THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Office of the Deputy Vice-Chancellor (Teaching & Learning)

DEPUTY VICE-CHANCELLOR (TEACHING & LEARNING)
Professor Deborah Terry

The University of Queensland
Brisbane Qld 4072 Australia
Telephone (07) 3346 7754
International +61 7 3346 7754
Facsimile (07) 3346 7792
Email dvc.tl@uq.edu.au
Internet www.uq.edu.au

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Mr John Carter
Committee Secretary
Department of the Senate
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Mr Carter

The University of Queensland is pleased to have the opportunity to make a submission to the Standing Committee on Education, Employment and Workplace Relations and its inquiry into the ability of universities and other research and training institutions to meet current and future demand for climate change professionals; and measures to assist understanding of climate change in the Asia-Pacific region, including provision of training and skills assistance. Outlined below is an overview of educational programs and research activities relevant to the professional education of those who will work to mitigate the impact of climate change.

FACULTY OF ENGINEERING, PHYSICAL SCIENCES AND ARCHITECTURE

School of Engineering

New technologies and engineering solutions are required for global sustainable development and so at both the undergraduate and postgraduate solutions to assist us to deal with climate change have been integrated into the engineering curriculum. Examples include: consideration of environmentally appropriate structures and materials in coastal areas, especially those subject to cyclones; development of materials technology to take advantage of advances in solar power and hydrological studies addressing the optimum storage of dam water and recycled water to minimize evaporation and pumping costs.

The graduates will help build cleaner and sustainable industries, provide waste and pollution control, and guide improved resource management. The degree program is built on a solid core of Chemical and Civil Engineering courses (it is accredited by both the Institute of Engineers and the Institute of Chemical Engineers) with integrating courses in environmental risk assessment and management, cleaner production and sustainable development, environmental modeling and design. Many of our graduates have become today's leaders in environmental engineering, while others have established careers in the traditional chemical and civil engineering professions.

School of Geography, Planning and Architecture

Key degree programs of this School which directly assist in the education and training of professionals who will work in climate change and related jobs include:

Bachelor of Environmental Management (BEM)
This is a flagship UQ program with large student enrolments for addressing environmental issues coupling science and policy. The largest field of study currently in the BEM is Sustainable Development, which incorporates a number of courses with an explicit focus on climate change (see course list below). The School is currently developing proposals for a suite of new fields of study in the BEM, one of which will be named Climate Change Adaptation; this proposal is currently in the consultation phase and we expect implementation in 2010.
Master of Environmental Management
An established degree program with relevant fields of study in Sustainable Development and in Sustainable Production and Consumption, it is planned to introduce a new field of study in Climate Change Adaptation in 2010.
Bachelor of Science - Geographical Sciences Major
It is proposed to offer "Climate Change and Environmental Management" as an area of study in this degree program.

Dr Mike Gillen and Associate Professor John Minnery have been funded to develop a suite of 10 modules entitled *Creating Climate Adaptable Settlements: Building Resilience through Adaptive Planning.* This funding was obtained from Climate Change Adaptation Skills for Professionals Small Grants Program coordinated by the Australian Greenhouse Office.

School of Information Technology & Electrical Engineering

Professor Jane Hunter is involved in a proposal to establish a Masters in Hydroinformatics within the International Water Centre. It is expected that there will be an increasing interest from honours students to undertake projects in the development of information systems that assist in the data collection aspect of climate change research.
The School is currently involved in the following research projects which will have a direct impact on building our understanding and expertise in research on climate change but with direct benefits for educational programs and students. These projects include:

Power & Energy Systems Research Group this group is involved in a climate change related project *Control methodologies of distributed generation for enhanced network stability and control* funded by CSIRO Energy Transformed Flagship: Low Emissions Distributed Energy from 2008 to 2010. The Chief Investigators included: Prof Tapan Saha & A/Prof. Zhao Dong.

Queensland Geothermal Energy Centre of Excellence this research group is also directly involved with Queensland Geothermal Energy Centre of Excellence (http://www.uq.edu.au/geothermal/index.html).

Professor Jane Hunter is currently working on *The Health-e-Waterways project* (funded by Microsoft and SmartState) which involves predictive modeling of water catchments including the effect of climate change on rainfall in SEQ. She is also a collaborator with Professor Ove Hoegh-Guldberg and Dr Scarla Weeks from the Centre for Marine Science to integrate, analyse and visualize data sets required identifying the effects of climate change on coral reef ecosystems. Professor Jane Hunter is a Chief Investigator on the Atlas of Living Australia project with CSIRO and Professor Hugh Possingham, Director, The Ecology Centre which will aggregate datasets and provide services to analyse the impact of climate change on Australia's biodiversity.

Professor Neil Bergmann has a new project in marine sensor networks (SEMAT - led by Associate Professor Ron Johnstone of Centre for Marine Studies), which in part is to allow monitoring of marine environments to investigate the effects of climate change on these areas. This project is part of a more general interest in environmental sensing using electronic sensor networks.

The School is starting a new "Smart House" project, with one of its goals being sustainable housing, some possible foci of the work will be considering issues such as distributed renewable energy generation (eg rooftop solar) and reduced energy consumption.

FACULTY OF SOCIAL AND BEHAVIOURAL SCIENCES (SBS) & INSTITUTE FOR SOCIAL SCIENCE RESEARCH (ISSR)

There are important areas of social science teaching, research and research higher degree training within the SBS Faculty that relate to the environment, climate change and sustainability supported by research in these fields. Relevant teaching occurs in all Schools in the SBS Faculty, and in ISSR there is also extensive RHD supervision on relevant topics throughout SBS and ISSR.

School of Education

SBS Faculty has capacity to offer expertise in climate-change education and the professional development of teachers with regard to sustainability. One of the School of Education's Adjunct Appointments is Dr Ron Tooth who heads the Pullenvale Environmental Education Centre and he is working with Professor Peter Renshaw on the professional development of teachers with regard to sustainability (pedagogy and curriculum focus). He is also a principal investigator on a proposed ARC Linkage (Renshaw & Tooth) looking at sustainability and pedagogical processes. This involves working with clusters of schools and teachers. Within the School of Education research is currently being conducted by science educators (Geelan, Wright and Nichols) and a team of 4 full-time PhD students (on scholarships) focussing on renewable energy sources through the Biotechnology Sugar CRC. This research focuses on teaching approaches and curriculum development at the Middle Years of Schooling.

School of Social Science

The School of Social Science teaches the course *Sociology of the Environment* course which introduces undergraduate students to the environmental problems faced by Australia. There is some prospect that a new course on the 'Sociology of Climate Change' will offered in future years. Professor Geoff Lawrence and Dr Carol Richards are involved in the organization of the Social and Behavioural Sciences Natural Resource Management (SBS NRM) group. It is an informal gathering of some 30 social scientists that meets three time each year to discuss environmental/NRM/climate-related issues.

The Faculty of Social and Behavioural Sciences and Institute for Social Science Research, are undertaking research/teaching relevant to climate change and the environment in the following:

UQ Social Research Centre (UQSRC)

The Urban and regional research program of UQSRC, which focuses on human settlement patterns is examining the impact of greenhouse gas emissions, transport patterns and urban form.

School of Political Science and International Studies, the Australian Centre for Peace and Conflict Studies and UQSRC

Global climate change has the potential to affect Australia's national security and relations with regional neighbours through destabilizing effects in local states and the creation of "climate change refugees" especially in some Pacific Islands. Research on international relations and conflict mediation in the School of Political Science and International Studies, the Australian Centre for Peace and Conflict Studies and UQSRC is relevant for understanding these issues.

Schools of Psychology, Social Work and Applied Human Services

Future sustainability and mitigating and adapting to the effects of climate and environmental change requires effective behavior change strategies to be implemented in the general population and in specific population segments. Research and practice on attitude and behavior change occurs in the Schools of Psychology, Social Work and Applied Human Services and elsewhere in the SBS Faculty and ISSR.

School of Social Science

The social implications of natural resource management are extensively studied in the School of Social Science. Professor Marshall Weisler has written widely on the impact on Pacific civilizations of environmental degradation and is currently examining aspects of climate change. Professor Geoffrey Lawrence has given numerous keynote/invited addresses on the social aspects of climate change and environmental degradation for Australia. He is a member of the Lake Eyre Basin Scientific Advisory Panel, which is currently ascertaining the likely impacts of climate change on the Basin.

School of Social Work & Human Services

Achieving sustainability and mitigating the effects of climate change requires effective policy development and institutional design. Relevant research on these topics occurs in School of Political Science and International Studies, Social Work and Human Services and Institute of Social Science Research. Dr Kelly Fielding from the School of Social Work & Human Services is on a 2-year secondment from Social Work and Human Services to CSIRO to work on a water project.

FACULTY OF BUSINESS, ECONOMICS AND LAW

School of Economics

Professor John Quiggin and Professor John Foster have ARC and CSIRO research grants on climate change questions. A number of our environmental economists are work in areas of climate change and its impacts – including Associate Professor Richard Brown (Pacific Islands), Professor Harry Campbell (Marine), Dr Jackie Robinson (Water). We have the strongest group of environmental economists in any economics school in Australia. Importantly, this is the first year in which a major in environmental and resource economics has been offered in the Bachelor Economics, this includes an elective specifically on carbon trading and most of the other courses will involve some discussion of climate change issues. The School of Economics is considering launching a new Masters Degree in Environmental Economics with a strong slant towards carbon/climate change material in 2010.

UQ Business School

The UQ Business School currently offers a course at the Masters level on Corporate Sustainability. From 2009 the UQ Business School will offer a Master of Business (Business Sustainability) with new Masters level courses in Sustainability and Innovation; and a course on Accounting and Decision Making for Sustainability.

FACULTY OF NATURAL RESOURCES, AGRICLUTURE AND VETERINARY SCIENCE

The Faculty is developing courses on business management in a carbon constrained world, with a focus on environmental markets and emissions trading. It is also planning a new Masters in Sustainable Systems. Professor Ockie Bosch, Head of the School of Natural and Rural Systems Management is also involved in preparing a submission to the University of the United Nations on those distance education courses UQ offers in environmental management. This has the potential to make these courses available to students across the world.

In addition to those degree program, course and research activities outlined above the focus at UQ is to continue to integrate the issue of climate change across the University's curriculum with an importance emphasis in health sciences as we facing increasing problematic public health issues due to temperature change and disease epidemics.

Thank you for establishing this inquiry I would be willing to discuss this submission further if required.

Yours sincerely

Professor Deborah Terry
Deputy Vice-Chancellor (Teaching and Learning)