

# Centre for Railway Engineering (Est. 1995) Centre for Hydrogen and Renewable Energy (2022)

## CQUniversity

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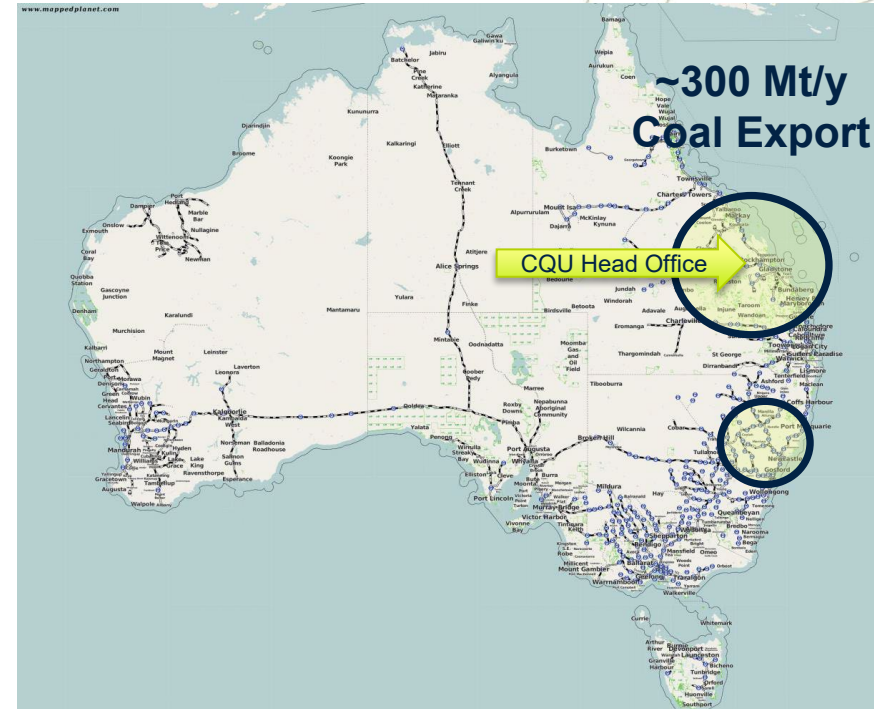
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# Introduction – Local Context – Energy Transition

## CARBON INTENSIVE

- 50 of Australia's Largest carbon emitters
- 3 Coal power stations
- Coal mining
- Liquefied Natural Gas Exports
- Aluminium, Chemicals, Agriculture



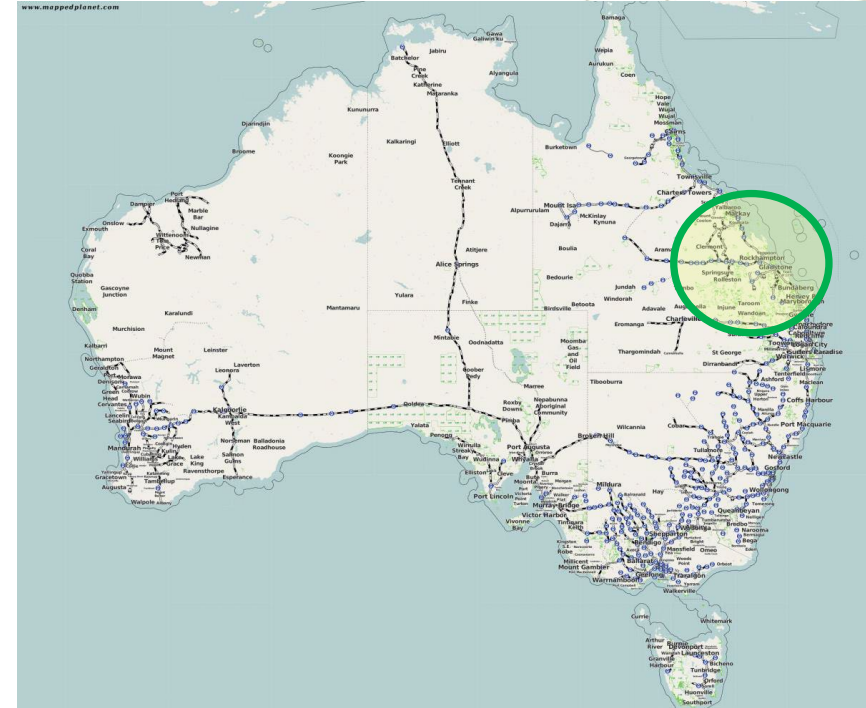
# Introduction – Energy Transition Projects

## Gladstone

- 9 GigaWatt - Solar & Hydrogen
- Manufacturing Hydrogen Electrolysers
- Hydro and Wind Power Stations
- Solar Farms and Rooftop Solar
- Green Chemicals

## Strong Government Support

- Qld Energy and Jobs Plan
- CQ-H2 Consortia



# Approach to Research

- These are “Industry Focused Centre’s” for problem solving and Applied Research.
- Research spans from “Theoretical” to “Industry ready” First-of-a-Kind solutions and Consulting.
- International Engagement via
  - Shared interests and Joint Publishing in High Quality Journals
  - Co-tutelle Research Student Programs
  - Focus on a select number of countries where needs and interest match
  - Benchmarking research in peak International Conferences and Associations
    - IHHA, IAVSD, WCRR etc



# What we look like in 2024 - Hydrogen and Renewables

- Green Hydrogen production
- Green Chemicals
- Freight Mobility



# Reach – Where we have worked

## Research Projects

In 4 of the 6 Australian States

New Zealand

India

China

## Joint Publications

Europe

Canada

South Africa

China

## Engineering Consulting

Australian States

New Zealand

India

USA

Mongolia

Cameroon

Canada

## New Product Rollouts

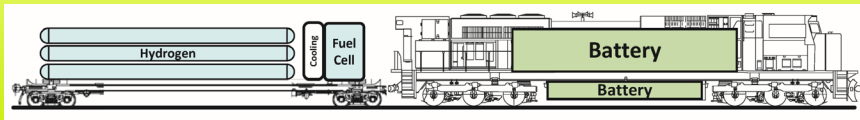
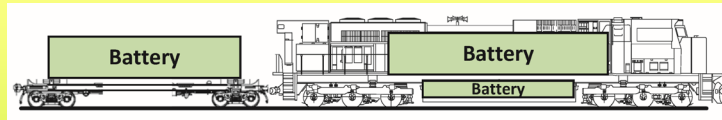
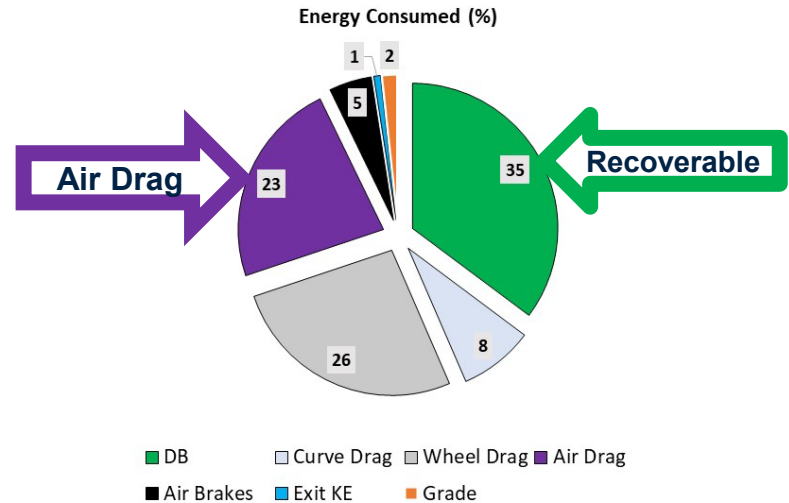
Australian States

New Zealand



# Example Projects in Energy Transitions - RAIL

- Energy Solutions for Large Railway Freight Operations
  - Simulation of Energy usage, recovery and storage
  - De-Risking Industry of Transition Solutions
  
- Similar Applications in Road



# Research Opportunities Going Forward

- Energy Analysis
- Reducing Energy Consumption
- Biofuel Projects
- Battery and Hydrogen Conversions
- Storage and Charging/Refueling Systems
- Safety System Developments in each new Application
- Green Chemicals
- Ammonia applications
- New Mobility Decarbonisation Technologies

## Current Projects

- ☆
- ☆
- ☆
- ☆
- ☆
- ☆





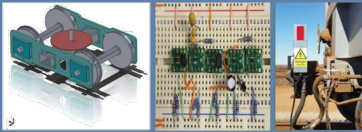
Smart Condition Monitoring



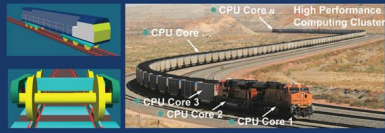
Automation and Optimal Energy Drive Assistance System



Virtual Prototyping Product Design Smart Devices



Simulation Parallel Computing Digital Twins



Field and Laboratory Testing



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# Thanks

## Comments, questions & discussions

### Presenter:

# Prof. Colin Cole

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