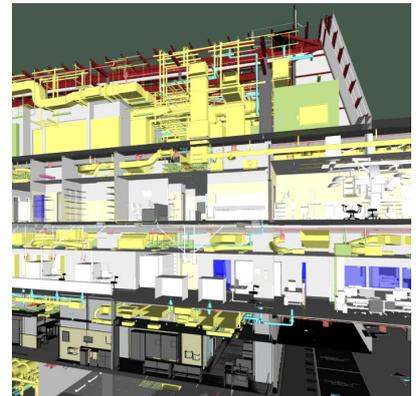
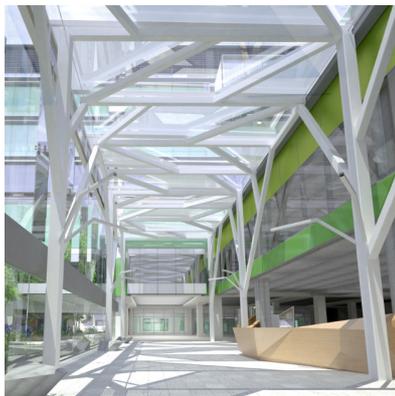




PLAN TO SAVE NSW ENERGY AND MONEY

buildingSMART Australasia Response

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Prepared by:

Mr Rodger Hills – Executive Officer
buildingSMART Australasia (bSA)
Telephone: +61 438 740 240
Email: eo@buildingsmart.org.au

Executive Summary

The NSW Government has asked for public feedback on a Draft Plan to Save NSW Energy and Money (Draft Plan) and the preferred options they have suggested to achieve the NSW energy savings target.

In response, buildingSMART Australasia (bSA) has prepared the following submission.

The BIM (Building Information Modelling) and digital engineering sector notes in the Draft Plan, the Governments' intention to deliver energy efficiency savings with a zero emissions target by 2050. To do that, bSA believes that the Government needs to adopt collaborative BIM based on open standards for information exchange (commonly referred to as Open BIM) throughout the procurement of all public buildings and infrastructure immediately.

In fact, the significant economic benefits of BIM in helping achieve policy targets such as energy efficiency have been detailed in numerous reports and inquiries such as:

- Productivity Commission – *Inquiry Report into Public Infrastructure* – July 2014 (Recommendation 12.5).
- Infrastructure Australia – *Australian Infrastructure Plan – Priorities and reforms for our nation's future* – February 2016 (Recommendation 10.4).
- Queensland Government – *State Infrastructure Plan – Part B: Program* – March 2016 (Implementation Action 15 and Opportunity 10).
- House of Representatives, Standing Committee on Infrastructure, Transport and Cities – *Report on the inquiry into the role of smart ICT in the design and planning of infrastructure* (March 2016).

Given that the benefits of BIM have been known and thoroughly documented for many years, the average NSW voter could be forgiven for concluding that the Government appears to be deliberately and irresponsibly wasting taxpayer money by not adopting BIM on all public projects.

Consider also that the recommendations we make in this submission will do far more than simply improve the energy efficiency of buildings and infrastructures and help NSW reach 2050 zero-emissions targets. Our recommendations will also result in:

- Lower cost public buildings and infrastructure.
- Increased conformity with specifications and performance targets.
- Delivery of public projects as promised (on time, on budget and to the expected standard).
- Transparency and accountability in government project decision making.
- Development of the technology skill base for NSW to be more internationally competitive.
- Improved construction industry productivity and labour market improvements including safety.
- Accelerated adoption of digital innovation throughout NSW.
- Greater opportunities for further economic stimulus.
- Improved operation and maintenance of public assets.
- Harmonisation of information across departments and agencies, leading to better records and reporting associated with public assets.

All of these advantages will result in considerable cost savings to the NSW Government.

In conclusion, the digital technologies necessary to help the NSW Government to deliver on its objective to achieve net-zero emissions by 2050, already exist and are ready to be deployed to help NSW save energy and money.

Precincts, high-growth areas and local government areas

Q12. Could the NSW Government achieve energy savings from precinct-scale developments, high-growth areas and by partnering with local government areas?

bSA Response:

bSA believes the answer to this is – yes. By integrating the interlinked aspects of energy, water, waste, transport and buildings, economies of scale can be achieved that are difficult or impossible to achieve building by building or dwelling by dwelling (in the case of apartments). Experience from the Victorian Governments’ Revitalising Central Dandenong (RCD) initiative indicates the following benefits for business and the community:

- Energy competitively priced to grid and GreenPower.
- Electricity from a cogeneration plant emits about 60% less carbon than grid energy.
- Improves energy efficiency and reduces carbon emissions of precinct buildings.
- Can be used to improve the NABERS Energy rating for precinct buildings by up to 1 star.
- Can be used to improve the Green Star rating for precinct buildings by up to 1 star.
- An in-building, near real time “Sustainability Monitor” to show staff and customers that the building or tenant is achieving best practice sustainability.

The NSW Government should also consider PIM (Precinct Information Modeling), which is a comprehensive 3D digital database model of a precinct. It contains all the Information needed to support planning, design, development, construction, management, operation, use and retro-fitting of urban precincts. The CRC for Low Carbon Living is working to maximize the benefits of precinct scale, high-growth and local government area developments. PIM provides a definitive repository of information at all stages in precinct design and management based on open standards. It integrates a diverse range of geographic, demographic and planning information data enabling Government to be better able to manage and reduce precinct and LGA scale energy efficiency.

Since the physical world is made up of objects, generally constructed or adapted by us for our convenience, it is natural to construct a PIM as a collection of objects (building, bridge, road, park, etc.) and then associate data or information with those objects. Importantly, that data is drawn from all kinds of existing sources through live database links: usage data, planning data, utility data, social data, product performance data, etc.

In essence PIM can explore all the different views of a precinct and develop a comprehensive digital model that accurately captures all the information needed to support those different views of the precinct. As well as all the activities undertaken to deliver an energy saving built environment, whether we start with a greenfield, brownfield or greyfield, or are simply retrofitting an existing precinct to increase its efficiency and reduce its carbon load.

As usage examples, the beneficiaries of PIM work range from an urban designer/planner wishing to measure projected carbon costs during precinct planning, a utility company endeavouring to optimise their operations to reduce carbon impact, a manufacturer managing the carbon efficiency of their building product or a householder seeking to understand the carbon impact of their lifestyle decisions.

State significant developments and major infrastructure

Q27: What is the best approach to develop higher sustainability and energy efficiency standards that can apply across a range of infrastructure types?

bSA Response:

bSA would encourage the NSW Government to introduce minimum standards or benchmarks for new state-significant development (SSD) and major infrastructure such as large mining, manufacturing, warehousing, waste, energy, tourism, education and hospital developments. However what bSA has in mind is the adoption of digital engineering options that when deployed, will have considerable impact on infrastructure energy and cost savings, even though they are not specifically energy-based standards per se. These options include:

- Adoption of collaborative BIM based on open standards for information exchange (commonly referred to as Open BIM and described here - <http://buildingsmart.org/standards/technical-vision/open-standards-101/>) throughout the procurement of all public buildings and infrastructure:
 - Process standard – Information Delivery Manual (IDM).
 - Data Standard - Industry Foundation Class (IFC).
 - Change coordination – BIM Collaboration Format (BCF).
 - Mapping of Terms – International Framework for Dictionaries (IFD).
 - Process Translation – Model View Definition (MVD).
- Develop a closer working relationship with ABAB (Australasian BIM Advisory Board) and adopt the BIM standards and protocols that the ABAB will promote as guidance for the industry. Note that while NSW is an active participant already in ABAB, it could do much more to take the learnings from that forum and proactively drive them through key departments responsible for infrastructure development and the built environment.
- Consider the learnings from international jurisdictions where performance/contractual mechanisms have been used as an effective means of reducing project process duplication, wasted effort and enforcing as-built compliance (resulting in energy savings and reduced cost at the same time). For example, on the current London Underground project, contracts contain penalties if contractors produce construction work that does not meet the initial digital specification and modelling parameters. Likewise there are contractual incentives/rewards for over-achievement of modelling requirements. New contractual models like FAC-1 (Framework Alliance Contracts) are also being used to integrate and harmonise the activity of all contractors on a project. To reduce the incidence of product and building non-compliance, jurisdictions are including in contracts the power for regulators to; enter any project premises with the police or any other authorised person; take measurements, photographs, recordings, samples and test them; require any person to give information/statements or require the production of, or inspection and copy of documents; impose fines and appropriate penalties.
- Adopt automated checking of regulations during design using software applications that link to a BIM model and identify compliance. Does the design comply with the regulations? Where does it fail to comply? What areas need to be resolved? Such a tool has been piloted in the UK and will enable the transformation of the business of checking compliance, including energy efficiency compliance, from a manual hard copy process (often undertaken after the design work has been completed), into an iterative software application that works alongside the design development. The speed of the process will allow the designer to explore other – more sustainable – options and enable swift, regular reassessment, leading to improved designs.

Hotels and other services used by the NSW Government

Q31: Are there other ways to save energy through government procurement?

bSA Response:

Please refer to our detailed response to Questions 12 and 27 above. bSA believes that one of the keys means for NSW to unlock energy savings and save significant public money, is the adoption of collaborative BIM and other digital engineering technologies.

International Role Models

The United Kingdom (UK) Government recently announced that BIM is now a minimum required by government from 2016.

Their chief construction adviser, Paul Morrell, has identified BIM as one way that government can deliver better value for the UK taxpayer. In his view, using BIM will lead to significant innovation and integration across the supply chain. Furthermore, his guiding statement is that BIM is not about a specific technology or product, but a process to give clients all the data that is of use to manage the facility after hand over. The United Kingdom is expecting to achieve a 20% reduction in procurement costs for government buildings compared with traditional practice through the introduction of its requirement for full 3D collaborative BIM to be used on government building procurements.

Other overseas jurisdictions that already require the use of BIM for government building procurements include the United States, Norway, Finland and Denmark. In our region, China, South Korea and Singapore have taken steps to achieve BIM implementation through a planned approach. For example, the Singaporean Government is well into applying a mandate for BIM, offering incentives to those willing to be the early pathfinders towards a goal of increased industry adoption, and ultimately full BIM submissions.

The Role of buildingSMART Australasia (bSA)

buildingSMART provides the worldwide chapter network, plus the necessary technical and process support, to develop open standards that support information workflows.

buildingSMART Australasia (bSA) is the body tasked with driving the uptake of BIM and digital engineering in Australia and New Zealand. bSA is a chapter of buildingSMART International and as such is able to bring considerable international experience to bear in support of the adoption of digital construction technologies.

bSA's mission is to work with key industry and government leaders to develop, maintain and facilitate the use of open BIM standards, collaborative processes and integrated practices. We are committed to ensuring the improved exchange of information between software applications used in the construction and infrastructure industries in Australia and New Zealand.

bSA's objectives are to:

- Improve the policy and regulatory environment for the adoption of common specifications for sharing construction data.

- Facilitate the sourcing of practical information to the industry about common specifications for sharing data.
- Publish common specifications for sharing data to create synergy among the languages of the building and construction industries leading to interoperability of the industry's information systems.
- Help integrate the industry into the global electronic market and improve productivity of the design, construction and operation process in Australasia.

bSA works to fulfil these objectives by gathering and supplying practical and current industry information on behalf of bSA stakeholders and other organisations and companies that follow bSA through various means. This industry-wide approach to responding to technology, policy and regulatory issues, helps to ensure that Governments are informed of potential opportunities in the building industry and are provided with appropriate industry-considered recommendations.

bSA Members include:

Autodesk Australia Pty Ltd	Norman Disney & Young
Arup Pty Ltd	Cadimage Group (Graphisoft NZ)
Masterspec - Construction Information Ltd Company	AECOM Australia Pty Ltd
BRANZ	Bentley Systems International Limited
Hansen Yuncken	Zuuse Pty Ltd
Aconex	NZ Transport Agency
Mitchell Brandtman	CIMIC Group (EIC Activities)
12D Solutions Pty Ltd	Laing O'Rourke Australia Pty Ltd
Architekton Ltd	NZ Ministry of Business, Innovation and Employment
Information Quality Pty Ltd	John Holland
DCTech	Dept of Defence, Infrastructure Asset Development Branch
Sofoco Pty Ltd	Master Builders Queensland
MWH Global	Investa Office Management Pty Ltd
Architectus	Lend Lease Building Pty Limited Company
Exactal Technologies Pty Ltd	BIM Consulting

Definitions

BIM (Building Information Modelling) is generally regarded as a process whereby a full 3D digital prototype of a planned facility (whether that is a building, piece of infrastructure or an urban precinct) is created during the planning and design stage and then maintained and updated throughout its life cycle to facilitate design collaboration across all disciplines, coordination during the construction and delivery phases, with handover of the as-built model to support on-going asset management and operation of the facility.

Open BIM is a term used to describe the same process when the digital prototype is structured in a non-proprietary, open-standard format and the associated processes are supported by industry-standard tools for managing information exchange between proprietary software tools and open access to standardised object libraries that host manufacturer's product data.