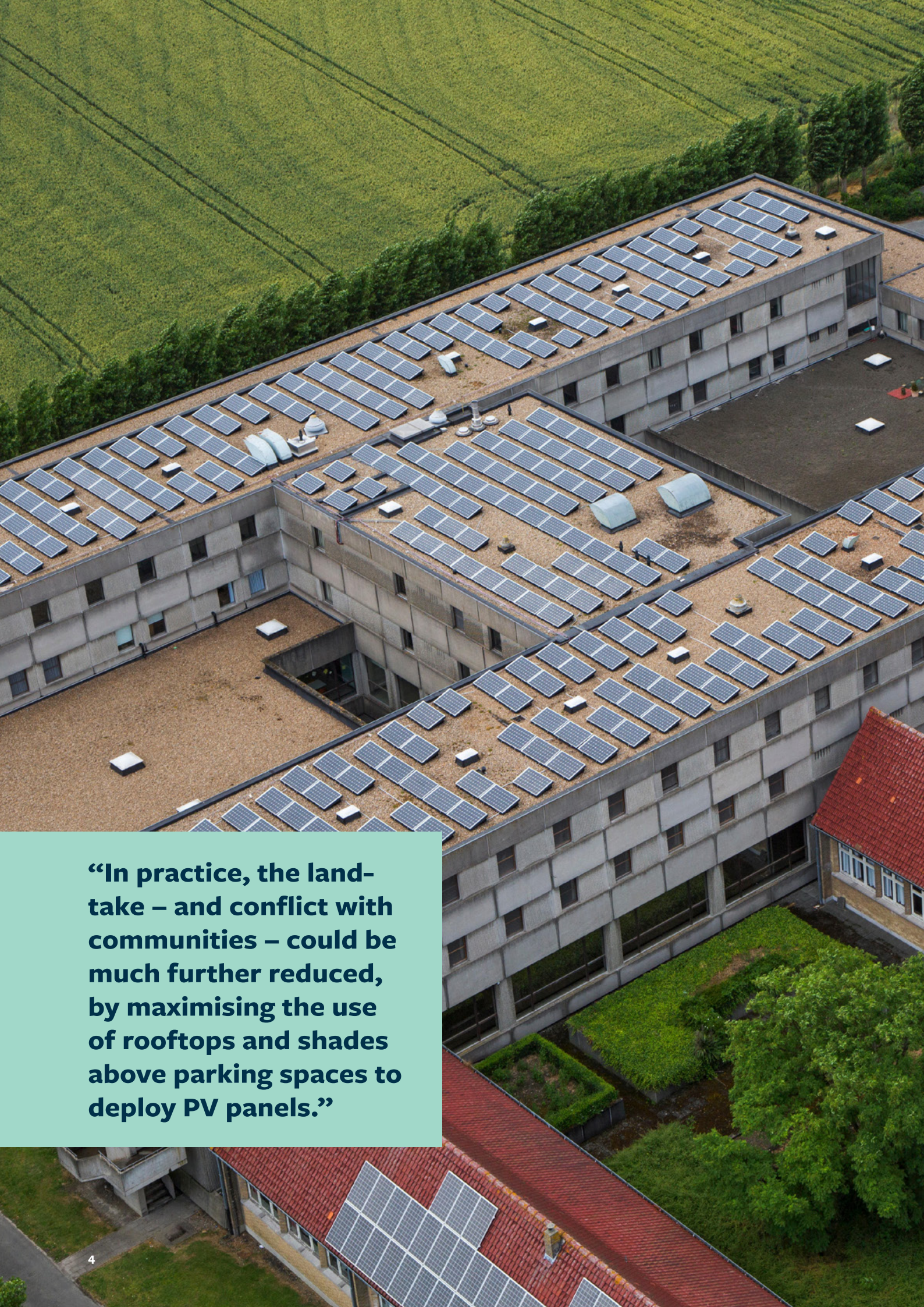
In practice, the land-take – and conflict with communities – could be much further reduced, by maximising the use of rooftops and shades above parking spaces to deploy PV panels. Research from UCL for CPRE found that installing solar panels on new buildings, existing large warehouse rooftops and other land such as car parks, could provide at least 40-50 GW of capacity, contributing more than half of the total national 2035 target. Longer term, there is potential for up to 117GW of low carbon electricity to be generated from roofs and other developed spaces.<sup>vi</sup> The UK Solar Taskforce has acknowledged that "schools, warehouses and car parks could be at the forefront of a revolution in affordable solar power,"<sup>vii</sup> and the new government has promised a 'rooftop revolution'.

## FOCUSING EFFORT

Where though is rooftop solar most effectively deployed? New modelling

from the University of Southampton provides a means of focusing effort for building owners and tenants, local authorities, community energy groups and the solar industry. A new, publicly-available map allows users to understand the potential rooftop solar capacity within an area, mapping the annual solar radiation falling on individual rooftops, based on LIDAR data<sup>xi</sup>. The project has mapped and analyzed every rooftop within Hampshire, East and West Sussex and Brighton & Hove, giving a theoretical capacity of 2000 MWp for Hampshire and 1950 MWp for Sussex. Overall, around 45% of building rooftops were found to have sufficient sunlight over the course of a year for solar PV installation to be effective. Data at this scale will enable action, policy or incentive schemes to get solar on rooftops to be focused on specific high-priority neighbourhoods or streets, and to shape both Local Area Energy Plans and Local Plans – enabling the prioritisation of rooftop solar, and a more strategic and limited approach to any ground-mounted solar capacity that is still required.

The modelling of theoretical rooftop capacity highlights other challenges with maximising solar on roofs. The load-bearing capacity and other physical constraints on individual roofs will need to be assessed, while grid capacity and connection limitations provide other significant impediments. In addition, ownership structures can create difficulties in sharing the costs and benefits between, for example, landlords and tenants. Careful policy design is needed to help overcome some of these challenges.



**“In practice, the land-take – and conflict with communities – could be much further reduced, by maximising the use of rooftops and shades above parking spaces to deploy PV panels.”**

# Recommendations

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A workshop convened by University of Southampton and CPRE, drawing on research by WPI Economics on effective policy for rooftop solar deployment around the world,<sup>x</sup> set out clear recommendations for what is needed in the UK to deliver a step-change in rooftop solar.

## THE UK GOVERNMENT SHOULD:



**1 Develop a national rooftop solar target** Commit to a new target that at least 40GW of the national 2035 70GW solar target is delivered through rooftop solar installations on new builds, commercial buildings and car parks. Larger rooftops, such as warehouses, should be a focus, filling in the ‘missing middle’ between domestic rooftop and utility-scale ground-mounted solar.



**2 Protect landscapes** Manage the potential impacts of solar development in the countryside by:

a. Introducing a land use framework to establish how the overall needs for built development, carbon sequestration, energy and infrastructure, food security and nature recovery should be integrated and planned for.

b. Revising national and local planning policy to set clearer principles for determining ground-mounted solar PV applications, following a sequential ‘roof first’ approach. This should prioritise installations on brownfield land and avoid Best and Most Versatile agricultural land. It should recognise cumulative impact within a local area and achieve best practice standards for landscape and nature.



**3 Planning regulations** Amend planning regulations and the Future Homes Standard so that:

a. Solar PV or thermal panels on suitably orientated roofs are a standard expectation for all new buildings, including homes, alongside tougher standards on insulation.

b. Conversions and major external changes to existing buildings should require full planning permission unless they bring the building up to the Future Homes Standard.

c. Planning permission should not be granted for car parks unless they also provide solar energy generation.



**4 Financial support** Develop a holistic set of market-based actions including:

a. Introducing government-backed low-cost loans for domestic, community and commercial rooftop solar, and dedicated support for solar upgrades to social housing.

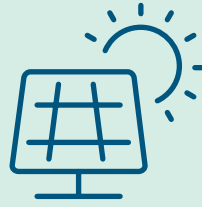
b. Upgrading the Smart Export Guarantee, giving higher minimum tariffs to homeowners and businesses selling electricity from rooftop solar, reducing payback periods. Delivering fixed-rate payments closer to the £0.08 per kilowatt hour offered in Berlin could as much as double the investment incentive for UK rooftop solar.

c. Piloting a Power Purchase Agreement scheme, similar to those in Japan, offering households the opportunity to have rooftop solar panels installed for free in return for a 10–20-year PPA through which they purchase the electricity they need.



**5 Community energy** Update national planning and energy policies to drive significant deployment of community-owned energy schemes, through:

- a. Adoption of the Local Electricity Bill which would effectively support 'local energy sales', and encourage best practice in community engagement.
- b. Empowering rural communities to set out where and how new renewable energy schemes can be incorporated in the countryside. This should build upon the Community Energy Visioning process, pioneered by CPRE and the Centre for Sustainable Energy.



**6 Grid capacity** Work with Ofgem to require Distribution Network Operators across the country to invest in local grid capacity to better accommodate increased generation from solar. This should deliver new connections in a timelier manner and ensure reasonable and proportionate connection costs. In addition, DNOs should bring forward new approaches to local storage, including through the charging and discharging of electric vehicle batteries, to enable local balancing and best use of locally generated electricity.

**“Solar photovoltaic (PV) panels convert the sun’s energy into electricity, which is either used locally or connected to the National Grid.”**

Solar panels on warehouse  
Photo credit: Jochen Tack / Alamy Stock Photo



Solar panels on roof  
Photo credit: John Morrison / Alamy Stock Photo

## LOCAL AUTHORITIES SHOULD:



**7 Hotspots** Identify potential roof and other developed spaces that can be used for solar panel installations. Having identified ‘hotspots’, local authorities should bring together accredited installers, finance mechanisms and building owners on an area-by-area basis to maximise deployment.



**8 Local Areas Energy Plans** Develop Local Area Energy Plans that seek to maximise available rooftop solar.



**9 Local Plans** Incorporate demanding energy performance standards into local plan policies, including mandatory rooftop solar on new buildings; pursue a rooftop-first approach for solar; and take a highly strategic approach to the location, and conditioning of, any ground-mounted solar that is needed in addition.



**10 Procurement** Maximise the deployment of rooftop solar on their own buildings, including council-owned housing stock, and work closely with other public sector partners to do the same.

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