



**COST-SAVING
ROOFTOP SOLAR
PV SOLUTIONS
FOR INDUSTRIAL
AND COMMERCIAL
BUILDINGS**



ROOFTOP SOLAR POWER

CONTENTS

Introduction	3	Case Studies	10
Why Rooftop Solar PV?	4	Distribution: Morrisons Bridgwater	10
Solar PV in Great Britain & Ireland	4	Agriculture: Lavenham Fen Farm	11
Installation Considerations	5	Transport: National Express	12
Planning Permissions	5	Industry: Stennack House	13
100% Funded Package	6	Office: Henderson Group	14
Funded Solution - Our Story	7	Manufacturing: Butcher's Pet Care	15
Service Package	8		
Guarantee & Maintenance	9		



INTRODUCTION

There is no better time than now for businesses to invest in solar photovoltaic technology to secure their energy future.

Electricity costs have risen aggressively in the last 10 years, and with this upward trend not showing any sign of stabilising, businesses continue to seek measures to control their ever-increasing operational spend.

Kingspan Energy can help in alleviating this challenge. We offer a comprehensive range of fully integrated and warranted rooftop solar PV systems, which carry a unique 25 year combined PV and insulated roof panel guarantee. Our solutions are tailored specifically to end clients' needs and provide long-term revenue generation and cost-savings.

We deliver a full turn-key service; including initial feasibility study, rooftop survey, system design, financing, installation and on-going maintenance and monitoring, providing our end clients with the ultimate peace of mind.

Our key differentiation within the rooftop solar market is our ability to provide a holistic building solution, combining highly energy-efficient insulated roof and wall panels with an optimised rooftop solar PV system.

We have the expertise to competently and professionally design and install the appropriate rooftop PV systems for our clients. We offer the market client-financed and 100% funded rooftop solar PV solutions.



WHY ROOFTOP SOLAR PV?

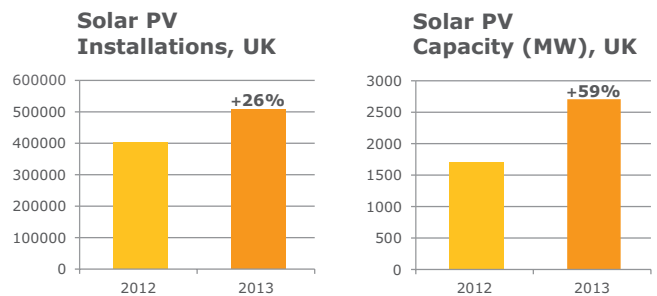
Rooftop solar PV integration delivers an array of immediate and long-term benefits by:

- 1 Reducing the energy consumption of the building;
- 2 Providing protection against rapidly increasing electricity prices;
- 3 Increasing asset and rentable value of a building by improving its Energy Performance Certificate (EPC) and BREEAM ratings;
- 4 Aiding Carbon Reduction Commitment cost offset;
- 5 Addressing Corporate Social Responsibility requirements;
- 6 Generating zero CO₂ emissions;
- 7 Being the only viable renewable technology for the urban environment; and
- 8 Having no impact on agricultural land.

SOLAR PV IN GREAT BRITAIN & IRELAND

Contrary to a widespread general perception, solar PV systems can generate power in cloudy, overcast conditions.

Great Britain and Ireland's incoming solar radiation averages 1,050 kWh/m²/year. In the southern regions it is comparable with most of Germany, which has the world's largest installed PV capacity. In addition, the higher winds, which cool PV modules, can lead to higher efficiencies than would be expected at these levels of solar radiation.



Source, DECC: www.gov.uk/government/collections/renewables-statistics (ET6.4)



INSTALLATION CONSIDERATIONS

For optimal performance, the photovoltaic array should face between south-east and south-west at an elevation of about 30-40°.

However, in Great Britain and Ireland even flat roofs receive 90% of the energy of an optimum pitched system.

It is important to ensure that the PV modules are not shaded during the day.

PV systems can also be used for solar shading or as a rainscreen on a building wall - this is particularly suitable for prestige buildings.

PLANNING PERMISSIONS

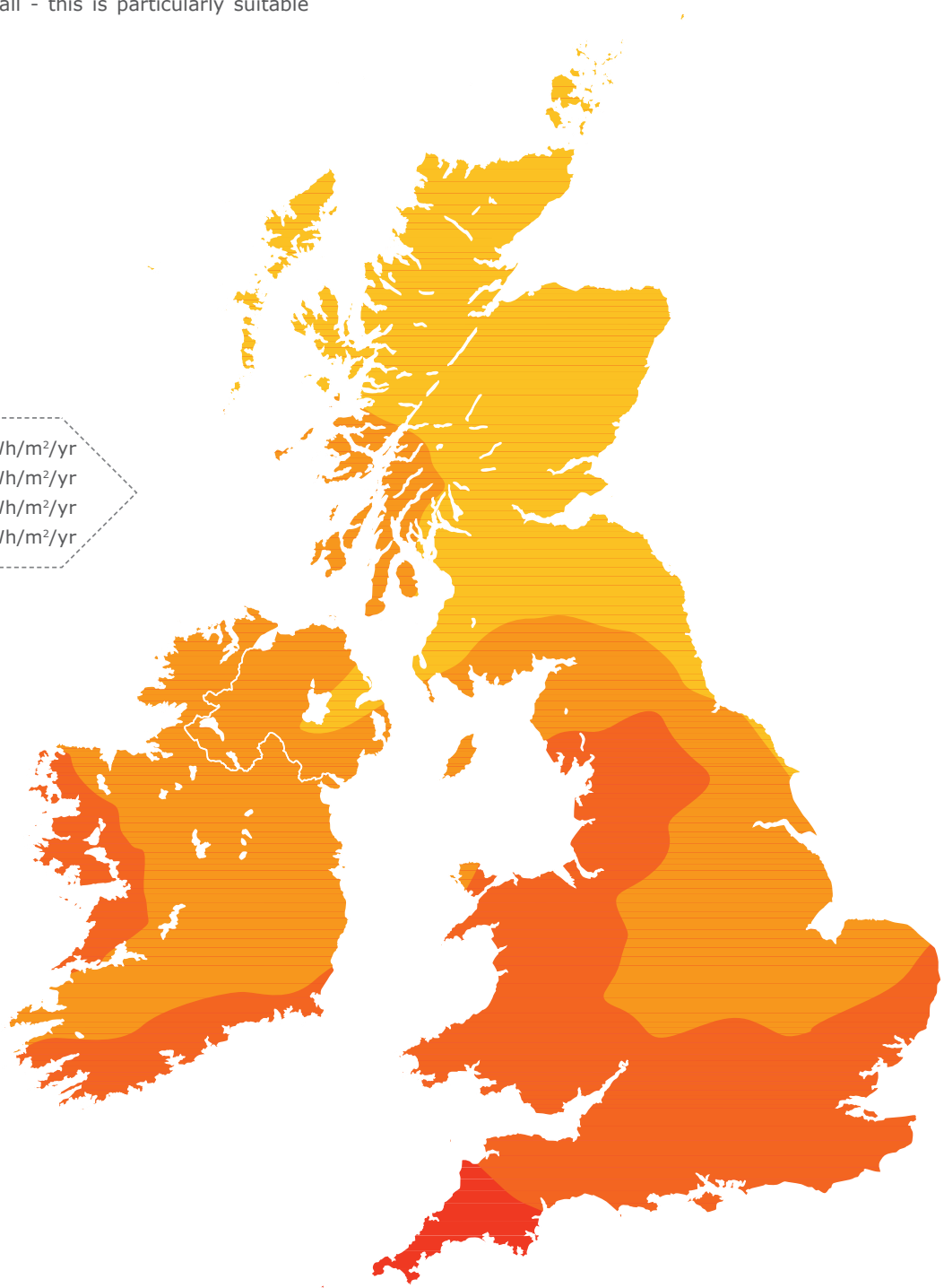
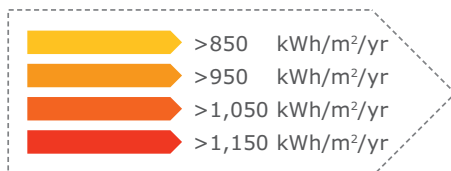
The majority of buildings do not require planning permission for the installation of PV modules.

If the building is in a conservation area or is a listed building it may be necessary to apply for full planning permission.

Kingspan Energy recommends checking with the local council to ascertain the planning requirement for each specific project or building.

SOLAR IRRADIANCE

Average annual solar radiation for Great Britain and Ireland.



100% FUNDED PACKAGE

Kingspan Energy offers business and building owners the opportunity to maximise the use of their roof space to generate power for their own benefit, thus reducing their energy costs and enhancing the value of their property without the need for any upfront capital outlay. The 100% funded solution provided by Kingspan Energy involves no capital risk to the end client.

Effectively, in return for a 25 year lease of the roof space, Kingspan Energy will provide 100% capital funding, as well as the design, project-management, installation and maintenance of a bespoke optimised Kingspan Roof Mounted PV System.

The electricity generated by the system will be available to the host company at lower rates than would otherwise be supplied from the grid. As a result, the client will have the advantage of fixing electricity cost indexed to RPI (Retail Price Index) rather than having exposure to the volatile annual utility inflation rates.

This means Kingspan Energy offers cost savings from day one, and with the predicted rises in traditional grid-based electricity costs, the potential savings can only increase over time. This helps future-proof businesses against rising external energy costs, providing a degree of certainty.

Client Commitment:

Client provides rooftop lease to Kingspan Energy for 25 years.

Our Commitment:

100% capital funding for the rooftop solar PV system.
Provide 25 year combined Kingspan roof and solar PV system guarantee.
System performance and maintenance.

Client Benefits:

Reduced electricity costs from Day One.
Future-proofed energy costs in line with RPI inflation index.
25 year combined Kingspan roof and solar PV system guarantee.

Our Benefits:

25 year client rooftop lease.
Government Green Tariff Incentive.
Income from Power Purchase Agreements (PPA) - client and utility.





FUNDED SOLUTION - OUR STORY

Since the introduction of the Net-Zero Energy initiative in 2011, five Kingspan manufacturing sites have been upgraded with rooftop solar PV systems designed, installed and commissioned by Kingspan Energy.

Kingspan Roof Mounted PV Systems have been retrofitted onto the existing roofs of the buildings. As part of its full turn-key service, Kingspan Energy's expert team of PV engineers carried out detailed surveys of the structural strength of each roof, designed, positioned and installed the systems' arrays to ensure maximum performance.

Although the Feed-in Tariff would have given Kingspan a payback in five to seven years, it was decided that a funded solution was the best option, allowing the Group to secure their energy costs for the future, as well as benefit from the carbon saving without any capital expenditure.

The results achieved so far are impressive. The Group Head Office in Ireland reached Net-Zero Energy during 2012 with a 132 kWp solar installation. Other sizeable projects at various UK sites include a 406 kWp solar PV array in Holywell, a 799 kWp array in Pembridge, a 250 kWp array in Hull and a 171 kWp array in Basildon. Altogether they generated 1,131,567 kWh of electricity in 2012.

"The installation of Kingspan Roof Mounted PV Systems has helped us decrease wasteful consumption of energy, reduce our carbon emissions, and save the business money.

We have chosen a funded solution, which allowed the Group to achieve these ambitious targets and increase the assets' value without a major capital expenditure."

Peter Bullough, Finance Director, Kingspan Insulated Panels Division.





SERVICE PACKAGE

Kingspan Energy provides an end-to-end service package.

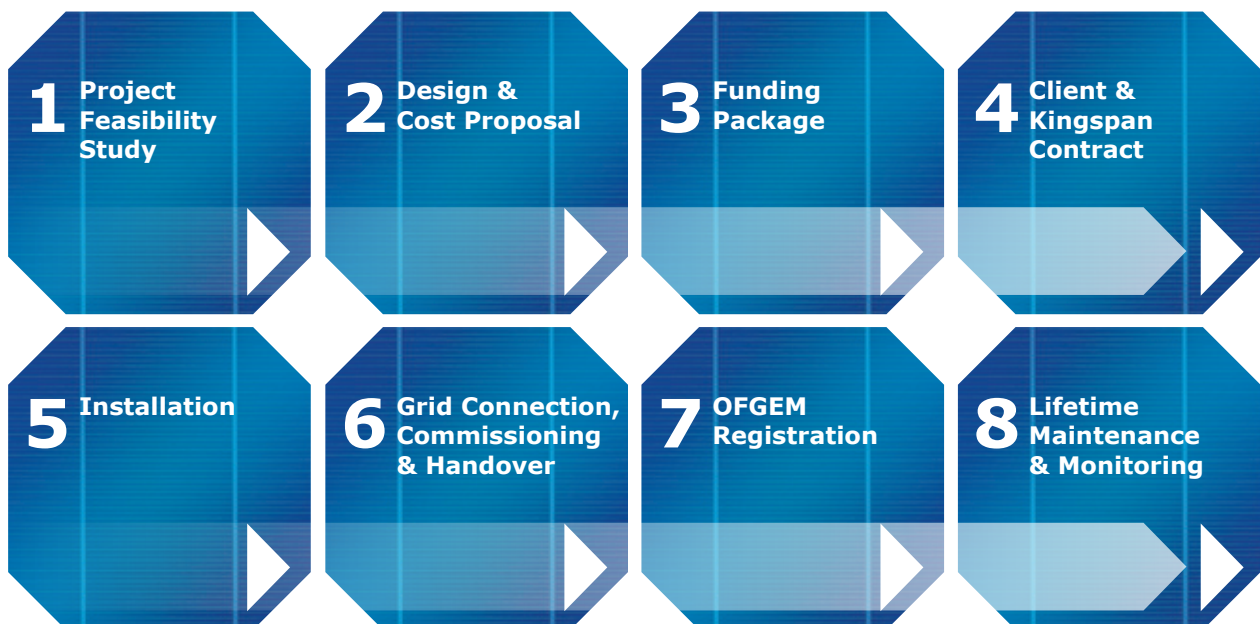
In-house consultancy, detailed design, specification and business value proposition are all part of our service offering. Kingspan Energy delivers a full turn-key EPC (Engineering, Procurement & Construction) project contract, including:

- Project management;
- Principal contractor;
- Leading technology partners;
- Health & Safety; and
- MCS-approved solutions.



With Kingspan Energy's expertise in sustainable energy solutions customers can be assured that we not only have the expertise to design a system that will suit their requirements but also the capacity to fulfil every aspect of their renewable energy project, from design and procurement to installation, commissioning and maintenance.

We have secured a guaranteed supply of PV modules and inverters to meet our supply chain demand. Each supplier has been audited in terms of Health & Safety, quality, technical and financial status.



GUARANTEE & MAINTENANCE

As part of our package we offer a 25 year system guarantee combined with free monitoring and maintenance.

With our in-depth knowledge and expertise of the industrial and commercial roofing sector, we can competently and professionally deliver to our end clients tailored solar PV solutions. Our PV systems will not only complement their new or existing roof system, but more importantly, will not compromise its structural integrity or weatherproofing performance, thus resulting in our ability to offer our unique 25 year combined PV system and insulated roof panel guarantee.

Kingspan Energy operational and maintenance obligation:

- We will maintain the roof and solar PV system for the duration of the 25 year contract lease term (the combined guarantee is only valid for Kingspan roofs); and
- We will ensure that the solar PV system's operational efficiency and its energy output are optimised.





CASE STUDY: DISTRIBUTION

Building owner: Morrisons
Main Contractor: Bowmer & Kirkland
Location: Bridgwater, Somerset
System size: 220 kWp
Roof space coverage: 2,500 m²
Project type: New Build
Sector: Retail / Distribution
Completion date: June 2011
Installation time: 3 weeks

MORRISONS BRIDGEWATER

Morrisons' South West Regional Distribution Centre, a 59 acre goods facility at Bridgwater, Somerset, is an exemplar scheme that uses Kingspan Roof Mounted PV System to create one of Europe's most energy-efficient logistics facilities.

One of the challenges of the project was to transform unproductive roof space into the facility's own power plant. Following a thorough project analysis by Kingspan Energy's in-house design team, rooftop solar PV systems were specified for two of the distribution facility's main buildings.

Using 1,548 modules, Kingspan Roof Mounted PV System provides a single-source, insulated, roof and solar PV power source, delivering a total peak output of over 220 kWp and an estimated 197,279 kWh of energy per annum.

Paul Kettlewell, Morrisons's Senior Construction Project Manager, said: *"Our ambition for Bridgwater was to achieve the best in sustainable design in accordance with our stated aims for environmental corporate responsibility. We believe that minimising carbon emissions is an important issue and that refrigeration, transport and waste are areas where significant reductions can be achieved. We are very pleased with the work that Kingspan Energy has done and the fact that the solar power generated at the distribution centre will provide more than 6 per cent of the facility's needs."*





LAVENHAM FEN FARM

The owners of Lavenham Fen Farm in Cambridgeshire are using Kingspan Roof Mounted PV System to slash bills from the farm's two potato storage buildings.

The buildings, housing standard and organic potatoes, require large amounts of energy to power internal cooling systems, keeping harvested potatoes at a constant low temperature. With electricity usage metered at half-hourly rates, this previously resulted in massive energy bills for the farm owners.

To tackle these costs, the farm owners decided to purchase Kingspan Roof Mounted PV System for their storage buildings. The PV system comprises a little over 1,500 PV modules and produces an output of 352.7 kWp, making it one of the largest of its kind in the UK.

Robert Pickard, Estates Manager for co-owners Abbots Ripton Farming Company, said: *"We have found it difficult to produce electricity by wind or hydroelectric power, so PV is an excellent solution. The buildings are tall and the visual impact of the panels is minimal. There is also a secondary benefit of fitting the panels to the roofs, as in the summer, they trap the solar energy which reduces the temperature on the roof sheets below the panels. The production of electricity during expensive peak periods is of great benefit to ourselves and to the consumer as all energy generated on-site is channelled directly into powering the potato storage facility."*

CASE STUDY: AGRICULTURE

Building owner: Lavenham Fen Farm

Location: Cambridgeshire

System size: 352.7 kWp

Roof space coverage: 3,000 m²

Project type: Refurbishment

Sector: Agriculture

Completion date: March 2012

Installation time: 1 month





CASE STUDY: TRANSPORT

Building owner: National Express
Location: West Midlands, Coventry and Dundee
System size: 278.24 kWp (combined)
Roof space coverage: 2,000 m²
Project type: Retrofit
Sector: Transport / Infrastructure
Completion date: March 2013
Installation time: 2 months



NATIONAL EXPRESS

Six National Express bus depots in England and Scotland have taken a big step towards a greener future, generating clean on-site energy with Kingspan Roof Mounted PV System.

These installations are the latest step in a series of highly successful initiatives by National Express to reduce energy consumption across the company. Kingspan Roof Mounted PV System made a key contribution to these savings with modules retrofitted onto the existing roofs of the West Midlands, Coventry and Dundee depots.

The arrays are capable of generating a combined power output of 278.24 kWp and have been registered and accredited under the FIT scheme, meaning that during periods when the power generated exceeds the depot's needs, they will also be able to feed carbon neutral energy back into the National Grid.

Stuart Parker, Environmental Director of National Express said: "At National Express we are committed to continually reducing the carbon we use to run our services. Our Gold Standard from Carbon Saver reflects the amount of effort and resources we have put in to improving our energy efficiency with schemes such as the installation of Kingspan Roof Mounted PV System."



STENNACK HOUSE

Stennack House provides a clear example of how effective the combination of insulated panels with the power of PV can be, and that putting your roof to work is the way forward to achieve zero carbon.

Following the initial phase of the project, where the old asbestos roof was replaced with over 1,200 m² of energy-efficient Kingspan insulated roof panels, the next step was to provide a source of energy generation with the addition of the latest PV technology. In this case Kingspan Roof Mounted PV System was the answer that allowed the building owners to take full advantage of energy generation and a dramatic reduction in energy costs. It is estimated that the electricity produced will save over £20,000 annually, with a predicted lifespan in excess of 25 years.

In total 273 of 210 Wp PV modules with a 57.33 kWp capacity were installed to the south facing elevations of the roof, in what is believed to be the 7th largest PV array in the country and the largest in the South West. *"The programme went really well, and we were very impressed with Kingspan Energy who pulled out all the stops ensuring the project was delivered on time,"* said Matthew Goddard, Commercial Manager, MITIE Tilley Roofing.

"We are in a win-win situation," explains David Renwick, Chief Executive of the Ocean Group. *"All the 'green' electricity we generate on site is free for us to use."*

CASE STUDY: INDUSTRY

Building owner: Ocean Housing Group Ltd

Location: St Austell, Cornwall

System size: 57.33 kWp

Roof space coverage: 500 m²

Project type: Refurbishment

Sector: Industrial / Office

Completion date: October 2010

Installation time: 2 weeks





CASE STUDY: OFFICE

Building owner: Henderson Group
Location: Newtownabbey, Northern Ireland
System size: 19.2 kWp
Roof space coverage: 130 m²
Project type: Retrofit
Sector: Retail / Distribution / Offices
Completion date: October 2013
Installation time: 3 days

HENDERSON GROUP

Henderson Group has chosen a 19.2 kWp Kingspan Roof Mounted PV System for one of its office buildings in Mallusk. This installation sees the Henderson Group's first investment in a programme to roll out renewable technologies throughout its businesses.

Henderson Group has been distributing food and grocery-related products to the convenience retail sector in Northern Ireland for over 100 years, and is now the largest operator of its kind, supplying over 400 stores.

The Mallusk office is a pilot installation for the Group's commitment to a larger 1 MW project in the near future. The 19.2 kWp PV system is expected to generate 787 kWh/kWp per annum, with a yield based on MCS of 15,110 kWh and a total annual offset of CO₂ around 7,863 kg.

Dr Glen Crumley, Group Energy Manager, Henderson Group commented: *"This installation forms part of our environmental strategy as the Henderson Group is fully committed to reducing its carbon footprint. Kingspan Energy were chosen for this project based on their experience and cost competitiveness. We have been monitoring the price of solar panels for several years and based on the return on investment we decided to deploy this first installation."*





BUTCHER'S PET CARE

The new 250 kWp Kingspan Roof Mounted PV System is helping Butcher's Pet Care to tackle rising electricity costs at their brand new state-of-the-art facility in Crick, Northamptonshire.

In early 2012, Legal & General funded a 250 kWp Kingspan Roof Mounted PV System at their facility tenanted by Butcher's Pet Care, the pet food manufacturer. The building is housing the company's headquarters, manufacturing and distribution operations.

Kingspan Energy, appointed by Knight Frank on behalf of Legal & General, undertook a full turn-key EPC project delivery, from the system design stage through to installation, project commissioning and handover. The installation of 250 kWp PV system covering 1,726 m² of the roof space took less than a month and was completed in June 2012.

Kingspan Roof Mounted PV System contributes towards the base electrical load for the building, and is currently outperforming its predicted output by 6%.

David Goatman, Head of Sustainability and Energy at Knight Frank commented: *"This installation helps the tenant save money on their electricity bills, delivers attractive inflation linked revenue streams to the landlord and improves the already very good EPC rating for the building. A win/win/win result."*

CASE STUDY: MANUFACTURING

Tenant: Butcher's Pet Care

Building owner: Legal & General

Agent: Knight Frank

Location: Crick, Northamptonshire

System size: 250 kWp

Roof space coverage: 1,726 m²

Project type: Retrofit

Sector: Industrial / Manufacturing

Completion date: June 2012





Care has been taken to ensure that the contents of this publication are accurate, but Kingspan Energy Limited does not accept responsibility for errors or for information that is found to be misleading.

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