Statement of Need

St. Mary the Virgin Primrose Hill – Installation of photovoltaic technology

Introduction

This statement has been prepared by MRDA Architects and Conservation Consultants with support from the PCC. This document should be read in conjunction with the Statement of Significance/Heritage Statement and the Design Access Statement.

General Information

St Mary the Virgin Primrose Hill

Elsworthy Rd, London NW3 3DJ

Camden London Borough Council.

Listed Grade II No.1329902

Registered Charity No. 1132701

Elsworthy Conservation Zone

Swiss Cottage (Ward)

Hampstead and Kilburn (Constituency)

D1 Non-Residential Institution

TQ 275841 Grid Reference

Email: office@smvph.org.uk

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St Mary the Virgin Primrose Hill lies within the deanery of North Camden in the Archdeaconry of Hampstead and the Edmonton Episcopal Area of the Diocese of London, within the Province of Canterbury in the Church of England. The population of the Parrish is 7,341.

Services:

Choral Evensong: Every First Sunday at 6 p.m. (Sunday)
Morning Prayer: Every First, Second, Third, Fourth, Fifth, Last Wednesday, Friday at 8:30 a.m. (Wednesday & Friday)
Evening Prayer: Very First, Second, Third, Fourth, Fifth, Last Monday, Tuesday, Wednesday, Thursday at 6 p.m. (Monday, Tuesday, Wednesday & Thursday)
Parish Eucharist: Every First, Second, Third, Fourth, Fifth, Last Sunday at 10:30 a.m. (Sunday)
Informal Eucharist: Every Second, Fourth Sunday at 9:15 a.m. (Sunday)
Morning Prayer: Every First, Second, Third, Fourth, Fifth, Last Monday, Tuesday, Thursday at 9a.m. (Monday, Tuesday & Thursday)
Weekly Eucharist: Every First, Second, Third, Fourth, Fifth, Last Thursday at noon (Thursday)
Holy Communion: Every First, Second, Third, Fourth, Fifth, Last Sunday at 8 a.m. (Sunday)
Weekly Eucharist: Every First, Second, Third, Fourth, Fifth, Last Tuesday at 7 p.m. (Tuesday)

The Parochial Church Council of the Church of St. Mary the Virgin Primrose Hill wishes to install an array of black Q-Peak Duo BLK-G5 315W photovoltaic panels on the south facing roof of the Nave. The German panels are of the best build quality and quality mark recognition. It is estimated that the scheme will generate 31,960 kWh/year at a cost of £40,400 (UKSG July 2018). 34kWp has been decided as a suitable size PV system. The system designer, supplier and installer UKSG has calculated it to be cost effective to install an export meter as the church is a relatively small consumer of electricity. The electricity generated will supply the Church's requirement, leaving a surplus allowing for an extra income that would help to sustain the Church and secure it as a place of worship for future generations. In 2017 St. Mary's electricity use was 15,126 kWh, 13,112 kWh day, 2,014 kWh night. If energy demands remain the same then the proposals would generate a net surplus of 16,834 kWh. Based on energy use figures the church would use 20% of the generated electricity, reducing its requirement from the grid by 42% (6,392/15,126 kWh). The other 80% would be exported to the grid. The return on investment has been calculated to be 10.9% with pay back after 10 years. Hypothetically speaking this surplus energy would be enough to power the latest model Nissan electric car for 58,830 km per annum if the generated electricity were to go straight to the vehicles with no losses en route.

Requirement

The proposed installation will:

- Help deliver UK government interim CO_2 emission reduction target of 57% by 2030 and long term target of 80% CO_2 emission reduction by 2050. Help deliver local Camden target of 40% CO_2 emission reduction by 2020.
- Help deliver Camden Council's Core Strategy 2010 Section 3.
- Help towards the CofE's 'Shrinking the Footprint' target of 42% CO_2 emission reduction by 2020 and 80% CO_2 emission reduction by 2050.
- Help the Diocese of London's 'Route 2050' target of at least 42% CO_2 emission reduction by 2020 and 80% CO_2 emission reduction by 2050.
- Meet the electricity requirement of the church in a sustainable and economic way.
- Supply the grid with renewable energy.
- Address the challenge of climate change and contribute towards locally generated renewable energy.
- Help raise awareness of environmental issues within the local community.
- Reduce the dependency on fossil fuel supply.
- Ensure the church is able to meet the needs of future generations.
- Increase local energy resilience.
- Provide an income for the Church.

The Church of England believes that responding to climate change is an essential part of their responsibility to safeguard God's creation. The 'Shrinking the Footprint' environmental campaign exists to enable the whole Church to address - in faith, practice and mission - the issue of climate change. The proposed installation will help meet the Church of England's sustainability objectives. The Government has also set a national target of 80% reduction in carbon dioxide emissions by 2050 with Camden Borough setting its own reduction target of 40% emission reduction by 2020. Delivering a Low Carbon Camden found that 58% of CO_2 emissions in the area are from non-domestic buildings such as the Church of St Mary the Virgin. If the national target of 80% and the local target of 40% reduction are to be met then a vast quantity of the built environment will have to be improved upon.

The proposed photovoltaic panels are a step in the right direction towards helping create a more stable and sustainable environment. The photovoltaic technology will reduce carbon emissions by 11.5 tonnes per annum. This is the equivalent of CO_2 emissions per year resulting from the energy use of around 9-10 return flights to New York[1]. The 11.5 tonnes per annum figure was calculated using the following formula:

Amount generated (G) X Average CO_2e emitted by the equivalent conventional methods (N) – The carbon used in the manufacture of the panels (M)

$$\mathbf{G \times (N - M)}$$

Various estimates were used to assume values for G, N and M, which are outlined and referenced below.

The amount generated, **G** is based in part on the manufacturer's rating and the average amount of solar radiation irradiation incident on the panels. The manufacturer estimates this to be 31,960 kWh per annum, calculated using the Energy Saving Trust's calculator.[2] 80% of this figure is to be exported, equivalent to 25,568 kWh. The church's most recent yearly requirement from the grid was 15,126 kWh. 20% of generation (6,392 kWh) is expected to be used on site. This reduces purchased electricity (drawn from the grid) by 42%. To this we add the remaining 25,568 kWh, which is predicted to be exported. This further offsets energy and emissions, resulting in a net saving of 31,960 kWh per annum.

[1] https://www.eta.co.uk/environmental-info/air-travels-impact-on-climate-change/
[2] wwww.pvfitcalculator.energysavingtrust.org.uk

The average carbon emissions needed to create and distribute conventional electricity **N** depends on what power generation methods are used (coal, gas, nuclear). The standard way of estimating this figure is using the 'standard grid carbon intensity', which was estimated at 449g CO_2 in 2017.

The carbon cost of primarily manufacturing and transporting these panels has been researched and calculated by the government. This is estimated as being **88 g CO_2 eq/kWh** [3] for a residential PV system in a typical location. The whole product life cycle has been taken into account.

Therefore:

(31,960 X (449-88))/1000 = 11.5 tonnes per annum

Proposal

It is intended that the photovoltaic system will be connected to the local power grid with the objective of selling surplus energy. The supporting electrical infrastructure such as the three-phase inverter will be located within the interior of the building. The photovoltaic panels are to be mounted to the south-facing nave roof on frames secured through the use of slate roof fixing hooks. These hooks are easily removable, allowing the roof to return to its original state should a need arise to remove the panels, highly desirable from a conservation point of view. The configuration of the panels will be a symmetrical array of 4 rows with 27 PV panels, totalling 108 in number as shown on the drawing of the southern elevation.

Justification

The proposed installation satisfies Camden Planning Policies: CS13 – Tackling climate change through promoting higher environmental standards, DP22 - Promoting sustainable design and construction, CPG3 – sustainability.

The National Planning Policy Framework[4] states that a balanced view should be taken of the community benefits and the visual impact of renewable energy. Paragraph 132 states that "When considering the impact of a proposed development on the significance of a

[3] http://wwww.parliament.uk/.../postpn_383-carbon-footprint-electricity-generation.pdf
[4] https://www.gov.uk/government/publications/national-planning-policy-framework--2

designated heritage asset, great weight should be given to the asset's conservation", and notes that substantial harm to a listed building of any grade should be exceptional.
Where the harm to a designated heritage asset is less than substantial (as in this case), NPPF paragraph 134 advises that "this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use."

The benefits to the local community are clearly outlined with further benefits to Greater London, The United Kingdom and our planet. The proposed black photovoltaic panels will have a visual impact as demonstrated by the series of winter and summer photographs of the church as seen from the surrounding area, however considering all the circumstances we believe the proposals to be justified. The installation of photovoltaic panels will have no more than a moderate-high impact, less than otherwise because they will be easily removable. The photovoltaic panels are to be installed using hooks designed to be retrofitted to tiled or slated roofs. The hooks will support the framework that the photovoltaic panels are mounted on to. This means that the photovoltaic configuration may be easily reversed or upgraded to another system without any damage to the fabric.

As well as the environmental and economic benefits, the scheme will also provide jobs with environmental benefits to local architects, engineers, builders and technicians. Savings made by the church on energy bills can be put towards essential maintenance of the building and church initiatives. Maintenance and conservation of the building can be costly and are important given the age of the church and it grade II listed status. The following areas are currently in urgent need of attention:

- South Aisle: buttress & wall to Chapel of the Holy Spirit
- South Aisle wall: buttress at west end
- North West entrance: buttresses flanking the entrance
- North Aisle: wall and buttress adjacent to rain water down pipe no. 19
- North Aisle: buttress adjacent rain water down pipe no. 18
- North East entrance: both buttresses flanking entrance

The Parochial Church Council organize a programme of lectures that attract enthusiastic audiences. Close liaison with the local schools maintain the links which are formed in the crèche and playgroup activities, while Youth groups and specialist groups are also supported within the Church family.

The principal church activities are as follow and listed in order of priority:

1. Youth work
2. Cold weather shelter (homeless)
3. School services
4. Tea room (outreach elderly people)
5. Crèche
6. Brewery (Craft Beer)
7. Lecture Series
8. Designer Fair
9. Counselling services
10. AA meetings weekly
11. Fitness clubs
12. Yoga Classes
13. Theatre group rehearsal space
14. Music concerts
15. Cinema Club
16. Meetings for local groups (resident meetings, groups, etc.)
17. Coding club (IT Training for children)
18. Citizens group meetings

Sources

1. http://wwww.pvfitcalculator.energysavingtrust.org.uk

2. http://wwww.ethex.org.uk/how-much-co2-pollution-do-solar-panels-save_479.html

3. http://wwww.parliament.uk/.../postpn_383-carbon-footprint-electricity-generation.pdf

4. http://wwww.parliament.uk/documents/post/postpn268.pdf

5. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

6. *https://en.wikipedia.org/wiki/List_of_churches_in_the_Diocese_of_London#Archdeaconry_of_Hampstead*

7. Ministry of Housing, Communities & Local Government. *National Planning Policy Framework*

8. London Borough of Camden. *Camden Council Core Strategy 2010.* London 2010. Crown Copyright 2012.

9. *http://www.hamhigh.co.uk/news/environment/highgate-church-to-be-powered-by-solar-energy-let-there-be-light-1-4626546*

10. *http://www.yougen.co.uk/blog-entry/2996/I+want+to+install+solar+panels+on+a+listed+building+-+how+do+I+proceed'3F/*

11. http://www.bbc.co.uk/news/uk-england-28546589

12. https://webcache.googleusercontent.com/search?q=cache:ugyLVD7oUiEJ:https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/661674/env0103.ods+&cd=1&hl=en&ct=clnk&gl=uk

13. Department for Transport Statistics – Table TSGB0303 (ENV0103) – Average Fuel Consumption, Great Britain: 2000 to 2016

14. https://www.bbc.co.uk/news/uk-england-28546589

15. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

16. https://www.eta.co.uk/environmental-info/air-travels-impact-on-climate-change/