

RSC Submission to Environment and Rural Development Committee's Inquiry into Climate Change.

The Royal Society of Chemistry (RSC) welcomes the opportunity to comment on the Scottish Parliament Environment and Rural Development Committee's inquiry into the Scottish Executive's policies on climate change.

Summary

- Scotland has set ambitious clean energy targets, however, there is still considerable scope for improvement in reducing greenhouse gas (GHG) emissions and mitigating the impacts of climate change.
- The RSC will like to see increased support for R&D on cleaner vehicle technologies (eg. the next generation of fuels, fuel cells and light weight hybrid vehicles) to reduce our reliance on fossil fuels in transport.
- The Royal Society of Chemistry advocates the support of scientific research to ascertain the uncertainties associated with the loss or gain of carbon from organic soils following a change in land use.
- Integrating environmental awareness into the school and university curriculum is likely to be the most effective method of raising public awareness of climate change.
- The Scottish Executive must work closely with UK government together with learned societies such as the RSC and scientists to persuade and help the scientists of other nations and their governments to tackle climate change in a coordinated global effort.
- It is important that support for science and engineering is maximised to ensure the development of sustainable energy solutions.
- The RSC believes that the Scottish Executive must continue to encourage R&D on alternative energy sources and technologies by investing funds and encouraging industry.

Introduction

Whilst Scotland has set some ambitious clean energy targets (40% of Scotland's electricity should be generated from renewables by 2020), there is still considerable scope for improvement in reducing greenhouse gas (GHG) emissions and mitigating the impacts of climate change. Scotland lags behind the rest of the UK on reducing

greenhouse gas emissions. The region's greenhouse gas emissions fell by 5.6% compared to England's 18% reduction between 2002 and 1990. For Scotland, this equates to a reduction of 2.4×10^{-7} Mt C equivalent emissions per capita¹. For comparison, the reduction in England equates to 5.2×10^{-7} Mt C equivalent emissions per capita². Although the Scottish economy grew by 25% over the same period and Scotland did not experience a large scale shift from coal to gas in the early 1990s there is still, nevertheless, scope for increased GHG reductions.

Transport

Rising traffic levels in Scotland are having a significant impact on levels of CO₂ in the atmosphere. Transport emissions rose by 8.4% between 1990 and 2002.

Undoubtedly, a good transport infrastructure underpins a sustainable economy while developing and regenerating rural communities. However we would stress that it is critical to formulate and develop an integrated transport policy that promotes a dynamic economy whilst also affording a high level of protection to the environment and ensuring social cohesion. Improving and increasing public transport networks across Scotland would potentially have a significant impact on reducing greenhouse gas emissions. The Transport Spending Proposals 2005 – 2008 suggests that support for air travel and road transport (motorways) exceeds public transport investment. Targets to increase bus and rail use (~ 1% per year) could be increased so that a significantly higher proportion of the public moves from private car use to public transport.

The RSC will like to see increased support for R&D on cleaner vehicle technologies to reduce our reliance on fossil fuels in transport. Chemists, engineers and material scientists must be encouraged to work together to develop the next generation of fuels (hydrogen and biofuels), fuel cells and light weight hybrid vehicles capable of two or threefold improvements in fuel economy.

Land-Use Change and Forestry

¹ Data derived from the National Greenhouse Gas Inventory for 1990 and 2002 (<http://www.naei.org.uk/>), assuming a Scottish population of 5 m.

² Data derived from the National Greenhouse Gas Inventory for 1990 and 2002 (<http://www.naei.org.uk/>), assuming an English population of 50 m.

Land Use Change and Forestry (LUCF) is responsible for ~ 31% of Scotland's greenhouse gas emissions (31%). It will be important to get a good handle on the processes involved in the carbon cycling for organic soils, the parameters controlling the loss or gain of carbon and the rates of carbon loss under different conditions before making accurate predictions on future impacts. The Royal Society of Chemistry advocates the support of scientific research to ascertain the uncertainties associated with the loss or gain of carbon from organic soils following a change in land use. Sound empirical data is needed before running model simulations to make future predictions about the impact of LUCF on climate change.

Public behaviour

The Scottish Climate Change Programme rightly emphasises the more efficient use of energy and the development of alternative, renewable energy sources as key elements which are needed to deliver on greenhouse gas emissions reduction. However, the programme does not specifically address public attitudes and behaviour which is essential in tackling rising GHG emissions. We believe the key to sustainable living is changing people's behaviour. Linking individual behaviour to rising emissions and climate change is needed to bring about a change in the way consumers view their impacts on the environment. Sustainable living will lead to a more energy efficient society with concomitant reductions in emissions of greenhouse gases. Education will be key here. Integrating environmental awareness into the school and university curriculum is likely to be the most effective method of raising public awareness of climate change which will lead to less energy use, the more efficient use of energy and hence reduced greenhouse gas emissions.

The role of the individual and the concept of shared responsibility and mutual stewardship should be emphasised as a key means of enabling change. Although climate change is largely perceived as an issue with which society should be concerned, there appears to be a failure for individuals to link their own actions to environmental impact on a global scale. The issue is generally perceived to be a global one and industry's affair.

The Scottish Executive needs to become more proactive in changing lifestyles by disseminating scientific information on climate change in an accessible manner so that the public understands and believes in climate change as a reality. Disseminating information on changes that have been reliably observed with the

facts and figures and predictions of what might follow would assist in this transformation.

However, while efforts on the domestic front are a critical step in the right direction, changes in behaviour within Scotland and more widely in the UK will only have limited effect on reducing global emissions. The UK is responsible for only 2% of global emissions of greenhouse gases (compared with, for example, the USA which is responsible for more than 20%). The Scottish Executive must work closely with UK government together with learned societies such as the RSC and scientists to persuade and help the scientists of other nations and their governments to tackle climate change in a coordinated global effort. The need for action is world-wide and collaborative partnerships between scientists in different countries should be encouraged. Learned societies such as the RSC must work with government to facilitate these interactions which will bring a broad base of disciplines to bear upon these particular challenges whilst encouraging innovative and creative R&D.

Research and Development

The Royal Society of Chemistry believes that innovative R&D will play a critical role in furthering our understanding of climate change science and providing sustainable alternative solutions. For example, developing renewable energy generation technologies in Scotland will underpin both economic growth and lead to improved environmental performance. It is therefore important that support for science and engineering is maximised to ensure the development of sustainable energy solutions.

It is vital that the public perception of science, including chemistry and the chemical sciences, is enhanced so that prospective students and the public in general appreciate the value of the chemical sciences as a means of realising technological innovation. Chemistry as a scientific discipline is vital for the economic and environmental wellbeing of Scotland and the UK at large. Enthusing students to study the chemical sciences by promoting the subject as being modern, novel, enabling and innovative would help to improve the image of chemistry, science and engineering and engage the interest of the public and students from an early age. Government, industry and learned societies all have a role to play here.

Financial incentives

There are significant economic benefits as well as reduced costs associated with adopting new sustainable energy technologies. The RSC believes that the Scottish Executive must continue to encourage R&D on alternative energy sources and technologies by investing funds and encouraging industry. Benefits include not only significantly reduced environmental impact but also new job opportunities and huge export potential.

The RSC is the largest organisation in Europe for advancing the chemical sciences. Supported by a network of 45,000 members worldwide and an internationally acclaimed publishing business, our activities span education and training, conferences and science policy, and the promotion of the chemical sciences to the public.

This document represents the views of the RSC and has been put together by the RSC's Environment, Sustainability and Energy Forum. The RSC's Royal Charter obliges it to serve the public interest by acting in an independent advisory capacity, and we would therefore be very happy for this submission to be put into the public domain.

The document has been written from the perspective of the Royal Society of Chemistry consequently our comments relate to only parts of the consultation document. However, the chemical sciences and chemical scientists will play an essential role in furthering our understanding of climate change and in developing alternative solutions to reduce our environmental footprint and associated greenhouse gas emissions.

For further information please contact:

Dr Eimear Cotter
Manager, Environment, Sustainability & Energy
Royal Society of Chemistry
Burlington House
Piccadilly
London
W1J 0BA

Tel: 020 7440 3333
Email: cottere@rsc.org