The Value of Solar Property

The financial benefits of a solar-powered future

Solar Energy UK

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About Us

As an established trade association working for and representing the entire solar and energy storage value chain, Solar Energy UK represents a thriving member-led community of over 240 businesses and associates, including installers, manufacturers, distributors, large-scale developers, investors, and law firms.

Our underlying ethos has remained the same since our foundation in 1978 – to be a powerful voice for our members by catalysing their collective strengths to build a clean energy system for everyone's benefit.

Our mission is to empower the UK solar transformation.

Together with our members, we are paving the way for solar to deliver 40GW by 2030 by enabling a bigger and better solar industry.

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Foreword

Adrian Ramsay, CEO, MCS Charitable Foundation

MCS Charitable Foundation is delighted to have been the principal funder for this important and timely research by Solar Energy UK. The research draws on an extensive data – including from the MCS database – to provide robust evidence on the value of solar homes across a range of case studies, and adds further weight to the growing list of reasons to install small-scale renewables.

As a charity, we work to increase public confidence, awareness and access to renewable energy and low carbon solutions across the UK. The Value of Solar Property report has provided an important contribution towards achieving those goals.

Executive summary

This report highlights the financial benefits of installing a solar energy system, which for a typical home could increase its sales price by at least £1,800, and reduce annual energy bills by more than £300. Overall, the impact of installing solar photovoltaic (PV) systems is clear. Solar power systems:

This report demonstrates for the first time that homes fitted with solar PV achieve a higher sale price than equivalent homes without them. Analysis of millions of housing transactions held in the Land Registry, cross referenced with the Microgeneration Certification Scheme solar installation database, found that for a typical home, installing a solar PV system could increase its sale price by £1,800.

This is equivalent to more than half the cost of installing the system in the first place, even before the running cost savings delivered by the solar system, which are significant. For a typical house, installing a PV system could lower bills by the equivalent of nearly £330 every year over the 30-year lifespan of the system – reducing the average gas and electricity energy bill by a third. The combined value of these financial benefits means that the system could effectively pay itself back in nine years, far less than the 17.4 years the average owner-occupier spends in their home. Solar already makes sense on current economics, and its financial performance will only improve as the UK adopts electric heating and transport.

The monetary benefits of a solar system depend on factors including the type of system and where the house on which it is installed is located, but they apply around the country. The findings of the ground-breaking research carried out for this report – including statistical analysis of more than five million property transactions – are clear. The return on investment makes upgrading a home with a solar power system an easy and simple way to lower a property's running costs and increase its value, while also reducing its environmental impact.

Overall, the investment case for residential solar is robust, and Solar Energy UK calls on relevant sectors to help maximise the incorporation of solar systems into the UK's residential housing stock.

The government can support this by creating a level tax playing field for solar, encouraging the development of new consumer financing initiatives, and developing green retrofit programmes.

The property development, finance and construction industries should also ensure these findings are reflected in how they design and build homes. In particular, home valuation models used by surveyors must be updated to take into account the results of this research, and help unlock investment in green energy by property owners and developers. Doing so would ensure that homeowners, renters, and landlords make the most of the contribution that solar's clean, affordable power can make to their properties. This is vital if the UK is to meet its legally binding target of achieving a net zero economy by 2050.

The findings presented here are based on analysis of an original dataset on house price sales and solar technology, as well as a bespoke financial running cost model. The development of the research methodology and findings was overseen by an independent steering group of experts.

The financial benefits for four case study solar homes with a PV system are presented in this report. Full details on these and a further eight scenarios explaining the value of solar property are included in the Annex which accompanies it.

Key findings

Analysis of more than five million property sales shows that installing PV on a typical home could increase its value by £1,891 - £2,722. Solar property commands a price premium of c.0.9% - 2%.

This means that the sale price of a home can be increased by half of the cost of installing a PV system itself.

For a typical home, installing a solar PV system could reduce energy bills by £329. This represents a 29% saving on the average combined electricity and gas bill of £1,138 per year.

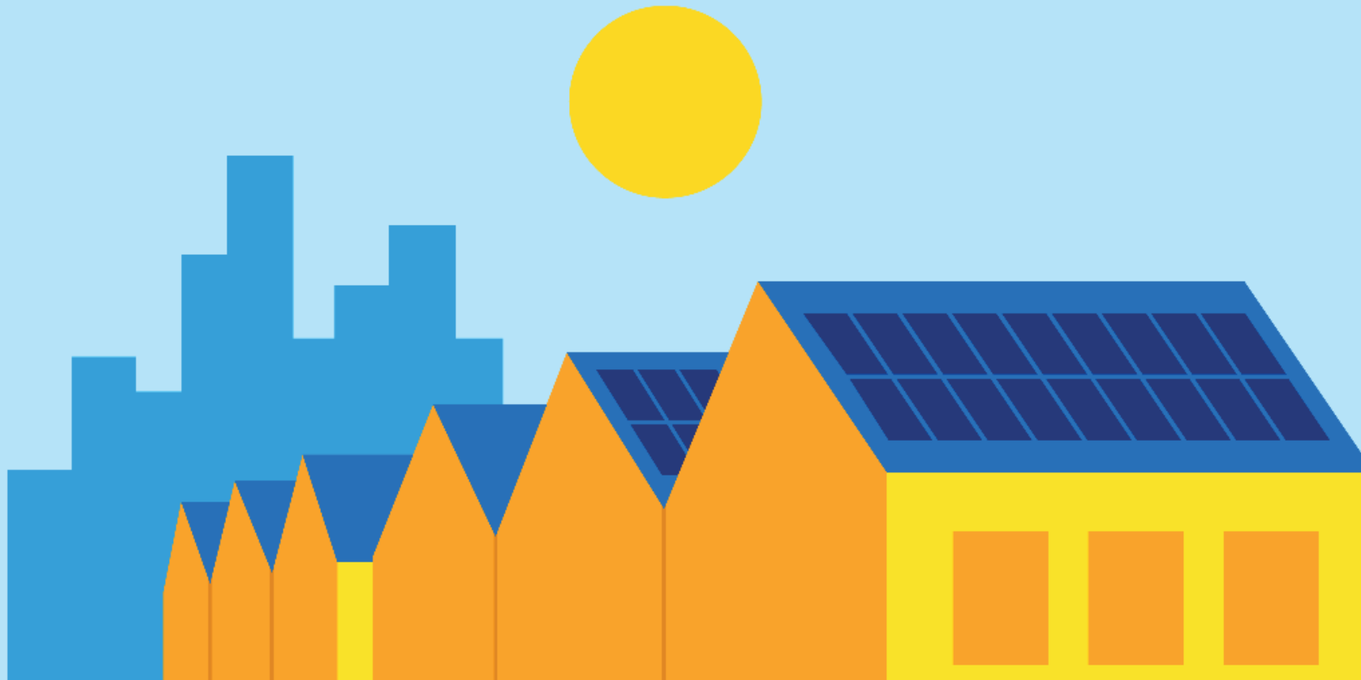
In a best-case scenario, annual savings could reach more than £960.

These running cost savings will be vital to ensuring an affordable consumer transition to clean heat, power and transport.

Solar PV is a viable technology across a wide range of financial circumstances – including for social housing, where tenants can benefit from reduced energy bills, and landlords can receive payments from selling surplus electricity to the grid.

The financial benefits for the four case studies presented in this report are shown below. Full details on a further eight case studies are included in the Annex which accompanies this report.

Location	House type	Finance	Minimum likely increase in value	Effective annual running cost savings (30 years)
Midlands	Terraced	Loan	£1,891 - £2,722	£329
Southwest England	Detached	Cash	£866 - £2,156	£963
Northeast Scotland	Semi-detached	Mortgage	£1,815 - £2,765	£188
London	Terrace	Housing association-funded	£1,050 - £3,053	£338 (reduction in tenant electricity bills)



Recommendations

To maximise the contribution residential solar systems can make to decarbonising the UK economy, Solar Energy UK makes the following recommendations.

The Royal Institute of Chartered Surveyors should:

- Update its valuation model for homes in line with the new evidence presented in this report.

The property and consumer finance industry should:

- Flag the financial benefits of rooftop solar available to borrowers at key financial decision points – for example, existing homeowners who are remortgaging their properties.
- Update valuation and other financial models to reflect the findings of this research. The green premium of installing solar technology must be recognised in property, mortgage, and credit risk assessments.
- Develop and bring to market consumer finance and green mortgage products that reward investment in properties which include solar and other low carbon technologies.
- Record and present information on the presence of solar generation systems as part of the standard description of a home (for example, on sales and lettings websites).
- Ensure that financial advice and guidance is based on up-to-date solar system cost assumptions, sourced from the solar industry.

The energy, housebuilding and construction industry should:

- Work with land buyers and valuation professionals to highlight the benefits of new homes installed with solar and energy storage technologies, particularly in the context of known policy developments, such as the future ban on petrol and diesel cars.
- Design show homes with integrated solar and energy storage systems as standard, providing home buyers with the opportunity to discuss the benefits of onsite generation and energy storage as part of the buying process.
- Coordinate skills, training, and professional development programmes to expand the workforce and supply chain capacity needed to ensure that all new homes are equipped with solar from 2023.

The Westminster and devolved Governments should:

- Develop building regulations which ensure that solar technology is installed on all new homes, with the system specified to the size that will deliver the maximum carbon and cost benefit for the building. The models developed for this project can be used to help understand what these specifications are.
- Include all solar and energy storage technologies, including batteries, on the list of Energy Saving Materials,[1] intended to encourage low-carbon home upgrades, ensuring that these qualify for zero-rated VAT.
- Ensure that relevant statutory bodies – such as Local Authorities – deliver as many new homes as possible with solar energy technologies included as standard. Local planning authorities should use their powers under the Planning and Energy Act (2008) to mandate the highest energy standards possible for new homes in their area.
- Enforce full and swift compliance from housing developers with the Future Homes Standard, using solar power as one of the key means to ensure energy performance targets are met.
- Work with the solar and other low carbon technology industries to establish a long-term retrofit support scheme for homeowners and renters. This should include relevant zero-interest finance schemes, backed by the National Infrastructure Bank, and grant support for social landlords and renters as relevant. All zero carbon technologies should have access to these support measures, including solar PV, solar thermal, energy storage and zero carbon heat technologies.
- Update the standard parameters of Energy Performance Certificates and other building documents to provide detailed information on the presence, and energy and financial performance of, low carbon technology, such as a solar generation.
- Explore and support the development of new financing, such as property-linked finance, through regulatory change.

Glossary

Battery storage – A type of rechargeable energy storage. Batteries are used to store surplus power produced by a solar energy system for later use

CCC – Climate Change Committee. This an independent agency which provides research and analysis on climate and environmental issues

Electrification – The use of electricity instead of fuel and gas to provide energy for heat and transport. The source of electricity should be renewable (such as solar power) and not fossil fuels (such as coal or gas) to ensure the climate benefits of electric technology are realised

Energy Performance Certificate – This is a statement of information about a property's energy use and costs. It is required whenever a property is build, sold, or rented. It provides an energy efficiency rating from A to G, where A is the most efficient

Electric vehicle – A car or van that uses an electric motor rather than an internal combustion engine, which uses fossil fuels such as petrol and gas, for propulsion

FIT – Feed-in Tariff. This was the government subsidy scheme that supported the installation of residential and small commercial solar systems in the UK. It ended in March 2019, by which point nearly a million homes in the UK had installed solar technology

The grid – The interconnected network of cabling and other equipment which transports electricity around the country

Heat pump – a form of heating that works by transferring thermal energy from a cooler to a warmer space

kW – kilowatt. A measure of electric power

kWh – kilowatt hour. The provision of one kilowatt of electric power for an hour. A typical home in the UK uses around four kWh of electricity per day

MCS – Microgeneration Certification Scheme. The quality assurance and standards body for residential renewable technologies in the UK

MW – megawatt. A measure of electric power equivalent to 1,000 kilowatts

MWh – megawatt hour. The provision of one megawatt of electric power for an hour

Net zero – this means that any carbon or other emissions produced by an economy are balanced by the equivalent amount of emissions being taken out of the atmosphere. Achieving net zero requires both reducing absolute emissions, and offsetting any that remain

NPV – net present value. This is an investment metric which refers to the lifetime cost or benefit of an investment, accounting for the cost of borrowing money and other factors relating to how the value of money changes over time. An NPV above zero means that over its lifetime, an investment will provide a positive return. For example, if a project has a total NPV of £4,000, the person or organisation which paid for the project will be £4,000 better off

PV – photovoltaic. A type of solar energy system which converts light into electricity

Running costs – where this is included in a table in this report, this refers to the assumed annualised cost of ensuring a solar system is kept clean and maintained. This includes a calculation to reflect the cost of replacing the system's inverter, and any battery equipment, where relevant.

SEG – Smart Export Guarantee. The payment energy suppliers with more than 150,000 customers must offer to customers who produce onsite power, such as from a solar energy system, and who wish to sell it to the national grid

Solar property – A home which includes one or more of a solar PV system, an energy storage system such as a battery, and intelligent controls, such as a smart meter, which allows its technology to interact with the electricity grid

TOUT – time of use tariff. This is a retail electricity tariff where the price of electricity changes during the day. This means that residential properties can trade electricity, buying power when it is cheap (or generating it for free from a solar system), storing it in a battery, and selling it when it is more expensive

The value of solar property:

how does a solar home save money?

£1,891 – £2,722*

Potential increase in value for a typical solar home

£329

Reduction in annual energy bills for a typical solar home

£963

Best case reduction in annual energy bills for a solar home

2,512 kWh

Annual electricity generated by a typical solar home

£3,925

Cost of a typical solar system (3.1 kW)

8–11 years**

Overall payback period

*Based on UK House Price Index data from March 2021.
**This figure will vary depending on if and how the increased equity value of a home with solar installed is realised, and will differ according to the specific characteristics of each home.

Introduction

Why we need solar properties

As part of its climate change goals, the UK has a legally binding commitment to achieve a net zero economy by 2050. To achieve this, it will need to drastically expand the amount of electricity it generates from renewable sources. Doing so will mean that clean electricity can be used to supply homes and businesses with power, as well as for new clean heat and transport technologies, such as electric heat pumps and electric vehicles.

Welcome progress has been made on decarbonising the electricity supply provided through the national grid. But a significant portion of clean electricity can and must be sourced from onsite residential solar generation. Prior Solar Energy UK research shows that 4.4 million smart solar homes – houses with a solar system on the roof, an energy storage system (such as a battery), and a smart meter – would make a major contribution to the UK's climate change objectives, and more than a million homes already have solar installed on them.[2]

The cumulative capacity of these solar systems is equal to 2.8GW of generation capacity, equivalent to the capacity of several gas or coal-fired power plants.

As such, many more solar homes are needed, and if the energy value of solar is clear, then its financial value is not yet well understood. The fact that a million households have already installed solar technology shows that homeowners and renters recognise the benefits of homes which generate their own electricity. But government research carried out in spring 2021 suggests that the perceived upfront expense of rooftop solar systems is a barrier to consumer uptake.[4] This is despite the fact that solar panel costs have declined by 60% since 2010, as the same research highlights. Indeed, Solar Energy UK analysis shows that a typical residential solar system now costs less than £4,000, comparable with many other home upgrades.

The perceived expense of solar may relate to the fact that many existing installations receive payments from the government Feed-in Tariff (FIT) scheme, which successfully kick-started the market for residential and small commercial solar power projects in the UK. However, even without subsidy, installing a solar energy system is an attractive investment, which reduces the carbon footprint of a home and helps save money. This is important, given the need for a major increase in solar deployment, through both new build and retrofit home installations: the UK's residential building stock accounts for 15% of the UK's entire carbon emissions, while the majority of homes which will be in use in 2050 – the UK's net zero target year – have already been built.[5]

To help support the increase in solar deployment needed, this report highlights the financial value of solar property: homes with solar PV, and potentially an energy storage system. It does so in two ways:

- By examining the impact on the equity value of a home (in other words, its sale price).
- By examining the impact on the running costs of a home (in other words, its energy bills).

The rest of this report outlines how this value is generated. First, it outlines the methodology used to calculate the financial performance of a solar system. Second, it presents the likely benefits that would be derived from installing a solar system on four different properties. Next, it outlines the role of solar in futureproofing homes as part of the UK's energy transition. Finally, it summarises the findings.

Further detail on the methodology, and another eight case studies, which explain the financial performance of a solar system in different scenarios, are included in the Annexes which accompany this report.

How does a solar system work?

Solar PV systems convert light into power. A typical 3-4 kW system will likely include 10-14 solar panels, which connect directly to a house's electricity system. Any power that is not used in its appliances can be sent to the national grid, helping to power other homes as well. Homeowners can receive payments from their energy supplier for this. Alternatively, many new PV systems are now also installed with a battery, meaning surplus power can be stored and used later. Battery storage is playing an increasingly important role in the UK energy system.

Solar systems can be installed on flat or sloping roofs. Panels can be installed on a mounting rack fixed to the roof, or integrated as part of the roof itself, by replacing roof tiles. The roof space needs to be free from shading (for example, from chimneys or trees). Solar can be installed on multi-occupancy properties, although this may entail more complex connection arrangements. Residential solar systems do not usually require planning permission.

As with any electrical or mechanical installation, solar systems should be inspected and maintained by qualified professionals. However, properly installed systems should last for at least 30 years (which is the assumed lifespan of systems in this report) and maintenance requirements should be minimal. For example, solar panels should be cleaned periodically.

Residential solar systems in the UK must be certified by the Microgeneration Certification Scheme (MCS) in order to be eligible for the Smart Export Guarantee (SEG). Solar Energy UK recommends to all consumers that they should only use companies that are MCS certified, and are also members of a Consumer Code, for both the installation and maintenance of their system. Installers who wish to be members of Solar Energy UK must be MCS-accredited.

Methodology

The overall approach taken for this project was to combine existing sources of data to produce new evidence on the financial value of solar property, including the development of two bespoke financial models. The first was used to examine the impact on the sale price of homes which have solar installed on them. The second examines the running cost savings delivered by homes which produce a proportion of their own power. A summary of the methodology for the equity and running cost benefits described in this report is provided below. More detail is available in the Annex which accompanies this report.

Equity value

Hedonic regression

To examine the impact of solar installations on the equity value of property (in other words, its sale price), an original dataset was compiled to test if properties featuring solar technology achieve a higher sales price. The dataset combines a new open-source database, which includes residential transaction data and information from the Land Registry, data from Energy Performance Certificates in England and Wales from 2011 to 2021, and the Microgeneration Certification Scheme (MCS) database.[6]

The first dataset captures approximately 80% of all sales that occurred during this period, including property and other characteristics. The MCS database includes information on the number, type, size and other characteristics of renewable heat and power generation systems installed on homes in the UK which have been accredited by MCS.

The two datasets were merged using address matching. Properties in the sales transactions database were only considered as having solar technologies installed if the date of the house sale occurred after the installation date recorded in the MCS database. In total, the analysis was carried out on well over five million property transactions, nearly 60,000 of which were properties with a PV system installed. This is one of the largest datasets to have been analysed for this purpose to date, and ensures the results are statistically robust.

A hedonic regression analysis was then conducted to isolate and determine the impact of the presence of solar PV on the sales included in the database. This is a standard method for investigating price determinants in any product market. The model controlled for other variables, such as the type and location of the property, as well house price extremes that could bias the results. As there is not currently a database of domestic battery installations, the model applies only to houses with a PV system, not a PV and battery system.

Note that the figures provided for the uplift in equity value for each case study below are indicative only, and based on a quartile distribution of the property market. The change in value for a specific type of house in a specific region will vary. The uplift in value is also presented as a range. This is because two versions of the analysis were developed, to account for the different ways in which energy performance certificate data can be incorporated. The figures discussed below represent the lower end of the range. As such, the findings are likely to be conservative. Note also that the sale price changes described are based on a quartile distribution of the English and Welsh housing markets. The analysis was not carried out on Scottish properties because of a lack of bulk, standardised data available on property transactions. Given assumed similarities in the behaviour of the Scottish housing market, which also includes many properties adjacent to the border with England, it does not seem unreasonable to assume that the presence of PV on properties in Scotland affects prices in the same way. However, as with all figures, care should be taken with their use.

See the methodology which accompanies this report for more detail.

Repeat sales

As well as the hedonic regression, a repeat sales analysis was also performed on the transaction database. This analysis takes repeat measurements of transactions for the same property at two points, and works out a growth rate. This is then compared against a hypothetical growth rate, if the property had grown in value in line with the regional house price index.

The repeat sales analysis was performed on a sample of 23,319 properties that met all the conditions: installation of PV solar panels between two recorded sales transactions, no change in recorded extensions to property, no change in recorded number of habitable rooms, and no change in total floor area. This analysis showed that the annual price growth rate of the properties examined was systematically above the index predicted value. This means that properties that have solar technology installed outperform the general benchmark index of the region in which they are located. This like-for-like comparison, of the same properties before and after the installation of solar technology, confirms the overall findings of the research.

See the methodology which accompanies this document for more detail.

Running costs

Solar systems save money on home running costs for two reasons. First, they reduce the amount of power which needs to be bought from the national grid. This is because the house on which a solar system is installed directly produces some of the electricity consumed by its occupants. This 'self-consumed' power is effectively free, once the cost of the system has been paid off.

Second, if a solar energy system produces surplus electricity – more than a home is using at a given point in time – this can be sold back to energy suppliers, who are in effect buying power from a small power plant. This is part of the 'Smart Export Guarantee.'

Smart Export Guarantee

The Smart Export Guarantee (SEG) is a payment which large energy suppliers (those with more than 150,000 customers) must offer to customers who have a solar system installed. The payment is for any surplus power a solar system produces which is exported, or sold, to the grid. The electricity is then fed into the local and national electricity networks, ensuring that no clean generation is wasted. Current SEG tariffs range from around 4p to 11p per kWh. On an annual basis, this can make a healthy contribution to the financial value of a solar system. Solar Energy UK maintains a league table of SEG tariffs. Visit https://solarenergyuk.org/resource/smart-export-guarantee/ for more information.

To examine these running cost savings in more detail, a fully-costed and modifiable financial model was developed for this project. The model is based on real-world cost data sourced from and checked with representatives of the solar and finance industries. The model allows more than 15 input variables for a solar or solar and energy storage system to be altered. These include:

- The type of solar system (for example, PV or PV with a battery), and the direction in which it is facing.
- The size of the PV system array.
- The type of property – detached, semi-detached, mid-terrace, end-terrace or bungalow.
- Whether gas or electricity is used as a heating fuel.
- The location of the property.
- The cost of the solar system and battery, including component replacement and any ongoing operational and maintenance costs.
- The financing used to pay for a system: cash, loan, or mortgage (including where the installation cost is covered by a third party, such as a housing association) and on what terms (loan interest rate and length of loan).

The model uses these variables to calculate a variety of outputs relating to the system, including its expected annual yield (electricity generation), and how these relate to its capital and operating costs including costs for replacing components. In turn, the model produces a range of standard investment metrics to assess the financial performance of the solar system. These include the net present value of the system over its lifespan, return on investment, and internal rate of return. The model also provides specific information on, for example, the value of grid imported electricity displaced by the presence of a solar system, and the value of payments received under the Smart Export Guarantee. These figures are intended to help inform the user of the cost effectiveness of the system.

Payback period

The payback period is the breakeven point for an investment. It is often given in years. For example, a £1,000 investment which generates £500 in returns each year would have a payback period of two years. After this, the investment has paid for itself.

In this report, we have provided two payback periods. One is based purely on the running cost savings produced by a solar system. For example, a £4,000 solar system which generated £500 per year in running cost savings would have an eight-year payback period.

The second version of the payback period has been calculated by combining this figure with the increase in equity value which could be realised if the property were sold. This has been calculated by deducting the increase in sales price produced by installing a solar system from the initial installation cost of that system.

For example, if installing a £4,000 solar system on a property led to a £2,000 increase in the value of that property, then the net installation cost of the solar system would also be £2,000. If the system generated £500 per year in running cost savings, it would therefore have an effective combined payback period of four years. Note that this would likely apply only in the scenario where the property was sold and the increase in equity realised, and as with the other financial performance indicators provided in this report, the value of a solar installation to a specific property depends on a wide range of factors.

This second version of the payback period is referred to as the 'Overall payback period' in the case studies below.

Financing a home solar system

The are several ways currently available to finance residential solar systems. These are outlined below:

Cash

This is where buyers fund the purchase of a system using their savings. As with other cash transactions, this does not imply paying to borrow money, and so will contribute to stronger financial performance.

Personal or home loan

Those who wish to install a domestic solar system could take out a home or personal loan. As this involves borrowing money from a bank or other commercial lender, the buyer will need to pay this back, including interest. As personal loans are not typically secured against an asset (such as a house), the interest rate is likely to be higher than with a secured loan.

Government-provided loan

This is where buyers fund the purchase of a system using a loan provided by a public body. An example of this scheme is the Home Energy Scotland Loan. Under this scheme, households in Scotland can borrow up to £17,500 interest-free from the Scottish government to pay for low-carbon home upgrades.

(Green) mortgage

The term green mortgage can refer to a number of financial products intended to support improvements in the UK's housing stock. One version is a mortgage which includes the provision for house buyers to borrow an additional amount, on top of the value of their home, to pay for a green upgrade. Because this is secured against the property, it can be borrowed at a lower interest rate than a personal loan, making the point of purchase or remortgaging of a home a sensible time to invest in a solar system.

Housing association

Housing association and other social landlords may pay directly for the installation of home upgrades on the properties they manage, funding the cost through the rental income they generate or via grant funding.

Grant

There have been a number of grant schemes in recent years intended to provide direct support to homeowners in the UK who wish to install green technology. The most recent of these was the Green Homes Grant. Challenges with this scheme saw it close to private homeowners in March 2021. Solar Energy UK has called on the Government to provide a long-term retrofit grant scheme, designed in consultation with the UK renewable energy industry, to support the decarbonisation of British homes.

Group-buying

Group buying schemes such as Solar Together enable residents living in participating areas to pool their money and buy a number of solar systems at once. This enables them to realise savings from the lower individual cost per system which installers are then able to offer.

The Value of Solar Property

Case studies

This section presents the financial benefits of installing a solar system on four different homes around the UK. They are intended to represent the variety of financial performance which could be expected depending on where the home is located, the financing used to pay for the system, and the property's typology and occupancy characteristics.

The figures are derived from the equity and running cost models developed for this research. Full details on a further eight case studies are presented in the Annex which accompanies this report.

Case study 1

Existing homeowner, loan finance

This case study represents a typical case of the financial gains which could be achieved by installing a solar PV system on a home in the UK. It represents the benefits for a mid-terrace, gas-heated home in the Midlands, with an average level of daylight hours. The installation is funded with a five-year personal loan, on which interest is charged at 6%. The solar system itself has a capacity of 3.06 kWp (approximately nine panels), and is installed at a pitch of 45 degrees on a southeast / southwest facing roof.

As Table 1 shows, this solar system delivers a healthy financial return on investment. The more than 2,500 kWh of power it produces on an annual basis means that even during the first year of its life, it will deliver a net saving of £152. By year ten – when the loan used to fund the system has been paid off – the savings have risen to more than £328 each year. Across its lifespan, the annual effective saving of the system is slightly higher, at £329. This would be equivalent to nearly 29% off the cost of the average standard variable energy tariff, as of June 2021.[7]

Overall, the system is worth nearly £10,000 in running cost savings, while it could also be expected to increase the sale price of this home by around £1,900. With the initial cost of the system being £3,874, the combined running cost and sale price value it generates would be three times as much as the installation itself – all while delivering zero-carbon electricity.

Combining the solar generation with a battery storage system more than doubles the amount of power produced by the solar system which is used on site within the home. This is because the battery stores surplus power generated during the day, which can be used later. Because the battery system means the installation costs more overall, it slightly reduces the effective annual saving to £313 per year. However, if this home installed an electric vehicle charging point in the future, this saving could be expected to increase; the additional electricity which the homeowners would be able to use to charge their vehicle would be less costly than buying power from the national grid.

Table 1: Case study 1 financial benefits

Property and system details		1a	1b
Property characteristics	Indicative sale price (£)	£163,975*	£163,975*
	Location	Midlands	Midlands
	Property type	Mid-terraced	Mid-terraced
	Heating fuel	Gas	Gas
	Occupancy	In half day	In half day
System characteristics	Type	PV	PV + battery
	PV array (kWp)	3.06	3.06
	Estimated generation (kWh / year)	2,512	2,512
	Battery capacity (kW)	N/A	≥2.1 <3.1
	Generation used on site (%)	25%	54%
System costs	Total installation cost (£)	£3,874	£6,026
	Annual running cost (£)	£125	£383
	Electricity price (p/kWh)	20	20
System financing	Type	Loan	Loan
	Interest rate (%)	6%	6%
	Loan term (years)	5	5
	SEG price (p/kWh)	8	8
Financial benefits (running cost)	Annual revenue (year one)	£152	£-19
	Annual revenue (year five)	£236	£169
	Annual revenue (year ten)	£328	£375
	Net present value (lifespan)	£9,860	£9,376
	Payback period (years)	16.1	21
	Internal rate of return (%)	4.1%	-2.9%
	Return on investment (%)	254.5%	155.6%
	Effective annual saving (lifespan)	£329	£313
Financial benefit (equity value)	Indicative sale price increase	£1,891 - £2,722	N/A

*Based on UK House Price Index data from March 2021
** This figure will vary depending on if and how the increased equity value of a home with solar installed is realised, and will differ according to the specific characteristics of each home.

Case study 2

Existing homeowner, cash buyer

This case study represents what might reasonably constitute a best-case scenario for the financial benefits of installing a solar system in the UK, based on current costs and energy use. It relates to a detached house in the Southwest of England, with the system purchased using cash. This means there are no costs associated with borrowing money. The home is also assumed to be heated using electricity, as opposed to gas. This will increase the savings realised, as electricity is more expensive than gas.

Overall, the system could be expected to save the occupants of this home nearly £1,000 a year on running costs, as well as likely increasing the sale value of the home by around £900.* In total, the combined value of these benefits over the 30-year lifespan of the system would therefore be nearly £30,000. The overall payback period should the property be sold and the change in equity value be realised be would be less than eight years, with the home benefiting from clean electricity from day one.

Where a battery is installed, the model assumes a large battery capacity to match the higher household electricity demands and larger generation capacity of the PV system. As such the capital costs of the system including a large battery are nearly three times the cost of installing a solar PV system on its own. Because batteries tend to last 10 years, they would need replacing at least twice within the life of the solar system. This is why the overall cost-benefits of a system including a battery in this case may not seem so attractive. When considering energy storage it is important to consider a number of variables that can influence the cost-effectiveness of the system, such as battery lifespans, daytime electrical consumption, and any future intentions to use electricity for charging a car.

*Note that this is lower than in the previous case study. This is because the uplift in value depends on the initial sale price of a home. A £4,000 solar system represents a greater proportion of the value of a £200,000 home than a £400,000 home. This means that in percentage and absolute terms, its impact on the value of the more expensive home is less. For more detail on this, see the methodology which accompanies this report.

Table 2: Case study 2 financial benefits

Property and system details		2a	2b
Property characteristics	Indicative sale price (£)	£448,039*	£448,039*
	Location	SW England	SW England
	Property type	Detached	Detached
	Heating fuel	Direct electric	Direct electric
	Occupancy	Home all day	Home all day
System characteristics	Type	PV	PV + battery
	PV array (kWp)	4.08	4.08
	Estimated generation (kWh / year)	3,984	3,984
	Battery capacity (kW)	N/A	≥11.1 <12.1
	Generation used on site (%)	41%	88%
System costs	Total installation cost (£)	£5,165	£13,773
	Annual running cost (£)	£143	£1,176
	Electricity price (p/kWh)	20	20
System financing	Type	Cash	Cash
	Interest rate (%)	N/A	N/A
	Loan term (years)	N/A	N/A
	SEG price (p/kWh)	11	11
Financial benefits (running cost)	Annual revenue (year one)	£442	£-422
	Annual revenue (year five)	£607	£148
	Annual revenue (year ten)	£797	£704
	Net present value (lifespan)	£28,902	£18,501
	Payback period (years)	9	21.9
	Internal rate of return (%)	11.9%	-5%
	Return on investment (%)	559.5%	134.3%
	Effective annual saving (lifespan)	£963	£617
Financial benefit (equity value)	Indicative sale price increase	£866 - £2,516	N/A
Overall payback period**	Effective payback period (years)	7.8	N/A

*Based on UK House Price Index data from March 2021
** This figure will vary depending on if and how the increased equity value of a home with solar installed is realised, and will differ according to the specific characteristics of each home.

Case study 3

Homebuyer, mortgage finance

This case study represents a non-optimal scenario for the financial benefits of installing a solar system in the UK. The property is a gas-heated, semi-detached home in Northeast Scotland. The location means the system will receive less solar irradiation than in the other scenarios, while the finance arrangements mean it is bought using money funded via a mortgage. This means that the financial performance of the system is calculated net of the costs of borrowing this money.

Even so, this 3.4 kWp system could be expected to generate more than 2,500 kWh of electricity in a year, and to save the home's occupants £188 per year over its lifespan. It might also increase the sale value of the home by more £1,800 – more than a third of its own installation cost. The increase is significant, because it demonstrates that even though the running cost benefits are not as high as in other scenarios, the impact of the solar system on the value of the property means that if the home were sold, the system could recover a large proportion of its costs as part of the transaction alone.

This is why housing market professionals, such as estate agents and valuers, should ensure that the green premium of solar technology is recognised in their assessments of homes fitted with onsite generation. The findings of this research must be recognised in property, mortgage and credit risk assessments.

[8]Note that this is lower than in the previous case study. This is because the uplift in value depends on the initial sale price of a home. A £4,000 solar system represents a greater proportion of the value of a £200,000 home than a £400,000 home. This means that in percentage and absolute terms, its impact on the value of the more expensive home is less. For more detail on this, see the methodology which accompanies this report.

Table 3: Case study 3 financial benefits

Property and system details		3a	3b
Property characteristics	Indicative sale price (£)	£263,814*	£263,814*
	Location	NE Scotland	NE Scotland
	Property type	Semi-detached	Semi-detached
	Heating fuel	Gas	Gas
	Occupancy	Out all day	Out all day
System characteristics	Type	PV	PV + battery
	PV array (kWp)	3.4	3.4
	Estimated generation (kWh / year)	2,579	2,579
	Battery capacity (kW)	N/A	≥3.1 <4.1
	Generation used on site (%)	21%	59%
System costs	Total installation cost (£)	£4,304	£7,174
	Annual running cost (£)	£125	£469
	Electricity price (p/kWh)	18	18
System financing	Type	Mortgage	Mortgage
	Interest rate (%)	3%	3%
	Loan term (years)	3	3
	SEG price (p/kWh)	5.5	5.5
Financial benefits (running cost)	Annual revenue (year one)	£85	£-137
	Annual revenue (year five)	£154	£79
	Annual revenue (year ten)	£226	£297
	Net present value (lifespan)	£5,638	£6,083
	Payback period (years)	20.3	24.1
	Internal rate of return (%)	-2.5%	-9.2%
	Return on investment (%)	131%	84.8%
	Effective annual saving (lifespan)	£188	£203
Financial benefit (equity value)	Indicative sale price increase	£1,815 - £2,765	N/A
Overall payback period**	Effective payback period (years)	14.6	N/A

*Based on UK House Price Index data from March 2021
** This figure will vary depending on if and how the increased equity value of a home with solar installed is realised, and will differ according to the specific characteristics of each home.

Case study 4

Social landlord and tenant

In this scenario, a housing association finances a PV / PV and battery system for a tenanted dwelling as part of its portfolio, to improve the energy efficiency of its housing stock. This scenario is intended to provide an example of the split in costs and benefits between a social landlord and its tenant, where the initial investment in the property is made by the housing association, which is assumed to own and manage it.

In this scenario, the tenant would not be liable for the capital cost of installing the system, although the housing association could choose to recover all or some of the capital outlay through increased rent, or a service charge. The tenant would receive the benefits of the reduction in electricity costs in full, while the housing association would receive any payment for exported electricity, via the Smart Export Guarantee. The housing association would also be liable for any ongoing operational costs.

In this scenario, the tenant would see their electricity bills reduced by a sizeable £338 per year, while the housing association would receive the equivalent of nearly £200 per year in SEG payments, for a PV-only system. Under this scenario the housing association would fully recover its costs, and turn a profit on the system overall.

Adding a battery – which increases the amount of electricity used onsite – would in turn increase the savings for the tenant. Doing so would reduce their electricity bills further, by more than £650 per year. In this scenario, because the housing association would then receive correspondingly less in SEG payments, it would not recover its initial outlay. However, it should be noted that this is not a conventional investment. The social landlord would be investing to improve the quality of its asset based, as well as the welfare of its tenants – for example, by reducing the risk of fuel poverty, because of the reduction in energy bills the solar system would deliver. This might also help de-risk the portfolio overall, as it would help mitigate the risk of tenants going into arrears on their rental payments.

Government funding, delivered through schemes such as the Local Authority Deliver element of the Green Homes Grant, is intended to support social landlords to improve the quality of the homes they manage, and a key recommendation of this report is that this funding be extended. The social housing sector has a major role to play in delivering an affordable energy transition, and this research demonstrates that there are clear models which social landlords can use to finance the installation of solar generation on their housing assets. The costs and benefits can be shared between the asset owner (the housing association itself) and its tenants, creating a positive financial outcome for both parties.

Table 4: Case study 4 financial benefits

Property and system details		4a	4b
Property characteristics	Indicative sale price (£)	£543,515*	£543,515*
	Location	London	London
	Property type	End-terrace	End-terrace
	Heating fuel	Gas	Gas
	Occupancy	Home all day	Home all day
System characteristics	Type	PV	PV + battery
	PV array (kWp)	2.38	2.38
	Estimated generation (kWh / year)	2,016	2,016
	Battery capacity (kW)	N/A	≥3.1 <4.1
	Generation used on site (%)	39%	81%
System costs	Total installation cost (£)	£3,013	£5,882
	Annual running cost (£)	£106	£450
	Electricity price (p/kWh)	20	20
System financing	Type	Housing association	Housing association
	Interest rate (%)	1.5%	1.5%
	Loan term (years)	3	3
	SEG price (p/kWh)	11	11
Financial benefits (running cost) – tenant	Annual reduction in electricity bills (£)	£338	£656
Financial benefits (running cost only) – Housing Association	Net present value (£)	£2,554	-£9,517
	Effective annual SEG payments	£186	£-121
	Effective annual saving	£85	£-317
Financial benefit (equity value)	Indicative sale price increase	£1,050 - £3,053	N/A
Returns (whole system)	Payback period (years)	11.4	20.2
	Internal rate of return (%)	10.7%	-1.8%
	Return on investment (%)	418.2%	169.6%
Overall payback period (whole system)**	Effective payback period (years)	8.3	N/A

*Based on UK House Price Index data from March 2021
** This figure will vary depending on if and how the increased equity value of a home with solar installed is realised, and will differ according to the specific characteristics of each home.

The economics of batteries

At present, installing a battery system does not necessarily improve the financial performance of a solar system. This is because the extra cost of the battery is more than the additional savings enabled through being able to store and use surplus power generation later. However, this is likely to change in future, for two reasons.

First, battery prices are decreasing. This is because production volumes around the world are increasing. As this happens, economies of scale reduce unit costs. Manufacturing techniques are also improving, and battery lifespans will increase, which means they will need to be replaced less frequently. These factors mean that costs will come down, which is precisely what has happened to solar panels themselves, which have seen a huge reduction in cost since 2010. This is why the International Energy Agency has said that in some circumstances, solar power is now the 'cheapest source of electricity in history.'

Second, the UK electricity retail market is moving to a full 'half-hourly metered' billing system from 2025. This means that home energy systems will be able to respond to changes in the electricity price which occur throughout the day, because of differences in supply and demand. This means, for example, that not only will a battery be able to store solar power, generated free during the day, for use in the home later. It will also be able to sell any surplus back to the grid at the point at which it is worth the most, such as in the evening, when lights and appliances are in use around the country and electricity prices are higher. The battery could also be used to store excess grid electricity, when overall demand is lower than generation.

Buying and selling electricity in this way will increase the revenue of these systems, and some systems already do this, using electricity 'time of use tariffs' (TOUTs). TOUTs are becoming more common, and these dynamics are one reason why some Solar Energy UK members have reported that more than 50% of their solar systems are already being installed with battery storage, as consumers prepare for the future energy system. In the meantime, they continue to benefit from a positive return on their investment and the zero carbon electricity they use to power their homes.

The value of solar property

Solar is affordable

The findings presented in this report are clear: residential solar systems deliver significant financial benefits. These are generated for two reasons. First, installing a solar system can increase the sale price of a home. Second, doing so lowers the energy bills associated with running that home, because of the reduced amount of electricity which needs to be bought from the national grid.

In a best-case scenario, the combined value of these savings might be more than £30,000 over the lifespan of a system, while in a typical situation the system would still pay for itself three times over. This demonstrates that installing a residential solar system is a sound investment for anyone who wants to decarbonise their home while saving money. As value is generated in different ways, it also means that solar makes sense for homeowners and occupiers with a range of financial circumstances. The running cost savings apply across the board, including for households on lower incomes and social tenants, all of whom will benefit from the improved affordability of running a home with lower energy bills.

This is also important in the context of payback periods. Consumers have a legitimate regard for the point at which they will recover the cost of any green homes upgrade. Because of the decrease in installation costs and increase in efficiency of solar panels over the last decade, payback periods of less than 10 years are now possible based on the running cost savings alone – far lower than the 17.4 years the average owner-occupier spends in their home.[8] And as the typical scenario in this report notes, selling a home with a solar system may increase its price by nearly half of the cost of the system in the first place – even before the running cost savings are included.

Furthermore, the running cost benefits are based on current domestic electricity usage rates. But the electrification of heating and transport – a key objective of the UK's climate change policy – is beginning to gather pace. For example, more than 6.5 million households plan to buy an electric vehicle in the next five years, in advance of the 2030 ban on the sale of new petrol and diesel vehicles.[9] If those households are also able to install a charging point at home, the financial performance of their solar PV system would immediately improve on the figures presented here, compared with a scenario in which any EVs need to be charged with electricity bought from the grid.

Similarly, the UK has announced a target of installing 600,000 new heat pumps a year (which use electricity to provide heating) by 2028. Their use will increase domestic consumption of electricity, which is also much more expensive than gas. Heat pumps will therefore increase running costs unless other measures are taken to reduce bills, such as installing onsite solar power generation. It is difficult to say exactly how much more power homes will use in future, but National Grid says that overall, the UK's electricity demand could increase by up to 200%. Installing a solar system will make the transition to electric heat more affordable.

This is also significant in broader context. Solar

enables homeowners and renters to produce at least a proportion of their own electricity on site. The long-term advantage of this will be enormous, as consumer electricity demand for cars and heating increases. Without onsite generation, the cost of this electricity could delegitimise the pursuit of a zero-carbon economy in the minds of consumers, if they consider that they are being asked to shoulder an unfair financial burden. By installing onsite generation, combined with home energy storage, solar technology can therefore help ensure that the multiple objectives of delivering affordable, carbon-neutral homes, with public buy-in, are achieved.

Clean heat

Decarbonising heat – for rooms and buildings, for water, and for industrial processes – is one of the key challenges the UK will face in its net zero transition. A number of long-term strategies are due to be consulted on and developed during the 2020s to develop sources of 'clean heat'. These include the Heat and Buildings Strategy for England and Wales, the Heat in Buildings Strategy in Scotland, and projects on heat networks, which deliver heat to an area of residential or commercial buildings. Maximising the contribution that onsite solar – PV as well as solar thermal, heat storage and emerging technologies including infrared – can make is key to delivering clean, affordable heat for the UK.

Solar should be standard

The financial benefits of solar have particular implications for new build homes. At present, those involved in building new homes, such as property developers and construction companies, have a structural incentive to install the minimum level of low carbon technology required to comply with the building regulations. This is because the value of the home is set by the market, and therefore the profit margin on a new home is essentially the sale price, less the cost of the land on which it sits, less the cost of building it. Including any equipment above the specification required by the building regulations reduces the profit margin, unless this can be demonstrated to increase the value of a home, and hence be reflected in its sales price. But outdated valuation models make this difficult, because they make it appear that homes with and without solar are worth the same, and so it is not possible for buyers to borrow more to finance a more advanced home.

To date, the limited evidence available on the value of solar means that it has been challenging to make the case for why new home buyers should pay more for 'non-standard' technology or highly energy efficient homes. This is a chicken-and-egg situation. If valuation methodologies artificially limit the price at which solar property can apparently be sold, it will also limit the evidence for solar property commanding a price premium, and hence for any need to change the valuation methodologies in the first place.

The empirical observations underpinning this research show that in spite of current surveyor valuations, solar homes already command a premium, and it could be expected that correcting outdated valuation models to reflect this would cause this premium to rise further in future. This research demonstrates the need for valuation models to reflect the way in which the market actually behaves, based on empirical observations of sales prices offered and accepted for solar property. Doing so would help formalise understanding among home buyers and sellers, and the broader property finance and construction industry, of the financial impact of installing solar.

Indeed, the findings presented in this report show that building new homes offer the opportunity to maximise the financial and environmental benefits for homebuyers, as well as to create a sales premium for new homes fitted with low carbon technologies. The research and the modelling tools developed for this project mean there can be confidence that new homes fitted with low carbon technologies can be marketed to prospective homebuyers with the relevant green premium. Organisations such as the Royal Institute of Chartered Surveyors should update their valuation models to incorporate this.

Furthermore, it also means that it costs less to run a home. This means that not only should housebuilders install solar as a minimum – flagging the benefits for the home buyer – they should specify the size of solar system that will most closely match a building's projected energy demand, taking into account how this will likely increase in future as a result of the installation of new technology, such as electric vehicle charging points. This is particularly important given that the cost of installing solar on new build homes is less than doing so as part of a retrofit project. This is because it can be installed at the same time as the roof, and hence there is no specific cost implied for the additional work (such as erecting scaffolding) required to do so.

Amendments to the regulations for how homes in England and Wales are built will come into force in 2022, tightening further in 2025. These follow on from similar changes to building regulations in Scotland, and Solar Energy UK expects that this will lead to a high proportion of homes in England having solar installed by default, which is a welcome development. For the reasons outlined above, new homes should be constructed to maximise the benefits of solar energy rather than constructed using the cheapest means of compliance with a regulatory target. This will ensure that homeowners can buy affordable and futureproofed homes, that will deliver the maximum environmental and cost benefits.

The Future Homes Standard

The Future Homes Standard will govern how new houses are constructed in England and Wales, as set out within the Building Regulations for energy and environmental performance. An interim version of the Standard will be introduced in 2022, from which point homes will need to be much more energy efficient. The full Standard will be implemented from 2025, when it may not be permitted, for example, to build new homes with gas heating.

Homes designed to meet the Future Homes Standard will have 70% – 80% lower carbon emissions than new homes constructed today. Solar Energy UK expects all homes designed to meet the Future Homes Standard to use Solar PV as a critical technology required to realise the carbon savings targeted.

Solar is security

The consumer, home and property finance and valuation industries have a key role to play in supporting the decarbonisation of the UK's housing stock. This is because, as research from the Government's Department for Business, Energy and Industrial Strategy (BEIS) demonstrates, the perceived upfront expense of rooftop solar systems is a barrier to uptake.[10] However, this research demonstrates that, taking into account the upfront cost, investing in solar is a sound financial decision. This in turn means that those involved in property financing, such as lenders, surveyors and valuers, should ensure the presence of onsite solar generation is incorporated into their approval processes.

First, the property valuation industry – led in the UK by the Royal Institute of Chartered Surveyors (RICS) – should ensure that its methodologies incorporate the findings of this research. This means acknowledging the sale price premium that solar property commands, by amending valuation processes to include an assessment of onsite solar generation technology. Until this is the case, sales prices will not formally reflect the solar price premium, which means that buyers, sellers and agents alike are not acting on the best information to value homes for sale. Similarly, and as noted previously, this means there is little incentive for property developers to incorporate solar as standard on new homes, because they cannot be sure that such properties will command the higher sales price they are worth.

Second, lenders should continue to develop their green finance products. This includes, for example, the emerging green mortgage market, where banks provide additional lending as part of a mortgage, to be spent on the retrofit of a solar power system as part of the purchase of a house. Case study 3 in this report in effect represents this scenario. Because the installation of the system will reduce the borrower's outgoings, this should in turn mean they present a lower lending risk for the bank. Discussions Solar Energy UK had as part of this research indicate that the point of remortgage is a typical stage when borrowers would consider taking on secured debt to finance this type of upgrade. Regulation should help incentivise this, which the Government is considering: for example, with the 2021 consultation on introducing a voluntary or mandatory target for lenders to ensure their property portfolios meet an average Energy Performance Certificate target rating of 'C' by 2030.[11]

Energy Performance Certificates

A home's Energy Performance Certificate (EPC) is a statement of information about its energy use and costs. It is required whenever a property is built, sold or rented. The EPC provides an energy efficiency rating from A to G, where A is the most efficient.

The figures presented in this report present the potential costs and benefits of installing solar generation and energy storage on homes in the UK. However, these are not adequately recognised in the EPC. Solar Energy UK recommends that the government update the EPC assessment process to ensure that key information on solar and energy storage installations is captured in the document. This will enable home buyers and renters to understand the benefits of solar in more detail.

Similarly, representatives of property lettings and sales platforms should ensure that appropriate information on home solar generation systems is recorded, presented as part of the standard description of a home, and reflected in their valuation and other appraisal processes.

More information on existing EPCs is available at www.gov.uk/buy-sell-your-home/energy-performance-certificates.

A third mechanism relates to the role of government, which has a major role to play in providing both public information and green financing. The challenges of schemes such as the Green Homes Grant Scheme – a flagship public grant scheme which was forced to close – do not mean that the government should not explore how to provide grant support for homeowners in future.[12] A key part of this should be expanding support for social landlords to ensure they can provide high-quality, low-cost housing to people on lower incomes. But the Government could also make relatively simple changes to policy that would enable the development of entirely new funding mechanisms, such as property-linked finance. A benefit of this is that government would not need to provide any direct funding, only ensure that the regulatory environment supported private capital to invest – which it would have a strong incentive to do.

Property-linked finance

Property-linked finance is a way to fund retrofit green home upgrades, which is now being used in North America and within the European Union. An external investor (for example, a bank) pays for the upgrade, such as a solar power system. The occupant of the home repays the loan via a form of property tax, administered by a third party. This means that when the home is sold, the new buyer agrees to continue paying the tax. They have an incentive to do so, because the savings produced by the upgrade (such as the solar power system) should be bigger than the repayment.

The advantage of this type of finance is that the loan is linked to the property, not the owner. This addresses the potential consumer concern of paying to install a green upgrade but then moving home before they have realised the value of the investment.

Solar Energy UK supports the introduction of property-linked finance in the UK. In North America and the European Union, it is known as 'property-assessed clean energy finance.'

Conclusion

This report highlights the financial benefits of installing a solar energy system. The impact of doing so is clear. Solar power systems:

- Increase the sale price of a home.
- Reduce bills, by producing power to supply some of a home's energy demand.
- Enable surplus power to be sold back to the grid.
- Help futureproof a building: ensuring a source of clean, cheap energy for new low carbon technologies, such as electric vehicles and heat pumps.
- Reduce carbon emissions and improve the environmental performance of a home.

This research project shows there is both a sales price premium and significant running cost saving associated with solar homes. In some cases, the value of these together may be nearly £30,000, and in a typical case could be nearly £12,000. This is a major finding, as it means that installing a solar power system will cover its cost many times over, while producing zero-carbon electricity that will help consumers play their part in supporting the UK to achieve net zero. As the social landlord case indicates, solar is a viable option for household with a variety of income and financing arrangements, while it should be noted that conservative assumptions were made in the modelling for this research, to ensure the presentation of a realistic set of the financial benefits likely. And those benefits are based on the current context, before any significant electrification of the UK's heating and transport sectors. This can be expected to increase household electricity usage, and hence to increase the savings of solar-powered homes, compared with those which draw their electricity solely from the national grid.

Consumers have already recognised these benefits, which is why there are already a million homes with solar energy systems in the UK. But many of these were installed under the UK's Feed-in Tariff (FIT) system, which provided subsidies to support early adopters of the technology. The FIT system was a major success, and kick-started the UK residential solar market. But this research makes clear that, even without subsidy, installing a home solar system is a sound financial investment. Solar homes help reduce bills, because they produce a proportion of the electricity they would otherwise import form the grid. This lowers the environmental impact of a home, and can also help contribute a significant amount of electricity to the UK's national power grid.

The four case studies included in this report outline the variety in financial performance which can be expected according to the specific parameters of any solar system installation, while details of a further eight case studies are included in the Annex which accompanies this report.

Together, they provide a clear snapshot of how the financial performance of a solar system varies – but also of how it is always a worthwhile investment. This is further the case because the financial assumptions used as inputs are based on current electricity and heating costs, which are forecast to rise. As such, solar homes protect occupants from rising energy costs, and provide a secure, affordable place to live. Solar Energy UK encourages the property, finance, and construction industries, as well as government, to work together to ensure maximum uptake of residential solar systems in the UK, and will engage with all stakeholders willing to support that goal. This research makes clear that the investment case should help achieve it.

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