

**Church of Scotland**

**CHURCH AND SOCIETY COUNCIL**



**ENERGY FOR A CHANGING CLIMATE**

**Report Presented to the General Assembly**

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## **1. Introduction**

**1.1** Energy policy has frequently featured in Assembly reports of the Society Religion and Technology Project (SRT) and the Church and Nation Committee. (1) The time has come to bring a more substantial review, in the light of the radical measures now needed to address climate change, the altered patterns of UK energy supply, and the recent and ongoing Westminster and Holyrood reviews of energy and climate policy, in which environment is now making a significant impact on policy. The main focus of this report is on electricity supply and energy saving. We plan to examine the larger but more intractable problems of heat supply and transport at a later date. This work comes from the energy and environment working group of the Church and Society Council. It draws particularly on a submission the Council made in April 2006 to the Westminster consultation on energy policy, (2) on the long standing work of the SRT Project, and the experience of the Eco-Congregation Scotland programme.

**1.2** How we should generate and use electricity obviously involves technical and economic assessment. But each option has its embedded values, pros and cons. The choice we make among them is ultimately an ethical matter. Indeed no one option stands out economically. In continuing to insist that the market must make the decisions, the Government, however, has failed to address this ethical dimension. We are greatly concerned that this insistence is putting its climate objectives in serious jeopardy.

## **2. Theology**

### **2.1 *Caring for God's Creation***

**2.1.1** "The earth is the Lord's" declares the psalmist. It is God's creation, not ours to do with as we please. Christ the alpha is its author. Christ the omega is its goal. (3) In the Biblical creation stories God subordinates rule over creation to humans to "fill the earth and subdue it". (4) 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. (5) We are also called to be partners with the rest of creation and co-partners in the ongoing creative and renewing activity of God. (6) In caring for what God has created, we care for ourselves, because in God's providence and wisdom our flourishing is dependent of 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.

**2.1.2** We have spoiled God's gift of creation by selfish exploitation, acting as if the whole earth was simply for our present benefit. As our examples in section 3 show, the creation groans in frustration because of our failure to look after it as God intended, and people and communities suffer in consequence. The voices of the poor and the displaced join the groans of creation. We are now called to a reckoning to undo in our generation some of the damage of the previous centuries.

**2.1.3** But, beyond the despair of some secular environmental analyses, the Christian gospel brings hope for redemption in the life, death and resurrection of Jesus Christ, through which all creation will be released from bondage to decay and brought into the glorious freedom of God's children. (7) We are called in our times to be the active agents of this hope. It is not an optional extra for Christians to be concerned about God's creation. It is written into the very charter of our belief. To be a Christian *is* to care for what God cares for, God's creation, its creatures and all people, and especially the poorest, marginalised and those now most vulnerable to the consequences of the excesses of our energy consumption.

## **2.2 General Ethical Principles**

**2.2.1** Derived from these theological basics and in the context of climate change, we recommend some general ethical principles to apply to energy policy.

### a) Responsible Stewardship of Creation

- managing wisely the resources given by God
- using what is renewable in preference to what is not, and no faster than its rate of renewal
- using what is finite on a scale that does not risk exhausting the gift
- energy efficiency in design and systems; energy saving in use; energy reduction generally
- restoring the damage done to creation, learning from past errors
- responsible innovation in technology, taking into account wastes, life cycle and impacts
- stimulating environmentally sustainable energy supply and use in developing countries

### b) Loving our Neighbour as Ourselves: Economic and Environmental Justice

- providing a prudent security of energy supply based on sufficiency not profligacy
- working for global equity in energy use - contracting our disproportionate share of global energy so that those in poorer countries may expand theirs to a common global level
- acting to redress and prevent the damage caused to others by our profligacy in energy
- equipping the poorest countries to cope with future climate-related disasters
- promoting personal and communal responsibility in energy decisions, and technologies which best encourage this, including international transferability
- being even handed in arguing the pros, cons, risks and benefits of rival technologies
- recognising inherent inequities between local risks and more widely shared benefits
- taking account of intergenerational equity in the legacy we pass to succeeding generations

### c) Modifying our Lifestyles; Reducing our Consumption

- using all forms of energy as if energy was a precious and limited resource
- encouraging local sources of sustainable energy, food and resources
- limiting our desire for mobility and speed within the carrying capacities of the planet
- using less energy demanding ways to keep warm or cool, travel, do business, take leisure
- applying global and environmental life cycle analysis to purchases, habits and aspirations
- learning from each other for best practice and mutual encouragement

### 3. The Policy Context

#### 3.1 Climate Change

##### *Climate Impacts*

The *Stern Report* on economic impacts listed the following impacts if global temperatures rise 2°C or more:

Melting glaciers will initially increase flood risks and strongly reduce water supplies, eventually threatening a sixth of the world's population, predominantly in the Indian sub-continent, parts of China, and the Andes.

Declining crop yields, especially in Africa, could leave hundreds of millions without the ability to produce or purchase sufficient food.

At middle latitudes, crop yields may increase with 2-3°C warming but at 4°C, global food production is likely to be seriously affected. While cold-related deaths will decrease, deaths from malnutrition and heat stress will increase.

Diseases like malaria and dengue fever will be more widespread. With a warming of 3 or 4°C, rising sea levels will flood tens or hundreds of millions more people each year.

There will be serious risks for Bangladesh and Vietnam, small Caribbean and Pacific islands, and large coastal cities, such as Tokyo, New York, Cairo and London. One study estimates 200 million people may become permanently displaced by 2050 due to rising sea levels, heavier floods, and more intense droughts.

Ecosystems are particularly vulnerable to climate change, with around 15 - 40% of species potentially facing extinction after only 2°C of warming. And ocean acidification, a direct result of rising carbon dioxide will have major effects on marine ecosystems, with possible adverse consequences.

**3.1.1** A hundred years ago, few would have dreamt of the benefits brought about by having abundant cheap energy, available at the turn of a tap, the flick of a switch and the squeeze of a nozzle. Plentiful energy has transformed our lives and become integral to our society, but it has also brought major environmental and social costs, most especially in climate change. The seriousness of this is at last sinking in. People are now making the connection which science has long predicted between patterns of increasingly stormy winters and hotter summers with global warming. Scientific studies report higher levels of carbon dioxide in the atmosphere than have occurred for 800,000 years, (8) breaking polar ice sheets, the unexpectedly fast melting of Arctic tundra, and other critical "tipping points" where quite small temperature rises could trigger long term ecological changes.

**3.1.2** In the year since the last Assembly, the emerging picture is the urgency with which action is needed. The measures we put in place in the next ten years will determine how much damage the warming of the earth's climate will bring over the next hundred years. The landmark Treasury study in 2006 (*Stern Report*) on the economic impact of climate change warned that if we continue with "business as usual", there is "at least a 50% risk of exceeding 5°C global average temperature change ... This would take humans into unknown territory ... Such changes would transform the physical geography of the world." (9)

**3.1.3** Climate change is as much a social issue as an environmental one, whose outcomes bring profound suffering, disruption and injustice. The poorest countries and people suffer earliest and most. They are generally in hotter regions, more vulnerable to climatic effects.

They suffer more from variable rainfall, and are heavily dependent on agriculture, the most climate-sensitive of all economic sectors. Their struggling economies, poor health care, low-quality public services and infrastructure mean that climatic shocks cause not only major suffering in their populations but serious setbacks to their economies and their ability to recover. Aid agencies such as Christian Aid and Tearfund see active campaigning about climate change as central to their work of promoting sustainable development in poor countries.

**3.1.4** The primary cause of human induced climate change is the excessive scale on which humanity is now burning fossil fuels, which make up the vast proportion of the energy which we and the whole world use. At the same time, the security of fuel supplies has become a major issue for the UK. The decline in our indigenous sources of coal, oil and gas is leading us to a reliance on imported gas and global energy markets. The recent politics of Russian gas supplies have underlined our vulnerability to international political and market instability. Rising international gas prices have undone many of the gains made in addressing fuel poverty and have also increased carbon dioxide emissions because suppliers switched back from gas to coal. An underlying trend of rising fuel prices is now clear.

### **3.2 Radical changes are required**

**3.2.1** Major authorities agree that industrial nations must move to low carbon, low emissions economies, greatly reducing the use of fossil fuels. The UK target is for a 60% reduction in emissions of greenhouse gases by 2050, to bring global warming to even a tolerable level, increasing by perhaps 2-3°C. (10) This is extremely challenging, but some authorities suggest that even bigger reductions are required on faster timescales. 60% is only an average global share. To achieve an equitable distribution of emissions across the nations, the *Stern Report* concludes that rich countries should take responsibility for higher emissions reductions, perhaps up to 80%. (11)

**3.2.2** Various studies have been made of how the UK might achieve the 60% target. (12) (13) In 1999 the Royal Commission on Environmental Pollution (RCEP) laid out four illustrative scenarios which underlined how far-reaching the changes need to be. If our present energy demand simply kept steady, we would need a massive 20-fold increase in renewable energy, yet still require either 46 new fossil-fuel power stations equipped to capture and store most of their carbon dioxide emissions, or 46 new nuclear power stations. For electricity supply, onshore wind farms would cover about 1% of UK land area. They would be visible from most high ground and coasts not in designated scenic or wildlife protected areas. 200 offshore wind farms of 100 turbines each, a kilometre out to sea, would mean that wind turbines were visible from much of the UK coastline. There would be 7500 small wave power devices, 20 tidal stream farms and a tidal barrage in the Severn estuary.

**3.2.3** Heat would be supplied to homes from thousands of combined heat and power plants using a completely new infrastructure of piped district heating networks, and fuelled by fast growing trees and agricultural wastes. Photovoltaic panels would cover many large flat roofs, upper storeys of multi-storey buildings, and the south-facing pitched roofs of most houses. Major improvements to energy efficiency would be needed in all housing built in the 19<sup>th</sup> and 20<sup>th</sup> centuries. Energy crops would take 15% of the UK's present farmland area. This scenario assumed that car and air travel would continue at present rates, but most cars would have to run on fuel cells using hydrogen from oil or gas.

**3.2.4** Alternatively, to avoid building large numbers of nuclear or fossil fuel stations, we would need to reduce our national energy consumption by over a third by 2050. This would be a radical change. Amongst the implications the Commission predicted would be the replacement of much of our 19<sup>th</sup> and 20<sup>th</sup> century housing by energy-efficient dwellings, a significant reduction in mobility especially in personal car and air travel, a much more general use of public transport, and a large proportion of the population working at home or close to their homes.

**3.2.5** The point of such scenarios is to illustrate the *scale* and extent of the changes that are needed over the next 50 years, by everyone and impacting on everyone. The emerging scientific picture is that what we do in the next decade will determine how far we can avoid the damages we have set in train. Our societies and economies are structurally dependent on the benefits of cheap energy. Inevitably there will be costs, perhaps 1% of GDP, but the *Stern Report* also solemnly warned that to delay action would cost us far more. We have come to the end of the era of cheap energy which we can use without a second thought.

### **3.3 Government Policy Developments**

**3.3.1** In 2003 the Government produced a White Paper (14) setting out its thinking at that time, as reported to previous Assemblies. In 2005 it became clear that a new White Paper would be needed, in the light of a combination of events - rising gas prices, greater import dependence, the urgency of climate change, the planning conflicts which undermined the renewable energy flagship of on-shore wind, and a realisation that the question of replacing nuclear power stations could no longer be put off. A consultation paper was produced for comment, (15) to which the Church and Society submitted a response in April 2006. (16)

**3.3.2** The UK Government produced its response in July 2006. (17) It continues to base its strategy on a combination of secure markets to deliver energy supply, an increased development of renewable energy sources, making substantial improvements in energy efficiency, and tackling fuel poverty. Significant changes include taking more seriously the risks of too much reliance on imported natural gas, and seeing nuclear power playing a role as well as fossil fuel power stations with carbon capture and storage. A White Paper is due in Spring 2007. A further consultation on nuclear power now seems likely. In March 2006 the Scottish Executive published its updated strategy on climate change, (18) and its first energy efficiency strategy is awaited. There are a variety of more detailed measures, for example designed to broaden the scope of renewable energies, to make it easier to pass the planning process, and to move towards distributed as opposed to centralised energy production. The Royal Commission on Environmental Pollution advised in 1976 that the UK should not build new nuclear plants until it had sorted out what to do with the waste. The need for a workable strategy has been seen by Scottish and Westminster governments as an implicit or explicit pre-condition for any future nuclear programme. After a long consultation process, the Committee on Radioactive Waste Management (CoRWM) published its strategy plan for how long-term disposal will be addressed, which we discuss further below.

#### **4. Previous Assembly Reports and Actions by the Churches**

**4.1** The 2004 Assembly adopted the Environmental Policy of the Church of Scotland which states “We are called to care for God's creation for its own sake and also for the sake of all people who depend upon it. Christian mission includes sharing in putting right the relationships which have gone wrong within God's creation, and between humankind and the rest of creation, and growing towards the balance and good stewardship which is God's purpose.” (19)

**4.2** Energy policy has generally been discussed in the context of climate change since the SRT Project and Church and Nation Committee drew climate change to the Kirk's attention in the late 1980's. (20) An important report on environmental issues in 1994 laid some ground rules for policy which remain valid today. (21) It called for integrated energy policies, targets to reduce carbon dioxide emissions, increased regulations and incentives for developing energy efficiency and renewable energies, and recognised differing views within the Church on the role of nuclear power. It called for immediate action to stop an unsustainable rise in road vehicle use, to develop integrated public transport and sound planning frameworks. SRT has given the Assembly regular updates on climate and energy issues in its reports, as well as publications, talks and information sheets. (22) In 2005 Church and Nation produced a report on the oil industry which touched on wider energy policy. (23) In response to the 2001 transport fuel crisis, the Assembly urged HM Government to increase its efforts to combat climate change and to ring fence fuel tax revenues for environmental remediation, promoting energy saving and renewable energy use, public transport and rural infrastructure.

**4.3** For such an international issue, ecumenical initiatives have often proved the most effective channel for making an influence. Through Churches Together in Britain and Ireland, the Conference of European Churches, the European Christian Environment Network (ECEN), and the World Council of Churches (WCC), the concerns of the church have been fed into the UK Government, the European Commission (EC), the 1997 Kyoto climate negotiations, the 2002 Johannesburg World Summit, and the 2005 Gleneagles G8 Summit. In 1997 congregations were urged to sign a WCC global petition on climate change which was handed to senior UN officials in Bonn during the Kyoto preparatory discussions. The September 2006 Assembly of ECEN in Flämslätt sent a letter asking churches of Europe to commit themselves to energy saving and generation from renewable sources, and to make representations to their relevant governments and to the EC. (24)

**4.4** Closer to home, the Church and Society Council has made submissions to some of the energy consultations mentioned above, including the UK energy review and the Scottish Executive's proposed planning regulations affecting renewable energy. It has ongoing links to various sectors of the energy industry, with MPs, MSPs and Government departments. Through SRT and Eco-Congregation it participates in the Scottish Sustainable Development Forum and the Stop Climate Chaos initiative. The Energy and Environment working group has prepared briefing notes on energy efficiency, renewable energy, fossil fuels and nuclear power. (25) These complement many other useful articles available on the SRT, CEC and ECEN websites, and WCC climate change briefings. (26)

**4.5** A crucial part of the church's response has been to make a considerable investment into putting our own house in order, through the Eco-Congregation Programme in Scotland, which SRT has run in partnership with Keep Scotland Beautiful on behalf of Action of Churches Together in Scotland. The Scottish Executive gave it considerable financial support over four years, and saw it as a significant grassroots initiative addressing a problem of personal lifestyle change which is proving difficult for Government and NGOs. Its churches (135 to date, and growing) bear a significant witness of the response of the Christian faith. The Church environmental policy of 2004 has led to recycling and a much needed energy audit of its 121 George Street headquarters. But much more can be done, by both ourselves and Government. We will start with the latter.

## **5. What should be done in UK and Scottish Energy Policy?**

There are many energy policy options available to the UK and Scotland. It is not our aim to add to the many technical and economic appraisals of these. (27) As we already indicated, in this report we want to emphasise the role of ethics in the choices to be made. This aspect has not been covered adequately by government or other agencies. Economic appraisals especially depend on the assumptions made. We note, however, that within the uncertainties no one combination among the main technological options emerges from published studies as clearly more cost effective than any other. There is no “free lunch” in energy options. Each one carries environmental, economic or social advantages and disadvantages, costs and risks. All energy policy is eventually a matter of ethical choices among a range of competing values and moral goods. Here are some examples:

- how much value do we place on avoiding adverse impacts of renewable energy installations on the landscape?
- what balance should we make among centralised, remote and local generation of electricity to supply a very unevenly spread Scottish population?
- should Scotland use its unusually large renewable resources to benefit Europe as a whole?
- how do we handle the inevitable imbalance between benefits to society and risks or inconvenience to particular individuals or communities?
- what do we conclude about our responsibilities to future generations for nuclear and fossil fuel wastes and impacts?
- to what degree should we subsidise desirable measures to address climate change which will not be realised fully or quickly enough without major financial incentives?
- given that energy prices must increase if we are to address climate change impacts, how do we avoid serious impact on the poor?

### **5.1 Energy Efficiency**

**5.1.1** It is now quite clear that if we continue “business as usual” and do not very substantially cut our present levels of energy consumption, we will not bring climate change under control. The first ethical and strategic priority is to set about making large reductions in our energy use at all levels and in all sectors of society in Scotland and throughout the UK. 30-40% savings in energy use are agreed to be technically possible in homes, organisations and businesses. If we did this it would greatly reduce our reliance on fossil fuels or nuclear power, improve fuel security, and save oil and gas as a chemical resource for the future. But it is not happening.

**5.1.2** The UK Government and its predecessors have failed to deliver and stimulate the main elements of the energy efficiency strategy, in the domestic, commercial and public sectors or in industry. It has failed to recognise where its policies have created barriers to realising the immense potential for saving. This missed opportunity represents not only an enormous waste but a contradiction of its declared commitment to being the world leader in addressing climate change.

**5.1.3** But the problem is not just “them”. It is equally “us”. Energy saving and efficiency is not a single measure like building a power station. It involves millions of small decisions made by all of us as individuals, families, communities, companies, public sector organisations and charities in all walks of life. But the incentive to save energy is not immediate. We have energy on tap. The environmental and social impacts of our choices do not confront us in daily life. For many of us, even though we could afford to install energy efficiency measures, energy is not such a large part of our household budget that saving it is a major priority, especially if the pay back is more than about two years. We value our time and convenience, or we feel (wrongly) that our savings would not make much difference. The 20% in fuel poverty, whose energy bills take a large slice of their income, cannot afford the saving measures that would make a big difference.

**5.1.4** Inertia and apathy are incompatible with our stewardship of God's provision, our care for neighbours far and near, and our companionship with all God's creation. If electricity was only available for a few hours a day, we would be very careful what we used it for. We need to recapture the idea of energy, not as an infinitely running resource, but as a precious commodity to be stewarded very carefully as though it "cost the earth" ... because it does.

**5.1.5** The Church of Scotland set up the first energy saving scheme for churches in 1978, but the uptake among congregations is still nothing like as strong it should be, given the potential to save both money and environmental damage. There is an increasing desire among the churches in the Eco-Congregation Programme to do something; but costs, payback times, or institutional inertia often hold them back. One lesson from our experience is that the vast potential of energy saving will only be delivered in the population at large if it is given very substantially more priority by Government. This has to be embodied in both "carrots" of widely available cost incentives, grants and subsidies, and "sticks" of regulations to discourage bad practice, and also by a mutual encouragement of sharing good practice and pressing on together within each community. Here are some examples we have identified.

**5.1.6** In housing and the built environment, the potential to save energy in buildings is enormous but the UK continues to have some of the least energy efficient housing stock in Europe. We stress the urgency of mandatory passive solar design in all new buildings and major incentives to upgrade or replace existing building stocks. Direct regulation in building standards is required because reliance on voluntary action within the building industry has not delivered. We are encouraged that the Government now propose that all new housing built after around 2015 be zero carbon in terms of energy use.

**5.1.7** In equipment, direct regulation is indispensable to improve appliance efficiency standards, in removing the drain on electricity supplies by appliances left on in standby mode, and much else. This should be linked creatively to labelling, the education of salespeople, and to point of sale incentives geared to promoting the best energy value of items.

**5.1.8** In awareness of the impact of our lifestyles, the Government needs urgently to set up the means to install "smart" metering of gas and electricity, as it did when we switched from town to natural gas, so that householders can see what they are consuming with their appliances and adjust their habits accordingly. This is entirely feasible.

**5.1.9** In transport, the fastest growing sector of energy use, we simply have to use cars less and fly less. Any advantages gained from more efficient car engines have been swallowed up by having more cars, more gadgets, and by using them more. To put it in perspective, the World Business Council on Sustainable Development concludes that car ownership has to decline by half by 2050, mileage must reduce to a third, and personal air flights be reduced to around a fifth of current levels. (28) This emphasises the stark failure of government policy in its increased spending on road and airport building, and the confused signals on fuel pricing, arising from the stop-go policy on the fuel duty escalator, by which the Government had set out to influence motorists via a 'fuel escalator' causing a steady rise in fuel prices, but this was perceived as a tax-raising rather than an environmental measure. (This led to protests by farmers and truck drivers which threatened fuel supplies, "encouraging the worst in our instincts at the very point when the Government could have put down a marker to encourage responsibility and altruism", as SRT noted in its 2001 Assembly Report. The Government dropped the proposal.)

**5.1.10** We commend the importance given to addressing fuel poverty in UK and Scottish strategies. Energy efficiency should be geared to addressing this ongoing problem, even if that means the better off pay more. Energy suppliers should continue to be given this as a "civic duty" via a strengthened Energy Efficiency Commitment, as a condition of doing business.

## **5.2 Renewable Electricity Supplies**

**5.2.1** Presently 80-85% of UK energy is delivered by fossil fuels. (29) It is now not merely an aspiration but a matter of urgency to implement the major shift required, from a fossil fuel based energy supply to one based primarily, and as far as possible, on renewable energy technologies. To use Scotland's indigenous renewable sources is the clear ethical choice on the grounds of environmental impact, long-term resource and fuel security. The issue is rather whether we can install enough renewable capacity quickly enough. The main drawbacks are the feasibility and economics of a radical change in how we supply energy.

**5.2.2** The biggest uses of fossil fuels are for domestic, commercial and industrial heating and for transport, but these are also the hardest to displace. Heating and transport each make up around a third of UK energy use, whereas electricity uses only about 17%. However, electricity generation currently offers the best opportunities for renewable energy technologies. They are generally less concentrated forms of energy, so that we need far larger numbers of devices and installations (like wind farms, wave machines or solar panels) per unit of electricity. This means a much more widespread impact. To generate as much electricity as a 1200MW coal or nuclear power station requires 1,200 wind turbines each with a 100 metres diameter. This also means that the capital cost of the plant per unit of electricity is in general more expensive. But because there is no fuel to pay for, a wind farm is much cheaper to run than, say, a gas-fired power station. The net result is that electricity is roughly comparable in price whether generated from wind, gas or nuclear sources.

**5.2.3** The current primary renewable source is wind power. But the realisation of its potential has been much reduced by serious planning difficulties, which few had envisaged, because of public opposition to siting of both turbines and to the power lines and infrastructure needed to connect them to the main centres of demand. As economics and feasibility improve, significant numbers of offshore facilities will be built alongside the continuing large increase in land-based wind farms. Expansion of large scale hydropower is unlikely to be an option for Scotland because of the lack of suitable unused sites and the considerable environmental impact. Other renewables have progressed but remain expensive. Wave power is at a much earlier stage of development. Some success with demonstration facilities has been shown, and a first larger scale installation in Portugal will use Scottish technology. There is large potential but it will be many years before it will be fulfilled. Other renewable energy sources include tidal power, small-scale hydroelectric, solar power, and bio-mass (by burning waste products, specific crops, or fast growth trees). Each of these has advantages and disadvantages for people and the environment, and localities to which it is best suited. These should be considered as part of a balanced energy strategy, where reliance is not placed on any one main source.

**5.2.4** A market led energy system does not lend itself readily to the transition that is required. It has proved a blunt instrument to deliver ethical priorities in energy supply. To deliver even the amount so far installed has required a complex system of subsidies to ensure that energy companies have incentives to install and offer renewable electricity to customers. As new sources emerge further measures need to be built in, for example for marine energies (tidal and wave), for them to gain a foothold and ultimately provide the large share they could deliver. Ways also need to be created to finance demonstration projects on a large scale prior to full commercial deployment. Scotland has a technical lead in offshore energies, and can play a leading global role in manufacture and supply, as Denmark has done on wind, but risks losing this by a failure of Government to ensure adequate investment at the right times.

**5.2.5** Renewable energies have practical drawbacks. While wind, tides and solar energy are inexhaustible they are not continuously available. Their variability means that extra gas- or coal-fired plant has to be kept on standby, to be switched on if, for example, a week of still, freezing weather comes in January, and somewhat limits the percentage of total electricity supply. Recent studies of UK-wide wind patterns suggest that enough variation occurs that up to 40% wind may be feasible in a co-ordinated UK network.

### **5.3 Location, Communities and Ethics**

**5.3.1** The extensive use of renewable energy could meet a substantial percentage of Scotland's energy needs, but its deployment may also challenge other values, including some environmental or social goods. Conurbations may continue to need some fairly large power generating facilities, but to adopt renewable electricity on a large scale will mean a much more dispersed system, dictated by the locations where practical renewable resources occur. Wave, wind and tidal energy have to be harvested where they are found. Often the best sources are in locations remote from the main centres of population, which is especially the case for most offshore generation. New electricity transmission lines will be required to carry such energy to the centres of population and to manage the variability of output. Since this means power lines across wilderness areas, undersea or underground cables would be preferred. But this leads to additional costs.

**5.3.2** A full deployment of renewable energy in Scotland would have a profound impact on landscape. Unlike coal, gas and nuclear where a handful of power stations in a limited number of locations can supply Scotland's needs without the vast majority of the populace being conscious of their existence, a renewable future will be clear and obvious to all. Arguably to be reminded daily where our energy comes from is a good thing. But many excellent locations for onshore wind power, for example, are in areas of particular scenic, ecological or amenity value.

**5.3.3** This is important in relation to the values people hold to their sense of place, identity, belonging, nature and heritage, whether as residents or tourists. This can be a very individual thing, but there are also shared understandings. Regulations reflect that, say, to put wind turbines on Ben Nevis, a pumped storage hydro scheme on Loch Lomond, or solar panels on John Knox's House would violate other important values. Much long term ill-feeling has been created by the failure to manage the preliminary siting of Scottish wind developments or to make community involvement integral at this early stage. Poor official planning guidance, inappropriate locations and insensitive developers have effectively delayed the uptake of wind power.

**5.3.4** In ethical terms if we wish to enjoy the variety of shared resources, which are produced in particular locations, there are two implications. Altruistically, everyone should be prepared to accept some personal loss for the sake of the whole. As Christians we are concerned at the underlying attitude of NIMBY ("Not In My Back Yard"). If the concept of the energy service is broadly accepted by the population, no one has a special pleading case that they should not be the ones to suffer, given that someone will have to bear the burden. Complete refusal to have a local installation of any kind would logically mean rejecting the benefits gained from the service. The problem occurs when some dispute one option or prefer another, or when especially remarkable local circumstances of landscape, social or wildlife impact arise. This then becomes a matter for social and local negotiations which have no magic solution.

**5.3.5** In recognition of this, a general principle is that the wider society which enjoys the benefit should provide some recompense for those who are in the vicinity of the installation. One problem is that this does not give like for like; the types of benefits and the nature of the costs are inherently different. Recompense might be financial in cheaper fuel or lower council taxes, or in the provision of some local amenity like a hospital. There may be employment advantages, which vary according to the technology. Some may boost local employment prospects on a reasonably long timescale. For others, employment is mostly transient during construction.

**5.3.6** In July 2006, the Committee on Radioactive Waste Management, CoRWM, produced proposals for a process to identify sites for radioactive waste repository. This was announced in July 2006 after an extensive public consultation process, designed to identify ethical problems. Experience in Nordic countries suggests that to seek a community which is

prepared to consider such a facility is a more constructive approach than top-down imposition by Government. In the UK, previous attempts to find locations for the long term storage of waste based on geology fell foul of local opposition. Similar problems occurred over the handling of wind farm and open cast coal mine siting. These have left widespread suspicion about any planning process set up by “them”.

**5.3.7** The notion of “volunteer communities” depends on the many important issues being handled in a participative manner with respect and sensitivity for local concerns. The Government proposal, however, is that volunteer communities would enter into private negotiations with developers of nuclear waste disposal facilities in exchange for “compensation packages”. This is fraught with problems, in reducing complex questions of local and national values to commercial factors or vested local interests. Some fear it might lead to bidding wars between rival communities. These questions are not consumer choices negotiated with private companies, but public values to be handled with elected public authorities, through effective local consultation.

**5.3.8** Community involvement poses complex social issues. One is about imbalances in power. Faced with the full legal and political muscle of government, a particular local community may not have the cohesion, negotiating skills and resources to represent itself, and protect what it considers are its interests. Another issue is the problem of defining what the relevant community is, and who has a voice in it. How should it go about coming to a valid conclusion about a proposed development, or about what safeguards and compensations are appropriate? In the case of radioactive waste, it also has to consider not only the community as it is today, but into the far long term for many generations to come. How also does it avoid bribery, local vested interests and intrigues, or a competitive tendering situation between rival interests? Another issue is the less immediate impacts on other communities, like a town through which waste is transported, or a village in another valley which has a permanent distant view of wind turbines.

**5.3.9** It is important that site selection is based on appropriate technical criteria, but this is not the only factor. An ethical balance must be struck. Legitimate interests of the locality concerned must not be overridden or manipulated by national pressures. On the other hand, a national issue should not become completely subject to competing local interests. The churches clearly have a role to play, both as an honest broker in helping the community to identify its important values in the context of the different and competing interests, and in protecting those most vulnerable in these situations.

#### **5.4 *Priorities and Pragmatism***

We are quite clear that renewable supplies are the ethical route on which future electricity generation should be based. If coupled with large scale energy saving and efficiency across all sectors of society, it ought to be possible to meet our UK and Scottish electricity needs without needing to build further base load fossil or nuclear power stations. We have doubts, however, that with the present Government policies and social trends, enough energy saving and renewable electricity capacity will be implemented in practice to avoid installing some new building of fossil and nuclear generation. The question is whether fossil or nuclear is the lesser of two evils? We consider these options in turn.

#### **5.5 *Electricity Generation using Fossil Fuels***

**5.5.1** We should not invest in generating electricity from coal, oil or gas any further than can be avoided, because their carbon dioxide emissions are the primary cause of human induced climate change. In recent years, however, the capture and storage of most of the carbon dioxide emitted has become technically feasible. All the components are proven in themselves, although no one has brought them together operationally into a nation-wide system. The Government is proposing a demonstration scheme, with a view to its widespread use. (30) We consider that no large new fossil fuelled installation for electricity, chemicals or

heat production should be implemented without the mandatory requirement for carbon dioxide capture and storage (CCS), and that retro-fitting existing plant should be considered. This should include the likely considerable future use of gas to make hydrogen for fuel cells. The EU has set a target of 15 such stations by 2015, and that all new coal stations should be capable of using CCS. (31) The Government currently estimates that CCS might reduce carbon emissions by 80-90% from the present concepts of fossil fuelled power stations. (32) This is a considerable improvement but a current gas-fired power station with CCS would still release at least 2.5 to 4 times more CO<sub>2</sub> per unit of electricity than nuclear power stations, based on EU figures comparing the CO<sub>2</sub> emissions for different technologies, including their complete fuel cycles and wastes. (33) More advanced technologies such as underground coal gasification may in future bring this figure down.

**5.5.2** It would be a very large undertaking demanding considerable new infrastructure. Its appraisal also indicates that because the *additional* cost is considerable, significant financial incentives and market signals will be needed before energy companies would willingly install the plant and infrastructure. As noted above, the total cost is still comparable with nuclear or wind. The safety considerations and international treaty implications of storing the CO<sub>2</sub> under the sea have not yet been resolved. (34) Experience also suggests that most very large expansions of scale of a new technology throw up problems that were not anticipated. A degree of precaution may be appropriate. From an ethical point of view it remains an “end of pipe” solution, to clear up the wastes, rather than what might be described as an inherently clean technology. While we applaud the efforts to improve the efficiency and environmental impact of coal, the expression ‘clean coal’ is misleading when compared in pollution terms with wind and wave power. A spin off is that CCS technologies will be essential in reducing emissions from the expanding industrialisation of China and India, where there are extensive increases in coal-fired power stations.

## **5.6 Electricity Generation using Nuclear Energy**

**5.6.1** Nuclear energy currently supplies about half of Scotland’s electricity. Together with its hydro power, this has meant that Scotland uses considerably less fossil-fuelled electricity, and emits less carbon dioxide per unit of electricity, than England and most other European countries. The two remaining nuclear stations are reaching the end of their life, and it is now unavoidable to address the question of how these should be replaced.

**5.6.2** The Church of Scotland has thus far left open the question of nuclear power, aware of the differing views among church members, some strongly in favour, some strongly against, many undecided. The advantages of nuclear power are that it is the only currently available large base load supply for UK electricity which does not generate large amounts of CO<sub>2</sub>, and that its life cycle releases of greenhouse gases are less than fossil fuel stations even with carbon capture and storage as the standard. The disadvantages of nuclear power have been well rehearsed. The key ethical question is whether human beings are capable of managing such a powerful force as the basis for a significant contribution to energy supply. On the positive side, the relatively good safety record in normal operation of nuclear power stations over 50 years in the UK suggests that humans are not incapable of doing so. Against this are the three main arguments: risk of accidents, waste disposal and nuclear weapons proliferation.

**5.6.3** The risk of a catastrophic accident is, for some, a reason to reject nuclear altogether. Others consider that, provided a rigorous safety culture and regulatory system is maintained, and with the designs now being proposed, this is a tolerable risk within the UK context. Given the dependence on this level of safety it would not be appropriate in countries where that infrastructure is absent or has collapsed. Low level accidental discharges also remain an issue.

**5.6.4** Radioactive waste presents a problem because it passes to future generations a continuing need to keep it secure over vast timescales. For some this rules out building any further nuclear power plants. Others argue this not a “show stopper”, if there was only a

single generation of replacements for the existing UK nuclear reactors, because the existing large stock of nuclear waste will have to be dealt with in any case and the increment is comparatively small. A large and continuing UK nuclear programme would be another matter. In their study of UK disposal options, CoRWM indicated that the waste implications for any new reactors should be the subject of a further consultation. Stored carbon dioxide from fossil fuels would be of a much greater volume and could also have a significant impact if it escaped in quantity. In both cases, remote risks must be taken into account in any comparison. Although energy policy is an issue reserved to Westminster, the Scottish Parliament have planning powers and have made a commitment to allow no new nuclear until the waste issue is addressed. It is not clear if the completion of the CoRWM report now meets that condition.

**5.6.5** For some the mere connection with nuclear weapons presents an in principle prohibition on peacefully motivated uses in power generation, or else the risk of diversion to weapons manufacture is an overriding objection. In practice, groups set on procuring weapons grade nuclear materials have many easier means outside the UK. The deployment of a further generation of nuclear power stations would continue to constitute a threat to security or a terrorist risk, although it is not clear that such facilities are seen as a desirable target.

**5.6.7** Some object because nuclear power involves a continuing commitment to large scale centralised generation, which would reduce the incentive to save energy. But the same could be said of coal or gas-fired electricity generation with carbon capture and storage, hydro and tidal barrages, and possibly larger wave devices or large solar photo-voltaic installations.

**5.6.8** A single replacement generation of nuclear power stations in the UK is not likely to run into uranium shortages, but some doubts are expressed about supplies if further tranches were ever proposed. Uranium is fairly abundant and its extra costs of extraction are only a small component of the cost of nuclear power. But if extra energy was required to extract lower grade ores, the extra carbon dioxide emissions might lose the climate advantage of nuclear power. As with all extractive technologies there are concerns about environmental and social impacts of uranium mining.

**5.6.9** Some of us also argue that the nuclear energy option appears problematic in that we in the developed world show a reluctance to see it deployed very widely in the developing world. This poses questions of social justice and respect for all people and involvement of communities at home and abroad. Others maintain that this argument falls because it applies equally to fossil fuel electricity generation – that if we do not want others to use that on climate grounds, then we should forbid it to ourselves. In technological ethics, arguments of unequal access would have applied to many other technologies. The opposite argument is that, because fossil fuels are scarce and likely to rise in price, any use which the UK can make of an alternative technology like nuclear power which would remove some of the pressure on fossil fuels will be of advantage to the poor, who lose first and most with rising oil prices.

**5.6.10** The final issue is the opportunity cost – what else might we do with the money, resources and skills? On present evidence, some of us doubt that we can make sufficient policy and practical changes, and would struggle to meet the very serious targets of greenhouse gas reduction we have been set on the timescales that are needed. If, by using nuclear power, we have the chance to make further reductions in emissions than we would otherwise achieve, and that issues of risk, wastes and security were not seen as overriding, our duty would be to continue nuclear power for at least one more generation. If it happened that we would have ended up meeting our targets without nuclear and exceeded them, we would have gone the extra mile in contracting our demands that others in the developing world might be able to meet theirs better. This is a judgement between values.

**5.6.11** On the other hand, as the Sustainable Development Commission noted, it will be ten to

fifteen years before we see a single additional unit generated from new nuclear power station building, and large sums of money would have to be committed to this. This is because nuclear is very expensive in up front capital investment, but is cheaper to operate than, say, gas. If it diverted scarce resources (capital and human skills and talent) away from the long term truly sustainable solutions which will be needed, this would be a major argument against any further deployment of nuclear power in the UK. It is not clear, however, whether this is indeed a case of either/or choices, or both-and parallel developments. That would also seem to be a value judgement.

**5.6.12** Some of us argue that nuclear power should only be considered as an option of absolute last resort to deliver the climate change targets, if it proves technically infeasible to deliver these reductions through renewables and energy efficiency as the primary route, and by cleaner fossil fuel combustion backed with carbon capture technologies as the second option. Others argue that nuclear power should be preferred to fossil fuels with carbon capture and storage, unless the latter could result in CO<sub>2</sub> emissions below those from nuclear power, but that a prudent energy supply policy would suggest a mixture of both.

**5.6.13** Either way, none of us wish to see nuclear energy used as a solution simply because the Government had failed to adopt policy measures, indicators, market and financial instruments, regulation, and the widespread supporting infrastructure and finances for community and individual measures, to support the full development of the greatly preferred options of energy efficiency and renewables. They remain overwhelmingly the priority.

### ***5.7 The Market and the Role of Government***

**5.7.1** Scotland has a target to generate 40% of electricity from renewable sources by 2020. The Scottish Renewables Obligation legally obliges electricity suppliers to increase their use of renewable energy sources. Despite UK and Scottish targets, however, neither administration has direct control over the production, distribution or consumption of energy, though their policies can influence decisions. Oil, gas, electricity, and transport are all private or privatised industries, with some operators being UK owned, others being part of overseas-based groups.

**5.7.2** The Government places far too much confidence in markets to deliver the optimum policy. We were very concerned at the attitude that “it is not the role of government to decide the fuel mix for generating electricity. Our policy is for the market to make these decisions within the right regulatory framework.” (35) Given the ethical, environmental and social issues at stake, we feel this is a dereliction of political duty. If it is “not the role of Government” to make such decisions in the interests of the country and the global environment, then no one will do it.

**5.7.3** UK electricity generation is not a fair market, because it is geared primarily to large-scale generation by substantial global companies, rather than energy efficiency measures and local renewable energy initiatives, which can find themselves at a disadvantage. We do not have confidence that they will naturally behave in a way which provides for the social and environmental goods we have identified, because the first requirement is to provide adequate rates of return for shareholders. This mitigates against the rapid uptake of carbon capture or the newer renewables. We believe that energy suppliers must be required also to promote energy efficiency, and to facilitate the transition to a system in which renewable energies predominate and where community and household renewable energy production is very widely adopted. For example, we note that the recent disappointing rise in carbon dioxide emissions when gas prices rose occurred because of a greater use of coal. It did not produce a greater use of renewables, because the market solution gave the wrong environmental answer.

**5.7.4** The motivations provided by the present market in energy may deliver efficiencies of production, but they have proved signally unsuccessful in delivering environmental goods of

substantial energy savings and in implementing renewable energy technologies. Figures quoted for cost-effective savings which could be achieved in energy in most sectors are not substantially different from what they were in 1986. (36) There is no indication from the recent past that radical changes to energy use, housing, road, air and public transport, patterns of mobility and renewable energy supply will be delivered by the market as it is presently constructed.

**5.7.5** As part of the recently passed Climate Change and Sustainable Energy Bill, (37) the UK Government is required to set clear long-term and annual targets for carbon reductions, renewable energy uptake and improved energy efficiency, with figures indicative of the scale of particular technologies which will be needed. Since many of the measures will require large up-front costs, long pay-back periods, or direct subsidies (eg district heating, carbon dioxide storage, hydrogen powered fuel cells, solar PV and wave power), it will need to establish substantial financial incentives, subsidies or other instruments, on a widely available scale, at all levels - from large companies to communities and individuals.

## **6. Policy Conclusions**

**6.1** The urgency of climate change leads to the unequivocal ethical priority of pursuing energy saving and efficiency at all sectors of society. We have covenanted to do our part (see below). On the UK and Scottish Governments' parts there is an urgent need to face up to the failure to implement the enormous environmental and economic potential of energy efficiency. They need radical change of policy to stimulate energy efficiency with the type of financial, tax and regulatory incentives and stipulations that will lead to real changes in practice in all sectors and levels of society. The measures should also continue to be geared heavily to alleviating fuel poverty, even if that means the better off pay more. Energy suppliers should continue to be given this as a "civic duty" via a strengthened Energy Efficiency Commitment as a condition of doing business.

**6.2** Renewable energy should be developed as quickly as possible and play the largest role that it practically can as soon as it can. We note again that a market led energy system does not lend itself readily to the major and urgent transition in electricity supply that is required. This is a case where the social and environmental need takes priority over a rigid adherence to what is already a very unnatural and highly constrained market, geared as it is to major bulk producers. It may be necessary to stipulate percentages of energy to be delivered by different technologies. In order to stimulate technologies which are not yet economic or fully developed technically, ways need to be created to finance large scale demonstration projects. Much greater and more widely available incentives are needed to stimulate local renewable energy generation by individuals, communities, churches and other local organisations.

**6.3** We do not favour building base load generating plant, using either fossil fuels with carbon capture and storage or nuclear energy. For their different reasons rehearsed above, we see neither of these as the good routes to go down. If pragmatically it is impossible to avoid some new building, we are not in a position to recommend which option we would regard as preferable. UK regulations should stipulate that any large scale fossil fuel plant must have mandatory carbon capture and storage. A condition of any nuclear build is that a strategy for the disposal of nuclear waste is realised that is just and fair to the communities concerned. Any call for volunteer communities must be done with the very greatest care and sensitivity in the light of the risks of abuse which we have identified above, and the past bad experience of many communities in Scotland where technologies have been unjustly imposed.

**6.4** As long as we can reduce energy demand considerably and use domestically produced renewable energy, there will be less need to be concerned about long term security of electricity supply. We might hope that the purchase of fuels from abroad and export of technology would constitute reasons to promote international collaboration and trust.

## 7. Taking responsibility: How should we respond?

**7.1** The outcomes we have highlighted in this report will only be achieved through concerted action at government, community and individual level. If the problem is not just “them” but us, the solution lies not only in major policies but with ourselves. As local churches, as national church councils, as households, communities and groups, and as individuals there is a wide range of actions which we call upon all to do.

**7.2** We would urge all churches to join the Eco-Congregation Programme. This gives a free, flexible and progressive way of making real changes in the life of congregations, individual members and influencing your wider community. The *Church Check-Up* gives a way of working out what is relevant in your situation. The free resource modules are adaptable to a very wide variety of church situations from Shetland to Galloway. As Kilmuir and Oban church said in their leaflet sent to all session clerks “It’s easy! We’re doing it – so can you”.

### 7.3 Action as individuals

**7.3.1** What changes should you be preparing for, and making now? Almost 900 members of Eco-Congregation churches have signed the “Stop Climate Chaos” pledge to cut carbon emissions in their own lives and to press the Government to take more urgent action on climate change.

- Exercise your influence on the market in your choice of energy supplier, in the products you buy as a consumer, in your investments or pension. Participate as a shareholder in company AGMs.
- Get involved in the planning process for local energy developments; become informed and play a pro-active role in shaping the developments.
- Use your democratic right to influence government. Get involved locally and nationally by asking questions, lobbying, and using your vote.
- Take action to reduce your energy consumption here and now, at home and where you work.

**7.3.2** Here are ten easy things that you can do at home:

Turn your thermostat down by 1°C. This could cut your heating bills by up to 10 per cent.

Check your hot water cylinder thermostat setting; it usually needn’t be higher than 60°C/140°F.

Close your curtains or shutters at dusk, to reduce the heat escaping through the windows.

Always turn off the lights when you leave a room.

Don’t leave appliances on standby, or on charge unnecessarily.

Use the half-load or economy programme if you’re not filling up the washing machine, tumble dryer or dishwasher.

Put only as much water in the kettle as you need; boiling water consumes far more energy than lights or computers.

Fix leaking hot taps; a week of drips wastes enough energy in a week to make a hot bath.

Replace your light bulbs with energy saving ones: just one can reduce your lighting costs by up to £100 over the lifetime of the bulb.

Switch to a green electricity supplier; choose one at [www.greenelectricity.org](http://www.greenelectricity.org)

**7.3.3** Look at the Energy Saving Trust website [www.est.org.uk](http://www.est.org.uk) (or phone 0131 555 7900) for comprehensive information on how to make your home more energy efficient, purchase energy efficient products, and much more. There are a range of renewable energy technologies which can be used by a household or groups of residents, such as ground source heat pumps, solar water heating panels, solar PV electricity panels, or, in rural areas, a small wind turbine. The Energy Saving Trust and Scottish Household and Community Renewables Initiative ([www.est.org.uk/schri](http://www.est.org.uk/schri) or 0800 138 8858) provide comprehensive information and will give 30 per cent grants.

#### **7.4 Action as Congregations**

**7.4.1** We would urge all churches to examine their use of energy as a moral issue. Switch to green energy tariffs and absorb any additional cost by adopting energy efficiency and conservation measures. Churches are well placed to be generators of energy through small scale renewables, which encourages you to value it and use it wisely and in community. Westray Church, having become self-sufficient in renewable energy, is setting up a fund to help other churches do the same.

**7.4.2** Why not follow the example of Eco-Congregations by taking the following actions in your church?

Install low energy light bulbs in the sanctuary, halls, and manse.

Insulate the roof and walls of the sanctuary, halls and manse.

Introduce timer and zoning controls to the heating system, and manage it carefully so that each part of the church is only heated while it is being used.

Install micro-renewable generation facilities like a wind turbine, solar panels, or ground source heat pump. (Grants to do this may be available from the Scottish Community and Household Renewables Initiative: [www.est.org.uk/schri](http://www.est.org.uk/schri).)

Maximise natural light by cleaning windows and installing skylights.

Lobby politicians to include churches and community centres in grants for energy saving measures.

Switch the church to a green energy supplier.

**7.4.3** To ensure that the Church's efforts to become more environmentally friendly realise their full potential, it is important to combine these practical actions with teaching and worship to link these issues to Christian faith, and with community outreach so that their impact reaches beyond the regular church attenders. The Eco-Congregation programme is designed to enable churches to do this, through auditing activities, resource modules, and support networks of other churches. Visit [www.ecocongregation.org/scotland](http://www.ecocongregation.org/scotland) to find out how.

#### **7.5 Action as a national church**

While the experience of Eco-Congregation shows that the ideas, enthusiasm and action come from the local church, the General Assembly and its Councils could make it much easier for them to turn their dreams into reality. In February 2007 a move to take forward environmental agendas across all the Councils of the Church was begun. It is anticipated that for the next two years a coordinated effort will be made, with financial backing from most or all of the Councils, to put this into place. We look forward to reporting on progress at the next General Assembly.

### **7.6 Acting Together**

Edmund Burke said: “*Nobody made a greater mistake than he who did nothing because he could only do a little.*” In this report we have stressed the urgency of action at all levels in society, if the effects of climate change are to be brought under control and the opportunities presented in how we create and use energy are to be realised. We are part of a growing movement for change as individuals and as a society. Through Eco-Congregation, as individuals, congregations and networks, we are joining up our actions and voices across Scotland and linking to sister programmes around the UK, Europe and the world. As people of faith, looking and working together for Christ’s redemption of the world, these are signs of hope.

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**Church of Scotland  
General Assembly 2007**

**CHURCH AND SOCIETY COUNCIL**

**Energy for a Changing Climate**

**Deliverances**

*At Edinburgh and within the Assembly Hall, the 22nd day of May 2007 years.*

The General Assembly:

16. Recognise that we as a Christian family have failed in our stewardship of God's creation, and that we must now show leadership by considering the impact of even the most seemingly insignificant of our decisions.
17. Recognise the urgency with which major changes are needed to avert the worst consequences of climate change.
18. Call on HMG, the Scottish Parliament and Executive, and local authorities to set clear and radical long-term targets for greenhouse gas reductions, by the implementation of stringent and specific environmental legislation, in recognition that we all have a duty of care for the world and its people beyond present market considerations.
19. Call on HMG, the Scottish Parliament and Executive, and local authorities to invest money and political effort in the promotion of energy efficiency and renewable energy.
20. Call on HMG, the Scottish Parliament and Executive, and local authorities to enable more community-based, local, distributed renewable energy projects.
21. Notwithstanding the financial support given by the Scottish Parliament and Executive to develop various public transport initiatives, which is to be welcomed and encouraged, call upon the Scottish Parliament and Executive, in conjunction with the Regional Transport Partnerships, to increase capital and revenue support for initiatives to encourage a long-term transfer from private to public transport, with particular regard for strategic and trunk Park and Ride schemes, building on the experiences of existing schemes, such as at Ferrytoll.
22. Continue to encourage all congregations to become involved in the Eco-Congregation Programme.
23. Call upon Her Majesty's Government to increase funding for the research and trialling of alternative fuels and technologies so as to reduce the current dependency on fossil-based fuels by the transport industry.
24. Challenge all individual church members to make significant lifestyle changes to reduce their use of energy and their consumption of the earth's resources.
25. Welcome the cross-council approach being developed within the Church to work with the Eco-Congregation Programme, aimed at drawing up and implementing strategies for integrating the Church's environmental policy into their work and ministry.
22. Urge Churches and Presbyteries in their outreach activities to undertake action to combat climate change in developing countries.
26. Instruct Presbyteries to include an environmental energy assessment in the five yearly property reviews of congregations from 2008.
27. Affirm the importance of the work that has been developed by the SRT Project and the particular contribution of Donald Bruce, and instruct the Council to ensure that the work of the Project continues to be at the forefront of the interface between Faith and Science.