



# The Royal Commission on Environmental Pollution

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Dear Sir/Madam

## **ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION – TOPICS FOR A FUTURE STUDY**

Following the successful publication of its report on *Adapting UK Institutions to Climate Change* in March 2010, the Royal Commission on Environmental Pollution is now considering which topic to investigate after the current major study on the *Environment impacts of demographic change in the UK*, which it expects to publish in Winter 2010/11.

A shortlist of possible topics has been drawn up from a longer list suggested by members of the Commission and other interested organisations. The Commission now aims to select and announce the final topic in the Autumn and would welcome your views before making its decision. The shortlist is:

- Environmental noise
- Managing air pollution
- Sustainable use of phosphate
- The environmental impact of pharmaceutical products
- The environmental impact of products and services – the case of embedded water
- The impacts of low carbon energy generation on the environment

Outline descriptions of each topic on the shortlist appear in **Annex A**. We would ask you to consider whether any of the suggested topics warrant further investigation as a Commission study, in particular the dimensions which you believe require or do not require attention. Please let us know if there are other relevant major studies which might help - or reduce the need for - a Commission study of any of these subjects. It is just as important for the Commission to know if you feel that a topic is not worth pursuing or if it would be a suitable subject for a short study. We would also welcome any suggestions for other topics which you feel should be considered.

A note setting out the Commission's criteria for selecting subjects to study is attached at **Annex B**. A list of organisations and individuals to whom this letter has been sent is attached at **Annex C**. **We would be most grateful for your comments and suggestions by Friday, 30 July**. These can be e-mailed to [laura.pleasants@rcep.org.uk](mailto:laura.pleasants@rcep.org.uk). If you have any queries, please contact me on 0300 068 6472. Please also let me know if you think we have overlooked any organisations or individuals who may wish to comment.

Yours faithfully,

LAURA PLEASANTS  
Assistant Secretary to the Commission

**SHORTLIST OF TOPICS THAT THE ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION IS CONSIDERING FOR ITS NEXT MAJOR STUDY**

**1. Environmental Noise**

Environmental noise is the general background noise we experience from transport and from activities in the outdoor environment (for example, from business or commercial activities). While it has long been known that environmental noise can cause annoyance and stress for humans, there is a growing body of evidence suggesting that long term exposure to high levels of environmental noise is directly associated with increased blood pressure, and consequently with a slightly increased risk of heart attacks and other cardiovascular problems. There is less evidence on the effect of noise on organisms in the terrestrial environment, although studies have been carried out on the effect of noise on organisms in the marine environment.

The evidence base for exposure to noise, and people's attitude to it, comes from surveys undertaken in 1990 and 2000. More recently, the Government and the Devolved Administrations have published noise maps (based on computer models) illustrating the current modeled levels in major urban areas and near major transport infrastructure, and have published noise action plans which focus on the places exposed to the highest levels of environmental noise. However, the mapping undertaken only covered certain parts of the country. Defra's *Evidence and Innovation Strategy 2010-2013 and beyond* listed noise as an area with decreasing evidence needs.

The management of noise in the UK is found in various legislation, guidance and policy documents, with some describing in detail noise exposure levels at which certain specific actions must occur (for example, the point at which double glazing must be provided for homes affected by new roads), but currently there are no general standards or limits regarding exposure to environmental noise.

Stakeholders and NGOs often turn to guidance published by the World Health Organisation when lobbying for reduced noise exposure. The WHO published their *Guidelines on Community Noise* in 1999 and last year their *Night Noise Guidelines for Europe*. In the 1999 document, levels are quoted at which certain effects are expected to occur, but in the Night Noise document, guidelines and targets are set out, with the comment that *countries are encouraged to reduce gradually the size of the population exposed to levels above the quoted interim targets*.

Adopting as standards these targets and guidelines could have significant implications: investment would be needed for better designed infrastructure, more effective traffic management (including speed and access limitations) would be required, and there would be constraints on the location of new development. There could therefore be potential conflicts between managing the risks of health effects and annoyance from noise and achieving other economic, social, and environmental

goals, and challenges in finding locations for new noise generating developments, or for homes in places which are quiet.

The Commission would not propose to address neighbour noise (from people in their homes and gardens), or noise in the workplace (which has is already covered by extensive legislation). The Commission would welcome views on whether the study should focus on impacts on of noise on organisms (including humans) in the terrestrial environment, or whether the scope of a potential study should be widened to include the impact of human-induced noise on marine organisms.

## **2. Managing Air Pollution**

Over thirty years ago the Royal Commission published a report entitled '*Air Pollution Control: an Integrated Approach*' (1976). The report contained far-reaching proposals for changes in the arrangements for controlling air pollution, mainly focused on point sources which were then the major issue. As these sources have now been brought under ever tighter control, the remaining challenges are increasingly from diffuse sources of pollution – transport, agriculture, or a multitude of smaller industrial or domestic sources. As a result, for air pollution, it is in some cases proving problematic to meet some of the standards, as highlighted in the recent Environmental Audit Committee report on air pollution (March 2010), which drew attention to the health implications of air pollution and resultant cost to the NHS, and the difficulties of meeting EU standard in some places.

The Royal Society also published a report on ozone in 2008, which reviewed why control efforts in many parts of the world have failed to reduce ozone and its impacts, and, using state of the art scenario and modelling analysis, evaluates how important ozone is likely to be for human health, climate and the environment by the end of the 21st century. The report concluded that existing emission controls will not be sufficient to reduce ozone concentrations to levels acceptable for human health and environmental protection and calls for renewed global action to address ozone and its precursors.

In the UK, regional spatial strategies set out the vision for growth and development at the regional scale for the next 10-20 years. These include plans for new housing, transport infrastructure, energy and water supply, and for the management of waste, including plans for obtaining energy from waste (EFW). The move towards local small scale EFW plants (including anaerobic digestions sites), combined with the development of renewable forms of energy could have significant (and complex) implications for the management of air pollution in the UK.

Air pollution is caused by activities at different geographical and administrative scales (local, regional, national, transnational), and its effects are similarly felt at different scales. As a result, governance of air pollution is complex, and occurs at different and overlapping levels. Air pollution exemplifies the need for a more considered approach to multi level governance of environmental challenges.

### **3. Sustainable use of phosphate**

Phosphorus is essential to life, and a lack of phosphorus can significantly limit crop yields. Phosphates are naturally present in food and are added both to animal feeds and to certain baby foods to improve their nutritional value. Phosphates are used in domestic and industrial cleaning detergents where they act to enable the cleaning components of the detergent to act. Domestic laundry cleaning products contribute 3-4% of phosphorus pollution load to the freshwater environment and by 2015 a ban will be in force for the sale of all domestic laundry cleaning products containing more than 0.4% phosphorus. Phosphate rock is a finite resource, and easily mined reserves of high quality rock could be depleted within a century, though there are conflicting views on the quantities remaining and how accessible outstanding reserves may or may not be. The price of phosphorus is therefore likely to rise significantly in the future. The mining and processing of phosphate rocks can also lead to adverse environmental and health effects.

An excess of phosphate in water (sometimes as a result of run-off from agricultural land) can lead to excessive growth of algae (eutrophication) and damaging environmental consequences for aquatic ecosystems, which would have to be addressed as required by the Water Framework Directive (WFD). Almost half of the rivers in England and Wales do not meet the WFD phosphorus standard for Good Status. The comparable problem of excessive accumulation of nitrates (another form of diffuse pollutant) in aquatic systems is being addressed in part through the designation of nitrate vulnerable zones (NVZs) by Defra.

There are therefore questions about how phosphate resources should be managed so as to avoid both increased costs and potential limits to supply in future, and to avoid the environmental problems caused by excess phosphorous in water. There are benefits in recycling phosphate from waste water for use in agriculture. This can be achieved either through the direct application of treated sewage sludge (biosolids) to agricultural land, or by phosphate recycling. There is a range of methods available for reducing the concentration of phosphate in treated waste water, including for example chemical and biological processes, but these are currently limited by cost and the challenge of retrofitting existing works. When biological processes are used, it is possible to include an extra step to recover phosphorus in mineral form, as struvite, which may be a more sustainable alternative to mineral form phosphorus. There are some international examples of struvite being produced and used on agricultural land (in Japan and the Netherlands). A pilot study carried out for Defra by Warwick HRI suggested that it is possible to achieve reasonable yields from potato crops enriched with struvite as opposed to mineral phosphate.

A Commission study may choose to give fuller consideration to the feasibility and life cycle assessment of the economic and environmental implications of different options for managing phosphate, in order to achieve the greatest sustainability.

#### **4. The environmental impact of pharmaceutical products**

A recent report by the European Environment Agency on pharmaceuticals in the environment presented a bleak picture. Per capita consumption of medicines is increasing, and it is becoming more common for people to be prescribed drugs for the long term (for example, statins). The fact that we have an ageing population means that there is likely to be a greater proportion of people relying on medication for longer. There is growing concern that there could be risks to human health or ecosystems from these products as they find their way into the environment during their production, consumption and disposal.

Pharmaceuticals are designed to remain biologically active in the human body. Either the pharmaceuticals themselves or the metabolites that constitute the final product may find their way into urban waste water systems. Depending on the fate of the chemicals in the sewage treatment, these end up in rivers, the sea, or may be spread over land in the form of sewage sludge, where they could potentially pose risks to food and ecosystems. Wastewater treatment facilities are not specifically designed or operated to remove pharmaceutical products and metabolites in water.

The impact of synthetic hormones on aquatic systems has been under investigation for a number of years, and there is now a growing body of ecotoxicological research about the potential impacts of other groups of human pharmaceuticals. There could also be risks to the environment from highly toxic substances such as those used in chemotherapy, and the possibility of synergistic effects from mixtures of pharmaceutical and other toxic chemicals. Many of these active compounds could have long lived effects or may bioaccumulate in the tissues of aquatic organisms.

Veterinary medicines pose similar problems. There is a stronger regulatory framework for veterinary medicines, preventing new products from being licensed if they pose significant risk to the environment. The environmental impact of the production process for pharmaceuticals used in the UK may also be an important consideration. A recent study found high levels of broad-spectrum antibiotics in sewage effluent from bulk drug manufacturers in India, exceeding levels toxic to bacteria over 1000-fold.

#### **5. The environmental impact of products and services – the case of embedded water**

The term 'carbon footprint' is used to describe the amount of carbon necessary to create a product; this has been looked at in some detail and as such the term is becoming more familiar to people. Similarly, there is growing consumer awareness of the significance of the carbon or 'air miles' expended in importing products into the UK from overseas. However, there is much less awareness of other "embedded" environmental impacts. For water for example, while there is growing understanding of the need to reduce our daily consumption of water which 150 litres per person per day that an average person uses from the public water supply, there is less awareness of the amount of water required to

produce the food we eat, the construction projects we undertake and the other products we use – i.e. our total 'water footprint'.

The amount of embedded water can be significant - for example it has been calculated by researchers at the University of Twente/Unesco have demonstrated that it takes 140 litres of water to produce one cup of coffee. Moreover, many of the agricultural, consumer and construction products used in the UK come from abroad. This gives rise to particular challenges in understanding and regulating the impact of the amount of embedded water – since water is more or less available in different regions, the environmental and social consequences of a given demand can be very different.

The evidence base is at an early stage of development, but there is much activity in the area (see, for example, the work of the Water Footprinting Network). Some of Defra's work on product roadmaps has also noted the amount of water (and wastewater) involved in production (e.g. of cotton for clothing): 2006 data suggested that clothing purchased in the UK was responsible for the consumption of 90 million tonnes of water and the production of 70 million tonnes of waste water.

The Royal Academy of Engineering published a report on 'Global Water Security – an engineering perspective' in April 2010. In the report, they call for (amongst other things) water security to become a core component of UK policy making, and for international bodies to evaluate the issue of water security in their strategies and for water footprints and virtual water content of globally traded goods and agricultural products to be taken into account in trade negotiations.

## **6. The impacts of low carbon energy generation on the environment**

The Climate Change Act requires UK carbon emissions to be reduced by 80% by 2050. In this context, the UK Low Carbon Transition Plan (2009) recognised the need to transform the electricity system. Included in this was the target to rapidly develop renewable energy (up to around 30% of UK power supply by 2020), the building of new nuclear power stations and the possible longer-term deployment of carbon capture and storage (CCS). While the transition to low carbon electricity generation is vital as part of our contribution to reducing greenhouse gas emissions in order to reduce the likelihood of dangerous climate change, there are potentially other kinds of environmental impact.

For example, the construction of renewable energy schemes may potentially have an impact on amenity, on biodiversity, and on air or water quality (according to circumstances), or using biomass may have implications for food security, land use and air quality. The construction of small scale hydroelectric schemes can have detrimental effects on water quality which may make it more challenging to meet the requirements of the Water Framework Directive. Nuclear power raises issues of siting and long-term radioactive waste management while carbon capture and storage raises questions about carbon transportation and the siting and integrity of carbon stores.

An investigation by the RCEP could examine policies and initiatives that contribute to reducing greenhouse gas emissions in the UK electricity system and the downstream implications of such policies for the wider environment. It may be possible for the RCEP to form a view on whether there is an environmentally preferable mix of low carbon electricity technologies for the UK, which balances the necessity to reduce greenhouse gas emissions alongside broader environmental considerations. To the extent that energy saving substitutes for electricity supply it might be desirable to compare the environmental impacts of supply options and energy saving, but this would involve an unmanageably large scope for the possible study.

**CRITERIA FOR THE SELECTION OF TOPICS FOR STUDY**

In choosing topics for study, the Commission is guided by the following criteria (although any one study may not necessarily satisfy all of them):

- the topics chosen should be what the Commission's First Report called 'priorities for enquiry': issues which require detailed and rigorous analysis before satisfactory policies can be adopted;
- they should raise wide issues, both intellectually (in the sense of spanning several disciplines) and organisationally (in the sense of not falling within the terms of reference of any other single body);
- they are likely to involve general issues of principle;
- they should not normally duplicate other studies already in progress or planned in the near future;
- there should be a reasonable prospect that worthwhile conclusions can be produced within two years with the resources likely to be available to the Commission;
- they should take into account trends in environmental policy at European and global levels which seem to have significant implications for the UK.

The implication of these criteria is that the Commission generally undertakes complex and challenging studies covering broad cross-disciplinary issues.

**LIST OF ORGANISATIONS AND INDIVIDUALS CONSULTED**

Academy of Medical Sciences  
Agricultural Industries Confederation  
Association for the Protection of Rural Scotland  
Association of British Insurers  
Association of the British Pharmaceutical Industry  
Aviation Environment Federation  
Bureauveritas  
Biotechnology and Biological Sciences Research Council  
British Association for the Advancement of Science  
British Ecological Society  
British Geological Survey  
British Medical Association  
British Resorts and Destinations Association  
British Retail Consortium  
British Veterinary Association  
CABE Space Advisory Committee  
Cabinet Office  
Campaign for Clean Air in London  
Campaign for the Protection of Rural Wales  
Campaign to Protect Rural England  
CBI Belfast( Northern Ireland)  
CBI Scotland  
CBI Wales  
Centre for Ecology and Hydrology  
Centre for Environmental Strategy, University of Surrey  
Centre for the Study of Environmental Change  
Charles Clover  
Chartered institute of Waste Management  
Chemical Industries Association  
Commission for Architecture and the Built Environment  
Commission for Rural Communities  
Committee on Climate Change  
Commons Science and Technology Committee  
Confederation of British Industry  
Consumer Council for Northern Ireland  
Consumer Focus  
Convention Of Scottish Local Authorities  
Council for Science and Technology  
Council of Food Policy Advisors  
Country Land & Business Association  
Countryside Council for Wales  
Department for Agriculture and Rural Development, Northern Ireland  
Department for Business, Innovation and Skills  
Department for Education  
Department for Communities and Local Government  
Department for Culture, Olympics, Media and Sport  
Department for Energy and Climate Change

Department for Environment, Food and Rural Affairs  
Department for Heritage, Wales  
Department for International Development  
Department for Regional Development, Northern Ireland  
Department for Transport  
Department of Culture, Arts and Leisure, Northern Ireland  
Department of Enterprise, Trade and Investment, Northern Ireland  
Department of Environment (Northern Ireland)  
Department of Health  
Directorate General Environment, European Commission  
Directorate General Health and Consumer Protection, European Commission  
Directorate General Research, European Commission  
Directorate General, Enterprise and Industry, European Commission  
Dr Peter Howsam, Reader in Water and Environmental Law, Natural Resource Management  
Centre, Cranfield  
Drinking Water Inspectorate  
Economic and Social Research Council  
ENDS  
Engineering and Physical Sciences Research Council  
Environment Agency  
Northern Ireland - Environment Agency  
Environment Protection UK  
Environmental Change Institute  
European Environment Agency  
European Environment and Sustainable Development  
Advisory Councils (EEAC)  
Food Climate Research Network  
Food and Environment Research Agency (FERA)  
Food Standards Agency  
Foreign and Commonwealth Office  
Forestry Commission  
Forum for the Future  
Foundation for Science and Technology  
Friends of the Earth  
Friends of the Earth Cymru  
Friends of the Earth Scotland  
Geological Society of London  
Global Phosphate Forum  
Government Office of Science  
Grantham Institute for Climate Change  
Greater London Authority  
Green Alliance  
Greenpeace UK  
Health and Safety Executive  
Health Protection Agency  
HM Treasury  
Home Office  
House of Commons Select Committee on Energy and Climate Change  
House of Commons, Environmental Audit Select Committee  
House of Commons, Select Committee on Environment Food and Rural Affairs

House of Commons, Select Committee on Health  
House of Lords, Science and Technology Select Committee  
Institute for Public Policy Research  
Institute of Directors  
Institute of Materials, Minerals and Mining  
Institute of Physics  
Institution of Mechanical Engineers  
Irish Congress of Trade Unions  
Joint Nature Conservation Committee  
Joseph Rowntree Foundation  
London Air Quality Network  
London School for Hygiene and Tropical Medicine  
Medical Research Council  
Met Office  
Ministry of Defence  
Ministry of Justice  
National Farmers Union  
National Farmers Union Scotland  
National Physical Laboratory  
Natural England  
Natural Environment Research Council  
NERC public sector and parliamentary liaison  
New Economics Foundation  
Northern Ireland  
Northern Ireland Environment Link  
Northern Ireland Local Government Association  
Northern Ireland Office  
Nuffield Foundation  
Ofgem  
Parliamentary Office of Science and Technology  
PREPARE  
Professor Howard Wheeler (Director, Imperial College Environment Forum)  
Recoup Recycling  
Research Councils UK  
Royal College of Paediatrics and Child Health  
Royal College of Physicians  
Royal College of Physicians and Surgeons of Glasgow  
Royal College of Physicians of Edinburgh  
Royal Meteorological Society  
Royal Society of Chemistry  
Royal Society of Edinburgh  
Rural Economy and Land Use Programme  
Science Advisory Council  
Science and Technology Facilities Council  
Science and Technology Policy Research Unit (SPRU)  
Science Media Centre  
Scottish Environment Link  
Scottish Environment Protection Agency  
Scottish Government - Finance & Sustainable Growth Department  
Scottish Government - Health & Wellbeing Department  
Scottish Government - Rural Affairs and the Environment Department

Scottish Government - SEPA and sponsorship team  
Scottish Rural Property and Business Association  
Scottish Trade Union Congress  
Society of Biology  
Soil Association  
Stockholm Environment Institute  
Sustainable Development Commission  
Tesco Stores Ltd  
The Academy of Royal Medical Colleges  
The British Academy  
The Centre for Environment, Fisheries and Aquaculture Science  
The Chartered Institute for Environmental Health

The ESRC Centre for Business Relationships, Accountability, Sustainability and Society  
The Hadley Centre For Climate Change  
The Homes and Communities Agency  
The Local Government Association  
The National Assembly of Wales  
The National Trust  
The Prince's Foundation for Integrated Health  
The Royal Academy of Engineering  
The Royal Institute of Chemistry  
The Royal Society  
The Royal Society for the Arts  
The Royal Society for the Protection of Birds  
The Scottish Parliament  
The Scottish Parliament - Economy, Energy and Tourism Committee  
The Scottish Parliament - Health and Sport Committee  
The Scottish Parliament - Rural Affairs and Environment Committee

The Scottish Parliament - Transport, Infrastructure and Climate Change Committee  
The Soap and Detergent Association (US)  
The Town and Country Planning Association  
The Tyndall Centre for Climate Change  
The Wildlife Trusts  
Trades Union Congress (UK)  
UK Climate Impacts Programme  
UK Energy Research Centre  
UK Environmental Law Association  
UK Permanent Representation to the European Union  
Ulster Farmers Union  
Wales Environment Link  
Wales Trade Union Council  
Waste & Resources Action Programme (WRAP)  
Water UK  
Waterwise  
Wellcome Trust  
Welsh Assembly - Social Justice and Public Service Delivery Department  
Welsh Assembly - Sustainability and Rural Development Department  
Welsh Local Government Association  
World Wide Fund for Nature UK