Eco-redevelopment for Downing Place Church

Margaret Reynolds

Thursday 14th October, 19:00-20:00

Downing Place United Reformed Church

Low-carbon redevelopment 2016 - 2021

Open Eco Homes

Zoom discussion – Ppt 2: Plans, Construction & Eco Measures

Thursday14 October 2021 – 7:00

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2nd part:
DPURC Eco-Retrofit - Non-Domestic

- What was there?
- What did we do? (Quick view, incl other measures)
- How did we do it?
  - Successes
- DISCUSSION

St Columba's United Reformed Church

Photo: ArchAngel

Church

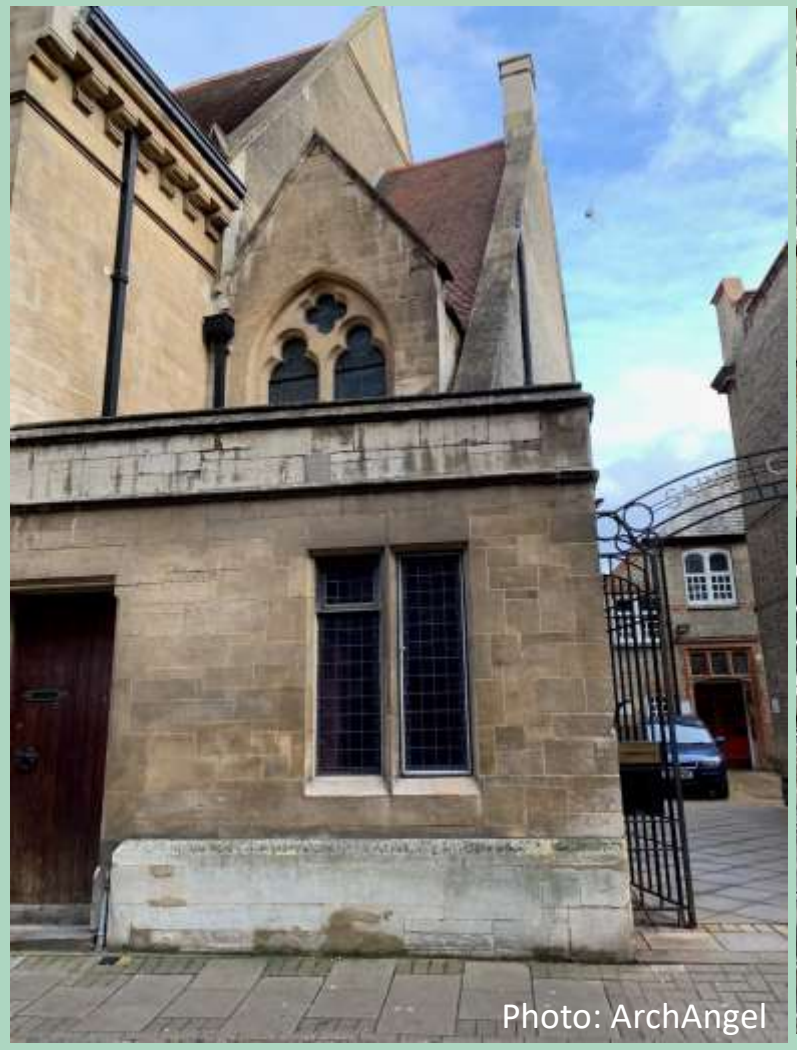


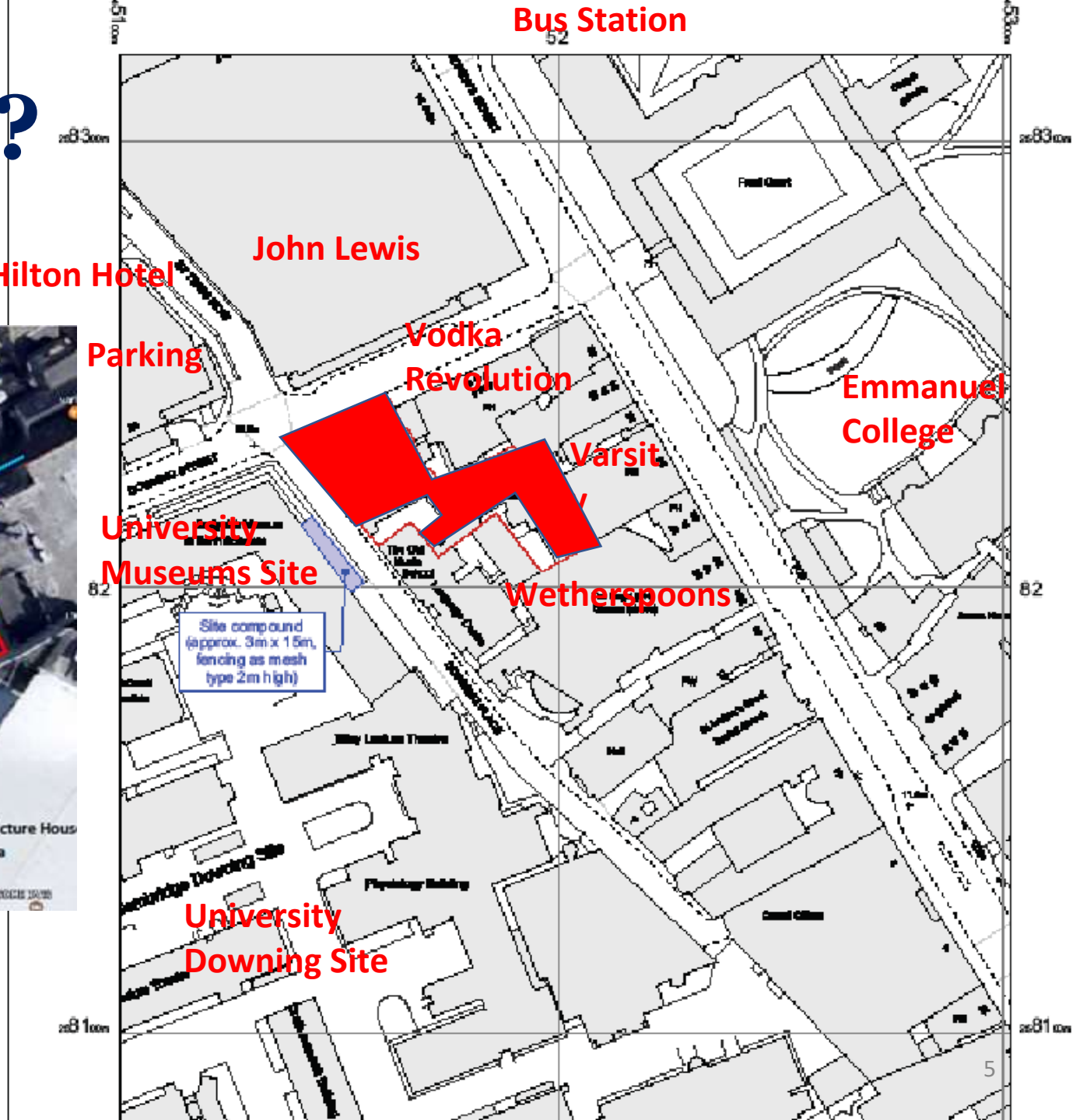
Photo: ArchAngel

Two Halls


Photo: ArchAngel

Caretaker's

What was there?

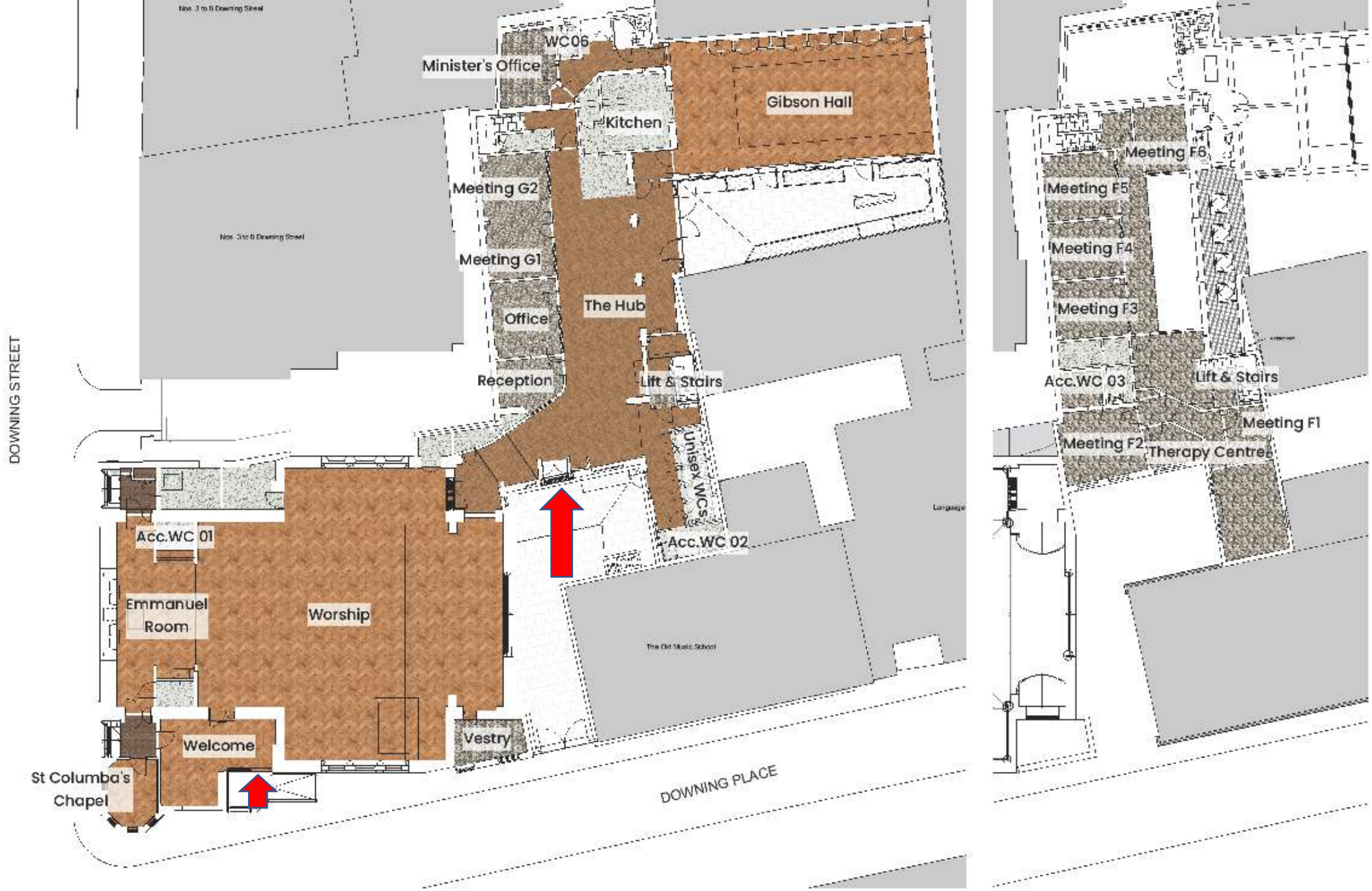


What was there?

Church

St Columba Hall

Gibson Hall



Ground Floor Plan

First Floor Plan

Building Group: Sustainability

2017, 13 November, Building Group meeting notes:

"Architect Interviews:

<u>Sustainability</u>:

'Whenever possible, the most sustainable route should be pursued' is to be added to the requirements; TBC when and how to do this.'

["Margaret, we hope you will show us how to do this."]

'Cost had made sustainable construction impossible when renewing the roofs with the Amey Cespa grant."

Building Group: Sustainability

2018, 23 February, Building Group paper:

EMMANUEL – ST COLUMBA'S
BUILDING GROUP

SUSTAINABILITY POTENTIAL

23 February 2018 - REV 2019.05.28

Here are some more thoughts, this time on possible measures we could take to lower carbon emissions associated with the new Downing Place URC site. We have said we want to make the buildings as sustainable as we can.

SUMMARY: Some general principles

1) In order to reduce our energy use and carbon emissions, we need to establish our baseline use now, per square meter of the building per year – this is a measurement to compare with other buildings, including exemplar low-carbon buildings.
2) Once we know our energy use, we can set targets for reduction. There are benchmarks, systems for "eco-renovation," and new-construction systems to help us set reasonable targets for existing buildings and new building.
3) In addition to the fabric of the building and the "utilities" required to operate it, there are the number of tonnes of carbon emissions generated by the activities in the building. This is the "Carbon Footprint" of our church as a whole.
4) Sections 1, 2 and 3 set out principles of sustainability in theory.
5) Section 4 looks at what we can do on the St Columba's site.
6) Among the many "measures" we can take, some will have a greater effect than others. We have a major opportunity here, presented by the re-organisation and building renovation, to "futureproof" the new church. This will not occur again for generations.

Building Group: Selling Sustainability
Nov 2018 & June 2019

- Strategy decided by July 2018
- Archts scheme costed by QS – Sept 2018
- Presentations of scheme by Archts, by BG in small groups
- Vote by Church Meeting Nov 2018:
  "to spend up to £5m, while continually seeking reductions"
- Consultants appointed by Jan 2019, incl Kitchen, IT, AV
- Documents to contractors for negotiated tender, got price May 2019
- SECOND vote by Church Meeting June 2019 on scheme + cost

What did we do? - Outside

Church –Downing St Church –Downing Pl New Welcome entrance

What did we do? - inside

Photo: M Reynolds

Hub

Photo: M Reynolds

Drawing: MRRIBA

Garden

What did we do? – external blinds

External awning blind transmits 4% - 14% of heat

Velux

Solar energy transmittance:

Figure 1: Window without blinds	g = 61% (0.61) as per EN 410
Figure 2: Window with internal blackout blind	g = 37% (0.37) as per EN 13363-1
Figure 3: Window with awning blind (depending on the fabric used)	g = 4-14% (0.04 – 0.14) as per EN 13363-1

Figure 1 Figure 2 Figure 3

Solar radiation coefficient 'g' informs about the amount of solar energy reaching the glass which penetrates into the room. The higher value of 'g' coefficient, the room heats up faster. The external awning blind offers up to **8 times more effective** protection in comparison with internal blackout blinds.

Fakro, installed 2020:
Put in place for summer season

What did we do? – Garden


Photo: ArchAngel


Drawing: MRRIBA


Garden screen on Church Magazine cover


Photo: MRRIBA

What did we do? - inside

Church

What did we do? – 3D design model

ArchAngel Architects: 3D model on-site tablet

How we did it - FABRIC INSULATION

Gibson Hall roof insulation

How we did it - FABRIC

Mezzanine + Hub

How we did it - FABRIC INSULATION

Hub: New roof, rooflights & PV

How we did it - FABRIC INSULATION

Church ceiling/roof insulation

How we did it - FABRIC OPENINGS


Photo: M Reynolds

Hub:
Daylight,
Ventilation
Solar shading


Photo: M Reynolds

Church:
Secondary glazing

How we did it - MECHANICAL

Photo: M Reynolds

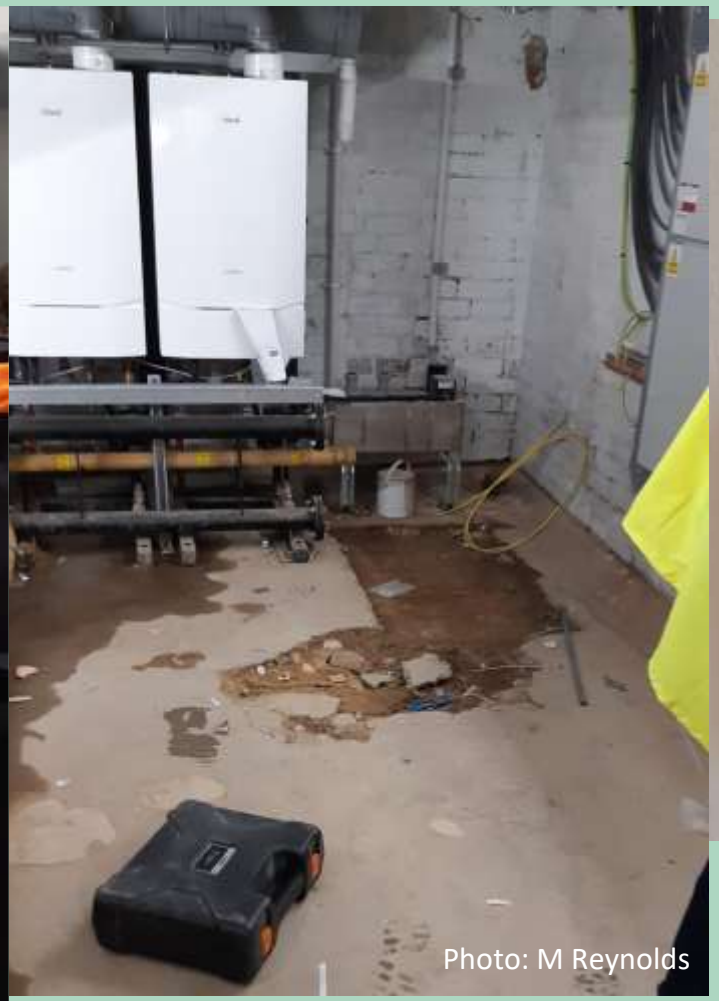


Photo: M Reynolds

Church & Halls site: Efficient gas boilers

Catering Kitchen extract & room controls

Photo: M Reynolds

How we did it - ENERGY

- 16 solar photovoltaic panels on ridge generating ~ 5 kWp

- Wiring and space for battery

- Electricity suppliers: Scottish Power
100% renewable

- Gas suppliers: Crown
100% ‘carbon offset’ renewable

16 Solar PV = 5 kWp

Other measures - DISABLED ACCESS

Photo: DPURC website

Piano lift, also for disabled

Photo: M Reynolds

Hub lift

Photo: M Reynolds

Other measures: AV, IT


Photo: M Reynolds

Mezzanine: Service distribution

AV: Livestreaming Info screens,
IT: Wifi, casting,
Monitoring: energy & PV generation


Photo: M Reynolds

Sustainability: Successes

FABRIC

- **Church ceiling**
- **Secondary glazing**
- **Triple-glazed rooflights with external solar screens**
- **Insulation to roofs and some walls**

ENERGY

- **Solar PVs, wiring and space for battery – run EV as mobile battery? Suppliers**

HEARTS & MINDS

- **Contractors: had never seen PVs → "going to qualify for PAS 2035"**
- **Green Service (Jan) – linking all ages, duty of stewardship, garden**
- **Sustainability Brainstorm (Feb) – 25 people unaware of each other**
- **Sustainability Group (Mar) – leader now Church Elder, Green Party**
- **Eco Church registration (Apr) https://ecochurch.arocha.org.uk/**

ENERGY RESULTS - WATCH THIS SPACE

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Next steps

- Please give quick feedback: form.jotform.com/211853362329052
- Make a donation: cambridgecarbonfootprint.org/donate/
- Share on social media: #OpenEcoHomes

Thank you for your support!

Further Resources

- Book another tour or talk
- Find out how you can get started with your retrofit
- Case Studies: Research our past homes
- Borrow a thermal imaging camera and get training
- Use Transition Cambridge's personalised home energy advice tool
- Take political Action e.g. Households Declare! and their resources