

IRCC Summit on Sustainability



**Surfers Paradise Marriott Resort
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Foreword

Sustainability is a term that is used widely in the built environment. However, one often finds that the term has different meanings, depending on the worldview of the user and the context of the discussion. In one discussion, the focus on sustainability may be related to water or energy conservation, while in another discussion, the life cycle of construction materials may be the focus. The focus may also vary from individual products, systems or buildings, to entire cities, countries or regions.

With such diversity in meaning, it is important to discuss sustainability within a context that allows different perspectives to be voiced and understood. This is particularly true in the context of building regulation, where gaining a common understanding of public, industry and government views on sustainability is essential for good building regulatory policy, which is vitally important from the perspective that sustainability will likely be one of many regulatory objectives, some of which may be seemingly at odds, which policy makers have to address and balance for the overall benefit of society.

As a means to facilitate dialog on the meaning of sustainability within the context of building regulatory policy, the IRCC brought together a small group of experts, with diverse perspectives, to present and discuss their views on sustainability in the built environment. This Summit Report provides a brief summary of the presentations and discussions, and highlights several areas that may be worthy of additional focus in the context of building regulatory policy.

Drawing from a theme of the Keynote speaker, it is hoped that this report serves as the basis of 'destination discussions' regarding the right balance of sustainability and the myriad other objectives of building regulation, which must work together to meet the needs of society and the world in which we live.

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Acknowledgements

The IRCC Summit on Sustainability would not have been possible without the hard work and dedication of Mr. Mike Balch, Chair of the IRCC / Deputy General Manager of the Australian Building Codes Board (ABCB), and the hard working and highly competent staff at the ABCB. The effort by Mike and his staff to secure a venue, invite all the speaker and participants, and make sure the Summit proceeded smoothly provided a great opportunity discuss the topic of sustainability in the built environment.

Sincere appreciation is also extended to the members of the IRCC, who supported the Summit through their participation in the Organizing Committee, in identifying speakers, and in chairing sessions. In particular, special thanks to Mr. Richard Bukowski of the US National Institute of Standards and Technology, Building and Fire Research Laboratory, who chaired the Organizing Committee, and to Mr. Richard Okawa, International Code Council, for his efforts in coordinating speakers and financial issues on behalf of the IRCC.

Finally and most importantly, we sincerely thank each and every speaker and participant. Your exceptional presentations and dialog will contribute to this important area well into the future.

Opening and Welcome

The IRCC Summit on Sustainability was opened by IRCC Chair **Mr. Mike Balch** (ABCB, Australia) and Past-Chair **Mr. Robert Bowen** (NRCC, Canada). The gentlemen outlined the aims and objectives of the Summit, and thanked everyone for their participation.

Participants were welcomed to Australia, to Queensland, to the Gold Coast and to the Summit by **The Honorable Desley Boyle MP**, Minister for Environment, Local Government, Planning, and Women (Queensland, Australia). The Honorable Ms Boyle spoke of several challenges facing the people of Queensland from the context of building regulation and sustainability, including an increasingly aging population, changing family patterns, and climate change, which appears to be having an impact on rainfall patterns and amounts.

Some of the specific measures that are being taken with Queensland include energy efficiency requirements, such as low-flow shower heads and low flush toilets, the potential for rainwater catch tanks in some locations, and push for 'energy star' rated buildings. A key objective is finding a way to create sustainable urban design, wherein a suitable balance can be struck between energy efficiency, proper land use planning, environmental protection, useability of spaces, flexibility of use, and related planning and building issues.

Keynote Address

The Summit attendees were challenged at the outset by **Dr. Peter Ellyard** of the Preferred Futures Institute (Australia) regarding *The Need for Sustainable Construction* in the context of our 'destination' for sustainability. Focusing on outcomes rather than means, Dr. Ellyard challenged participants to think about preferred futures, ways to get there, and where we can make an impact along the way.

Living with our perpetual solar income was the first challenge. With the range of issues revolving around fossil fuels, we need to look to new sources of energy, including using ocean currents to drive turbines, the broader use of Hydrogen, and biomass as a fuel source. Coupling technology advances such as these, with energy and water conservation, we can begin to make a significant difference in our ecological footprint.

Along the path to one of these preferred futures, however, we must not lose sight of the need to make economic advancements alongside of ecological advancement – we need to aim for sustainable prosperity without economic poverty. In fact, the challenge is to create the right balance of economic, social, cultural and sustainable prosperity for all people.

Bringing his themes back to construction, Dr. Ellyard provided examples of where we can do a better job by working with nature instead of against it. He provided the example of the Darwin Hospital, which was based on a Vancouver, BC, Canada, design, and simply did not work in the tropical environment of Darwin. He then pointed to the James Cook University, Center for Tropical Design, as an example of where research is conducted into use of appropriate construction technology and techniques to fit the environment.

In summary, key points that Dr. Ellyard urged the attendees to walk away with are that we need to be thinking about preferred futures – those we want rather than those that will evolve without intervention – and have ‘destination discussions’ focused on how to get there, balancing economic, social, cultural and sustainable prosperity, aiming for zero collateral damage.

CIB Agenda 21

Continuing on the theme of *The Need for Sustainable Construction*, **Dr. Christina du Plessis** from CSIR in South Africa outlined the roadmaps to sustainable construction developed by CIB in partnership with several other organizations – *Agenda 21* and *Agenda 21 for Developing Countries*.

Agenda 21 aimed to look at issues of sustainable development and of sustainable construction and to outline a framework for how the concepts interact. Formulated primarily by people from developed countries, *Agenda 21* unfortunately did not capture all the needs and issues associated with developing countries. For example, *Agenda 21* assumed too much in terms of access to electricity, levels of wealth, and what people value, and did not consider cultural, moral or spiritual drivers.

The aim of *Agenda 21 for Developing Countries* was to broaden the roadmap laid out in *Agenda 21* to encompass worldviews from developing countries, particularly with respect to values, ethics, morals, and culture, providing more focus on the use of an ecological model for sustainability that employs a ‘cradle to grave’ approach, making sure factors from raw material to reuse are considered.

Going forward, Dr. du Plessis noted that several countries would be working to adapt *Agenda 21* to their needs, and that there is a strong desire for collaboration, sharing of knowledge, and for creating databases that can be shared by all.

Sustainable Infrastructure

In the next session, **Dr. Julio Kuroiwa** of the Peru Civil Defense, spoke of the need to assure the sustainability of civil infrastructure as a means to assure community sustainability. Focusing on water supply and distribution, Dr. Kuroiwa stressed the importance of conducting appropriate hazard and risk analyses, and developing mitigation strategies, such that water supplies and distribution networks, and other critical infrastructure, are not unduly subject to loss during earthquakes and other natural hazards. Looking to earth sciences, and developing good hazard maps, is a good first step for many countries.

The Business of Sustainability

Ms Caroline Pidcock, past President of the Royal Australian Institute of Architects, provided some thoughts on the business of sustainability from an industry perspective. She noted that sustainability has ‘come of age’ in Australia, and that there are many stakeholders engaged in the issue. This has driven the need for a common framework for discussions, and has led to the formation of the Australian Sustainable Built Environment Council (ASBEC).

One of the efforts of the ASBEC was the development of an agenda for sustainable buildings, which served in part as a basis for intergovernmental agreements on legislation and regulation in the area of sustainable construction. Ms Pidcock noted that regulation was desirable as a backstop for market failures, and that it should include specific performance measures, performance levels, a framework for consistency, and flexibility.

To assure business takes hold of sustainability in a serious way, Ms Pidcock noted that a strong and credible business case is needed, along with education for all stakeholders.

The Use of Appropriate Technology

A significant part of the sustainability discussion, in the built environment, often focuses around construction material use and reuse. **David Eisenberg**, Development Center for Appropriate Technology (USA), presented views on the risks to society associated with non-sustainable materials, and how the use of sustainable materials and appropriate technology can make a significant difference.

Mr. Eisenberg set the tone for his presentation with a reminder to the attendees that wealth is not equally distributed throughout the world, with many people surviving on less than US\$2.00 per day. This is a significant driver when thinking about what technologies are appropriate for construction throughout the world – what works in one part of the world may be logistically inappropriate somewhere else (e.g., a building code from a developed country may simply not be practical in a developing country). The focus should rather be on understanding the local needs, practices and materials, and developing approaches that use technology appropriate to the area.

Another factor stressed by Mr. Eisenberg is the need to reduce our ecological footprint – the carrying capacity of the world to support or resource usage. At present, he notes that 2/3 of the world is living within the bounds of our ecological footprint, but that there is insufficient capacity to support the remaining 1/3, which is using far more. Energy and water are two resources being used at far too high of a rate.

As we think about sustainability, ecological footprints, and appropriate technology, we also need to think about risks and hazards being created by the technologies and materials we currently use. The damage to the environment by stripping resources from developing countries may have a long term cost, in terms of risk as well as currency, which we do not currently appreciate. We should not forget the impact to future generations that result from actions today.

In terms of building regulation, performance-based approaches provide an avenue to embrace sustainability and the use of appropriate technology. In this context, appropriate technology is the lowest level of technology that can do the job well. We should not be employing complex technology just because we can – we need to consider implications (the more complex the technology, the less reliable it may be, and the greater the impact should it fail).

Sustainable Cities

Bringing many of the Summit concepts together, **Mr. Graeme Campbell**, Waitakere Council, New Zealand, spoke of the application of sustainable concepts to the city of Waitakere and of the benefits gained by doing so.

The starting point was the adoption of CIB *Agenda 21* by the Waitakere Council as the basis for a sustainable development plan for city growth. A development company was formed, with a focus on sustainable design and development, and plans were put into place for energy efficient residential and civic buildings, as well as for energy and water conservation. Along the way, investment was made into research and development, which resulted in a code of practice for urban sustainability, and the development of an energy efficient house that can be constructed for NZ\$180,000.

At a higher level of government, the Building Act, the Building Regulation, and the Resource Management Act all play a role in sustainable design and development. However, a critical driver is also commercial success. In at least one case, it has been shown that a 5-times return on investment can be achieved over a 20 year period.

In summary, application of sustainable concepts can work within planning and building regulation, and can result in significant cost savings. Going forward, there is an objective to make every new government building in Waitakere a sustainable building.

Building for Environmental and Economic Sustainability (BEES)

As an example of the technology available to help people in the construction industry better understand the sustainable impact of building materials, **Dr. Barbara Lippiatt** of the US National Institute of Standards and Technology, Building and Fire Research Laboratory (NIST/BFRL) presented the Building for Environmental and Economic Sustainability (BEES) software package, developed by NIST/BFRL for helping people to select cost-effective, environmentally-preferable building products.

The environmental performance of building products is measure in BEES by using the life-cycle assessment approach specified in the ISO 14040 series of standards, including raw material acquisition, manufacture, transportation, installation, use, and recycling and waste management. Economic performance is measured using the ASTM standard life-cycle cost method, which covers the costs of initial investment, replacement, operation, maintenance and repair, and disposal. Within BEES, environmental and economic performance are combined into an overall performance measure using the ASTM standard for Multi-Attribute Decision Analysis.

BEES is available for download from NIST/BFRL, and is being used as part of procurement by the Federal government

Sustainability as Risk Management

In the final presentation of the Summit, **Mr. J. Gary Lawrence** of Arup (USA) offered the view that sustainability can be a robust framework for managing risk, and that the concept of sustainability can be a means to better accomplish core objectives of government.

From a risk management perspective, Mr. Lawrence suggests that sustainability is more robust than other approaches, as it forces risk analysis much broader, looks at the intersections of systems, and embraces longer time horizons. A key to this approach is that one views sustainability as a human-centered approach, more so than an environment-centered approach, built around a values-based decision-making framework which optimizes conditions for human development over time. By focusing on what society needs to be sustainable, the constituent parts are addressed holistically.

Mr. Lawrence observed that because the business model has overtaken the policy model for some governments, there is a lack of focus on future constituents, with the aim being the here and now. By applying a sustainability approach, however, one can achieve a balance between current and long-term objectives. In the end, sustainable outcomes are political choices. The challenges are defining the problem correctly, knowing what to do about the problem, and making an effective case for stakeholder consideration.

Summary and Closing

Following the last speaker, the Summit was drawn to a close by **Dr. Brian Meacham** of Arup (USA), who summarized the key points presented and discussed during the day:

- We should be outlining our 'preferred futures' and having 'destination discussions' as to how to get there – this is more effective than waiting to see what happens and reacting.
- Appropriate consideration of needs of developing countries – we should stop assuming what works in developed countries will work in developing countries. This involves everything from government policy to choices in technology.
- Sustainable infrastructure is as important as sustainable buildings – if the infrastructure fails, people will not be sustained.
- Sustainability provides a robust framework for societal risk management. If properly employed, it forces risk analysis to be much broader (society, culture, environment), considers the intersections of systems (technological, ecological, sociological), and embraces longer time horizons.
- There is a good business case for sustainability. Governments and business can realize tangible benefits by employing sustainable practices. In doing so, we can realize the right balance of economic, social, cultural and sustainable prosperity for all people.

On behalf of the IRCC, Dr. Meacham thanked each speaker, the attendees, and the ABCB for their efforts in making the Summit a success.