Australia – United States Climate, Energy and Water Program
Program Launch and Policy Forum
2-3 December 2010, Australian National University, Canberra

Speaker biographies and abstracts

Thursday 2nd December 2010
Morning session: Introduction and Program Launch

Professor Andrew MacIntyre is Dean of the College of Asia and the Pacific at the ANU. Professor MacIntyre is also Convenor of the Australia-Indonesia Governance Research Partnership, an active member of the Australian American Leadership Dialogue and sits on the advisory boards of the Australia America Education Leadership Foundation and the Asian Development Bank Institute. Andrew is Honorary ACT President of the Committee for Economic Development of Australia (CEDA), and in 2006 was the recipient of the Japanese Foreign Minister’s Commendation for contributions to the promotion of relations between Japan and Australia.

Andrew will act as MC for the morning’s proceedings, including introducing the VIPs.

Professor Ian Chubb AC is Vice-Chancellor of the Australian National University. Professor Chubb was appointed to the Vice-Chancellorship in January 2001, after previously serving as Vice-Chancellor of Flinders University from 1995 – 2000. In June 2006, Professor Chubb was appointed a Companion of the Order of Australia for "service to higher education including research and development policy in the pursuit of advancing the national interest socially, economically, culturally and environmentally and to the facilitation of a knowledge-based global economy”.

Ian will officially welcome distinguished guests and international visitors to the AUSCEW Policy Forum (5 mins).

Professor Geoffrey Garrett is founding Chief Executive Officer of the United States Studies Centre and Professor of Political Science, both at the University of Sydney. He was previously President of the Pacific Council on International Policy in Los Angeles and before that Dean of the UCLA International Institute. Professor Garrett is author of Partisan Politics in the Global Economy, editor of The Global Diffusion of Markets and Democracy and author over fifty articles in the world’s leading social science journals.

Geoffrey will provide an introduction to the United States Studies Centre and the AUSCEW program (5 mins).

The Honourable Mike Kelly AM MP is Parliamentary Secretary for Agriculture, Fisheries and Forestry with the Australian Government. Mike was first elected as the member for Eden Monaro (in New South Wales) in 2007 and has previously served in the Australian Government as Parliamentary Secretary for Defence Support and Parliamentary Secretary for Water. Prior to becoming a Member of Parliament, Mike served extensively in the Australian military, finishing his career as the Director of Operations and International Law and Director of Army Legal Services in 2007.

Mike will deliver the opening speech of the AUSCEW Policy Forum (15 mins).

Professor Robert Hill is Adjunct Professor of Sustainability at the United States Studies Centre at the University of Sydney. Professor Hill was a member of the Australian Senate from 1981 to 2006, representing South Australia. He was Leader of the Government in the Senate from March 1996 until his resignation in January 2006, and served as Minister for the Environment from 1996-98, Minister for the Environment and Heritage from 1998-2001 and Minister for Defence from November 2001 to January 2006. Professor Hill was Australian Ambassador to the United Nations for Australia from 2006 - 2009.
Robert will officially launch the AUSCEW Program (10 mins).

Dr Karen Hussey has recently returned from three years in Brussels as the Australian National University Vice Chancellor’s Representative in Europe, where she was responsible for developing the ANU’s research relationships and profile with European research teams and institutions. Dr Hussey is a Research Fellow at the Crawford School of Economics and Government, where she undertakes research in the field of environmental policy and politics, water resource management, the energy-water nexus, and global environmental governance. Her most recent publications include a Cambridge University Press book Water Resources Planning and Management (with Professor R. Quentin Grafton), and a special issue of the international journal Ecology and Society dedicated to the energy-water nexus.

Karen will present the keynote address of the AUSCEW policy forum.

Lessons in managing energy and water from Europe, the US and Australia

The links between water, energy and climate are important and complex: energy production requires vast quantities of water, and supplying water requires significant amounts of energy. Energy production and the CO2 emissions deriving from it is a major driver of climate change and, conversely, climate change has a strong impact on both the availability and quality of our water resources, and on the types of energy supplies that are environmentally and economically feasible.

Despite these links, in existing policy frameworks energy and water policies are developed largely in isolation from one another - a fragmentation which is seeing erroneous developments in both sectors. Furthermore, policies adopted to tackle the challenges of climate change have the potential to produce technological and management decisions that exacerbate the energy-water nexus. The evidence of a changing climate is driving extensive and fast policy reform in the energy and climate sectors but policy-makers are ill-equipped to make informed decisions based on empirical research and a comprehensive risk assessment.

Thus, at the heart of the problem, is a lack of policy integration: the energy, water and more recently ‘climate’ sectors are highly developed within themselves but only limited effort is made to account for, and manage, the extensive links between them. This lack of integration and coordination is the case not only between policy-makers, but also between scientists of different disciplines and sectoral expertise, and between scientists and the policy-makers they are supposed to inform.

Thursday 2nd December 2010

Mid-morning session: New energy sources, new challenges

Chair: Professor Will Steffen is Executive Director of the Climate Change Institute at the Australian National University. Professor Steffen has a long history in international global change research, serving from 1998 to 2004 as Executive Director of the International Geosphere-Biosphere Programme (IGBP), based in Stockholm, Sweden, and before that as Executive Officer of IGBP’s Global Change and Terrestrial Ecosystems project. Prior to taking up the CCI Directorship in 2008, Steffen was the inaugural director of the ANU Fenner School of Environment and Society. From 2004 he has served as science adviser to the Department of Climate Change, Australian Government.

John Seebach is the Director of the Hydropower Reform Initiative at American Rivers, a conservation organization which seeks to protect and restore America’s rivers for the benefit of people, wildlife, and nature. John’s focus is reducing the harm that hydropower dams cause to fish, wildlife, recreation, and the local communities that depend on these resources to survive and thrive. He serves as the Chair of the Hydropower Reform Coalition (previously he was National Coordinator). A Kentucky native, John has been an avid hiker, canoeist and kayaker for as long as he can remember.

Koen Zuurbier graduated cum laude in Applied Environmental Geosciences at the VU University of Amsterdam in the summer of 2010. During his Masters Graduation research he worked for the ‘More with Subsurface Energy’ consortium at Deltares, where he constructed a model to simulate the effects of ATES on mobile contaminant plumes. In September 2010 he started his PhD-research at KWR Watercycle Research Institute, which focuses on the subsurface storage of fresh water for irrigation purposes.
Additionally, he is still working on and publishing data from research on ATES and mobile contaminant plumes.

Underground thermal energy storage: Environmental risks and policy developments in the Netherlands and EU

This paper presents an overview of regulation and research aspects pertaining to the widespread implementation of Underground Thermal Energy Storage (UTES) in the EU. Our research shows that although the potential risks of UTES are only broadly known, the number of UTES systems is increasingly exponentially. This means that the sustainability of UTES as a form of renewable energy is not fully understood and, at the same time, the technology may be compromising the natural resilience of our subsurface environment. Three main issues could be addressed to secure sustainable application of UTES: 1) Scientific research is required to further elucidate the impacts of UTES on groundwater; 2) Cross-sectoral subsurface planning is required to minimize negative conflicts between UTES and other subsurface interests; 3) EU wide guidelines and standards are required for quality assurance and control when installing a UTES system.

Robert Glennon is the Morris K. Udall Professor of Law and Public Policy in the Rogers College of Law at the University of Arizona. A recipient of two National Science Foundation grants, Robert serves as Water Policy Advisor to Pima County, Arizona; as a member of American Rivers’ Science and Technical Advisory Committee; and as a commentator and analyst for various television and radio programs. Robert is the author of the highly acclaimed Water Follies: Groundwater Pumping and the Fate of America’s Fresh Waters (Island Press, 2002). His latest book, Unquenchable: America’s Water Crisis and What To Do About It, has received a Rachel Carson Book Award for Reporting on the Environment from the Society of Environmental Journalists. In 2009-2010, his speaking schedule has taken him to more than 25 states and to Switzerland, Canada, Singapore, and Australia.

Solar thermal power and water

With governments and environmental groups both clamouring for clean alternatives to fossil fuels, the future of solar energy looks bright. To date, however, solar power produces less than one percent of the U.S.’s electricity needs, and, despite unprecedented subsidies since the 2008 passage of the American Recovery and Reinvestment Act, very few utility-scale solar projects have broken ground. Solar remains an emerging technology not yet price competitive with fossil fuels, but this efficiency gap alone does not account for the lack of a burgeoning utility-scale solar market—especially when subsidies are considered. Instead, as this article explains, large land and water requirements for utility-scale solar technologies, the arduous permitting process required for proposed sites on public lands, disincentives created by a preference for agriculture, and stringent objections from politicians and environmentalists toward actually siting utility-scale solar projects, better explain the state of solar power in the United States. This article will suggest that solar companies would be wise to focus their efforts to site their projects on private or tribal lands. And, it will suggest that, if solar is ever going to contribute significantly to this country’s energy needs, we must minimize the disincentives and strike a balance between the opposing environmental goals of preserving pristine land and reducing carbon emissions.

Thursday 2nd December 2010

After-lunch session: Biofuels and water

Chair: Andrew Campbell is the Managing Director of Triple Helix Consulting Pty Ltd (http://www.triplehelix.com.au), a consultancy firm that operates in the interstices between science and policy around climate, water, energy, food and knowledge. He was Executive Director of Land & Water Australia for seven years to 2006, prior to which he was a senior executive in the environment portfolio. Andrew was instrumental in the development of Landcare in Australia and was Australia’s first National Landcare Facilitator. He is also a Visiting Fellow at the Fenner School at the ANU.

Dr Anna Dalla Marta has a PhD in Soil Science and Climatology at the University of Florence and is now a researcher at the Department of Plant, Soil and Environmental Science. Her research has examined the analysis of interactions between crop responses and meteo-climatic conditions, including in relation to different farming and management techniques. Specific studies have also been carried out to verify the
effect of solar radiation (PAR, UVA and UVB) on crop responses, on disease susceptibility and on the quality of production. A further area of research concerns the study of climate change in the Mediterranean. Dr Della Marta has developed studies on energy crops, energy and water balances for energy production and the development of short supply chains. She has also carried out life cycle assessment studies on the sustainability of biomass production and its use for the generation of energy.

Biofuels in Italy

The contribution of agro-biomasses, as a source of energy, to the reduction of greenhouse gas emissions was confirmed by several studies. Biomass from agriculture represents one of the larger and more diverse sources to exploit and in particular ethanol and diesel have the potential to be a sustainable way for replacing fossil fuels, mainly for transport purposes. However, the cultivation of energy crops dedicated to the production of biofuels presents some potential problems (competitiveness with food crops, water needs, use of fertilizers), and the economic, energy and environmental convenience of such activity depends on accurate evaluations about the global efficiency of the production system. In this work the processes related to the cultivation of energy crops were analyzed from an energetic and water cost perspective. The crops studied, maize and sunflower, were identified for their different water requirements and cultivation management, which in turns induces different energetic cost. A 50 years climatic series of 19 weather stations scattered in the Tuscany region was used to feed the crop model CropSyst for the simulation of crop production, water requirement and cultivation techniques. Obtained results were analyzed to define the real costs of energy crop cultivation, depending on energy and water balances.

Ms Naomi Pena has worked as Senior Scientist at Joanneum Research in Austria since 2008. She started work on climate change in 1989 at the Pew Center on Global Climate Change in Washington, DC and has specialized in land use, biofuels, and carbon capture and sequestration. She focuses on policy options to achieve climate objectives, but also assesses technology options, including their deployment readiness and hurdles to implementation, including costs. With a background in Regional Planning (MCRP, University of North Carolina, Chapel Hill) her approach to climate change issues and solutions, encompasses consideration of infrastructure and needs to balance economic growth with environmental goals.

Bioenergy Accounting System Options

The accounting system adopted under the Kyoto Protocol and EU Emissions Trading Scheme provides a powerful incentive to use bioenergy even if it causes reductions in carbon stocks, with consequent CO₂ emission increases. Some carbon stock reductions escape the accounting system entirely, and where they are counted, actions taken by national-level actors are likely to be counterproductive. Expert analyses and bioenergy discussions in the EU and U.S. point to the need for new approaches. Three criteria are used to evaluate approaches under the assumption that many nations will not adopt binding GHG-emission limitations in the foreseeable future.

Thursday 2nd December 2010

Afternoon session: Carbon sequestration in the landscape

Chair: Professor R. Quentin Grafton is Professor of Economics and Director of the Centre for Water Economics, Environment and Policy at the Australian National University. In 2010 he was appointed Chairholder of the UNESCO Chair in Water Economics and Transboundary Water Governance. Professor Grafton is also Co-Chair of the ANU Water Initiative. He has published more than 80 scholarly articles in some of the world’s leading journals and has authored several books, including the Handbook of Marine Fisheries Conservation and Management (2010) and the Economics of Water Resources (2009).

Dr Albert van Dijk is research stream leader with CSIRO Water for a Healthy Country. His expertise is in the influence of vegetation on natural resources and how to use satellite observations to quantify this role. He has been involved in several large projects related to national water policy. He is also lead architect of the Australian Water Resources Assessment system being developed together by the Bureau of Meteorology and CSIRO.
Biological carbon sequestration: trading water for carbon dioxide?

There is an inseparable biological link between vegetation carbon uptake and water use. As a consequence, virtually all biological measures to enhance carbon capture will draw on water resources. If water is scarce this impact needs to be considered when deciding whether biological carbon capture is desirable. Conversely, vegetation management strategies that maximise water resource generation may have an adverse impact on climate change mitigation. Tree plantings, natural regrowth, forest thinning and riparian vegetation management all affect both the carbon and water balance, but the magnitude of impact and the marginal cost in used water resource vary. The concept of water use efficiency can be applied at different levels and provides a convenient framework to explore this trade-off. Local conditions and vegetation characteristics determining water use efficiency will be explored, as well as some strategies to optimise the trading of water for carbon dioxide.

Associate Professor Peter E. Holm is soon to become a Professor in water quality at the University of Copenhagen, Faculty of Life Sciences. He is currently Associate Professor. Peter specializes in environmental chemistry, including a focus on geochemistry and speciation of trace elements and heavy metals in groundwater, polluted soil, solid waste and food plant materials. Peter is currently the Director of the faculty Water Research Initiative (ViVa), which aims to stimulate integrated water education, research and collaboration.

Soil management strategies to mitigate climate change - synergies and tradeoffs with water resource management and energy security

The Intergovernmental Panel on Climate Change (IPCC) has identified a number of soil management strategies that may be applied to reduce GHG emissions. Before deciding which of these strategies are most appropriate in a given situation it is important to investigate how these strategies affect other aspects of sustainable development. This paper discusses the synergies and tradeoffs of different soil management strategies with water resource management and energy security in Europe, both at the management level and at the policy level.

Andrew Campbell (see bio on page 3 above).

The water implications of reafforestation

This presentation will explore the types of knowledge required to help us to capture the great opportunities conveyed by the convergence of climate, energy and water as ‘issues’ of public policy concern. It will also examine how we might go about acquiring and sharing such knowledge, using contemporary case studies at a regional level. For organisations like water utilities and irrigation companies, the climate-water-energy nexus is not an abstract concept, but an everyday reality that has huge implications for business viability, right now.

Dr Barry Newell is a physicist who has an interest in (a) the dynamics of complex social-ecological systems, and (b) the way that individuals understand the way that such systems ‘work’. His research is focused on the nature of the conceptual barriers to the development of integrated research and policy. He is particularly concerned about the widespread lack of understanding of basic dynamical principles that is demonstrated daily in public debates about climate change and population growth. He is involved in the development of practical ways to help groups to build the shared conceptual frameworks necessary for effective integrative endeavours.

Friday 3rd December 2010

Morning session: Making the trade-offs

Chair: Richard Davis is currently Senior Science Advisor to the Australian National Water Commission. Richard has had an extensive career in water and environmental research with CSIRO, Australia, specializing in environmental flows, water quality, catchment management and decision support systems. He has also worked for Australian government policy departments, the World Bank, and Land and Water Australia.
**Professor Graeme Dandy** is Professor of Civil and Environmental Engineering at the University of Adelaide. He holds Bachelor and Masters degrees in Civil Engineering from the University of Melbourne and a PhD from the Massachusetts Institute of Technology. Prof Dandy is a Fellow of the Australian Academy of Technological Sciences and Engineering and is also a Fellow of Engineers Australia. Graeme is a Director of Optimatics, an Adelaide-based company that provides a consulting service to water utilities in the USA, Canada, UK, New Zealand and Australia in optimisation of the planning, design and operations of water distribution systems and sewer networks. He has published widely in the areas of water resources planning and management, optimisation of water distribution systems and the use of neural networks for forecasting water resources variables.

**Trade-offs between cost, energy and greenhouse gas emissions for water supply systems**

Both life cycle costs of water distribution systems involving pumping and life cycle carbon emissions (from both the embodied energy and electricity usage) are in direct conflict as objectives in the design of new systems. Outcomes can be a low life cycle cost-high life cycle carbon emissions solution or alternatively a high life cycle cost-low life cycle carbon emissions solution. To reduce life cycle carbon emissions, larger pipes can be selected in order to reduce the amount of pumping energy required, however, these solutions result in increased initial capital expenditure for the project. The benefits though are reduced pumping costs as well as reduced carbon dioxide emissions permanently into the future. Our research group has developed a framework to develop the trade-off curves that considers the cost-carbon emission trade-off in the design of new pumping water distribution systems.

**Ms Ashlynn Stillwell** is a PhD candidate and National Science Foundation Graduate Research Fellow at The University of Texas at Austin in the Department of Civil, Architectural, and Environmental Engineering. Her research focuses on the nexus of energy and water, both the management of resources and policy decisions. Ashlynn previously completed dual master’s degrees in Environmental & Water Resources Engineering and Public Affairs at The University of Texas at Austin and has interned for the Congressional Research Service in Washington, D.C., USA. In her spare time, Ashlynn volunteers as a Girl Scout leader in Austin, Texas.

**Water and energy policy in Texas**

Our study sought to quantify the energy-water relationship in Texas, specifically the relationship between electricity generation and water resources as it pertains to policy and society. Analysis of available data for Texas reveals that approximately 595,000 ML of water annually – enough water for over 3 million people for a year – are consumed by cooling the state’s thermoelectric power plants. At the same time, each year Texas uses an estimated 2.1 to 2.7 TW h of electricity for water systems and 1.8 to 2.0 TW h for wastewater systems— enough electricity for about 100,000 people for a year. Substantially more site-specific data are necessary for a full understanding of the nature of the energy-water nexus and the sustainability of economic growth in Texas. Greater efficiency in usage of either energy or water will help to stretch our finite supplies of both, as well as reduce costs to water and power consumers.

**Dr Barry Newell** (see bio on page 5 above)

**Climate-Energy-Water: Towards Integrated Policy**

Policies designed to help Australians mitigate and adapt to climate change will have serious implications for the energy sector. The sector, however, does not operate in isolation, but is an integral part of the wider social-ecological system. In particular, there are strong energy-water interactions. In such circumstances we need integrated policies that take into account the dynamic complexity of the climate-energy-water system.

Policy integration is challenging, due to the complexity of the system and the inevitable conceptual, social and political barriers. The probability that such endeavours will produce genuinely integrated policies depends directly on the extent to which the discussants develop shared conceptual frameworks. The focus of this presentation will be on a practical approach to the construction of such frameworks. This approach, which is based on concepts from dynamical systems theory and ‘second generation’ cognitive science, can help researchers and policy makers overcome conceptual barriers to integration.
James Bennett is a hydrologist at Entura (formerly Hydro Tasmania Consulting) who specialises in assessing water availability in a changing climate. James has been seconded to the Antarctic and Climate Ecosystems Cooperative Research Centre for the past 18 months as the water and catchments analyst for the comprehensive regional climate study Climate Futures for Tasmania. James also contributed to the other major hydroclimatological study conducted for Tasmania, the CSIRO Tasmania Sustainable Yields project. In addition, James has consulted on numerous yield studies for hydropower developments.

**Hydropower generation in a changing climate: bridging the gap between climate projections and operational decisions**

Accurate assessments of future inflows under a changing climate aim to make decisions on how hydroelectric power schemes are operated in the long-term. Hydro Tasmania, Australia’s largest renewable energy generator, has recognised the risks posed by anthropogenic climate change and responded by supporting leading-edge climate research since 2003, culminating in the Climate Futures for Tasmania project (http://www.acecrc.org.au/drawpage.cgi?pid=climate_futures). This research indicates that the power generation capacity of the Hydro Tasmania system is likely to decrease in future. Hydro Tasmania is now incorporating the results of this research into its operations. This presentation describes the nature of the climate research, how the research was tailored to Hydro Tasmania’s needs and how Hydro Tasmania is adopting the findings of this research in practical ways.

Mr Jamie Pittock is Program Leader for the Australia and United States Climate, Energy and Water Program, a joint collaboration between the United States Studies Centre and the ANU Water Initiative. He is also Director of International Programs for the UNESCO Chair in Water Economics and Transboundary Water Governance at the ANU Crawford School of Economics and Government. Mr Pittock has a background in zoology and geography and has worked for various non-government environmental organisations in Australia promoting nature conservation, including as director of WWF’s Global Freshwater Programme from 2001 to 2007. From 2007 to 2010 Jamie was a WWF Research Associate undertaking PhD research on freshwater ecosystems and climate change at the ANU Fenner School of Environment & Society.

**Integrating national policies**

Most public debate on water has focussed on the direct impacts of climate change. However, there is growing evidence that climate change policies themselves may have substantial additional and negative impacts on water. In this assessment national climate change policies from Australia, Brazil, the European Union (EU), India, Mexico, South Africa, Tanzania and the United Kingdom were assessed to (i) identify where negative trade-offs may exist between climate change policies and freshwater resources, and (ii) analyse where institutions and structures exist to optimize integration between climate, water and biodiversity policies. Success factors identified for better policy development identified in this assessment and synthesis include engagement of senior political leaders, cyclical policy development, multi-agency and stakeholder processes, and stronger accountability and enforcement measures.

---

Friday 3rd December 2010

After-lunch session: Perspectives from key sectors

**Chair:** Professor Robert Hill (see bio on page 1 above).

Alan Smart is the Marketing Director and Principal Consultant working in the Canberra office of ACIL Tasman. He advises economics policy and strategy in the energy and resources sectors. Alan consults in energy and water markets and has authored a number of prominent reports on energy markets, energy resources and infrastructure in recent years. Alan has undertaken a number of projects addressing water and electricity sectors including authoring a report on water and electricity for the National Water Commission and providing commentary and advice to the commission on urban water and energy interactions. Alan is qualified in Engineering and Economics. He is also a Member of the Board of the Tasmanian Economic Regulator and Chairman of the Spatial Industries Business Association.

Adam Aspinall is Principal and Brisbane Operations Manager with Evans and Peck, an international infrastructure-based advisory company and consultancy. Adam has 30 years experience in the Australian and International electricity industries. His expertise includes project feasibility analysis, strategic project planning and power station operation and maintenance. Recent experience includes major contract
negotiation for fuel supplies, feasibility studies, approvals and financial close of major Power Station and renewable generation projects across Australia. He has also recently assisted in developing the business case for a major Carbon Capture and Storage Project.

**Looking at the energy-water nexus in Australia: The Waterlines report**

The report was prepared for the National Water Commission Waterlines series. It examines the potential impacts of changed water availability on the Australian electricity industry with the aim of facilitating informed consideration of future options for managing water. It also looks at the role of current and planned reforms in water, electricity and carbon markets in determining the most suitable and effective water management options. Ongoing drought conditions and lower water inflows in some parts of Australia may reduce the water available to electricity generators, and increase the risk that there will not be enough electricity generation capacity to meet demand in some regions. In the longer term, continued growth in electricity demand will require additional investment in thermal power stations, such as coal-fired, gas-fired, geothermal and solar thermal generators, which are reliant on water for cooling purposes. There is a trade-off between dry cooling and sent out efficiency that has implications for the relative competitiveness of different generation technologies as well as emissions.

**Mr James Cameron** is the Acting Chief Executive Officer of the National Water Commission. Prior to his appointment as Deputy Chief Executive Officer in October 2009, he held a number of senior management roles in the Australian Government’s communications portfolio, including responsibility for telecommunications, broadcasting, information and communications technology and arts and sport policy. James holds a Bachelor of Arts (Honours) degree and a Graduate Diploma in Legal Studies.

**Professor Stephen Dovers** is the Director of the Fenner School of Environment and Society. Professor Dovers has published over 200 articles, books, chapters, papers and reports on the theoretical and policy dimensions of sustainability, institutional arrangements for resource management, science-policy linkages, climate change adaptation, and Australian environmental history. He serves on the editorial boards of *Global Environmental Change, Environmental Science and Policy* and the *Australasian Journal of Environmental Management*. Professor Dovers has also acted as consultant and adviser to a range of private and public sector bodies.