GREEN SQUIRREL

CASE STUDY

Complete slate-roof renewal with integrated solar, LONGi Hi-MO S10 technology and Tesla Powerwall storage

A complex Cheshire property upgraded through traditional roofing craftsmanship and modern renewable-energy technology.

Traditional roofing. Integrated solar. Intelligent energy storage. One coordinated Green Squirrel project.

3	16	~8.1 kWp	13.5 kWh
slate roof areas renewed	LONGi Hi-MO S10 panels	installed solar capacity	Tesla Powerwall 3 storage

Cheshire • Roofing • Solar • Battery Storage

A complete property-led approach

This project showcases the level of workmanship that can be achieved when traditional roofing skills and modern renewable-energy technology are planned as one complete system.

The Green Squirrel team were tasked with working across three separate slate roof areas, carefully removing the existing roof coverings before rebuilding the roof build-up and incorporating a new integrated solar installation. Rather than treating the solar panels as an addition fitted on top of an ageing roof, the team renewed the underlying roof construction properly, providing a strong foundation for the solar system and the property for years to come.

The scale and complexity of the property demanded careful planning around multiple roof elevations, chimneys, valleys, abutments and changes in roof geometry. The finished installation has been designed to sit neatly within the character of the home rather than appearing as an afterthought.

The completed and in-progress roof areas demonstrate the challenge of integrating solar across several traditional slate elevations.

Starting with the roof

Before the solar installation could begin, the Green Squirrel team removed the slates from the three affected roof areas and exposed the underlying roof structure.

New high-quality roofing membrane was installed, followed by new battens. This stage is particularly important on an integrated solar installation because the longevity of the finished system depends on the condition, accuracy and workmanship of the roof beneath it.

Renewing the membrane and battens gave the team a clean, accurately prepared surface on which to construct both the renewed slate areas and the integrated solar sections. It also provided the opportunity to inspect the roof structure rather than simply covering over ageing materials.

Additional works that added value to the home

As the project progressed, the homeowners asked Green Squirrel to extend the original scope so that a number of additional defects and improvement opportunities could be addressed while the scaffolding, roofing team and access arrangements were already in place.

Additional works included

Replacement of perished leadwork around the chimneys.
Repairs to deteriorated soffits and fascias.
Repairs to rotten timber on an existing dormer.
Installation of additional guttering and a new downpipe to improve rainwater management.

Chimney leadwork

The existing leadwork around the chimneys had perished and reached the point where renewal was appropriate. The team removed the deteriorated material and completed new lead detailing to provide durable weather protection around these vulnerable roof junctions.

Chimneys are among the areas of a slate roof most exposed to water penetration if flashings, soakers or adjoining weathering details deteriorate. Completing this work alongside the roof renewal helped ensure that the new installation was not compromised by older defects immediately beside it.

Soffits, fascias, dormer and rainwater goods

Green Squirrel were also asked to repair areas of soffit and fascia that had deteriorated over time. These roofline components protect the roof edges, support the rainwater system and contribute significantly to the appearance of the property.

A further issue was identified around an existing timber dormer, where sections of the wooden construction were rotten. The affected timber was repaired rather than being left alongside the newly completed roofing works. The project was then enhanced with additional guttering and a new downpipe, improving the collection and controlled discharge of rainwater from the roof.

S4 RooFit integrated solar system

The solar panels have been incorporated using the S4 RooFit integrated mounting system. Unlike a conventional installation where aluminium rails and panels sit above the finished roof covering, an integrated system occupies part of the roof covering itself. The surrounding slates finish into the solar installation, allowing the modules to sit much closer to the roofline.

S4 describes RooFit as a universal in-roof photovoltaic mounting system. Its universal integration plate is designed to accommodate current photovoltaic module sizes and both portrait and landscape layouts. The system is MCS 012 certified and S4 states that it is BBA assessed for compliance with relevant NHBC standards.[1]

How the S4 system integrates into a slate roof

On a traditional slate roof, integration begins by stripping the area in which the solar array will sit. The roofing membrane and supporting battens are then prepared to provide the correctly formed roof structure beneath the installation.

The S4 mounting components are positioned and mechanically secured in accordance with the manufacturer's setting-out and fixing requirements. The system creates the solar field while maintaining drainage paths beneath and around the photovoltaic modules.

A key advantage of an integrated approach is that the surrounding slate work is dressed into dedicated weathering components rather than simply being cut around conventional above-roof rails. Side flashings and roof-covering transition details manage the change between the slate and solar areas, producing a flatter, more architecturally integrated finish.

The solar modules are therefore part of the visual roof plane, while the membrane, battens, integration components and surrounding slate detailing work together as the weather-management system. This is especially valuable on high-quality traditional properties, where appearance and long-term serviceability are both important.

1	Existing slates carefully removed in the array zone.
2	New membrane and high-quality battens prepared.
3	S4 RooFit mounting and drainage components fixed to the roof structure.
4	LONGi modules secured within the integrated solar field.
5	Slates and weathering details finished neatly around the array.

LONGi Hi-MO S10 solar panels

The installation comprises 16 LONGi Hi-MO S10 solar panels. The Hi-MO S10 is LONGi's premium residential module platform and uses advanced back-contact cell technology, moving electrical contacts to the rear of the cell so that more of the front surface is available to collect sunlight.

LONGi publishes residential Hi-MO S10 module efficiencies of up to 25 per cent, power outputs up to 510 watts, a temperature coefficient of approximately -0.24 per cent per degree Celsius, and a 30-year warranty on the relevant residential S10 range.[2] These characteristics make the technology particularly attractive where roof area is valuable and a high output is required from a relatively compact array.

What can 16 panels produce?

The exact installed peak power depends on the precise S10 module selected. With 510-watt modules, 16 panels provide:

16 × 510 W = 8,160 W = 8.16 kWp

If 505-watt modules are used, the equivalent array size is 8.08 kilowatts peak. Either configuration represents a substantial residential solar installation.

Peak power is not the same as annual generation. Actual yearly energy production depends on roof orientation, pitch, location, shading, weather, module temperature, inverter losses and the way the 16 modules are distributed across the different roof areas.

For an approximately 8.1-kilowatt-peak system in the North West of England, a broad early-stage expectation might be around 6,500 to 7,700 kilowatt-hours per year where orientation and shading are reasonably favourable. This is an indicative range only; the formal customer proposal and Microgeneration Certification Scheme documentation should use the project-specific generation assessment.

Using more than one roof orientation can also broaden the daily generation curve. Although the separate roof areas may reach their individual peak outputs at different times, the combined installation can generate useful electricity across a longer part of the day.

Up to 510 W	Up to 25%	16 panels	≈8.1 kWp
per S10 module	published module efficiency	installed on this project	total peak capacity

Tesla Powerwall 3: storing solar for when the home needs it

The solar array can be paired with a Tesla Powerwall 3 so that electricity generated during the day can continue working for the property after the sun has gone down.

Tesla states that Powerwall 3 has 13.5 kilowatt-hours of nominal battery energy, an integrated solar inverter, three solar inputs with independent maximum power point trackers, and United Kingdom on-grid output configurations up to 11.04 kilowatts depending on local conditions and the approved system design.[3]

How solar and Powerwall work together

- Solar electricity can supply the home's immediate demand first.
- Surplus solar generation can charge the Powerwall rather than being exported immediately.
- When solar generation falls, stored electricity can be used by the property instead of buying as much electricity from the grid.
- The Tesla application shows live energy flows between the solar array, home, battery and electricity grid.
- Where the system is designed and configured for backup with the appropriate Tesla equipment, Powerwall can support backed-up circuits during a grid outage.

Using time-of-use electricity tariffs

A controllable battery does not have to charge only from the solar array. With suitable settings and an appropriate electricity tariff, it can also charge from the grid when electricity is cheaper and then supply the home, or export stored energy, when electricity is more valuable.

Tesla provides tariff-based energy controls, while Octopus Energy supports smart import and export arrangements for compatible batteries. Octopus specifically supports Tesla Powerwall integration with Intelligent Octopus Flux, allowing the battery to be automatically optimised for charging and discharging. Octopus explains that its optimisation can charge the battery from either solar or the grid before the 4 pm to 7 pm peak period, then use the battery for the home and export surplus energy during that peak.[4]

In practical terms, the principle is simple: buy or store electricity when it is cheaper, use stored energy when grid electricity is more expensive, and export surplus electricity when the tariff rewards it. Eligibility, prices and tariff availability change over time, so the current Octopus terms should always be checked at commissioning.

SOLAR	HOME	POWERWALL	GRID
Generate	Use first	Store surplus	Import / export

More than a solar installation

This project is an excellent example of how Green Squirrel can add value to high-profile homes across Cheshire by bringing together a range of specialist skills under one coordinated project.

The work demanded far more than the installation of solar panels. It required an understanding of traditional slate roofing, leadwork, timber repairs, roofline detailing, rainwater management, integrated photovoltaic technology and intelligent battery storage.

The Green Squirrel team were able to move between these disciplines, responding to issues uncovered during the project and carrying out additional works to a standard appropriate for a substantial Cheshire home. Rather than installing solar onto an existing roof and walking away, the team helped create a broader upgrade to the building fabric and energy system.

A roof designed for the next generation of energy

Three roof areas have been stripped and reconstructed with new membrane and high-quality battens. Perished chimney leadwork has been replaced, soffits and fascias repaired, rotten timber to the dormer addressed, and additional guttering and a downpipe installed to improve rainwater management.

The S4 RooFit system has allowed the photovoltaic array to become part of the finished roof rather than sitting above it. Sixteen high-efficiency LONGi Hi-MO S10 modules provide approximately 8.1 kilowatts peak of solar capacity, while Tesla Powerwall technology provides the means to store generation, use it after sunset, provide backup capability where configured, and interact intelligently with modern import and export tariffs.

> **“High-quality roofing first, carefully integrated renewable technology second, and added value throughout the wider property wherever the opportunity arises.”**

For homeowners with prestigious, traditional or architecturally sensitive properties in Cheshire, this project demonstrates the breadth of Green Squirrel’s capability. Renewable energy does not have to be treated as a bolt-on product. When it is combined with skilled roofing, careful detailing and an understanding of the existing building, it can form part of a much broader improvement to the home.

The result is a property that retains its character while benefiting from modern energy generation, intelligent battery storage and substantial improvements to the roof and surrounding building fabric - a strong example of the craftsmanship, flexibility and attention to detail Green Squirrel brings to high-quality homes across Cheshire.

Technical sources

Technical information current at September 2026. Project-specific details and photographs were supplied by Green Squirrel.

1. S4 RooFit - S4 Mounting System
2. LONGi Hi-MO S10 residential module information
3. Tesla Powerwall 3 - How Powerwall Works (United Kingdom)
4. Octopus Energy - Intelligent Octopus Flux / Tesla Powerwall support