



## **CRC Construction Innovation**

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Mr Stephen Boyd  
Committee Secretary  
Standing Committee on Economics, Finance and Public Administration  
House of Representatives  
PO Box 6021  
Parliament House  
CANBERRA ACT 2600

Dear Stephen

### **Submission to the Standing Committee on Economics, Finance and Public Administration**

The Cooperative Research Centre (CRC) for *Construction Innovation* welcomes the opportunity to submit our views in relation to the inquiry into the future directions of Australia's services and exports sectors. This submission follows a recent meeting between the Chair and other members of the House of Representatives Standing Committee on Economics, Finance and Public Administration and *Construction Innovation* in Brisbane.

Our submission will highlight the importance of a long term Government and industry commitment to innovation for Australia's building, construction and property services industry to compete on an aggressive and increasingly crowded international stage. Further, the submission proposes a five point plan that tackles the competitive threats our industry faces in global markets and summarises the enormous consequences of ignoring innovation.

## **1. Background**

Put simply, the building, construction and property services industry is one of the engines driving the national economy. It builds the infrastructure upon which the whole economy is based—roads, rail, airports, power generation—and is one of our largest employers. In 2002–03, the industry was directly responsible for 14.4 per cent of GDP and employed 860,000 people through 250,000 firms—the vast majority of which are small-to-medium sized enterprises (SMEs). Further, the industry has a significant influence on the effectiveness and efficiency of other industries to compete locally and in global markets and provides for a myriad of support businesses.

Indirectly, the industry has a greater impact on the economy and wider community due to the fact that:

- Every Australian and every business uses the built environment—improvements to this industry flow over more significantly than other sectors to national growth;
- More than nine million Australians rely on the continued growth and improved productivity of the industry through their superannuation investments in Listed Property Trusts; and
- The industry contributes more than \$24 billion each year to the nation's tax system.

Like any industry, the construction industry's future will be determined by its ability to adapt to a constantly changing marketplace, meet ever changing client and community expectations and meet ongoing regulatory requirements. To do this it must innovate—a fact the Government has previously recognised through the creation of the CRC for *Construction Innovation* in 2001 in partnership with industry.

*Construction Innovation* funding has created an unprecedented alliance of industry, government and researchers who are committed to saving lives on construction sites, widening the pool of locally-based skilled workers, dramatically reducing the industry's use of precious water and energy resources, and improving productivity and efficiency in the \$90 billion industry. The Federal Government has publicly recognised the importance of many of its projects including the *Construction 2020* vision, the *Your Building* project and the *Sydney Opera House Exemplar Project* to name a few.

*Construction Innovation* arose out of the *Building for Growth* Action Agenda as Australia's only research and development body solely devoted to improving practices in the property, design, construction and facility management sectors. It is the largest ever research commitment to Australia's construction industry and is recognised internationally.

A recent decision to discontinue our CRC funding has highlighted some serious flaws that we believe exist in the CRC evaluation process. We strongly believe the CRC review panel made several incorrect assumptions in relation to our bid, perceiving limited industry support and using a methodology that strongly disadvantages those CRCs whose industry has strong public sector representation. Our four main points are:

- **Industry support is stronger than ever.** Twenty five new partners—committing \$16 million (an increase of 80%)—were recently recruited to support our application. This would have taken this valuable research through to 2014. Our work is strongly supported by peak industry bodies represented by the Australian Construction Industry Forum (ACIF) and leading enterprises such as John Holland, Mirvac and Lend Lease.
- **The methodology for calculating industry support is flawed** because the review panel gives greater weight to private sector funding over public sector funding. This makes it virtually impossible for us to secure CRC renewal funding because 40% per cent of our industry market value derives from the public sector. The review panel has failed to recognise this, despite the fact that the public sector groups primarily fall into the category of “end users”—the group the panel appear to believe falls exclusively into the private sector.
- **The Federal Government's investment in *Construction Innovation* will deliver a strong return to taxpayers.** Independent analysis suggests a return to the industry of \$1.2 billion or 42 times greater than the Government's investment in *Construction Innovation*, with economic benefits to Australia of \$6.5 billion.
- **Our future work program will deliver a range of new practical research and skill development outcomes** that improve the industry's competitiveness and productivity, its ability to succeed in international markets and its contribution to the community, the environment and the economy

**We and our many industry partners believe the absence of a strong Government funding commitment to *Construction Innovation* severely hampers the industry's ability to successfully compete on the global stage.**

## 2. Exporting Australian Innovation

### 2.1 *Competitive Threat*

The emergence of the super economies in the Asian region, particularly China, is the most serious threat to the international competitiveness of the Australian construction industry in international markets. Its ability to quickly mobilise cheap labour locally for global projects and its massive manufacturing capability should send a sobering message to policy makers. Consider this:

- 20 million new entrants into China's labour market from the education system annually and 10 million migration from the countryside. They all need jobs.
- Chinese economy doubling every decade and exports every five years.
- More construction is occurring in Beijing than in the whole of Europe so massive growth in the construction industry and increasing numbers of skilled workers.

To illustrate, a Chinese company recently built the components of a major bridge in China and shipped it to South Africa with the labour and tools required to erect the structure. And China is not alone in processing the horsepower to squeeze other players out of the market. In Japan, one of the nation's largest construction firms, Shimizu, employs 300 full time researchers dedicated to finding new and innovative ways to build infrastructure.

Without a focus on Australian-based innovation, Australia faces the prospect of becoming a "quarry"-based economy that simply exports the raw materials used in construction to other countries. This in turn will allow foreign companies with the manufacturing capabilities to use Australian raw materials to beat Australian companies.

Locally, the establishment of free trade agreements with China and other countries mean Australian companies now must face the prospect of competing in a global environment but on local soil. If Australian companies are unable to compete internationally, there is little to stop foreign companies entering Australia and using their muscle to win work in Australia.

Fortunately, Australia's construction industry has successfully competed in global markets. Leighton's, Bovis Lend Lease and Multiplex are just three companies with a strong presence in other countries. However, we cannot rest on our laurels. Australian industry has an opportunity to prosper on the international and local stage only if it adopts an innovation-centred culture and mindset. We cannot afford to stand still.

### 2.2 *Market Opportunity*

The work of *Construction Innovation* can combat this threat and position Australia as an international leader in sustainable building practices, safety, skills and efficiency. *Construction Innovation's Construction 2020 Vision Report*, launched by the Industry Minister in 2004, predicts Australian companies will have a significant impact on the global construction industry provided they overcome the current fragmented state of the industry. The report identifies environmentally sustainable construction—which minimises the impact of building on the environment—as the area of greatest potential for the industry.

To achieve this, *Construction Innovation* has developed a suite of information and communication technology (ICT) products which make the industry more internationally competitive while generating export income. Local and international organisations have expressed significant interest in our five products—*Project Diagnostics*, *LCADesign*, *Auto Estimator*, *DesignCheck* and *Auto Scheduler*.

*Construction Innovation's* ICT suite requires uptake of three-dimensional computer-aided design (3D CAD) software. The electronic plans that result are called a Building Information Model (BIM). This new BIM technology has the potential to make significant increases in productivity and safety, reduce errors and the need for rework. Rework is conservatively estimated to cost more than US\$200 billion in the US each year (A\$2 billion in Australia).

Take-up of 3D CAD software is growing. In 2005, five per cent of all worldwide construction work used 3D CAD software. According to consulting firm STEM Partnership, that figure is estimated to increase to 50 per cent by 2020. The US Government recently introduced regulations that require all Federal Government departments to accept only 3D CAD electronic plans for future construction work. Finland and other Scandinavian countries are developing similar regulations, while numerous international construction groups have also stipulated all future work be produced using 3D CAD software.

ACIL Tasman (conservatively) estimates the value of *Construction Innovation's* ICT suite at more than \$100 million to Australia, with scope for significant additional sales overseas. STEM Partnership estimates the worldwide 3D CAD market at 25 million users – highlighting the massive export income earning potential of 3D CAD-based products and services. *Construction Innovation* has recognised this opportunity and developed a suite of ICT services and products, which are outlined below:

### **2.2.1 Project Diagnostics**

#### *Background*

- *Project Diagnostics* is a unique toolkit that investigates areas of poor health on construction sites. The toolkit evaluates a project's performance against international benchmarks and identifies areas which should be of concern to the project director and client. Zeroing in on these potential problems provides value to senior managers and can suggest possible root causes and remedial measures.
- *Project Diagnostics* has recently won two prestigious industry awards for its unique leadership—from the Australian Institute of Project Management and the Australian Institute of Building.

#### *Opportunity*

- Leading consulting firm, Arup, is licensed to use *Project Diagnostics* for international and domestic markets.
- According to consulting firm, Corporate Context, *Project Diagnostics* has a potential market of \$A1.1 billion in the UK and US alone.

### **2.2.2 LCADesign**

#### *Background*

- *LCADesign* enables building design professionals to minimise the environmental impact of buildings at the conceptual stage. Ultimately, this will reduce pollution and greenhouse emissions and save energy and water resources.

#### *Opportunity*

- *LCADesign* is currently being trialled on a dormitory building at Stanford University, USA, an office building in The Netherlands, and by General Property Trust on the new Rouse Hill project in Sydney. In the past it has been successfully trialled by Arup, Bovis Lend Lease, Woods Bagot and the Queensland Department of Public Works.

### **2.2.3 DesignCheck**

#### *Background*

- *DesignCheck* allows building designers and surveyors to reduce errors and increase productivity by providing an automated, quick and simple check against building codes.

#### *Opportunity*

- Global software company Hearne Scientific Software—the largest distributor of technical and scientific software in the Asia-Pacific—is currently assessing *DesignCheck* with a view to establishing a global commercialisation partnership with *Construction Innovation*.
- In July 2006, *DesignCheck* won the Australian Institute of Building's Excellence Award for Industry Innovation.

### **2.2.4 Automated Estimator**

#### *Background*

- *Automated Estimator* automatically creates a bill of quantities for constructors on any building project, increasing productivity (by removing this mundane task so quantity surveyors can value-add to projects in other ways) and reducing errors that cause delays.

#### *Opportunity*

- Leading property and construction consultants Rider Hunt, who have a worldwide reach of 60 offices, are currently trialling *Automated Estimator* to use both locally and globally.
- Further development work is being carried out to assess future opportunities in global markets.

### **2.2.5 Automated Scheduler**

#### *Background*

- *Automated Scheduler* automatically prepares a 'first cut' building schedule for planners and constructors to increase productivity and reduce errors that cause delays and rework.

#### *Opportunity*

- While *Automated Scheduler* is still being developed, it offers significant export potential given rework is estimated to cost more than US\$200 billion in the US each year alone.

## **2.3 Off-Site Manufacture and On-Site Assembly**

Many construction projects can be manufactured in factories off-site and brought to the site for assembly. This can enable better quality control, improved and more efficient site processes, better health and safety control, more environmentally friendly manufacture and possible reductions in cost.

*Construction Innovation's* process and ICT expertise provides the opportunity for volume manufacture under factory-controlled conditions. It also provides opportunities to embrace lean production methods and re-engineer the construction process. *Construction Innovation* will partner with industry to advance the economic, social and environmental benefits necessary to make investment in industrialised processes worthwhile.

### 3. Future of Construction Innovation - Our Five Point Plan

#### PROGRAM 1: eco-Construct

**eco-Construct** will create a world-first science-based platform and tools to accurately benchmark greenhouse gas emissions and water usage in global cities to ensure they are achieving sustainable practices. Too little research is currently being undertaken in this vital policy area.

The **eco-Construct** program will:

- Slash waste, energy and water use in buildings and infrastructure with a platform of tools and case studies that prove the economic, environmental and social benefits to design new 'green' facilities and refit existing structures.
- Give governments, industry and the public the facts to better understand and measure greenhouse emissions, water usage and waste in our built environment to unify and reinforce national and international standards.
- Complement the Government's ongoing support for projects that improve energy and water efficiency in commercial buildings including the *Your Building* project and commercial building environmental rating systems.

#### PROGRAM 2: i-Construct

**i-Construct** will help slash this ongoing cost by reducing barriers for Australian industry to adopt 3D building information models (electronic plans) as standard practice, a world-best 'smart' technology capable of providing a \$6.5 billion boost to GDP. The **i-Construct** program will:

- Allow Australian industry to compete internationally by developing (with leading overseas research agencies) an internationally-accepted standard for 3D building information models.
- Reduce costs and eliminate inefficiencies by developing standards for sharing building information entered by designers, constructors, facility managers and recyclers.
- Reduce costs and eliminate inefficiency by developing 'smart' building plans that incorporate maintenance, security, emergency procedures and other vital services.
- Complement the Government's support for *Construction Innovation's Construction 2020* vision, which outlines ways that technology and collaboration can help lift the Australian building and construction sector to a new level of success.

#### PROGRAM 3: skill-Construct

**skill-Construct** will address the industry's growing skills gap in the key areas of new technology, safety and e-business by working closely with industry and training providers to create tailored, on-demand learning resource packages to ensure Australia's workforce is ready to meet our future local and global needs.

The **skill-Construct** program will:

- Slash costs and increase productivity by promoting no-fuss, on-site e-procurement technology for all business sizes.
- Up-skill Australia's 250,000 building and construction SMEs with a suite of on-demand skill development courses that improve productivity, cut down-time and allow them to compete internationally.
- Complement the Federal Government's policy objective to improve skills and training in industry.

#### PROGRAM 4: safe-Construct

**safe-Construct** will dramatically improve safety for Australian workers operating locally and on international projects run by Australian companies. On an export front, this will allow Australian companies to compete on a “work safety” platform in international markets and highlight the social and economic benefits of adopting safer practices that some of its international competitors may be lacking. Locally, it will reduce the \$3.6 billion cost to Australia by bringing together key players across the industry—including the Federal Safety Commissioner—to solve cultural and design issues contributing to Australia’s atrocious safety record.

The **safe-Construct** program will:

- Reduce deaths and injuries by developing computer-based planning tools that ‘test’ facility designs for safety before construction commences and provides a ‘how-to-guide’ for on-site construction.
- Reduce deaths and injuries by identifying those job and time ‘black spots’ that regularly create safety hazards and create training tools for industry to brief workers on-site.
- Change the unattractive industry image for youth by helping eliminate deaths and injuries.
- Complement the Government policy objective to improve safety in the workplace with an emphasis on cooperation at the individual workplace level.

#### PROGRAM 5: smart-FM

**smart-FM** will develop tools to optimise built assets internationally, improve the industry’s productivity and improve investment returns for superannuation funds investing in local and international markets.

The **smart-FM** program will:

- Reduce costs, waste and improve security and maintenance by creating 3D building information models that automate, consolidate and streamline all building management functions.
- Complement the Government’s policy to foster growth of a sustainable and internationally competitive Australian FM sector through the *Managing the Built Environment: Facility Management* Action Agenda.

## 4. Conclusion

There are huge opportunities available to Australian industry to reap the benefits of a globalised economy. However, much of these opportunities will be lost if the industry continues using outdated, in-efficient and unsafe work practices. We recommend that the Government seeks input from the industry via the Australian Construction Industry Forum with a view to establishing a national, independent research and development centre of excellence for the property and construction industry.

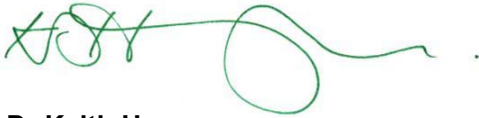
This body could be independent from the current CRC system. *Construction Innovation* estimates such a commitment would cost \$5.0 million per year over five years – with \$2.75 million a year (\$13.75 million total) to be funded through the Australian Government. In addition to this, *Construction Innovation* would seek to maintain the Centre’s current annual cash funding commitment from its partners at \$2.25 million per year (\$11.25 million total).

## 5. Contact Details

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Yours sincerely



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