YHA Hadrian's Wall at The Sill – England & Wales

SUMMARY

Project description: The Sill (UK's first dedicated landscape discovery centre) will attract more than 100,000 visitors each year to the all-weather, year-round facility that will incorporate a new Youth Hostel, YHA Hadrian's Wall, retail facilities and a café.

Project type: Energy efficiency, Education in Sustainability, Sun, Other

National association: YHA (England and Wales)

Project location: YHA Hadrian's Wall at The Sill

Estimation of number of reduced tonnes of CO_2: The photovoltaic array will enable CO_2 savings of 9,776 kg/year or 9.77 CO_2e tonnes annually will be achieved. The solar thermal array will enable CO_2 savings of 6,499 kg/year or 6.49 CO_2e tonnes annually will be achieved. Combined, the volume of CO_2 saved is 16,275 kg or 16.275 CO_2e tonnes annually equivalent to the emissions from an average new car driving almost twice round the world (EU 2015 standard car emissions – 209g/km – distance round the equator 40,075 km. = 1.94).

Total funds request: GBP £7,000

Total project cost: GBP £14.5m

Annual £ saves and ROI (return of investment):

Photovoltaic Panels:

•Total cost – supply, installation & commissioning £25,406.25

•Payback Period 6.6 Years

Solar Thermal Panels:

•Total cost – supply, installation & commissioning - £78,863.47

•Payback Period x Years – awaiting information

Why this project should be funded ahead of others:

The Sill is a once in a lifetime opportunity to turn a national spotlight onto the vital importance of landscape to our nation's health, wealth and well-being; to stimulate and nurture the next generation of landscape enthusiasts; to open up access to the countryside to everyone; and to ensure that these last wild places - and the communities within them - continue to thrive.

But The Sill will be far more than simply a visitor destination. It will create a gateway from which extensive learning and research activities will be provided and become a leading education facility for landscape, conservation, countryside management, leisure, and tourism skills. A comprehensive new activity programme will inspire people to celebrate, value and conserve Northumberland's unique natural and cultural features.

Climate change continues to shape and impact on the nationally important landscapes of North East England, demonstrating these impacts can be slowed or reversed is an important element of this project. The renewable energy systems practically demonstrate how low impact, natural methods of providing heat and hot water don't have to have a detrimental impact on the environment.

DETAILED PROJECT INFORMATION

Purpose/objectives of the project activity:

Introduction: The Sill: National Landscape Discovery Centre – a summary

The Sill is a bold, ambitious project that will transform how people of all ages understand and explore the landscapes, history and heritage of Northumberland and the wider North East England. The Sill will be the UK's first dedicated landscape discovery centre and will form a gateway from which extensive learning, participation and research activities will be provided. It will become a leading education facility for landscape, conservation, countryside management, leisure, and tourism skills. A major purpose of The Sill is to enable the landscapes of Northumberland National Park and surrounding Areas of Outstanding Natural Beauty to be opened up to a broad range of new audiences, including children, families, older people, disabled people and those less confident at exploring natural places. The Sill will attract more than 100,000 visitors each year to the all-weather, year-round facility that will incorporate a new Youth Hostel, YHA Hadrian's Wall, retail facilities and a café. It will deliver substantial economic benefits to the area, including a Rural Growth Hub to support the development of rural enterprises, and will offer a wide range of volunteering activities to strengthen local communities through increased participation activities.

We have designed a comprehensive programme of interpretation, education and participation activities that will inspire people to celebrate, value and conserve the unique natural and cultural features of the landscape. YHA (England and Wales) is working in partnership with Northumberland National Park Authority and in partnership with a broad range of other supporters, to develop and deliver this ambitious project that will have a substantial impact in Northumberland and beyond.

For more background information on the project see the Sustainable Development Impact Overview.

In supporting the vision of YHA's Environmental Strategy, Green Spirit 2 to become a more sustainable organisation, as well as protecting the charity against rising utility costs, YHA has embarked on a programme to invest in renewable energy systems at each site it develops where practical and affordable.

Appendix 2. Green Spirit 2*

YHA's two previous applications to the Hostelling International Sustainability Fund have been successful enabling the installation of a biomass boiler system at YHA Pen-y-Pass in Wales and a photovoltaic installation at YHA Boggle Hole, North Yorkshire.

This year we are hoping to secure HISF 15 funding to support the installation of renewable energy systems in the form of both solar thermal and photovoltaic panels at what will become a must visit place to stay, study and enjoy this ground breaking project in an iconic location.

Methodology (How):

In developing the energy strategy for the new building, M&E consultants, CAD 21 have assessed which renewable energy technologies could be incorporated into the new building with a view to providing a minimum of 10% of the building's annual energy usage via renewable technologies. Doing so will reduce both future carbon emissions and operating costs.

Appendix 3. The Sill Energy Statement*

The renewable energy contribution will come from a combination of photovoltaics and solar thermal panels. The photovoltaics will provide on-site electricity generation and solar thermal panels will be used to pre-heat the incoming mains cold water to gas fired water heaters, thus reducing the Sill's hot water energy consumption.

- Photovoltaic Panels – south façade canopy to incorporate 75 photovoltaic panels (122m² /18.75 kWp)

The Yield:

PV Generator Power (AC grid) 16,294 kWh/year

Own Consumption 13,448 kWh/year

Grid Feed-in 2,845 kWh/year

CO_2 Emissions avoided 9,776 kg/year

Appendix 4. The Sill PV Array – Specification/Energy Output/Financial Analysis/Carbon Saving Calculation*

- Solar Thermal – 13 roof mounted solar thermal collectors (40m²/37.77 kW). A high efficiency heat pipe evacuated tube system integrated to a 1500 Ltr preheat vessel.

Results of Annual Simulation

Installed Collector Power:	37.77 kW	
Installed Gross Solar Surface Area:	53.95 m²	
Collector Surface Area Irradiation (Active Surface):	39.20 MWh	942.35 kWh/m²
Energy Produced by Collectors:	23.60 MWh	567.35 kWh/m²
Energy Produced by Collector Loop:	23.28 MWh	559.54 kWh/m²
DHW Heating Energy Supply:	118.72 MWh	
Solar Contribution to DHW:	23.42 MWh	
Energy from Auxiliary Heating:	98.76 MWh	
Natural Gas (H) Savings:		**3,073.5 m³**
CO2 Emissions Avoided:		**6,499.27 kg**
DHW Solar Fraction:		**19.2 %**
Fractional Energy Saving (EN 12976):		**18.7 %**
System Efficiency:		**59.7 %**

Appendix 5. The Sill Solar Thermal Array – Specification/ Energy Output/Financial Analysis/Carbon Saving Calculation*

Monitoring plan:

YHA currently monitors electrical and gas consumption at all sites on a monthly basis. Oil and LPG consumption is monitored annually.

Completion of the installation will see output data captured and recorded. This will compiled and reported publically on an annual basis through YHA's Green Spirit 2 environmental plan.

- Operational efficiency will be measured and benchmarked against all YHA sites using KWH per Overnight
- Building efficiency will be measured and benchmarked against all YHA sites using KWH per M^2
- Fuel costs will be measured and benchmarked against all YHA sites

Contribution of the project activity to sustainable development (Sustainable Development Matrix) (For example, you might include details of other environmental, social or economical initiatives which will complement this project)

The Sustainable Development Impact Overview provides information on the impact the project will have on education and learning, the economic benefits, participation and conservation. It also outlines who will benefit from the project and in what way. It also outlines the local needs the project will tackle and difference the Sill make.

Appendix 6. Sustainable Development Impact Overview*

Environmental impacts:

The new Youth Hostel and Discovery Centre achieved a BREEAM rating of 'Very Good' with numerous measures designed to reduce energy consumption including;

- Building materials that insulate the building with low U values including external glazing
- The use of glazing to maximise daylight where possible
- The use of opening windows to maximise natural ventilation
- Ensuring the building is air tight and therefore warm air doesn't easily escape
- High efficiency LPG boilers
- Heat recovery devices
- Low energy use pumps and fans throughout
- Automatic self-learning controls for heating, ventilation and air conditioning
- LED lighting solutions to include occupancy detection and daylight linking.
- Spray taps and aerated shower heads to reduce hot water consumption
- Dual flush toilets to reduce water consumption

Other Positive Environmental impacts

- Local food stuffs will be served daily and locally produced ales sold
- Local tradespeople will be employed to support on-going maintenance.
- Through proactive marketing and improved information provided to guests in advance of their stay, we will increase the number of people who travel to YHA Hadrian's Wall using public transport
- YHA actively encourages car free breaks and promotes the use of public transport as a means of access
- YHA ensures the needs of walkers and cyclists are catered for encouraging the car to remain at home
- YHA will continue to promote cycling and walking through enhanced on site interpretation coupled with improved staff knowledge. Secure storage, repair equipment, bike cleaning facilities and extensive route information will aim to exceed expectations
- When operational, all waste on site will be sorted and removed to be recycled. Food waste will be composted.

Estimations of emission reductions (CO_2e tones)

- The photovoltaic array will enable CO_2 savings of 9,776 kg/year or 9.77 CO2e tonnes annually will be achieved
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  (EU 2015 standard car emissions – 209g/km – distance round the equator 40,075 kms = 1.94)

Saved Funds and ROI (return of investment):

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***Should you be interested in any Appendix marked with a star, please send us an e-mail; blopez@hihostels.com**

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