# The Value of New Build Solar

Why the UK urgently needs solar solutions in new builds

Solar Energy UK

# Acknowledgements

**The MCS Charitable Foundation provided the principal funding for this report. Additional funding was provided by the Forster Group, Viridian Solar, City Plumbing, and Q Cells.**

**The research was overseen by a Steering Group including the following members:**

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**Chris Davidson** Ground Source Heat Pump Association

**Christophe Williams** Naked Energy

**Danny Wilkinson** City Plumbing

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**Ken Gordon** Ground Source Heat Pump Association

**Kieran Sinclair** The Association for Decentralised Energy

**Richard Hall** Department of International Trade

**Richard Hauxwell Baldwin** MCS Charitable Foundation

**Ross Kent** Q-Cells

**Sean Bingham** Barilla

**Sophie Whinney** Regen

**Stuart Elmes** Viridian Solar

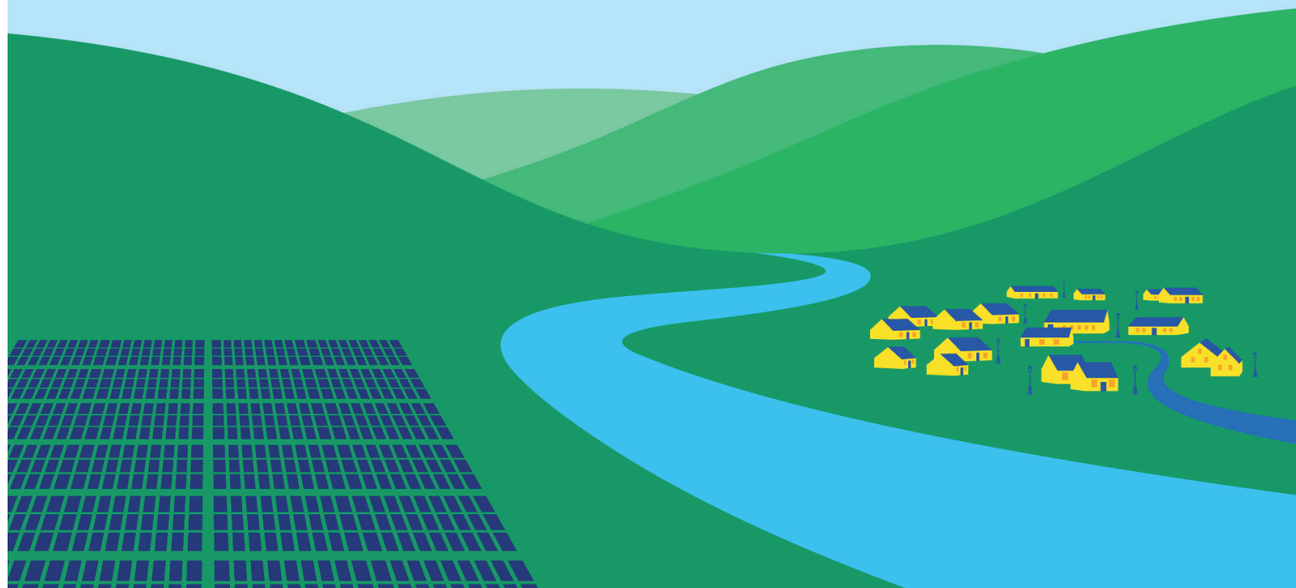
**Think Three** carried out the financial modelling for this research.

**Solar Energy UK** would like to place on record its thanks to the groups and individuals above. Please note that the reports and their contents do not necessarily represent the views of any of these organisations.

# 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 300 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.**



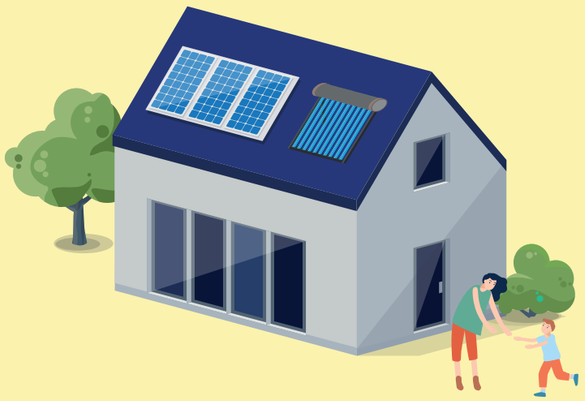
# Foreword

Richard Hauxwell-Baldwin, MCS

**MCS Charitable Foundation is delighted to have been the principal funder for this important research by Solar Energy UK.**

**The research provides robust evidence on the significant energy cost savings that solar technologies can provide to new build homeowners. This report gives further credence to our call for all new homes to be built with the highest possible energy efficiency standards. In practice this means homes should be net zero ready and fitted with all of the necessary low carbon technologies such as solar panels and clean heating options like heat pumps. Stringent building regulations will maximise the benefit for new homeowners and help address the cost of living crisis whilst deliver decarbonised homes.**

**The MCS Charitable Foundation's primary purpose is to ensure that all of the UK's homes are futureproofed and powered by low carbon solutions, new builds homes present an invaluable opportunity for this to be done at the point of construction. The Value of New Build Solar report clearly demonstrates the necessity of solar to all new homes.**



## Contents

# The Value of New Build Solar

## Why the UK Needs Solar in New Builds

To meet the UK's legally binding commitment to achieve a net zero economy by 2050, it will need a near-complete decarbonisation of UK housing stock[1]. Maximising the deployment of onsite solar generation in new build homes will be fundamental to achieving a net zero economy could help homeowners of a typical new build home save between £974- £1,151, thereby helping mitigate the impact of the energy crisis. Though 80% of the buildings that will exist in 2050 already built, the remaining 20% will need to be built with energy efficiency measures baked in, providing cost-saving measures to millions of households.

A considerable change in UK energy efficiency standards in both new and existing homes is needed if we are to meet our ambitious net zero targets. Incoming building regulations, for example, must ensure mandated installation of onsite generation as standard. This will ensure that new build homeowners benefit from clean and affordable heat and power. 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 significantly contribute to the UK's climate change objectives[2]. Every new home fitted with a solar system is one step further along the spectrum towards net zero.

This is important given the need for a major increase in solar deployment through new build installations. If the UK hopes to achieve a net zero future, a significant portion of its energy demand must be sourced from clean electricity. Clean electricity can be used to supply homes and businesses with power, and for new clean heat and transport technologies such as electric heat pumps and electric vehicles.

Still, the rationale for greater solar deployment extends beyond environmental factors. The financial value of residential solar is significant, and its economic benefits are now more apparent to homeowners and consumers. Previous Solar Energy UK research on the Value of Solar Property shows that installing a solar energy system can increase the sale price of a home by 0.9-2%. This research indicates that the return on investment makes upgrading a home with a solar power system an easy way to lower a property's running costs and protect the consumer against the volatility of the traditional energy market.

Among the barriers to the deployment of solar for the new build property sector is the perception on the part of property developers that solar does not add financial value. Even though solar panel costs have declined dramatically in recent years[3], the financial value that solar generates, both asset value and running cost terms needs to be recognised by the new build property sector as a means to offset the initial investment. The property and construction industry must place greater value on energy efficiency and recognise that installing a solar energy system is an attractive investment, which commands a higher home sale price, reduces carbon, and saves homeowners money. Formally recognising the financial value of these homes will mean the sector can meet its climate change objectives whilst building energy efficient homes for the future.

To help support the increase in solar deployment needed, this report highlights the financial value of new build solar properties: new build homes with solar, and potentially an energy storage system. It does so by examining the impact on the running costs of a new build home (in other words, its energy bills).

First, the report presents the potential benefits derived from installing a solar system on four different new build properties. Second, it outlines the role of solar in futureproofing homes as part of the UK's energy transition. Next, it provides real-world case studies where solar was successfully integrated into new build housing developments. Finally, it summarises the findings.

# Solar Energy UK Policy Recommendations

**To maximise the contribution that new build residential properties can make to decarbonising the UK economy, Solar Energy UK makes the following recommendations.**

### The Westminster and devolved Governments should:

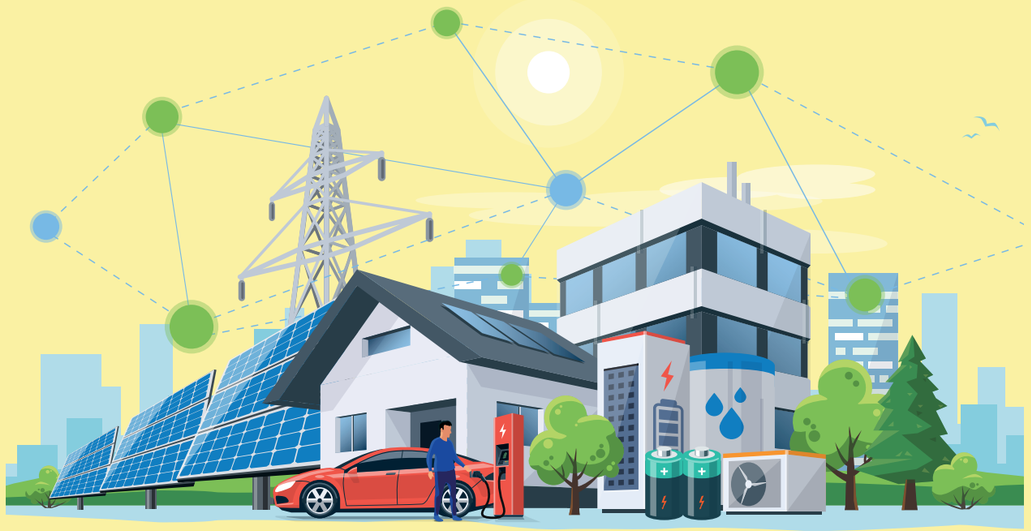
- Develop building regulations to ensure that solar technology is installed on all new homes, with the system specified to the size that will deliver the maximum carbon and cost-benefit for the building.
  - In England, this means ensuring that solar is mandated within the Future Homes Standard 2025
  - For Scotland, this means adding solar PV to the heat pump specification in the Building Regulations.
  - In Wales, this means ensuring that the installation of solar is mandated within the Building Regulations Part L and F
  - The models developed for this project can be used to help understand these specifications.
- 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.
- 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.

### 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.
- 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.



## How does a solar system work?

Solar photovoltaic (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.

Many new PV systems are now also installed with a battery, meaning surplus power can be stored and used later, instead. 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 should ideally be free from shading (from chimneys or trees, for example). Solar can be installed on multi-occupancy properties, although this may entail more complex connection arrangements.

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.

## 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 was 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.

# The Value of New Build Properties

## 4 Case studies

For the UK to reach its climate goals, homes must actively contribute to the flexibility needed to maximise the potential of renewables, rather than simply be passive consumers of electricity. To do so, homes of the future must be equipped with the necessary low carbon technologies such as solar, heat pumps, smart controls and electric vehicle chargers. Taking such measures significantly reduces energy bills for households whilst minimising their carbon emissions.

This section presents the financial and carbon benefits of installing a range of low-carbon technologies on four new-build homes around the UK. To demonstrate the financial and carbon benefits of adding solar to the Future Homes Standard 2025 specification, our analysis compares new homes built to the Future Homes Standard in comparison to an identical home with no energy efficiency enhancements or low carbon technologies. These case studies are intended to represent the variety of carbon and financial performance outcomes which could be expected depending on where the home is located, the property's typology and occupancy characteristics. The outputs are drawn from the carbon and running cost model developed for this research, with full details presented in the accompanying annex.

# Case study 1

## Midlands; Mid-terrace

This case study represents a typical case of the financial and carbon benefits which could be achieved by installing a range of solar technologies system in a new home in the UK. This case study demonstrates the cost-benefits for a mid-terraced house constructed in the Midlands, with average sunlight levels for the UK. This scenario assumes that the home is occupied half day, the roof can host a PV array of 2kWp, generating 2,565 kWh / year along with a storage system.

Heating demands for this new home are very low at all specifications with minimal heat loss. This translates into significant savings in energy costs for heating. The Future Homes Standard home secures an average energy savings of £974 to £1,151 a year. Although operational costs are higher with more technologies to maintain, the cumulative lifetime income more than offsets the higher operational costs, where the lifetime cumulative income ranges from £37,101 to £42,403 depending on which heating fuel is being offset.

As well as securing significant savings in energy costs, these newbuild homes all demonstrate reductions in emissions, with the Future Homes Standard Home delivering reductions in emissions of 65% to 85% when compared to an identical dwelling with no energy efficiency enhancements or low carbon technologies.

| **Energy Tariffs** | | **Electric 34p/kWh** | | **Gas 10.3p/kWh** | |
|---|---|---|---|---|---|
| **Property and system details** | | **1a** | **1b** | **1c** | **1d** |
| **Property characteristics** | Heating fuel | Gas | Direct electric heating | Heat pump | Infrared |
| | Location | Midlands | | | |
| | Property type | Mid-terrace | | | |
| | Energy efficiency | Future Homes Standard 2025 | | | |
| | Occupancy | Home half day | | | |
| **Energy and operational costs** | Onsite generation type | PV and battery | | | |
| | Annual energy costs (before LCTs) | £1,725 | £2,607 | £1,922 | £2,557 |
| | Annual energy costs (after LCTs) | £833 | £1,844 | £1,128 | £1,794 |
| | Annual Opex (yr1) | £710 | £439 | £726 | £529 |
| **Financial benefits (cash buyer)** | Annual revenue (year one) | -£78 | £243 | £52 | £243 |
| | Annual revenue (year ten) | £765 | £934 | £763 | £934 |
| | Net annual income (lifespan) | £3,029 | £2,803 | £2,645 | £2,803 |
| | Effective annual saving (lifespan) | £1,064 | £1,151 | £974 | £1,116 |
| | Lifetime cumulative income | £39,796 | £42,403 | £37,101 | £42,403 |
| **Carbon emissions** | Total emissions saved TCO2 | 30.77 | 19.89 | 17.96 | 19.89 |
| | % reduction in emissions (lifetime) | 56.64% | 65.93% | 83.52% | 67.66% |

# Case study 2

## Southern England, Detached

This case study represents what may reasonably constitute a best-case scenario for the financial and carbon benefits of installing a solar PV, solar thermal and battery system on a new build property. The home located in Southern England, which has the highest irradiation levels in the UK. This detached house is fitted with a south facing solar photovoltaic system and a home storage battery; the solar PV array is fitted at an angle of 30 degrees and generates 4,921kWh of electricity per year along with a 6.25m2 solar thermal system with a 3.6kW output and a 12kW battery.

Under the Future Homes Standard regulated home, the low carbon technologies contribute a significant proportion of the overall energy demands delivering significant savings in energy costs and carbon emissions.

Because the home is energy efficient, it has a relatively low heat demand, and reduced heat loss. This is ideal for low-temperature heating systems like heat pumps. As a result, the heat pump operates at a high efficiency resulting in lower energy demands for heating and hot water where this system is used. Overall, the system could be expected to save consumers of a heat pump heated home over £7,038 annually.

The table below shows the energy costs for the Future Homes Standard specified home and compares the energy costs with and without the applied solar heat technologies (PV, solar thermal and battery). It shows savings of between £2,000 to £3,000 using low carbon technologies to offset high energy import costs.

Lifetime operational costs associated with the ongoing maintenance and component replacement of the heating systems and solar heat technologies appear high at £17, 000 over the life of the systems (30yrs). However, the lifetime cumulative income more than exceeds these operational costs delivering ongoing and progressively higher energy cost savings over the life of the systems between £202,000 to £242,000.

| **Energy Tariffs** | | **Electric** 34p/kWh | | **Gas** 10.3p/kWh | |
|---|---|---|---|---|---|
| **Property and system details** | | **1a** | **1b** | **1c** | **1d** |
| **Property characteristics** | Heating fuel | Gas | Direct electric heating | Heat pump | Infrared |
| | Location | Southern England | | | |
| | Property type | Detached | | | |
| | Energy efficiency | Future Homes Standard 2025 | | | |
| | Occupancy | Home all day | | | |
| **Energy and operational costs** | Onsite generation type | PV and battery | | | |
| | Annual energy costs (before LCTs) | £3,554 | £5,497 | £3,893 | £5,320 |
| | Annual energy costs (after LCTs) | £204 | £1,560 | £132 | £1,383 |
| | Annual energy costs (after LCTs) | £476 | £798 | £798 | £933 |
| **Financial benefits (cash buyer)** | Annual revenue (year one) | £2,485 | £3,071 | £2,895 | £3,071 |
| | Annual revenue (year ten) | £4,597 | £5,571 | £5,265 | £5,571 |
| | Net annual income (lifespan) | £12,779 | £14,950 | £14,321 | £14,950 |
| | Effective annual saving (lifespan) | £6,118 | £7,446 | £7,038 | £7,446 |
| | Lifetime cumulative income | £202,010 | £241,850 | £229,606 | £241,850 |
| **Carbon emissions** | Total emissions saved TCO2 | 30.77 | 19.89 | 17.96 | 19.89 |
| | % reduction in emissions (lifetime) | 56.64% | 65.93% | 83.52% | 67.66% |

# Case study 3

## Northeast Scotland, Semi-detached

This case study represents a sub-optimal scenario for the financial benefits of installing solar technologies. The orientation of the system on the semi-detached home is East-West, 's orientation is not ideal (facing East/West), and daylight levels are lower than in most other parts of the UK. The home comes with a solar thermal system, a solar photovoltaic system, and a home storage battery. The solar thermal system has an aperture of 5m2, which offsets ~30% - 40% of the home's hot water demands. The 3kWp PV system generates 2,367 kWh / year, and the 8kW battery facilitates a high self-consumption rate of 88% - 95%.

Although this is not considered an optimised scenario, the combined solar technologies still generate significant savings in energy costs and carbon emissions compared to the same home without any low carbon technologies.

The table opposite shows the results in terms of average annual energy savings; this combination of solar technologies could save homeowners between £2,870 - £3,918 depending on which heating fuel is being offset. Homeowners would begin to see substantial savings on their energy bills from the first year of installation, with energy bill reductions between £816 - £1,542.

Similarly, the table shows substantial savings in carbon emissions. When compared to an identical home constructed in 1900- 66 with no energy efficiency enhancements, the Future Homes Standard regulated home shows savings of up to 81%.

| Energy Tariffs | | Electric 34p/kWh | | Gas 10.3p/kWh | |
|---|---|---|---|---|---|
| **Property and system details** | | **1a** | **1b** | **1c** | **1d** |
| **Property characteristics** | Heating fuel | Gas | Direct electric heating | Heat pump | Infrared |
| | Location | Northeast Scotland | | | |
| | Property type | Semi-detached | | | |
| | Energy efficiency | Future Homes Standard 2025 | | | |
| | Occupancy | Out all day | | | |
| **Energy and operational costs** | Onsite generation type | PV, solar thermal and battery | | | |
| | Annual energy costs (before LCTs) | £2,934 | £4,402 | £3,291 | £4,302 |
| | Annual energy costs (after LCTs) | £1,011 | £2,171 | £1,228 | £2,071 |
| | Annual Opex (yr1) | £869 | £688 | £998 | £798 |
| **Financial benefits (cash buyer)** | Annual revenue (year one) | £816 | £1,542 | £1,096 | £1,542 |
| | Annual revenue (year ten) | £2,159 | £3,005 | £2,483 | £3,005 |
| | Net annual income (lifespan) | £6,720 | £8,195 | £7,250 | £8,195 |
| | Effective annual saving (lifespan) | £2,870 | £3,918 | £3,266 | £3,918 |
| | Lifetime cumulative income | £100,041 | £131,471 | £111,909 | £131,471 |
| **Carbon emissions** | Total emissions saved TCO2 | 18.69 | 11.83 | 10.62 | 11.83 |
| | % reduction in emissions (lifetime) | 43.32% | 48.99% | 58.40% | 49.77% |

# Case study 4

## London, Social Landlord and Tenant

In this scenario, a housing association finances a PV system for a tenanted dwelling as part of its portfolio to improve the energy efficiency of its housing stock. The property is an end terrace home located in London built to Future Homes Standard levels and is fitted with a 2.5kWp PV system; and an 8kW battery.

This scenario provides an example of how costs and benefits can be split between a social landlord and their tenant, where the initial investment in the property is made by the housing association, which is assumed to own and manage it. Under a scenario of rising energy costs, the social landlord would be at increased risk of its tenants defaulting on their rent and therefore will have a vested interest in mitigating this risk. One method of mitigating these risks is to invest in new homes with significantly improved energy efficiency standards combined with solar technologies.

Under this scenario the tenant would receive the benefits of the reduction in electricity costs in total, 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. Under the split benefit arrangement, the tenant receives a reduction in energy costs of £496 to £772 in the first year of the installation.

While the social landlord might not fully recover its costs, the landlord owns the asset and would ultimately benefit from investing in future proofing the property and ensuring tenants can reside with lower energy costs and therefore less risk of defaulting on their rent.

| Energy Tariffs | | Electric 34p/kWh | | Gas 10.3p/kWh | |
|---|---|---|---|---|---|
| **Property and system details** | | **1a** | **1b** | **1c** | **1d** |
| **Property characteristics** | Heating fuel | Gas | Direct electric heating | Heat pump | Infrared |
| | Location | London | | | |
| | Property type | End Terrace | | | |
| | Energy efficiency | Future Homes Standard 2025 | | | |
| | Occupancy | Home all day | | | |
| **Energy and operational costs** | Onsite generation type | PV | | | |
| | Annual energy costs (before LCTs) | £1,748 | £2,675 | £1,940 | £2,617 |
| | Annual energy costs (after LCTs) | £1,252 | £1,903 | £1,266 | £1,846 |
| | Annual Opex (yr1) | £86 | £86 | £86 | £86 |
| **Financial benefits (cash buyer)** | Annual revenue (year one) | £411 | £686 | £588 | £686 |
| | Annual revenue (year ten) | £679 | £1,110 | £957 | £1,110 |
| | Net annual income (lifespan) | £1,749 | £2,805 | £2,429 | £2,805 |
| | Effective annual saving (lifespan) | £867 | £1,470 | £1,255 | £1,470 |
| | Lifetime cumulative income | £29,144 | £47,230 | £40,788 | £47,230 |
| **Tenant benefit** | Annual reduction in energy costs (yr1) | £496 | £772 | £674 | £772 |
| | Annual reduction in energy costs (yr10) | £777 | £1,208 | £1,054 | £1,208 |
| **HA cost-benefits** | Annual SEG payments (yr1) | £78 | £25 | £44 | £25 |
| | Annual SEG payments (end of life) | £299 | £95 | £167 | £95 |
| | Payback | >40yr | >40yr | >40yr | >40yr |
| **Carbon emissions** | Total emissions saved TCO2 | 7.3 | 7.3 | 7.3 | 7.3 |
| | % reduction in emissions (lifetime) | 18.26% | 32.17% | 44.35% | 32.87% |

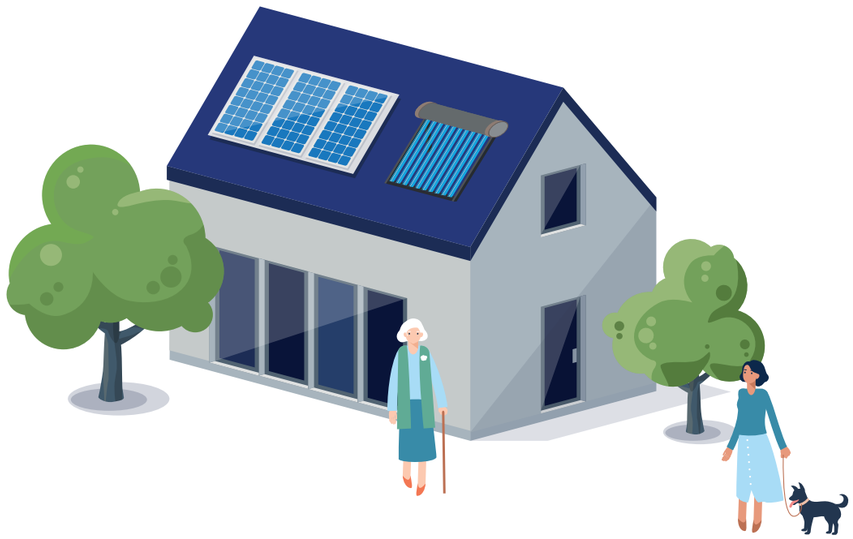
# Solar as the enabling technology for new homes

## Solar is affordable

The carbon emissions of UK homes can be mainly attributed to how homes are heated and built. To tackle this, amendments to building standards have been introduced in England and Wales, such as the Future Homes Standard. The full standards will be implemented from 2025, when it may not be permitted to build new homes with gas heating; the standards favour electrified heating systems instead. Solar can support this electrification agenda, and the standard must set an attainable but ambitious solar target if new build properties are to have any meaningful contribution to net zero.

The new standard follows similar changes to Building Regulations introduced in Scotland in 2015, which led to a major increase in solar deployment. So owners of new Scottish homes already benefit from onsite heat and power generation. Around a quarter of all MCS solar installations last year were in Scotland[4]. Housing developers elsewhere have been hesitant to back a stringent energy efficiency standard, fearing that this would lead to higher costs and ultimately reduce the number of homes built. This thinking does not align with the real-world relationship between solar and the housing market and contradicts the Scottish example.

Housebuilders must also consider the energy price crisis's impact on consumers. Although new build homes offer more energy-efficient homes with lower running costs than older properties, they will be far from immune to rising energy costs unless they come with solar and storage as standard. Higher energy bills will significantly impact lower-income households, pushing millions more into fuel poverty and potentially contributing to a stagnant property market[5]. This is an issue which shows no signs of dissipating and emphasises the urgency of investing in onsite heat and power generation for all residential properties. A home with solar installed is a clear selling point by offering lower bills, energy security and lower carbon emissions.



Homeowners are increasingly familiar with the advantages of solar as rising gas prices have led many to turn to the technology to save money on their energy bills. Demand for residential systems has therefore skyrocketed, with the first half of 2022 alone seeing nearly 60,000 solar PV installations under the MCS scheme. The necessity of onsite solar generation to reduce a home's running costs will become even greater when we consider the electrification of heat and transport.

The overall electricity demand for new homes is expected to increase and National Grid estimated that the UK's electricity demand could increase by up to 200%. Installing a solar system on a new build property will make the transition to electric heating more affordable.

As it stands, the UK Government has announced a target of installing 600,000 heat pumps a year by 2028. Heat pumps will significantly increase domestic electricity consumption, leading to a rise in consumer bills, unless powered by onsite generation such as solar. If housebuilders were to install heat pumps as a standalone measure, this could present a major risk to the net zero agenda; as the increased electricity demand from the heat pump could lead to higher energy bills. The addition of solar would help make certain that electrified heat is produced affordably whilst reducing the need for expensive and complex grid reinforcement works.

Westminster and the Devolved Governments building standards must mandate the installation of onsite heat and power generation installation, given the need for all homes to be decarbonised. This is particularly the case given the significant expected increase in power demand as the UK begins to electrify heat and transportation and the current grid constraints. All homes, including new builds, will need to help meet some of their heat and power demand.

# Solar Should Be Standard

For new properties, developers have the added benefit of being able to install renewable onsite generation at the point of construction. According to Solar Energy UK analysis, installing a residential solar system on a new build property is 10% cheaper than retrofitting. Embedding a solar system from the beginning also means a greater efficiency level can be achieved, as factors such as insulation, orientation, and airflow can all be considered during the design phase. Adding a solar system to a newbuild property also requires little disruption, with installations completed more quickly.

The Scottish example has also highlighted that solar is a convenient way to meet regulations and an excellent consumer proposition. As previously noted, in 2015, the Scottish Government uplifted building regulations so that new Scottish homes had to be substantially more energy efficient than the rest of the UK. Scottish property developers have already shown their ability to adapt to higher building standards without severe construction delays. Solar Energy UK's 2021 analysis of Scottish EPC data showed that two-thirds of new Scottish homes had solar PV on the roof. It i's clear that developers turned to solar PV to meet buildinglegal requirements and that the regulations drove the volume of solar deployment.

Scotland's reforms mean that property developers have a structural incentive to install the minimum level of low-carbon technology required to comply with building regulations. Further, outdated valuation models fail to capture how low-carbon technologies increase the value of a home, resulting in their inaccurate reflection in the sale price. Given the strong evidence that these technologies increase home value, the economic incentives of highly energy efficient homes[6] offer significant consumer benefits which developers can present to increase the attractiveness of their builds.

Our previous report, the Value of Solar Property, shows that despite current surveyor valuations, solar homes already command a premium. It could be expected that correcting outdated valuation models to reflect this would cause this premium to rise further. The Value of Solar Property report demonstrates the need for valuation models to reflect how the market behaves based on empirical observations of sales prices offered and accepted for the 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 our Value of Solar Property report show that building new homes maximises the financial and environmental benefits for homebuyers and creates a sales premium for new homes fitted with low-carbon technologies[7]. Solar Energy UK research provides property developers with the confidence that new homes equipped with low-carbon technologies can be marketed to prospective homebuyers with the relevant green premium.

# Case study 1

## Viridian Solar

**Type of project:** Rooftop

**Installed capacity:** 60.2 KW

**Location:** Drumchapel area of Glasgow

Linkwood Drive is a development of 134 homes for affordable rent in the Drumchapel area of Glasgow for both Cernach and Glasgow Housing Associations. A mixture of family houses comprising two-, three- and four-bedroom properties as well as cottage flats and single storey homes for wheelchair users were constructed over several phases by McTaggart Construction.

The featured site comprises 48 homes for Cernach Housing Association with roof integrated Clearline fusion solar PV installed by Parker Energy. Homes were built to meet the standards of Scottish Building Regulations Section 7 Silver Aspects 1 to 8, with the use of photovoltaic panels in addition to a robust fabric specification.

Ivan Aitken, General Manager at Parker Energy said:

*This is just one of many sites we've worked on with McTaggart Construction in a long standing working relationship that goes back many years. For us this site was a continuation from another site we were working on for McTaggart's that was further up the same street and can be seen in the background of the aerial photo.*

Parker Energy have been a long-standing supporter of Viridian Solar due to its excellent wind loading capabilities, fire rating, its ease of install and its value for money compared to its quality."

# Case study 2

## Taylor Wimpey

**Location:** Denmark

**Technology:** Solar thermal

**System size:** 12,436 solar thermal collectors

**Area size:** 156, 694 m2

As one of the UK's leading housebuilders, Taylor Wimpey is committed to designing and building thriving new communities that help protect the environment for future generations.

In 2021, the company launched its Environment Strategy, Building a Better World, which aims to reduce its environmental impact across three key areas: climate change, nature and resources and waste. The company was an early adopter of Science Based Targets, and has committed to producing a net zero transition plan. As part of this commitment, Taylor Wimpey is making significant strides in building more energy efficient homes including through the installation of PV panels on new homes at its developments,

Many of Taylor Wimpey homes currently integrate on-site renewables, such as PV panels, as well as 100% low energy light fittings, LED recessed downlights and energy efficient appliances. In 2021 over 2,000 solar panels were fitted on new homes built by Taylor Wimpey. These measures help generate cost savings for customers and cut the carbon emissions produced by the home.

Taylor Wimpey is also responding to changes in Building Regulations. For example, by building homes with features such as wastewater heat recovery systems, triple glazing, thermal break lintels and PV panels, from June 2022 a 31% reduction in home carbon emissions will be generated to comply with the new requirements of Part L Building Regulations. This Building Regulation change will significantly accelerate PV deployment on their homes.

The company is also preparing for the Future Homes Standard. They will build fossil fuel free, all electric homes from 2025 relying on technologies such as air source heat pumps and PV. These homes will emit 75-80% less carbon, will be 'zero carbon ready, and will be true zero carbon once the UK electricity grid fully decarbonises.

At the same time, Taylor Wimpey is taking measures to reduce its operational carbon emissions. For example, it has installed PV panels on some of its office buildings, including at its business unit in Exeter.

# Case study 3

## Barratt Homes

**Type of project:** New Build House

**Installed capacity:** 6.75kW

**Location:** University of Salford

The ‘Zed House’ is a unique project that looks to address the challenges faced by the housing sector. In early 2020, Barratt Developments PLC announced its commitment to build zero carbon homes in use from 2030. An important step on this journey was to understand what a home of the future looks like. The concept behind the Zed House, was to design and build a zero carbon home which goes above and beyond the 75-80% target set by Government in their Future Homes Standard for 2025, whilst also challenging the supply chain and integrating multiple new technologies. The Zed House, in partnership with the University of Salford, is not only designed to be a sustainable home but to also demonstrate a scalable solution, whilst being commercially viable.

The result is a fabric-first, zero carbon home, which combines advanced modern methods of construction, renewable technologies, smart heating systems and low carbon materials. The house delivers over 125% carbon reduction against current regulations, this means the house on average can run for around 4 days of the week on energy produced through its renewable technologies.

The Solar PV panels, 25 in total over four elevations (6.75kwp – 270w panels), generate an estimated annual energy outcome of 4,600kWh, this is more than enough electricity for a large family in a four bedroom home. This energy production is estimated to produce 1,521 kWh/yr excess towards the unregulated energy of the home.

The cost of running the Zed House is around £35 per month compared to a house built to today’s regulations, costing £100 per month [before the energy price cap increase] This is all made achievable through renewable energy through air source heat pumps, solar PV and battery storage.

Embodied carbon reduction has also been used through alternative material use for example:

- Thinner tiles, from 10mm to 8mm, saving 20% embodied carbon of materials, with reduced carbon to manufacture and transport
- High amount of recycled content within materials requested, such as 100% recycled content in kitchen doors
- Lightweight external cladding
- Metal roof tiles c. 86% lighter than equivalent clay or slate roof tile

# Conclusion

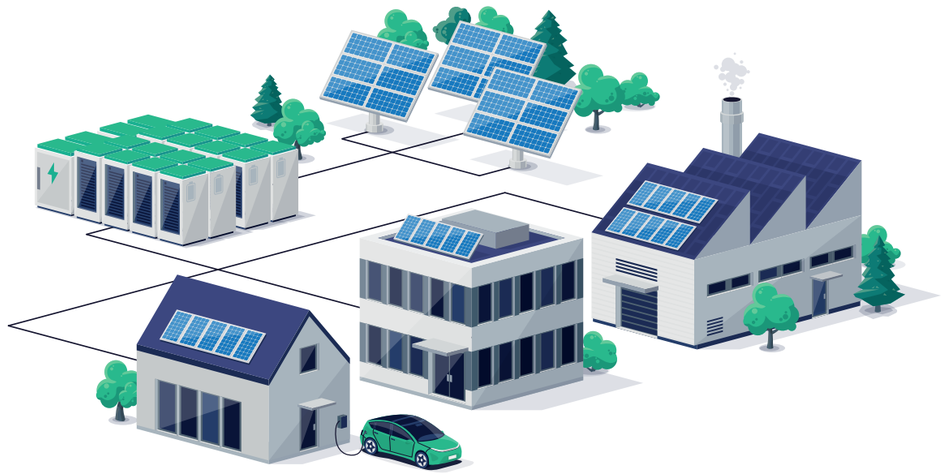
Building on previous Solar Energy UK research that found solar homes command a higher sale price, this study demonstrates that maximising onsite solar generation in newbuild homes will be fundamental to achieving a net zero economy.

Most urgently, it will help typical newbuild homeowners save an between £974 - £1,151 a year on their energy bills, mitigating the impact of the ongoing and worsening energy crisis. The report clearly shows that the return on investment makes upgrading a home with a solar power system an easy and simple way to reduce a property’s running costs whilst decarbonising UK homes.

These achievable outcomes will only pass with considerable change in UK energy efficiency standards in new homes. Forthcoming building standards across the UK must mandate the installation of onsite heat and power generation, such as from a solar system. Solar PV is the enabling technology for affordable low-carbon homes of the future. It directly contributes to reducing energy costs for households and reducing energy poverty. Solar helps avoid the need for the grid and other infrastructure investments, the costs consumers would otherwise bear as part of their energy bills.

We urge key construction and government stakeholders to rapidly integrate these findings and recommendations into their activities and policies. Most broadly, coordinated action is needed to maximise the deployment of solar technologies on new builds. The rationale for doing so is clear - installing solar energy systems is an attractive investment, which commands a higher home sale price, reduces carbon, and saves homeowners money.

Clean solar power can be used to supply homes and businesses, as well as new heat and transport technologies such as electric heat pumps and electric vehicles. Recognising these simple and undeniable factsis will make for more robust and competitive industries that can meet their climate change objectives whilst affording households and their communities with energy and financial security for generations to come.



# Notes

# References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