The Innovation Hub

for Affordable Heating and Cooling

Lesson Learnt Report

Subtropical and Tropical Mixed-use Buildings

Project IDS 13 and 14

19 November 2021

QUEENSLAND UNIVERSITY OF TECHNOLOGY

About i-Hub

The Innovation Hub for Affordable Heating and Cooling (i-Hub) is an initiative led by the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH) in conjunction with CSIRO, Queensland University of Technology (QUT), the University of Melbourne and the University of Wollongong and supported by Australian Renewable Energy Agency (ARENA) to facilitate the heating, ventilation, air conditioning and refrigeration (HVAC&R) industry's transition to a low emissions future, stimulate jobs growth, and showcase HVAC&R innovation in buildings.

The objective of i-Hub is to support the broader HVAC&R industry with knowledge dissemination, skills-development and capacity-building. By facilitating a collaborative approach to innovation, i-Hub brings together leading universities, researchers, consultants, building owners and equipment manufacturers to create a connected research and development community in Australia.

This Project received funding from ARENA as part of ARENA's Advancing Renewables Program.
The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.

Primary Project Partner

i-Hub Lessons Learnt Report

Guidance notes for completion of the Lessons Learnt Report:

- This report is intended to be made public.
- Please use plain English, minimise jargon or unnecessary technical terms.
- Please use your organisation's branding for the report.
- The report should meet your organisation's publishing standards.
- Please use one template per each major lesson learnt and include as many as are relevant for your sub-Project. If what you learnt is more technical, this is the section to include technical information.
- The content of these Lessons Learnt Reports can be compiled (and updated, where necessary) for inclusion in the (public) Project Knowledge Sharing Report, for submission at the completion of your sub-Project.

Lead organisation	Queensland University of Technology		
Sub-Project number	IDS 13 and 14		
Sub-Project commencement date	03/03/2021	Completion date	30/06/2022
Report date	19 November 2021		
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Lessons learnt

Lesson learnt #1	Co-design is a terminology that needs clarification					
Category	Other: Social / Cultural / professional practice					
Choose from:	*Technical*	*Commercial*	*Social*	*Regulatory*	*Logistical*	*Other (specify)*

Describe what you learnt about this aspect of the Project.

The term 'co-design' appears to be understood differently by different professions. Architectural students appeared to interpret it as 'others' contributing to 'their' design, i.e. the architect being in charge of the design, and inviting input from other parties. The architect can then choose to incorporate this input or not.

Non-architecture participants (students and consultants) also appeared to reinforce this idea, by seeing themselves as technical advisors or contributors to specific aspects requested by architects.

These views / roles may be reflective of common practice.

Please describe what you would do differently next time and how this would help. What are the implications for future Projects?

In future IDS activities we would include, at the initial stage, 'co-design' as a terminology that needs to be discussed by participants. Participants in an IDS project would need to collectively determine how co-design will be interpreted and implemented for that particular project.
Some questions that need to be resolved within an IDS team include:

- Are all participants considered equal contributors to the design, albeit with different inputs? Or is there a hierarchy of designers?
- Who, within the multidisciplinary team, should be the 'manager' of the design process?
- How will decisions about inclusion/exclusion of design ideas into the overall design be made?

If your Project learnings have identified any knowledge gaps that need to be filled, please state it below.

Please include any other information you feel is relevant or helpful in sharing the knowledge you learnt through this stage of the Project. This may be qualitative or quantitative and may include a graph, chart, infographic or table as appropriate.

Lesson learnt #2	Integrated thinking is difficult for all participants at the early stage where no building form is yet determined					
Category	Other: professional practice					
Choose from:	*Technical*	*Commercial*	*Social*	*Regulatory*	*Logistical*	*Other (specify)*

Describe what you learnt about this aspect of the Project.

Both architecture and non-architecture participants experienced difficulty in approaching energy efficiency, renewable energy, HVAC and sustainability (ESD) considerations and options at the initial phase of the project (prior to the emergence of any building form). It may be that engineering and ESD professions typically provided input at a later stage of design development, and that architects first want to consider building form (before function). This presents a challenge to the IDS goal. This challenge was also exacerbated by the very different levels of technical knowledge between architecture, engineering and construction management students; and between students and academic/industry professionals.

Please describe what you would do differently next time and how this would help. What are the implications for future Projects?

For future IDS projects within a university setting, it would be beneficial to first address the knowledge gap in architectural science and building services, by providing units/subjects that could be undertaken by students in architecture, engineering or construction management degree programs.
It would also help to break the IDS 'whole of project' concept into discrete segments, so that inexperienced (early career) professionals can focus on one aspect at a time, rather than trying to integrate all requirements into a single project.
For professional practice, there may be a need for some interdisciplinary workshops to determine ways in which design concept can emerge collectively prior to building form being established.

If your Project learnings have identified any knowledge gaps that need to be filled, please state it below.

Please include any other information you feel is relevant or helpful in sharing the knowledge you learnt through this stage of the Project. This may be qualitative or quantitative and may include a graph, chart, infographic or table as appropriate.

Lesson learnt #3	Procurement methods can inhibit or support integrated design					
Category	Commercial (contract management)					
Choose from:	*Technical*	*Commercial*	*Social*	*Regulatory*	*Logistical*	*Other (specify)*

Describe what you learnt about this aspect of the Project.

All building projects are subject to a procurement contract of some sort (e.g. fixed price contracts such as lump sum or Design and Construct; or collaborative contracting such as early contractor involvement or managing contractor). Integrated Project Delivery (IDP) contracts appear to be best aligned with the integrated design objectives and process, particularly an Alliance Contract. Refer to the IDS13/14 50% reports for a comparison of contracting models and outcomes.

Please describe what you would do differently next time and how this would help. What are the implications for future Projects?

For IDS projects within a university setting, we would advise that the participant team establish an IDP Alliance Contract – both as a means of agreeing to roles, responsibilities, values and shared risks; and as a means of emulating what could be industry 'best practice'.

For industry application: it would be helpful for professional bodies (e.g. Australian Institute of Architects; Engineers Australia and Australian Institute of Builders) to examine some emerging Alliance Contract forms (from the UK) and collectively develop Australian appropriate contract templates that can be used to enable integrated design to occur from a commercial and legal perspective.

If your Project learnings have identified any knowledge gaps that need to be filled, please state it below.

Please include any other information you feel is relevant or helpful in sharing the knowledge you learnt through this stage of the Project. This may be qualitative or quantitative and may include a graph, chart, infographic or table as appropriate.