UNDER EMBARGO UNTIL 00.01 UK TIME ON WEDNESDAY 14 SEPTEMBER 2011

THE SPICE PROJECT

Preparations are underway for a unique test of engineering technology that could open up new ways to reduce atmospheric temperatures caused by climate change, and complement conventional measures to reduce carbon emissions.

The test, the first of its kind in the UK, is expected to take place in the next few months, it was announced today at the British Science Festival in Bradford.

It is part of the SPICE project (Stratospheric Particle Injection for Climate Engineering), a collaboration between researchers at the Universities of Bristol, Cambridge, Edinburgh and Oxford, together with Marshall Aerospace.

The project will investigate the feasibility of one so-called geoengineering technique: the idea of simulating natural processes that release small particles into the stratosphere, which then reflect a few percent of incoming solar radiation, with the effect of cooling the Earth with relative speed. This could produce the same type of global cooling effect as a large volcanic eruption – such as Mount Pinatubo in the Philippines in June 1991 (but without any disruption from hot lava, ash or smoke, which would not be present). In the two years following that eruption the Earth cooled on average by about half a degree centigrade.

The SPICE project will take the very first steps in research to understand whether or not these natural processes can be mimicked and, if so, with what effect.

The technology test, led by Dr Hugh Hunt from the University of Cambridge, involves pumping water to a height of 1km through a suspended hose, held aloft by a helium-filled balloon. This will allow the engineers to study how the hose and balloon behave over time in a variety of weather conditions and so assess the feasibility of using this approach to potentially inject particles into the stratosphere at an altitude of 20km.

Dr Matt Watson from Bristol University, who leads the overall project, said:

' SPICE is the first UK project aimed at providing some much-needed, evidence-based, knowledge about geoengineering technologies. The project

itself is not carrying out geoengineering, just investigating the feasibility of doing so. We hope that by carrying out this research we will start to shed light on some of the uncertainties surrounding this controversial subject, and encourage mature and wide-ranging debate that will help inform any future research and decision-making.'

Geoengineering is seen as being potentially useful in combating climate change but could also lead to unforeseen or unintended risks – for example on local weather systems, or discouraging people to take action to reduce carbon emissions.

There will always be a range of debate surrounding this issue. An integral part of the governance process for the SPICE project is to assess and understand the potential impacts of this new technology, beneficial or otherwise, and to open up dialogue and debate around these as our understanding improves. A multidisciplinary panel of experts was set up enable the Spice project team to consider the direct and indirect effects of the technology, and to inform the discussion on how and if the technology should be developed now and in the future in a way that is safe, responsible and responsive to the diversity of views about geoengineering.

A consultation exercise has already been undertaken with members of the public in a parallel project by Cardiff University, with specific exploration of attitudes to the SPICE test. This research found that very few people were unconditionally positive about the idea of geoengineering or the proposed test. However, most were willing to entertain the notion that the test as a research opportunity should be pursued.

Prior to this in 2010, 'Experiment Earth?', a public dialogue exercise, was commissioned by the Natural Environment Research Council to start the process of hearing peoples' views about a variety of geoengineering solutions. Further dialogue is planned with wider groups of people, including environmental groups, to ensure that the project benefits from a full range of views on this subject.

The SPICE project consists of three strands of research:

Evaluating candidate particles: Researchers from the Universities of Bristol, Oxford and Cambridge and the Rutherford-Appleton Laboratory are considering what would be an 'ideal' particle to inject into the stratosphere. The researchers will aim to identify a particle with excellent solar radiation scattering properties, and consider what potential impacts might be on climate, weather, ecosystems and human health.

Delivery Systems: Engineers from the University of Cambridge and Marshall Aerospace will test the feasibility and design of using a tethered-balloon to inject particles into the stratosphere. They will be using the data obtained from the test-bed project in computer models to examine how a full-scale system might work at an altitude of 20km.

Climate and environmental modelling: Researchers from the Universities of Oxford, Edinburgh and Bristol are working with the Met Office Hadley Centre to consider what can be learned from past volcanic eruptions. They are also modelling the potential impact on ozone layer concentrations, regional precipitation changes and atmospheric chemistry.

SPICE is funded by the Engineering and Physical Sciences Research Council (EPSRC) and the Natural Environment Research Council (NERC), with support from the Science and Technology Facilities Council (STFC) who are providing laboratory facilities and expertise for the project.

Notes to editors

1. **Dr Matthew Watson**, SPICE Principal Investigator and Lecturer at the Cabot Institute, University of Bristol, **Dr Hugh Hunt,** Senior lecturer in Engineering, University of Cambridge, **Chris Walton**, SPICE Project Trials Advisor, University of Cambridge and Marshall's Aerospace and **Dr Kirsty Kuo**, Research Associate, University of Cambridge will discuss details of the project at a press briefing at the British Science Festival Press Centre, Student Central, University of Bradford at 11am on Tuesday 13 September.

2. Copies of the results from the Cardiff University public engagement research (August 2011) will also be available at the press briefing. More information about the project can be found at: http://www.iagp.ac.uk/news/members-public-deliberate-geoengineering-press-release-cardiff-university

3. More information about Experiment Earth? can be found at: http://www.nerc.ac.uk/about/consult/geoengineering.asp

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