International Alliance for Interoperability
Australasia Chapter
c/o 16 Sophia Street
Kingston TAS 7050

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Barriers to Effective Climate Change Adaptation
Productivity Commission
LB2 Collins Street East
Melbourne Vic 8003

Via email: climate-adaptation@pc.gov.au

Dear Productivity Commission

Thank you for the opportunity to provide comment on the Productivity Commission's Issues Paper "Barriers to Effective Climate Change Adaptation". This submission is made on behalf of buildingSMART Australasia (buildingSMART) with particular reference to adaptation of the Australian built environment to climate change impacts.

buildingSMART is an industry association, and a member of an international alliance of built environment sector professionals, contractors, suppliers and client groups who promote the benefits of open standards for information sharing and interoperability between built environment-related computer systems and software. buildingSMART's principal focus at this time is the promotion of the widespread use of building information modelling (BIM) across the Australian buildings sector.

The report "*Productivity in the Buildings Network: Assessing the Impacts of Building Information Models"* prepared by the Allen Consulting Group for the Built Environment and Industry Innovation Council (BEIIC) with the support of buildingSMART, the Commonwealth Department of Innovation, Industry, Science and Research (DIISR) and others in 2010 found that BIM has macroeconomic significance – its accelerated widespread adoption could improve productivity in the built environment sector by a very significant 6 to 9 per cent, with a resultant 0.05 percentage boost to GDP by 2025. Attached for the Productivity Commission's information is an overview of the findings and recommendations of the Report that was endorsed by the BEIIC in December 2010.

BIM is today a suite of technologies that is being used world-wide to transform traditional building procurement practices based on two-dimensional drawings to one based on intelligent model databases that have the potential to directly support building performance measurement, innovative design, advanced manufacturing and digital system management. buildingSMART believes that BIM has a critical role to play in planning for energy efficiency, built environment sustainability and climate change adaptation. Attached for the Productivity Commission's information is a submission made by buildingSMART in May 2010 to the National Building Energy initiative.

With the financial assistance of the DIISR, buildingSMART will be working this year with the Australian built environment industry to realise a national strategy for the adoption and implementation of BIM across the Australian economy in line with the above identified BEIIC recommendations. A copy of the National Initiative documentation is attached for the Productivity Commission's information.

buildingSMART considers that the information and cognitive barriers to climate change adaptation, as identified by the Department of Climate Change and Energy Efficiency in its submission to this inquiry, are two of the most important barriers for adaptation to climate change for the built environment in Australia. buildingSMART believes that improved information about the performance of buildings (both existing and new) over their design life through the use of BIM - and the improved simulation and analysis capabilities that it will support - will:

- assist owners to comprehend the potential impacts of climate change impacts on buildings;
- encourage better investment decision making by owners about resilience requirements for buildings to withstand adverse climate change impacts ; and
- better inform and hence improve the performance of the insurance industry in managing risks to buildings from extreme weather events attributable to climate change.

buildingSMART considers that there are six key challenges to the achievement of the potential that BIM promises to support effective climate change adaptation of the Australian built environment, each of which is addressed in turn below:

- the need for integration of simulation and analysis tools with BIM;
- the lack of BIM compatible building product data;
- the lack of integration of graphical information system (GIS) and land data for use with BIM;
- the lack of scaling of BIM for precinct and urban modelling;
- the need for new procurement methods that realise the technological benefits of BIM; and
- the lack of regional scale information on climate change impacts on Australian built infrastructure.

Integration of simulation and analysis tools with BIM

Simulation of building performance – focused on new buildings – has to date been a labour-intensive process that has been widely recognised as time-consuming and inaccurate. The demand for sustainability of buildings has increased, with computer-based building energy simulation becoming the primary means to evaluate available design options. At the Building Simulation 2011 conference hosted by the International Building Performance Simulation Association (IBPSA), the Australian Institute of Refrigeration, Airconditioning and Heating, IBPSA and DEECEE held a workshop to assess the harmonisation of building simulation modelling protocols (see http://www.bs2011.org/BS2011_survey.pdf). The same workshop created a BIM working group to better understand better the potentials of building information modelling for thermal performance measurement.

It is imperative that interoperability between simulation software and building design software be improved as a matter of urgency so that these technologies can be applied as early as possible to assist with resilience planning for the built environment in Australia to cope with climate change impacts.

BIM compatible building product data

Sufficient incentive exists for markets to deliver accurate geometric representations of manufactured products for use in building design for constructability planning using BIM, but there is a lack of incentive for any market participant to develop sufficient libraries of approximate geometric representations of generic manufactured products that will facilitate building design at the conceptual level and support simulation and analysis of thermal, acoustic and structural performance of building elements. The Australian construction sector is realising that to be internationally competitive, local protocols are inadequate - we must be compatible with international standards and guidelines for BIM if we are to be data and process compatible. buildingSMART believes that direct and early government intervention to financially assist with the development of generic approximate-geometric representations of building products is warranted.

Integration of GIS and land data for use with BIM

A major gap in the BIM process in Australia has been the lack of accessibility of geographic information system (GIS) information during the infrastructure development process. Equally, local and state government agencies are looking for better building information that will allow them to process development proposals more quickly and accurately. Some activities have been carried out such as the University of New South Wales urbanIT research project which, with international collaboration, developed an extension of the openBIM standard to transform NSW cadastral data with its associated land data. However, this initiative - which could be applied to national cadastral data - languishes for want of a national consensus and direction. buildingSMART believes that direct and early government involvement to resolve these deficiencies is warranted.

Scaling of BIM for precinct and urban modelling

With accurate GIS information available, along with relevant datum and populations of building models, it becomes feasible to create urban models that can be hosted on a model server as a repository for governments to provide access to integrated precinct and urban information models. The established Spatial Information Cooperative Research Centre (CRC) is already talking to buildingSMART about BIM, and the new Low Carbon CRC offers a major opportunity to accelerate the adoption of these complementary technologies. This link between rich building content and diverse GIS data sources offers new ways to determine regulatory compliance, support large-scale simulation and analysis and provide detailed reports based on specific information content and urban planning needs.

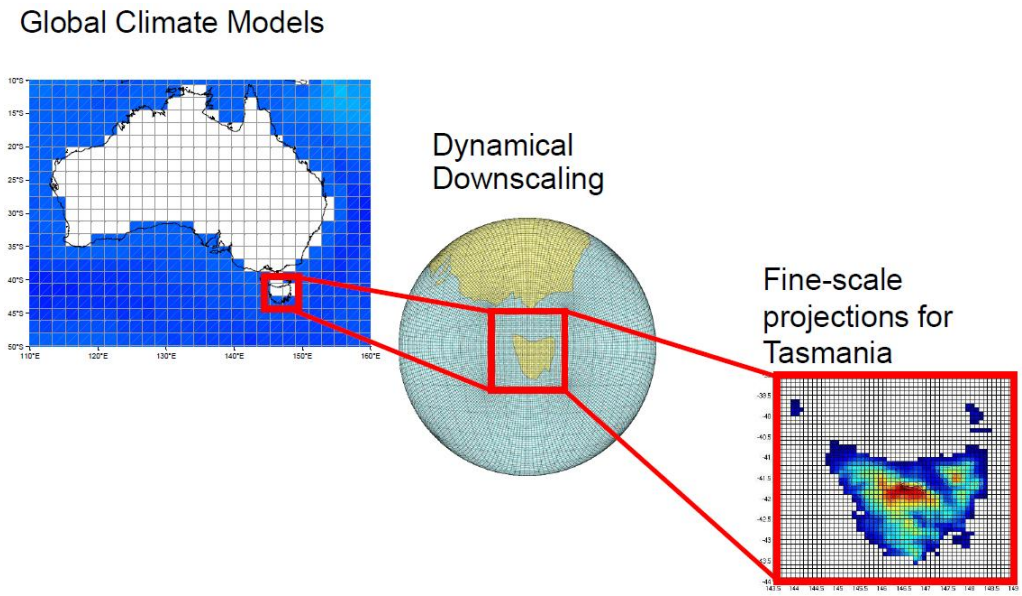
New procurement methods that realise the technological benefits of BIM

The adoption of BIM has created an opportunity to reconfigure the way that building projects are undertaken. BIM redistributes resources away from rote tasks such as documentation to the more critical design, performance checking, and analysis of alternative scenario activities.

Instead of most resources being used to create traditional detailed documents for the building construction phase, BIM enables a multidisciplinary environment for prototyping a building in software, accurately measuring, simulating and optimising performance. buildingSMART believes that direct and early government collaborative involvement with industry to expedite the development of appropriate procurement methods is warranted.

Regional scale information on climate change impacts on Australian built infrastructure

buildingSMART believes that dynamical downscaling of global circulation models to provide reliable projections of climate change impacts across populated areas in Australia will be necessary to facilitate effective resilience planning for Australian built infrastructure. buildingSMART notes that the Antarctic Climate & Ecosystems CRC has generated climate projections specific to Tasmania through fine-scale climate modelling to dynamically downscale outputs from global climate models to simulate the Tasmanian climate to 2100 (see White CJ, Grose MR, Corney SP, Bennett JC, Holz GK, Sanabria LA, McInnes KL, Cechet RP, Gaynor SM & Bindoff NL 2010, *Climate Futures for Tasmania: extreme events technical report*).



Extracted from a presentation by Will Steffen, Aug 2011 Hobart available at http://www.climatescience.org.au/downloads/steffen_2011_BLUE_SKIES_LECTURE.pdf)

The downscaling method used two IPCC emissions scenarios (SRES A2 and B1) and six global climate models for each emissions scenario. The aim of the study was to produce projections of climate change for the Tasmanian region of sufficient spatial resolution to allow the analysis of climate impacts at different locations within Tasmania and to produce projections at sufficient temporal resolution to allow the analysis of changes in seasonality and extreme events.

buildingSMART believes that work similar to the above should be undertaken for all Australian States and Territories so as to enable effective simulation and analysis for buildings – both existing and new – throughout Australia using BIM enabled tools.

buildingSMART observes that several international construction sectors - China, Northern Europe, Germany & Japan - are developing highly automated, off-site fabricated building systems that can be erected in literally a matter of days or weeks compared with months or years in conventional systems. buildingSMART believes that Australia must, if it wants to remain internationally competitive in the global architecture, engineering and construction market, pursue market leadership in this global move to adopt and exploit BIM technologies, state of the art analysis and performance measurement, and rapid on-site erection of prefabricated large scale components.

buildingSMART believes that the potential for Australia to realise opportunities in the global market for climate change adaptation technologies for the built infrastructure, together with the imperative to reduce greenhouse gas emissions from the built environment as soon as possible, warrant early government intervention to assist with removal of barriers to the wide adoption of BIM related technologies across the Australian economy.

As outlined above many activities are underway, but they are not supported by explicit Government policy and/or Commonwealth or State common adoption nationally.

buildingSMART Australasia would be pleased to expand on this discussion in person at your inquiry and await your response.

Your sincerely,

Wayne Eastley
Committee Member, buildingSMART Australasia Chapter

Acknowledgement: This submission was prepared with the valuable assistance of Mr. John Mitchell, President, buildingSMART Australasia Chapter