House of Commons Science and Technology Select Committee – Leaving the EU: implications and opportunities for science and research inquiry

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Written evidence submitted by The Institution of Environmental Sciences

The Science and Technology Select Committee is investigating the implications and opportunities for UK science and research associated with leaving the EU. Written submissions were invited in July on a series of points outlined in the terms of reference.

Summary:

- The potential loss of access to EU finding schemes represents a significant risk to interdisciplinary environmental research in the UK, the magnitude of which will depend upon the relationship ultimately negotiated with the EU.
- The collaboration and competition involved in EU finding bids promotes and fosters ambitious and innovative research, which can deliver benefits for our environment, economy and society.
- For the UK science sector to thrive, we need to be able to attract the best researchers and students into UK Institutes, Universities and businesses. The Government must act quickly to counter uncertainty which is already discouraging some from taking up positions or places in the UK.
- The changing regulatory environment associated with Brexit will have significant impacts on many professional environmental scientists whose work is concerned with the implementation of EU environmental regulation, or in data collection, monitoring or impact assessment associated with it. A major review will now be required to decide which pieces of EU regulation should continue to apply to the UK and significant scientific expertise will be required to undertake this substantial task.
- It is clear to environmental scientists that environmental systems rarely reflect political boundaries, and environmental processes and pollutants rarely respect them. Therefore, maintaining positive working relationships with our EU neighbours will be vital. Where appropriate, and on the basis of good scientific advice, the Government should seek continuity in policies on trans-boundary issues and problems such as climate change and air pollution which can be better tackled at a pan-EU level.

Background

1.1. The Institution of Environmental Sciences (IES) is a membership organisation that represents over 3,000 professionals from fields as diverse as air quality, land contamination and education - wherever you find environmental work underpinned by science. A visionary organisation leading debate, dissemination and promotion of environmental science and sustainability, the IES promotes an evidence-based approach to decision and policy making.

1.2. The Committee of Heads of Environmental Sciences (CHES) is the collective voice of the environmental sciences and related programmes in Higher and Further education. CHES plays a leading role in the Higher and Further Education Environmental Science communities and advocates for environmental science within education. After working closely together for over a decade, CHES merged with the IES in 2013 and now serves as its education committee. Together, the IES and CHES now accredit over 75 degree programmes in the UK and abroad, including more than 20 Masters courses.

1.3. This submission draws upon research conducted by the Institution before the referendum, some of which was submitted to the House of Lords Science and Technology Select Committee's previous inquiry on the issue, as well as views and experiences reported by members and others across the sector since the referendum took place. In this submission, we highlight key risks both for the environmental science sector and UK science in general. We also highlight issues which we consider should be priorities as the Government prepares to implement Article 50. However, it should be noted that some of the challenges highlighted are already impacting the work of scientists in our sector and beyond.

Funding for research and innovation

2.1. The IES strongly believes that it is vital to maintain the strength of the UK science base in order to deal with the major social, economic and environmental challenges we currently face both in the UK and globally. It is also vital that 'challenge-focused' or applied science is adequately funded. Particularly given the context of public sector spending constraints in the UK, it is very important to recognise the significant contribution EU funding currently makes for this type of research. Designed to complement the funding systems of individual Member States (in theory according to the subsidiarity principle), the EU (through the Framework Programmes, including the current scheme, Horizon 2020, and the European Research Council: ERC) does not tend to fund much basic research, but rather focuses on investigator-led, 'frontier research' which spans the fundamental-applied divide. In this way, funding can be directed to fields which are showing promise with greater flexibility than is generally possible through structures such as the UK Research Councils. The UK's withdrawal from the EU therefore represents a significant risk to researchers based here who are working in such frontier areas, as a key funding stream may now be under threat and this in turn represents a threat to our economy and communities.

2.2. Interdisciplinary environmental science research is essential if we are to transition to a sustainable society, and make our communities resilient in the face of major environmental threats such as flooding, climate change, air pollution and soil degradation. It supports major international commitments such as those pertaining to addressing climate change, nature conservation, chemical safety, transboundary pollution impacts and a range of other issues important for the health of the public and of our supportive ecosystems; abiding by such commitments is in many cases a prerequisite for international trade. Moreover, the low carbon and environmental sector is now a major contributor to the UK economy, supports hundreds of thousands of jobs, and exports billions of pounds worth of goods and services. During the last recession, data shows that the low carbon and environmental sector defied broader economic

trends and continued to grow[1]. Investment in renewable energy now exceeds that in traditional generation as renewables become cost-competitive with fossil generation[2]. This growth is underpinned by conditions which incentivise innovation and ambitious interdisciplinary research (often with uncertain outcomes), and a strong science skills base.

2.3. Social and environmental processes and challenges do not respect disciplinary boundaries, and nor does the knowledge economy, so funding for interdisciplinary research is essential. There are well documented deficiencies in the UK Research Council system regarding the funding of interdisciplinary research, which is often considered high risk. By contrast, the ERC's Scientific Council encourages interdisciplinary applications. In guidance to peer reviewers it is explicitly stated that the priority is to select the best science, "independent of its discipline and independent of the particularities of the review panel structure"[3].

2.4. Historically, the UK has a strong track record in winning a disproportionately high level of EU research funding relative to its size. For example, since 2007, the ERC Peer Review Evaluation Panel for Earth System Science (PE10: the panel whose remit most closely aligns with environmental science) has awarded funding for 46 projects to UK host institutions[4]. This is a significantly greater number of projects than awarded to institutions in any other Member State, with France the next highest at 25. This success is due to the excellence of UK science.

2.5. Environmental science research in the UK has also benefited from significant funding under the EU Framework Programme for Research and Innovation. Under the seventh Framework Programme (FP7) from 2007 to 2013, €1,704 million was spent on projects falling under the 'Environment' theme[5]. Of the 4,055 projects funded under the FP7-Environment theme (according to the Community Research and Development Information Services; CORDIS), 603 were based in the UK, second only to Germany, with 645[6].

2.6. Not only does scientific research in the UK currently benefit from significant financial support from the European Funding Council, the increased competition for funding from the ERC (a product of the large number of eligible institutions across the EU Member States) drives up standards and ambition in research. The significant value of EU research grants, which in the 'Advanced' category (for established researchers with strong track records as field leaders) can be worth up to €2.5 million over five years, combined with the increased collaboration with EU colleagues, enable the ambitious research programmes which this competition encourages.

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[1] Green Alliance (2012) *Green economy: a UK success story,* http://www.green-alliance.org.uk/page_52.php
[2] REN21. (2016). Renewables 2016: Global Status Report. http://www.ren21.net/wp-content/uploads/2016/06/GSR_2016_Full_Report.pdf.
[3] ERC (2015) *ERC Frontier Research Grants Guide for peer reviewers*, Ref. Ares(2015)1056537, https://erc.europa.eu/sites/default/files/document/file/Guide-for-Peer_reviewers_StG_CoG_AdG_2015.pdf
[4] https://erc.europa.eu/projects-and-results/erc-funded-projects?f[0]=sm_field_cordis_project_hi_count%3AUnited%20Kingdom&f[1]=sm_field_cordis_project_subpanel%3APE10
[5] https://ec.europa.eu/research/fp7/index_en.cfm?pg=budget
[6] http://cordis.europa.eu/projects/result_en?q=(contenttype%3D%27project%27%20OR%20/result/relations/categories/resultCategory/code%3D%27brief%27,%27report%27)%20AND%20programme/pga%3D%27FP7-ENVIRONMENT%27

2.7. It is important to note that the magnitude and significance of the risks identified above are of course dependent on the nature of the arrangement the UK agrees with the EU during exit negotiations. The different options available to us each have particular positive and negative factors, and in negotiation the UK's future engagement with EU research programmes the Government will need to carefully quantify and assess each possibility in a transparent fashion to develop a proposal which will minimise the risks identified above, and maximise the opportunities available to the UK in the research and innovation sphere. We can look to the relationships of some other nations to assist in this analysis. For instance, if we followed Norway's model, access to the Horizon 2020 programme could be maintained, but the UK would lose any influence over its strategic priorities. Under the Swiss model, participation could be maintained in most Horizon 2020 calls, but successful proposals would have to be funded by the UK Government. Alternatively, the UK could continue to participate in Horizon 2020 calls as a 'third country', but would not be automatically eligible for funding.

2.8. Given the UK's new circumstances, it is also now important that the Government, in collaboration with the research sector, enhances its efforts to develop new partnerships outside the EU. This could include a greater role for the British Council in brokering research partnerships, and action to enhance our important links with research institutions in the Commonwealth nations, who may have much to offer in terms of funded, high-level scientific collaborations. These opportunities have always been available, but with the UK leaving the EU, stimulating these links and collaborations will take on a new significance.

2.9. In summary, as environmental science is highly interdisciplinary, our sector has seen particular benefits from EU funding mechanisms. The potential loss of access to these schemes is therefore a significant risk, the magnitude of which will depend upon the relationship ultimately negotiated with the EU. However, in addressing this risk, it is important to recognise that the benefits these EU research programmes have delivered are much greater than the monetary value of the grants themselves. As explained, the collaboration and competition involved in these bids promotes and fosters ambitious and innovative research, which can deliver benefits for our environment, economy and society. Therefore, it would be over-simplistic to suggest this funding could simply be replaced by the UK government, with the expectation of similar results. More creative and collaborative solutions will be required.

Collaboration and mobility

3.1. For the UK science sector to thrive, we need to be able to attract the best researchers and students into UK Institutes and Universities. If the ability of the best scientists from EU nations to move to the UK to work or study is compromised as a result of the referendum, this would represent a significant risk to our world-leading science base.

3.2. Conditions are required which encourage talented international researchers to develop their careers here, and which promote opportunities for international collaboration. The diversity in the UK science sector is highly valued, and we must continue to foster this by also encouraging international students to study and train here.

3.3. International students represent an important proportion of those enrolled on environmental science programmes, and make valuable contributions in their departments, bringing a diversity of different ideas and perspectives, which enrich the educational experience for whole study groups.

Data from the HESA Student Record shows that at UK Higher Education providers in 2013/14:

- 5.5% of students studying F7 (Science of aquatic & terrestrial environments) and F6 (Geology) courses were non-UK EU domiciled.
- 13.9% were non-EU domiciled.

3.4. We are already receiving anecdotal evidence that since the referendum some international students and researchers are now concerned about taking up positions or places in UK institutions. The Government must act quickly to counter this uncertainty and provide some reassurance by developing a plan (in discussion with the sector) which will ensure that the most talented researchers and students from all over the world can continue to access UK institutions.

4.1. A major theme in responses to a pre-referendum survey of IES members on this topic was the value of partnerships and skill sharing with teams and individuals from other EU Member States. It was noted by members that the collaborations facilitated (and often required) by EU research funding programmes tend to generate long-term partnerships.

4.2. For environmental scientists working outside of academia, the free movement of people within the EU has also been important, as it has enabled companies to employ the best experts without barriers. Ensuring businesses can retain access to vital science skills and knowledge under new immigration arrangements should be another priority for the Government.

4.3. As noted, the majority of IES members are scientists employed in commercial organisations, with expertise across the environmental sector. Historically, UK based organisations have been successful in winning projects within the EU due to the international experience of these scientists, the transferable nature of their scientific skills, and their knowledge of EU legislation and requirements. The loss of the opportunity to tender for EU projects may have adverse impacts on employment and profitability within some UK businesses employing highly skilled scientists, whose services are likely to remain in demand within the EU. To ensure that UK companies employing highly skilled scientists can still access business opportunities in the EU, the Government should seek to negotiate continued access for UK companies to tender opportunities within the EU. This will include opportunities published through the Official Journal of the European Union, *Tenders Direct*[7].

Skills

5.1. In a pre-referendum survey of IES members, one frequently raised point was that access to skilled professional scientists from the EU is very important to many environmental businesses in

[7] http://www.ojeu.eu/

the UK. Studies have shown that other developed countries are outperforming the UK on certain skills measures[8], with shortages documented in some higher skilled areas. The easy transfer of personnel across EU borders has therefore been important for the skills base in the sector, and for maintaining the UK's international competitiveness in light of this trend.

5.2. Visa conditions are required which enable UK companies to continue to attract highly skilled and knowledgeable international professional scientists, and which encourage these scientists to develop their careers here. Therefore, it is important that the science community is not defined exclusively in relation to research, and that the concerns of businesses and applied professional scientists are also addressed.

6.1. As well as concerns about access to skills, the changing regulatory environment associated with Brexit will have significant impacts on the work of many professional environmental scientists. Outside of academia, environmental scientists work throughout the public sector, industry, consulting, and NGOs, and for these practitioners much of their work relates to achieving or monitoring environmental standards or requirements written into UK law, but derived from EU Directives and policies.

6.2. Meanwhile, as environmental standards are gradually globalised, many of the activities and services of these practitioners are increasingly in demand in the rest of the world. As such, whilst the shape of the UK's future relationship with the EU will undoubtedly have major impacts on the work of environmental scientists domestically, it may also affect their ability to deliver services abroad. To best mitigate these risks, and to ensure that any business opportunities can be maximised, the Government should consult closely with businesses and professional associations as it develops plans for the future.

Regulation, expertise and the environment

7.1. The majority of IES members work in applied science, and a wide range of EU Regulations and Directives shape and affect their work. The work of many environmental scientists in the UK is concerned with the implementation of EU environmental regulation, or in data collection, monitoring or impact assessment associated with it. Important Directives include the Water Framework Directive, Air Quality Framework Directive, Birds and Habitats Directives, Environmental Impact Directive, Strategic Environmental Assessment Directive, the Waste Framework Directive, Marine Strategy Framework Directive, the Floods Directive and many others. Although the provisions of these regulations could be recreated directly in UK law (and have of course in most cases been transposed onto the UK statute book), considerable effort will now be required to review which of these pieces of legislation should still apply to the UK, and where changes may be appropriate. Significant scientific expertise will be required to undertake this substantial task.

[8] UK Commission for Employment and Skills (2014) *The Labour Market Story: The State of UK Skills*, Briefing Paper, July 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/344440/The_Labour_Market_Story-_The_State_of_UK_Skills.pdf

The institution of environmental sciences

7.2. The EU has a positive tradition of developing strong environmental regulation, based on consideration of the available scientific evidence. Consequently, the UK's EU membership has led to the translation into UK law of much good, evidence-based, environmental policy. We must build on our own strong systems of scientific advice to ensure decision makers have access to the relevant expertise in the extensive regulatory review which must now take place. We hope that the committee will be robust in holding the Government to account in this process, and outspoken in championing evidence-based policy making.

7.3. It should also be noted that, although EU leadership on environmental issues has been very important in bringing about change, UK environmental scientists have had significant influence in shaping EU environmental regulation. For example, the Urban Waste Water Directive was strongly shaped by UK science, staff from the Nature Conservancy Council were instrumental in the development of the Habitats Directive and Natura 2000 network of protected areas, and the Water Framework Directive and its standards were substantially shaped by UK science and environmental management expertise. We must now bring this expertise to bear and seize the opportunity to develop strong, new environmental regulations which match or better EU protections.

8.1. It is clear to environmental scientists that environmental systems rarely reflect political boundaries, and environmental processes and pollutants rarely respect them. As history has shown, regulation and policy developed at pan-European level is likely to be much more effective in addressing environmental challenges. At this scale, policy makers can take a systems approach to what are essentially transboundary issues. It may also be essential to demonstrate a regulatory 'level playing field' to facilitate trade. Therefore, maintaining positive working relationships with our EU neighbours will be vital. Where appropriate, the Government should seek continuity in policies on transboundary issues and problems such as climate change and air pollution.

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