INSPIRED EFFICIENCY

ENERGY • CARBON • SUSTAINABILITY

Walk and Talk Energy Audit Workshop

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DIOCESE OF TRURO

DISCOVERING GOD'S KINGDOM
GROWING THE CHURCH

Outline

- Net Zero Carbon – Targets and What it Means
- Faculty Rules
- Audit Walk
  - Lighting
  - Fabric / Insulation
  - Electricity Capacity and Meter
  - Boilers and Heating
  - Hot Water
  - PV
- Technical Solutions Overview
  - Heat Pumps
  - Direct Electric Heating
  - Electric Hot Water
- Q&A

CofE Target to be Net Zero Carbon by 2030

What this means

- No burning of fossil fuels (gas, oil, LPG, coal) to provide heat and hot water to our buildings.
- No burning of fossil fuels (petrol, diesel, LPG) in our transport.
- Efficient use of electricity
- Generation of energy on site where practical

- Electricity is clean future energy source

This Can be Done!

- 7% of churches in England are already Net Zero Carbon
- Please complete **Energy Footprint Tool** as part of annual parish returns
- First Net Zero church of modern era achieved in this Diocese in 2010



In July 2022 Faculty Rules were changed to support Net Zero Carbon

Underpew Heating (List B)
Cushions and Pew Runners (List A)
Pipework insulation (List A)
Roof insulation must be considered
Electric vehicle chargers (List A)
PV panels on unlisted churches (List B)

Fossil fuel boiler (Faculty)
Replacement oil tanks

All list B and Faculty applications (which involve a matter to which net zero applies) must show ‘due regard’ for the Net Zero Carbon guidance

What this means for churches

- Replacement of gas and oil boilers is actively discouraged and only permitted where no other options are available
- Forms of electric heating (heat pumps, direct electric heating etc.) will tend to be the heating solutions for the future
- Under pew heating is easier to gain permission for.

- Challenges:
  - Planning what to do BEFORE the boiler fails
  - Electricity supply capacity
  - Accepting change!

Walk and Talk Audit Process

Key Technologies

PV Panels

Decarbonised Heat & Hot Water

- Heat Pumps (Ground, Air-to Air and Air-to-Water Source)
- Direct electric heating
- Electric hot water (centralised or point of use)

PV Panels

Heat Pumps – many flavours!

	sCOP	Install Cost per kW
Air to Air	4.5	£450
Air to Water (50°C)	3.5	£850
Air to Water (75°C)	2.8	£1,100
Ground Source	4	£1,550
Water Source	4.5	£1,100

Ground / Water Source

- Deep piles or long trenches to extract heat from ground – can be open or closed loop
- Units in plant room to compress heat from ground water loop and put it into building]
- Works well with underfloor or large radiators.
- sCOP of around 4
- Needs insulated building

Air to Water

- Extracts heat from outside air, compress it and puts it directly into water to circulate through heating system – around 50°C
- Need good flow rates around heating system so not suitable for small bore pipework or single pipe system
- Minimal internal plant
- sCOP around 3.5
- Need large radiators or underfloor – not suitable for most fan convectors
- Needs insulated building

High Temp Air to Water

- Air to Water system with two parts, initial air to water goes into internal unit for a second water to water cycle.
- Produces flow temps up to 75°C
- sCOP around 2.5
- Needs internal and external space
- Easier to integrate with existing radiator systems – can use existing radiators

Air to Air

- Extracts heat from air, heat is compressed and put into a refrigerant gas at the external unit
- Heated refrigerant gas run to internal units (floor, wall ceiling) and blown into room.
- sCOP of around 4.5
- Can also cool
- Rapid warm up of around 20 mins

Air to Air Internal Units

Office - FCAG100B (Compact Roundflow Cassette - Advance)

The Daikin Round Flow ceiling cassette provides 360° air discharge for optimum efficiency and comfort. It combines a stylish design with the latest energy-saving technologies and is designed to fit snugly to ceilings making it ideal in both offices and retail.

This unit has the lowest installation height in the market, making it ideal to fit into tight ceilings.

- Available in black or white
- 9.5 kW cooling
- 10.8 kW heating

Air to Air Internal Units

Office - FHA71A9 (Ceiling Suspended)

Stylish ceiling suspended unit blends easily with any interior. Suitable for small retail, offices or residential. The FHA-A range is controlled with a wall mount controller and can be also controlled via WiFi with the addition of an optional adaptor

- 6.8 kW cooling
- 7.5 kW heating

Air to Air Internal Units

Office - FUA71A (Under Ceiling Cassette)

Unique under ceiling cassettes for all types of commercial applications. The FUA-A range have individual louvre control to suit all room layouts.

- 6.8 kW cooling
- 7.5 kW heating

Air to Air Internal Units

Office - FTXM60-R Standard Inverter Wall Mount

Attractive, wall mounted design with perfect indoor air quality. Suitable for bedrooms, living rooms or small offices.

The FTXM range is equipped with an infra-red remote control with a 7 day timer and can be also controlled via smart phone or tablet.

- 6.0 kW cooling
- 7.0 kW heating

Air to Air Internal Units

Office (note multiple indoor units for this room) - FVXM35A R32 Floor Mount Flash Streamer

Attractive, floor mounted design with perfect indoor air quality. Suitable for bedrooms, living rooms or small offices.

The FVXM-A range is equipped with an infra-red remote control with a 7 day timer and can be also controlled via smart phone or tablet.

- 3.4 kW cooling
- 4.5 kW heating

Air to Air Internal Units

Office (note multiple indoor units for this room) - FTXA35 Stylish

Premium, low profile units with perfect indoor air quality. Suitable for bedrooms, living rooms or small offices.

The FTXA range is equipped with an infra-red remote control with a 7 day timer and can be also controlled via smart phone or tablet.

Available in White, Silver, Black and Blackwood.

- 3.4 kW cooling
- 4.0 kW heating

External Unit Locations

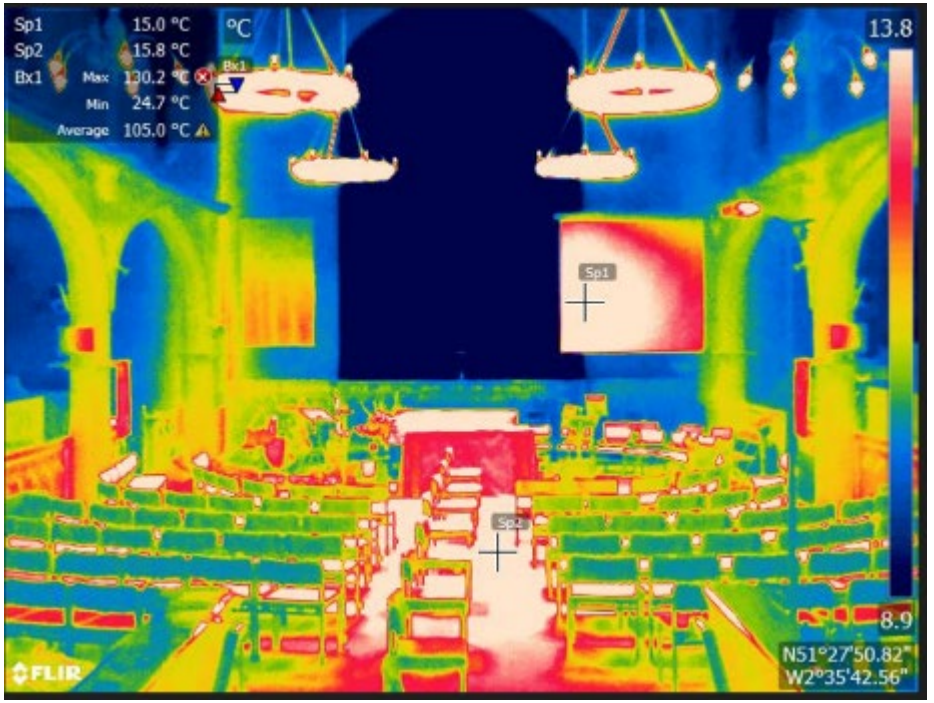
Underpew

- List B item from 1st July under Victorian or later pews

Far Infra Red

Far Infra Red

Herschel Halo – In Trial



Near Infrared

Heated Seat Cushions and Mats

Electric Hot Water – Point of Use

- Small storage electric immersion heater units located need outlets.
- Can range from 2l over sink units to 100l units (for kicthens etc.)

	sCOP	Ratio gas and elec cost (old)	Ratio gas and elec cost (new)	Instal l Cost per kW	
Air to Air	4.5	5	3	£450	External and Internal fan units. Insulation beneficial but not critical
Air to Water (50°C)	3.5	5	3	£850	External fan unit, internal radiators. Insulation critical
Air to Water (75°C)	2.8	5	3	£1,100	External fan units, internal radiators and tank. Insulation highly advisable
Ground	4	5	3	£1,55	Massive external

	Heat Up	Comfort	Pros	Cons	Most likely solution
Air to Air	Around 30mins from cool	Generally very good	Quick, efficient and cost effective	Fan noise Heat from cold, large units	Well used church but not constant use
Air to Water (50°C)	Days – needs to be on 24/7	Very good if on 24/7 with UFH – very challenging if not	Good with UFH, established	Expensive, needs to be on 24/7	Daily used church
Air to Water	Same as boilers	Depends on radiators!	Works with existing.	Very expensive	Ad hoc situations

Boilers Fail – Plan don't Panic

- Temporary heating solutions
  - Heated Seat Cushions and Mats
  - Tripod IR heaters
  - Hired electric fan heaters

  - NO PROPANE HEATERS

- Planning
  - Is electricity capacity OK / quote to increase
  - Install under pew in choir/front pews now

Some Useful Links

The Church of England's Routemap to Net Zero Carbon.

The Practical Path to Net Zero for church buildings.

The landing pages for net zero carbon churches and net zero carbon schools,

The net zero webinar programme to help you on that path.

CofE heating guidance and energy efficiency guidance.

Our inspiring case studies.

Sign up for an energy audit.

For news, resources and events, sign up for the Environment Programme newsletter.

Q&A

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