

MODULE
13

eco-congregation

an environmental toolkit for churches

Climate change

managing your
carbon footprint



Scotland

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Useful websites and addresses

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Why bother?

Why congregations must be concerned about climate change

Care for creation is at the heart of the Eco-Congregation movement. 'The earth is the Lord's', declares the psalmist (Psalm 24:1). It is God's creation, not ours to do with as we please. In the Biblical creation stories God subordinates rule over creation to humans to 'fill the earth and subdue it'. (Genesis 1:26-28) But in doing so God lays on human beings the responsibility for how we manage the earth and every living creature, in ways consistent with the ways of the Owner, to whom we will have to give account. This expresses the now familiar notion of stewardship or trusteeship (Genesis 2:15). We are also called to be partners with the rest of creation and co-partners in the ongoing creative and renewing activity of God. In caring for what God has created, we care for ourselves, because in God's providence and wisdom our flourishing is dependent on the flourishing of creation. To care for what God has created is therefore also to care for each other, and especially for the poor and vulnerable.



As we have come to understand that, through our deeds we are changing the climate, so we have come to realise that our care for creation has been deeply flawed. **Climate change represents a failure in our stewardship of the earth and its implications for people and for other life on earth are profound.** In a report to the General Assembly the Church of Scotland has recognised this deep failing.

'When our land is submerging slowly but visibly, any ideological debate on ecological issues is only a luxury of the privileged communities.'

Rev Tafue Molu
Lusama Pacific,
Eklasia Kelisiano,
Tuvalu

'The Church of Scotland is concerned that climate change poses a serious and immediate threat to people everywhere, particularly to the poor of the earth; and that climate change represents a failure in our stewardship of God's creation. We accept the need to reduce the emissions of greenhouse gases urgently to avoid dangerous and irreversible climate change; and to promote a more equitable and sustainable use of energy'.¹

For Christians responding to climate change is no longer an option but a spiritual and moral necessity. Will we be like the people who, as Jesus said, 'were eating, drinking, marrying and being given in marriage up to the day Noah entered the ark' (Luke 17:27), destroying ourselves because we are too selfish or fearful to face reality?

In the twenty-first century climate change will change lives. Eco-congregations have to be concerned about the impact this will have around the world and have to take steps to respond.



¹ Church and Society Council Report to General Assembly 2009

What are the causes of climate change?

Climate change can be linked unequivocally to human activities

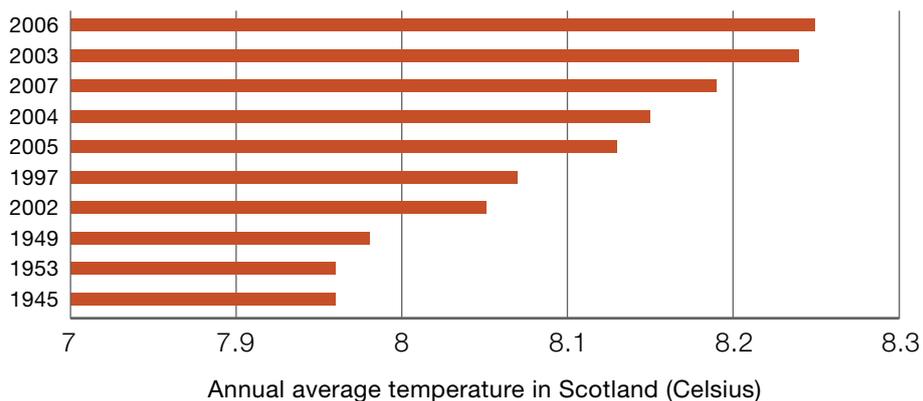
Climate change has occurred many times in geological history, including ice ages and extremes of heat. The changes we are witnessing now are different because they can be linked unequivocally to human activities and in particular to the burning of fossil fuels such as coal, oil and gas. All such hydrocarbon fuels emit carbon dioxide (CO₂) when burnt and, over the past century this has resulted in billions of tonnes of carbon dioxide being released into the atmosphere.

In consequence the amount of CO₂ in the atmosphere has risen from under 300 parts per million (ppm) 100 years ago to over 380ppm today. It is rising at about 2ppm each year and is likely to rise to 400ppm in the next decade. Rising levels of CO₂ in the atmosphere enhance the atmosphere's greenhouse effect and will lead to rising atmospheric temperatures.

In Scotland we have seen the effects of this in recent years. We've had milder winters and warmer summers. The five warmest years on record in Scotland have all been this century.

The ten warmest years since 1914

Source: WWF Scotland



What are the likely consequences?

The report to the UN Conference on Climate Change held in Bali in 2007 predicts by the end of the century:

- the disappearance of Arctic sea ice, shrinkage of Antarctic sea ice and contraction of snow cover elsewhere
- an increase in frequency of heat waves and heavy rainfall
- a likely increase in tropical cyclone intensity
- a likely decrease in rainfall in subtropical areas such as the Mediterranean or southern Africa.²

² IPCC Fourth Assessment Report. Climate Change 2007: Synthesis Report summary for Policy Makers. See http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf





The consequences of this could be appalling. Cyclone Sidr hit Bangladesh in November 2007 killing thousands, and Hurricane Katrina devastated New Orleans in August 2005. Heat waves of the kind experienced in Europe in 2003 could become much more regular. Scotland could experience heavier winter rainfall and many coastal areas will be put at risk by rising sea levels. The Scottish Environment Protection Agency (SEPA) estimates that 18,000 properties in Scotland are at risk of flooding. Climate change will significantly increase this risk. In Africa up to 250 million people may experience water shortages and agricultural production could be severely affected. In Asia the large and heavily populated river deltas, for example in Bangladesh and Vietnam, will be at increased risk of flooding. Melting ice will contribute to the rise in sea levels, which by 2100 may locally be up to one metre higher than in 2000.

It also poses a major threat to other species and habitats. Between 20% and 30% of plant and animal species may be at risk of extinction if temperature changes exceed 2.5 degrees Celsius and there would be major changes in habitats and the geographical ranges of species.³ For example, summer melting of the Arctic ice cap would dramatically change the habitat of polar bears and other arctic mammals. There are concerns that large areas of the Amazon rainforest, one of the most diverse habitats on earth would be put at serious risk; and in Scotland, the highland mountain habitats of rare species such as the dotterel would be significantly reduced. The effects on agriculture will be similarly dramatic and agrarian communities around the world put at risk.

You and your congregation contribute to global warming

You and other members of your congregation contribute to climate change in many ways: heating buildings; travelling; using electrical appliances such as freezers or televisions. And almost everything you buy has a carbon footprint: food, clothes and the consumer goods that fill supermarkets shelves. Processed goods embody the energy used in their production and delivery: this is called embodied energy. All this contributes to your carbon footprint, yet few congregations know the carbon footprint of their church buildings, their homes or their travel.

For most people one of the largest contributions to climate change is in their direct use of energy: **monitoring, managing and reducing energy consumption is an important practical action congregations can take to reduce their carbon footprint.**

- The section **Measuring impact** shows how to start measuring energy use and the carbon footprint of your church buildings: it's easier than you may think!
- The section **What can I do?** signposts help, advice and support available across Scotland to help you reduce the carbon footprint of your church buildings.
- The section **What next?** suggests you apply the same principles in your home and your lives.



3 IPCC Climate Change 2007 Synthesis Report, page 48



Measuring impact

How do I measure the carbon footprint of my church buildings?

Getting started

Working out your direct emissions is the easiest way to start, and the largest portion of this probably comes from heating and lighting of buildings. We strongly suggest that, as a congregation, you begin by working out how much energy you use in your church buildings. This is easier than it sounds. You can do it by using your gas or electricity bills, or even better, by reading your own electricity meter and, if you have one, your gas meter. This will get you started, and while it's only part of your carbon footprint, once you have done this together you will be in a strong position to work out the carbon footprint of your homes and travel and begin to take action to reduce your personal footprint.

What is the typical church's carbon footprint?

No two churches are the same, either in size or use through the week, so there is no 'typical' carbon footprint. Carbon footprints of churches range from three tonnes a year for a small rural church in use once a week to over 150 tonnes for a large urban church in use all week. The carbon footprint of a church building depends on the size of the church; the way it is used, and the type and age of the heating system.

STEP 1 Monitor your energy use

How much energy did you use last year? From your fuel bills or fuel meters work out how much energy you used.

Your gas and electricity meters (and your fuel bills) tell you how many units of energy you have used. Each unit of electricity is one kilowatt hour; that is, the amount of electricity used by a one kilowatt appliance in one hour or by ten 100 watt bulbs in one hour. This is the standard unit used to calculate energy consumption. For every kilowatt hour of electricity just over half a kilogram of carbon dioxide is released into the atmosphere from power stations around Britain. The precise figure varies from day to day and from year to year but the figure used is the average: you can find out a lot more about how these figures are calculated from the UK Government DEFRA or



Carbon Trust websites.⁴ Gas is measured in cubic metres and for each cubic metre approximately 2 kg of carbon dioxide is released into the atmosphere. Your gas bill should also give you the amount of gas in kilowatt hours.

STEP 2 Work out the carbon footprint of your church buildings

As soon as you know how much electricity or gas you have used, do a simple sum using the table below – it works for both church buildings and households.

Calculating the carbon footprint of your church buildings

When you have gathered the information above from your fuel bills, use the calculator below to work out the footprint of your church buildings. **If possible, use information for a complete year to work out your footprint for a full twelve month period.**

Name of building: _____

Is this information for a full 12 month period? If yes, which year: _____

If not, what are the dates to which this information relates: _____

Carbon calculator



	Enter energy used	multiplied by	to give ... kgs of CO ₂
Gas: Cubic metres		2.009	
or: Kilowatt hours		0.185	
Oil (litres)		3.179	
Electricity (kWh)		0.537	
Total CO ₂ emissions from buildings (kilograms)			
Total CO ₂ emissions from buildings (tonnes)			

4 For an introduction, see Carbon footprinting: an introduction for organisations, Carbon Trust, 2007 (www.carbontrust.co.uk/publications/) and for conversion factors the UK government website: www.defra.gov.uk/environment/business/reporting/pdf/20090717-guidelines-ghg-conversion-factors.pdf



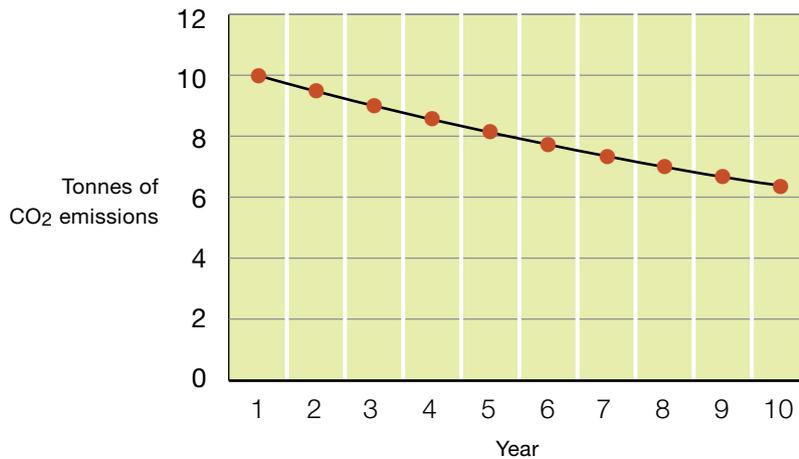
STEP 3 Make a commitment to reduce this by 5% a year

Following the lead of the Iona Community we propose that you try to reduce your footprint by 5% a year. This gives your congregation a simple and realistic target to aim at each year.

Working out the footprint of your church buildings is the first step in the process, rather than an end in itself – it provides a baseline against which your church, and members of your congregation, can measure changes in the future. The important thing about the footprint exercise is that it shows the areas where changes can be most effective. If heating accounts for the largest part of the footprint of your church, as was the case in many of our pilot churches, it is more likely that you'll be able to make significant savings there than in other areas, although smaller, easier savings are also likely to be available at lower cost in relation to lighting and other electricity use.

Both the Scottish and UK Governments are committed to reducing emissions by 80% by 2050. It's highly unlikely you can reduce the carbon footprint of your church buildings by 80% in one go, so what can you do?

It is important to note that 5% savings do add up – the graph below shows that 5% a year over ten years would reduce emissions of ten tonnes to just over six tonnes.





What can I do?

How do I reduce the carbon footprint of my church buildings?
Signposts to help, advice and support

Read your meters

Working out your footprint is the first step in the process

Don't take energy for granted and don't wait for a nasty shock when you get your energy bills. Take responsibility collectively in your congregation for your energy use and **read your meters every month**. This will give you a full record of your energy consumption through the year and the management information you need to measure progress.

Engage the whole congregation

Energy management is not just the responsibility of the property manager: it is everybody's responsibility. Put up a notice in a prominent place to show the church's carbon footprint and the latest monthly meter readings. Ensure this information is a regular item on the agenda of any relevant committee. Set yourself a challenge of reducing this each year by 5%.

Seek advice on how to take action

Some aspects of energy management seem obvious: turn off lights when you don't need them and don't waste heat by leaving doors open. We know that heating is likely to be the biggest part of your carbon footprint so this is probably the area you should pay greatest attention to. But we also know that churches are often old or historic buildings that require special attention. For these reasons we urge you to seek advice from the sources below to help you work out what to do.



Where to go for advice



THE ENERGY SAVING TRUST

There are many sources of advice but we recommend that your first contact should be the Energy Saving Trust. Contact the Energy Saving Trust on 0800 512 012 or through the website: www.energysavingtrust.org.uk/scotland

The Energy Saving Trust (EST) is a national agency whose purpose is to help individuals and communities reduce their energy consumption and their carbon footprint.

EST will provide free impartial advice to help you save money and respond to climate change by reducing carbon dioxide emissions from your home, church or church buildings.

EST offers advice through a network of energy advice centres across Scotland including: Changeworks; The Wise Group; The Energy Agency, and SCARF. All the local advice centres can be contacted through the national number 0800 512 012.

Good Practice: Burnside Blairbeth Church

Burnside Blairbeth Church in Rutherglen had an energy survey carried out by the Wise Group (an energy advice agency funded by EST). The survey examined current energy use and identified that the carbon footprint of energy used in the building is about 110 tons of carbon dioxide a year. The survey identified methods by which the congregation could use energy more efficiently, save money and reduce the carbon footprint.



THE CHURCH OF ENGLAND PROJECT: SHRINKING THE FOOTPRINT

The Church of England has been working to measure its carbon footprint and has found that its churches and cathedrals are responsible for emissions of about 220,000 tonnes of carbon dioxide a year. Energy surveys carried out in churches revealed a number of actions that can help reduce energy consumption in churches. These are set out in the table below.

Actions to reduce energy consumption in churches

Description of action	Annual cost saving	CO ₂ saved/year (kg)
Energy saving routine	~ £280	~ 2,100
Improve boiler controls	£300 – £1,000	2,220 – 7,400
Insulate hot water pipes	£200 – £350	1,480 – 2,590
Install draught proofing	£50 – £700	370 – 5,180
Reducing heat loss associated with windows	Up to £100	760
Replace lighting installation	£15 – £800	114 – 6,080
Replace boiler	£200 – £1000	1,480 – 7,400

Source: Survey Aecom consultants for the CofE Shrinking the Footprint conference, June 2009



For further information on the Church of England programme Shrinking the Footprint see the website: www.shrinkingthefootprint.org/

GENERAL TRUSTEES OF THE CHURCH OF SCOTLAND

Information on support available to Church of Scotland congregations on energy conservation and the Better Heating Scheme is available from the General Trustees pages of the Church of Scotland website:

www.churchofscotland.org.uk/extranet/xgentrustees/xgtresources.htm#energy



CHURCH BUILDINGS MAINTENANCE IN SCOTLAND

This is a website supported by churches in Scotland and Historic Scotland. It provides learning modules, toolkits and resources on how to maintain your church, including energy management.

Find out more at: www.maintainyourchurch.org.uk





What next?

Take action in your home!

Reducing unnecessary consumption is the key

Reducing the carbon footprint of your church buildings is just the beginning. Energy used in a large church could produce a carbon footprint of 100 tonnes but each household in the congregation may well have a carbon footprint of over ten tonnes. On this basis a congregation of just 100 people would have at least ten times the carbon footprint of the church buildings; so the collective footprint of a congregation will almost always be far larger than the footprint of their church buildings. Together, a congregation can make a big difference by reducing energy use at home, in its travel and in its shopping.

What is the carbon footprint of the energy you use in your home?

Simply use the same calculator used above for church buildings to work out the carbon footprint of energy used in your house. From your fuel bills or your meter work out how many units of electricity you have used; or how many cubic metres of gas or litres of oil; then enter them in the calculator to work out the carbon footprint of your energy use at home.

How can you reduce energy use at home?

The Energy Saving Trust will be able to help you reduce the carbon footprint of heating your house. Contact them on **0800 512 012** or through the website: www.energysavingtrust.org.uk/scotland

What about travel?

Another large component in your carbon footprint is likely to be travel, particularly if you drive a car. Every litre of petrol or diesel used in a car engine contributes over two kg of CO₂ to the atmosphere. By recording how much fuel you use you can work out how much your car is contributing to your overall carbon footprint, using the simple calculator below.



**Carbon calculator:
Car travel**



	Fuel used	multiplied by	to give ... kgs of CO ₂
Petrol (litres)		2.315	
Diesel (litres)		2.63	
Total CO₂ emissions from car travel (kilograms)			
Total CO₂ emissions from car travel (tonnes)			

Car travel is the largest source of transport-related carbon dioxide emissions in the UK but other sources are also important, particularly air travel, which in 2006 accounted for over 6% of the UK's total carbon dioxide emissions. A number of airlines provide online calculators to enable you to calculate the emissions from your air travel, for example, www.easyjet.com/EN/environment. Travel by train or bus is also responsible for emissions but these are typically much lower per mile travelled than trips made by car or plane.

Indirect emissions: shopping

When you know the carbon footprint associated with your energy use in the home and car travel then you have a good understanding of the impact of your direct emissions. You can go beyond this and investigate the impact of your indirect emissions; for example for shopping for food; clothes or other goods or services you buy. There are a range of website carbon calculators that help you estimate these emissions. The Government website: actonco2.direct.gov.uk has a detailed carbon calculator that may be helpful.

Take action in your lives



As with church buildings we suggest you set a target to aim at. When you know the carbon footprint of your homes and car travel, can you make a commitment to reduce this by 5% this year and go on to reduce you emissions by 5% each year thereafter? It might be easier than you think. Reducing unnecessary consumption is the key. By not travelling when you don't need to, or by cutting back a little on the things you buy or use, you can start making inroads to your carbon footprint. To achieve a 5% reduction consider the following pointers from the UK Government's **ActonCO2** website.

In the home

- If you have a loft, check the insulation – is it 270mm thick? Fitting this amount of insulation could save up to £150 a year on heating bills



- If you have a hot water tank fit an insulating jacket at least 75mm thick and save up to £30 a year
- If you have cavity walls save up to £120 a year by installing cavity wall insulation.
- Find out more at:
<http://campaigns2.direct.gov.uk/actonco2/home/in-the-home.html>

On the move

- If you drive a car, do you have the most fuel efficient car for your needs? It is estimated that buying the most fuel efficient car in its class could reduce emissions by 24% and save three months worth of fuel a year.
- Can you find an alternative to using a car or share a journey for some of your trips? An average car commuter drives 12 miles a day and reducing this by half could save 400kg CO₂ a year or 170 litres of fuel.
- Smarter driving could reduce your fuel consumption by 8% a year – see website for more details: <http://campaigns2.direct.gov.uk/actonco2/home/on-the-move.html>



Out shopping

- When purchasing white goods look for the energy label or energy-saving recommended logo.
- Producing, processing and transporting food may be responsible for up to a third of your carbon footprint, yet the average UK house spends £420 a year on food that could be eaten but is thrown away. How do you manage your food shopping?
- UK consumers buy about 2 million tonnes of clothes a year with a carbon footprint of 3.1 million tons: how do you shop for clothes?
- Find out more on:
<http://campaigns2.direct.gov.uk/actonco2/home/out-shopping.html>

What about recycling, composting and other initiatives?

Many eco-congregations have developed recycling initiatives. Recycling makes a vital contribution to reducing the amount of waste going to landfill and can make a contribution to reducing greenhouse gas emissions. Similarly, composting and making more efficient use of water all have environmental benefits and can help reduce your carbon footprint. There is more detail of these activities in Eco-Congregation Module 3: Greening the Cornerstone.

Recycling, composting and reducing water use are all important and helpful things to do, and have wider environmental benefits, but their impact on carbon emissions is much smaller than direct use of energy in heating, lighting and travel, which is why we are urging congregations now to move on to measure, manage and reduce their energy use as a priority.





Helping others to reduce their carbon footprint

Reducing carbon emissions in our lives is essential, but it is also important to help others to do the same elsewhere. International agreements have identified the need to support sustainable development projects in developing countries to enable others to address poverty without becoming dependent on carbon fuels. Part of the solution is to find and implement clean energy solutions that also generate wealth. MercyCorps, for example, has developed the Cool Carbon Initiative to reduce poverty, generate jobs and improve livelihoods while decreasing carbon emissions.

MercyCorps invites congregations to join the initiative. For further information see: www.mercycorps.org.uk/topics/environment

Can you work together as a congregation to make savings?

CARBON REDUCTION ACTION GROUPS (CRAGs)

One way you can do this is by setting up a carbon rationing action group (CRAG). In seeking to reduce your carbon emissions, the support and fellowship of a group that is taking similar action is invaluable. CRAGs provide one way to do this with bible studies introducing church groups to the issues of climate change from both a practical and a theological perspective.

You can find out more about setting up a CRAG in your congregation at the Eco-Congregation website: www.ecocongregation.org/scotland





Further information

You can find out more from a wide range of websites and publications. Here are some you might like to visit.

THEOLOGY AND SPIRITUALITY

- **A Moral Climate**
by Michael Northcott (Darton, Longman and Todd, 2007)
- **Planetwise: Dare to Care for God's World**
by Dave Bookless (Intervarsity Press, 2008)
- **Hell and High Water: Climate Change, Hope and the Human Condition**
by Alastair McIntosh (Birlinn, 2008)

WORSHIP MATERIALS

- **Eco-Congregation Scotland**
Modules containing a range of resources for worship and practical action
www.ecocongregation.org/scotland/materials.html
- **Churches Together in Britain and Ireland**
Creationtime resources: www.ctbi.org.uk
- **European Christian Environment Network**
for resources around Europe in English and other languages www.ecen.org

PRACTICAL ACTION

- **Energy Saving Trust**
for advice, support and possible grant aid for churches and for your home:
www.energysavingtrust.org.uk/scotland
- **General Trustees of the Church of Scotland**
for advice on property management:
www.churchofscotland.org.uk/extranet/xgentrustees/xgtresources.htm#energy
- **Church of England Shrinking the Footprint:**
<http://www.shrinkingthefootprint.cofe.anglican.org/>
- **A Rocha**
is a Christian nature conservation organisation active in many countries around the world: www.arocha.org/int-en/index.html
- **Church Buildings Maintenance in Scotland**
for detailed guidance on looking after church buildings:
www.maintainyourchurch.org.uk



MORE FOOTPRINT CALCULATORS

- **Actonco2**
for footprint calculator and details of how to reduce your personal carbon footprint:
actonco2.direct.gov.uk
- **WWF:** <http://footprint.wwf.org.uk/>

TRAVEL

- **Eco-driving:** tips on how to reduce the carbon footprint of your car travel:
<http://www.energysavingtrust.org.uk/scotland/Scotland-Welcome-page/At-Home/Transport-Eco-driving>

SCIENCE OF CLIMATE CHANGE

- **Intergovernmental Panel on Climate Change (IPCC)**
for detailed and authoritative review reports on the causes and consequences of climate change: www.ipcc.ch/
- **Met Office**
for detailed and well presented information including an introduction to the science:
<http://www.metoffice.gov.uk/climatechange/>
- **UK CP09**
Government projections published in 2009 about Britain's climate in 2050 and 2080: ukcp09.defra.gov.uk/

GOVERNMENT

- **UK Government**
A detailed website with much information on climate change and the response of the UK Government: www.defra.gov.uk/environment/climatechange/
- **Scottish Government**
Details of the Scottish climate change legislation and delivery plan
www.scotland.gov.uk/Topics/Environment/climatechange

Campaigning

- **Stop Climate Chaos Scotland** is a coalition of environment, faith and other groups campaigning on climate change issues:
<http://www.stopclimatechaos.org/scotland>
- Environment campaigning groups with good online resources include Friends of the Earth Scotland, <http://www.foe-scotland.org.uk/> and WWF Scotland, <http://scotland.wwf.org.uk/>
- Faith based groups active on climate change issues include Christian Aid Scotland, <http://www.christianaidscotland.org/> and SCIAF, <http://www.sciaf.org.uk>



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