



Geological Society of Australia (Victoria Division) media release
Embargoed until 5am AEST, Wednesday 24 September 2008
(embargoed interviews also available Tuesday evening)

Global expenditure on clean energy R&D “should be increased tenfold”: Harvard professor

Worldwide expenditure on R&D into clean energy should urgently be increased tenfold from US\$50 billion to US\$500 billion per annum, to combat looming shortfalls in oil and other fossil fuels production and the unprecedented environmental and climatic damage their use is causing, an international expert on climate change, Harvard Professor Paul Hoffman, has warned.

Professor Hoffman is a keynote speaker at the Geological Society of Australia's (Victoria Division) Selwyn Symposium and Lecture 2008, being held this Thursday in Melbourne. He is currently in Australia on a Harvard Club of Australia Fellowship hosted by The University of Adelaide.

“World oil production is a roughly US\$10 trillion a year industry, yet only about 0.5% (US\$50 billion) of this amount is spent annually on alternative energy R&D, far less than the 5% norm for R&D. Globally, governments, industry and the research sector need to remedy this shortfall urgently” Professor Hoffman said.

“Although oil consumption continues to rise, there are increasing signs that world oil production has flattened out and may soon begin to fall. And although global coal reserves are ultimately far larger than those of oil and natural gas, burning coal is exacting a higher price in terms of greenhouse gas emissions.

“Greenhouse gases not only cause global warming, but also changes in rainfall patterns leading to longer droughts in countries like Australia and in agriculturally critical parts of Africa, North America and south-east Asia. They also cause the acidification of surface ocean waters that threatens coral reef ecosystems.

“Crucially, it takes about 20 years for Earth's climate system to adjust to the current load of greenhouse gases (primarily CO₂) in the atmosphere. This means that today's climate is a dangerously false measure of the consequences of current CO₂ levels – we will only see the real extent of current CO₂ levels 20 years down the track, and there will come a point at which it will be too late for us to do anything about it.

“CO₂ levels are currently rising by 2-3 parts per million (ppm) per year. Today, CO₂ levels stand at 385 ppm, about 100 ppm higher than before the Industrial Revolution and at least 80 ppm higher than at any time in the last 800,000 years.

“If present trends continue, CO₂ levels will reach 500 ppm by the year 2050 – it will then take thousands of years for CO₂ to return to pre-industrial levels even if humankind's emissions were to cease completely. At no time in the past 55 million years has CO₂ risen so rapidly and in such a large proportion through natural causes.

“In short, we are launched on an unprecedented global 'experiment' of unknown consequences.

“In addition to alternative energy sources—solar, wind, tidal, geothermal and nuclear—we must take more urgent steps to conserve oil and lower the rate at which CO₂ and other greenhouse gases are rising. These steps will involve a combination of energy conservation, alternative energy production, carbon sequestration and, if need be, atmospheric CO₂ removal.

“Nature removes CO₂ from the atmosphere through ocean mixing and by chemical reactions that convert rocks into soil. Nature is very effective at this but it operates on timescales that are not very helpful for our current needs—thousands of years for ocean uptake and hundreds of thousands of years for soil development. More research should be undertaken urgently into how these natural processes could be artificially accelerated.

“A potentially cost-effective means of countering the effects of greenhouse warming is 'geo-engineering'. This involves artificially reducing the solar radiation the Earth receives by introducing light-scattering particles into the

upper atmosphere. A disadvantage of this approach is that it does nothing to prevent ocean acidification due to the rise of CO₂, and the projected CO₂ level of 500 ppm could be devastating for coral reef ecosystems. Geo-engineering is also ripe with unforeseen side-effects, some of which could be problematic.

“At the end of the day, leadership on climate change mitigation and alternative energy development must come from the more affluent countries that stand to be most directly affected by global warming—for example, Australia (which is prone to drought) and Canada (which holds a “miner’s canary” because climate change is amplified at high latitudes). Affected *developed* countries, rather than affected third-world countries, will be much better placed to lobby for change and to lead the way in new R&D efforts.”

In his Selwyn Lecture on Thursday, Professor Hoffman will emphasise how geological research into Earth's history has been a key driver behind the discovery of fundamental processes in the Earth's climatic system.

“A great 19th Century controversy in geology over the glacial theory of the ice ages – the theory that most of Europe and North America were buried by 2-3 kilometres of glacial ice in the geologically recent past – led to the realisation that the Earth's climate could in fact get warmer” Professor Hoffman said. “Before that time, physicists only believed that Earth was getting colder and colder over time, due to the loss of heat from the Sun and the Earth's interior. The controversy over the ice ages, the last of which ended only 10,000 years ago, was directly responsible for the discovery of the 'greenhouse effect' that we hear so much about today.

“More recently, geohistorical research has led to the concept of mass extinction, and the role of meteorite impacts and periods of increased volcanic activity, in shaping biological evolution. There is currently intense debate in scientific circles over the role of global glaciations (the so-called 'Snowball Earth' events) in the rise of multi-cellular animals that have changed the face of the globe in the last 500,000 years of Earth's history.

“The importance of geohistorical research is its power to surprise, to reveal what was formerly undreamt of and to demand an explanation. Far from being old-fashioned and irrelevant, it is a cutting-edge field of science that plays a critical role in helping us to better understand how the Earth and its climatic engines really work” Professor Hoffman said.

Request to media: Please mention in any article / interview that Professor Paul Hoffman is speaking at the Geological Society of Australia's (Victoria Division) Selwyn Symposium 2008 and Selwyn Lecture 2008. Promotion of the Symposium – and the free public lecture which follows it on Thursday evening – would also be appreciated. Please find details below.

Media interviews: are available with Professor Paul Hoffman on tel: 08 8303 7046 from 7:30am to 2:30pm AEST Wednesday. Please contact Patrick Daley on 0408 004 890 to contact Professor Hoffman outside these times. Interviews about the Selwyn Symposium are also available with the organiser, Associate Professor Stephen Gallagher, on 0400 099 273.

Media contact: Patrick Daley (Patrick Daley Public Relations) on 0408 004 890.

Details about the Selwyn Symposium and Lecture 2008

(Media assistance in informing the public of the free lecture would be greatly appreciated)

(Both the symposium and lecture are free to media)

Geological Society of Australia (Victoria Division) Selwyn Symposium 2008

Neoproterozoic extreme climates and the origin of early life

Thursday 25 September 2008, 9am (registration from 8am)

Fritz-Loewe Theatre, McCoy Building, Earth Sciences, University of Melbourne,
(cnr Elgin & Swanston Streets)

Further information at www.vic.gsa.org.au/Selwyn/symposium.htm.

Geological Society of Australia (Victoria Division) Selwyn Lecture 2008 – free public lecture

The greenhouse effect, sea-level change, continental drift and the discovery of the glacial theory of Pleistocene ice ages

Professor Paul Hoffman, Harvard University

Thursday 25 September 2008, 6:30pm

* includes presentation of the Geological Society of Australia (Victoria Division) Selwyn Medal 2008 *

Copland Theatre, University of Melbourne

Further information at www.vic.gsa.org.au/Selwyn/symposium.htm.