THE UNIVERSITY
OF ADELAIDE
AUSTRALIA

Research Institute for Climate Change and Sustainability

Strategic Plan 2008 - 2010

Prepared for discussion
May 2008

Introduction

Achieving a sustainable future, embracing a healthy society, economic prosperity and a resilient environment, is the inspiration driving the research of the Research Institute for Climate Change and Sustainability (RIsCCS). Institutes like RIsCCS are an exciting new initiative for the University of Adelaide, and, in aspiring to be a world-leading centre of interdisciplinary studies which meet the challenges posed by global change, is strongly representative of a paradigm shift in the way innovative research is undertaken in the 21st century.

We were established in late 2006 with a core membership of over 40 leading University of Adelaide academic staff and non-academic (government and industry) stakeholders, along with their post-doctoral fellows and postgraduate students.

Our goal is to foster the formation and ongoing development of genuinely collaborative teams of researchers, working within themes which span the five academic faculties, which 'think big' and so are best positioned to tackle the tough issues facing society in a rapidly changing world.

Our aims align strongly with State and Federal strategic directions, such as STI10, Constellation SA and South Australia's Greenhouse Strategy 2007–2020, with an overarching goal of reducing fragmentation of effort and building critical technical capabilities in, and real-world application of, new knowledge and innovation. It is clearly critical that end-users of the research, such as businesses, industry and the local and national management agencies, are embedded throughout the 'applied research cycle', to maximise knowledge and technological transfer.

Communication of research results to the broader community is a fundamental responsibility of modern researchers. If, in presenting robust and hard-won evidence, we can provoke meaningful societal change, then we have surely left an enduring legacy. It is this imperative that has encouraged our members to take an active role in the communication of climate change and sustainability issues to government, the private sector and the general community, both directly (via public lectures and workshops and advisory committees) and indirectly (via the media – including television, radio, the print media and popular science articles).

Whether we are scientists, business people, policy makers or members of the general community, now is the time to implement the sort of changes that will be necessary to avert future climate-driven crises, and build a resilient and sustainable society for the long term. This is going to need careful planning, inventive thinking and a lot of hard work. RIsCCS is working to deliver on all of these fronts.

Context

The planet is becoming hotter and much of the observed warming is attributed to increases in greenhouse gases in the atmosphere, the most significant of which is carbon dioxide. Regardless of our efforts to reduce emissions over the next few decades some level of climate change is now thought inevitable. However the extent and severity of the changes are still uncertain. Also, the anticipated impacts of the likely changes in climate patterns are complex varying considerably between regions and sectors, and over time.

In Australia anticipated changes include:

- An increase in annual average temperatures
  An increase in average temperatures of between 0.4^{o} and 2.0^{o}C by 2030 and of between 1.0^{o} and 6.0^{o}C by 2070 with more heat waves and fewer frosts

- Reductions in average rainfall
  Possibly more frequent El Nino Southern Oscillation events resulting in more pronounced cycles of drought and heavy rains

- Severe weather
  An increase in severe weather events eg more severe wind speeds in cyclones, storms and more days of high fire risk

Increases in annual average temperatures over most of Australia will be accompanied by a decrease in the annual average rainfall in the south-west and in parts of the south-east and Queensland. These changes, combined with the general drying trend over large parts of Australia due to increased temperatures and evaporation, are likely to adversely impact on our water resources, agricultural productivity and social and natural systems. An increase in extreme weather patterns is expected to increase risks to human settlements and expose natural systems to flooding, storm surges and erosion damage (Allen Consulting Group (2005) Climate Change Risk and Vulnerability).

Most of the changes likely to be observed over the next few decades will result from greenhouse gases already in the atmosphere. Further it is unlikely that greenhouse gases will be stabilised in the atmosphere for several decades and therefore climate patterns will continue to change.

Vision

The Research Institute keeps South Australia at the forefront of climate change research with an international reputation for outstanding quality and impact

Mission

We undertake multidisciplinary research to mitigate carbon emissions and develop adaptive strategies to respond to the anticipated impacts of climate change

We value

Open participation
We encourage open participation to foster greater ownership of relevant knowledge and understanding of the imperatives of climate change and sustainable development

Shared responsibility
We share responsibility for living sustainably

Integration
We integrate economic, social and environmental considerations in our research and decision-making processes

Innovation and creativity
We embrace a commitment to learning, use of sound scientific information and evidence-based decision-making, and a willingness to explore new and alternative options

Integrity
Our research informs a better understanding of the capacity and vulnerability of natural and human systems in the face of unprecedented global change

Goal

Our goal is to foster the formation and ongoing development of genuinely collaborative teams of researchers, working within themes which span the five academic faculties, and so are best positioned to tackle the tough issues facing society in a rapidly changing world.

Objectives

We will:

- Capitalise on our research strengths and develop capacity in emerging areas to build an international reputation in climate change and sustainability research

- Bring together traditionally separate academic disciplines to develop multidisciplinary research teams

- Build on existing collaborative relationships and broker new partnerships with key stakeholders to explore and develop new research opportunities

- Communicate the findings of our research widely to scientific peers, government, business and the community, to inform policy and industry development

Strategies

A number of Commonwealth and State Government documents shape the strategic directions of the Research Institute. *Australia's National Research Priorities* highlight particular areas of social, economic and environmental importance for Australia. These priorities aim to improve the impact of research efforts by building critical mass and encouraging collaborative effort.

South Australia's Strategic Plan, and *Shaping the Future: A 10-year Vision for Science, Technology and Innovation in South Australia*, also aim to foster greater innovation and creativity through collaborative effort.

The South Australian Government aims to place South Australia at the forefront, both nationally and internationally, in tackling climate change. It has legislated to reduce emissions by 60 percent (40 per cent of 1990 levels) by 2050. In keeping with this aspirational agenda our objectives will be achieved using the following strategies.

We will capitalise on our research strengths and build capacity by:

- Attracting and developing research leaders

- Pursuing both conventional and alternative revenue streams

- Working in partnership with industry

We will bring together traditionally separate academic disciplines to work in multidisciplinary research teams by:

- Promoting and building a culture of research collaboration amongst our researchers

- Establishing and consolidating cross-disciplinary research teams that address national research priorities and industry needs

- Emphasizing a strong quantitative, predictive and adaptive approach to climate change research

We will build on existing partnerships and broker new partnerships by

- Exploring options to collaborate with other institutions, and national and international research networks

- Working with industry stakeholders to address applied problems in mitigation and adaptation

- Embedding end-users throughout the 'applied research cycle' to maximise the transfer of knowledge and technologies

We will promote our research achievements and the relevance of these to the broader community by:

- Developing and implementing a communication strategy for both internal and external stakeholders

- Publishing in high impact, international peer-reviewed journals and relevant technical and public policy fora

- Authoring articles on climate change related issues in magazines, newspapers and websites

- Presenting public and business addresses, and conducting television and radio interviews

Research capabilities

Climate change research at the University of Adelaide is conducted across a broad range of disciplines that span all five University faculties. Our capabilities in technological innovation, environmental assessment, predictive modelling, economic and social analysis, and legislative and policy development, enable translation of research to government, business and the community.

Areas of research expertise	
Sustainable energy	Geothermal (hot rocks), biomass, biofuels, wind and solar
Engineering solutions	Combustion technologies for renewable fuels, in particular biodiesel fuels
Carbon capture and storage	Geosequestration, biosequestration (i.e. natural sinks)
Resource management	Terrestrial and marine ecology, inland waters, evolutionary biology, soil and land systems, modelling of biological processes, economic analysis, ecoinformatics, palaeoecology, landscape restoration and management
Built environment	Energy efficiency, population policy
Human health	Epidemiology, social impact of policy change
Adaptive strategies	Integrative modeling, impact assessment, policy and decision-making frameworks, legislative and market-based instruments, ecological jurisprudence

Research focus

Our research focuses on approaches to reduce carbon emissions and to develop adaptive strategies to address the anticipated impacts of climate change.

The challenge to meet the State target for reductions in greenhouse gas emissions is substantial and will require the application of latest understanding and development of new technologies. Even with considerable commitment to reduce emissions, it is predicted that Earth will experience some degree of increased temperatures and more variable climatic conditions, which are likely to generate novel pressures on both natural and agriculture systems across Australia. It is therefore important to build knowledge about the climatic dependency of human and natural systems, identify how they are likely to respond to variations in climate, and seek ways to safeguard the most vulnerable systems and regions. The following areas are the focus of our research.

Strategic Policy
Research Director – Professor Barry Brook
Communicating cutting-edge research on climate change to the public domain, and providing a conduit for the transfer of knowledge and applied tools to service the policy needs of government, business and society.

Energy, Emissions and Offsets
Research Director – Professor Gus Nathan
Research progressing within this program spans geothermal (hot rock), solar, wind, biofuels, combustion technologies for improved fuel efficiency and reduced emissions, and a diversity of approaches for carbon capture and storage (geosequestration, biosequestration).

Adaptive Responses for Sustainable Environments
Research Director – Professor Andy Lowe
It is anticipated that increased temperatures and drier conditions are likely to create pressures on both natural and production systems across southern Australia. This program is building knowledge about the climate dependency of native and introduced species and how they are likely to respond to variations in climate.

Marine Impacts
Research Director – Associate Professor Corey Bradshaw
The adaptability of marine species to climate forcing will be examined in conjunction with other drivers of population change, such as fishing exploitation, coastal development and other forms of habitat degradation. Future impacts are being quantified and modelled to predict marine system health across Australia.

Productive Agriculture under Global Change
Research Director – Professor Randy Stringer
This program is supporting research to understand how climate change and related threatening processes impact on the interrelationships between agricultural landscapes, sustainable production systems and environmental services.

Population Health and Social Impacts
Research Director – Dr Peng Bi
Climate change and increasing climatic variability are expected to have considerable social and economic impacts. Research is taking place to explore the likely future consequences of severe weather events (especially heatwaves and cold spells) for population health.

Water
Research Director – Associate Professor Justin Brookes
The anticipated decline in rainfall, combined with a general drying trend over large parts of the continent due to increased temperatures and evaporation, are likely to adversely impact on our water resources. This research program will provide information that will enable us to track, manage and allocate water so both society and the environment gain the greatest net benefit from the available water

Governance

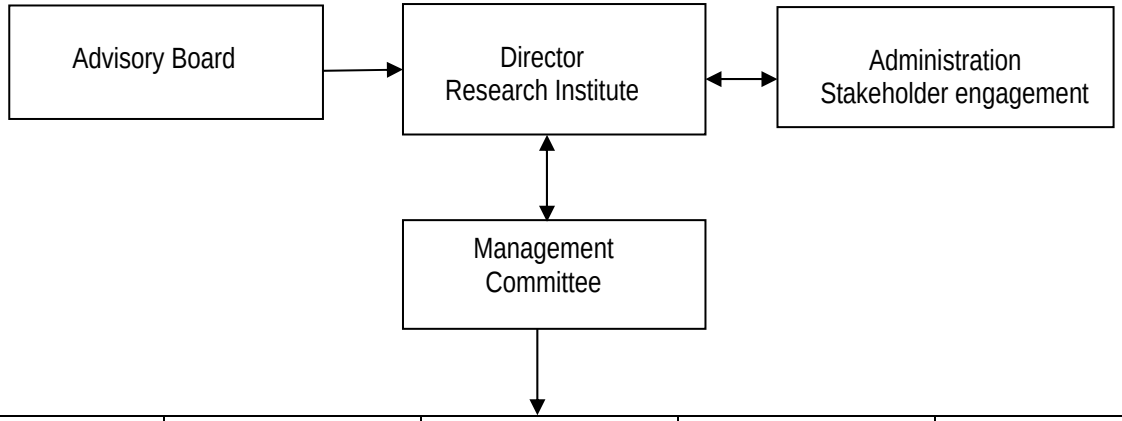
Advisory Board

The Advisory Board comprises the Executive Director, Faculty of Sciences, RIsCCS Director, and representatives from State Government agencies, private sector organisations (e.g. from food, mining, energy), and the Deputy Vice-Chancellor (Research). The Advisory Board will meet twice a year with a formal agenda.

Management team

The management team will comprise the Director, Deputy Director, Manager and Research Directors. This team will meet bimonthly to report on progress, evaluate performance and discuss new opportunities. Each research leader is required to management their research area and report on progress.

Organisational structure



Energy, emissions and offsets	Strategic policy	Marine impacts	Sustainable environments	Agricultural productivity	Water	Population health and social impacts
Gus Nathan	Barry Brook	Corey Bradshaw	Andy Lowe	Randy Stringer	Justin Brookes	Peng Bi
Richard Hillis Martin Hand John Kaldi Stephen Lincoln Con Doolan Peter Ashman	Adrian Bradbrook Paul Barbie Tom Wrigley	Sean Connell Bronwyn Gillanders	Alan Cooper Andy Austin David Paton Bob Hill Martin Williams Sue Carthew	Ron Smernik David Chittleborough	Mike Young Holger Maier John Tibby Friedrich Recknagel Nigel Bean	Graeme Hugo Nick Harvey Christopher Findlay Dino Pisaniello Antony Radford Veronica Soebarto Terry Williamson
Mitigation	Adaptive strategies					

Action plan

Objective 1 - Capitalise on our research strengths and develop capacity in emerging areas, to build an international reputation in climate change and sustainability research

Strategy	Actions 2008	Actions 2009	Actions 2010
Developing and attracting research leaders	Invite wider membership from the University of Adelaide and other research institutions locally and nationally Introduce postgraduate programs and courses to promote and encourage research into climate change Provide stipends to support PhD studies		
Pursuing alternative revenue streams	Make approaches to external organisations to establish partnerships Be positioned to bid for large-scale and cross-disciplinary research grants in the field of climate change as opportunities arise	Make approaches to external organisations to establish partnerships Be positioned to bid for large-scale and cross-disciplinary research grants in the field of climate change as opportunities arise	Continue to build and maintain partnerships Be positioned to bid for large-scale and cross-disciplinary research grants in the field of climate change as opportunities arise
Measure of success	Engagement and appointment of world-class researchers Attracting high quality postgraduate students		

Objective 2 - We will bring together traditionally separate academic disciplines to work in multidisciplinary research teams

Strategy	Actions 2008	Actions 2009	Actions 2010
Build and promote a culture of research collaboration across researchers working on climate change.	Hold Think Tank sessions to build relationships between key researchers and external stakeholders. Hold workshops to develop collaborative research proposals	Hold Think Tank sessions to build relationships between key researchers and external stakeholders. Hold workshops to develop collaborative research proposals	Hold Think Tank sessions to build relationships between key researchers and external stakeholders. Hold workshops to develop collaborative research proposals
Establishing and consolidating cross-disciplinary research teams	Add research groups as membership expands		
Seeking to work with industry on major multidisciplinary problems	Ongoing collaboration and communication	Ongoing collaboration and communication	Ongoing collaboration and communication
Measure of success	Publications in high impact, multidisciplinary international peer-reviewed journals and relevant technical ?? Success in securing large-scale research grants that are cross-disciplinary Support for RIsCCS activities from key stakeholders		

Objective 3 - Build on existing collaborative relationships and broker new partnerships to explore and develop new research opportunities worldwide

Strategy	Actions 2008	Actions 2009	Actions 2010
Establish relationships with Government and industry to identify climate change research requirements.	Support role of Advisory Board Build links with stakeholders and other research networks	Support role of Advisory Board Build links with stakeholders and other research networks	Support role of Advisory Board Build links with stakeholders and other research networks
Measure of success	Uptake of research and technologies by Government and industry Success in joint university-industry research ventures, eg ARC Linkage and CERF grants Incorporation of RIsCCS technical and strategic advice into Government policy and industry strategic plans		

Objective 4 - Communicate the findings of our research widely, to scientific peers, government, business and the community to influence policy and industry development

Strategy	Actions 2008	Actions 2009	Actions 2010
Develop a marketing and profile-building strategy for internal and external stakeholders.	Host events to promote research capabilities of Research Institute Maintain and update RIsCCS website Develop printed and electronic material promoting expertise of our research teams Prepare background material for media releases to promote member activities Author articles on climate change related issues for mass media Present public and business addresses, and conducting television and radio interviews Develop seminar series and short courses – Climate2030 and other	Host events to promote research capabilities of Research Institute Maintain and update RIsCCS website On-going activities from 2008	Host events to promote research capabilities of Research Institute On-going activities from 2009
Measure of success	Frequency with which RIsCCS is mentioned in the popular media Invitations of RIsCCS members to plenary talks, business planning sessions, workshops, etc. Degree to which public comment on key issues is sought from RIsCCS members Links and page rank of RIsCCS website		

Our membership

Researcher		Organisation/School	Organisation/Faculty
Ashman	Peter	School of Chemical Engineering	ECMS
Austin	Andrew	School of Earth and Environmental Sciences	Sciences
Babie	Paul	Law School	Professions
Bean	Nigel	School of Mathematical Sciences	ECMS
Bi	Peng	Department of Public Health	Health Sciences
Bradbrook	Adrian	Law School	Professions
Brook	Barry	School of Earth and Environmental Sciences	Sciences
Carthew	Sue	School of Earth and Environmental Sciences	Sciences
Chittleborough	David	School of Earth and Environmental Sciences	Sciences
Connell	Sean	School of Earth and Environmental Sciences	Sciences
Cooper	Alan	School of Earth and Environmental Sciences	Sciences
Damania	Richard	School of Economics	Professions
Doolan	Con	School of Mechanical Engineering	ECMS
Findlay	Christopher	School of Economics	Professions
Gillanders	Bronwyn	School of Earth and Environmental Sciences	Sciences
Hand	Martin	School of Earth and Environmental Sciences	Sciences
Harvey	Nick	School of Humanities and Social Sciences	HSS
Hillis	Richard	Australian School of Petroleum	Sciences
Hugo	Graeme	School of Humanities and Social Sciences	HSS
Kaldi	John	CRC for CO2	CRC
Lincoln	Stephen	School of Chemistry and Physics	Sciences
Lowe	Andy	Department for Environment and Heritage	State Government
Maier	Holger	School of Civil and Environmental Engineering	ECMS
Nathan	Gus	School of Mechanical Engineering	ECMS
Paton	David	School of Earth and Environmental Sciences	Sciences
Pisaniello	Dino	Department of Public Heath	Health Sciences
Radford	Antony	School of Architecture, Landscape Architecture and Urban Design	Professions
Recknagel	Friedrich	School of Earth and Environmental Sciences	Sciences
Smernik	Ron	School of Earth and Environmental Sciences	Sciences
Soebarto	Veronica	School of Architecture, Landscape Architecture and Urban Design	Professions

Researcher		Organisation/School	Organisation/Faculty
Stringer	Randy	School of Agriculture, Food and Wine	Sciences
Tibby	John	School of Humanities and Social Sciences	HSS
Williams	Martin	School of Humanities and Social Sciences	HSS
Williamson	Terry	School of Architecture, Landscape Architecture and Urban Design	Professions
Young	Mike	School of Earth and Environmental Sciences	Sciences