



Queensland
Decarbonisation
Hub

Centre for Policy Futures

Insights from Sector Technology Assessment

Queensland Decarbonisation Hub Forum 2026

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Research Team – Chief Investigators

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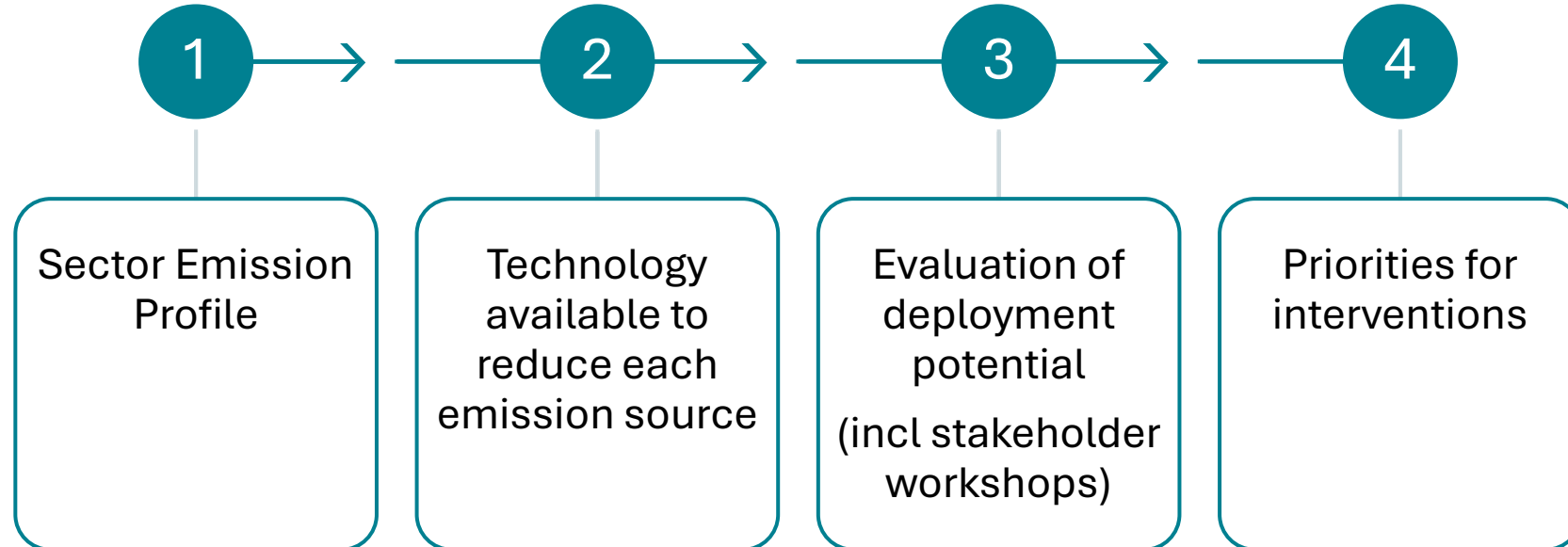
Ass. Prof Simon Smart



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The Question We Asked

What is the deployment potential of technologies that can reduce emissions in key economic sectors of Queensland and what is holding deployment back?



Queensland Context

- Large resource sector
- Large agricultural sector
- Long transport corridors
- Energy-intensive industry
- Regional and remote communities
- Long-lived infrastructure

Technologies must work under Queensland conditions, not just be theoretically available

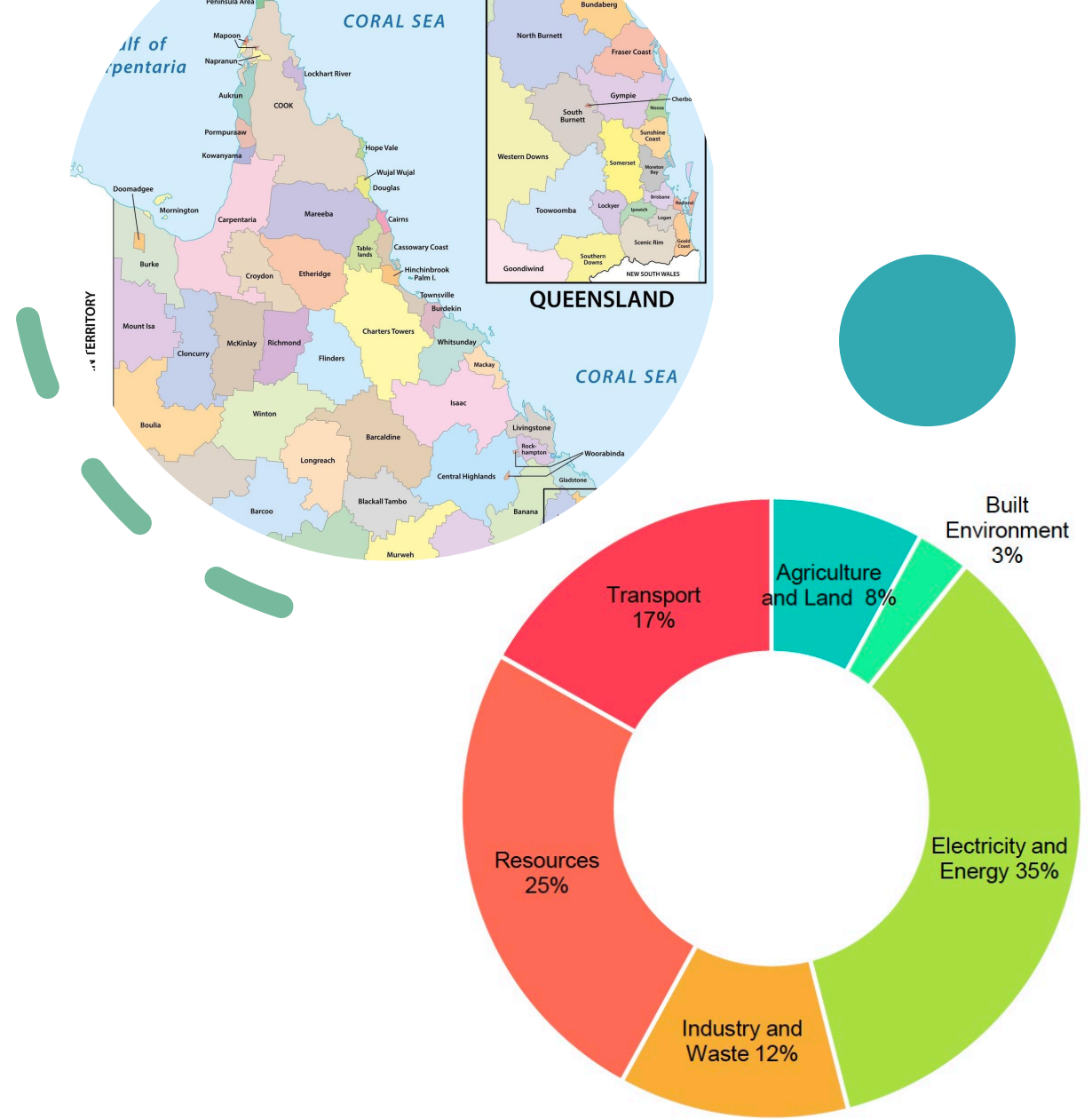


Figure 1: Queensland Net Emissions

Emissions are presented by Sector Emissions, 2023 STGGI Dataset, Year 2022.

What We Assessed

- Transport, Industry, Resources, Agriculture & Land, Built Environment.
- Examined emissions sources and technology available to abate those emissions.
- Assessed abatement potential, tech maturity, commercial maturity, barriers / enablers and deployment potential.
- 98 stakeholders consulted across government, industry, research.

Table 1: Example of Technology Traffic Light System

Activity	Technology	Abatement Potential	Technology Maturity	Complexity	Social Acceptance	Enabling Environment	Deployment Potential
Activity named	Tech i.	High	Existing	Simple	Supported / Neutral	Enabling Environment	High
	Tech ii.	Medium	Emerging	Medium	Mixed / Unknown	Neutral Environment	Medium
	Tech iii.	Low	Prospective	Complex	Opposed / Polarising	Significant Barriers	Low

Example - Aviation

Activity	Technology	Abatement Potential	Technology Maturity	Complexity	Social Acceptance	Enabling Environment	Deployment Potential
Domestic Aviation	Electrification	High	Prospective	Complex	Supported / Neutral	Significant Barriers	Low
	Low Emissions Fuels (incl. Hydrogen)	High	Prospective	Complex	Supported / Neutral	Significant Barriers	Low
	Rail adoption - high speed rail and upgrade to long distance rail network to increase travel speeds or lower travel times	High	Existing	Complex	Supported / Neutral	Significant Barriers	Medium
	Efficiency Gains in Aircraft	Medium	Existing	Medium	Supported / Neutral	Enabling Environment	High
	Air Traffic Control Management	Low	Existing	Simple	Mixed / Unknown	Neutral Environment	Medium
Airport Infrastructure Combustion of Fuels	Electrification	Low	Existing	Simple	Supported / Neutral	Enabling Environment	High
	Low Emissions Fuels (incl. Hydrogen)	Low	Prospective	Medium	Supported / Neutral	Enabling Environment	Medium

Key Finding

Technology maturity does not automatically translate into deployment potential

Examples:

High maturity/high potential: EVs, Building efficiency, Pre-drainage methane capture & use

High maturity/lower potential: Agricultural waste management, Heavy freight electrification, Electric heating for hydrogen production

Lower maturity/higher potential: Concrete carbonation, Diesel combustion of low emission fuels

DEPLOYMENT POTENTIAL				
TECHNOLOGICAL MATURITY		High	Medium	Low
	High	H/H	M/H	L/H
	Med	H/M	M/M	L/M
	Low	H/L	M/L	L/L

Activity	Technology	Abatement Potential	Technology Maturity	Complexity	Social Acceptance	Enabling Environment	Deployment Potential
Domestic Aviation	Electrification	High	Prospective	Complex	Supported-/Neutral	Significant Barriers	Low
	Low-Emissions Fuels (incl. Hydrogen)	High	Prospective	Complex	Supported-/Neutral	Significant Barriers	Low
	Rail adoption -- high-speed rail	High	Existing	Complex	Supported-/Neutral	Significant Barriers	Medium
	Efficiency Gains in Aircraft	Medium	Existing	Medium	Supported-/Neutral	Enabling Environment	High
	Air Traffic Control Management	Low	Existing	Simple	Mixed-/Unknown	Neutral Environment	Medium

Domestic aviation

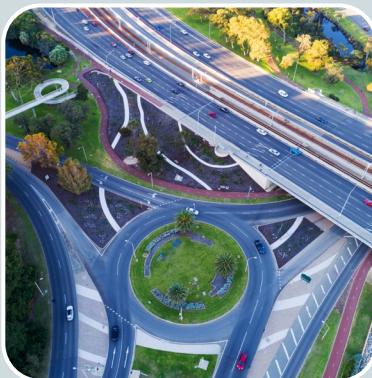
What this allowed us to build

Deployment Potential				
Technological Maturity		High	Medium	Low
	High	Efficiency gains in aircraft	Rail adoption - ↓ Air traffic control management - ↓	-
	Med	-	-	-
	Low	-	-	Electrification Low-emissions fuels)

Key Findings

- Many barriers were not technological
- Different sectors face different challenges
- This helps build a picture of how policy may play a role

Many Barriers are Not Technological



Infrastructure

- Transmission
- Charging
- Fuel supply
- Renewable electricity
- Location
- Social acceptance



Assets

- Long equip life
- Plant replacement cycles
- Electricity supply



Market

- Demand uncertainty
- Investment risk
- Pricing, green premium
- Geopolitical uncertainty



Institutions

- Approvals
- Regulations
- Policy
- Leadership
- Coordination

Different Sectors Face Different Challenges

Built Environment

- Uptake and retrofit.

Transport

- Charging and renewable fuels.

Resources

- Methane and electrification.

Industry

- Process emissions, high-temp heat, electrif'n

Agriculture

- Biological methane.

All Sectors: Access to renewable energy and electricity supply, asset lifecycle and investment constraints

Policy Implications

- Deploy proven technologies.
- Enable shared infrastructure.
- Demonstrate technologies where performance uncertainty remains
- Provide for regulatory certainty
- Place matters, specific application matters
- Where tech maturity is low, invest deliberately



Final Reflection & Next Steps

Technology matters, but deployment determines outcomes.

Queensland's challenge is increasingly about timing, supportive regulations and regulatory certainty, coordination, infrastructure, investment and social acceptance.

Next Steps (contingent on funding)

- Public sharing of technology assessment data & process for ongoing update as things change.
- Energy sector assessment (as was omitted from scope of initial work)
- Focused research on overcoming major bottlenecks in each sector.



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Panel Discussion

Prof Kerrie Wilson

Dr Liz Fellows

Dr Liz Young

Prof Belinda Wade

