VCCCAR think tank report

Incorporating climate change impacts and adaptation into capital investment decision-making

presented by the La Trobe Institute for Social and Environmental Sustainability

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Executive summary

- La Trobe University has stated its determination to make sustainability a central principle of its organisation. The University recognises that climate change, unsustainable resource use and increasingly inequitable access to the benefits of economic development are some of the major challenges that have to be tackled on a global scale. Issues of sustainability and social responsibility will affect everyone now and in the future.
- The La Trobe Institute for Social and Environmental Sustainability, led by Professor Carol Adams, seeks to take a multidisciplinary approach to these issues, and was pleased to organise this thematic Think Tank in conjunction with the Victorian Centre for Climate Change Adaptation Research. The organisers aimed to take a multi-disciplinary and multi-stakeholder approach to the incorporation of climate change impacts and adaptation into capital investment decision-making. Bringing together researchers, government, industry and the community to articulate the problem and possible solutions, the Think Tank was an important stage in the development of a wider research agenda on these issues.
- Capital investment in transport, roads, health, water and electricity, amongst other sectors, is significant both in dollar terms and in its potential to interact with climate change adaptation strategies. In circumstances of limited economic resources for such investment, the general lack of formalised approaches to assessing the social, environmental and economic impacts of capital investment projects is of particular concern.
- The Think Tank aimed to contribute to existing knowledge whilst identifying gaps in knowledge and current practice as priority areas for future research and policy development.
- The backgrounds of participants in the event included a mix of public and private sectors, researchers and practitioners, policy-makers and policy-implementers, and other interested parties. Although this meant that the Think Tank necessarily covered a wide range of issues, it also meant that different perspectives were represented.

Key Conclusions

- The nature of investment in the energy and water sectors will impact on the extent of production of greenhouse gases and on the capacity of these production systems to respond to the impacts of a changing climate.
- Long-term time horizons of many climate change impacts emphasises the importance of planning and investment today. This applies both to critical infrastructure such as water and energy, and to the regeneration of housing and local neighbourhood infrastructures.
- There is a need for better quality, relevant, and specific information about likely climate change impacts and about adaptation measures (including successful ones).
- Increased frequency and severity of extreme weather events will necessitate changes in many areas of policy, including standards, regulations, and legislation. Policy leadership is an essential element of climate change adaptation.
- Experience to date indicates that significant benefits (financial, social, and environmental) can be yielded if the right investments are made.
- In the housing sector, much of our current infrastructure will be significantly degraded by the effects of climate change and that this will lead to other negative consequences – especially for human health.

Recommendations for policy

1. That government implement improved consultation and communication for infrastructure policy and planning, particularly with regard to identifying qualitative environmental and social impacts and benefits of alternative capital investment options.

2. That government provide mechanisms for consideration of social and environmental impacts and benefits in infrastructure decision making.
3. Significant financial resources are required to upgrade infrastructure. Government and industry should develop and use holistic assessment techniques, procedures and processes to ensure that the range of benefits from proposed investments are captured. These can include:
    - Better economic models and better financial quantification of impacts and benefits incorporating appropriate discount rates. High discount rates tend to push costs onto future generations and minimising the effect of long-term benefits on current decisions.
    - Improved formal assessment techniques that provide for the assessment of the broader worth of many projects.
4. More research is required to assess the wider benefits from investment in infrastructure renewal in the housing sector.

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Purpose and objectives

Introduction

The basis for this report was the VCCCAR sponsored Think Tank *Incorporating climate change impacts and adaptation into capital investment decision-making*, presented by the La Trobe Institute for Social and Environmental Sustainability at La Trobe University on October 7, 2010. The key purpose of the Think Tank was to contribute to the process of refining ways to incorporate the costs and benefits of climate change impacts into the assessment of capital investment infrastructure proposals. Key areas where these issues are important include transport, roads, health, water and electricity. Because organisations act in situations of constrained economic and environmental resources, there is a practical need to develop ways to weight and balance competing issues and perspectives. The aim of the Think Tank was to consider how such constraints and priorities are – and should be – dealt with.

We aimed to elaborate and build upon existing knowledge and experience of speakers and participants, identifying knowledge gaps, key issues of concern, and areas for improvement. An objective over time is to inform priority-setting for future research and development, encouraging the formation of new collaborative activity through cross-sectoral learning.

Ideas canvassed at the Think Tank encompass different sectors and types of organisations, including local Councils, water authorities, government Departments and Agencies, and others. A common factor of interest amongst participants was that all are involved in the development of long-lasting infrastructure with potentially high environmental impact.

Particular efforts were made to ensure that the discussion – and the outcomes – are relevant across sectors. It was widely agreed that there is an urgent need for leadership and vision at organisational and government levels. Adaptation measures are unlikely to emerge without a significant push from policy, regulation, systemic incentives, and better techniques for understanding, assessing, and communicating climate change impacts. In recognition of this, and to further develop these themes, the Office of the Pro Vice-Chancellor (Sustainability) at La Trobe University conducted an Academic Symposium and a multi-stakeholder Business Forum on Leadership for Climate Change and Sustainability on 28th February and 1st March 2011 respectively (see www.latrobe.edu.au/sustainability).

Intended outcomes and time horizon

The Think Tank was intended to assist participants (and their organisations) to understand the interplay of economic and natural systems with human and social systems. Specifically, the management of the climate change impacts of organisational activities in the immediate time horizon, and the development of more appropriate responses to environmental issues in the long term, should be enhanced.

Over time, ideas generated at the Think Tank may be further developed into practical measures, assisting organisations to maximise the total lifetime benefits of capital investments. Over the longer term, the Think Tank will contribute to the development of a formal process for incorporating social, environmental and economic impacts into the assessment of alternative capital investment options. This approach will seek to encapsulate both monetary (quantifiable) and non-monetary (non-quantifiable) factors.

The informed balancing of social, environmental and economic factors will help avoid mal-adaptive decisions and negative environmental impacts. These approaches have the longer-term potential to contribute to a transformation in thinking in relation to public and private utilisation of land, water, mineral, energy and other resources.

Significance

In assessing capital investment proposals in a situation of constrained natural and financial resources, it is increasingly important to actively work to minimise deleterious environmental impacts while addressing a range of stakeholder interests and concerns.

Development of a formal process for holistic and integrated impact assessment will address key limitations of existing informal (or non-existent) processes. This has the potential to significantly enhance traditional accountability processes that are often constrained by attempts to quantify or monetise all factors and produce a single "bottom line".

In recent research in this area there is an emerging emphasis on the importance of dialogue and participation in organisational processes, recognising the potential of various accounting technologies to facilitate the foregrounding of significant issues. This must be done in a way that makes meaningful consideration of competing interests and priorities possible without foreclosing the possibilities of producing broadly acceptable outcomes.

The outcomes should contribute to the development of approaches to assist public and private sector organisations to balance competing perspectives and interests in the context of capital investment decision-making. It is increasingly being recognised that it is no longer in the interests of organisations or their stakeholders to base capital investment decisions primarily on expected short term economic returns. The historical neglect of long term environmental impacts and associated social impacts is not sustainable.

On the day

Participants were welcomed to the Think Tank by Professor Carol Adams and Assoc Professor Gordon Boyce.

Assoc Professor Boyce outlined the team's aims in organising this Think Tank, primarily relating to initiating and consolidating the development of links among and between participants, and moving the broad climate change adaptation and sustainability agendas forward through better understanding the implications of climate change and adapting to it. As an academic institution, La Trobe, and especially researchers associated with the La Trobe Institute for Social and Environmental Sustainability are keen to further this agenda into the future through undertaking collaborative research with a range of external partners.

Professor Rod Keenan, VCCCAR Director, briefly outlined the background and aims of VCCCAR and the series of VCCCAR-sponsored Think Tanks. He emphasised the desire to build partnerships across a range of interested parties and organisations. The key purpose of sponsoring the Think Tanks is to encourage multidisciplinary academic and government research and to develop recommendations to progress the objectives of VCCCAR.

Final program

Incorporating climate change impacts and adaptation into capital investment decision-making

The Chamber, John Scott Meeting House, La Trobe University, 7 October 2010

10.00 – 10.30 am	Registration and Morning tea
10.30 am	Welcome and opening
10.35 – 11.15 am	Session A: Group discussions - Current practice within participant organisations - Areas where participants would like to see improvements
11.15 –11.45 am	Session B: Groups report back
11.45 am – 12.45 pm	Session C: Panel presentations Q & A with Panel, including *John Dyer, Technical Executive – Strategic Consulting, Parsons Brinckerhoff* *Daniel Voronoff, Senior Policy Officer – Climate Change, Department of Human Services*
12.45 – 1.45 pm	Lunch
1.45 – 2.15 pm	Session D: Keynote presentation *Kate Auty, Commissioner for Environmental Sustainability, Victoria* "Understanding the Victorian community appetite for useful and place-based information"
2.15 – 2.45 pm	Session E: Keynote presentation *Francis Pamminger, Manager – Research & Innovation, Yarra Valley Water* "The Yarra Valley Water Capital (Sustainable) Investment Framework"
2.45 – 3.15 pm	Session F: Panel discussion and Q&A session (Keynote speakers and Panel members)
3.15 – 4.00 pm	Session G: Summary of discussions - Changing practices and priorities
4.00 pm –	Closing remarks, followed by networking drinks

List of participants

1. Margaret Abbey, Chief Executive Officer, Murrindindi Shire Council
2. Kate Auty, Commissioner for Environmental Sustainability
3. Sue Chaplin, School of Public Health, La Trobe University
4. Jen Chaput, Environmental Sustainability Manager, Infrastructure and Operations Group, La Trobe University
5. Rebecca Connell, Sustainability Coordinator, Strategic Planning, Melbourne Water
6. Jerry Courvisanos, Associate Professor, School of Business, University of Ballarat
7. Lin Crase, Professor and Executive Director, La Trobe University Albury–Wodonga
8. Chloe Duncan, Senior Policy Officer, Sustainable and Active Transport Policy Branch, Department of Transport
9. John Dyer, Technical Executive, Strategic Consulting, Parsons Brinckeroff
10. Tara Frichitthavong, Manager Community Services, Nillumbik Shire Council
11. Susan Gillett, Executive, Infrastructure Policy, Department of Treasury and Finance
12. John Houlihan, Team Leader: Adaptation Science & Information Environmental Policy and Climate Change Division, Department of Sustainability and Environment
13. Rod Keenan, Director, Victorian Centre for Climate Change Adaptation Research, University of Melbourne
14. Steven Lakotij, Business Advisor, Enterprise Connect Manufacturing Centre – Victoria, Department of Innovation, Industry, Science & Research
15. Jeslyn Lu, Finance Manager, Sin Han Yangtze Plaza (Singapore) Pty Ltd
16. Robyn Major, City of Greater Bendigo
17. Jane Mullet, Research Fellow, Climate Change Adaptation Program, Global Cities Research Institute
18. Philip Norman, Senior Economist, Economics and Transport Modelling Branch, Policy and Communications Division, Department of Transport
19. Francis Pamminger, Manager Research & Innovation, Yarra Valley Water
20. Jonathan Power, KPMG
21. Jane Poxon, Senior Policy Adviser, Climate Change Branch, Department of Premier & Cabinet
22. Scott Rawlings, Manager, Environmental Monitoring & Analysis, Office of the Commissioner for Environmental Sustainability
23. Rob Roggema, Visiting fellow, VCCCAR
24. Gillian Vesty, Lecturer in Management Accounting, Department of Accounting and Business Information Systems,
25. Daniel Voronoff, Senior Policy Officer – Climate Change, Integrated Planning Branch, Industry, Workforce & Strategy, Department of Human Services, Victoria
26. Rae Walker, School of Public Health, La Trobe University

Profiles of key speakers

Kate Auty, Commissioner for Environmental Sustainability, Victoria

Dr Kate Auty (PhD, MEnvSc, BA(Hons), LLB) has an extensive legal and academic background. She was appointed a Victorian Magistrate in 1999, establishing the first Victorian Koori Court and acting as inaugural Koori Court Magistrate; and she served as a Magistrate in Western Australia 2004–2009.

She has undertaken a number of consultancies including a project on local government and climate change for the National Environmental Law Association.

Prior to her appointment in June 2009 as Commissioner for Environmental Sustainability, Dr Auty was a Charles Joseph La Trobe Fellow with the Centre for Sustainable Regional Communities, La Trobe University. She also served as Chairperson of the Victorian Ministerial Reference Council for Climate Change Adaptation and as a member of the Premier's Reference Group on Climate Change. Dr Auty recently accepted an appointment as Adjunct Professor in the School of Law within the Faculty of Law and Management, La Trobe University.

Keynote presentation: *Understanding the Victorian community appetite for useful and place-based information*

- Work to develop methodologies for generating informed collaborations for public conversations about sustainability, so that the community appetite for useful and place-based information about climate change can be understood *and acted on by* incorporating sustainability into planning and practice.

Francis Pamminger, Manager – Research & Innovation, Yarra Valley Water

Francis Pamminger has 30 years experience in the water industry and fourteen years with Yarra Valley Water. He has qualifications in Civil Engineering, Engineering and Water Supply, Water Resources, and Business. He has a diverse range of professional experience spanning groundwater projects, flood studies, yield analyses, and environmental flows, together with his present experience in the urban water industry.

Key achievements include managing the conceptual design for Victoria's first third pipe system at Aurora, a urine separating toilet trial at Kinglake, the stormwater harvesting and reuse project at Kalkallo – potentially for potable use, and being the recipient for the International Water Association's runner-up in the Sustainability Specialist Group Prize for Research Excellence in 2008 and 2010.

Francis is also a member of the Environmental and Sustainability Board of the Water Services Association of Australia, Victorian Water Sustainability Task Group, RMIT Centre for Design Advisory Committee, and Smart Water Technical Reference Committee.

Keynote presentation: *The Yarra Valley Water Capital (Sustainable) Investment Framework*

- The importance of sustainable outcomes for a water company
- The Capital (Sustainable) Investment Framework
- Business benefits.

John Dyer, Technical Executive – Strategic Consulting, Parsons Brinckerhoff

John Dyer is a Technical Executive with Parsons Brinckerhoff (PB). He is an experienced manager with a range of technical, commercial and regulatory experience. John primarily consults to energy businesses in the area of asset investment decision making. He has tertiary qualifications in electrical/electronic engineering and management.

Over the past four years John has been involved in both preparation of company submissions to economic regulators and the assessment of submissions as an independent expert on behalf of the regulator in both electricity and gas reviews. He has also been involved in the development of regulatory guidelines and has experience in compliance reviews. In addition to his regulatory experience, John has strong asset management experience including the development of strategic asset management plans and his work on asset strategies from forecasting through to implementation.

PB is a leading planning, environment and infrastructure firm whose work in this region encompasses spans infrastructure projects in transport, power, renewable energy, urban development, water, and resources and industry. It is involved with strategic consulting, environmental studies, design, construction management, and project and program management.

Panel presentation

- The process of capital investment decision making in a regulated environment, with reference to recent work undertaken for the Energy Networks Association, taking into consideration the perspectives of businesses that are regulated by an economic regulator (primarily electricity and gas).

Daniel Voronoff, Senior Policy Officer – Climate Change, Integrated Planning Branch – Industry, Workforce & Strategy, Department of Human Services, Victoria

Daniel Voronoff is currently the Senior Policy Officer, Climate Change in the Department of Human Services. The role is to represent DHS in the Victorian Climate Change strategy and develop the department's approach to adaptation. He has worked as an environmental advocate on a number of environmental issues and on innovative behaviour change programs across Victoria.

Panel presentation

- Issues and drivers around climate change adaptation in the Department of Human Services portfolio; pointers to capital investments that need to be made across this broad area.

Further detail of the content of each presentation and associated discussion is provided in the next section.

Keynote presentations and discussion

"Understanding the Victorian community appetite for useful and place-based information" (Session D)
Dr Kate Auty, Commissioner for Environmental Sustainability, Victoria

Kate opened her presentation by commenting that recent fires and floods had provided a profound reminder both of the need to respond to extreme events and of our general lack of preparedness for such events. This provided an indication of the importance of developing our capacities for adaptation to climate change. Specifically, there is a need to find ways to deal with extreme weather events, given the likelihood of more such events in the future.

Climate change adaptation necessitates critical infrastructure planning, and this will involve a range of organisations including local government authorities, water authorities, Auditors-General, and the insurance industry, as well as the community at large. There are some moves to adapt the planning approaches that were developed in response to the contemporary emergence of terrorist threats to the climate change arena.

The Office of the Commissioner for Environmental Sustainability seeks to work closely with a range of organisations and groups in this arena. Work with local government is especially important as it aims to enhance their capacities to invoke the principles of ecologically sustainable development (ESD) in their decision making processes. Local government authorities are involved in a diverse set of concerns and many of their core activities carry energy, waste, and water-use implications. They also undertake major projects – many involving large engineering problems and solutions (roads, bridges, etc.) – in a dynamic environment which sometimes includes changing influences at Council level (including changes of direction and leadership). At the same time, they must work in a financially constrained environment (limited rates, fixed government grants, specific-purpose grants; and, often, short-term time horizons). Sustainability reporting and the application of GRI Principles, for example, can help give visibility to environmental issues, but there are a range of competing pressures.

State of the Environment (SOE) Reports represent one important tool to assist in the task of incorporating ESD principles, but, in general, councils are reluctant to support the mandatory adoption of SOE reporting because of the costs involved in preparing reports. This gives rise to a range of issues that also reflect on the State Government. Is government prepared to adequately fund local government to fulfil their roles in relation to environment, sustainability, and climate change?

Local government is well placed to undertake meaningful community consultation, but, again, this requires an adequate funding base to carry out this task effectively.

Climate change raises awareness of the need to rethink engineering solutions, because traditional attempts to control environmental effects may not provide adequate solutions in the face of extreme weather events. There is a need to plan for uncertainty, and traditional risk abatement measures are unlikely to be adequate. For example, it is unlikely to be satisfactory to try to simply increase the height of flood levee banks – there is a need to also plan what will happen if (and perhaps when) a flood level reaches a certain height above whatever the levee height is. Therefore, this involves more than risk management; it requires planning for levels of uncertainty.

Is local government sufficiently flexible to deal with these issues? Probably not. Traditionally, local government has been content to limit themselves to adherence with prescribed standards – but the standards have not, themselves, caught up with the realities of climate change.

There is a need for more interaction between organisations to develop new approaches to doing things; otherwise changing the way things are done becomes just too difficult.

This brings us back to the work of the Commissioner for Environmental Sustainability to develop methodologies for generating *informed collaborations* for *public conversations about sustainability*. There is s need to understand how the community sees climate change issues and a community appetite for useful and place-based information about climate change. We need to turn our aspirations and opportunities into

accomplishments, but we also need to develop clear ways to understanding and communicate what both our aspirations and accomplishments are.

"The Yarra Valley Water Capital (Sustainable) Investment Framework"
(Session E)

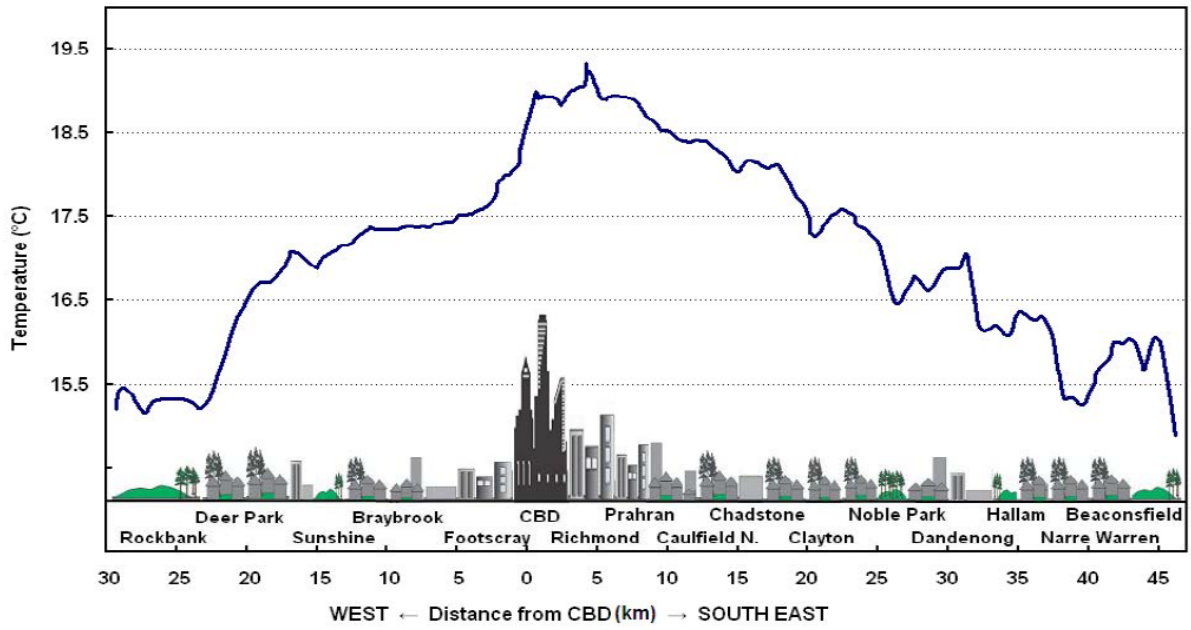
Francis Pamminger, Manager – Research & Innovation, Yarra Valley Water

Francis opened his presentation with the idea that he was involved with the task of "delivering the cities of the future". At Yarra Valley Water, Francis is involved in developing ways to think differently about the provision of water and wastewater services. Because the design life of water infrastructure is around 100 years, infrastructure investments today will affect the way cities look – and work- well into the future, even as other changes occur in the 100-year time frame.

Water presents significant challenges because it is essential for life, but availability of potable water is declining just as demand for it is rising. Wastewater presents equally challenging issues because of the need to consider the quality of discharges to the environment. The nutrient content of wastewater (for example nitrogen, phosphorus) is an outcome of a production and consumption chain that includes the use of fertilizers in the production of food that is eventually cycled into waste in various forms. In turn, because wastewater has significant environmental impacts, discharges must be treated, but this treatment itself has environmental impacts in terms of energy consumption. Metals and pharmaceutical discharges (use of both, and associated waste, is increasing) in wastewater present another set of challenges. Thus, there is an intense interrelationship between water, energy and nutrients.

Climate change has significant implications for the carrying capacity of our suburban spaces. A range of issues must be considered – not the least of which is the replacement of aging infrastructure (such as pipes and drains). Other issues include the "urban heat island" – as suburbs are more building and concrete intensive and there are less green spaces, more heat is generated and retained (see diagram, reproduced below). This, in turn, can generate negative health impacts (including increased mortality). Stormwater management also becomes more challenging, because in the more intensive built environment (more concrete), a greater quantity of stormwater runoff is generated (increased again by more extreme rainfall events).

Temperatures at 1am on 23 March 2006



Cities currently use about half of the flow of water in our rivers, and discharge significant levels of nutrient back into those rivers, generating damage to natural wetland systems.

Dealing with these issues is essential for businesses (no less for Yarra Valley Water), because companies that fail to deal with them will not be here in the long term. Success must be thought of as sustainability *and* business value, which requires climate change planning to be incorporated into business strategy, working across conventional organisational boundaries. Better environmental outcomes are possible.

The concept of "zones of stewardship" can help avoid becoming overwhelmed by the issues of sustainability at a global level. This involves clarity about what we *control* (immediate level), what we can *influence* (often, indirect impact), and what we *care about* (but have little direct influence over). Responses should be tailored according to organisational capacities ain these zones.

Francis provided detailed case studies drawing on the Yarra Valley Water experience with the Kinglake West Sustainable Servicing Project and the Kalkallo integrated water management strategy. Both projects sought to deliver more sustainable results working across the urban water cycle in a new infrastructure development.

Key features included:

- Use of detailed quantification techniques where possible to present "objective values" – helping the corporate board make investment decisions.
- Adoption multi-criteria analysis revolving around economic, environmental, and social dimensions.
- Consideration of all externalities, and how to account for future flexibility.
- Handling of uncertainty using multiple approaches centred on probabilistic analysis.
- Determination of total community cost and tested "resilience" with sensitivity analysis.
- Recognise that high discount rates can effectively transfer risk to future generations.
- Keep all viable options remain "on the table" for ongoing assessment – do not lock into one option too early.
- Incorporation of as many stakeholders as possible – talking within and across organisational boundaries to integrate different perspectives Overcome institutional inertia by discussing issues and familiarising people with them.
- Adopt a community building attitude to leadership at all levels.

Significant gains were produced by these projects including:

- Increased economic savings (up to 20%)
- Reduced wastewater discharges (by up to 50%)
- Reduced nutrient discharges (up to 80%)
- Reduced greenhouse gas emissions (30%)
- Increased reliability in water supply (from 90% to 100%)
- Reduced imported water (by up to 90%)
- Decreased urban runoff (by 45%)
- Decreased nutrient discharge (by 25%)
- Reduction in energy use (75% less energy)
- Cost recovery within a 25 year period.

A range of challenges are ongoing, including the absence of a clear external driver – incentives are still needed. There is not a common method to identify externalities, nor to account for future flexibility, so assessment of options remains difficult. Nevertheless, the articulation of common goals into a Sustainability Assessment Framework at Yarra Valley Water has yielded positive environmental and business outcomes.

Panel presentations

(Session C)
Speakers

John Dyer, Technical Executive – Strategic Consulting Parsons Brinckerhoff
Daniel Voronoff, Senior Policy Officer – Climate Change, Department of Human Services

John Dyer discussed the impact of climate on Australian energy networks. Impact in this domain encompasses two broad areas:

(1) Direct impacts on the networks themselves – they are essentially in the business of transporting energy;
(2) Indirect impacts that result from changes in patterns of energy use and energy generation.

In 2008 Parsons Brinckerhoff (PB) was commissioned by Energy Networks Australia (ENA – comprising all Australian electricity and gas transmission and distribution businesses) to assess the likely costs to ENA members of both climate change adaptation and mitigation measures. PB assessed key risks in relation to each asset type by region, developed a set of "typical" responses to the identified risks, and quantified the risks.

The expected cost (to the energy networks) of adapting to climate change over the next five years has been estimated to be around $2.5 billion. This is driven by both of the impacts above, but is dominated by changes in patterns of use (for example, the rise in the use of air conditioning systems in a hotter climate). Changes in patterns of use (that is, by electricity consumers) are not particularly price sensitive.

The above cost must be placed in the context of the current spending of energy companies, in which light it is not an unreasonably large sum. For example, Energy Australia currently spends about $1 billion each year on its network.

Subsequent work commissioned by electricity businesses in Victoria found that, in the next five years:

"… the likelihood of climate change effects over the medium to longer term … [does] not demonstrate any material shifts in asset ageing or deterioration nor in operating conditions sufficient to materially alter the expected future demand or power system capability …"

In Australia, the regulatory process is managed by the Australian Energy Regulator (AER). The AER does not consider the issue of climate change adaptation per se, but works from a position that energy businesses should be able to recover their costs through energy pricing. Therefore their asset base and forecast asset base is considered in terms of generating a return *on* capital and a return *of* capital (depreciation). As part of the regulatory (pricing) cycle, energy businesses propose a business case to the AER, which responds on the basis of what it considers to be a reasonable business case.

The AER's considerations include assumptions about efficient operation of an energy business (creating incentives to provide service to consumers and to spend prudently and efficiently), but it does not consider long-term impacts of climate change that are not measurable in the short term (where the latter is defined as the five-year regulatory cycle). In the latest AER draft decision, no extra costs for climate change adaptation were incorporated in energy pricing for the next five years (2011–2015), because any projected impacts are regarded as long terms and not measurable in the short term. There is a low expectation from the AER that climate change will require large expenditure in the next five years. Thus, the "bar" for cost assessments and pricing decisions has been set quite high, and any changes that affect planned expenditure by energy businesses will require strong justification to the AER.

Daniel Voronoff discussed the broad impacts of climate change in his portfolio areas of housing, disability services, children, youth and families, and emergency recovery.

In the area of housing, there are more than 85,000 public and social housing units in Victoria, with 6000 new premises to be constructed by 2012. Of the total public housing portfolio, 68% is located in metropolitan Melbourne (32% regional), and around 30% is over 30 years old. Affordable and quality public

housing responds to a significant social need, providing an essential service to low income citizens and those who are homeless or at-risk. Analysis of the profile of public housing tenants shows that 10% are unemployed and a further 74% receive some form of income support. Single parent households comprise 23% of public housing tenants, with single persons 49%.

This profile presents multiple and complex needs. Longstanding and ongoing challenges are made even more complex by the likely impacts of climate change. A 2007 report prepared for the Victorian Government found that buildings infrastructure in Victoria is at significant risk from climate change impacts (see table partially reproduced below). Impacts include both damage from extreme events and increased degradation. An NCCARF/CSIRO study found that material degradation and structural degradation were significant issues.

The idea of "asset performance" is one way to capture some of the likely consequences. For example, climate change may result in a degradation of housing infrastructure; there are significant health risks that flow from poorer quality housing stock. This introduces a significant "vulnerability of place" in terms of where people live.

An issue to be confronted within the Department of Human Services is how to move from general overviews like the infrastructure and climate change risk assessment to the on-the-ground reality of day-to-day work dealing with issues of housing provision and maintenance.

Buildings	Risk Scenario	Climate Variable	Rating			
			2030		2070	
			Low	High	Low	High
Buildings and Structures	Degradation and failure of foundations	• Increased Variation in Wet/Dry Spells • Decrease in Available Moisture	Moderate	High	High	High
	Degradation and failure of building materials	• Increased temperature and heatwaves	Moderate	Moderate	Moderate	Moderate
	Increased storm and flood damage	• Increase in Extreme Daily Rainfall • Increase in Intensity of Extreme Wind • Increase in Frequency and Intensity of Storms	Moderate	High	High	Extreme
	Coastal storm surge and flooding	• Increase in extreme daily rainfall • Sea level rise • Increase in Intensity of Extreme Wind • Increase in frequency and intensity of storms	Moderate	High	Moderate	Extreme
	Increased bushfire damage	• Increase in Bush fires	Moderate	High	High	Extreme

Source: Infrastructure and climate change risk assessment for Victoria, 2007

A range of possible adaptation actions are being considered to deal with an accelerated decline in public housing stock as a consequence of climate change. These include retrofitting, divestiture, and building new dwellings. The issues (and solutions) are not straightforward because ecologically sustainable development needs to consider both the asset and the place – that is, housing is located in neighbourhoods, and neighbourhoods are places where people live. The adaptive capacity of neighbourhoods as a whole, as well as material features of individual buildings, must be considered.

There is a need to work within the existing system to develop solutions. There are, therefore, a range of ongoing challenges to be faced. The institutional drivers within the political space are clearly important, but the need to protect the health and wellbeing of people must be an overriding concern as we struggle with ESD. Significant investment in infrastructure renewal and development will be required. Part of the challenge is to make this happen.

Group sessions – discussion notes and feedback

Group discussion
(Sessions A and B)

Groups were asked to focus on two main themes/questions:

1. Do you incorporate climate change and/or other social and environmental impacts into capital investment decision making in your organisation? How?
2. Where would you like to see improvements?

Each small group discussed these issues and reported back to the full group of participants. Summary results of these reports and ensuing discussion are outlined below.

Group feedback

- Climate change issues emphasise what might be referred to as a "social conscience mandate" that organisations should fulfil. Often, however, the social conscience mandate is not incorporated into organisational processes unless it is captured in legislation (thus becoming a "legal mandate").
- Science communication is essential – including the communication of positive actions and outcomes in relation to climate change.
- Economic models for climate change are needed to communicate in a way that creates imperatives for managers and shareholders.
- Leadership and vision are essential.
- Regulation and standards are needed to influence the thinking of decision-makers.
- Most businesses don't actually make very good decisions in this area; they continue old practices, approaches, and templates; there is not much innovation.
- Young people within organisations have a capacity to drive change.
- There has been a lot of talk about triple bottom line (TBL) and related approaches for many years, but decision-making processes have not changed much.
- There is a need to convert ad hoc approaches to formal approaches; this may require that dollar values be put on intrinsic values.
- Policy has a big impact on decisions. Policy and leadership support is needed to progress these issues.
- Need to recognise the role of uncertainty – this is not the same as risk. Need better understanding of how to assess risk and uncertainty.
- Climate change exacerbates a range of pre-existing problems.
- Regulation and the review of standards for climate change impacts are significant. Flood intervals, required heights and clearances, standards for engineering expansion joints, and a range of related issues come into play.
- Need to start (!) thinking in terms of physical, social, and natural capital.
- Need ways to conceptually and practically incorporate costs and benefits of climate change adaptation into project proposals. This requires adjustment to projected cashflows, but it may also necessitate adjustment to discount rates. Many organisations may be prepared to accept lower NPVs for environmentally beneficial projects, but will not accept a negative NPV.
- Big issue is how to factor social benefits into project assessments and decisions – it's always easier to anticipate costs.

Distillation of key issues

- Currently not much climate change information being used in decision making. Change needs to be driven externally, recognising that most businesses do not make good decisions in this area (and many small businesses do not have a long life span in any case).

- Most activity at the moment is in the area of mitigation of impacts; more work is needed to adapt to changes that are imminent.
- Must recognise that the people making decisions today will not be around when climate change impacts the most. Need long term thinking – current infrastructure planning is too short term.
- There is a need for government action and leadership, including in policy and regulation, despite a more generalised resistance to regulation. Standards (such as building and engineering standards) are a key area for forward-thinking change – this is needed now.
- Uncertainty is currently not incorporated well – needs intellectual investment to do this.
- Funding for baseline research and innovation is lacking.
- Organisational leadership and vision are also key drivers. Young people inside organisations may be key players.
- Education is a key area – to produce knowledge that can drive change.
- Need better ways of communicating key outcomes, including the good things that are happening.
- Openness and transparency are needed in relation to social and environmental issues.
- There is a pressing need to ensure all benefits from infrastructure investment are factored into decision-making. For example, new public transport investments must take into account the number of cars taken off the road as well as various social benefits. We want these adaptive investments to happen, so need to develop ways to ensure that all benefits (not just costs) are incorporated into assessment and decision frameworks.

Group discussion following Panel presentations
(Sessions F and G)

Distillation of key issues

- Need to involve stakeholders in organisational and regulatory processes.
- Multiple processes need to be considered.
- Need to overcome organisational silos; requires a focus on internal and external communication.
- Poor investment decisions are often made; institutional inertia is a big factor (following past patterns), meaning that alternatives are often not adequately considered or explored. Organisations need to think about doing things differently.
- Need broad-range thinking to consider a wide range of options and a preparedness to not take some options off the table prematurely.
- Need to vision and leadership, combined with a preparedness to listen and be flexible.
- When embarking on project assessment and capital investment, must set realistic timelines – allowing the time to produce optimal outcomes.
- There is currently a generalised distrust of decision makers, in part because of inadequate communication and stakeholder involvement. Greater transparency is required.
- Need to ensure incentives are provided to factor climate change and sustainability issues into organisational processes. In many cases, people are used to waiting for the organisational or regulatory "push"; those who may have acted anyway actually may wait for incentives.
- Sanctions are significant, but there is a problem that people become oriented to minimisation of the threat of sanctions rather than dealing with the underlying problem.
- Overall approach needs to think about ways to empower people to do what they already really want to do, but need ways to encourage and enable this to happen.

Conclusions and implications for policy and practice

Discussion at the Think Tank was focused on a range of core concerns relating to climate change adaptation. The broad-ranging nature of the discussions identified a number of gaps in our current knowledge and understanding. This will assist in the formation of priorities for future research and action.

Tying together the themes that emerged in the presentations, it is clear that climate change will impact directly and indirectly at many levels. For example:

- Many direct impacts are felt at the level of community and local government. The consequences of extreme weather events are felt most profoundly here, and a significant level of capital investment is required at this level to recover from and adapt to climate change. In many senses, local government represents the largest collective unit with which each citizen has a (potential) direct involvement in climate change adaptation and therefore represents a "big picture" perspective that everyone can relate to and, hopefully, deal with. The need for better "place-based" information and communication is therefore central to advancing capacities for adaptation and change.
- Local government is also a significant investor in infrastructure, and better techniques for holistic assessment of investment proposals are required.
- The water and energy sectors are at the forefront of needed capital investment. Investment in these areas is highly significant because of the long time horizons that investment relates to. Capital investment in these areas quite literally shapes the future.
- Experience has shown that infrastructure investment in water and energy can yield significant benefits. There is a need to ensure that assessment of investment proposals considers all externalities and includes multi-criteria analysis of economic, environmental, and social dimensions. Alternative solutions to meeting our water and energy needs must be considered. Traditional capital investment appraisal techniques need to be re-thought.
- Housing and local neighbourhood infrastructure represents the area where most individuals actually experience climate change. The deterioration of housing stock, and of local community infrastructure, represents a significant challenge to be addressed. Major capital investment for renewal will be required, but it must be recognised that neighbourhoods are where climate change impacts are felt and where adaptive actions need to happen. Decisions about investment must consider the wide range of climate change effects that are felt at this level, and the significant potential for broad benefits in a range of social dimensions.

In thinking about climate change adaptation, we must recognise that we are designing our future, today, and that our stewardship extends beyond the immediacy of short-term time horizons and narrow financial assessment criteria. Better techniques must be developed through research and innovation, but the framework of standards, regulations, and legislation also needs to be updated to provide appropriate incentives and drivers.

Returning to the original objective of the Think Tank (to contribute to the process of refining ways to incorporate the costs and benefits of climate change impacts into the assessment of capital investment infrastructure proposals), we conclude that there is a pressing need to find ways to conceptually and practically incorporate costs and benefits of climate change adaptation into project proposals. We must be mindful of ensuring that we do not discount the future in the way projected cash flows are calculated and discounted using traditional NPV techniques. More broadly, formal processes for the holistic assessment of social, environmental, and economic factors must be developed. A key difficulty arises when attempting to factor social and environmental costs and benefits into project assessments and decisions, because anticipation and assessment of financial costs and benefits is easier (although equally fraught with possibilities for error and mis-estimation).

More holistic approaches to assessment appraisal will empower decision makers to invest in socially and environmentally beneficial projects.

Research, communication, education, and engagement are all essential elements, in advancing the agenda. We recognise the importance of vision and leadership at organisational and government levels. Equally – and, indeed, more significantly – we recognise the vital role that young people will play – in a range of formal and informal organisations and other settings. It goes without saying that it is the next generations of people that will have to live with the impacts of climate change; they will also have to live with the impacts of the adaptation measures we adopt today.

Feedback from participants

At the conclusion of the day, participants were asked to complete a feedback form (see Appendix). Questions included a mix of quantitative (Likert scale) and qualities (written comments) responses.

Fourteen forms were returned. Results summarised here indicate broad satisfaction with the Think Tank. All written comments are reported in their entirety (verbatim).

Q1. Affiliation of participants

The table shows a breakdown of attendance (those present at the Think Tank) and respondents to the feedback survey.

	Present	**Survey**
Public sector (federal government)	1	1
Public sector (state government, state-owned corporation)	10	5
Public sector (local government)	3	1
Industry/Private business	3	2
University/higher education	9	5
Total	**26**	**14**

Q2. Reason for attending

Reason (multiple responses possible)	**N**	**% (/14)**
To learn about recent developments	13	93
Networking opportunity	9	64
To represent my organisation	6	43
Personal interest	3	21
To present	1	7

Q3. Did the think tank improve your understanding of the incorporation of climate change impacts into capital investment decision-making? (1=not at all, 5=a great deal)

Mean response: 3.5 (n=12)

(Range: 2–5)

Comments (n=6) were generally positive, although some participants indicated that they would have preferred a more formal and detailed discussion of some of the issues. Others expressed a particular appreciation for the interactivity of the discussion and the coverage of multiple views and inclusion of people from different organisations and backgrounds. There was some particular interest in the discussion of the water sector, and interest in further development of the capital investment perspective.

Q4. Most informative or useful aspects of the day.

Comments (n=11) covered a range of aspects, with participants identifying the following features:

- Discussion of energy and water issues – the presentation from Yarra Valley Water, in particular, attracted a lot of interest.
- Informal discussions between sessions and throughout the day, and associated networking opportunities.
- Diversity of participants, views, and perspectives.
- Learning about the relevance of adaptation to other organisations / sectors and learning about their experiences.

Q5. Other things that should have been included in the program.

Comments (n=8) made several useful suggestions, including:

- Discussion and analysis of actual capital budgeting techniques and appraisal approaches; including approaches to quantification and economics-based techniques.
- More direct indications of the political complexities of the issues involved.
- Clear indications of research and policy agendas and priorities to take the issues further.

- More group discussions and small group work to work on proposals and solutions.

Overall, responses in the feedback indicated that the session was a useful introduction to a range of relevant issues and concerns, noting that it was not necessarily the forum to develop "answers".

Q6. Did you meet people or learn about organizations or projects at the think tank that may assist you to improve your (organisation's) response to climate change?

	N (/13)	%
Yes	12	92
No	1	8

Comments (n=3) noted that the development of contacts and networks was helpful and that the Think Tank overall assisted with understanding of the issues.

Q7. Scope and relevance of the issues discussed. (1=very poor, 5=excellent)

Mean response: 3.8 (n=14)
(Range: 2–5)

Comments (n=5) indicated that the scope of the issues discussed was relevant and that the presentations were appreciated. There was also interest in finding ways to take the agenda forward by providing clear indications of what to do to embrace change and to determine "next steps".

Q8. Level of discussion and input from participants. (1=very poor, 5=excellent)

Mean response: 3.7 (n=14)
(Range: 2–5)

Comments (n=2): One indicated that the presenters and participants were a knowledgeable and that there was good interaction and listening to what others had to offer. Another comment expressed some frustration that the discussion did not produce resolutions and recommendations in terms of specific technologies and approaches to help incorporating costs and benefits in assessments.

Q9. Opportunity to contribute. (1=very poor, 5=excellent)

Mean response: 3.9 (n=14)
(Range: 2–5)

Comments (n=2) clearly indicated that participation was encouraged and that there were good opportunities to get involved.

Q10. Did you think the number and mix of participants and presenters was appropriate?

	N (/14)	%
Yes	13	93
No	1	7

Comments (n=6) expressed overall satisfaction with the mix or presentations and the number of participants, but also suggested that it may have been helpful to have some additional sectors included in the program, including:

- Local government;
- Non-government organisations working in the area;
- Department of Primary industries and Department of Sustainability and Environment.

Q11. Overall rating. (1=very poor, 5=excellent)

Mean response: 3.6 (n=14)
(Range: 2–5)

Comments (n=2) indicated interest in advancing the agenda covered by the Think Tank, and perhaps further challenging the received wisdom.

Q12. Other comments.

Comments (n=4) indicated appreciation for the opportunity afforded by the Think Tank, enjoyment of the discussions during the day, and appreciation to the organisers.

Think Tank organisers

Professor Carol Adams
Pro Vice-Chancellor (Sustainability), La Trobe University

Professor Adams is Pro Vice-Chancellor (Sustainability) at La Trobe University and leads the La Trobe Institute for Social and Environmental Sustainability. She is Editor-in-Chief of Sustainability Accounting, Management and Policy Journal; Board Member of Globally Responsible Leadership Initiative (GRLI); Judge for ACCA Australia and NZ Sustainability Reporting Awards and Vice President (Universities) of Australian Campuses Towards Sustainability. She gained her Masters degree from the London School of Economics and her PhD from Glasgow University.

Her previous roles include Executive Director and Council Member, AccountAbility; Acting Dean, Faculty of Law and Management, La Trobe University; Head of School roles at Glasgow, Monash and Deakin Universities; Auditor at KPMG; and Financial Controller/ Company Secretary of a UK manufacturing company. She is a member of the Institute of Chartered Accountants of Scotland.

Professor Adams is an internationally recognised expert in the field of sustainable development strategy, environmental management systems and sustainability reporting and performance management. She has conducted research, consultancy and advisory work with companies in the UK, Germany and Australia; NGOs in the UK and Australia; and in the public sector in Australia. She has undertaken research in multi-national chemical and pharmaceutical companies, major banks, mining companies, manufacturing companies, the retail sector and utility companies.

Associate Professor Gordon Boyce
School of Accounting, La Trobe University

Dr Boyce's interdisciplinary research encompasses social, critical and interpretive perspectives on accounting, combining methodological and theoretical rigour with practical relevance. Published research includes work on environmental and social accounting; public administration, ethics and accountability; interactions between globalisation and accounting; and accounting education. His current research work focuses on the theory and practice of accounting's interrelation with contemporary socio-political and environmental issues and the role of technologies of accounting and accountability in public discourse.

He previously held academic posts at Deakin University (Geelong) and Macquarie University (Sydney). He was a co-recipient of the 2009 Macquarie University Innovation Award for his contribution to a collaborative research engagement with Ombudsman Victoria, on Understanding Conflict of Interest in the Public Sector. In both 2008 and 2009 and again in 2011, he received the Outstanding Reviewer Award from Accounting Education: An International Journal, and he received the Mary Parker Follett Award for the most outstanding paper published in Accounting, Auditing and Accountability Journal in 2000. His doctoral thesis, entitled "Critical, Social and Environmental Accounting: Prospects and Possibilities for Gramscian Intellectual Praxis in a Globalising World" was awarded a Macquarie University Vice-Chancellor's Commendation for exceptional merit and a Highly Commended Award in the Emerald/EFMD Outstanding Doctoral Research Awards.

He is on the Editorial Boards of Sustainability Accounting, Management and Policy Journal, Issues in Accounting Education, and Accounting Education: An International Journal.

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- **Rod Keenan**
  Director, Victorian Centre for Climate Change Adaptation Research
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- **Doug Scobie**
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- **Megan Haines**,
  Eve Merton,
  Stephen Muir, and
  Dianne Parslow
  Office of the Pro Vice-Chancellor (Sustainability)
  La Trobe University
- **Margaret Abbey**
  Chief Executive Officer
  Murrundindi Shire Council

  Margaret was scheduled to make a presentation to the Think Tank on "Addressing the competing interests of stakeholders involved in Local Government infrastructure projects". Unfortunately, unexpected events prevented her attendance, but we are very grateful to her early input to the Think Tank. Margaret was previously the Group Manager of Planning and Environmental Services at Nillumbik Shire Council, which has been nationally recognised for its strategic approach to environmental programs including integration into mainstream organisational processes and practices.

Appendix – Participant feedback form

Incorporating climate change impacts and adaptation into capital investment decision-making

PARTICIPANT FEEDBACK

1. Which of the following best describes your affiliation?

   - ❑ Public sector (federal government)
   - ❑ Public sector (state government)
   - ❑ Public sector (corporation)
   - ❑ Public sector (local government)
   - ❑ Industry
   - ❑ University/higher education
   - ❑ Other (please specify) _____

2. Why did you attend the think tank?

   - ❑ To present
   - ❑ To learn about recent developments in an area of importance to me (or my organisation)
   - ❑ Networking opportunity
   - ❑ To represent my organisation
   - ❑ Personal interest
   - ❑ Other (please specify) _____

3. Did the think tank improve your understanding of the incorporation of climate change impacts into capital investment decision-making? (1=not at all, 5=a great deal)

   1 **2** **3** **4** **5**

   Comments: _____

   _____

   _____

4. What were the most informative or useful aspects of the day?

   _____

   _____

   _____

   _____

5. Were there other things that should have been included in the program? (please specify)

   _____

   _____

   _____

6. Did you meet people or learn about organizations or projects at the think tank that may assist you to improve your (organisation's) response to climate change?

   ❑ Yes ❑ No

   Comments: _____

   _____

   _____

7. How would you rate the scope and relevance of the issues discussed?
   (1=very poor, 5=excellent)

   1 **2** **3** **4** **5**

   Comments: _____

   _____

   _____

8. How would you rate the level of discussion and input from participants?
   (1=very poor, 5=excellent)

   1 **2** **3** **4** **5**

   Comments: _____

   _____

   _____

9. How would you rate the level of opportunity that you had to contribute?
   (1=very poor, 5=excellent)

   1 **2** **3** **4** **5**

   Comments: _____

   _____

   _____

10. Did you think the number and mix of participants and presenters was appropriate?

    ❑ Yes ❑ No

    Comments: _____

    _____

    _____

11. Overall, how would you rate the think tank? (1=very poor, 5=excellent)

1 **2** **3** **4** **5**

Comments: _____

_____

_____

12. Other comments

_____

_____

_____

_____

Thank you for your feedback, which is much appreciated

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