Pre-Forum Primer

Pathways to Net Zero Precincts

Urban Design Forum



pathways to net zero precincts

Curtin University

RACE for 2030

Project background

Pathways to Net Zero Precincts is a three-year national research project exploring practical strategies for transitioning the built environment towards net zero emissions. It is a collaboration between Curtin University, the RACE for 2030 Cooperative Research Centre and a consortium of industry and research partners from across Australia, with live case studies providing the testing ground for real-world interventions.

Precincts, unified areas of urban land typically containing a mix of private and public development activities supported by shared infrastructure,[1] can offer a strategic scale for climate action interventions. Cities and urban centres account for a large share of global greenhouse gas emissions, and the precinct scale is large enough to justify meaningful investment in infrastructure and technologies (such as rooftop solar, batteries and electric vehicle charging) yet small enough that these can be coordinated through good governance to operate reliably and affordably.

In this precinct-focused project, a variety of industry-led case studies across Australia form the focus of the research - spanning residential, mixed-use, light industrial and transit-corridor typologies - and include sites at every stage of development from early planning through to construction and operation, enabling continuous learning. The research has been organised across four integrated pathways including Urban Design, Certification, Governance Practices, and Consumer Energy Resources and Grid Integration.

This document focuses on the Urban Design Pathway, as a primer to the keynote presentations and panel discussions at the NZP Urban Design Forum being held on 1 October 2026. The Forum is being held as part of Curtin University's School of Design and the Built Environment Graduate Research Exchange (GRX); see the program details later in this primer.

[1] Thomson, G., Newton, P., Newman, P. & Byrne, J. (2019). *Guide to Low Carbon Precincts*. Cooperative Research Centre for Low Carbon Living, Curtin University and Swinburne University.

How can urban design contribute to a net zero trajectory in the built environment?

The Urban Design Pathway to net zero precincts examines how urban design decisions and characteristics can enable the transition to a low-carbon built environment and help deliver precinct-scale net zero outcomes. It investigates how urban form, energy systems, water sensitive urban design and green infrastructure influence emissions, climate resilience, liveability, affordability and development feasibility. The pathway aims to produce practical, spatial design guidance and tools to support practitioners and decision-makers with accelerating the planning and delivery of net zero aligned precincts.

Over the past three years, research has drawn on interviews with industry professionals, utilised scenario modelling, and analysed case studies from across the country to tease out the connections between sustainability ambition, precinct planning in practice and project realisation. A number of innovative modelling tools have been central to this work, including Digital Twins and the development of Envision Tomorrow Australia (ET-Oz) – an end-to-end methodology and tool kit[2] to support decision making when balancing sustainability goals and project feasibility.

What is a net zero aligned precinct and how do we design for it in the built environment?

As the world works toward net zero and the goals of the Paris Agreement,[3] and sector-specific decarbonisation plans emerge, claims and references to 'net zero' developments are becoming increasingly common. Yet the term is often used loosely and sometimes misleadingly. There is currently no settled industry definition, no authoritative academic consensus, and no third-party certification for a net zero precinct, either in Australia or internationally.[4] For developers, financiers and asset owners, this creates real exposure: a net zero claim is a quantifiable, emissions-related sustainability claim and, if it is not accurate

[2] Envision Tomorrow Australia (ET-Oz) is an open-source, precinct-scale scenario planning and decision-support tool being developed by the Urban Design Pathway, adapted from the US-based Envision Tomorrow platform. See Pathways to Net Zero Precincts, 'Urban Design', netzeroprecincts.au/urban-design/ (accessed September 2026).
[3] United Nations, *Paris Agreement* (2015), unfccc.int/process-and-meetings/the-paris-agreement.
[4] See Net Zero Certification for Urban Precincts, Pre Forum Paper, netzeroprecincts.au/wp-content/uploads/2024/11/NZP-Certification-Pre-Forum-Paper-Vo6.pdf.

and well-supported, it could constitute misleading and deceptive conduct under Australian consumer law and, for qualifying entities, may be scrutinised as a climate-related target under AASB S2.[5]

Within the built environment sector, precincts are one of the most effective scales at which to pursue Australia's net zero transition. They allow co-ordinated action across buildings, infrastructure and public realm, can combine precinct-wide initiatives (e.g. integrated transport and shared energy systems) with lot-scale actions (e.g. energy-efficiency retrofits, as distinct from adaptive reuse), while linking into broader urban systems such as the electricity grid and circular economy flows.

Industry practice to date has focused almost exclusively on operational carbon, the emissions from energy, water and day-to-day use, because pathways and rating tools for it are mature. But as operational emissions fall, embodied carbon (locked in at construction, renovation and demolition) is set to become the dominant emissions source for the built environment by 2050. Transport carbon remains a significant and only partially addressed component.

In this research, we use the term 'net zero attribute' to refer to a feature of the built environment of a precinct that achieves an emissions reduction, a carbon removal, or an adaptation action. Net zero attributes are the levers that support the transition of the built environment to net zero. Net zero-aligned precincts will contain a set of net zero attributes. This is a working definition developed for the project, and the Forum offers an opportunity to test and refine the concept and its language with industry.

Adaptation is the process of adjustment to actual or expected effects of climate change.[6] This adjustment may occur through direct on-the-ground measures (e.g. protective infrastructure), development controls (e.g. to avoid climate risks), extreme event response and recovery planning, changes to the design of buildings and urban areas, and other measures.[7]

When we use the term 'adaptation action', we are referring to a feature of the built environment of a precinct that supports local and state adaptation plans and aligns with the National Adaptation Plan[8] vision for settlements, buildings and infrastructure that are resilient to the impacts of climate change and are future-proofed to ensure the health, wellbeing, safety and liveability of our communities. These features may reflect aspects of how precincts are planned, built, and modified to mitigate climate risks (e.g. extreme events like floods, bushfires, and storms), and to sustain property liveability, affordability and insurability, and human health and safety in changing climates.[9]

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[5] See Australian Accounting Standards Board, *AASB S2 Climate-related Disclosures* (September 2024); and Australian Competition and Consumer Commission, *Making Environmental Claims: A Guide for Business* (December 2023), accc.gov.au.
[6] Department of Climate Change, Energy, the Environment and Water (2025), *National Adaptation Plan*, dcceew.gov.au/climate-change/publications/national-adaptation-plan.
[7] See, e.g., the Victorian *Built Environment Climate Change Adaptation Action Plan 2022–2026* and the draft *Built Environment Adaptation Action Plan for 2027–2031*, climatechange.vic.gov.au.
[8] Department of Climate Change, Energy, the Environment and Water (2025), *National Adaptation Plan*, dcceew.gov.au/climate-change/publications/national-adaptation-plan.
[9] Newton, P.W., Newman, P.W.G., Glackin, S. & Thomson, G. (2022). 'Climate Resilience and Regeneration: How Precincts Can Adapt to and Mitigate Climate Change.' In *Greening the Greyfields: New Models for Regenerating the Middle Suburbs of Low-Density Cities*. Singapore: Palgrave Macmillan.

Getting the terminology right matters because it shapes what credible action looks like. Applying net zero to a precinct requires clear choices about:

- which emissions to count (operational, embodied, transport)
- what geographic and ownership boundary applies
- whether the accounting is annual or whole-life
- whether offsets are considered, and
- how exported renewable energy is treated.

Greater precision about which of these apply to a given project is essential both to avoid greenwashing risk and to focus effort on the areas - particularly embodied and transport carbon - where the built environment sector still has the most work to do to meet Australia's 2030, 2035 and 2050 emissions targets.

Furthermore, how this translates to the front end of precinct planning is at the heart of this Urban Design Pathway research. How do we reduce emissions, better conserve resources and adapt our built environment to a changing climate? What does it mean for the urban form, streets and landscapes of our towns and cities. Does it alter our traditional view of place quality and best practice? And how can these lessons be captured in a practical, industry facing guide that assists with a change of course and climate-oriented mindset?

What to expect on the day

The net zero aligned precinct framing outlined in this primer forms the basis of keynotes and discussions at the Forum where industry experts, researchers and PhD candidates will share learnings and open them up for panel discussion and audience input. The key themes arising from this process will be captured and made available afterwards to support continued discourse in the net zero transition.

The Forum is organised into two sessions. The first session explores how net zero objectives can be translated from high-level aspirations into practical planning and design decisions. Drawing on digital twin modelling, campus master planning, corridor-scale research and architectural practice, the discussion will examine where urban design has the greatest influence, how competing priorities are balanced, and what needs to change in mainstream practice to deliver low-carbon and net zero precincts at scale.

This second session focuses on how emerging research can be converted into practical tools, guidance and decision-support for planners, designers, developers and government. Drawing on work in development feasibility, environmental performance indicators, and research synthesis, the discussion will consider how research can better inform real-world decisions, what makes tools credible and usable, and how project findings can achieve lasting impact beyond the research program.

Following the formal proceedings and networking lunch, in person participants are invited to attend the ‘milestone’ and ‘in-progress’ presentations of three of the Pathways to Net Zero Precincts project PhD candidates as part of the DBE GRX program. These will be happening in the same venue as the Forum.



ÌMAGE: Exchange Precinct at the Curtin University Bentley campus

Presenter biographies

Brendan McRae – Department of Transport and Planning, Victoria



Brendan McRae works with Victoria's Department of Transport and Planning on major precinct and transport-led urban development initiatives. His experience with the Sunshine Precinct brings a government planning perspective to the Forum, demonstrating how digital twins and integrated modelling can support decisions around development, investment and long-term precinct transformation.

Sarvenaz Norouzy – Planning Director, Curtin University



Sarvenaz Norouzy is Planning Director at Curtin University's Properties Facilities and Development, leading campus, asset and project planning and helping align capital investment with sustainability and institutional strategy. Drawing on the Bentley campus experience, she brings a practical client-side perspective on embedding decarbonisation objectives into long-term master planning and maintaining them through project delivery.

Dr Giles Thomson – School Design and the Built Environment, Curtin University



Dr Giles Thomson is an ARC DECRA Fellow and urban sustainability researcher at Curtin University. With previous professional experience in urban design and strategic planning, his research investigates low carbon transit-activated corridors and the integration of land use, transport and governance. He leads the project's work extending net zero alignment beyond individual precincts.

Ross Donaldson – Australian Institute of Architects



Ross Donaldson is National President Elect of the Australian Institute of Architects and former CEO and Chairman of Woods Bagot. An architect, educator and strategic adviser, he has become closely involved in construction-sector decarbonisation. He brings a professional perspective on design leadership, embodied carbon and architecture's role in precinct-scale sustainability.

Faz Ikram – Curtin Law School, Curtin University



Faz Ikram is a Curtin PhD candidate with nearly two decades' experience in finance and capital markets. His research integrates urban design, development feasibility and scenario modelling through Envision Tomorrow Australia, examining how net zero attributes can align with commercial realities.

Jia (Nikki) Zhang – School Design and the Built Environment, Curtin University



Jia (Nikki) Zhang is a Curtin PhD candidate and urban designer with experience in Australia and China, including transit-oriented and high-speed rail precinct projects. Her research develops data-driven, scenario-based tools linking urban form with environmental performance, helping planners compare alternative precinct and corridor development scenarios during early decision-making.

Patrick Bendall – School Design and the Built Environment, Curtin University



Patrick Bendall is an architect, computational designer and Curtin PhD candidate. His research explores how data, modelling and case-study evidence can be translated into practical net zero urban design guidance, bridging complex environmental analysis with the everyday decisions of designers and practitioners.

Adjunct Professor Dusan Mills – Hawaiian / School Design and the Built Environment, Curtin University



Dusan Mills is a Non-Executive Director of Hawaiian and Adjunct Professor at Curtin University, with four decades of international experience in property development, investment and economic development. As an industry adviser to the project, he brings a commercial perspective on feasibility, investment decisions and the conditions required to mainstream net zero development.

Gemma Cook – RACE for 2030



Gemma Cook is Research Partnership Manager and WA Node Manager at RACE for 2030. With a background in local-government climate strategy, behaviour change and community engagement, she focuses on connecting research with industry impact. She brings a partnership perspective on translating research findings into adoption, capability building and enduring net zero outcomes.

Professor Josh Byrne AM – Faculty of Humanities, Curtin University (Forum Chair)



Professor Josh Byrne is Dean Sustainable Futures in the Faculty of Humanities at Curtin University, an environmental scientist and urban design professional whose work spans research, practice, policy and communication. He leads the Pathways to Net Zero Precincts project, focusing on translating sustainability research into practical approaches for urban development, industry and government.

Pathways to Net Zero Precincts Urban Design Forum Program

Thursday 1 October, 09:30-12:00 AWST

Hybrid event: Collaboration Hub, Building 418 Curtin Bentley Campus + ONLINE

The forum is part of Curtin University's School of Design and the Built Environment 'Spring Graduate Research Exchange' (GRX) which is being held over three days from Tuesday 29th to Thursday 1st October.

9.30 – 9.45am	Welcome; Forum introduction	Prof Josh Byrne (MC) *Dean Sustainable Futures, Curtin University*
9.45-10.00am	Digital twins for precinct-scale decision support: Sunshine, Melbourne case study	Brendan McRae *Victorian Department of Transport and Planning*
10.00-10.15am	Decarbonising and sustainability in campus precinct master planning: Curtin University, Bentley case study	Sarvenaz Norouzy *Planning Director, Curtin University*
10.15-10.30am	Research insights: Net zero urbanism, from precincts to corridors	Dr Giles Thomson *DECRA Fellow, Curtin University*
10.30-10.50am	Panel discussion + audience Q&A	Session speakers + Ross Donaldson *Australian Institute of Architects National President Elect* Chaired by Josh Byrne
10:50–11:00	**Short break**	
11.00-11.05am	Welcome back and session explainer	Josh Byrne
11.05-11.25am	Pecha Kucha with NZP PhD candidates – applied research in the transition to net zero precincts	Faz Ikram Jia (Nikki) Zhang Patrick Bendall
11.25-11.50am	Panel discussion + audience Q&A	Session speakers + Assoc Prof Dusan Mills *Hawaiian* Gemma Cook *RACE for 2030* Chaired by Josh Byrne
11.50-12.00pm	Forum wrap-up and close	Josh Byrne
12.00-1.00pm	Lunch (catered for in person attendees)	

** Please note all times are in AWST*

About DBE GRX

When: 29 September to 1 October 2026

Where: Level 1 Collaboration Hub, DBE, Curtin University

The DBE Graduate Research Exchange (GRX) is a biannual forum that brings together traditional and practice-based research within a transdisciplinary setting. Each GRX features keynote lectures, presentations, panel discussions and workshops, alongside exhibitions and installations connected to candidate milestones and in-progress talks.

The event fosters critical dialogue, shared learning and a visible culture of graduate research across Curtin University's School of Design and the Built Environment. Whether you are a student, researcher, practitioner or member of the public, GRX offers a chance to encounter new ideas and experience how design and built environment research can shape future communities, practices and ways of thinking.

Register and access the full GRX event program.



ÌMAGE: East Village, Knutsford Urban Regeneration Precinct