Construction Industry Skills Workshop

13 October 2016 – Vibe Hotel, Sydney, NSW

Proudly hosted by:

NSW Government | Office of Environment & Heritage

Government of South Australia
Department of State Development

COAG Energy Council

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Disclaimer

This document represents the original, compiled outputs generated by the participants from the construction industry in a single day facilitated workshop and has not been modified.

The information within this report does not represent the policy or opinions of the New South Wales Office of Environment and Heritage or the South Australia Department of State Development.

The outcomes and directions identified from the workshop will inform and contribute to the ongoing consultation and project planning process for both OEH and DSD in the development of knowledge and skill programs.

Background

Introduction

High-performing residential buildings have significant benefits to consumers, government and professionals:

- For consumers, high-performing buildings provide comfortable, healthy, quality homes with low lifetime costs, making them more affordable to run and maintain.
- For governments, these buildings are compliant with the National Construction Code and State regulations. They require less energy to run, produce less waste and ultimately reduce national carbon emissions.
- For professionals, building high-performing quality assured homes reduces the cost, effort and re-work required to comply with regulation, and generally increase customer satisfaction and demand.

To achieve these benefits, the South Australian Department of State Development (DSD) and the New South Wales Office of Environment and Heritage (OEH) have both developed projects to address barriers and encourage the design and construction of high-performing residential buildings.

The National Energy Efficient Building Project

The National Energy Efficient Building project (NEEBP) is funded through the Council of Australian Governments (COAG) and has been managed by the South Australian Department of State Development since 2012. Information about the previous six NEEBP consultation, research and local government pilot projects is available at the South Australia Government website.

The current work, Phase 3, comes from the National Energy Productivity Plan (NEPP) Measure 32 – which aims to improve compliance with building energy efficiency regulation. Phase 3 projects focus on supporting industry compliance through targeted knowledge and skill development, and on-site IT tools that augment quality control for improved compliance.

The Collaborative Sustainable Housing Initiative

Since 2014, the NSW Office of Environment and Heritage has facilitated the Collaborative Sustainable Housing Initiative (CSHI). The CSHI is an ambitious program and aims for housing-industry organisations to work together to address the systemic barriers to the supply and demand of sustainable housing design and features.

The CSHI, under its Industry Education and Engagement component, has developed education projects for Architects, Building Designers and Real Estate Agents, a consumer facing communications platform (Build4Life) and research into existing housing typologies.

The CSHI seeks to develop similar projects alongside industry partners for the building and construction industry.

Joining of programs and consultation

As both the NEEBP and the CSHI are seeking to develop similar education and training projects with the building and construction industry, it was decided that it would be far more effective and efficient, particularly for industry members, if OEH and DSD worked together to achieve their outcomes.

To kick start industry engagement, OEH and DSD met representatives from peak construction organisations and sought their feedback on: the issues facing the industry, the current role of sustainability and energy efficiency training, if regulation is effective and what barriers prevented or compromised the construction of high-performing buildings. Through these meetings, it became clear that:

- Sustainability and energy efficiency education needs to be made relevant to industry
- Regulatory compliance needs to be supported and improved.
- The residential construction industry is changing. Trades and suppliers want the skills to keep up with the market, meet consumer demands and deliver more comfortable and affordable homes.
- The building and construction industry tends to work in specialty or trade silos. These silos may significantly impact the design and construction of high-performing buildings.

To address these issues, DSD and OEH decided to hold a Construction Industry Skills Workshop. Through this workshop, DSD and OEH would have the opportunity to partner with representatives from construction industry peak organisations to identify ways to enhance sustainability and energy efficiency education, to begin to break down silos and to discuss issues in regulatory compliance.

Workshop Overview

The New South Wales Office of Environment and Heritage (OEH) and the South Australian Department of State Development (DSD) were pleased to host the **Construction Industry Skills Workshop** at the Vibe Hotel, Sydney, on Thursday 13 October, 2016.

OEH and DSD held the workshop to work with key members of the building and construction industry to achieve the following outcomes to identify:

- cross-industry barriers and issues impacting the development of high-performance buildings
- which issues have a higher priority to industry
- if education and training products can address issues within industry that compromise the construction of high-performance buildings
- if silos in the industry impact on the development and functionality of high-performance buildings
- ways to break down silos within the industry

Throughout the workshop, OEH and DSD received expert feedback on what training is needed, what works, what doesn't, and how to best develop and deliver material, or augment existing industry resources, to fill the gaps.

The cross-industry workshop helped to shape how OEH, DSD and construction industry peak organisations can develop targeted resources to improve energy efficiency and sustainable practices (and increase high-performing buildings) in the residential construction industry.

Key Workshop Outcomes

1. The key cross-industry issues impacting the construction of high-performance buildings are: knowledge and skills, quality control and regulatory compliance. Targeted education and skills training programs should be developed to address these issues.

2. Formal education continues to be vital to the sector but must be made accessible and relevant, requiring the development of targeted resources for education institutions and CPD in industry associations.

3. The lack of cross-sector communication and systems-thinking between the trade and supply chain silos are negatively impacting the delivery of high-performing homes. Uniform "system-based" education and cooperative skill development across building industry sectors may encourage more integrated and mutually accountable work teams.

Next Steps

An overview of the CSHI and NEPP Measure 32 (NEEBP Phase 3) was presented to participants at the opening and conclusion of the workshop. OEH and DSD will develop a plan (in consultation with industry) for the second workshop, which will be held at the end of November.

The purpose of the second workshop will be to work through priority knowledge and skill needs, and to co-design a methodology for development and delivery of relevant education and training products.

OEH and DSD would like to then partner with industry peak member and training organisations in 2017 to develop resources suitable to address priority energy efficiency compliance, sustainability knowledge and skill needs in the residential construction sector.

The following timeline has been proposed (subject to consultation and funding):

Workshop 1 13 October	Industry provides insights into priority knowledge and skill needs for training in residential construction.
Planning Oct - Nov	DSD and OEH develop a plan based on industry insight
Workshop 2 November	Work through priority knowledge and skill gaps, content development and cross-sector delivery options
Development Dec - Jan	Partnering with industry, OEH and DSD develop content and delivery options
Workshop 3 2017	Industry partners reconvene to review what has been developed and support rollout planning and logistics
Rollout 2017	Rollout of train the trainer and information campaigns


5
GROUND
7
SECOND FIX
8
HANDOVER

Attendees

Thirty-two individuals from the residential construction industry participated in the Construction Industry Skills Workshop. All participants that attended the workshop agreed to have their details shared with those present to facilitate further engagement between workshops.

Organisation	First Name	Last Name
Air Infiltration and Ventilation Association	Jesse	Clarke
Air Infiltration and Ventilation Association	Sean	Maxwell
Alistair Coulstock	Alistair	Coulstock
ASK Property Consultants	Abdul	Khan
Australian Architecture Association	Tone	Wheeler
Australian Building Sustainability Association	Chris	Lockhart Smith
Australian Glass and Glazing Association	Warren	Overton
Australian Institute of Architects NSW Chapter	Murray	Brown
Australian Institute of Refrigeration Air Conditioning and Heating	Phil	Wilkinson
Australian Living	Anthony	Lieberman
Australian Living	Cameron	Rosen
Australian Sustainable Built Environment Council	Suzanne	Toumbourou
Australian Windows Association	Tracey	Gramlick
Building Designers Accreditation & Training	Les	Dickson
Building Designers Association of Australia	Dick	Clarke
Building Products Innovation Council	Rodger	Hills
Building Professionals Board	Andrew	Clift
Building Professionals Board	Jose	Sevilla
Construction Industry Training Board	Mark	Gosden
CRC for Low Carbon Living	Stephen	Summerhayes
SA Department of State Development	Sabina	Douglas-Hill

Commonwealth Department of Environment and Energy	Angie	Marlow
Housing Industry Association	Kristin	Brookfield
Housing Industry Association	Michelle	Harrex
Insulation Council of Australia and New Zealand	Dennis	D'Arcy
Master Builders Association of Victoria	Philip	Alviano
Office of Environment and Heritage	Rachel	Haley
Office of Environment and Heritage	Ryan	Skinner
Pointsbuild	Michael	Tomlinson
Sustainability Supply Chain School	Robin	Mellon
TAFE – South Western Sydney Institute	Greg	O'Neill
TAFE – Western Sydney Institute	Greg	Cheetham
TAFE NSW	Sue	Gibbins
Think Brick	Paul	Waterhouse
WeldonCo	Melissa	Neighbour

Workshop Agenda

Date: 13 October 2016

Time: 9:00am – 4:00pm

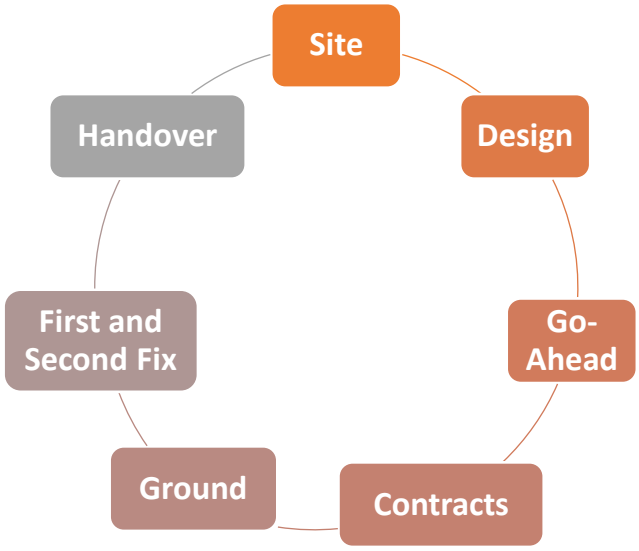
Venue: Vibe Hotel, 111 Goulburn Street, Sydney NSW

Time	Activity
8:30am	Arrival tea and coffee
9:15am	Welcome and housekeeping
9:25am	Attendee introduction
9:45am	Building cycle line-up
9:50am	Building blocks of high-performing buildings
10:05am	Cracks in the foundation of high-performing buildings
10:20am	**Morning tea**
10:50am	Building blocks and cracks – report out
11:10am	Presentation 1: OEH and DSD
11:30am	Issues and clustering
12:00am	**Lunch**
1:30pm	Presentation 2: Tone Wheeler
1:50pm	Understanding the challenge – “The 5 Why’s”
2:25pm	User empathy
2:45pm	Rapid Prototyping: training and information programs
3:35pm	**Afternoon tea**
3:35pm	Issue Prioritisation
3:45pm	Closing discussion and next steps
4:00pm	**End workshop**

Knowledge and Skill Silos in the Residential Building Cycle

Participants were asked to form their own working groups based on where they are engaged in the building cycle. The following seven groups were created:

1. **Site:** land development, land and infrastructure planning, ESD.
2. **Design:** Concept, design and construction drawings, certifying, ratings, specifications and costing.
3. **Go-ahead:** regulation, approvals, compliance, engineering and quality assurance.
4. **Contracts:** pre-approval, builders, quantity survey, purchasing and supply chain.
5. **Ground:** site works, earthworks, foundations, slab and plumbing.
6. **First and second fix:** waterproofing and DPC, framing, roofing, masonry, insulation, glazing, rendering, plumbing, electrical, fit-out and services (HVAC, PV and HWS), plastering, painters and landscaping.
7. **Handover:** lock up, commissioning, final inspection, occupancy permits, client handover.



Within these groups, participants were asked to brainstorm the individual components (or "building blocks") that contribute to high-performing buildings, and then to combine their efforts on to a single sheet (depicting an image of a house) for reporting out.

The most critical elements were placed closer to the foundation, while the less critical were stacked on top. Participants were asked to address the following:

- **What do construction professionals need to know to deliver high performance buildings?**
- **What mindset do construction professionals need to have in order to deliver high performance buildings?**

- **How do construction professionals need to interact with others to deliver high performance buildings?**
- **How can construction professionals be supported to deliver high performance buildings?**

Following on from this, each participant was asked to identify the factors ("cracks") that compromise compliance and energy performance of a building, and then combine the components onto the one sheet. Participants addressed the following points:

- **What are the critical or incremental events, decisions, and mindsets that can compromise compliance and energy performance?**
- **In a changing industry, what are the skills gaps that can compromise compliance and energy performance?**

After reporting out, all participants discussed both the successes and failures of high-performing buildings and developed a shared understanding how the issues cut across different parts of the building cycle. These was analysed later in the workshop, and will be further reviewed in Workshop 2. The key findings are listed below:

Group 1: Site

- Inadequate resourcing to enable community engagement in residential and precinct planning and development.
- Success is not just about yield and density - planning needs to think about needs and not dollars.
- Integrated land planning needs to account for design, solar access, transport and community amenity and health.
- There needs to be a 'big vision' to breakdown the silos between players in development and construction.
- Metrics need to be defined - what is a successful community?
- We all have a part to play, but we have all been indoctrinated into the system.
- Planning policy driven by vested interests. – prevents needs-based and best practice land use policy.
- If a value can't fit in a calculator – it is not valued.
- Huge skills gaps in understanding design, high performance building and integrated systems thinking
- Trades and suppliers must learn to think broader – is a particular solution right for the situation?

Group 2: Design

- Consumers won't pay for good design. Consumers and designers are designing houses for short term investment (best returns) instead of a long term functioning home. Focus on cheapest building cost for maximum selling profit.

- Designers need broader and better tertiary training and a holistic understanding of building science, heat transfer mechanisms, product performance, etc.
- There needs to be more appreciation for the NCC - rather than just scraping by with compliance. Compliance is very loosely applied in practice.
- Designers generally are not as familiar with NCC as they need to be.
- Disconnect between good design and practicality, compliance needs and affordability of build. We need better integration between elements of the NCC. Designers need to design for quality and achieve outcomes rather than just gadgets.
- We need a holistic/system and quality installation/pride mindset.
- There is poor alignment between design specification and actual build (poor interpretation plus substitution).
- Designers rely on trades to interpret their design and vision – this increases risk.
- Designers would benefit from better knowledge of material choices, embodied energy, climate appropriateness, performance and interaction.
- Holistic design must include optimum appliances and energy systems.
- Carbon reduction of materials used is worth more than carbon reduction in future operations.
- The higher the performance requirements the greater the need for bespoke design.

Group 3: Go-Ahead

- There needs to be a better understanding of the approval process, and equal understanding of the performance impacts of when it's not done right.
- Everyone should use a checklist for what is a Code compliant and energy efficient building.
- The compliance and verification process is inconsistent. Regulations are complex and hard to interpret; there is no consistency or capacity to keep up with regulatory or Code change.
- Builders must understand Code requirements and the approvals process in more detail and depth and regulators need to understand energy design components and rating certificates.
- Regulators must understand product capabilities - understand ratings, performance and interaction of products as well as innovative design and products in a changing market.
- Regulators need to understand building physics and supply chain factors.
- There is a culture of non-compliance throughout the building cycle.
- There is a skills gap that needs to be addressed (compliance, data capture, materials). Role for “best practice code compliance officer”.

Group 4: Contracts

- There is a need to define high performance buildings, why they are relevant to consumers and the industry and what their benefits are.
- There needs to be a mechanism for checking work and measures - what happens if jobs are not done properly?
- How can trades do the job properly, but still save money?

- Trades and suppliers are often time poor – how will they be educated in these circumstances? What is the best, fastest and cheapest way to learn?
- There are compounding errors as work isn't checked.
- Purchasing is often just about the job, not the lifetime of the project/home.
- Education can be expensive and 'old school'.
- Why would a trade do their job properly if no one else does – cultural issue? What's the point if work isn't checked?
- Short term wins are often more important to medium and long term wins.
- Necessary information is often spread across too many sources.

Group 5: Ground

- .All trades need to understand the basics of building physics, product specifications and performance and solar passive design.
- Need to support training and awareness, CPD needs to be low cost and relevant. Be trained and paid properly.
- Consumers need to understand the benefits of high performing buildings – there are easy ways to achieve and go beyond compliance.
- Trades and suppliers need to know and respect their own role and the role of others. Work as a team to deliver a product that complies.
- There isn't enough control over or site supervision of sub-contractors. No individual responsibility or accountability. It's too easy to blame others.
- There is no communication between trade sectors and they are operating in silos.
- Lack of understanding of terminology and language. Cultural issues, language issues – ESL is very common in these site work trades. Poor understanding of the Code and regulations.
- Trades and suppliers need to be aware of sustainability and how trades contribute to energy efficiency and sustainability outcomes.
- Overcome "old school thinking" - many just do work the way it's always been done.

Group 6 and 7: First and Second Fix

- Poor knowledge of the code and care factor has a significant impact upon compliance. Changes in BCA towards performance metrics will impact building performance and accountability.
- We need to define high performance buildings and the role (and benefits) of sustainability. Trades must understand their role in delivering design for minimised operational energy.
- Builders need to understand connection between environmental health and personal health.
- In some circumstances, trades act as "de facto" designers. Information needs to be transferred accurately though the building process. Value innovation.
- Designs need to be better specified and detailed. Need to clarify when design is lacking (not make it up on the job). Collaborative problem solving.
- Understand how each part of the cycle impacts – have clear expectations, checklists, guidelines, clear and simple - plus consumer demand.

- Provide training, CPD, websites, just in time training, better access to instructions.
- All trades need to know basics of heat flow physics and ability to interpret ratings, regulations, designs and specifications.
- The building team needs to follow design through to as built through to performance.
- There needs to be an increase in understanding and respect for other trades and a role for peer networks.
- Manage risks of poor workmanship, manage and account for flow on effects of damage to performance systems.
- Must guarantee trained and qualified contractors and progressive inspection and verification at each step.
- We need penalties for non-compliance with Codes and regulation. The industry is dollar driven – best practice is sometimes not the number one priority.

Group 8: Handover

- There is a need for a legal framework across the value chain, a regulatory framework and consumer protection, as well as an increase in accountability.
- All participants in a project must be accountable.
- There is a lack of general knowledge for BASIX and NatHERS in all practitioners.
- Lack of information and understanding - how to explain the benefits of sustainability and energy efficiency to the homeowner. There is a need to address the knowledge and communication problem.
- There is a lack of training for Real Estate Agents. They drive the consumers to invest wisely and value the design.
- Private certifiers need to be across all parts of a build.
- Local councils need to ensure that an Occupational Certificate is up to speed.
- There is currently no verification of building performance. 5 years after BASIX, a building could be degraded.
- Builders and real estate agents need to have protection.

Key discussion points:

- Compliance needs to be enforceable and checked regularly throughout a build
    - Compliance is the "worst you can get away with"
    - High-performance is different to compliance
- The lack of cross trade accountability needs to be addressed throughout the system
    - Silos are driven by performance metrics in the code.
- There is less and less accountability put on the people documenting a build. This results in the risk being pushed on to trades
- There is currently no training available in Australia on building science
- We need to look at where success is carried out in the rest of the world.
    - Germany is successful because they collaborate. They share successes and failures. Then the whole industry lifts
    - Need to incentivise industry to share and reduce silos
- We need cross pollination in the education of trades
- The "my job stops here" mentality limits in how far certifiers go. A project manager needs to be constantly involved
- Capacity needs to be built from apprentice training and up. The problem could be addressed with a “bottom up” approach, instead of relying on existing trades to change their behaviour
    - Students learn about sustainability in school, they will be more understanding and open to learning about the associated benefits to themselves and their clients

Identifying the Drivers and Barriers in High-Performing Buildings

A key aim of this workshop process was to identify a set of challenges that commonly impact trade performance, ability to achieve compliance and the construction of high-performance buildings.

To achieve this, participants were asked to generate a list of what they believe are the most critical, systemic and commonly shared issues preventing compliance and energy performance in residential builds. These issues were written individually on single pieces of paper, shared with the group and then clustered together in categories.

There were a considerable number of issues and, after a group discussion, it was agreed that the issues could be condensed into 5 key “challenge groups”. Participants ranked these groups in order of importance to achieving compliance and high-performance buildings, as follows:

1. Knowledge
2. Quality
3. Regulation
4. Purpose
5. Cost

All issues have been clustered below under their key challenge groups:

Knowledge

- Information needs to be kept simple
- Builders don’t have sales skills to explain value and opportunity for energy efficiency
- Need research into housing performance and energy use/cost (hard data for decisions)
- Lack of knowledge
- Knowledge transfer – getting the information out to the people who need it
- Specialisation with no driver/reward for integration
- Lack of NCC knowledge
- Need to educate consumers
- Lack of ongoing training and CPD
- Lack of professional development structure (and requirements) for most trades
- No mentoring, no site supervisors to instruct in appropriate technique
- No sanctions or inspection to catch people for lack of skill – or to motivate learning
- Difficulty in moving existing practitioners to learn new things (upskilling)
- Develop Design & Specification and product performance interpretation skills
- Need more understanding of building physics/science
- There is no building science education

- No central information repository or link between research and information and skills (like there is in USA, Europe, UK)
- Information management asymmetry
- Knowledge of rating tools, inability to address changes and new things, understanding stringency, understanding multiplicity of tools and approaches (outcomes)
- Need for central industry data source – go-to place for easy access
- Challenge: educate/communicate to the public the benefits of high-performing building
- Lack of collaboration in trades, skills, supply chain - no understanding of other trades
- Poor materials science knowledge
- Poor understanding of energy efficiency
- Not enough info and too complex when available

Quality

- Industry is in silo's – quality can be expensive, alignment takes time
- Focus on profit/speed vs. best compliant build
- Conflict/disconnect between design standards and product standards
- Conflict between collective responsibility and individual liability
- No quality definition
- No quality benchmarks for any trades
- No quality consistency on national scale
- Lack of quality accountability
- Cost vs. quality pressure
- Pride of work vs. cutting corners
- Designing to standards is fragmenting liability/response
- Lack of integrated project management
- Poor specification interpretation
- Lack of focus on build quality
- Product substitution
- Short term focus
- Externalities not included
- The owner is the only person with an overview of the whole building project from perspective of quality and compliance – but often not even allowed on site

Regulation

- Not delivering comfortable/sustainable homes
- No sanctions for non-compliance
- No site overseer
- Lack of management to see designs No policing or verification
- Minimum standards too low
- No consumer protection
- Very complex system

- Trying to be all things to all trades
- Doesn't start with clear objective and purpose
- Different variations between states
- Different ways to implement/interpret
- Complexity of regulations and codes
- Lack of compliance inspections
- Fragmented system – multi-agency and government
- Different government regulation, legislation and policy
- As build performance verification
- No on-site overseer
- Embedded practices
- Lack of policing surveillance
- Risk averse building practices
- Lack of sanctions
- Lack of government commitment
- BCA is piecemeal/not holistic
- Language needs to be useful and enforceable
- Lack of government commitment
- Performance verification
- No evaluation of other trades work
- Changing demographics from owners to renters – may be opportunity for new focus
- Access of codes and standards (code is free, standards are not
- Lack of compliance inspections
- Private inspectors – conflict of interest
- There are no site managers or overseers anymore. No one sees the big picture

Purpose

- People don't understand relevance of energy efficiency
- No understanding of relationship between home and mental /physical health
- Value of sustainable homes to reduced resource waste and community health costs
- Cross-motivations – emotional, societal, regulatory, science/facts
- Changing mindsets and attitudes of builders and consumers
- Conflict between short and long term. Conflict between my needs/other needs
- Personal benefit – vs – long term benefit (vs global benefit)
- Selling the message – media options, training incentives
- Consumer understanding – drives builders
- Fear
    - increasing housing prices
    - builder liability
    - politically unfavourable

- Mindset
    - Cheap is not better
    - Long-term investment
    - Invest in building fabric
- Lack of professionalism and “pride in work”

Cost

- No incentives for improving performance of existing housing stock
- Cost and value (business case)
- Financial model driving unrealistic ROI
- “What’s in it for me” mentality (practitioner, home buyer and home owner). Finance vs environmental, long term vs short term
- Look existing business case
- Split incentives
- Cost is a critical element to the building outcome
- Invert hierarchy of needs
- The client is asking for these outcomes due to running costs
- Big business influence
- Finance/valuation
- There is no “valuation” of outcomes, nothing tangible to make cost decisions against
- Cost drives economic decisions/dictates hierarchy of needs – no info available
- Access to Codes and Standards for builders inconsistent (Code is now free but Standards cost)

Understanding the Challenges – “The 5 Why’s”

After each of the issues were appropriately combined under the key challenge headings, participants divided into five teams – each to address a key challenge cluster.

The five teams were asked to each agree upon a title or "challenge statement" for the cluster of issues. Participants then reviewed their challenge statement and sequentially worked through WHY it’s a problem. Teams were encouraged to move beyond the initially identified problem to eventually delve deeper and discover the key driver for each issue.

Each participant initially worked individually, and then came together with their group to combine their versions into a single shared product. A discussion was held to confirm each of these underlying challenges, or “key drivers”. Each challenge statement, questioning process and key driver have been included below:

Knowledge

Challenge Statement: Our industry needs to overcome a lack of connected and integrated knowledge across the whole spectrum of stakeholders.

WHY: Knowledge tends to get siloed - this needs to be constantly addressed.
WHY: Pace of change is leaving people behind – must keep it current, keep people in touch.
WHY: Cultural resistance to change - fear of change, risk management, resistance to formal learning.
WHY: Trades communicate differently to different audiences, including cultural groups (trades, professionals and consumers) - different cultures embrace learning differently.

Key Driver: There is a great variety of attitudes to cross-cultural knowledge, learning, communications and styles - some embrace and some do not.

Quality

Challenge Statement: Define quality to achieve compliance and high-performance building.

WHY: Focus on ‘profit and speed’ vs. ‘compliant build’ - builder isn't focused on quality.
WHY: Subcontractor environment - risk-finance models.
WHY: Delivery time vs. long term value.
WHY: Lack of accountability and enforcement to define what quality is.
WHY: Lack of incentive.

Key Driver: There is no established system to deliver quality throughout the whole value chain. Quality of documentation at approval stage is weak - need to ensure quality roles in every part of the value chain.

Regulation

Challenge Statement: regulations is not fit for purpose

WHY: Not delivering comfortable or sustainable homes.

WHY: There is no harmony – disparity between state and federal governments, variations in interpretation and implementation – complexity of regulations, readability and usability.

WHY: The NCC drafting is piecemeal as opposed to holistic.

Key Driver: There is a lack of checks, measures and sanctions - no regulation at all levels.

Purpose

Challenge Statement: The purpose of high performance is not clear to consumers.

WHY: People don't understand the relevance to them (homeowner and occupant).

WHY: Not enough information in the right places or communicated in the right way – terminology needs to be reviewed.

WHY: It's complex; emotionally, regulatory, financially, societally.

WHY: Short vs. long-term thinking for builders, and the problem of split incentives.

Key Driver: People only care about benefits and relevance to themselves.

Cost

Challenge Statement: cost is a critical element to the building outcome.

WHY: It drives consumer decisions.

WHY: It dictates the hierarchy of needs.

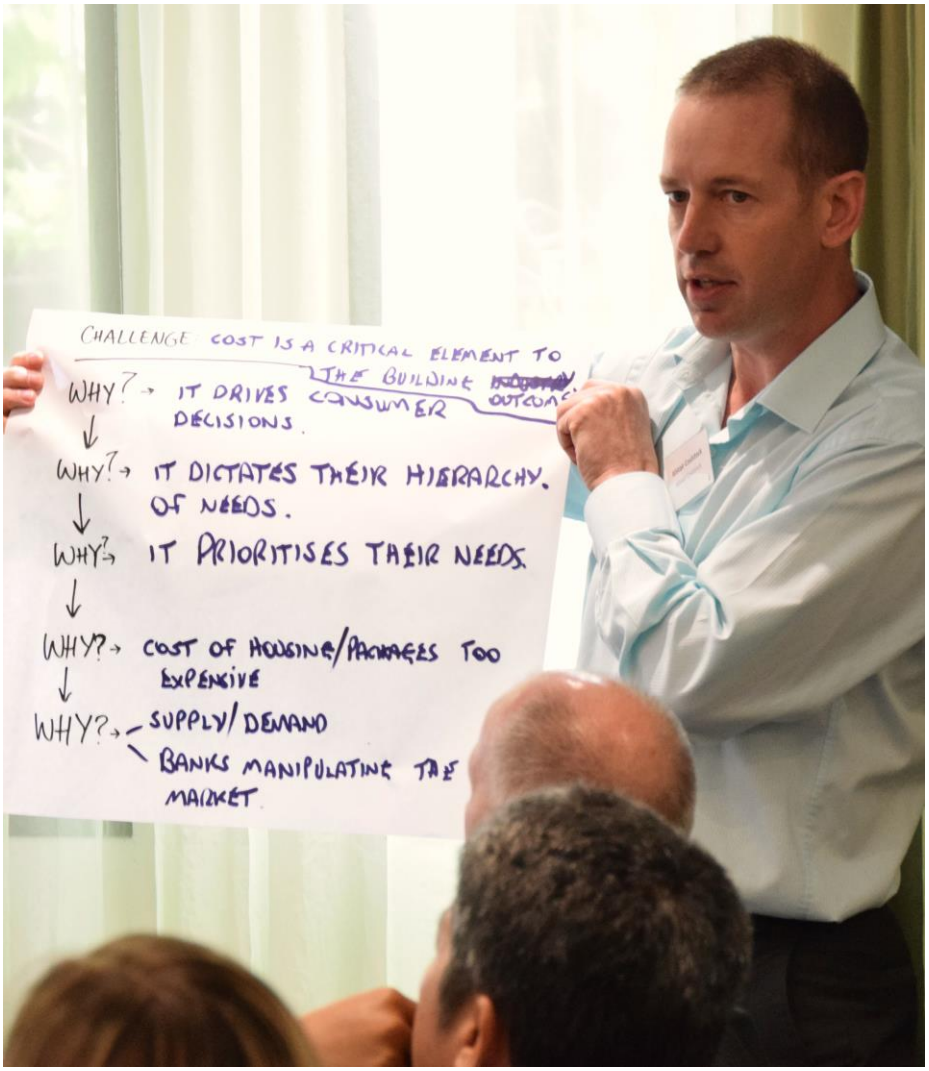
WHY: It priorities those needs – trades and consumers must choose the most vital.

WHY: Costs of housing and land packages are too expensive.

Key Driver: Supply/demand issue - not enough approvals over the last decade.

Key discussion points:

- All participants agreed that communication is a core issue across all levels of the building cycle. This must be addressed.
- Australia's construction industry would benefit from a holistic education and training program. A core component of education and training must be consistent between industry sectors. In some cases, training should not be separated per subject area, but be more integrated.
- Building experts are, in many cases, the wrong people to pass on knowledge and understanding and be of the source of technical education. Many trades-people do not learn best from class-based technical knowledge but require more "hands-on" and practical instruction. The mode of instruction is key.
- Education must be practical and, above all else, be understood in the "big picture" and made immediately relevant and practically and commercially important to the learner.
- "High-performance", "quality assurance" and "code compliance" must be clearly defined and understood in the context of integrated system thinking and cross-sector or mutual accountability for the final product.



Engaging Industry in Learning and Change

Following on from the previous activity, participants identified how builders, construction workers and trades could respond to each of the key drivers, and what actions could help enable a change in behaviour.

This activity was valuable in developing a shared understanding of how industry leaders might influence the behaviour of trades and professionals through information campaigns and training programs.

For each of the key drivers, participants were asked to identify:

- **How construction professionals currently respond to the identified challenge**
- **What they would be prepared to do to fix the problem**
- **What might enable them to change**

The following tables were constructed by each group to address each key driver:

KNOWLEDGE		
CURRENT RESPONSE	**WILLING TO FIX**	**ENABLERS**
• Seminars – often only partially integrated with other parts of industry • Promote courses • No consistent approach to learning resources • Key qualifications have limited availability and need to be demand driven (e.g. NatHERS)	• Industry organisations	• Courses • Site demonstration • Finding funding? • Strong visual components • Understand the psychology of recipients • Tailoring modes of delivery to suit

QUALITY		
CURRENT RESPONSE	**WILLING TO FIX**	**ENABLERS**
• Not my problem • Minimum compliance attitude • I can't afford to offer more than my competitors • The client doesn't ask for sustainability and quality • Race to the bottom	• Client needs to define quality expectations (standards and regulation) **eg** blower door ($500) and thermal imaging • 3rd party check agreed to in contract (offered by builders as a value-add to improve marketing)	• New model contract that includes as-built/as-perform requirements • Banks/insurance to ask for and recognise the above • Two-hours required for an as-built inspection verified against documentation for energy efficiency compliance requirement

		• Photographic or video evidence • Use of mobile app technology to check QA and verify each building stage, each tradie and all products. • Video about trade interaction on a worksite to respect each other's work

REGULATION		
CURRENT RESPONSE	**WILLING TO FIX**	**ENABLERS**
• Frustration • Avoidance • Can't read or understand • Indifference • Scepticism	• Free training • Upskill if not too much time/cost effective	• Simple, readable code to apply • One code for new build, one code for existing buildings • Code detail or guidelines written for each building sector • Training in compliance.

PURPOSE		
CURRENT RESPONSE	**WILLING TO FIX**	**ENABLERS**
• Ignore • Focus on own silo/part • Lack of understanding and awareness • Not joining dots along the process • Cynical – not my problem • Belief that it has premium cost • Don't have time • Wait until it catches up and I have to do it	• Least cost/time and max benefit • If I make more money • If I can watch videos or its on-line and short • If I can find a point of difference • Will listen to change messages if relevant to me • Prepared to do lots of little things	• Peer to peer – builders talk to builders • Right messenger: Fear, greed and laziness must be overcome by correct messaging and positive drivers.

COST		
CURRENT RESPONSE	**WILLING TO FIX**	**ENABLERS**
• Efficiency and processes • Spread the cost risk over the project	• They must meet the "bottom line" • The client to go into deeper debt	• Positive government policy • Financial incentives • Identify and communicate consumer needs and expectations.

Rapid Prototyping: Ideas for Information and Skills Training

Leading on from the previous activity, participants were asked to brainstorm an information or training campaign (or a combination of both) that would best support builders, construction workers and trades to change their behaviour in a way that will address the identified priority needs and challenges - leading to more Code compliant and high-performing buildings.

Participants were encouraged not to limit their group work to short-term options, but to "go big" and work backwards from there.

Participants were asked to identify the following components of the campaign:

Challenge: what does this solve?

Aim: what is the aim/outcome/change they are hoping to achieve?

Who: what is the mix of construction professionals that will benefit from your solution?

How: what approach will be used?

What: what will be the content of their intervention? What is the new knowledge or behaviour to be conveyed?

Participants were given the opportunity to think holistically about solving challenges within the constraints of the key drivers and their target audience. At the end of the group exercise and presentations, all participants voted (using a nominal voting technique) on which campaign would be the most immediately practical and have the greatest cross-industry impact.

This exercise was designed to generate solution-focussed ideas and will contribute material to Workshop 2 and our longer term project planning.

The following campaigns were presented by each of the five groups:

"No More Leaks – NoEL (No Energy Leaks)"	
CHALLENGE:	Poor quality build
WHO:	Consumers, builders and sub-trades
HOW:	As-built inspections included in contract (with energy efficiency focus). Mandatory inspections prior to occupancy to include thermal image and blower door testing. • Skill training and consumer and industry promotion • Site-based trade QR codes linked to "just in time" video instruction on best practice and compliance

	• Mobile App used for inspections that takes photos and links to design, rating and specs. • Cross-trade training to create mutual understanding and accountability.
VOTES:	16

“One Bite at a Time”	
CHALLENGE:	Regulation and Code is not fit for purpose
AIM:	That every building professional in Australia will understand the intent of the NCC / Standards
WHO:	All builders and trade contractors – plus benefit to designers and approval or regulatory bodies
HOW:	Digital guideline to support Code compliance structured by building elements **e.g.** slab, walls, windows, roof, 2nd fix, etc.
WHAT:	Industry research survey responses: top 10 building elements that building professionals ask. Hands on skills learning.
VOTES:	13

“How Tool” App for Trades	
CHALLENGE:	Product / Material Installation failures and poor building and compliance practices
AIM:	Q.A Trade – product/material installation skills
WHO:	Trades and site overseers on site
HOW:	Provide detailed info and “how to” instruction on site. Designed to inform and reinforce upskilling, compliance and best practice.
WHAT:	Broad capacity interactive mobile (cloud based) App • QR reader → “how to” notes and instructional videos. • “Just in time” instruction to reinforce and remind. • Visual instruction → product info and performance and installation notes and videos • Link to ‘electronic building passport’ and QA and verification process – so linked to docs, plans, ratings and specifications.
VOTES:	13

"Time for a Change"	
CHALLENGE:	Educate / communicate to the public the benefits of high performing buildings. Cost is a critical element to the buildings outcome
AIM:	To educate/communicate to the public the benefits of high-performing buildings. Invert the hierarchy of needs
WHO:	Everyone in the supply chain
HOW:	Via media, needs to be consistent with the top-down message
WHAT:	Show how clients are now asking for good buildings outcomes. Justify change to industry.
VOTES:	6

Industry Master Program	
CHALLENGE:	Difficult to each purpose – individual preference. Linked to profession / industry
AIM:	To drive pride and engage in purpose
WHO:	Builder, architecture, real estate
HOW:	Provide detailed info and how to on site to inform and reinforce upskilling
WHAT:	Industry master program to build/demonstrate expertise – structured CPD program ➔ Holistic (OHS, Fire, architecture, sustainability, project management), like masters buy not a university course ➔ Recognise levels of expertise ➔ Bringing recognition of expertise and pride to industry, which is limited to industry goal and purpose All builders should be trained so they can build sustainable buildings. Sustainability and high-performance integrated into every subject.
VOTES:	2

Closing Discussion

The group was brought together to discuss the outcomes from the workshop activities and to reflect on the key outputs and learning outcomes from the day.

Through the 'rapid prototyping' activity, participants were able to start thinking about solutions to the key drivers and began to identify which learning or education resources would be most appropriate for the industry as a whole. This, however, will be further examined in the second Construction Industry Skills Workshop.

Together, it was agreed that although creating an easily accessible mobile site-based app would greatly serve the building and construction industry, it would only be a 'refresher' or 'top-up' – a solid foundation must be established. Therefore, formal education is paramount, requiring the development of resources for educational institutions, CPD and industry associations.

Further industry workshops and agency work will be conducted in coming month to identify and co-design priority skill training products to reflect the best information compiled through consultation and supporting research. The work of all organisations present and their continued involvement in this work is greatly appreciated.

Key discussion points:

- The solution to the vast majority of issues discussed in the workshop is education.
    - Knowledge and education are foundational and require constant review and renewal. Training must therefore be integrated into the job of a trade or supplier.
    - There is a large market for education, as there are many trades and suppliers who haven't been updated with advancements and changes in the building and construction industry.
- Education content that is developed should also be available digitally, with smart phone access.
    - Educators can get access to trades through their smart devices – a complex regulation translated into a simple app.
- Changed requirements to the sustainability and energy efficiency provisions in the National Construction Code and State Regulations has changed how certain parts of the house are built, especially compared to ten years ago.
    - There is therefore a constant need for refreshment and upskilling courses
    - A large potential market for skills training and CPD in the construction industry.
    - The need for training has increased significantly – the modern industry is vastly different to what it used to be (fewer unions and peer- to-peer group communications, resulting in fewer ways to pass on information).

- The trades and suppliers of today need to know a lot more technical detail
    - This information is more complicated, which means there is more to get right (or wrong).
    - Training must be clear, technically correct, integrated across sectors and delivered in ways that enable quick uptake and reskilling for site based workers.
- High-performing homes need to be the industry standard, rather than an add-on when requested. Compliance is being driven by both regulation and consumers.
    - Educated trades need their training to be continuously to be activated - need to do it every day.
    - When there is a higher level of regulation and QA, it will just be the norm.
- Skills must be instilled from courses, training or CPD. Apps should be seen as a 'top-up" to existing quality training as it's difficult to learn properly, and with peer mentoring and guidance, from an App.
    - Primary training must therefore be formal and professional. This can be done through TAFE, CPD or industry associations.
- There is so much information available today that no one is the absolute expert – creating a high-performance building has to be an integrated, cross-industry effort that results in cross-sector understanding and accountability

Key Workshop Outcomes

1. The key cross-industry issues impacting the construction of high-performance buildings are: knowledge and skills, quality control and regulatory compliance. Targeted education and skills training programs should be developed to address these issues.

2. Formal education continues to be vital to the sector but must be made accessible and relevant, requiring the development of targeted resources for education institutions and CPD in industry associations.

3. The lack of cross-sector communication and systems-thinking between the trade and supply chain silos are negatively impacting the delivery of high-performing homes. Uniform "system-based" education and cooperative skill development across building industry sectors may encourage more integrated and mutually accountable work teams.

In addition, there was a shared commitment for the group, with additional expertise from the construction industry knowledge and training sector, to re-convene in November to continue to flesh out the identified knowledge and skills requirements and work together to develop a cross-industry development and delivery strategy for 2017.

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