

# The Big Green Energy Company

## ROI Calculation Report

Date: 2025-05-14

### Assumptions & Constants

- Battery efficiency: 85% (round-trip efficiency for battery storage)
- Usable battery percentage: 90% (portion of battery capacity that is usable)
- Battery degradation: 70% capacity after 10 years, linear decline to 0% at 15 years
- Maximum battery lifespan: 15 years
- Solar generation factor: 850 kWh/kW/year (typical UK value)
- Solar self-use percentage: 50% (if not home during day), 70% (if home during day)
- Solar export percentage: 50% (if not home during day), 30% (if home during day)
- Battery cost per kWh: £500.00
- Solar cost per kW: £1,500.00
- Tariff rates: User-selected or typical market rates for peak, off-peak, and export
- All calculations are based on the above constants and user-provided inputs.

### Installation Cost Assumptions

- Assumed total installation cost: £8500.00 GBP

### Input Summary

### Calculation Breakdown (Yearly Table)

Year	Usable Battery (kWh)	Degradation	Shiftable (kWh)	Battery Savings (£)	Solar Used (kWh)	Solar Export (kWh)	Solar Savings (£)	Yearly Total (£)	Costs Outstanding (£)
1	4.50	0.97	1593.23	£202	1700.00	1700.00	£755	£957	£-7543
2	4.50	0.94	1543.95	£196	1700.00	1700.00	£755	£950	£-6593
3	4.50	0.91	1494.68	£189	1700.00	1700.00	£755	£944	£-5649
4	4.50	0.88	1445.40	£183	1700.00	1700.00	£755	£938	£-4711
5	4.50	0.85	1396.13	£177	1700.00	1700.00	£755	£932	£-3779
6	4.50	0.82	1346.85	£171	1700.00	1700.00	£755	£925	£-2853
7	4.50	0.79	1297.57	£164	1700.00	1700.00	£755	£919	£-1934
8	4.50	0.76	1248.30	£158	1700.00	1700.00	£755	£913	£-1021
9	4.50	0.73	1199.03	£152	1700.00	1700.00	£755	£907	£-114
10	4.50	0.70	1149.75	£146	1700.00	1700.00	£755	£901	£786
11	4.50	0.56	919.80	£117	1700.00	1700.00	£755	£871	£1658
12	4.50	0.42	689.85	£87	1700.00	1700.00	£755	£842	£2500
13	4.50	0.28	459.90	£58	1700.00	1700.00	£755	£813	£3313
14	4.50	0.14	229.95	£29	1700.00	1700.00	£755	£784	£4097
15	4.50	0.00	0.00	£0	1700.00	1700.00	£755	£755	£4852

*Note: All cost values in this table are rounded to the nearest pound.*

## Worked Example: Year 1 ... Year 15

### Year 1:

Year: 1

Costs Outstanding: £-7543.28

Costs Outstanding: £-7543

Working Out (Year 1):

Usable Battery Max Capacity: 4.50 kWh

Degradation Factor: 0.97

Shiftable: 1593.23 kWh

Solar Used: 1700.00 kWh (50%)

Solar Export: 1700.00 kWh (50%)

Battery Savings: £202

Solar Savings (self-use): £474

Solar Savings (export): £281

Costs Outstanding: £-7543

Yearly Total Savings: £957

...

### Year 15:

Year: 15

Costs Outstanding: £4851.58

## Cumulative Savings Chart

## Summary

## How We Calculate Your Results

### Battery Savings (per year):

The lesser of (Usable Battery Max Capacity × Degradation Factor × 365) or Usage, multiplied by (Peak Rate minus Offpeak Rate), multiplied by Battery Efficiency.

## Cumulative Savings Over Time



### Solar Savings (per year):

$(\text{Solar Used} \times \text{Peak Rate}) + (\text{Solar Export} \times \text{Export Rate})$ .

### Yearly Total Savings:

Battery Savings + Solar Savings.

### Cumulative Savings (per year):

The sum of Yearly Total Savings up to this year, minus the Initial Cost.

### Payback Period:

The first year when Cumulative Savings becomes greater than zero.

### ROI Percentage:

$(\text{Total Savings} \div \text{Initial Cost}) \times 100$ .

### What the variables mean:

Usable Battery Max Capacity: Maximum usable battery capacity (kWh)

Degradation Factor: Battery degradation for the year (e.g., 0.85)

Usage: Annual energy usage (kWh)

Peak Rate, Offpeak Rate, Export Rate: Tariff rates (GBP/kWh)

Solar Used: Solar energy used on-site (kWh)

Solar Export: Solar energy exported (kWh)

Battery Efficiency: Battery round-trip efficiency (e.g., 0.85)

Initial Cost: Upfront system cost (GBP)

Total Savings: Cumulative savings at the end of the period (GBP)

## Explanatory Notes

This report details the calculations and assumptions used to estimate the return on investment for your solar and battery installation. For questions, contact our support team.