Net Zero Commission

Pathways Call for Evidence Submission

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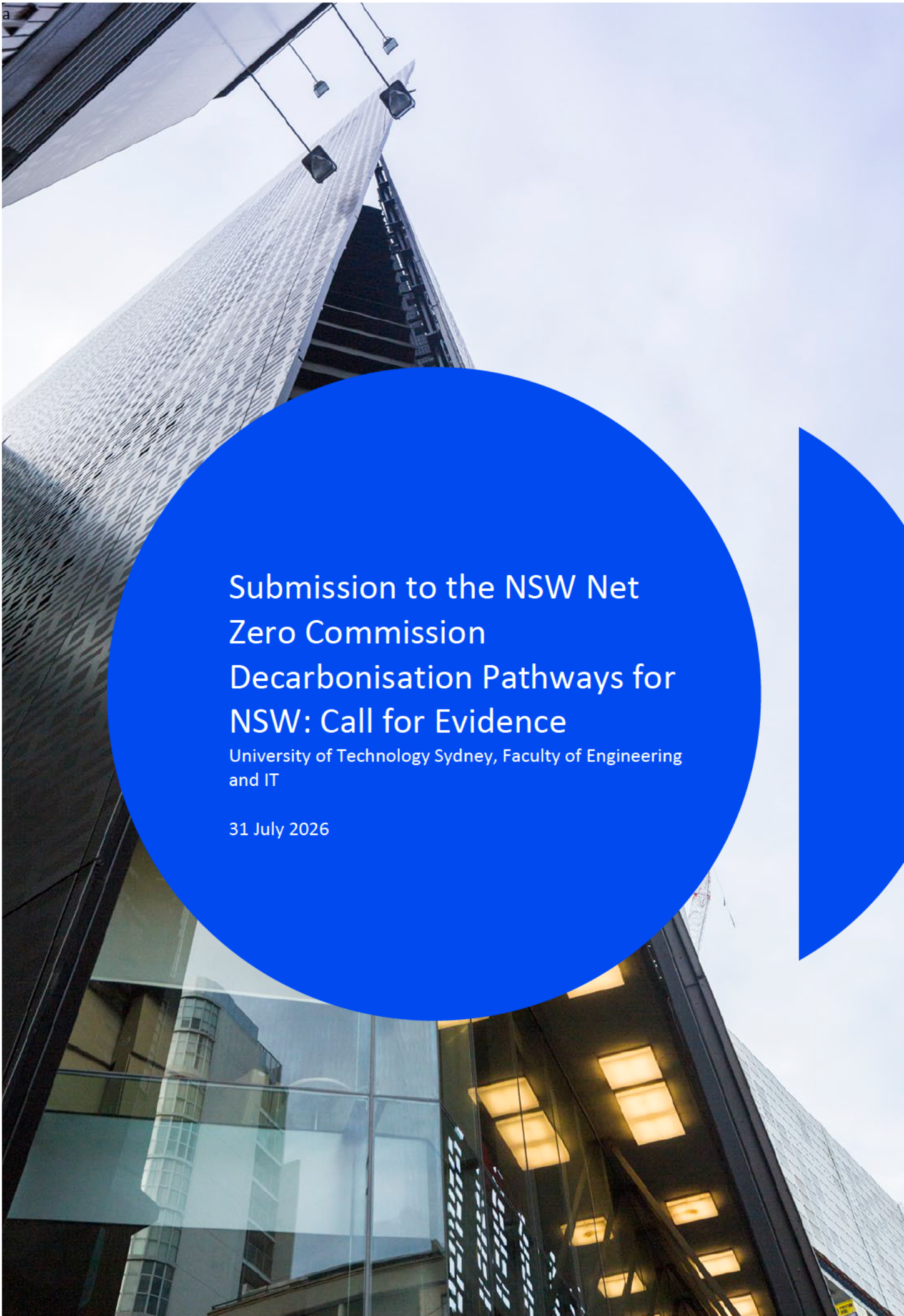

Submission to the NSW Net Zero Commission Decarbonisation Pathways for NSW: Call for Evidence

University of Technology Sydney, Faculty of Engineering and IT

31 July 2026

Submission to the NSW Net Zero Commission

Decarbonisation Pathways for NSW: Call for Evidence

From: Electrical Power and Energy Systems (EPES) discipline, School of Electrical, Mechanical and Biomedical Engineering, Faculty of Engineering and Information Technology, University of Technology Sydney

Contact: [redacted]

1. About this submission

This submission sets out where the EPES discipline holds data, test results and technical judgement that could inform the Commission's pathway modelling, and who to speak to about each. It does not contain details of the evidence itself.

We would welcome a follow-up conversation with the Commission, or directly with the CSIRO and Climateworks Centre modelling teams. From there we can supply the underlying data in whatever form is useful, including material that would need to be treated as confidential.

2. About the EPES discipline

The Electrical Power and Energy Systems discipline sits within the School of Electrical, Mechanical and Biomedical Engineering at UTS. It brings together around 14 academic staff and more than 60 PhD students and postdoctoral researchers, working across power systems and microgrids, power electronics and energy storage, electric machines and drives, and automation and control.

Our evidence comes from operating test facilities at UTS Tech Lab. These include a 9 kW modular second-life battery system, a grid simulator and photovoltaic emulator platform, a real-time digital simulator for digital twin systems, an electric-drive testing platform, and a commissioned hydrogen and fuel cell laboratory. Recent work has been funded by the Australian Research Council, RACE for 2030, the Blue Economy CRC, the Regional and Remote Communities Reliability Fund, and Transgrid.

3. Technology readiness, constraints and costs

Technology	Readiness	Binding constraint in NSW	Cost evidence we hold
Second-life battery storage	TRL 4	Technical, financial and regulatory	Estimated
Grid-forming and grid-following inverters for smart grids	TRL 3	Technical and regulatory	Estimated
High-power EV charging	TRL 3	Technical	Estimated
EV battery degradation	TRL 3	Technical	Published
High power density, reliable and efficient power conversion for data centres and e-mobility	TRL 3	Technical	Estimated

4. Evidence EPES can provide

The table below maps the sectors and questions in the Call for Evidence to the evidence EPES holds, the form that evidence takes, and the person best placed to discuss it.

Sector and NZC question	Evidence we can supply	Form it takes	Lead contributor
Electricity and Energy: consumer energy resources, storage and waste (Q2)	Measured performance of a 9 kW modular second-life battery system	Bench data, state-of-charge balancing results, degradation curves	Gang Lei
Electricity and Energy: orderly coal closure and system strength (Q2)	Grid-forming converter and fault ride-through test results	Grid simulator and PV emulator platform data	Ricardo Aguilera Echeverria
Electricity and Energy: regional and remote supply (Q5)	Derwent Bridge and MyTown microgrid feasibility work; energy management system for NextGen NRG industry	Digital twin outputs, cost-benefit method, community co-design process, energy management framework	Jahangir Hossain
Industry: process heat and hydrogen (Q2)	PEM electrolyser and fuel cell performance under real duty cycles	Test data from the commissioned hydrogen laboratory	Kosala Gunawardane
Cross-sector: emissions measurement and verification (Q6)	Low-cost sensor network and AI-assisted inverse modelling of NSW emissions	Sensor data, inventory imputation method, dashboard	Quang Ha
Cross-sector: electrified transport and industry, including data centres (Q2)	Measurement data on power quality, conversion efficiency, electric machine performance, thermal management and electromagnetic compatibility, together with computed reliability of power systems under realistic mission profiles	Test data from laboratory-tested prototypes	Yam Siwakoti
Electricity and Energy: behaviour change (Q3)	Evidence on energy literacy, consumer decision-making, trust, and behavioural interventions that influence adoption of clean energy technologies	Energy Literacy project findings, literature review, behavioural framework, and survey and co-design results where available	Bahareh Berenjforoush Azar
Policies and market mechanisms (Q1a to Q1d)	Recommendations for improving consumer participation through targeted incentives, energy literacy, trusted digital tools and equitable policy design	Policy analysis informed by research and international evidence	Bahareh Berenjforoush Azar
Economic impacts and workforce (Q4)	Evidence on the economic impacts of household energy technologies, including energy affordability, consumer investment decisions, and equitable access to consumer energy resources	Evidence from ongoing projects on energy literacy and household energy management	Bahareh Berenjforoush Azar

5. Final remark on carbon pricing

We note that carbon pricing sits outside the evidence the Commission has asked for, being an input assumption for the pathway modelling rather than a technology or cost input. We also note that the main price signal facing NSW industry is set federally. Still, we use this submission as an opportunity to highlight existing evidence on the role of carbon pricing.

It has been tested that carbon pricing reduces emissions. A 2024 systematic review in Nature Communications, drawing on 80 causal ex-post evaluations across 21 schemes worldwide, found that most of those schemes delivered immediate and sustained emissions reductions, even where prices were low. What separated the

effective schemes from the ineffective ones was rather their design and implementation, not the price level or the breadth of sectoral coverage.

This evidence demonstrates that durable and well-designed carbon price can be considered accelerant for market-led decarbonisation, ie it lowers the cost of sectorial policies built on top of it.

6. Working with the Faculty of Engineering and IT at UTS

EPES is a discipline within the Faculty of Engineering and IT at UTS (FEIT), which includes a number of adjacent capabilities that support government and industry efforts with net-zero goals.

Our working model is long-term partnership with industry, so much of our evidence comes from deployed systems and operating facilities rather than from models alone. We would welcome acting as a standing technical reference point for the Commission through to the completion of pathways development in mid-2027.

Key contact for any questions or requests arising from this submission: [redacted] can direct enquiries to the relevant lead contributor, or to colleagues elsewhere in the Faculty.

Endorsed by the Faculty of Engineering and IT

Professor Peta Wyeth
Dean, Faculty of Engineering and IT
University of Technology Sydney

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