**Australia – United States Climate, Energy and Water Program**

Policy Forum

6 December 2010, University of Melbourne

**Speaker biographies and abstracts**

---

**Monday 6th December 2010**

**Morning session: Introduction**

**Professor Mike Sandiford** is Director of the Melbourne Energy Institute at the University of Melbourne. Mike is an ARC Professorial Research Fellow studying tectonic activity within the Indo-Australian tectonic plate, particularly focusing on the factors that have shaped the landscape of Australia, and in our near northern neighbors such as Timor and Indonesia. He was the recipient of the Mawson Medal by the Australian Academy of Sciences in 2004 for ‘outstanding contributions to Australian Earth Science’, and has twice been awarded the Stillwell medal by the geological Society of Australia for his published work.

Mike will welcome guests to the Melbourne policy forum (5 mins).

**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.

Jamie will introduce the AUSCEW Program and the purpose of the Melbourne policy forum (5 mins).

**Mr David Downie**, of the Victorian Department of Sustainability and Environment, will provide opening comments (5 mins).

---

**Monday 6th December 2010**

**Mid-morning session: New energy sources, new challenges**

**Chair: Snow Barlow** is Professor of Horticulture and Viticulture, and is Associate Dean (Strategic Relationships) at the Melbourne School of Land and Environment. His research expertise ranges from plant physiology and environment determinants of grape growth and wine quality, Australian viticultural terroirs, water use efficiency, and impact of climate change on Australian agricultural systems. His other professional interests include science policy, particularly economic, social and environmental returns on R & D investment, and greenhouse and climate change, particularly as it relates to water and landscape management. He is currently President of the Federation of Australian Scientific and Technological Societies (FASTS) and a member of Prime Minister’s Science, Engineering and Innovation Council (PMSEIC).

**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 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.

Roger Dargaville is a climate change research fellow in the School of Earth Sciences at the University of Melbourne and an energy analyst in the Melbourne Energy Institute. His research areas are optimization of large-scale renewable energy systems, the global carbon cycle and stratospheric chemistry. His energy research looks at combinations of different generating technologies over large geographic regions to meet demand at lowest cost while accounting for the short-term variability. Prior to returning to Melbourne in 2008, Roger worked at the International Energy Agency on the Energy Technologies Perspective 2008 publication, and at UNESCO in Paris.

Robert will present data on the water consumption of various energy technologies, including conventional thermal power as well as next generation solar, geothermal and coal and gas by carbon capture and storage capability. Taking into account the likely transition from the current electricity generating system to a low carbon emitting system, we will examine the volume and quality of water required, the characteristics of the typical locations of the technologies and associated water constraints. With an increasing population and energy demands, we will extrapolate water requirements into the future, identifying potential supply issues. We will also describe the Melbourne University energy system optimization framework, and will discuss options for modeling water in the same framework.

Morning tea break

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 of 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.

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.

Monday 6th December 2010

After-lunch session: Making the trade-offs

Chair: Mr Jamie Pittock (see bio on page 1)

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.

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.

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.

---

**Afternoon tea break**

Professor Lee Godden researches and teaches within the Melbourne Law School. She is the Director of the Centre for Resources, Energy and Environmental Law (CREEL). Her research interests include environmental law, natural resources law (especially water) property law and indigenous peoples’ land rights. The impact of her work extends beyond Australia with comparative research on environmental law and sustainability, property law and resource trading regimes, water law resources and Indigenous land rights issues. Engagement with the theoretical and the grounded aspects of law is a hallmark of her scholarship distinguished by an interdisciplinary approach. She maintains a focus on legal theory, drawing on her background in law and geography.

Jacqueline Peel is an Associate Professor at the Melbourne Law School and an Associate Director of CREEL. Her research interests are in the areas of environmental law (domestic and international), risk regulation and the role of science, and international trade law. In the last few years Jacqueline has expanded her research to focus on the emerging field of climate change law. She also secured a US Studies Centre grant in 2009 to undertake a comparative analysis of Californian and Australian climate change law. These projects augment Jacqueline’s existing publications and teaching in the fields of environmental and climate change law. Together with Lee Godden, she is the author of a major work on Australian environmental law: Environmental Law: Scientific, Policy and Regulatory Dimensions (OUP, 2010).

**Law and Policy Aspects of the Climate/Water/Energy Nexus: the Adequacy of Environmental Impact Assessment Laws**

Environmental impact assessment is the primary policy and legal tool used in Australia to assess and manage projects with potential environmental impacts. At the national level the relevant legislation is the Environment Protection and Biodiversity Conservation Act 1999 which requires the assessment and approval of projects with significant impacts on designated matters of national environmental significance. Currently the Act does not include a reference to climate change or greenhouse gas emissions as a matter of national environmental significance. Nevertheless, cases brought before the federal court have attempted to link the impacts of greenhouse-intensive projects, such as coal mines, to impacts on matters within the protection of the Act including marine areas like the Great Barrier Reef. This presentation will examine the adequacy of federal environmental impact assessment law for managing the nexus between climate change, energy projects and other environmental resources.
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.

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.