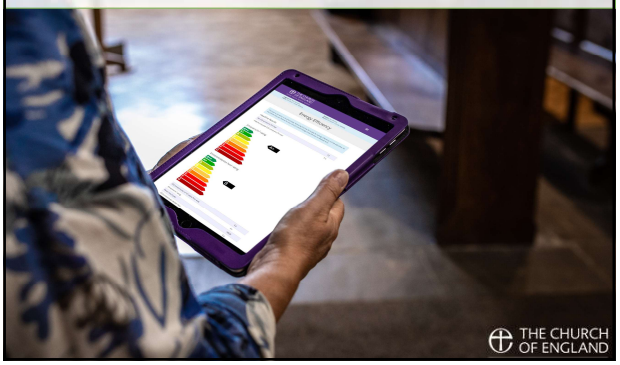
Defining and measuring "net zero carbon"

Catherine Ross, Cathedral and Church Buildings Division



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Zoom tips

- You can click "side by side view" in the View Options to see the slides better.
- Mute your microphone please
- To ask a question, type it into the chat. I'll come back to the questions at the end.

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Today….

- **Why** net zero carbon?
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First.
Let's be honest, we don't know everything.

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Why net zero carbon?

- IPCC report: scientific analysis > **halve emissions by 2030** and **net zero carbon by 2050**
- General Synod have called for all parts of the Church to move faster, setting us the challenge of planning for **net zero by 2030**

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This is firmly rooted in mission

1. To proclaim the Good News of the Kingdom
2. To teach, baptise and nurture new believers
3. To respond to human need by loving service
4. To transform unjust structures of society, to challenge violence of every kind and pursue peace and reconciliation
5. To strive to **safeguard the integrity of creation**, and **sustain and renew the life of the earth.**

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Defining terms: carbon and greenhouse gas emissions ("carbon footprint")

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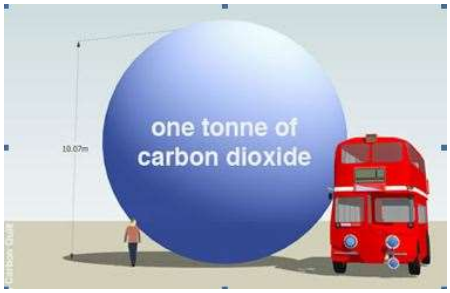
Picturing a tonne of CO_2



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What is net zero carbon anyway?

Energy use (oil, gas, electricity) x conversion factors **+** Fuel from reimbursable travel x conversion factors

=

Majority of gross "carbon footprint"

−

100% renewable electricity **+** Carbon offsets / sequestration

=

Majority of net "carbon footprint"

↓

Zero by 2030

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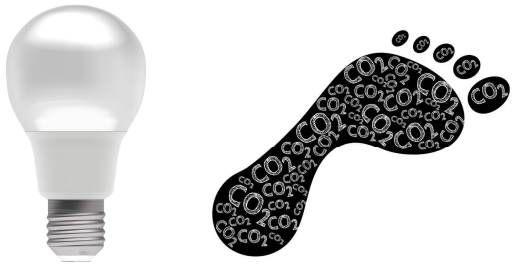
Defining terms: energy use vs. carbon footprint



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Defining terms: Carbon factors

GOV.UK

Search

Departments Worldwide How government works Get involved
Consultations Statistics News and communications

Research and analysis

Greenhouse gas reporting: conversion factors 2019

Documents

Conversion factors 2019: condensed set (for most users)

MS Excel Spreadsheet, 1.25MB

This file may not be suitable for users of assistive technology. Request an accessible format.

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Defining terms: Carbon factors

GOV.UK

Search

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One kWh of **electricity** (incl. well to tank, transmission & distribution)	= **0.316 kg** of CO2e
One kWh of **natural gas** (non-renewable sources, including well to tank)	= **0.208 kg** of CO2e
One kWh of **fuel oil** (including well to tank)	= **0.339 kg** of CO2e
One kWh of **LPG** (including well to tank)	= **0.259 kg** of CO2e
One kWh of **wood chips**	= **0.024 kg** of CO2e
One kWh of **pellets**	= **0.053 kg** of CO2e
One km of **car travel** in a medium sized petrol car	= **0.192 kg** of CO2e
One km of **air travel** in economy, long haul	= **0.150 kg** of CO2e

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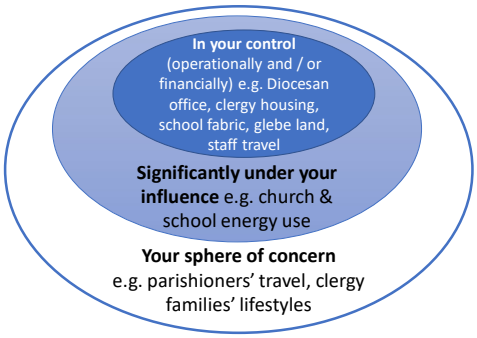
Defining terms: What are the boundaries of the organisation?



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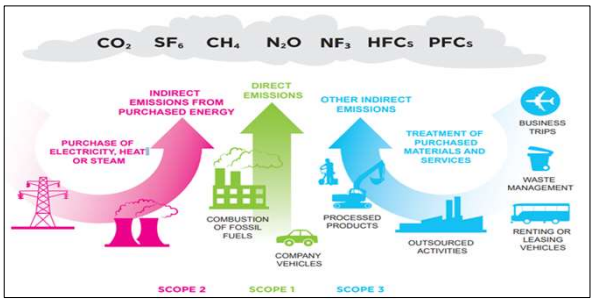
Defining terms: scope 1, scope 2 & scope 3



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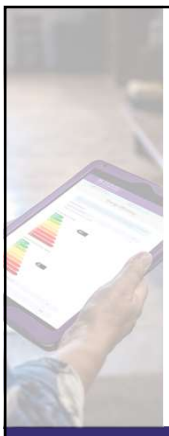

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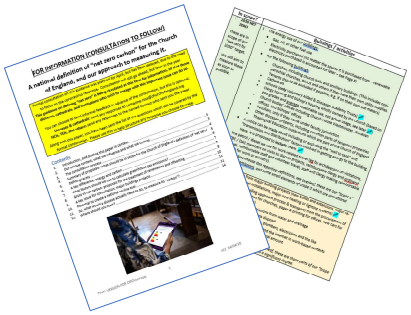
Guidance has been issued, defining the proposed scope of 'net zero'



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The definition is now open for consultation. In the document, key questions for consultation are marked:

Meantime, we are using it as our working assumption, for planning purposes.

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In scope by 2030

1. The energy use of our buildings;

- Gas, oil, or other fuel use
- Electricity purchased (no matter the source it is purchased from – renewable electricity purchased is accounted for later)
- For the following buildings;
  - Churches, including church halls and ancillary buildings.
  - Cathedrals
  - Schools (**only** Voluntary Aided & Diocesan Academy Trusts)
  - Clergy housing and bishop's housing wholly owned by the Church
  - Offices including Church House Westminster, diocesan offices, and bishops' offices
  - Peculiars, only if they come under faculty jurisdiction
  - Other diocesan property, including common parts of tenanted properties
  - Theological Education Institutions which are part of the Church of England
- "well to tank" and "transmission & distribution" factors.

2. The petrol / diesel we use for work-related travel

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In scope after 2030

3. All the emissions from **major building projects** (new builds and extensions, major re-orderings, solar panel installations, major new heating or lighting systems)
4. All the emissions (including upstream process & transport) from the **procurement of any items we buy** (e.g. pews for churches, paper & printing for offices, new cars for bishops, catering for events)
5. Upstream and downstream emissions from **water and drainage**
6. Downstream emissions from **waste disposal**
7. Emissions from **building contractors, plumbers, electricians etc**
8. Carbon generated from use of **emails and the internet** in work-based contexts
9. **Diocesan investments**, if they are a material amount
10. **Air-conditioning gasses**

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Out of scope

11. **Travel** of staff, clergy and volunteers **to and from their usual place of work or ministry**
12. The **travel of the public** to and from church, school, and church events.
13. **Clergy family's & residents' GHG emissions** (consumer goods, travel, holidays). The energy used to heat and light the housing, if over the average reasonable use above.
14. **Personal GHG emissions from the lives of worshippers** attending church, other church users (such as people attending a choir or playgroup), and overseas visitors
15. **Voluntary Controlled Schools** (which are fully controlled by Local Authorities)

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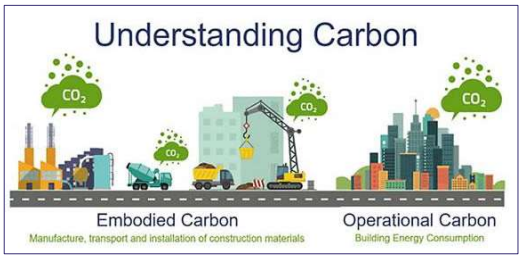

It is not currently proposed to make embodied carbon part of the net zero carbon by 2030 target. This is a key question for consultation.

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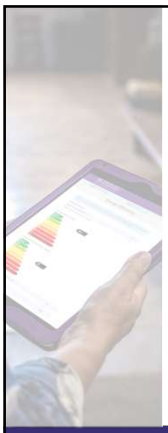

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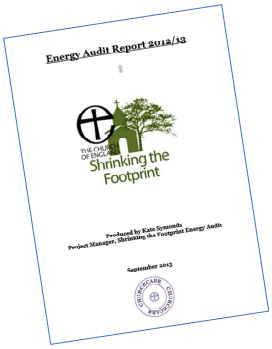
The 2012 baseline study



430 buildings took part in the National Energy Audit.

Total annual carbon footprint of energy use in the Church estate was **609k-1013k tonnes CO2e.**

Down 7% from 2007 study.

Average diocesan footprint of **14-24k tonnes CO2e per year**

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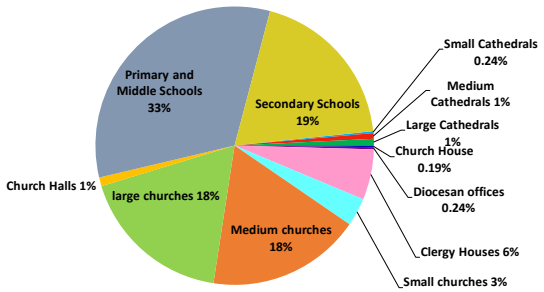
Breakdown of 2012 carbon footprint:

% of total carbon emissions by building type



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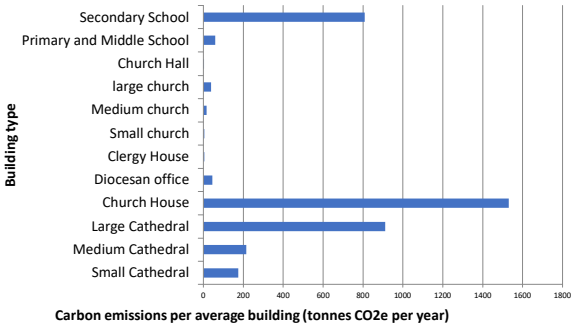
2012 carbon footprint by building-type:



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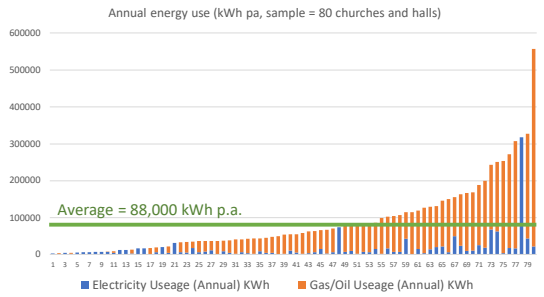
For churches, recent energy audits show how widely energy use varies.



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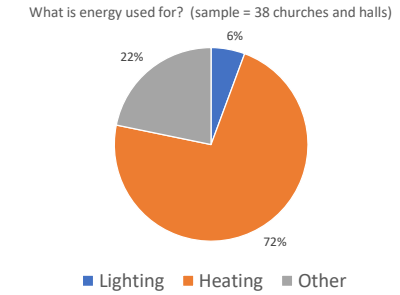
For churches, we know that heating makes up the bulk of energy use.



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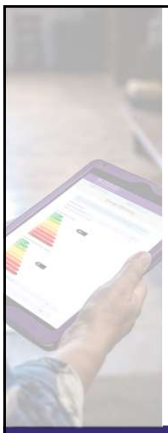

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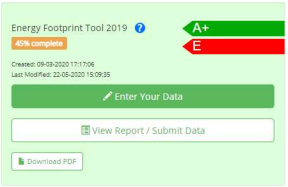
For churches: two, related tools



The Church of England Energy Footprint Tool

360° carbon

Climate Stewards / Eco Church 360 degree carbon

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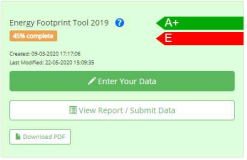
The C of E Energy Footprint Tool



A massive step forwards.

Gives the 'footprint' of **energy use** in every church.

Simple to use.

Completed annually, so tracks progress.

Allows for Diocesan and national reporting

Please encourage all churches to complete it.

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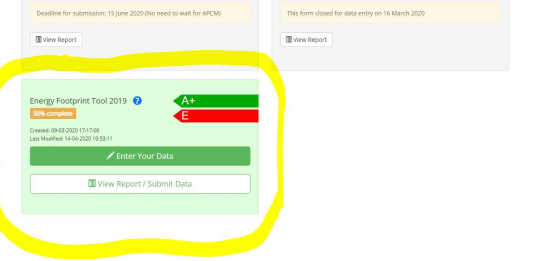

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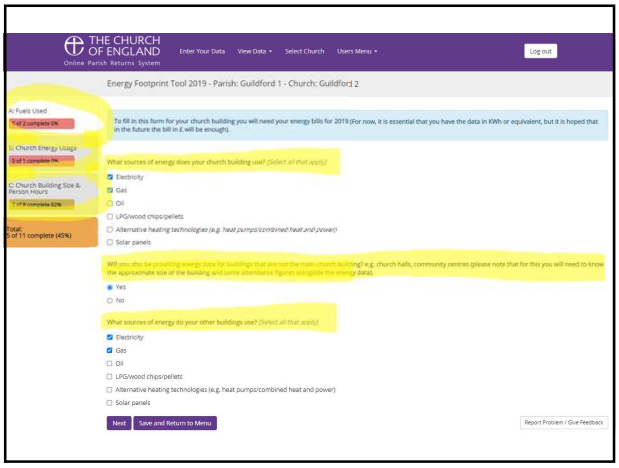

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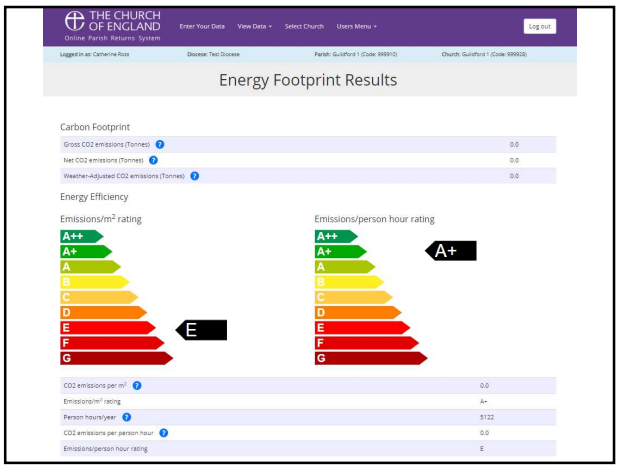

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360degree Carbon

360°carbon

Also a massive step forwards!

Gives the complete 'footprint' of **energy, food, water, travel, and procurement**.

BUT takes more time to gather info, and is entirely voluntary.

Not designed for diocesan or national reporting.

A great **next step** for keen churches, esp. Eco Churches.

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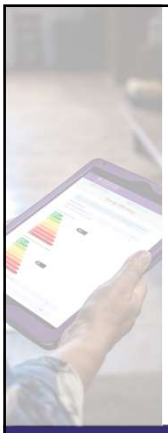

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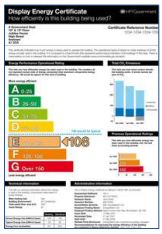
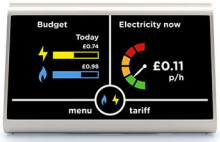
For schools: two potential approaches



Gather info from their Display Energy Certificates (DECs) online



Ask schools for their data, e.g. from smart meters

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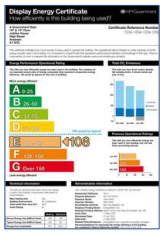
DECs



- Start by creating a spreadsheet with every school that is in-scope, including their postcode.
- Go here: https://www.ndepcregister.com/

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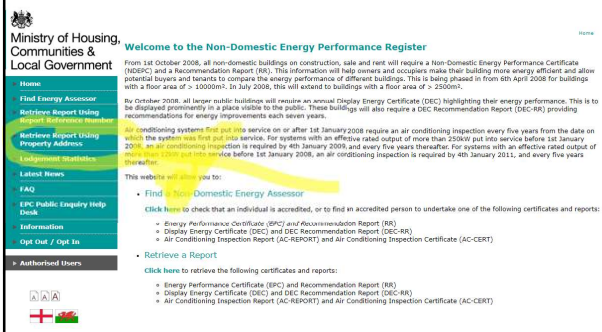
DECs



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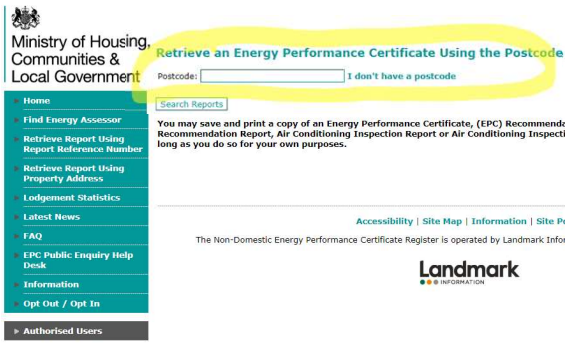
DECs



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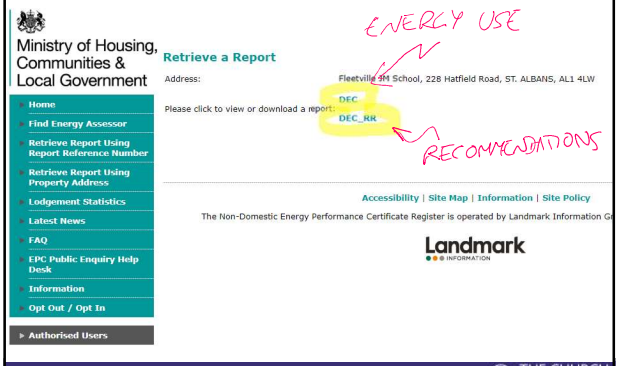
DECs



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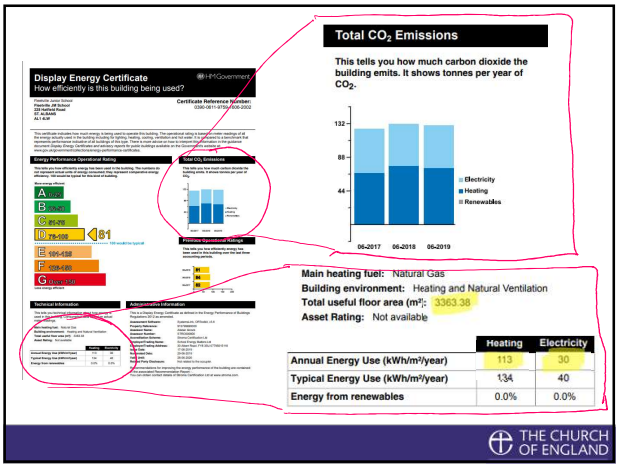

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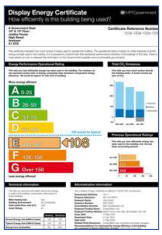

- Start by creating a spreadsheet with every school that is in-scope, including their postcode.
- Go here: https://www.ndepcregister.com/
- Will take up to a day to do for all your schools
- Your Schools Property Officer may be able to do this
- Hopefully, a national tool will be developed to make the calculations simpler.

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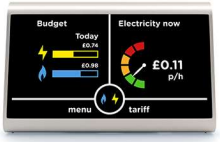
Or - ask schools for their data



- Speak to your schools individually
- Find as many as possible who are willing to record and share regular energy data
- Encourage use of smart meters

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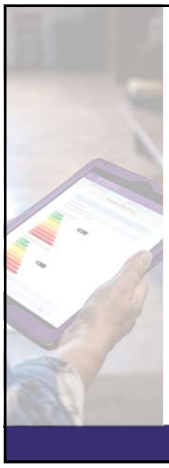

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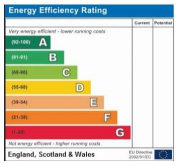
Clergy housing: Three potential approaches, which may need to be combined

Actual use, submitted by clergy



Energy Performance Certificates and average use

Specialist survey

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Actual use, submitted by clergy

Pros: Accurate info on use

Cons:
- Hard to gather, and may be seen as an intrusion
- Varies based on family size and lifestyle, not under the church's control

A sample from some keen clergy families could be very useful.

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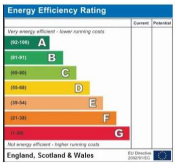
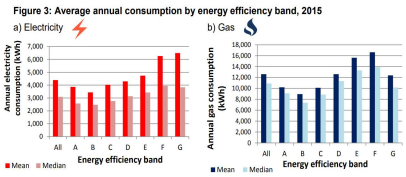
EPCs and average use





This would involve choosing the appropriate average use for each house, based on the EPC grade

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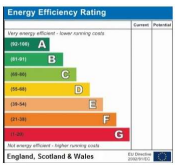
EPCs and average use



Pros:
- Already have EPCs for some properties
- The building fabric & systems are under Church control

Cons:
- Need EPCs where they are missing
- A slightly blunt tool
- Need to find good data for average use

Currently the recommended approach

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Specialist surveys

Pros:
- Accuracy
- Action oriented; says what to do

Cons:
- Cost

One diocese is trying this approach, to get accurate info on their clergy housing. We will learn from this.

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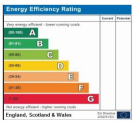

Whichever approach is used, multiplying the energy use by the right carbon factor will give the **gross** carbon footprint.

BUT

To know the **net** carbon footprint, you will need to find out from clergy if they are on a green energy tariff and/or already offsetting.

You may need to survey clergy to ask about renewables.

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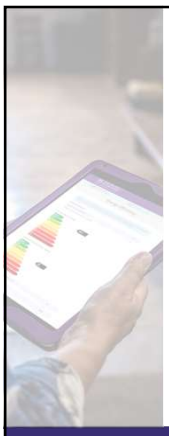

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What travel is in scope?

✓ The petrol / diesel we use for **work-related travel** (e.g. by archdeacons on visitations, CBC / DAC members on visits to discuss projects, reimbursable clergy and ordinand travel, reimbursable staff and volunteer travel, staff and clergy making reimbursable flights for work or ministry).

× Travel of staff, clergy and volunteers to and from their usual place of work or ministry

× The travel of the public to and from church, school, and church events.

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How we measure it?

In theory, easy.

- Find out the miles done and the vehicle.
- Multiply the miles by the correct carbon factor.
- > Carbon footprint of travel

In practice, gathering the information may be tricky.

- Speak to colleagues to find out what info is already gathered e.g. by your expenses and finance systems
- Staff travel may be gathered, but clergy travel?
- You might know **mileage** but not the **vehicle** e.g. is it an electric car, is it petrol/diesel, is it large/small?

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			Diesel	Petrol
Activity	*Type*	Unit	kg CO_2e	kg CO_2e
Cars (by market segment)	Mini	km	0.11096	0.14114
		miles	0.17858	0.22715
	Supermini	km	0.13725	0.15743
		miles	0.22089	0.25336
	Lower medium	km	0.15048	0.18284
		miles	0.24217	0.29425
	Upper medium	km	0.16849	0.20956
		miles	0.27116	0.33726
	Executive	km	0.18125	0.23952
		miles	0.2917	0.38548
	Luxury	km	0.22177	0.33702
		miles	0.35691	0.54238
	Sports	km	0.17521	0.24626
		miles	0.28198	0.39632
	Dual purpose 4X4	km	0.21194	0.24684
		miles	0.34108	0.39725
	MPV	km	0.18452	0.20096
		miles	0.29696	0.32342

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- Staff travel may be gathered, but clergy travel?
- You might know **mileage** but not the **vehicle** e.g. is it an electric car, is it petrol/diesel, is it large/small?
- You may have the info e.g. if you need to provide for insurance. If not, you may need a survey, or to use averages

> National tool would help with calculations, but still need the data

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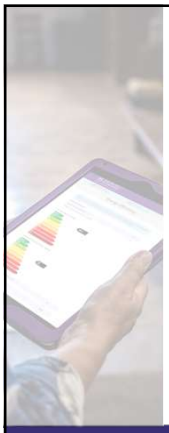

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Church Land

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Very complex set of issues

Carbon emissions
- Farming machinery
- Farming chemicals
- Methane from livestock

Carbon offsetting
- Renewable e.g. solar farms

Carbon sequestration
- Tree planting (*if ….)*
- Soil improvement
- Nature-based solutions

(+ Biodiversity / ecology)

Church Commissioners Land

Glebe Land

Churchyards

Needs to be considered alongside financial return from rental to farmers, commercial forestry, or development

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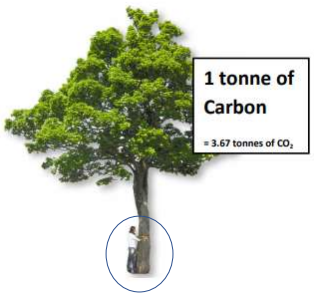
A quick aside: tree planting



A big, mature tree <4 tCO2e over its whole lifetime.

If:
- It survives (many don't)
- It was genuinely additional
- It neither rots nor burns at the end of it's life.

Typical church
= 26 tCO2e per year
= 7 trees per year, every year

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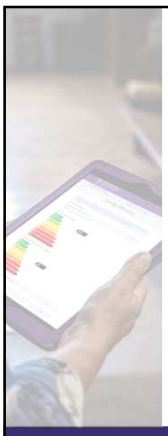

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Cathedrals

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Offices

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Theological Education Institutions

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Offsetting policy – work in progress:

Underlying principle:
reduce everything you can, and then offset the rest.

Key questions:
- Start date: from 2030, before 2030, phased?
- Kind of offset: Reinvestment? UK? Abroad?
- C of E scheme or use existing? Ensuring quality?
- Potential for church land for nature-based solutions such as tree-planting and soil-enrichment?

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Consultation questions include:

Confirmation of scope and approach

Treatment of building projects

How we measure the benefit from land

Creation of a national toolkit

Views on an offsetting policy

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Consultation process

Sent for info to Diocesan Secretaries and other in March.

On-line survey now open; Diocesan Secretaries informed by email 16/06.

Single diocesan response; as best you can in these difficult circumstances.

Also sent to cathedrals, TEIs, key committees, institutions

DEADLINE 17th August

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Next steps - centrally

- Gather consultation responses, update the definition, and take to EWG and General Synod for confirmation
- Continue working on offsetting policy
- Continue work on approach to measuring land
- Keep up to date with progress in 'pathfinder' diocese, and share this information
- Confirm budget for toolkit development
- (If budget confirmed) in 2021, develop the national toolkit; e.g. for cathedrals, offices, travel, schools

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Next steps – for dioceses

Respond to the consultation by 17th August

If you have time to do one thing – rollout the EFT:

Encourage churches to gather their 2019 utility bills and complete the "Energy Footprint Tool"

If you have time to do more – focus on finding data:

- Talk to your Board for Education about gathering the utility data from smart meters or DEC reports
- Talk to your diocesan surveyor about clergy housing, and whether they already hold EPC reports for them.
- Talk to your Finance Manager about gathering expenses info, to calculate your staff transport emissions.
- Talk to your Office Manager about getting electricity and gas usage for your offices.

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Next steps – for other consultees

Respond to the consultation by 17th August

Think about the main energy uses that you control or influence through your activities; electricity, gas/oil, and fuel for reimbursable work-related travel.

Discuss with colleagues how you can you best gather information on these.

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Next steps – for individual churches

Where to start?

Gather your 2019 utility bills

Complete the Energy Footprint Tool

Discuss the results in your next PCC meeting

Where next?

Register with 360 Carbon https://360carbon.org/

Look through the sections and understand the information needed. Decide how you will approach it.

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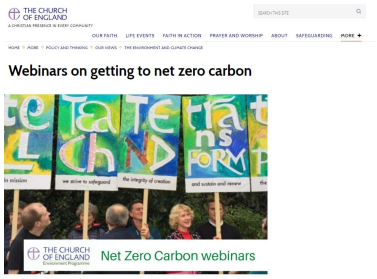
And come to other net zero webinars ….



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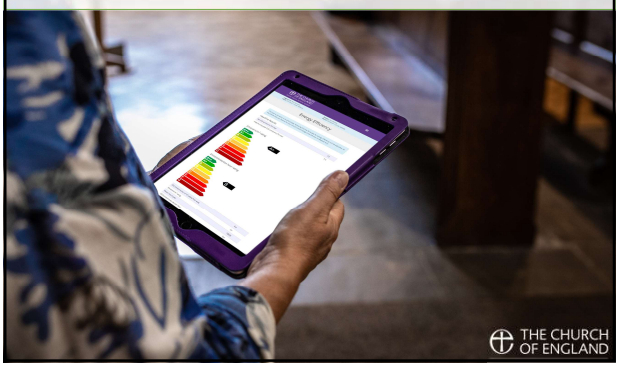
Questions

Catherine Ross, Cathedral and Church Buildings Division



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