# The Big Green Energy Company
# ROI Calculation Report

Date: 2025-05-24

## 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 | 2380.00 | 1020.00 | £832 | £1034 | £-7466 |
| 2 | 4.50 | 0.94 | 1543.95 | £196 | 2380.00 | 1020.00 | £832 | £1028 | £-6438 |
| 3 | 4.50 | 0.91 | 1494.68 | £189 | 2380.00 | 1020.00 | £832 | £1022 | £-5416 |
| 4 | 4.50 | 0.88 | 1445.40 | £183 | 2380.00 | 1020.00 | £832 | £1016 | £-4401 |
| 5 | 4.50 | 0.85 | 1396.13 | £177 | 2380.00 | 1020.00 | £832 | £1009 | £-3391 |
| 6 | 4.50 | 0.82 | 1346.85 | £171 | 2380.00 | 1020.00 | £832 | £1003 | £-2388 |
| 7 | 4.50 | 0.79 | 1297.57 | £164 | 2380.00 | 1020.00 | £832 | £997 | £-1391 |
| 8 | 4.50 | 0.76 | 1248.30 | £158 | 2380.00 | 1020.00 | £832 | £991 | £-401 |
| 9 | 4.50 | 0.73 | 1199.03 | £152 | 2380.00 | 1020.00 | £832 | £984 | £583 |
| 10 | 4.50 | 0.70 | 1149.75 | £146 | 2380.00 | 1020.00 | £832 | £978 | £1561 |
| 11 | 4.50 | 0.56 | 919.80 | £117 | 2380.00 | 1020.00 | £832 | £949 | £2510 |
| 12 | 4.50 | 0.42 | 689.85 | £87 | 2380.00 | 1020.00 | £832 | £920 | £3430 |
| 13 | 4.50 | 0.28 | 459.90 | £58 | 2380.00 | 1020.00 | £832 | £891 | £4321 |
| 14 | 4.50 | 0.14 | 229.95 | £29 | 2380.00 | 1020.00 | £832 | £861 | £5182 |
| 15 | 4.50 | 0.00 | 0.00 | £0 | 2380.00 | 1020.00 | £832 | £832 | £6014 |

*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: £-7465.76
Costs Outstanding: £-7466

Working Out (Year 1):
Usable Battery Max Capacity: 4.50 kWh
Degradation Factor: 0.97
Shiftable: 1593.23 kWh
Solar Used: 2380.00 kWh (70%)
Solar Export: 1020.00 kWh (30%)

Battery Savings: £202
Solar Savings (self-use): £664
Solar Savings (export): £168
Costs Outstanding: £-7466
Yearly Total Savings: £1034

**...**

### Year 15:

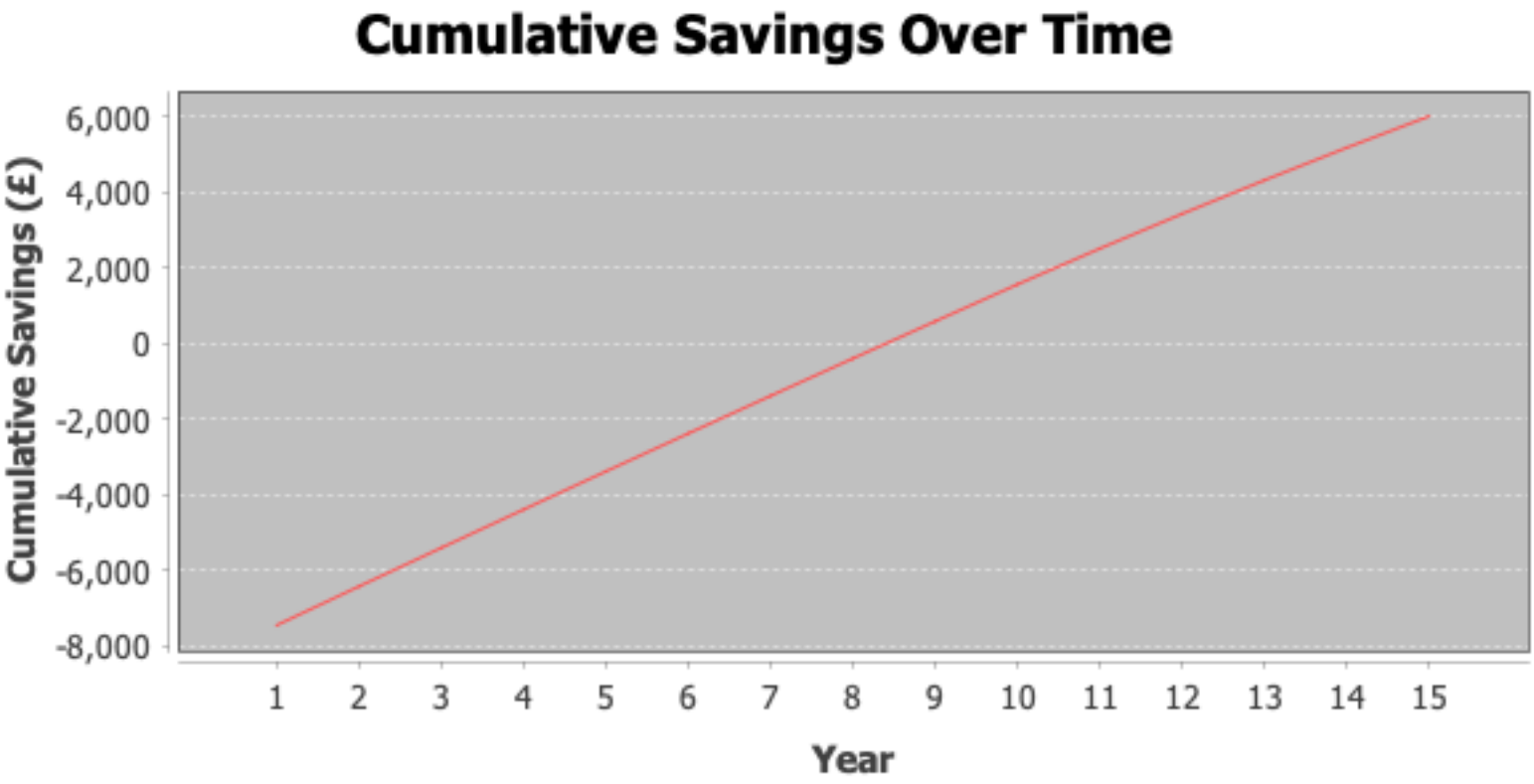
Year: 15
Costs Outstanding: £6014.38

## 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.




**Solar Savings (per year):**
(Solar Used × Peak Rate) plus (Solar Export × 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:**
(Total Savings divided by Initial Cost) × 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.