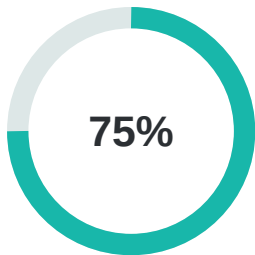
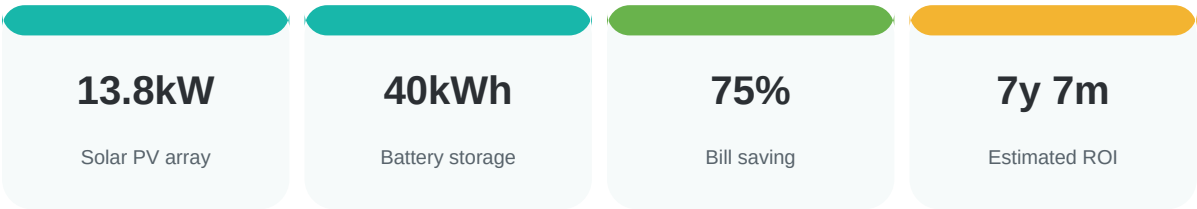




13.8kW Solar PV & 40kWh Battery Storage Case Study

High-capacity solar, battery storage and backup power for a high-usage home using a smart EV tariff strategy.



Estimated annual electricity bill saving

Using solar generation, 40kWh battery storage and low-cost overnight tariff charging.

Estimated ROI: 7 years and 7 months

Annual electricity consumption	13,235kWh
Total project cost	£36,558
Roof type and aspects	Slate roof - south and east-facing sections
Inverter and backup	12kW single-phase inverter with backup gateway

For households with high electricity usage, solar panels alone are not always enough to deliver the best return. The strongest savings often come from combining solar PV, battery storage, backup capability and a low-cost overnight tariff into one controlled energy strategy.



The Customer Challenge

The customer had annual electricity consumption of **13,235kWh**, which is significantly higher than a typical UK household. This made the property suitable for a larger solar PV and battery storage system designed around year-round savings, not just summer generation.

The objective was to reduce grid import, store more solar energy on site, use low-cost overnight electricity intelligently, and protect the home during power cuts.

- Reduce annual electricity bills
- Store surplus solar generation instead of exporting it cheaply
- Use a low-cost EV tariff to avoid peak-rate imports
- Improve winter performance when solar generation is lower
- Keep the house running during power cuts
- Provide enough battery capacity for evening and overnight demand

The Solar PV Design

A **13.8kW solar PV array** was installed across south and east-facing slate roof sections. The east-facing aspect helps capture morning generation, while the south-facing aspect provides stronger output through the middle of the day.

The slate roof required careful fixing and weatherproofing to protect the roof structure and maintain a tidy finish. The design was sized to support both immediate household demand and battery charging.

Battery Storage Strategy

The installation included **40kWh of battery storage**. This is a key part of the financial return because it allows the customer to store solar generation and low-cost overnight electricity for use during more expensive periods.

- Increase self-consumption of solar generation
- Reduce peak-rate grid electricity purchases
- Store cheap overnight electricity in winter
- Run the home from battery power during evenings and overnight
- Provide battery backup during grid outages



Seasonal Operating Strategy

Winter strategy	Summer strategy
In winter, solar generation is lower and household demand is usually higher. The batteries are charged overnight using a low-cost EV tariff, then used during the day to avoid peak-rate grid electricity. Any daytime solar generation supplements the stored energy and reduces import further.	In summer, the solar PV system becomes the main source of energy. The batteries are charged from solar during the day, then used in the evening and overnight. The EV tariff remains available as a top-up where needed, but solar self-consumption becomes the priority.
Best for: lower-generation months, high evening usage, expensive daytime rates.	Best for: maximising solar value, reducing evening import, using less grid electricity.

This seasonal strategy means the battery remains useful all year round. It is not only charged by solar; it is also used as a tariff management tool during the colder months.

Backup Power During Power Cuts

A backup gateway was installed so the house can continue running from battery power during a grid outage. When the grid fails, the gateway isolates the property and allows household loads to be powered from the battery system.

For customers who work from home, have high reliance on electricity, or experience occasional power cuts, backup capability adds value beyond bill savings.

Return on Investment

The total project cost was **£36,558**. The system is expected to reduce the customer electricity bills by approximately **75% per year**, with an estimated **return on investment of 7 years and 7 months**.

- Solar generation from the 13.8kW array
- Storing excess solar in the 40kWh battery system
- Charging batteries overnight using a low-cost EV tariff
- Reducing peak-rate electricity imports
- Using stored energy during evenings and overnight
- Maintaining backup power during grid outages



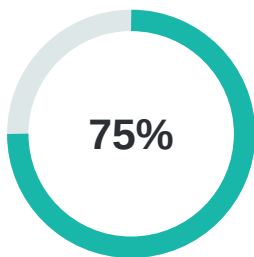
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Solar PV | Battery Storage | Backup Power

The Result

This installation delivered a high-performance solar PV and battery storage system for a high-usage home. By combining a 13.8kW solar PV array, 40kWh of battery storage, a 12kW single-phase inverter and a backup gateway, the customer now has a system that works effectively in both summer and winter.

The result is lower electricity bills, improved energy independence, better use of off-peak tariffs and protection during power cuts.



Estimated annual electricity bill saving

Using solar generation, 40kWh battery storage and low-cost overnight tariff charging.

Estimated ROI: 7 years and 7 months

Who this type of system is suited to

- Homes with high annual electricity consumption
- Properties with EV tariffs or access to cheap overnight rates
- Homes with large evening or overnight electrical demand
- Customers who want to store more solar instead of exporting it cheaply
- Customers who want backup power protection during grid outages



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Why Choose Green Energy Systems?

Green Energy Systems is an MCS certified installer, a RECC member and a CPA Approved Craftsman. The company also holds £5m public liability insurance and provides a 2-year insurance-backed guarantee on eligible installations.

Trusted, Certified & Protected

Installer credentials and customer protection for additional peace of mind.



Also included

- £5m public liability insurance
- 2-year insurance-backed guarantee

Could your home use a similar solar and battery strategy?

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Figures are project-specific and based on the customer usage, tariff strategy, system design and estimated annual savings. Actual savings vary depending on consumption pattern, tariff, export rate and system operation.