Decarbonology

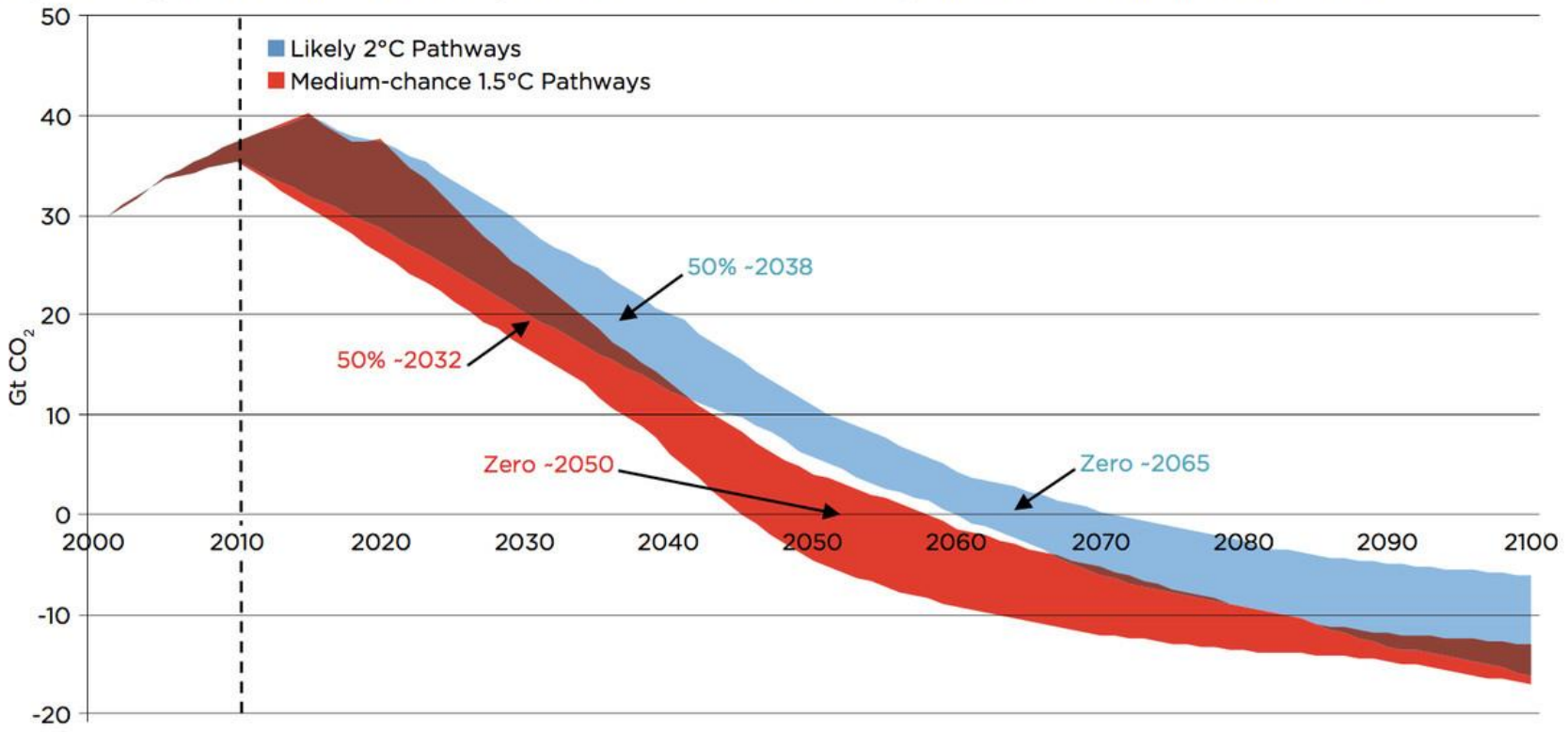
SMART RE MICROGRIDS IN A NET ZERO FUTURE

AMCOE AND LITHIUM VALLEY EVENT 9TH DEC 2021

Decarbonisation – The Task Ahead

- Paris Agreement:
  - Goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.
  - 2018 IPCC report shows world would have to curb its carbon emissions by at least *49% of 2017 levels by 2030* and then achieve Zero Net Emissions by 2050 to reach 1.5 degrees Celsius target.
  - At COP26 countries agreed to come back next year to submit stronger 2030 emissions reduction targets.

Figure 1: Range of Global Emissions Pathways in Scenarios Consistent with Likely Chance of 2°C or Medium Chance of 1.5°C[18]



Sources: Joeri Rogelj et al

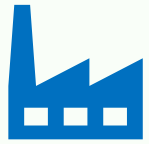
https://www.vox.com/energy-and-environment/2018/1/19/16908402/global-warming-2-degrees-climate-change

Geopolitical Situation Regarding Decarbonisation

- Global Commitments to Net Zero by 2050 mean:
  - Urgency – Major global emissions reductions required in next 9 years (2030) and then more in next 20 years.
  - *Cannot kick the can down the road* – real action is required now.
  - Reductions required across all countries, all aspects of society and all economic sectors.
  - *Cannot kick the can over the fence* – everyone needs to reduce and not just shift the emissions.
  - Focus has shifted from individual country or sector action to whole of global society action.
  - Focus has shifted from individual company actions to need for whole of value chain action.

https://depositphotos.com/108781344/stock-illustration-man-kicking-can-down-the.html

EU Carbon Border Adjustment Mechanism (CBAM)



Non EU companies

Trading directly or indirectly with the EU

Crosses an EU border

Are EU climate standards being met?

Pay carbon tax – tax payable is carbon content * carbon price (includes transportation)

Current estimates are A$ 115-120 per metric ton

Equilibrium within the EU market

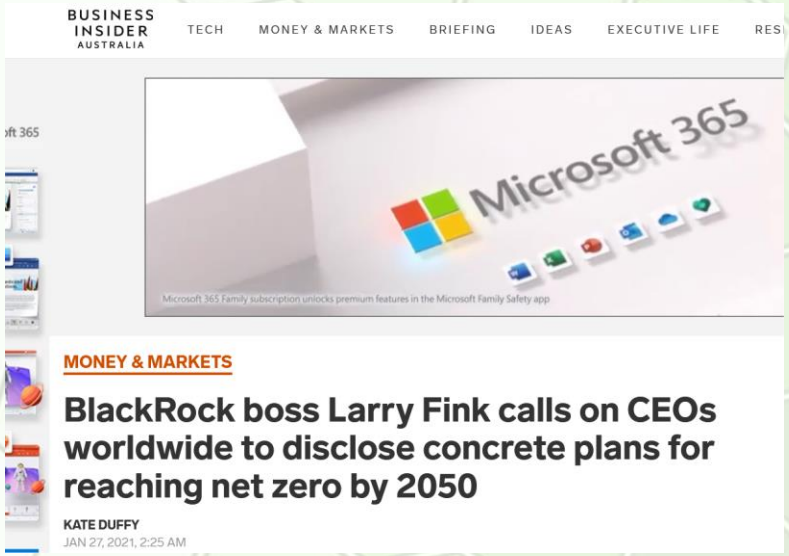
If your part of a supply chain, it matters.

Source : Decarbonology 2021

Global Debt and Equity are Acting

Global debt and equity have recognized both the risks of not reducing emissions and the opportunities in doing so.

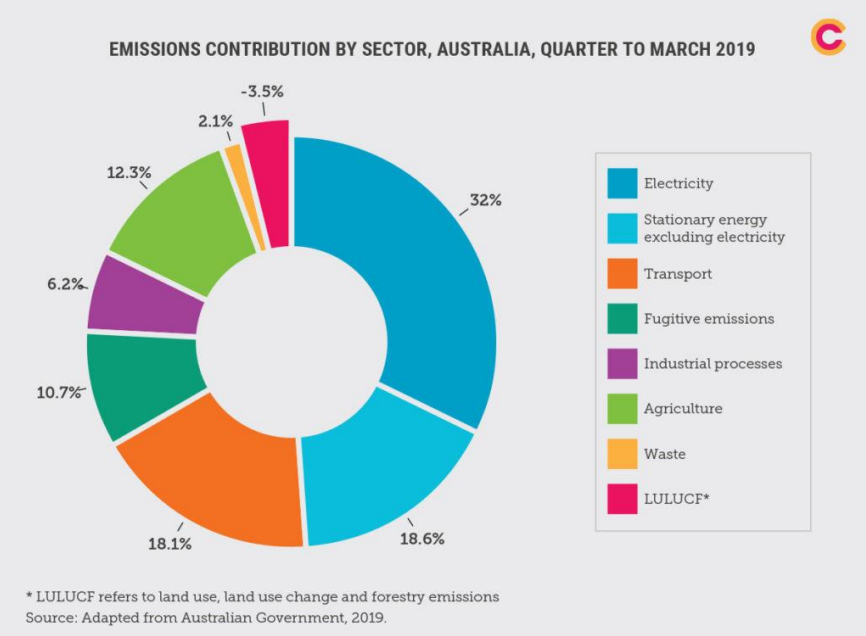
- Transparent reporting about company climate change risks required – TCFD climate related disclosures framework.
- Large individual (Blackrock) or aggregated shareholder/investment funds (CA100+, TPI) are requiring carbon disclosure and are shifting out of high emitting companies and sectors to lower emissions or new innovation ones.
- Banks and lenders are shifting capital investment and lending away from high emitting industries to lower emissions or new innovation ones.
- Regulators have made carbon disclosure a fiduciary duty.



TCFD has developed framework for voluntary, consistent climate-related financial disclosures that would be useful to investors, lenders, and insurance underwriters in understanding material risks.

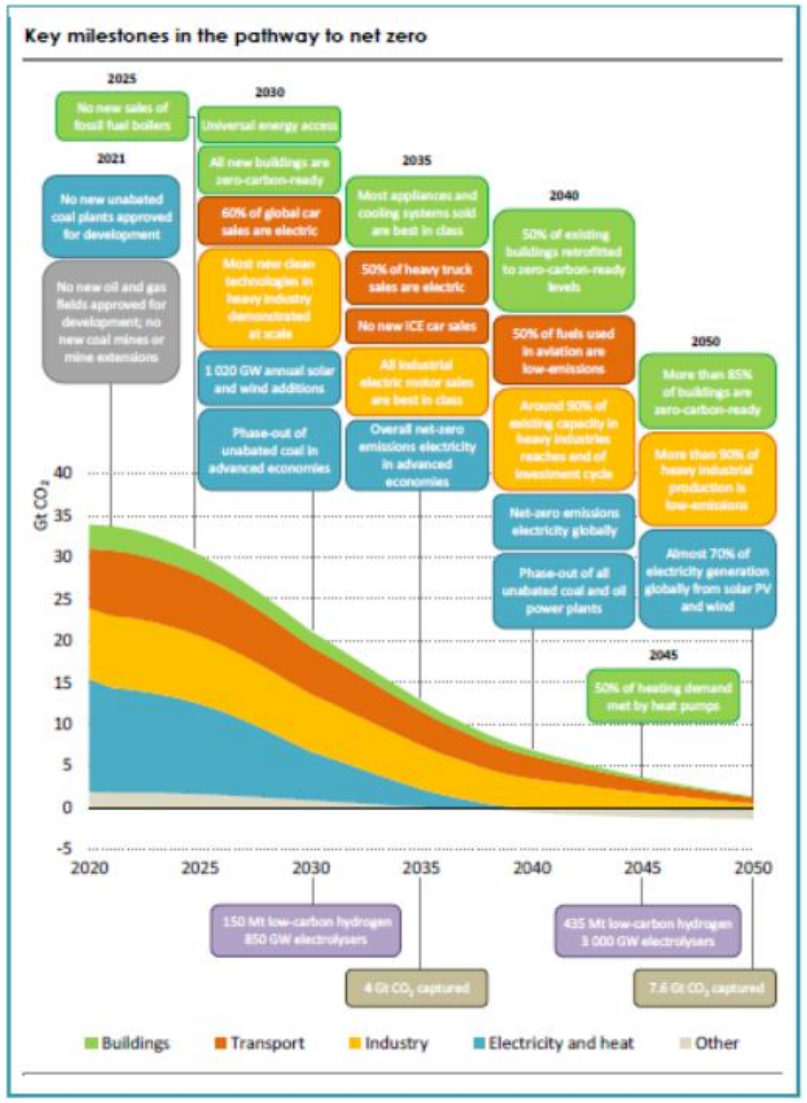
Why Electricity Matters

Australia's GHG Emissions



- Electricity generation and distribution – 32%
- Transport – 18%

https://www.climatecouncil.org.au/resources/what-is-climate-change-what-can-we-do/



https://www.iea.org/reports/net-zero-by-2050

IEA Net Zero 2050 Pathway

- **2021** – No new unabated coal plants approved.
- No new oil and gas fields approved and no new coal mines or extensions.
- **2030** – 60% of global car sales are electric.
- 1020 GW annual solar and wind additions.
- Phase out of unabated coal in advanced countries.
- **2035** – overall net zero emissions electricity in advanced countries.

Why Electricity Matters

IEA Net Zero 2050 Pathway

The path to net-zero emissions is narrow: staying on it requires immediate and massive deployment of all available clean and efficient energy technologies.

All the technologies needed to achieve the necessary deep cuts in global emissions by 2030 already exist, and the policies that can drive their deployment are already proven. IEA Net Zero by 2050 report.

https://www.climatecouncil.org.au/resources/what-is-climate-change-what-can-we-do/

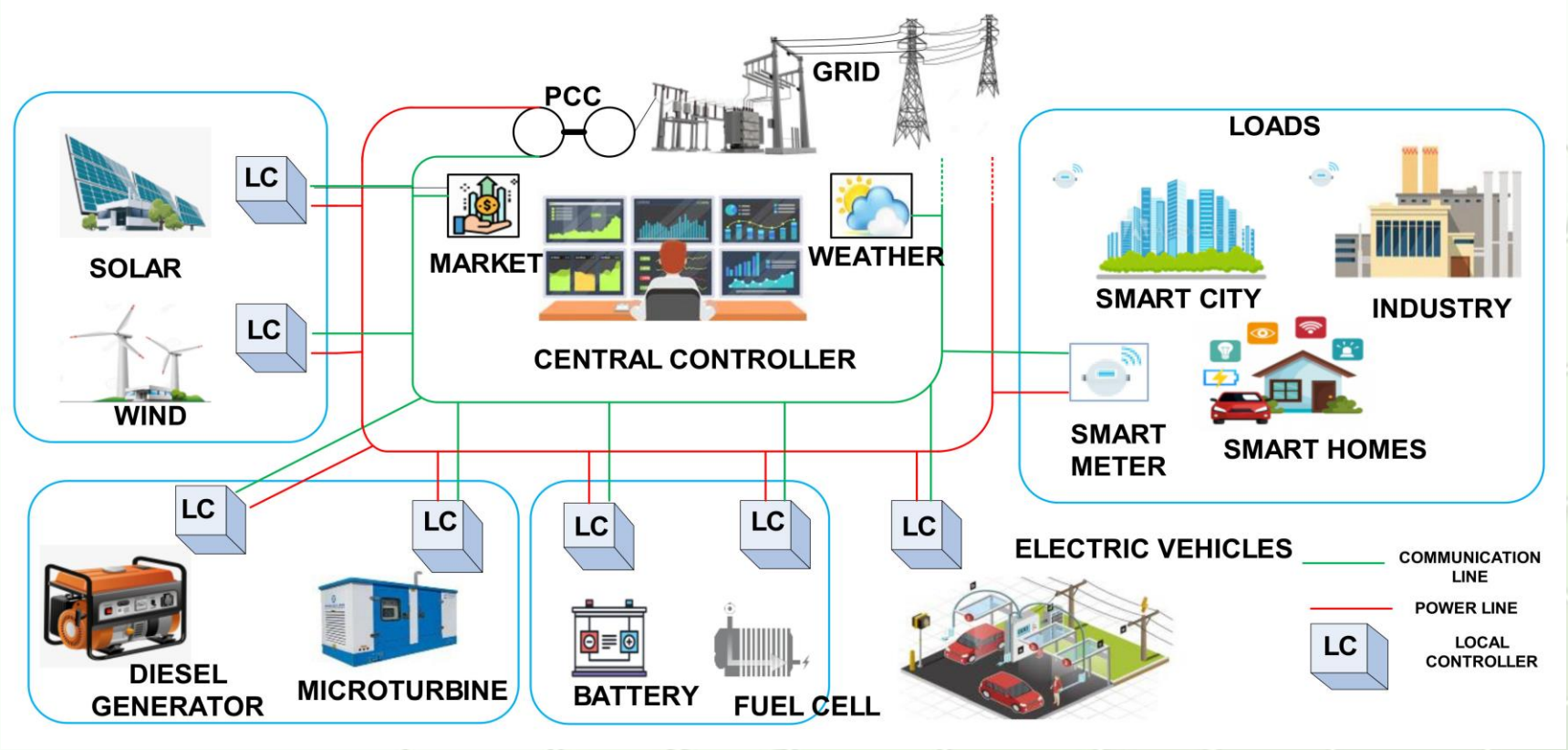
https://www.iea.org/reports/net-zero-by-2050

Features of Microgrids That Aid Decarbonisation

Integrator

- Needed to integrate and enable all of the other energy reduction and low carbon solutions and the existing grid.

Smart microgrid



https://www.mdpi.com/1996-1073/14/17/5459/htm

Features of Microgrids That Aid Decarbonisation

Dispatchable

- Able to installed relatively quickly anywhere - not reliant on having the grid.

Onslow Microgrid

Peel Business Park Microgrid

Whitegum Valley Residential area

Rural Property Microgrid

Scaleable

- Any size from household to community.

Degrussa Solar Power Project

Household Microgrid

Features of Microgrids That Aid Decarbonisation

Flexible and Incremental

- Can start with conventional generation and renewable energy systems and then transition to full RE over time.
- Can easily increase size of system over time as needed.

Lord Howe Island Microgrid

https://www.pv-magazine.com/2021/09/20/solar-microgrid-makes-remote-australian-island-less-dependent-on-diesel/

Solar wind diesel Microgrid

https://regenpower.com/off-grid/hybrid-systems/

Rottnest Island Microgrid

Features of Microgrids That Aid Decarbonisation

Egalitarian

- Renewable energy electricity generation is no longer only the exclusive domain of big utilities.
- Anyone can fund and build a microgrid and so opens up multiple investors. :
  - Mum and dads (households).
  - SMEs.
  - Land developers and builders.
  - Consortiums.
  - Venture capital.

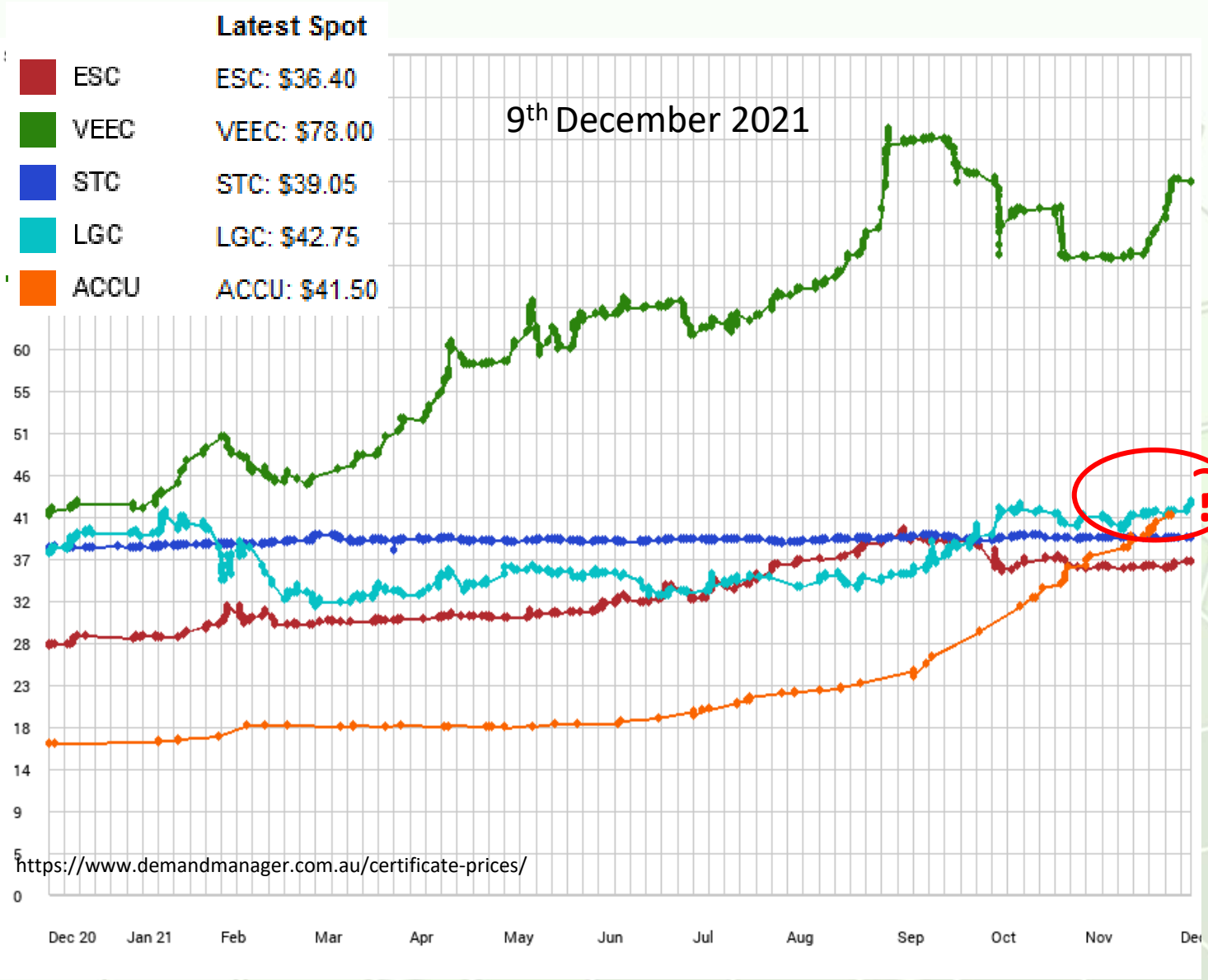
Peel Business Park Microgrid

- Means that Government does not need to find all the the funds and implement the required grid transformation on the timeframe needed.

LGCs and Carbon Offset Credits

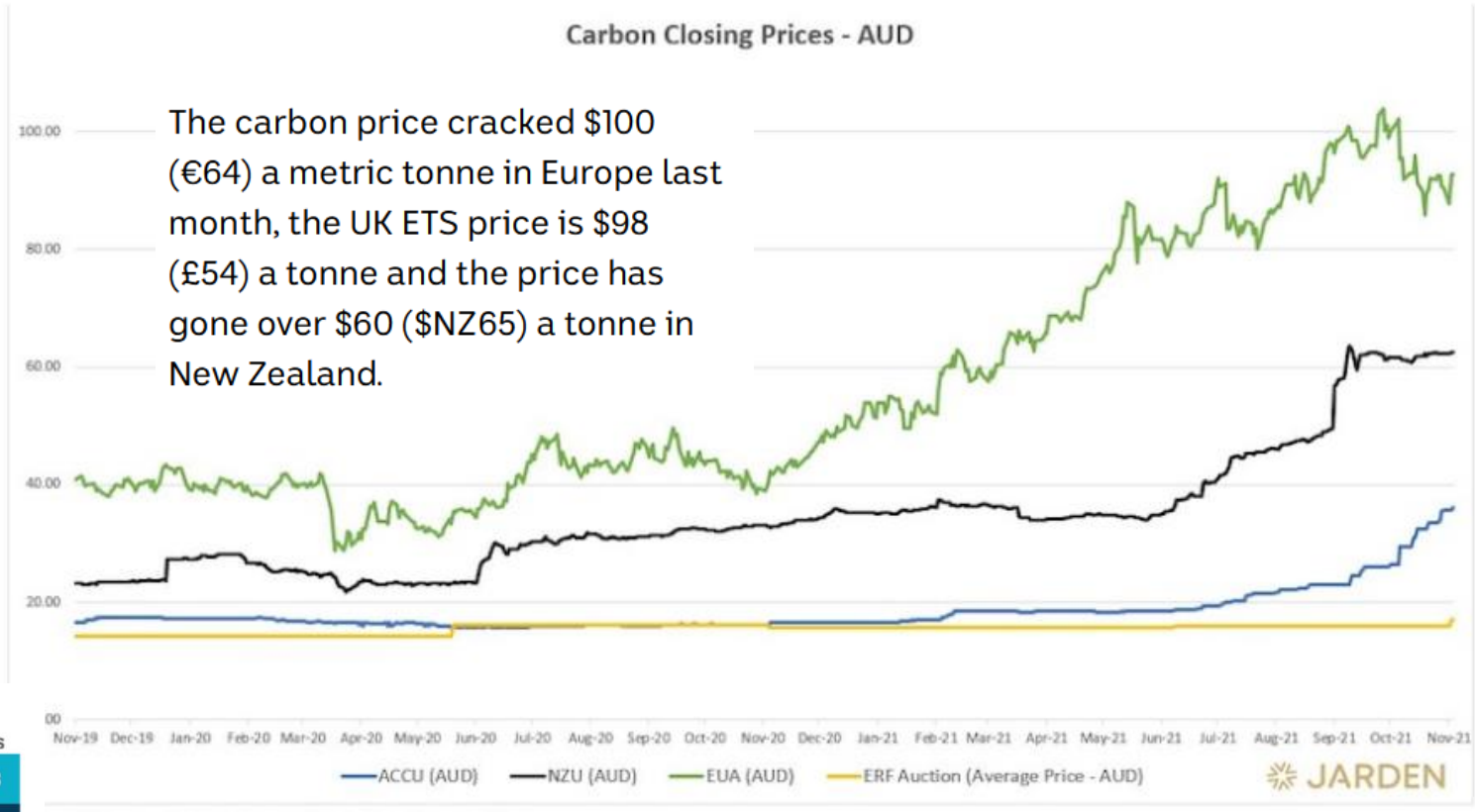
What about renewable energy as certified carbon credits?

- On the SWIS:1 REC = 1MWh = 0.68 tonnes CO2-e abated.
  - Spot LGC price = $42.75 MWh
  - $/tonne CO2-e = 1.47*$42.75
    = $62.84/tonne.
  - Spot ACCU price =$41.50/tonne.
- LGC price relatively stable
- ACCUs rising steeply - forecast to double again within next few years.
- RECs price believed to follow ACCU price until 2030.



Microgrids and Carbon Offset Credits - Considerations

- There are no ACCU methodologies for renewable energy systems.
- There are internationally voluntary standards that credit renewable energy systems.
- RE one of the largest offset categories generated and used



https://www.abc.net.au/news/2021-11-06/carbon-price-record-but-why-is-australia-behind-/100595060

	2020		2021 (through August)	
	Issuances	Retirements	Issuances	Retirements
Forestry and Land Use	57,247,268	38,477,731	107,486,170	44,760,618
Renewable Energy	102,237,718	41,152,446	100,601,884	35,466,709
Energy Efficiency/Fuel Switching	8,266,837	5,519,068	6,311,075	4,628,514
Agriculture	125,351	1,792,683	112,144	1,582,333
Waste Disposal	12,249,756	7,845,430	5,971,932	4,001,304
Transportation	6,686	60,829	2,826,675	48,601
Chemical Process/Industrial Manufacturing	6,293,883	3,029,002	7,459,956	3,551,151
Other	4,296,141	1,596,175	6,028,329	1,668,866

VCM Issuance & Retirements by Project Category, 2020 and 2021

Microgrids and Carbon Offset Credits

- Considerations:
  - Additionality requirement is met if LGCs are needed for business case.
  - There are existing methodologies for offset generate from energy efficiency savings in industrial processes and households - these should be captured..
  - Further additionality is there if batteries/storage is used (with extra cost) – but there is no clear offset generation methodology for this.
  - Should AMCOE seek to work with Clean Energy Regulator or Verra and other international Standards to develop a microgrid and energy storage methodology?

Be careful that you don't need the offsets for yourself.

- There can be no double counting.

Microgrids In A Net Zero Future

- Smart renewable energy microgrids have a major role to play in a Net Zero Future and it can’t be achieved without them.
- They have a major role in the next 10 years if we are to meet the emissions reduction targets required by 2030.
- They are integrators - enabling all of the new technologies needed to play nicely together and wit the existing grid.
- They are dispatchable, scalable, flexible incremental and egalitarian– enabling a smoother navigation of the transition to a renewable energy powered decantralised electricity system.

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