Calthorpe Project solar feasibility study

July 2018

GREATER LONDON AUTHORITY

the calthorpe project
A Green Oasis in the Heart of Kings Cross

COMMUNITY BY DESIGN

REPOWERING LONDON

Contents

1. Background

Established in 1984, the Calthorpe Project is an inner-city community garden and centre that exists to improve the physical and emotional well-being of those who live, work or study in Camden and surrounding area. Its three core objectives are:

1. Managing sustainable green space and community facilities
2. Developing people and their skills
3. Creating better social conditions

Its core services include; horticultural volunteering for those with learning disabilities and mental health issues; supervised children's activities for children and families; sports coaching for young people; and community classes and activities.

Since 2014, the Calthorpe in partnership with Community by Design, has established an educational closed-loop model incorporating sustainable food growing, a vegetarian cafe and a micro anaerobic digester. Building on this foundation it has developed and delivered a number of free training courses and workshops in:

- Urban food growing
- Anaerobic digestion and composting
- Sustainable cities and local management of organic resources
- Solar panel building workshops
- Building an electricity generating bicycle
- Upcycling workshops
- The Organic Circular Economy and Community Biogas (with the University of Surrey)
- Hydrogen and fuel cells (with UCL)

This proposal is therefore part of a number of measures led by the Calthorpe Project to reduce their carbon footprint and increase public awareness of climate change.

2. Project overview

The purpose of this on-site renewable energy generation project is to provide electricity for the Calthorpe Project community centre and serve as an educational tool for the project's visitors. The project will encourage sustainable behavior by the community, through awareness raising to reduce unnecessary energy use.

The Calthorpe's roof size, structure and lack of shading make it an ideal candidate for the proposed solar installation. In addition, the project will generate a steady income over the next 20 years from the Government Feed-in-Tariff and the sale of electricity onsite and export to the National Grid, which will benefit the Calthorpe Project and its users by reducing operating costs.

A 10.2kW solar system is proposed, which could be integrated with the existing green roofs on the community centre buildings. The small-scale nature of this installation is in keeping with the visual appearance and values of the existing Calthorpe Project building. Consideration has been given to minimise the visual impact and external appearance of the solar installation on the surrounding buildings. The visibility of the panels from street level or from buildings of the same or lower height has been minimised across the scheme. There will be no wall-mounted panels but the panels will be partially visible from street level as well as to the surrounding buildings due to the low nature of the roof of the community centre. However, the majority of the panels will be screened from street level by the surrounding vegetation and installation on the east side of the roof.

With funding from Patagonia, we will engage people with renewable energy across solar, wind and electricity generating gym technology. Activities and workshops will teach practical skills and engage people with climate change and renewable energy.

3. Community energy expertise

The project will be jointly led by Repowering London and Community by Design working in partnership with the Calthorpe.

Through Repowering, we aim to involve young Londoners in apprenticeship opportunities helping install the solar system proposed for the Calthorpe. Repowering will supervise the apprentices working alongside experienced installers.

Repowering London develop renewable energy projects working closely with professional installers, and local community groups to:

- Reduce CO2 emissions by generating decentralised low-carbon energy
- Tackle fuel poverty and educate residents about energy efficiency
- Promote local leadership through co-operative community engagement
- Provide opportunities for local and responsible financial investment
- Create training and employment opportunities for local people.

The design, execution and maintenance of each solar project includes internship opportunities for young people in finance, IT, technology, legal and marketing activities. So far, they have installed 132kWp of community owned renewable energy, saving almost 60 tonnes CO^2 per annum.

Community by Design (CbD) a Camden-based community energy organisation, will engage people with solar system after the installation. Workshops designed to engage people with issues around energy, climate change and renewables will be followed by weekly sustainability volunteering opportunities where people can practise the skills learned and continue exploring renewable energy themes.

Established in 2012, CbD has worked with the Calthorpe since 2014 to develop a closed-loop food-energy-waste model. We now have an anaerobic digester, which turns food waste from the café into renewable biogas for cooking and heating, and digestate to support more food growing. The produce harvested goes back to the café to complete the loop. The off-grid AD system is powered by a 1kW solar system.

CbD have developed and delivered AQA accredited training modules based on this organic circular economy model to teach people about sustainable cities, anaerobic digestion, composting, soil management, food growing and how to waste less and recycle more with the aim of helping people to become more empowered, informed and self-sufficient.

4. Benefits

The Calthorpe Project in partnership with Community by Design and Repowering London intend the project to be an example project to other community centres and encourage the surrounding communities to take positive action to mitigate climate change.

4.1 Environmental benefits

The system is estimated to generate an annual energy yield of 9,811kWh, capable of saving 4,522kg of CO_2e per year. This would reduce fossil fuel consumption on-site by 25%.

4.2 Community benefits

The system will be configured so as to maximise on-site usage of the electricity generated spread over the next 20 years, which will benefit the Calthorpe Project by reducing the amount that needs to be bought from a supplier. The electricity will supply the main buildings, which include the office, café kitchen, under 5's area, activity and meeting rooms etc. Any energy not used on site will be sent to the National Grid.

At a time of widespread funding cuts and increased overheads, this represents a significant contribution towards the sustainability of this valued community resource, which has been described as a "haven in a busy, urban area, acting as an important focal point for the local community". It will help ensure that its diverse services can continue to be delivered into the future.

5. Project plan

Activity	**Delivered by**	**Milestones**
Planning application submission	27th August	M1
Fundraising applications for match funding and in-kind contributions sought	17th September	
Planning consent	27st October	
Match funding/in-kind contributions confirmed	17th December	M2
Installation preparation	7th January 2019	
Installation	14th January 2019	M3

6. Technical details

The proposed PV array will consist of a 10.2 kWp system, where this system will comprise of 34 x 300W solar PV panels spread over the flat roof, which will provide electricity to the community buildings listed above. The system is estimated to generate an annual energy yield of 9,811kWh, capable of saving 4,522kg of CO_2e per year. The system will include 1 inverter to convert the solar output to the correct voltage of alternating current for use within the premises. Supporting electrical infrastructure including cabling will also be part of the installation.

A total of 55.75 m^2 of solar panels will be installed on the roof (34 panels). Further details of these installations that include Layout Drawings and street level views of the centre are attached in the appendix below.

The photovoltaic modules are glass fronted, aluminum framed modules. The modules have an anti-reflective coating to enhance solar energy capture and therefore appear duller than conventional glass due to lack of reflection and glare. The layout has been designed to minimize the shading from surrounding buildings and other structures on the roof to provide a higher energy yield.

On flat roofs panels will be roof-mounted using metal or plastic A-frames secured by ballast. No roof penetration will be required, and wind-loading calculations will determine the ballast requirement. The panels and A-frames will be approximately 200mm high.

As a single storey building, access will be via scaffolding towers or other methods in compliance with relevant legislation and HSE guidance.

7. Permissions

The installation requires planning permission. A draft planning statement has been prepared with drawings and will be submitted before the end of August.

A green roof expert has been consulted and his recommendations will be taken on board for the installation to minimize impact on the green roof.

A structural engineer has also been engaged to assess the building's load bearing capacity and provide a report.

Permission has been sought on 30.07.18. from LB Camden with whom the site lease is held. The Calthorpe are currently awaiting a response.

8. Community engagement

Community engagement for this project took place over two phases between 01.02.18. – 31.04.18. Below is a small selection of the comments gathered as well as tables summarising the activities for each phase. More detailed evaluation of the engagement activities can be found in Appendix 2.1 and 2.2.

> "I believe that the idea of installing solar panels at the Calthorpe is brilliant and fits the ethos of the project as a sustainable social enterprise. It will help us to reduce our carbon footprint and serve as a good example to our community."
>
> "Why wouldn't you? A sustainable oasis in the heart of London. If the energy is coming from the sun, it's not coming from the taxpayer."
>
> "I think it's important and urgent. No concerns. For an area like Kings Cross, this would be an important step towards sustainability and containing toxicity."
>
> "Great for the community and the planet! Exciting – having a unique feature in the garden."
>
> "I think it's great – especially as it makes it accessible to interested members of the public to learn about. As I'm thinking in an educational context, it would be good if it was accessible for groups to go up on the roof to see and learn about the technology - inspire others to do it too."

8.1 Phase 1 Community engagement summary

Activities	No of people reached
Solar panel taster workshop	5
Bicycle generator workshop and solar tour	6
Online channels	
▪ Eventbrite	100
▪ Social media	150
▪ Calthorpe website blog	150
▪ Community by Design blog	100
▪ Calthorpe newsletter	100
Calthorpe groups	
▪ Spanish speaking older people's gardening group	12
▪ Bloomsbury Beginnings	6
▪ Weekly volunteer groups	8
▪ Calthorpe staff	8
▪ Calthorpe Trustees	6
TOTAL	651

8.2 Phase 2 Community engagement summary

Community engagement activities	No of people reached
Make your own DIY Solar panel workshop	8
Staff and Trustee meeting	13
Online channels	
▪ Eventbrite	150
▪ Social media	150
▪ Calthorpe newsletter	100
Calthorpe groups and workshops	
▪ Exploring cultivation workshop	11
▪ AQA Food Growing training	13
▪ AQA Anaerobic Digestion training	5
▪ Upcycling workshops	8
Flyering local area	250
TOTAL	708

9. Costs

The feasibility work to date, including the planning application, has been supported by the GLA's London Community Energy Fund.

Two quotes were sought. The total system cost will be £13,630.

Match funding for the system costs will be met through fundraising efforts by the Calthorpe Project over the coming months.

10. Dissemination

The Calthorpe regularly hosts a mixture of volunteering activities, trainings and group site visits for university students, community energy projects, corporate staff and other interest groups. A tour of the site is always included for each of these activities and the proposed solar installation will become a major feature of these tours in highlighting the importance of renewable energy generation. It also makes the Calthorpe a more attractive event and meeting space for environmentally minded groups.

Appendix 1 – site layout and location

Below are a series of images showing the layout and location of the proposed solar installation at the Calthorpe Project.

Figure 1: Calthorpe community energy and garden street view, from Grays Inn Road

Figure 2: Ariel view of the Calthorpe centre and garden

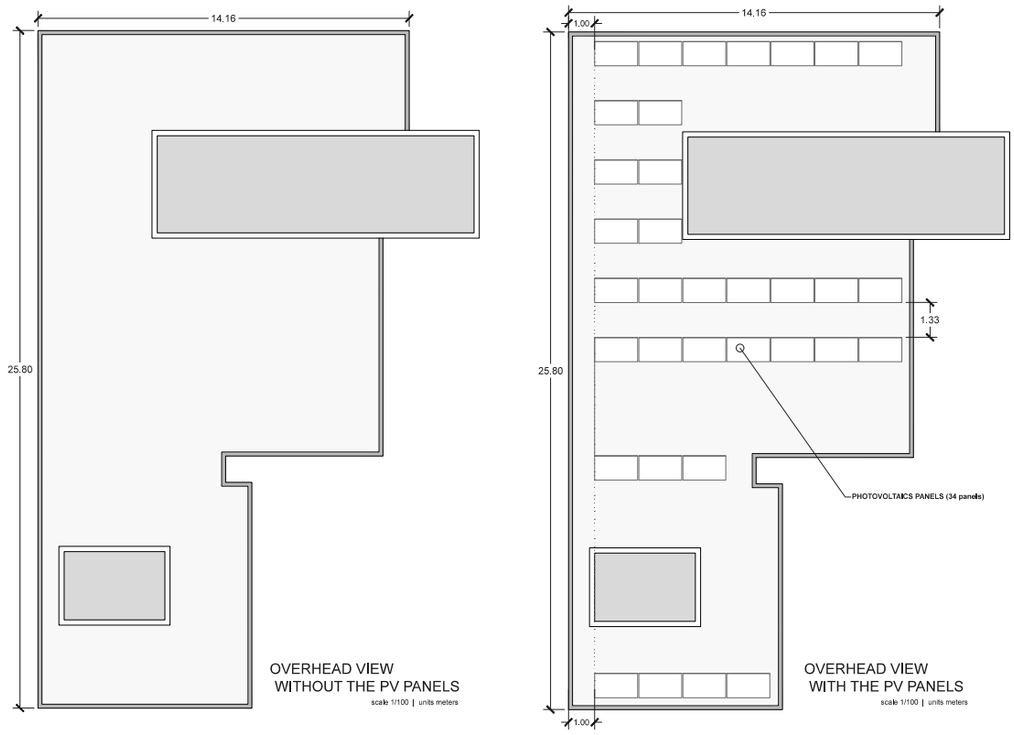


Figure 3: Ariel view of the roof with and without proposed solar panel installation

Project Location

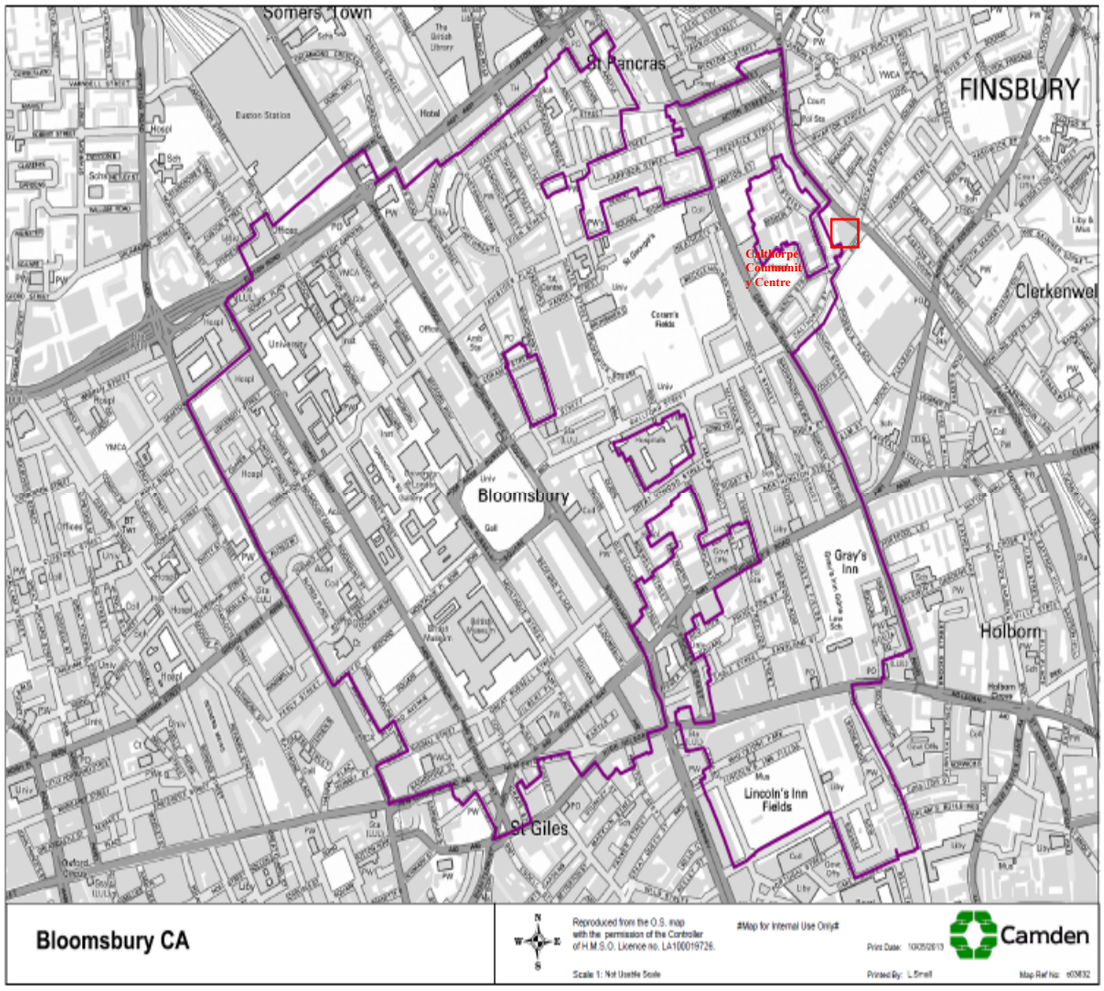


Figure 4: Arial view of the Avondale and Avondale Park Gardens Conservation Area

Appendix 2 - Community engagement

Engagement covered activities from 01.02.18. to 27.04.18.

2.1 Community engagement: Phase 1

During this period, community engagement activities focused on:

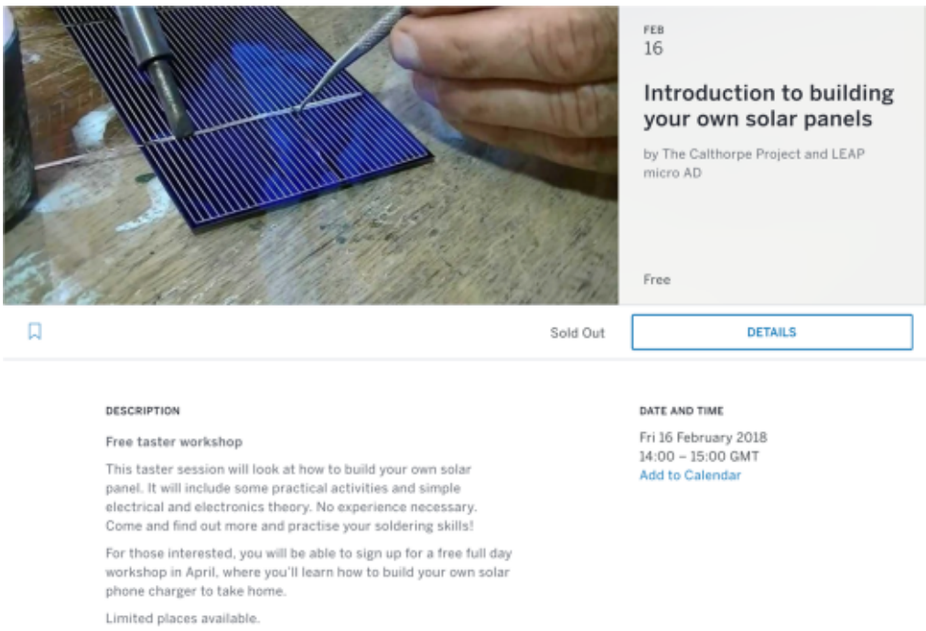
- Delivering two public engagement events,
- Online marketing through:
  - Eventbrite,
  - Social media,
  - Blogs on the Calthorpe and partner websites,
  - Calthorpe newsletter,
- Consultation with Calthorpe's existing user groups, staff and trustees.

Engagement events

16.02.18. A Solar panel taster workshop was held explaining the basics of solar energy, electricity and the aims of the proposed installation. Participants' feedback was then invited and recorded.

10.03.18. A DIY Bicycle generator workshop was held to approach renewable electricity generation from a different angle. People learned how mechanical energy can be converted into electricity and were given a tour of the site including the small existing 1kW solar array on the Calthorpe greenhouse roof. The aims of the larger proposed installation were explained and participant's feedback was gathered.

Online engagement
Eventbrite listing were created for both workshops above – see example below:



Events were also tweeted through partner Twitter accounts and advertised through local University student networks including SOAS and UCL.

Blogs about the solar installation inviting feedback were posted on the Calthorpe and Community by Design website.

The Calthorpe's February newsletter included a section about the solar project and an invitation to feedback.

Calthorpe user group consultations
Solar consultation activities with existing Calthorpe user groups as well as staff and trustees included explaining the purpose and scale of the proposed solar installation. Feedback, comments and concerns were invited from the following groups:

- Spanish speaking older people's gardening group
- Bloomsbury Beginnings
- Weekly volunteer groups including the Calthorpe Living Lab group
- Calthorpe staff
- Calthorpe Trustees

Comments gathered
Below, is a representative sample of the comments gathered during consultations with 51 centre users, workshop participants, volunteers, staff and trustees. People were asked:

- What they thought of the idea of installing solar the Calthorpe,
- If they had any concerns
- What they thought might be the benefits.

While all respondents were in favour of the proposed installation, a small number (4) expressed concerns over how wildlife and the green roof might be affected.

> "I believe that the idea of installing solar panels at the Calthorpe is brilliant and fits the ethos of the project as a sustainable social enterprise. It will help us to reduce our carbon footprint and serve as a good example to our community."
>
> "Why wouldn't you? A sustainable oasis in the heart of London. If the energy is coming from the sun, it's not coming from the taxpayer."
>
> "I support the proposal for solar panels. It fits perfectly with the Calthorpe ethos and is a great example for all users, particularly young people. If it can contribute to saving costs even better. It is a progressive and well thought out proposal, which will benefit users."
>
> "Solar as part of showing energy self-sufficiency from renewables – all for it – do it!"
>
> "Fantastic that we could have solar, very good for carbon footprint and the premises."
>
> Solar panels would be an amazing addition for the Calthorpe to fulfil its closed-loop system aspirations."
>
> "It will be good to add solar panels to the roof in order to use that energy to reduce the carbon emissions of the office and rooms at the Calthorpe. I would just like to be reassured that they don't have a bad impact on birds and insects."
>
> Solar panels would be a great addition to the Calthorpe, in keeping with its ethos and how things should be run.

> “The Calthorpe is an inspirational and progressive organisation and the idea of including solar panels seems a natural continuation of a brilliant path already undertaken.”

2.2 Community engagement: Phase 2

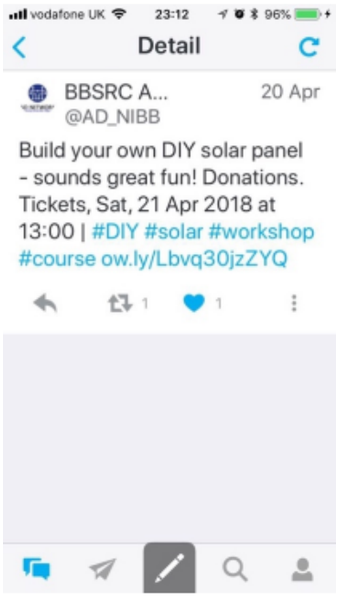
During this period, community engagement for this project focused on:

- Delivering two engagement events
- Flyering the local area
- Online marketing through Eventbrite and social media
- Including information in Calthorpe newsletter to invite feedback
- Engaging with Calthorpe’s existing user groups and workshop participants

Engagement events

- 17.04.18. Calthorpe staff and trustee meeting
- 21.04.18. Solar panel DIY workshop

Online engagement



Comments gathered
Below, is a sample of the comments gathered during consultations with 58 centre users, volunteers, trustees, workshop and training participants. People were asked:

- What they thought of the idea of installing solar the Calthorpe,
- If they had any concerns
- What they thought might be the benefits.

All respondents were in favour of the proposed installation with just 5% mentioning concerns such as wind and panel vibration, and cost.

> “I think it’s important and urgent. No concerns, I think Calthorpe will provide an important space or sustainable energy. For an area like Kings Cross, this would be an important step towards sustainability and containing toxicity.”

> “Great for the community and the planet! Benefits – educational – local schools and residents learn about solar; environmental obviously: Exciting – having a unique feature in the garden.”

> “I think it’s great – especially as it makes it accessible to interested members of the public to learn about. As I’m thinking in an educational context, it would be good if it was accessible for groups to go up on the roof to see and learn about the technology. Benefits – educational – inspire others to do it too.”

> “Great idea. No concerns. Close the energy loop and provide more alternative, off-grid energy on site.”

> “Seems like a great idea to help out a good cause. No concerns, I think it is a great showcase of the benefits of solar power and allows for amazing educational purposes.”

> “Brilliant, very good idea! Would be concerned about vibration of panels on a windy day.”

“Why not? If you have free roof space it makes sense to put PV on it. No concerns although they are still quite expensive. Well depending on how you get financing for it – if you get someone else to pay for it will decrease the bills.”

“Brilliant idea. Will be good for the community to see the innovations that we need to implement. It should be functional so people can see what it is charging. Main benefits would be awareness and electricity.”

“Great idea! Environmental benefits for the entire community. Economic benefits as it can help reduce the energy bills for running the facilities. Social benefits for all users and participants of the project.”

“I think it’s a great idea as solar is becoming more relevant and is a cleaner source of energy. No concerns. Main benefits – have an alternative to power the Calthorpe; allows less places to be reliant on non-renewable energy (fossil fuels); reduces energy costs.”