

28 Highbury Road Energy and Performance Assessment

Project Reference:	25-014
Installation Address:	28 Highbury Road, Hitchin, SG4 9SA
Survey carried out by:	Stephen Wright, James Taylor

Within this document, you will find information and official MCS & Easy PV calculations for the savings gained from the proposed solar installation, as well as the amount of energy both given back to the local area and used within the property directly from the installation, further reducing the energy requirements of the local area.

This design further utilises an Electrical Energy Storage System (EESS)/Battery to store energy not being used within the property, allowing for further savings to the client, as well as reducing energy consumption from the local grid. The designed Inverter and battery system has the capability of being directly controlled by an energy supplier, to alleviate strain on the grid, whether that be under or over loading.

With excess energy being feedback to the grid and utilising a battery system alongside the Solar Panels to reduce the average strain on the local network, this small-scale project would provide a valuable contribution to the local area as well as cutting greenhouse gas emissions. In relation to applications for renewable energy, paragraph 168 of the Framework states LPA's should recognise the benefits, outlined above, of these small-scale projects.

The Figures – Current Usage

If the system performs in line with the predictions set out by MCS, the following will apply. We have calculated the client will **self-consume 69%** of the energy produced, as determined by the method set out in MGD 003, therefore **exporting 31%**.

<u>Annual Benefit to Property</u>		
Estimated total annual output – kWh	4207kWh	per year
Grid independence: Estimated annual electricity savings	£836.00	per year
Annual income generated from Smart Export Guarantee	£119.00	per year
Estimated annual benefit of proposed Solar Installation:	£955.00	per year

<u>Annual Benefit to Local Area</u>		
Energy utilised from the installation/Reduction of local demand	3,257kWh	per year
Energy Fed Back to Local Community	749kWh	per year
Combined Reduction of Grid Requirements	4207kWh	per year
Reduction of CO2 Emissions	924kg	per year

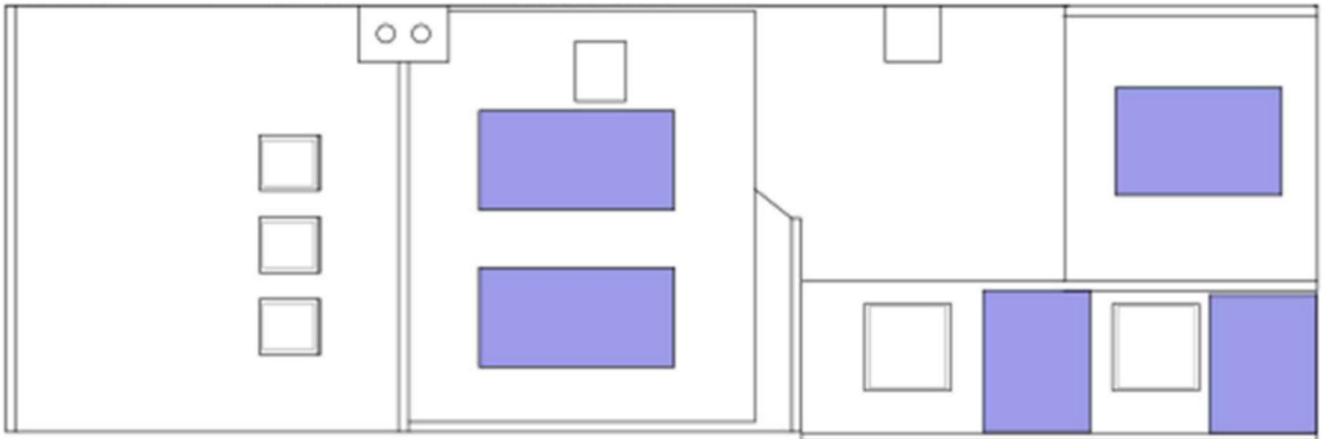
Total Cost and Payback Time		
Total Cost of Installation	£11694.24	
Estimated annual benefit of proposed Solar Installation:	£955.00	per year
Payback Period	12.2 Years	

Calculations and Declarations

A. Solar PV Installation data	House Arrays
Installed capacity of PV system – kWp (stc)	5.26kWp
Orientation of the PV system – degrees from South	Various
Inclination of system – degrees from horizontal	Various
Postcode region	1
B. Performance calculations	
kWh/kWp (Kk) from table	708-960
Shade Factor (SF)	0.88-1
Estimated annual output (kWp x Kk x SF)	4207
C. Estimated PV self-consumption – PV Only	
Assumed occupancy archetype	Home half day
Assumed annual domestic electricity consumption	5700kWh
Expected solar PV self-consumption (PV Only)	1665kWh
Grid electricity independence / Self-sufficiency (PV Only)	29%
D. Estimated PV self-consumption – with EESS	
Assumed usable capacity of electrical energy storage device, which is used for self-consumption	8.1kWh
Expected solar PV self-consumption (with EESS)	3,257kWh
Grid electricity independence / Self-sufficiency (with EESS)	55%

Case Study for a reduced System

Below you'll find a Performance estimate for a reduced size installation on the same property, 28 Highbury Road. This is designed to illustrate the inefficiencies of such a system, as well as the undesirable payback period of such a system. This system removes the frontal facing solar array visible from Highbury road, as well as the south facing panels on the middle roof, the two arrays most effecting the overall "amenity of the area".



Remaining panels in "reduced System"

Annual Benefit to Property		
Estimated total annual output – kWh	2010kWh	per year
Grid independence: Estimated annual electricity savings	£501	per year
Annual income generated from Smart Export Guarantee	£3.00	per year
Estimated annual benefit of proposed Solar Installation:	£504.00	per year

Annual Benefit to Local Area		
Energy utilised from the installation/Reduction of local demand	1988kWh	per year
Energy Fed Back to Local Community	22kWh	per year
Combined Reduction of Grid Requirements	2010kWh	per year
Reduction of CO2 Emissions	427kg	per year

Total Cost and Payback Time		
Total Cost of Installation	£10,413.91	
Estimated annual benefit of proposed Solar Installation:	£504.00	per year
Payback Period	20.6 Years	

While this reduced system is not visible from the highway, comparing this to the proposed full system, it is clear to see the environmental and financial benefits of a system fully utilising the available roof spaces far outweigh any reduction in visibility, or rather a reduction of impact on the local area. With the reduced system paying for itself within 20 Years, compared with the full system of 12 Years.

The same MCS certified & Easy PV calculations have been used for the reduced system, and all previous disclaimers apply.

Further Planned Energy Usage and the Effects on Both Systems

Alongside the solar installation, it is the property owners current plan to install an Air Source Heat Pump (ASHP) as well as purchase another Electric Vehicle, further steps along the road to lower their, and the properties, carbon footprint. With this to be installed late 2025, early 2026, it is important to consider how these energy consumption changes will affect the property and is imperative to consider these changes in the current solar PV design.

Below you'll find a comparison between the full and reduced systems, with the current and future energy usages of the property.

<u>Total Usage, System Cost and Payback Times</u>	<u>Full System</u>		<u>Reduced System</u>	
Total Cost of Installation	£11694.24		£10,413.91	
Total Generation of Installation	4207kWh		2010kWh	
Future Annual Usage with ASHP & 2 nd EV	12800kWh			
Estimated annual benefit of proposed Solar Installation:	£1,048.00	per year	£529.00	per year
Percentage of Energy Needs Met from Solar	30%		15%	
Payback Period	11.1 Years		19.7 Years	

From the above analysis, it is clear to see that an extra 90% annual saving on the properties future and current bills will significantly benefit the property owner.