



ThinkFuture Smart Infrastructure Conference 2010
12 March, Main Committee Room, Parliament House, Canberra, Australia
Hosted by: House Standing Committee on Infrastructure, Transport, Regional Development and Local Government

ThinkFuture Smart Infrastructure Conference 2010

Summary paper

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Introduction

The House of Representatives Standing Committee Infrastructure, Transport, Regional Development and Local Government is undertaking an inquiry into Smart Infrastructure. The inquiry is examining the potential benefits to Australian communities of embedding appropriate and relevant technologies into Australia's infrastructure, with particular focus on the transport, communications, energy and water sectors.

As the first activity of this inquiry, the Committee held the *ThinkFuture Smart Infrastructure Conference* at Parliament House in Canberra on 12 March 2010. The Conference was designed to facilitate discussion within the community about smart infrastructure issues and identify areas for further consideration as the inquiry progresses.

The Conference generated a great deal of debate and highlighted significant issues surrounding the development of smart infrastructure in Australia.

This paper provides a brief summary of the Conference, drawing together some of the key themes identified across each of the sectors. The Committee will, as part of the next phase of the inquiry, explore each of the themes. The five key thematic areas which the Committee believes broadly encompass many of the issues that were raised at the conference are:

- challenges posed by current *regulatory environments* across the sectors;
- a need for greater *collaboration* between industry players and across sectors;
- the requirement for greater investment in *research and development* and in *skills* for smart infrastructure;
- a need for a stronger focus on *consumer engagement* to promote the benefits of smart infrastructure; and
- issues surrounding the collection and management of data, including privacy concerns.

This paper is not a complete summary of the ThinkFuture Conference, but rather a representation of the key issues raised at the conference which have been identified by the Committee as areas of particular interest at this early stage of the inquiry.

For the full transcript of the conference, as well as selected video from the day, please see the website: www.aph.gov.au/thinkfuture.

What is Smart Infrastructure?

Smart infrastructure is the application of communications technologies to infrastructure to make better, more efficient use of resources. Smart infrastructure can be used within the transport, energy, communications and water sectors.

Minister Albanese, in his opening address at the conference, explained that ‘smart infrastructure is shorthand for innovative, technology based, adaptive infrastructure—infrastructure that, once built, could serve our economy’s needs for the rest of this century and beyond.’

The Minister emphasised the enormous potential of smart infrastructure as a means of tackling problems within Australia such as urban congestion. He highlighted examples of smart infrastructure already occurring in Australia such as the traffic signals in Sydney and Melbourne that prioritise bus flow and the investment in the Kwinana Freeway in Perth which will help install advanced technologies such as variable speed limits and lane management systems. Mr Albanese suggested that smart infrastructure is central to the economic debate, the employment debate and to the debate we must be having about our cities in Australia.

Mr Albanese noted that amongst other bodies, Infrastructure Australia and the COAG Infrastructure Working Group are already thinking about smart infrastructure. He argued that the implementation of smart infrastructure has the ability to positively affect social issues, as well as economic issues in Australia.

What are the benefits of smart infrastructure?

The conference raised a range of potential benefits of smart infrastructure in Australia, such as reducing congestion in our major cities to improving the efficiency of our water use. A majority of participants at the conference believed that smart infrastructure could impact upon social issues such as social mobility as well as economic issues. By developing smart infrastructure, Australia could compete on an international level with new emerging technologies. Some benefits of smart infrastructure highlighted at the conference include:

- Improvement to Australia’s greenhouse gas emissions, through both more efficient energy use and significant reductions in congestions on our roads;
- Reduction in road traffic delays, and improved reliability of rail services, which will have both environmental and social benefits;
- Greater efficiency of water use by both industry and household consumers;
- Improvement in consumer choice regarding when and how to use their energy and water;
- Further social benefits of greater utilisation of tele-presence—allowing employees to work from home; and
- Faster identification of faults in both energy and water supply, and therefore faster repair.

Session one of the ThinkFuture Smart Infrastructure Conference was a series of three keynote addresses, which mapped out a range of key issues and benefits of smart infrastructure in Australia. Below is a brief summary of each address.

Glen Boreham: Managing Director, IBM Australia and New Zealand

Glen Boreham's central point was that Australia now has an opportunity to begin merging together the infrastructure of the industrial age—roads, rail, water and electricity grids—and the infrastructure of the digital age—data centres, PCs, mobile phones and embedded devices to create 'smart infrastructure.' Mr Boreham claimed that investing in smart infrastructure would prepare Australia to compete in the global digital economy, improve the Australian standard of living and would also give consumers more control over how they use energy, water and transport.

Mr Boreham argued that building intelligence into Australia's infrastructure would also assist in reducing unnecessary waste, such as water through undetected leakages and energy that is lost in transmission.

Robin Batterham: President, Australian Academy of Technological Sciences and Engineering

Professor Robin Batterham articulated that the integration of the 'digital world' with the 'physical world' was a key issue in regards to the development of smart infrastructure in Australia. Professor Batterham argued that one of the main benefits of smart infrastructure is that it can allow for greater social mobility within society by providing greater and more affordable access to transport and communications systems.

Professor Batterham also stated that collaboration between the public and private sector was essential in order to tie 'together whole different systems' and that it was vital for the private sector and governments to be talking to each other to help achieve this goal.

Karen Curtis: Australian Privacy Commissioner

Karen Curtis discussed the potential significance of smart infrastructure in improving Australian lives, and her belief that we should grasp all opportunities we can. She cautioned, however, that the vast quantities of data which will be generated by the use of smart infrastructure must be used appropriately and sensitively. Ms Curtis urged that both industry and government take the opportunity to embed privacy in the design and operation of smart infrastructure rather than consider privacy issues at a later stage in the process. Ms Curtis argued that to integrate privacy into the early stages of smart infrastructure would ensure that consumers and the broader community will be much happier and better served by smart infrastructure.

Benefits and challenges of smart infrastructure in the sectors

The conference examined the potential benefits and challenges of smart infrastructure to the transport, communications, energy and water sectors.

Transport

Smart infrastructure can be used in the transport sector to reduce travel times, decrease congestion and improve the lifespan of the infrastructure itself. 'Intelligent Transport Systems' (ITS) is the name often used to describe the use of embedded information communication technology in transport infrastructure to better manage traffic flows in both road and rail.

Challenges for smart infrastructure in the transport sector raised by participants of the conference include:

- The requirement for *greater collaboration* between transport stakeholders, and the need for *national leadership* from government to achieve this.
- The difficulty of demonstrating the benefits of smart infrastructure, and the need for greater *research and development* to 'prove up' the potential benefits of smart infrastructure, including studies that provide *firm statistics and data* on the benefits.
- The need for a *national strategy* for ITS to ensure consistency and coordination of practice and technology across Australian states and territories, and to allow import of international products.
- The challenge of engaging and consulting with the community to establish understanding and appreciation of the potential benefits of ITS, and to encourage a more stable *investment* environment for industry.
- The need to develop national spatial data for effective ITS.

Communications

The communications sector essentially drives smart infrastructure in all other sectors, as it is the basis of the information communication technology (ICT) which is applied to infrastructure in other sectors to make it 'smart'. The National Broadband Network (NBN), when established, will provide 'fibre-to-the-home' for Australian communities, and will also allow greater, faster information sharing for other smart infrastructure, such as e-health, better education services and better transport services. Further development of communications smart infrastructure such as tele-presence will allow employees more flexible working conditions with the ability to work from home, as well as reducing the need to travel to other offices to conduct meetings.

Challenges for smart infrastructure in the communications sector raised by participants of the conference include:

- The management of the vast quantities of *data* which will be generated by smart infrastructure and the *privacy* concerns around whether and for how long this data should be stored.
- The need for *consumer education* to ensure awareness of and support for smart infrastructure.
- The need to provide ‘ease-of-use’ for smart infrastructure consumers—so consumers understand how best to utilise smart infrastructure, but not necessarily the technicalities of how it works.
- The requirement for better spatial data for successful smart infrastructure.
- The requirement for *research and development* through trials of smart infrastructure to guarantee effective cost/benefit analyses can be carried out by industry.
- The lack of current *integration and collaboration* across sectors and industries which will be necessary for successful smart infrastructure in all sectors.

Energy

Smart infrastructure is used in the energy sector to better monitor consumption of energy, through the use of ‘smart grids’. Smart grids utilise ‘smart meter’ technology, which monitor the use of energy remotely and in real-time at point of consumption and communicates this information back to the grid. This allows peaks to be monitored so consumers can choose to use energy at cheaper rates, as well as allowing faults to be identified and corrected more swiftly.

Challenges for smart infrastructure in the energy sector raised by participants of the conference include:

- The difficulties posed by the current regulatory framework which is *fragmented* across the states and territories, and the need for a *national regulatory framework* to allow for greater collaboration between stakeholders on smart grid projects.
- The significant *privacy* concerns regarding the smart grid, as more *data* becomes available for collection by energy companies.
- The global shortage of energy workers which will be exacerbated by smart infrastructure developments, and the need for greater investment in skills for the energy sector, with particular emphasis on ICT rather than the traditional engineering skills.
- The need for further investment in *research and development* in Australia to catch up with other parts of the world in this area.

The current lack of *consumer understanding* regarding the potential benefits and savings, which deters demand for the technology.

Water

In the water sector, smart infrastructure is being developed both for consumers and the agriculture industry. For instance, smart water meters are being developed to allow consumers greater, real-time understanding of their water consumption. In the agricultural sector, irrigation systems are being embedded with smart sensors to identify precise areas of need to allow greater efficiency of water usage.

Challenges for smart infrastructure in the water sector raised by participants of the conference include:

- The need to collect superior *data* and spatial information to allow further development of smart infrastructure.
- The need for a standardised method for disseminating *data*.
- The requirement for *collaboration* between the energy and water sector as they may be able to implement similar smart technologies.
- The crucial need for *collaboration* between states and territories to ensure successful smart infrastructure in the water sector.
- The challenge of *consumer education and engagement*, targeted to the appropriate audience (ie. rural or urban areas)
- The need for more *research and development* to develop smart water infrastructure to allow cost/benefit analyses to determine best practice for the implementation of smart infrastructure.

Common Themes:

A number of key themes emerged as consistent across the four sectors during the workshops, suggesting that there are common thematic areas which can be addressed for smart infrastructure more generally. Broad common themes addressed in all sectors were:

- Need for a *national approach* to regulation
- Need for *collaboration* between industry and across sectors
- Need to prove benefits of smart infrastructure through *greater research and development*
- Need for *community engagement*
- Need to address *privacy concerns regarding the data* generated by smart infrastructure

Current Australian smart infrastructure project examples

The Committee is aware that there are several smart infrastructure projects currently being undertaken in Australia, and in a one day conference format, only a small selection could be showcased, covering a range of project and business areas. Some presentations focuses on particular project experiences, while others gave more general perspectives on smart infrastructure in Australia. As noted in the introduction, video and transcripts of these presentations are available on the ThinkFuture website at www.aph.gov.au/thinkfuture.

Presentations were given on the following:

- The importance of ‘smart’ and ‘connected’ technology in successful smart infrastructure—focussing on a series of projects including the Monash Freeway in Victoria.
 - *Kevin Bloch (CEO, CISCO)*
- Experiences from Jemena’s roll out of smart meters in Victoria
 - *Ann Burns (APAC Utilities Lead, Accenture)*
- The potential for significant reductions in Australia’s greenhouse gas emissions through the use of smart energy metering.
 - *Matthew McKenzie (General Manager, GE Energy)*
- The Victorian MI upgrade and collaboration between private and public sector.
 - *Danny Elia (Transurban General Manager, CityLink)*
- The benefits of upgrading Australia’s rail networks, and the new ‘Advanced Train Management Systems’ project.
 - *Mike Van de Worp (General Manager, Communications and Control Systems, ARTC)*
- The use of spatial information in successful smart infrastructure projects across Australia.
 - *Alan Smart (Deputy Chairman, SIBA)*
- VicUrban’s experience utilising smart infrastructure.
 - *Sam Sangster (Chief Operating Officer, VicUrban)*
- The South East Queensland Water Grid ICT Strategy program.
 - *Paul Pettigrew (Program Director, SEQ Watergrid Manager)*
- Enhancing telecommunication networks for more convenient transport solutions.
 - *Steve Schmidt (A/g Director, Industry Solutions, Telstra)*

Summary of themes from the ThinkFuture Smart Infrastructure Conference

From throughout the conference, as summarised in this paper, five recurring themes emerged. From the key note addresses, the workshop sessions, and the presentations in Sessions 3 and 4, the following themes stood out to the Committee as most significant:

Regulatory Framework

- There is a need for a *national* approach to smart infrastructure regulation
- Regulatory arrangements should be examined as duplication of and differences between current state regulations pose barriers to uptake of smart infrastructure
- *National smart infrastructure policy* would be beneficial to ensure consistency
- *Common standards* for smart technologies should be adopted at a national level

Collaboration

- *Collaboration* must occur between industry and government and between industry players for successful smart infrastructure
- *Interoperability* of smart infrastructure is essential, so collaboration across sectors should be established
- Major smart infrastructure projects will require *integration across industries*

Research & Development and Skills

- There is a need for *greater investment in research and development* in smart infrastructure
- Government should provide *leadership* for smart infrastructure research and development
- *Trial projects* should be commenced to prove up smart infrastructure benefits
- Greenhouse gas abatement possibilities should be researched and promoted
- An *assessment of skills* required to establish and maintain smart infrastructure should be undertaken
- Greater investment should be made in appropriate training for smart infrastructure skills
- Delegates would like to see Australia work with other countries, for instance the United States of America or Korea, to learn from their policies and technology.

Consumer Engagement

- There is an urgent need to *promote the benefits* of smart infrastructure to the consumer
- Consumer understanding of smart infrastructure's benefits will improve investment environment
- *Consumer consultation* will improve image of new technologies and encourage uptake

Data, ICT Management and Privacy

- Smart infrastructure will generate vast quantities of *data* which will have to be sensitively managed
- There are *privacy* and *risk management issues* which must be addressed at the design stage of smart infrastructure projects
- Issues surrounding *availability of spectrum* need to be resolved
- Common standards or protocols for data management should be established

Next steps for the Smart Infrastructure Inquiry

The conference confirmed the extent of expertise and knowledge in the Australian community with regard to this new and developing area of our infrastructure.

Since the conference, the Committee has undertaken site inspections of VicRoads Traffic Management Centre, the MI Corridor, Transurban's CityLink Traffic Control room, the Western Power Network Operations Control Centre and the Rio Tinto remote mining operations centre. The Committee will continue with a program of site visits as a means of informing itself of current and developing smart infrastructure projects.

In the latter part of 2010, the Committee will also conduct workshops based on the five key themes identified at the conference as key to the establishment of smart infrastructure in Australia. These workshops will bring together experts to present further evidence to the committee inquiry.

The Committee looks forward to continuing its investigation of smart infrastructure, and to the continuing support of stakeholders.

APPENDIX A

Smart Infrastructure Inquiry Terms of Reference

The Committee is to inquire into "smart infrastructure" and make recommendations on ways to maximise the potential benefits to Australian communities of embedding appropriate and relevant technologies into Australia's infrastructure, including, but not limited to, the transport, communications, energy and water sectors.

The Committee's report is to consider:

1. how the productivity of existing infrastructure can be improved by enhanced utilisation of, and investments in, smart infrastructure;
2. existing experiences of communities utilising smart infrastructure and opportunities for more widespread application;
3. how smart infrastructure applications can assist in reducing communities' greenhouse gas emissions;
4. the potential opportunities for and net benefits of, new investment in smart infrastructure; and
5. ways in which government project selection processes can be better focussed to maximise future smart infrastructure opportunities.

During the course of its inquiry, the Committee should note any privacy, safety, health, environmental and other issues relating to smart infrastructure that might be relevant for Australian communities.

APPENDIX B



ThinkFuture Smart Infrastructure Conference 2010

12 March, Main Committee Room, Parliament House, Canberra, Australia

Hosted by: House Standing Committee on Infrastructure, Transport, Regional Development and Local Government

CONFERENCE PROGRAM

8:30	Arrival - Registration				
9:00	CONFERENCE OPENS				
9:00	Opening Address The Hon Anthony Albanese MP , Minister for Infrastructure, Transport, Regional Development and Local Government Welcoming remarks from Infrastructure Committee				
9:30 Main Cttee Room	SESSION ONE: Opportunities for and benefits of smart infrastructure investment 3 speakers (20 min. presentations). Glen Boreham (Managing Director, IBM Australia) Robin Batterham (President, Australian Academy of Technological Sciences and Engineering) Karen Curtis (Privacy Commissioner)				
10:30	MORNING BREAK				
11:00	SESSION TWO: Benefits and challenges of integrating smart technology into existing infrastructure Workshops with speakers and discussion.				
	<table><tr><td>2.1 WATER SECTOR Convenors: Glenn Wightwick (Chief Technical Officer, IBM), Thomas Connor (Director Engineering & Technology, Kellogg Brown and Root) (Room 1R2)</td><td>2.2 TRANSPORT SECTOR Convenors: Maxwell Lay (Director, Connect East), Alan Burns (Partner, Strategic Connections Group and Chair, Australian Rail Industry Corporation) (Room 1R3)</td><td>2.3 ENERGY SECTOR Convenor: Martin Thomas (Chair – Energy Forum, ATSE) (Room 1S2)</td><td>2.4 COMMUNICATIONS SECTOR Convenor: Terry Percival (Laboratory Director, NICTA) (Room 1S3)</td></tr></table>	2.1 WATER SECTOR Convenors: Glenn Wightwick (Chief Technical Officer, IBM), Thomas Connor (Director Engineering & Technology, Kellogg Brown and Root) (Room 1R2)	2.2 TRANSPORT SECTOR Convenors: Maxwell Lay (Director, Connect East), Alan Burns (Partner, Strategic Connections Group and Chair, Australian Rail Industry Corporation) (Room 1R3)	2.3 ENERGY SECTOR Convenor: Martin Thomas (Chair – Energy Forum, ATSE) (Room 1S2)	2.4 COMMUNICATIONS SECTOR Convenor: Terry Percival (Laboratory Director, NICTA) (Room 1S3)
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12:00	Feedback to Plenary				
12:30	LUNCH				
13:30 Main Cttee Room	SESSION THREE: Australian experiences in utilising smart infrastructure Presentations on smart infrastructure projects currently operating in Australia. Kevin Bloch (Chief Technology Officer, CISCO) Ann Burns (APAC Utilities Lead, Accenture) Matthew McKenzie (General Manager, Asia-Pacific, GE Energy) Danny Elia (Transurban General Manager, CityLink) Mike van de Worp (General Manager-Communications and Control Systems, ARTC) Alan Smart (Deputy Chairman, Spatial Industries Business Association) Sam Sangster (Chief Operating Officer, VicUrban) Paul Pettigrew (Program Director, SEQ Watergrid Manager) Steve Schmidt (Acting Director-Industry Solutions, Telstra)				
15:00	AFTERNOON BREAK				
15:30 Main Cttee Room	SESSION FOUR: Future directions for government policy on smart infrastructure The Infrastructure Committee will lead a discussion with delegates about recommendations for future policy settings.				
16:30	Closing remarks from the Hon Ian Macfarlane MP , Shadow Minister for Infrastructure and Water				
16:45	CONFERENCE CLOSES				