



Creating value in transition

NET ZERO 2050:

THE TRANSITION TO A DECARBONISED ECONOMY

19 October 2022



Agenda and Objectives

Net Zero 2050 – the transition to a decarbonised economy

Net Zero is coming. What this means for Australian industry, and opportunities and challenges with the decarbonisation process.

This discussion will cover:

- An overview of what net zero will mean across the economy;
- How decarbonisation will transform Australia's energy system;
- Emission reduction opportunities (and barriers) for large energy users; and
- Renewable technologies and fuels that manufacturers can consider.



Engevity Expertise

CREATING VALUE IN TRANSITION THROUGH STRATEGIC ADVISORY

Engevity brings together a powerful cross-section of expertise, providing quality and timely strategic advice spanning commercial, sustainability and climate change adaptation, regulatory and technical areas across the renewables, energy, utility, infrastructure and innovation sectors.



TRANSFORMATION

Engevity supports sustainable and renewable project development through a collaborative approach, technical understanding, and a proven track record of experience and fact-based analytics.



POLICY &
REGULATION

Engevity advises on the transition of regulation, markets and policies that support new technologies, investment and customer outcomes.



NET ZERO

Engevity undertakes climate scenario impact modelling, understanding of market trends and the development of net zero strategies for organisations.

Engevity assists organisations seeking to expand to adjacent markets, transition to net zero and implement high value, low risk strategies aligned to their strengths.



STRATEGY

Engevity offers detailed market trend analytics, financial and economic case evaluations, and technology trend insights.



ENERGY & CARBON
MARKETS

Engevity provides transaction due diligence and market opportunity or entry assessment.



FINANCE



Maurice Oldham

Associate Director: Climate & Energy

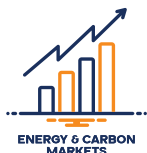
BBus/BDev Studies(Hons), MClim



[Maurice Oldham](#)



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Maurice is a skilled climate policy adviser with 15 years of progressive and broad experience providing advice on energy and climate issues in a strategy development environment, both in-house and as a consultant. As an international policy analyst and programme manager, Maurice has worked across the globe providing vast cross-cultural and multi-national experience. Maurice delivers impactful advice to diverse clients in the energy and climate space, including long-term decarbonisation strategies for multiple energy utilities, and analytical support as part of the policy-making process.

Selected relevant client experience:

- Mullion Group: focused on North American climate and energy project for diverse clients – including governments, corporations, utilities and non-government organisations. Technical contributions including data interpretation, technology assessments, scenario modelling and policy and market tracking.
- ICF: led and contributed to climate projects across the US – with a focus on development of low carbon fuels and technologies, and their potential contribution to deep and long-term decarbonisation strategies. Technical contributions related to hydrogen and RNG, including strategy development, data collection and interpretation.
- Pacific Gas & Electric Company: conducted technical and economic assessments of energy policies, technologies and trends. Focused on the transport sector to provide recommendations for action to senior leaders.
- Australian-Indonesia Partnership for Economic Governance: provided strategic advice to executive and senior Indonesian government officials on cross-cutting public policy issues, including fossil fuel subsidies, energy sector reforms and the private investment climate.

Professional background:

- Associate Director (Engevity Advisory)
- Principal Consultant (Mullion Group)
- Senior Consultant, Energy & Transportation (ICF International)
- Energy & Climate Policy Analyst, Principal (Pacific Gas & Electric Company)
- Lead Finance Advisor (Australia-Indonesia Partnership for Economic Governance)
- Advisor (Australian Government Department of Climate Change)

Value to Client:

- Business planning strategy & implementation
- Business case preparation & implementation
- Economic forecasting & modelling
- Net zero transition
- Cost benefit analysis
- Energy & climate market analytics
- Regulatory design
- Policy design & development
- Policy review
- Regulatory proposal support
- Consultation response & co-ordination
- Project modelling & evaluation

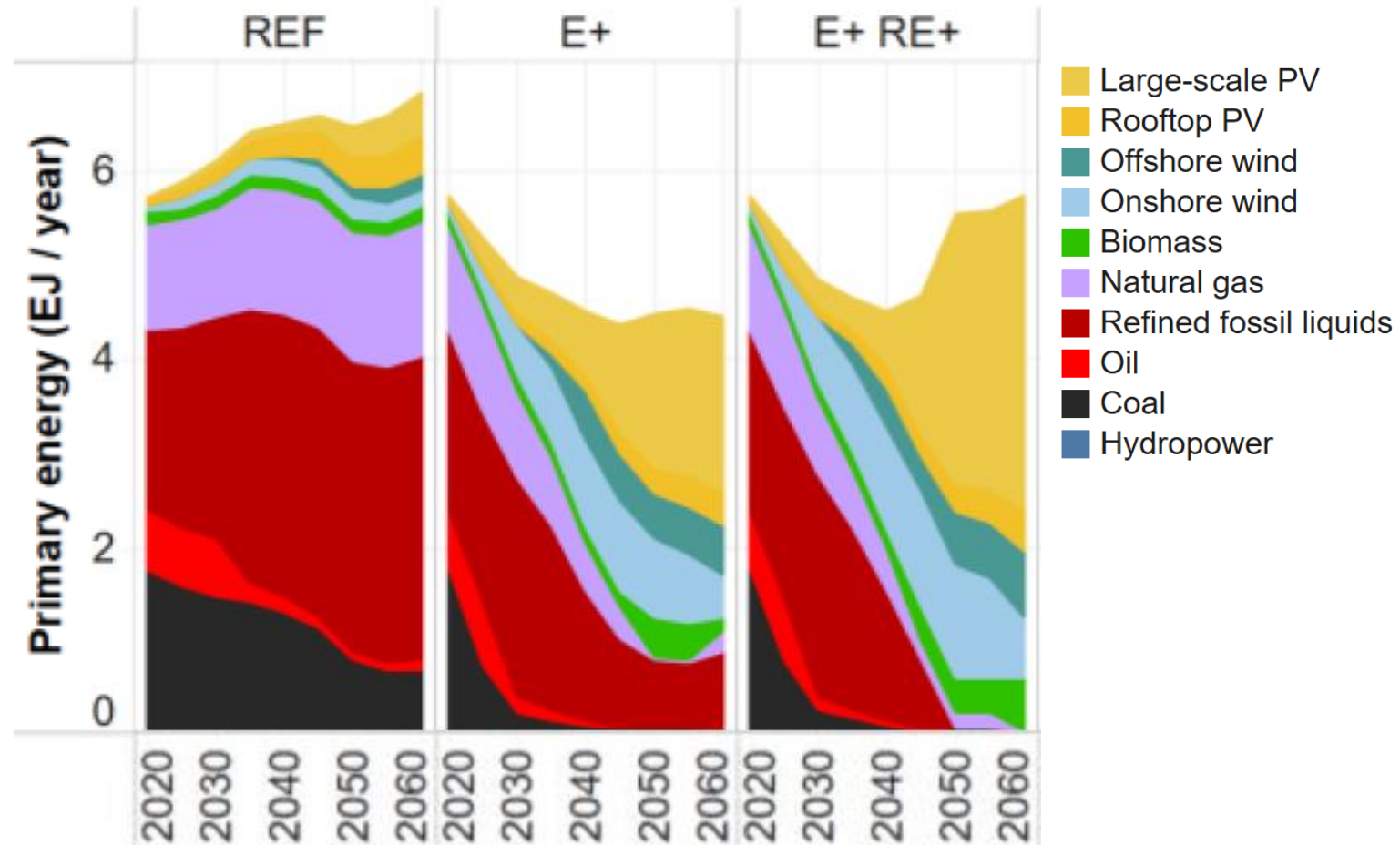
Relevant Strengths:

- Stakeholder communications
- Project governance & management
- Strategic & corporate communications
- Developing speeches & presentations
- Structured problem solving
- Strong research and analytical abilities

Economy-Wide Decarbonisation in Australia

- In 2021 the Australian Government committed to a net zero target by 2050: a bipartisan policy position.
- Economy-wide net zero analyses highlight the significant energy system transformations needed to get to net zero.
- Net zero requires the roll-out of multiple actions, technologies and fuels across the economy:
 - Fuel switching (e.g. gas to electric).
 - Phase-out of fossil fuels, including coal, natural gas and petroleum.
 - Shifts in energy consumption patterns and behaviours.
 - Introduction of 'reach' technologies and fuels (e.g. batteries, electrolyzers, direct air capture, bio- and synthetic fuels).
 - Policy innovation.
- **No sector, activity or business will be left untouched by this transformation.**

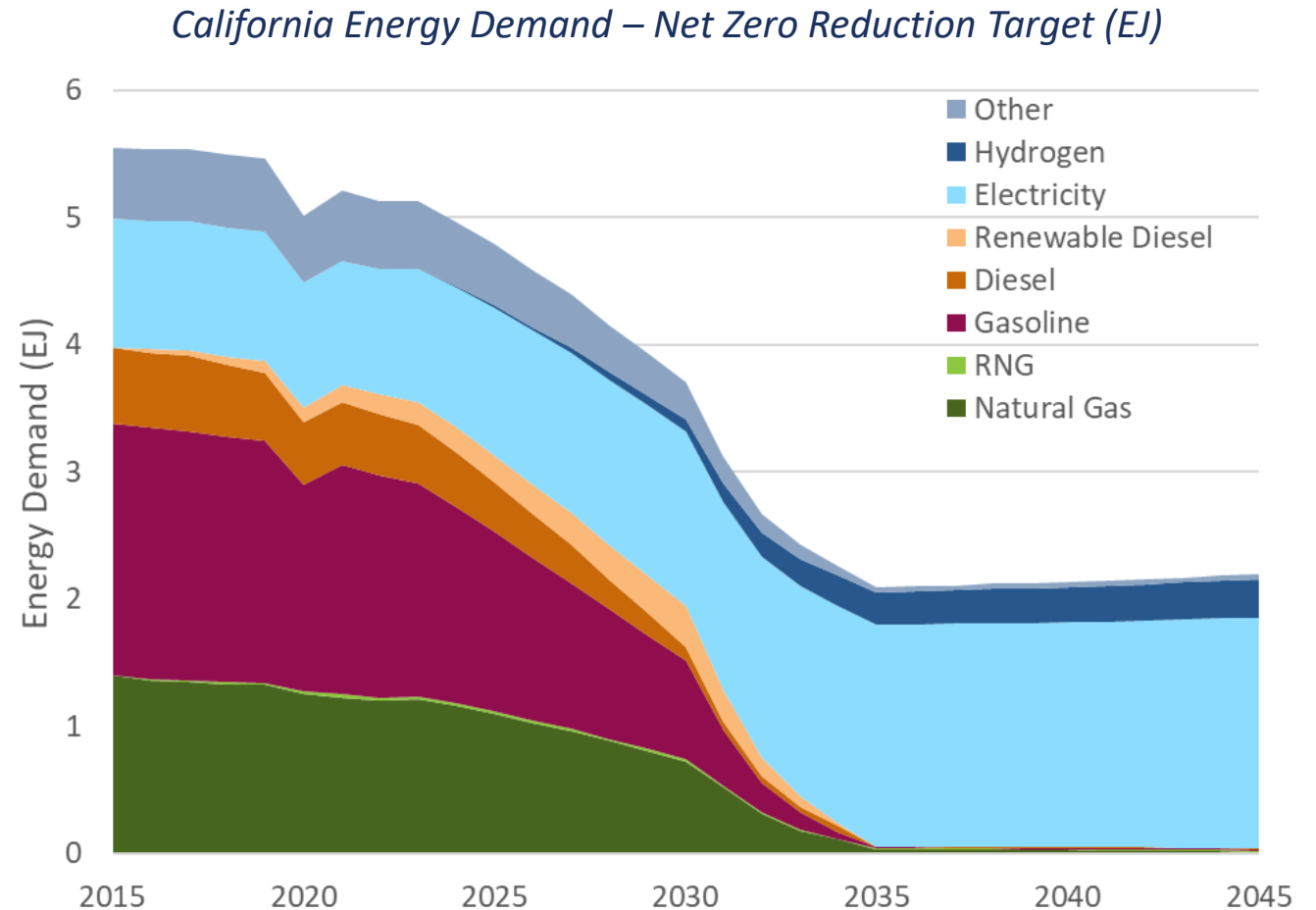
Australian Primary Energy Demand (exajoule, EJ)



Source: <https://www.netzeroaustralia.net.au/>

Economy-Wide Decarbonisation: Global Context

- Global analysis on decarbonisation pathways is consistent with Australian context, with similar trends, technologies and fuels.
- International Energy Agency's Net Zero by 2050 report shows the comprehensive transformation of our existing global energy system.
- The net zero transition is already occurring, with policy support and incentives being implemented across the board:
 - Introduction of aggressive renewable electricity targets (see: GHG-free electric grid targets in Europe and US).
 - Phase-out of conventional liquid fossil fuels (see: European and US state-level ban on internal combustion engines from 2035, if not earlier).
 - Phase-out of conventional natural gas (see: bans on new gas hook-ups in residential homes).
 - Funding and support for new fuels (hydrogen) and new technologies (electric vehicles across all segments).



Emission Reduction Options

Renewable Electricity

- On-site, with different technology options including solar PV and batteries, or indirect through power purchase agreements.
 - Potential to reduce energy costs over time.
 - Energy independence (or reduced dependence).
- Challenges:
 - Balance generation and demand.
 - Suitability and availability of technology options.
 - Need policy and regulatory framework to evolve to reflect a renewables-dominant grid and also value of GHG-free electricity.

Electrification (Stationary)

- Electrification of natural gas end-uses, such as boilers and heating.
 - Potential to reduce energy costs over time.
- Challenges:
 - Higher upfront cost (but potential for lower overall costs or lower costs in the future).
 - Technology not available or suitable in some cases.

Electrification (Transport)

- Electrification of conventional vehicles (petrol/diesel).
 - Established technology for light-duty vehicles, with lifetime costs lower than conventional vehicles.
- Challenges:
 - Limited availability of EVs.
 - Developing technology, particularly for medium- and heavy-duty vehicles and bespoke vehicle types.
 - Currently higher upfront costs, including EV infrastructure as required.

Offsets

- Low cost alternative.
 - Does not require significant commitments or actions.
- Challenges:
 - Public perceptions on relying on offsets (not direct emission reductions).
 - Does not deliver direct emission reductions (i.e. accounting approach).
 - Not a long-term or widescale solution to decarbonisation (i.e. complementary to other emission reduction options).

Emission Reduction Options

Biofuels

- Versatile drop-in replacement fuel for many end-uses.
- Potentially cost-effective.
- Challenges:
 - Limited biomass feedstock and/or production capacity.
 - Competing end-uses (road transport vs aviation vs stationary).

Renewable Natural Gas

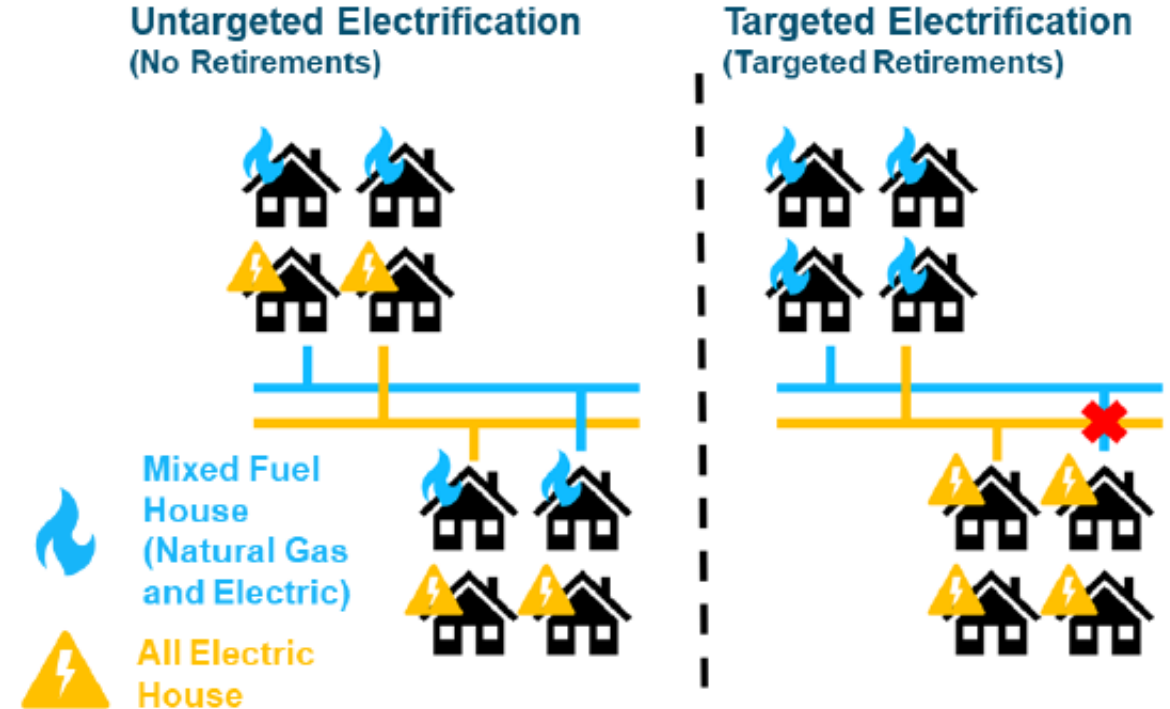
- Drop-in replacement fuel for existing natural gas end-uses.
- Utilises existing energy infrastructure.
- Challenges:
 - Limited biomass feedstock and production capacity.
 - Competing end-uses (power vs stationary).
 - Environmental value of RNG not reflected in policy/regulatory framework.

Emerging & Developing Technologies

- Hydrogen
 - Versatile fuel, with developing end-uses: power, transport, stationary...
 - New energy system infrastructure (at high deployment levels).
 - High production cost, but declining.
- Synthetic Fuels
 - Removes feedstock constraint of biofuels.
 - Expensive to make, with limited production capacity.
- Direct Air Capture
 - Captures CO₂ from atmosphere and either stored or used in fuel production (synthetic fuels).
 - High potential, but technology still developing at high cost.
- Carbon Capture & Storage
 - Questionable feasibility: decades-long technology lead-time with large R&D investment for marginal outcomes to date.

Deep Dive on the Gas System

- Electrification:
 - High-level approach: appliance-based electrification vs. geographic (or 'strategic') electrification.
 - Influence of climate, geography and population density.
 - Practical implications, including efficacy of electric heating options, large-scale retrofits, and industrial electrification.
 - Electric system infrastructure investment.
 - Shifts in daily and seasonal electric loads (exacerbated by other measures such as transportation electrification).
- Low carbon gases:
 - Availability/supply and costs of low carbon gases (e.g. renewable hydrogen, renewable natural gas and synthetic natural gas).
 - Prioritisation of limited low carbon gas supply – buildings, industrial, power generation, transportation (on- and off-road).
 - Managing shutdown of gas system, including ongoing infrastructure investment and maintenance.
 - Daily and seasonal gas load management, including minimum throughput requirements for pipeline infrastructure.



Decarbonisation Process for Organisations

1. Data and information assessment:

- Collect historical data on energy consumption, direct and indirect emissions and other relevant information sources, such as forecasts.
- Also identify any information gaps.

2. Scenario analysis:

- Identify and assess energy, operations or climate strategies; these can include corporate ESG objectives, GHG targets and other plans, such as long-term business strategies and regulatory requirements.
- Integrate and align analysis of operational data (1. above) with climate and energy objectives, including assessment of different emission reduction and technology options.
- Can include modelling, cost-benefit analysis and other analytical tools.

3. Strategy development:

- Identify and assess appropriate pathway(s) to meet climate and energy objectives, including near-, medium- and long-term goals and actions.

4. Action plan implementation:

- Develop and implement a detailed and comprehensive action plan to deliver higher-level strategy.
- Can include pilot projects, feasibility studies, and additional research and analysis.

Note: all of the above typically requires significant engagement and buy-in throughout the organisation, from decision-makers to end-users.





Questions?

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Engevity creates value in transition

Future focused and progress orientated, Engevity works with organisations to expertly navigate the complexities of change.

Engevity is a professional team of trusted leading experts creating impactful advice to industry, financial sectors, governments and regulators.

Engevity create value through transition by offering innovative thinking, expert guidance, pragmatic advice and smart solutions – leading us to a more sustainable future. Engevity's model is agile, solutions focused and centered around our people and the needs of our clients.

We are an Australian owned, professional services organisation committed to supporting our clients to sustainably evolve their organisations with our passion, integrity and the power of our exceptional people. Our team bring a diversity of real-world experience and are leaders in tackling challenging projects and creating enduring value for our clients.



Our Culture

SUPPORTING OUR CLIENTS WITH OUR PASSION, INTEGRITY AND THE POWER OF EXCEPTION PEOPLE

Our core culture revolves around supporting our clients to make challenging decisions, develop sustainable projects, implement high value strategies and understand the benefits of innovation.



Exceptional People & Culture

- Collaborative & connected
- Flexible
- Trustworthy
- Purpose driven
- Outcomes focused
- Communicators



High Performing Organisation

- Exceptional service
- Focused on our core capabilities
- Collaborative
- Consultative
- Efficient systems & process



Creating a Valued Legacy

- Go-to advisory firm for cleantech and decarbonising our economy
- Commitment to continuously creating unrivalled client value
- Positive industry legacy
- Delivering on time, every time
- Independent thought leadership

Our Sectors



Engevity supports solar development, connection, due diligence and technology development



Engevity supports wind development, connection, due diligence and technology development



Engevity has experience that spans utility scale storage to distributed storage, including stand-alone, co-located with renewables or conventional technology, as well as behind-the-meter and off-grid application



Engevity has experience in hydrogen project developments, market analysis, business and economic cases, and technology evaluations



Engevity has experience in working with technology innovations, working with or changing regulations, amended tariffs and co-designing with customers



Engevity advises on grid connections in the NEM, with careful planning and consideration of design, Generator Technical Performance Standards (GPTS), coordination of multiple stakeholders, and testing and commissioning



Engevity has experience in working with technology innovations, working with or changing regulations, amended tariffs and co-designing with customers



Engevity has experience with community and industrial scale microgrids in navigating regulations or licensing and developing market approaches based on robust technology and financial assumptions



Engevity has experience in developing and evaluating passenger and commercial EV business cases, considering upstream infrastructure impacts and consideration of regulatory implications



Engevity has experience in developing, assessing and analysing bioenergy and bioenergy projects and technologies



Engevity has experience in assessing the impact of alternative climate scenarios and net zero transition pathways for alternative infrastructure categories such as airports, ports, pipelines, buildings, etc.

Our Services



STRATEGIC SOLUTIONS

Integrated and specialised services, assisting clients progress sustainable projects.

Strategy

- Business and project strategy
- Business case development and positioning
- Go to market strategy & implementation
- Business transformation and change management
- Project management
- Co-design and group facilitation
- Business development
- Risk evaluation and compliance
- Executive and market dashboards



CREATING TRANSITION

Evolution and reform is imperative to future growth and success, and understanding commercial impact.

Reform

- Cost benefit analysis
- Regulatory design
- Compliance
- Rule changes
- Reforms facilitation
- Policy design & development
- Regulatory proposal support
- Consultation response & coordination
- Reform impact assessments



TRANSACTION ADVISORY

Techno-commercial transaction advice and market insights.

Transactions

- Stakeholder consultation & engagement
- Contract management & approach
- Mergers & acquisitions
- Specialist commercial advice
- Tender design, evaluation & negotiation
- Competitive bid processes
- Market & competitor analysis
- Due diligence & investigations
- Project modelling & evaluation



PROJECT DELIVERY

Highly collaborative, integrated approach focused on client needs and future facing solutions.

Delivery

- Business investment cases
- Project governance & management
- Life-cycle development (origination to financial close)
- Feasibility assessments
- Contract packaging design
- Digital and technical innovation
- Owners / lenders engineering
- Constructability advice
- Asset management support

Our Locations

Team Locations

Engevity has team members based in most states of Australia.

Key capital cities – Canberra, Melbourne, Sydney and Brisbane.

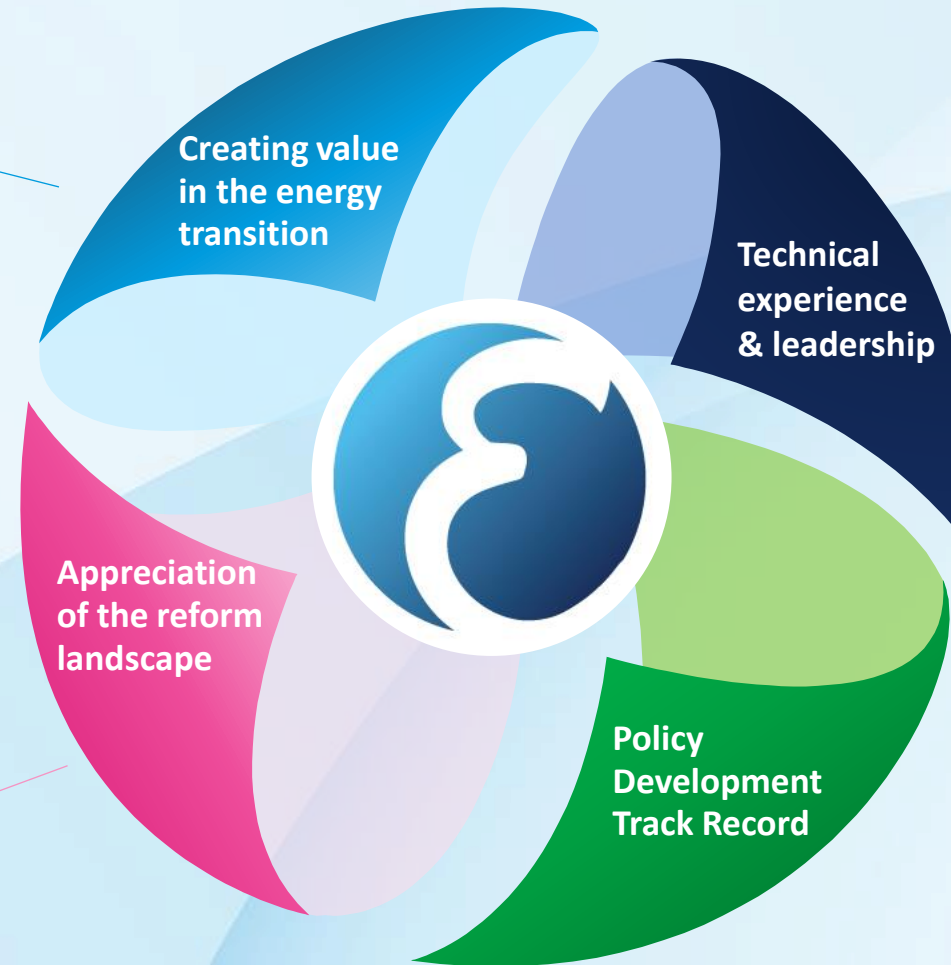
Key regional areas - Sunshine Coast (QLD) & Newcastle (NSW).



Our Differentiators

We have a track record in **enabling governments and organisations to realise their renewable energy ambitions**, finding ways forward that achieve both financial and ESG goals. Our team are at the forefront of the energy transition and industry decarbonisation, including Craig Chamber's involvement with **ARENA as an Investment Director** and leadership of the **Distributed Energy Integration Program** which he both founded and has Chaired since 2018.

Our team has **direct knowledge of the regulatory and reform landscape** through our long term involvement with **state and federal governments**, the recent development of the **Orana REZ**, team members **with experience within the AEMC, CEC, Productivity Commission, ESB and DPIE** and multiple ongoing engagements such as currently working for ESCOSA on reshaping their code to account for the emergence of DER. **We have an intimate knowledge of regulatory reforms, government policies and commitments, as well as the evolving energy technology solutions.**



Our recent technical experience developing large scale renewables, hydrogen, EV and battery projects for clients such as **Nexif, Banpu, EDF, Zenobe, Lumea, Sunshine Coast Council, Energy Queensland, Acciona, APA, ARENA, and TransGrid** enables us to bring a comprehensive and current understanding of the technical challenges facing our power system. We are leading thinking domestically and internationally and can **balance strategic, regulatory, commercial and engineering capabilities across multiple professional disciplines.**

Engevity has experience through Anthony Bell who has worked in the Productivity Commission and he together with Edward Hawkins have worked at AEMC developing NER rules (e.g. the recent Access and Pricing as well as the System Strength Reforms) and Craig Chambers who has worked closely with DISER and supported ARENA to develop its investment priorities since 2018. We have **a comprehensive understanding of national and international policies, sector trends, long term emissions and carbon price forecasts, key technological, industry practice and policy turning points and their interdependencies.**