Net Zero Precincts

What are they and how do make them happen?

Professor Josh Byrne
Dean Sustainable Futures, Faculty of Humanities

Presentation Overview

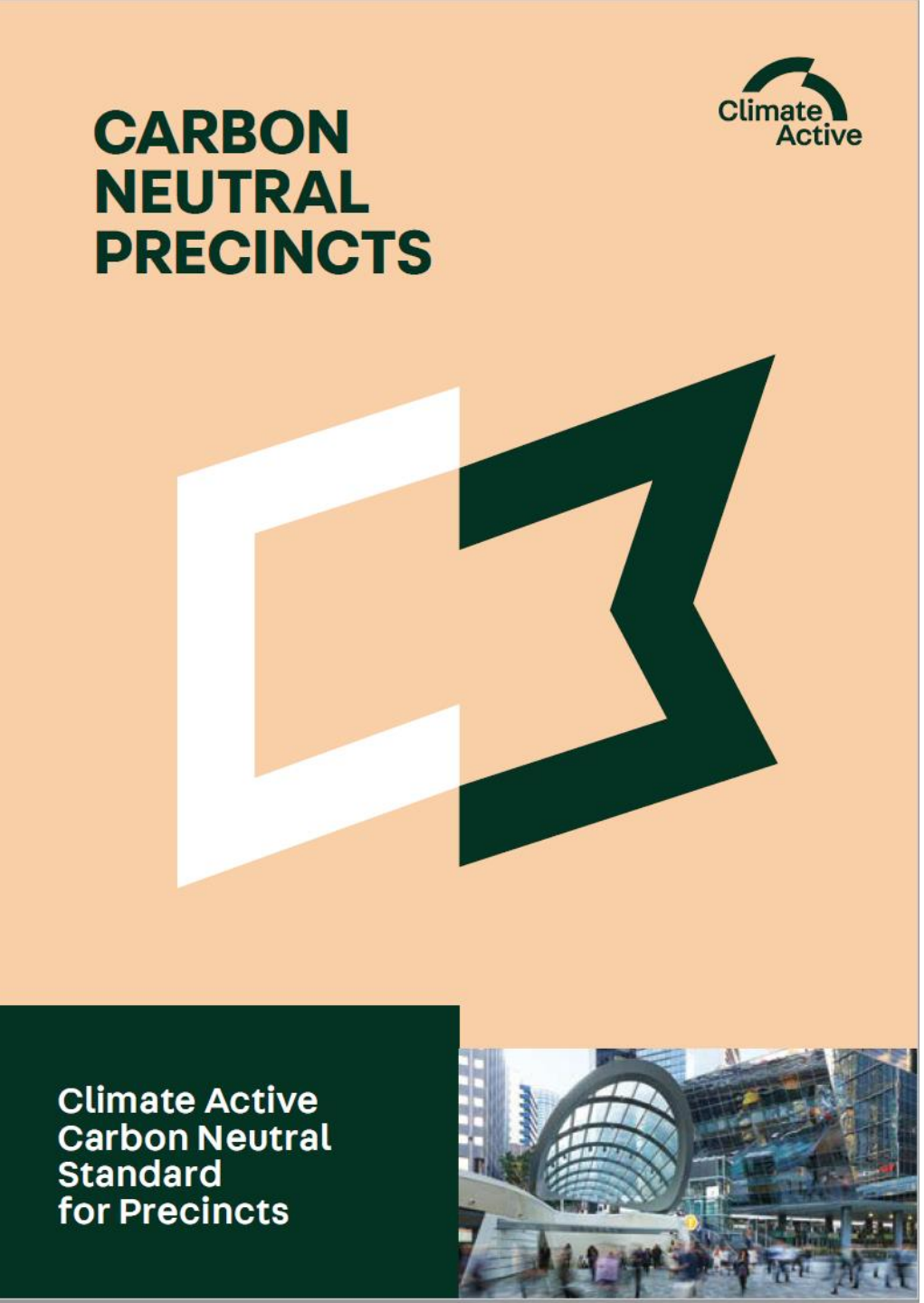
- Defining ‘Net Zero Precincts’
- Earlier Work
- RACE for 2030 Net Zero Precincts Project
  - RACE for 2030 CRC
  - Project Overview and Design
  - Case Studies and Activities
  - Next Steps
- Questions

DEFINING NET ZERO PRECINCTS

Precincts

A unified area of urban land with a clearly defined boundary. Synonymous with neighbourhood or district. A typical precinct will contain private and public land with shared infrastructure.

Source: Thompson, G. Newton, P. Newman, P & Byrne. J. (2019). *Guide to Low Carbon Precincts*. Cooperative Research Centre for Low Carbon Living. Sydney, Australia



DEFINING NET ZERO PRECINCTS

Carbon Neutrality

Carbon neutral means reducing emissions where possible and compensating for the remainder by investing in carbon offset projects to achieve net zero overall emissions.

Offsets are generated from an activity that prevents, reduces or removes greenhouse gas emissions from being released into the atmosphere.

Source: Climate Active Carbon Neutral Standard for Precincts, Commonwealth of Australia 2022

DEFINING NET ZERO PRECINCTS

Net Zero Carbon Precinct

A net zero carbon precinct is one where there is a balance between the amount of greenhouse gas produced and the amount removed from the atmosphere on a net annual basis.

Its use must be accompanied by the focus on emissions, e.g. net zero carbon in operations, net zero carbon for construction, etc.

Net zero carbon claims are often unverified, and at this stage, there is no agreed standard for precincts that defines them.

Source: Climate Positive Roadmap for Precincts, Green Building Council of Australia, 2022

DEFINING NET ZERO PRECINCTS

Net Zero Principles

Reduce

Built with lower upfront emissions

Built using materials with significantly lower embodied carbon. Emissions are reduced during construction.

Highly efficient

All buildings and infrastructure are energy efficient. Reduces stresses in the grid.

Walkable and livable

Transport emissions are reduced by good urban design, promotion of active transport, and low carbon options.

Eliminate

Fossil fuel-free

The precinct does not use fossil fuels for stationary energy.

Powered by renewables

All energy used in the precinct comes from 100% onsite or offsite renewable sources.

Compensate

Offset with nature

The balance of emissions are compensated or neutralised through investments in nature-based carbon offsets.

Source: Climate Positive Roadmap for Precincts, Green Building Council of Australia, 2022


WGV by DevelopmentWA
DevelopmentWA
White Gum Valley

WGV

Detached Dwellings

WGV

Attached Dwellings

Richard Hammond Architect / Anda & Kemp

WGV

Gen Y Demonstration House

David Bar

WGV

SHAC

Donaldson + Warn Architects / Access Housing

WGV

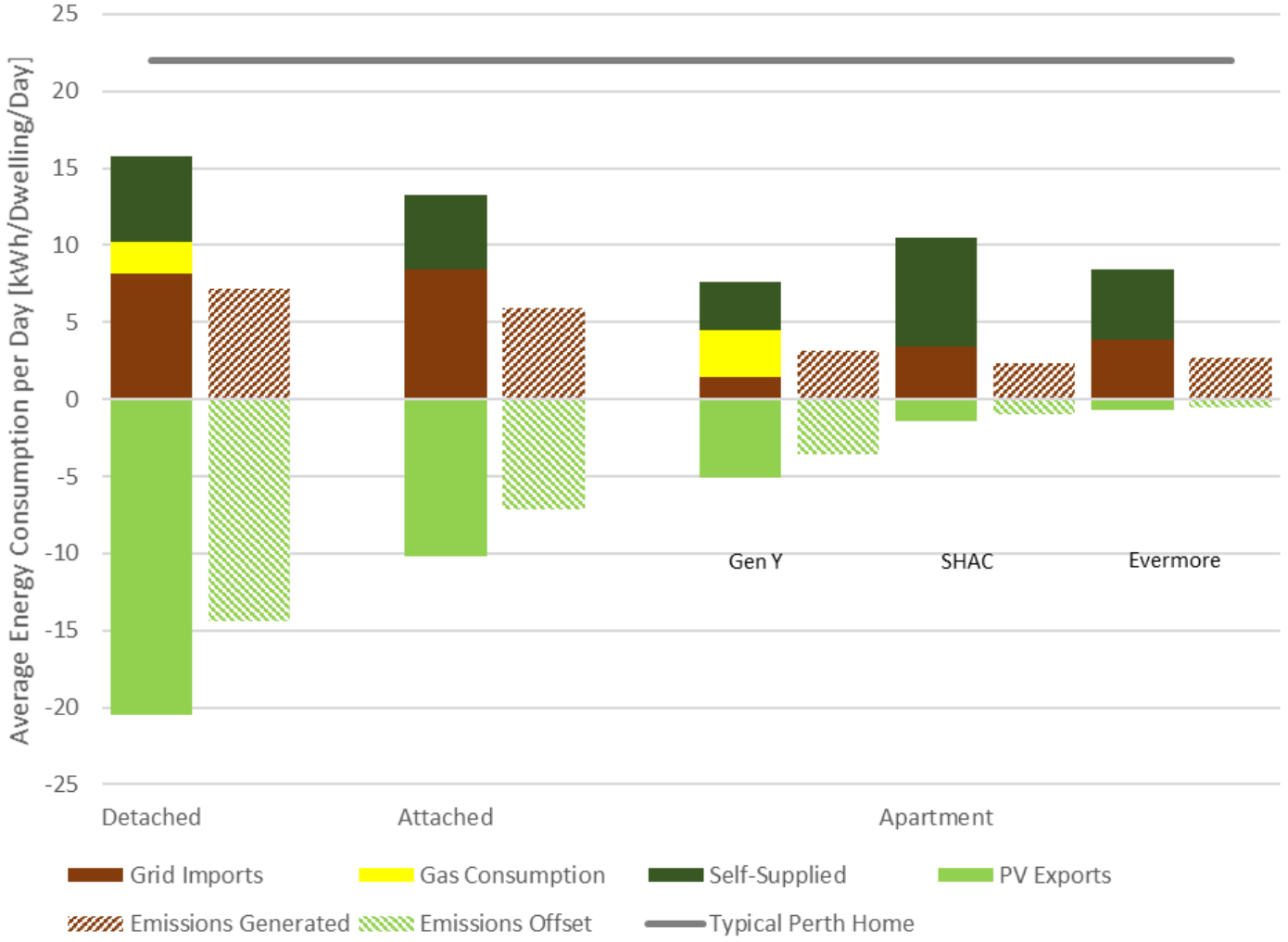
Evermore

Harris & Jenkins Architects / Yolk Property Group

WGV

Daily Energy & GHG Emission Profile by Typology

- All typologies use less energy than the Perth average.
- The detached dwellings, attached dwellings and the Gen Y apartments achieve NZEH status.
- SHAC and Evermore apartments are close.



Source: Byrne. J, Law. A, Hosking. R, Breadsell. J, Syed. M, Babaeff. T, Morrison. G, Newman. P (2019), *Mainstreaming Low Carbon Residential Precincts – the WGV Living Laboratory: Final Report*, Cooperative Research Centre for Low Carbon Living. Sydney, Australia

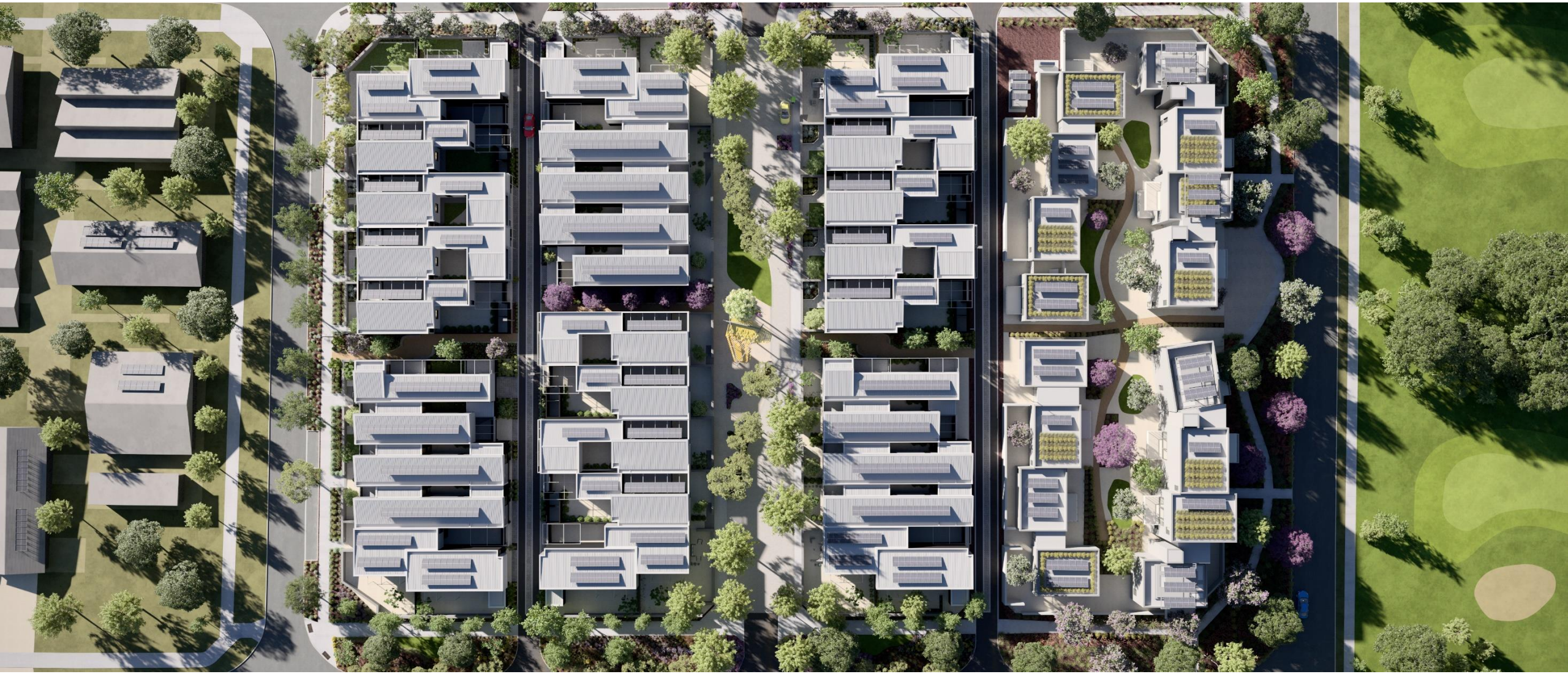
EAST VILLAGE AT KNUTSFORD

Fremantle

DevelopmentWA

EAST VILLAGE AT KNUTSFORD

Subdivision Plan



EAST VILLAGE AT KNUTSFORD

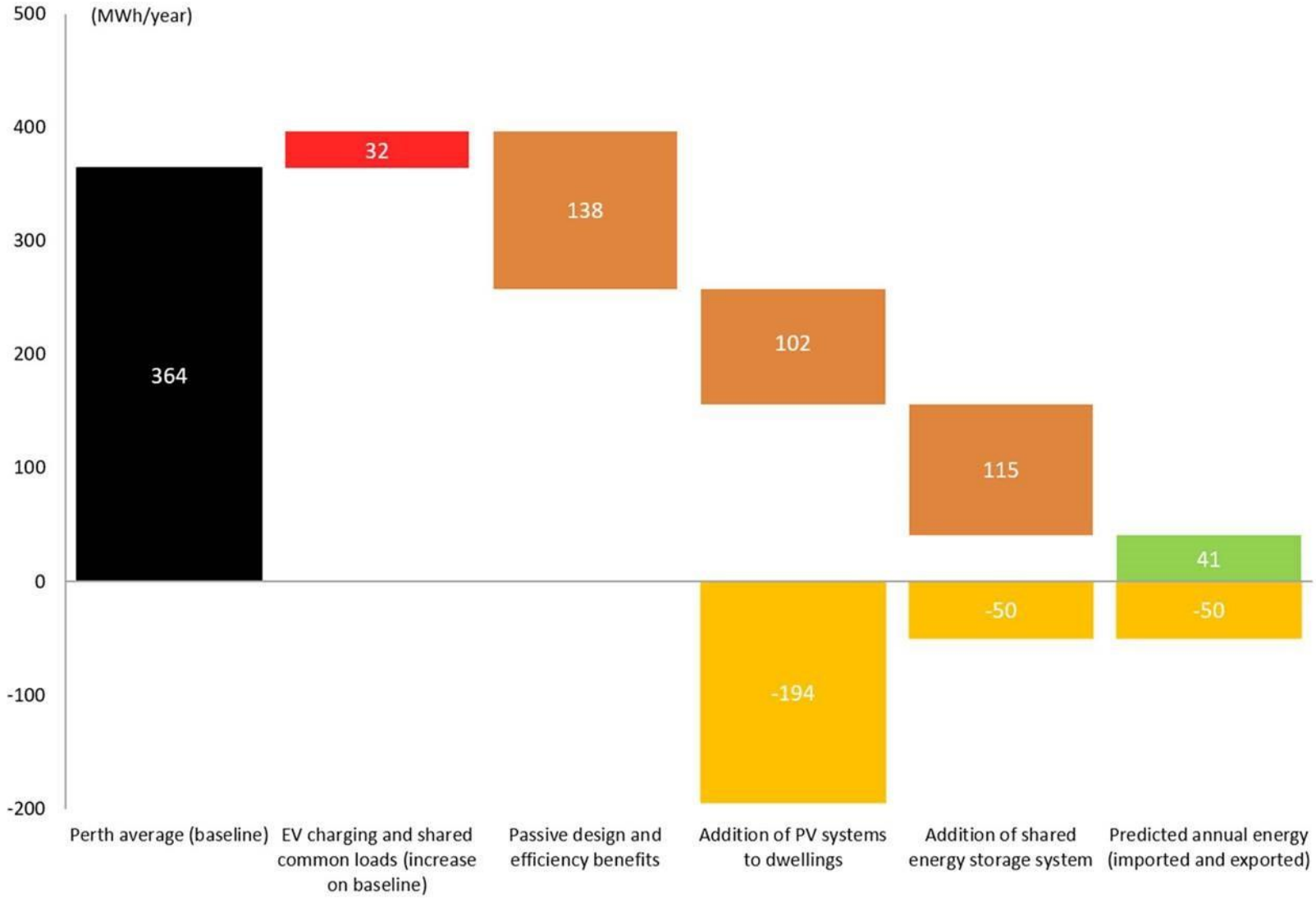
High Performance Housing

EAST VILLAGE AT KNUTSFORD

Precinct Battery

EAST VILLAGE AT KNUTSFORD

Projected Energy Use (per household)



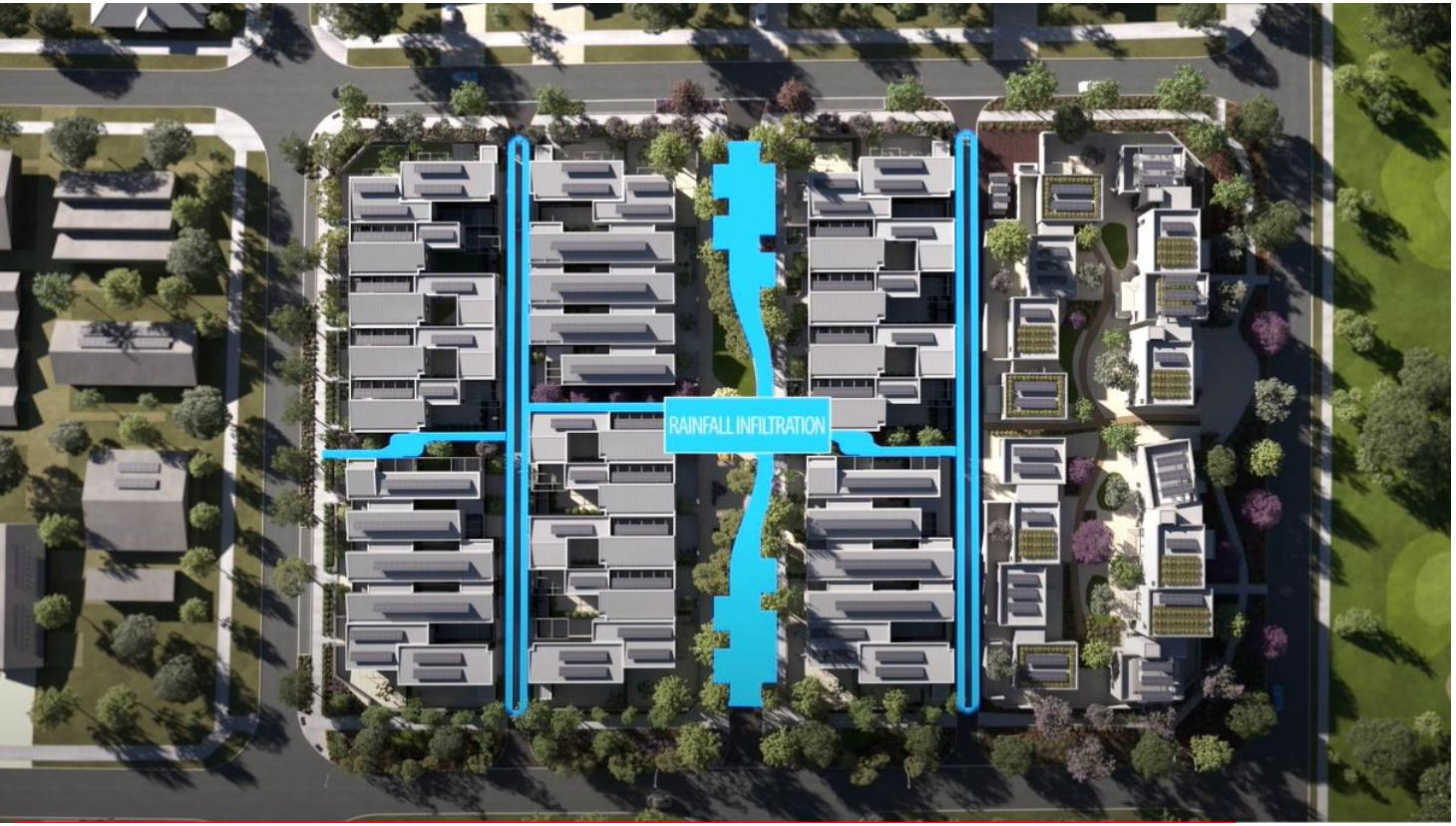
Source: Byrne, J., M. Taylor, M. Mouritz, and J. Breadsell. 2020. *East Village at Knutsford: A Case Study in Sustainable Urbanism*. Sustainability. 12 (16): 6296.

East Village at Knutsford

Lot-scale Rainwater Harvesting

East Village at Knutsford

Stormwater Harvesting

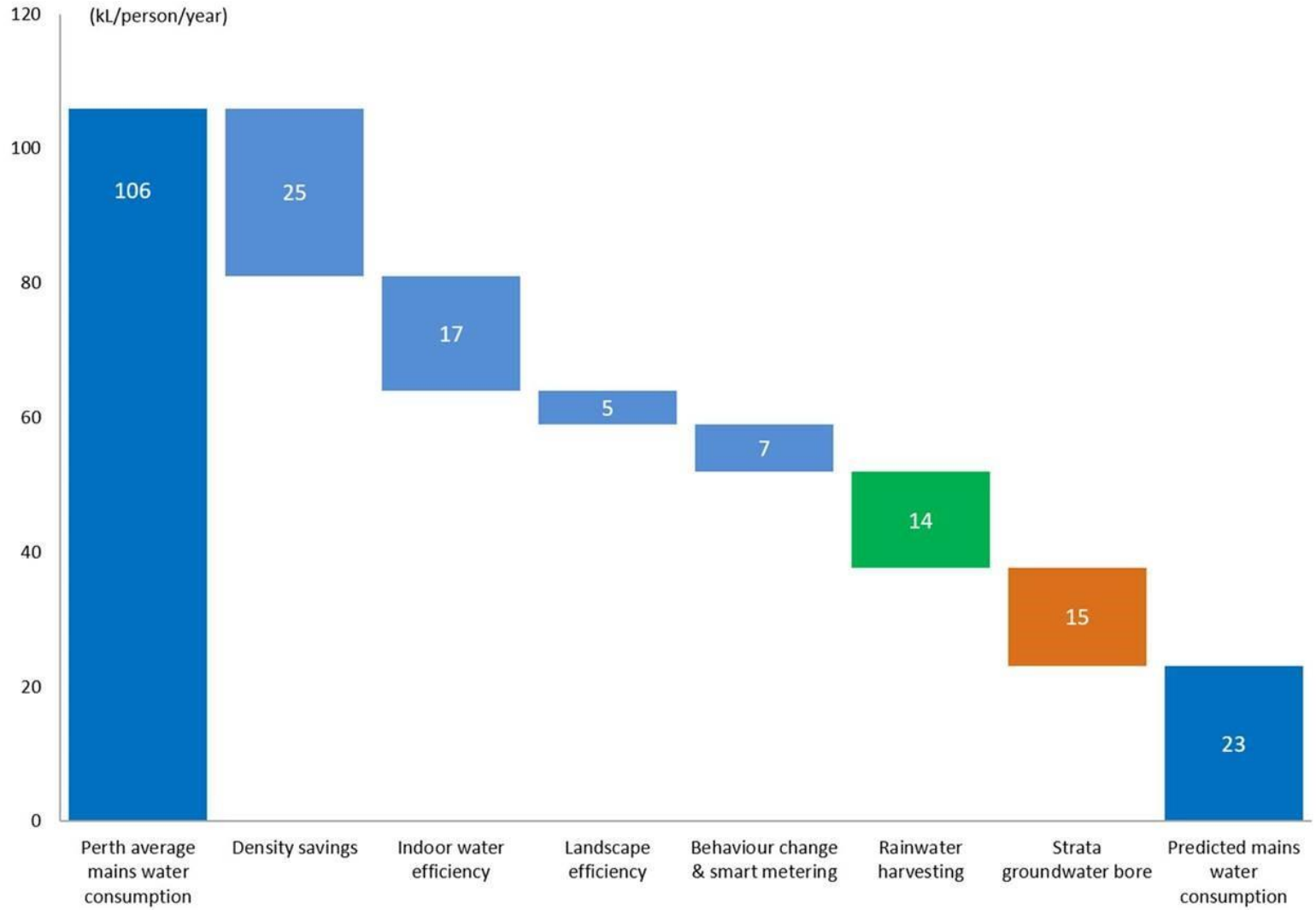


East Village at Knutsford

Precinct Groundwater Scheme

East Village at Knutsford

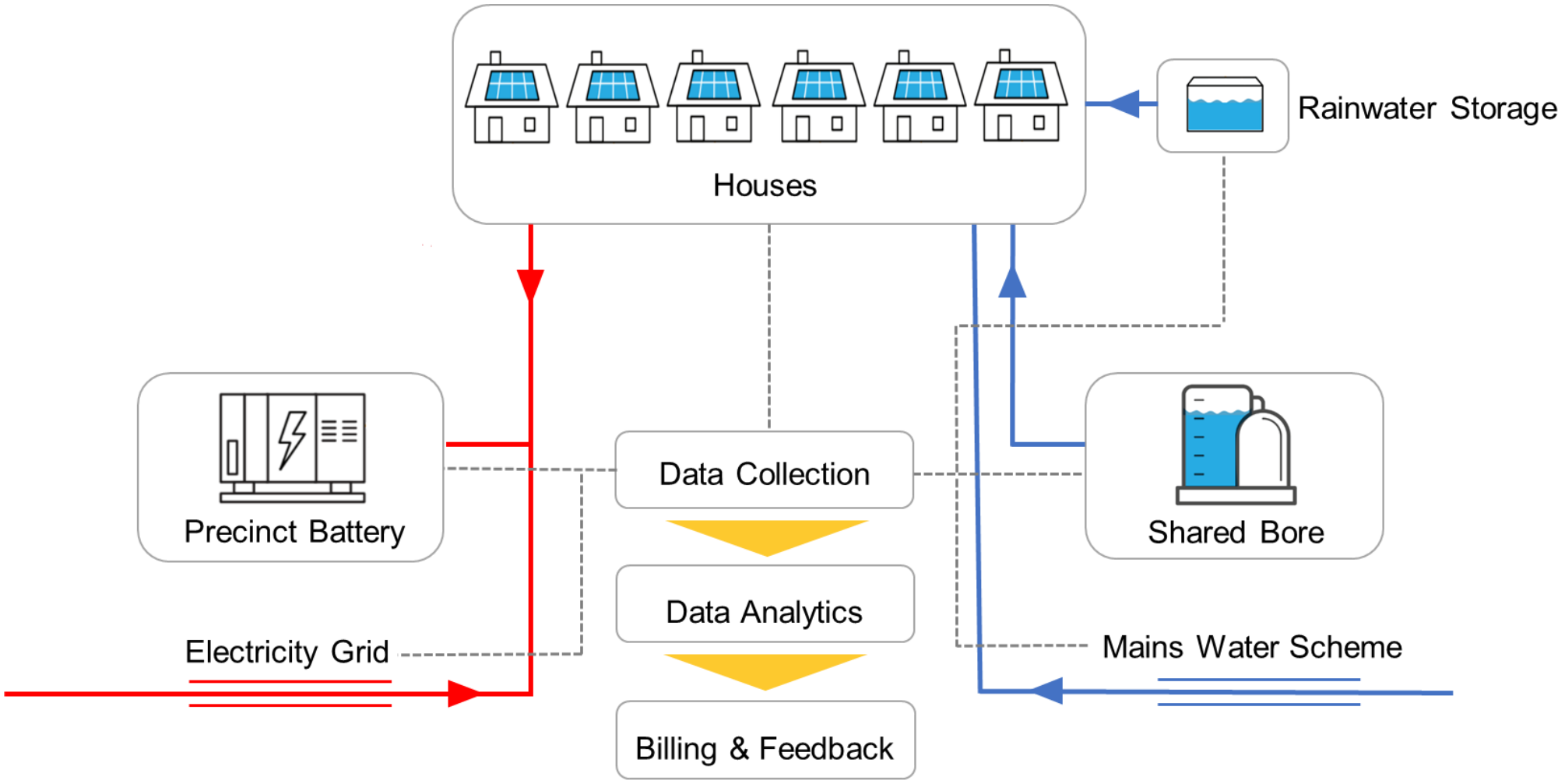
Projected Water Use (per person)



Source: Byrne, J., M. Taylor, M. Mouritz, and J. Breadsell. 2020. *East Village at Knutsford: A Case Study in Sustainable Urbanism*. Sustainability. 12 (16): 6296.

East Village at Knutsford

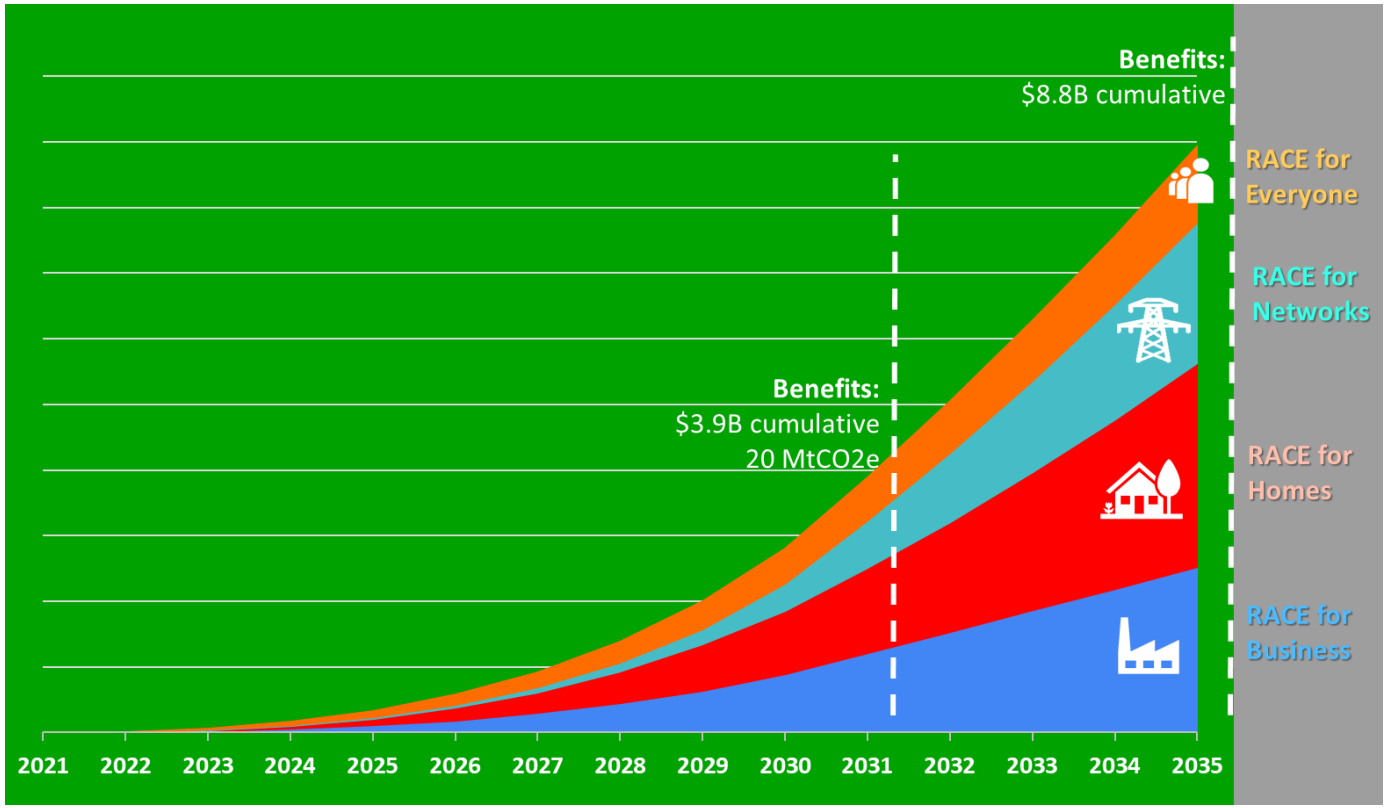
Embedded Network Schematic



RACE for 2030
RELIABLE AFFORDABLE CLEAN ENERGY

PATHWAYS TO NET ZERO PRECINCTS

RACE for 2030 CRC



- One of Australia's largest CRCs.
- 10-year life (2020 to 2030).
- Curtin University is a core partner.
- NZP project is a 'priority project' for RACE and one of the largest awarded to date.

PATHWAYS TO NET ZERO PRECINCTS

Project Overview

Research Partners: Curtin, UTS, Monash, UniSA, Griffith

WA Industry Partners:

- DevelopmentWA
- Hesperia
- Cisco-Curtin Centre for Networks
- Sustainable Built Environment National Research Centre
- Western Power
- Hawaiian Investments

Start Date: 1 October 2023

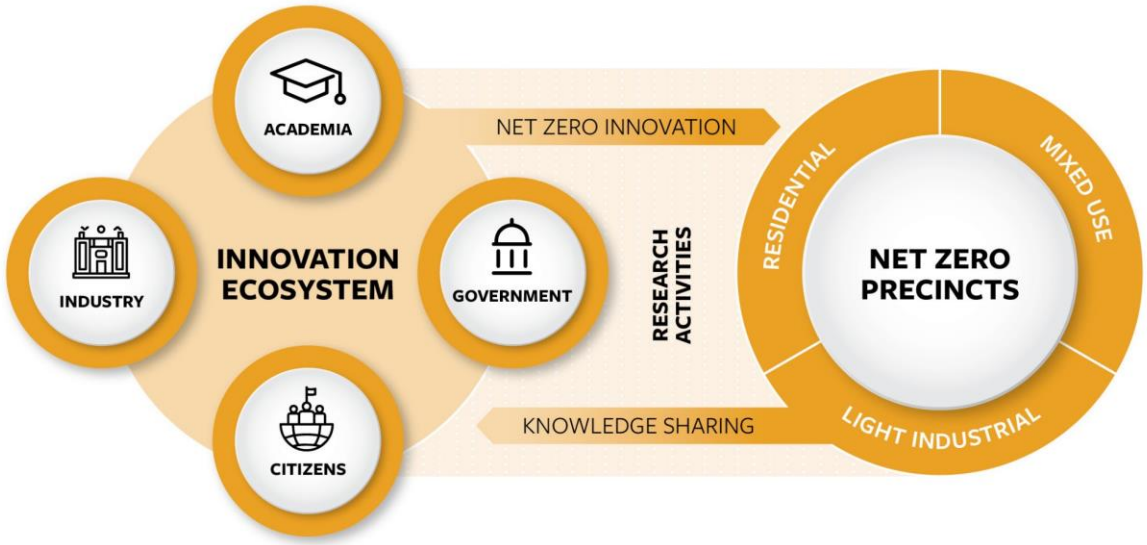
Duration: 3 years

CI's: Josh Byrne and Peter Newman, Curtin University

Project Manager: Nasrin Aghamohammadi

PROJECT DESIGN

Objectives & Approach

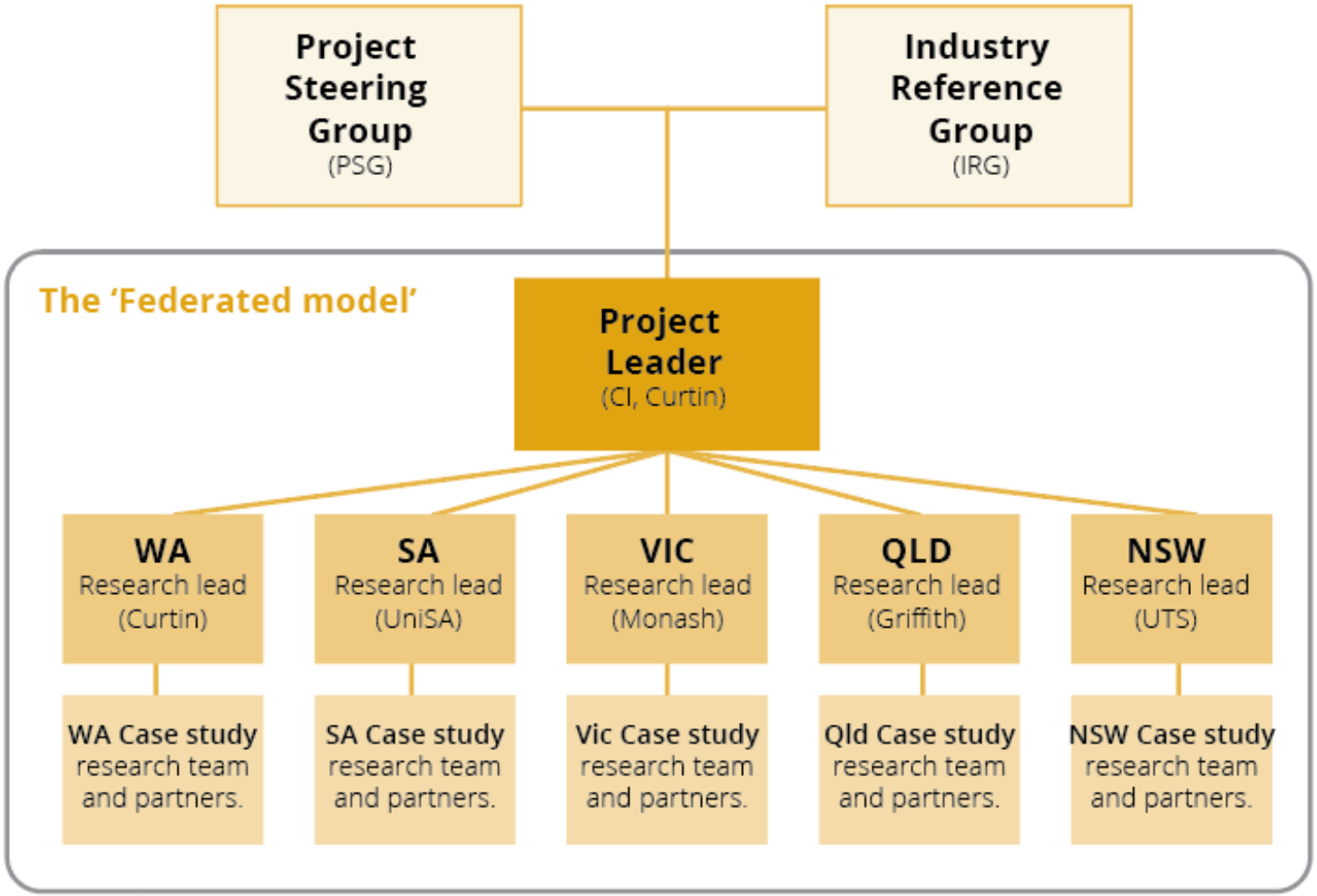


Living Lab Methodology

- Investigate how to achieve net zero emissions outcomes across different precinct typologies.
- Embed research within a range of live case study precincts at different stages of maturity (i.e. planning, development and operational).
- Contribute to the net zero goals of the precincts and share learnings in quick time to accelerate adoption and rapid scaling nationally.

PROJECT DESIGN

Partners & Governance



WA CASE STUDIES

Residential

Knutsford Urban Regeneration Precinct

- Conduct a review of the benefits and operations of WGV.
- Analyse and integrate lessons from the East Village innovations to inform the next stages of development in the Swanbourne Street Structure Plan Area.

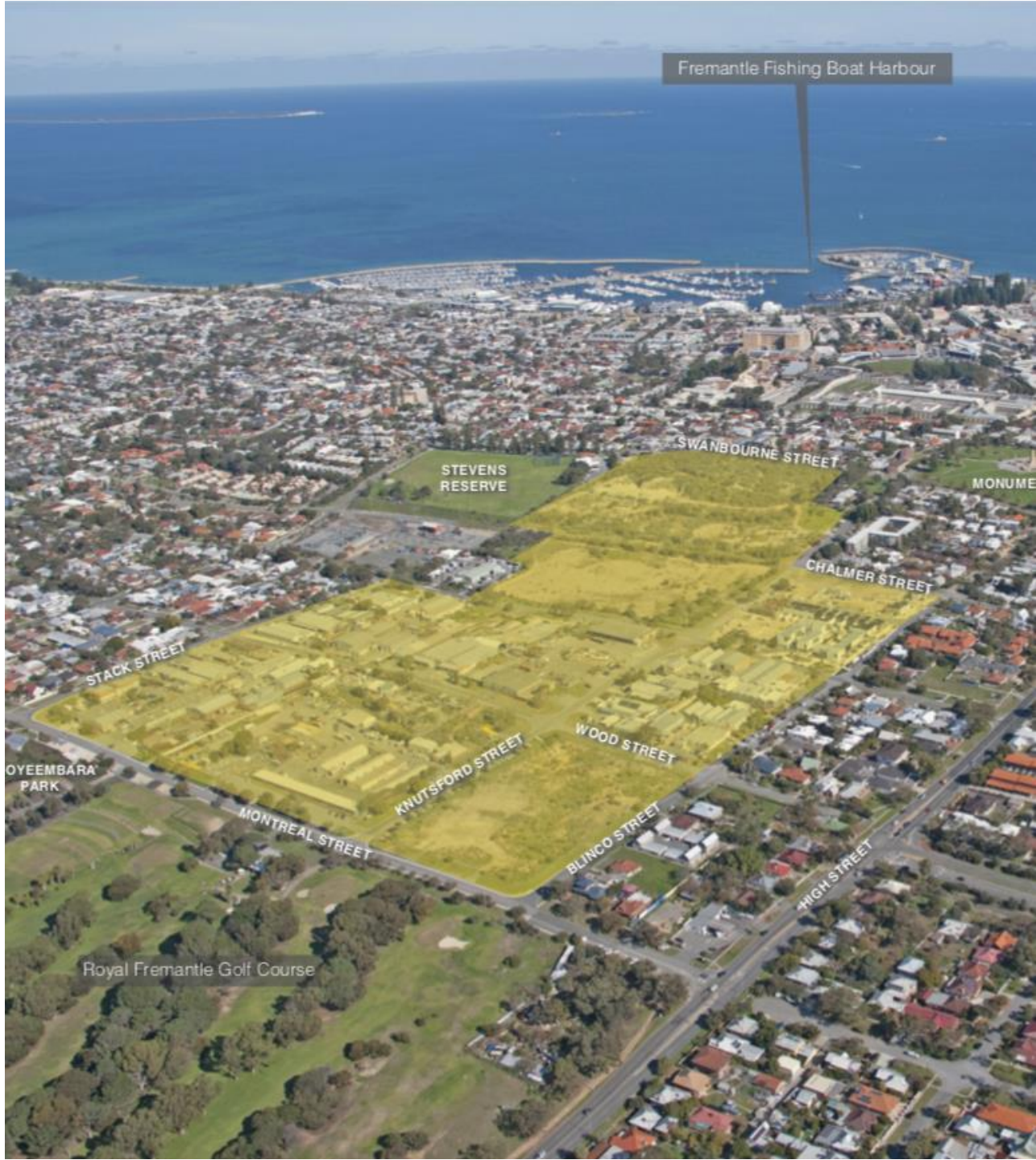


Image: Knutsford Precinct, DevelopmentWA

WA CASE STUDIES

Residential

Rivermark

- Evaluate net zero urban planning and governance innovations including the Rivermark Solar Maximiser Service (novel renewable subscription service).
- Assess other carbon reduction measures e.g. energy demand reduction through low embodied energy construction materials and ecological place-making.

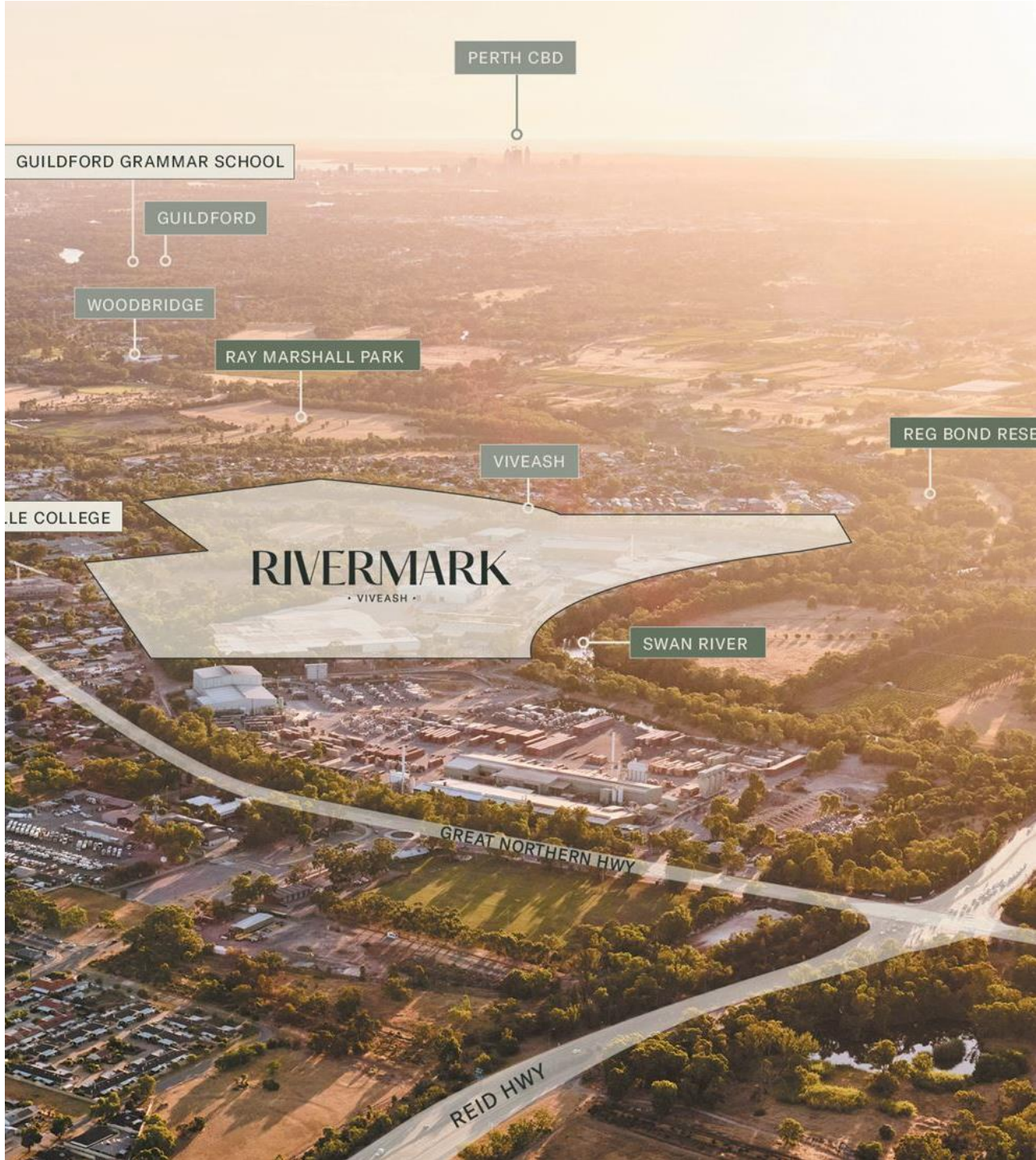


Image: Rivermark, Hesperia

WA CASE STUDIES

Mixed Use

Alkimos Central

- Contribute to net zero urban planning options for a new city centre around a new train station including how to optimise urban form, reduce vehicle kilometres travelled, maximise roof area available to PV and to integrate precinct DER with the existing community battery.

Image: Alkimos Central, DevelopmentWA

WA CASE STUDIES

Mixed Use

Curtin Bentley Campus

- Develop a digital twin for real-time data monitoring, visualisation and predictive analytics.
- Contribute to a decarbonization action plan to support Climate Active certification and align the outcomes to a planned campus Masterplan review.

Image: Curtin Bentley Campus

WA CASE STUDIES

Light Industrial

Peel Business Park

- Evaluate operations of first stage solar and battery-based system for enabling green industrial development.
- Develop strategies to improve the operations and efficiency of the system.

Image: Peel Business Park, DevelopmentWA

WA CASE STUDIES

Light Industrial

Roe Logistics Park

- Review operations of first stage in line with Climate Active certification.
- Verify impacts of low embedded carbon initiatives.
- Investigate integration of electrified transport.

Image: Roe Logistics Park, Hesperia

CASE STUDIES

Net Zero Corridors

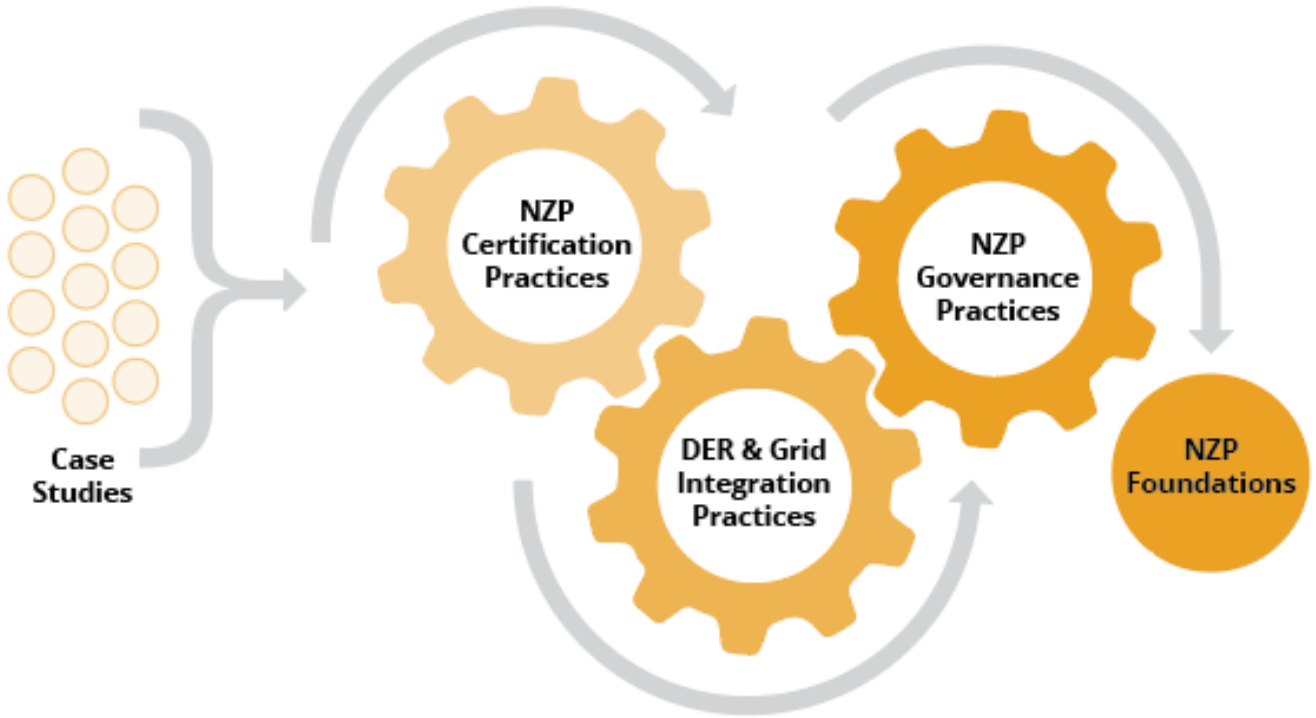
Undertake scenario modelling using ‘Envision Tomorrow Australia’ to support the identification of optimum mid-tier transit corridors. This will be tested via:

- Knutsford to Fremantle (WA) joining a planned route along South Street
- Stirling to Curtin (Perth)
- Caulfield to Rowville via Monash Campus and Chatswood Shopping Centre (Melbourne)

Image: Trackless Tram Stop, Peter Newman

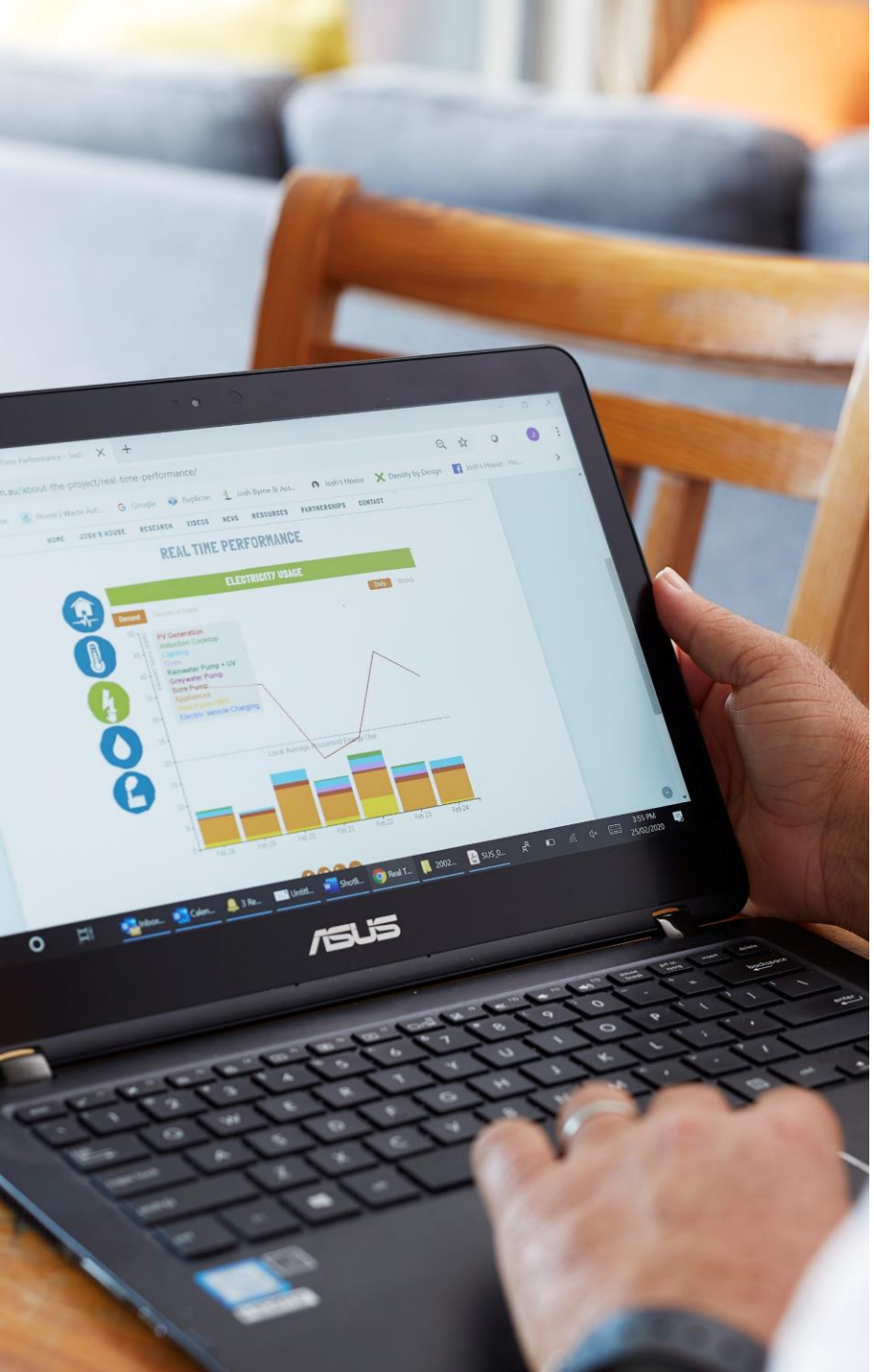
PROJECT DESIGN

Synthesis



Synthesis Pathways

- NZP certification through evaluation and verification.
- NZP DER and grid integration via smart systems.
- NZP governance models for different contexts and stakeholder requirements.



Project Deliverables

- Support project partners in meeting their objectives.
- **Practice orientated**: 3 x industry forums, technical notes and guides.
- **Mass digital communications**: case study factsheets and videos via a project website, supported by social media campaigns.
- **Academic outputs:** journal articles and PhDs.

INVITATION

Humanities Professoriate Lecture Series

Professor Peter Newman AO presents:

Can we dare to hope? Reflections on a personal journey through global and local sustainability issues

Dear **DBE Staff**

You are cordially invited to join us for the third and final **Faculty of Humanities Professoriate Lecture** for 2023, to conclude a series that showcases the depth and breadth of Faculty's world-renowned academic researchers.

By acknowledging and celebrating their achievements through their stories and lived experiences, our aim is to enrich and inspire the audience and our next generation of eminent Curtin professors.

Introducing Professor Peter Newman AO

"Can we dare to hope? would be the title of my memoir if I could ever get around to stopping work. But the issues I have been writing on since the early 1970's are now so rapidly mainstreaming that I find it hard to stop. My lecture will show the journey from working with the great apocalyptic ecologist Paul Ehrlich at Stanford University in the early 70's who saw no hope in the future and how I slowly worked out how to hope through my family, community, government secondments, IPCC and over 50 years in universities. I will tell some stories of how hope was embraced in transport and urban planning, environmental campaigns, and sustainability strategies, before the biggest challenge of all, climate change".

Next Steps

- Project launch 26th October.
- Net Zero Precincts 'Certification Review' released February 2024.
- Web site launched February 2024: www.netzeroprecincts.au
- Video series launched February 2024.
- Peter Newman's Professoriate Lecture – 26th October, 5pm: events@curtin.edu.au


Curtin University
Questions
420