

The Energy Crisis and Toondah Harbour Governance & Market Failure

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Black Thursday – National Electricity Market Suspended

- 16th June, 2022, AEMO “announced that it has suspended the spot market in all regions of the National Electricity Market (NEM) from 14:05 AEST, under the National Electricity Rules (NER).
- AEMO has taken this step because it has become impossible to continue operating the spot market while ensuring a secure and reliable supply of electricity for consumers

“The national electricity market is a failed 1990s experiment. It’s time the grid returned to public hands.” (Quiggin, The Conversation, 22 June, 2022).

- What has caused this failure? & some solutions.
- Are there problems across the Energy Sector - electricity, gas and transport fuels?
- What are some comparisons with and links to Toondah Harbour Project?

Some Good News

- Shortage of Energy?
- Renewables are now cheapest electricity
- Renewables >30% of supply NEM 2021
- Likely to be 80% by 2030
- All States are on-board
- Heavy Industry coming on-board with Hydrogen?
- Change of Fed. Govt.

By the Numbers

\$72/MWh

The global offshore wind LCOE benchmark, which is now cheaper than the global CCGT and coal LCOE benchmarks

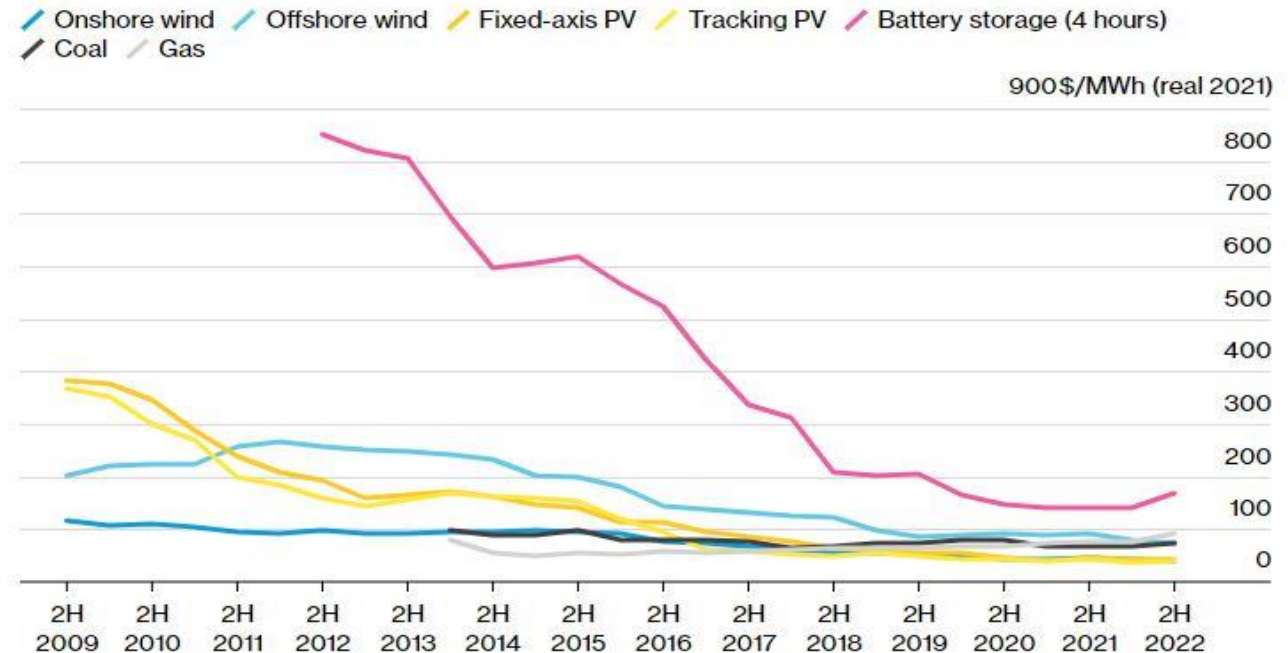
+23%

Rise in the global CCGT LCOE benchmark since 1H 2022

20%

Increase in debt costs for newly-financed projects since 1H 2022

Global levelized cost of electricity benchmarks, 2H 2022



Source: BloombergNEF

Note: The global benchmark is a country-weighted average using the latest annual capacity additions. The storage LCOE reflects a utility-scale battery storage system with four-hour duration running at a daily cycle and includes charging costs.

Neo-liberal Experiment – 1980s >

- Market knows best
- Small Government is better
- Less or No Govt. regulation
- Promoted Industry Self-regulation
- Lower Taxes

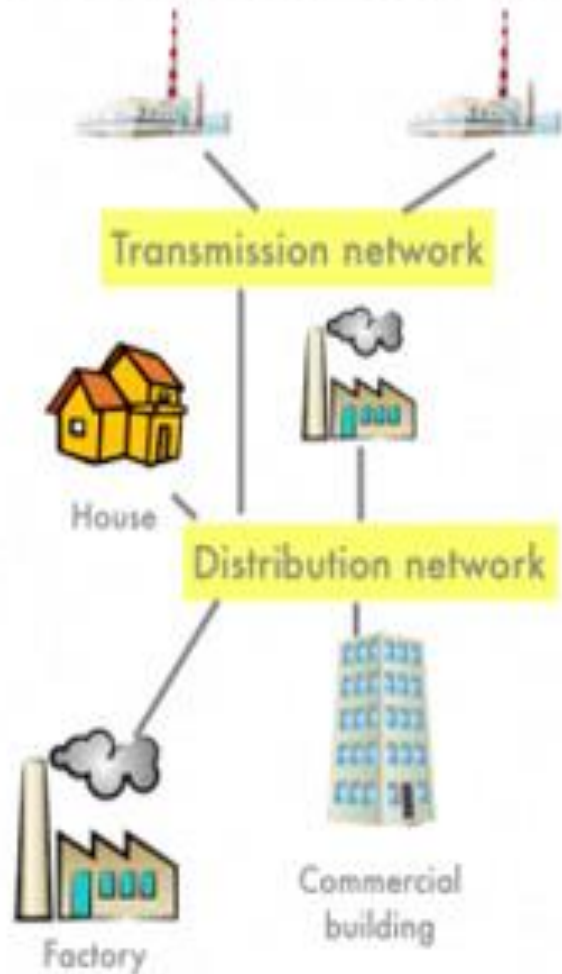
Promises/Promises/Promises

- Cheaper energy
- More reliable system
- Better customer service

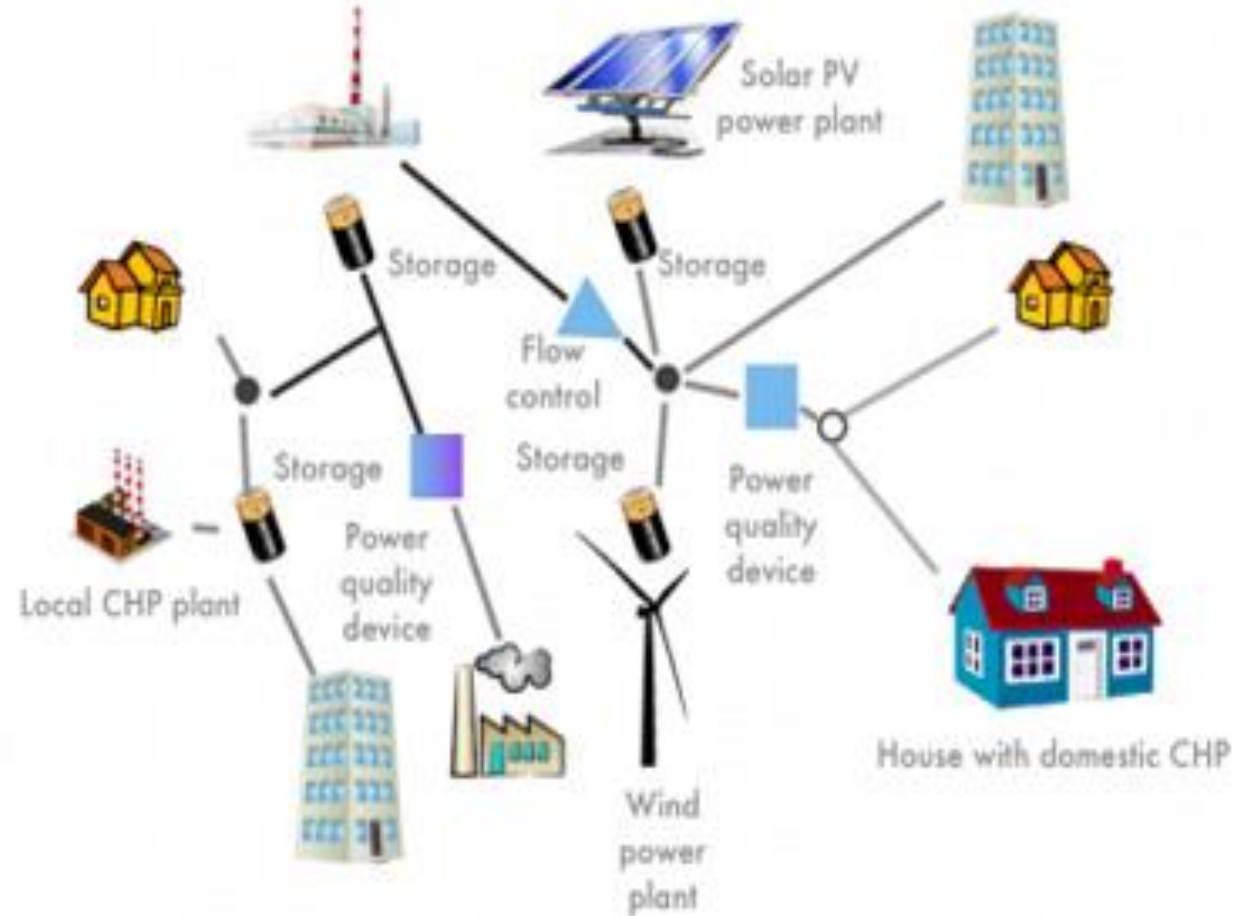


Old Electricity Grid VS Smart Distributed Grid

~~Yesterday~~
Centralized Power



~~Tomorrow~~ **NOW**
Clean, local power



Privatisation of National Electricity Market (NEM)

- Late 1990s – Kirner Govt then Kennett Govt Victoria sells Electricity Assets



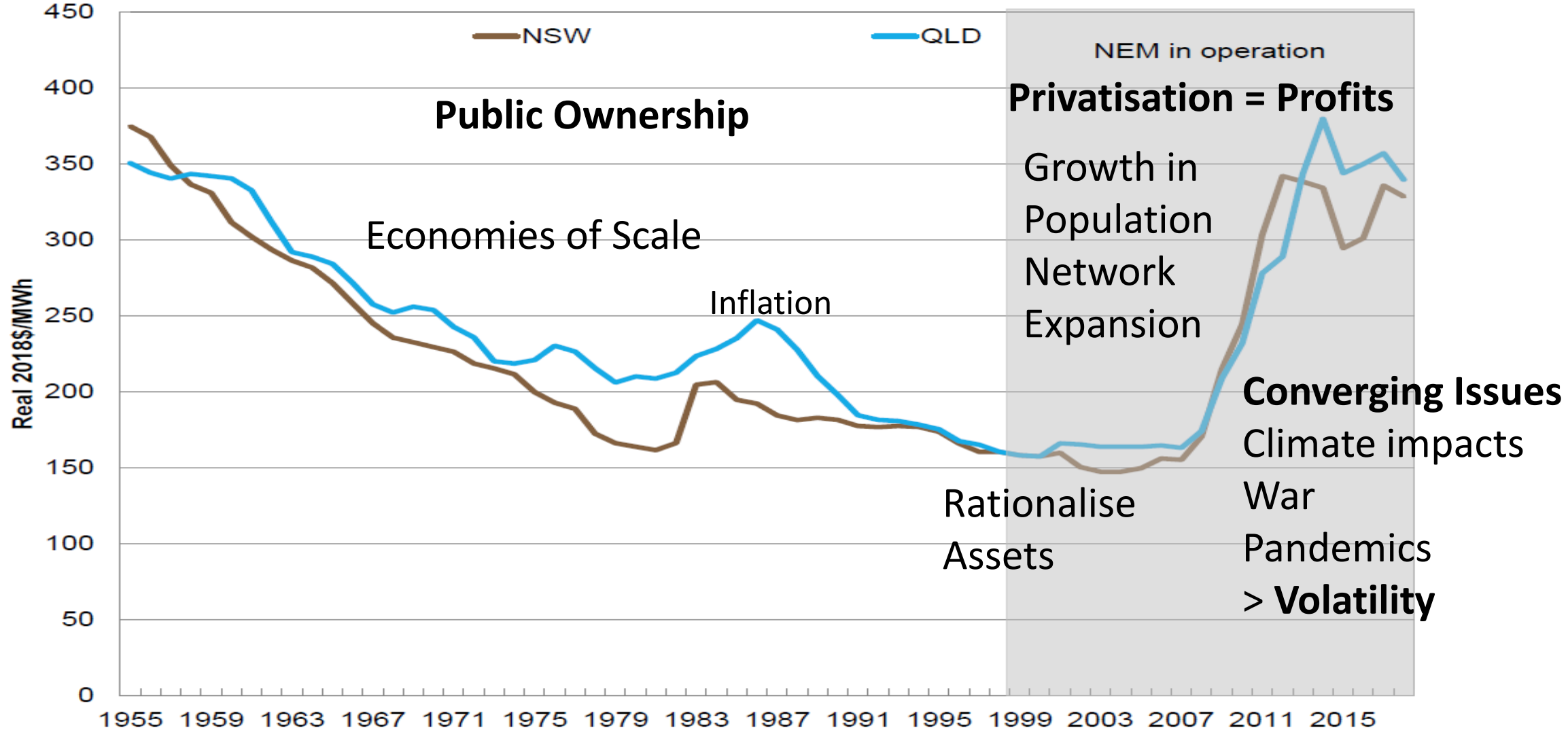
- Labor progressively sees privatisation as **Electoral & Economic Poison**



(Source: Quiggin 24 Oct 2022 The Conversation)

- What Governments ignored? - External costs – mining, power generation, rehabilitation
- Estimates \$40 to \$160 per MWh over mine / plant life
- Up to 4x Old Generation Cost of Coal \$40/MWh

What happened to Costs? - Real Retail Electricity Prices



Notes: Shaded area indicates period over which the NEM has been in operation.

Sources: AEMC (2018); Nelson *et al.* (2017); Simshauser (2019); St. Vincent de Paul & Alvis Consulting.

Source: Rai & Nelson, 2019

More factors > Higher Prices (Source: Richardson, 2013)

- **Electrical Industry Productivity** fell between 1995 and 2012
- **Split companies** with multiple business units > lack of coordination
- **Increased capital costs**
- **Asset price inflation**

- Manager to worker ratio decreases 1:13 to 1:9
- Large increases in managers, professionals and marketing staff
- Less technical staff as proportion
- Added costs of privatisation passed on to customers

Multiple Layers of Regulation

- Energy Security Board (ESB)
- Australian Energy Market Commission (AEMC)
- Australian Energy Regulator (AER)
- Australian Energy Market Operator (AEMO)

- Not independent of Industry
- Sometimes at odds with AEMO
- Highly paid bureaucrats

What happened to Reliability?

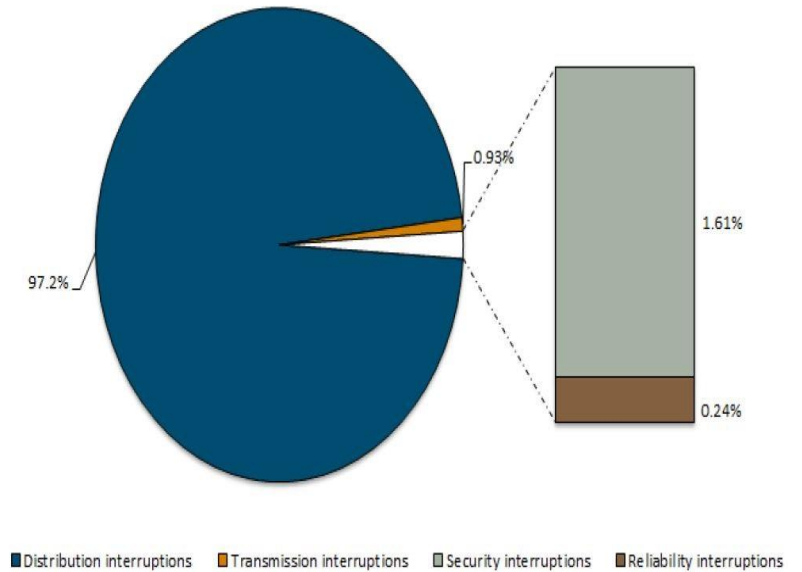
How it is measured?

- **Duration and Frequency** of outages
- **Available Generation** to meet Demand

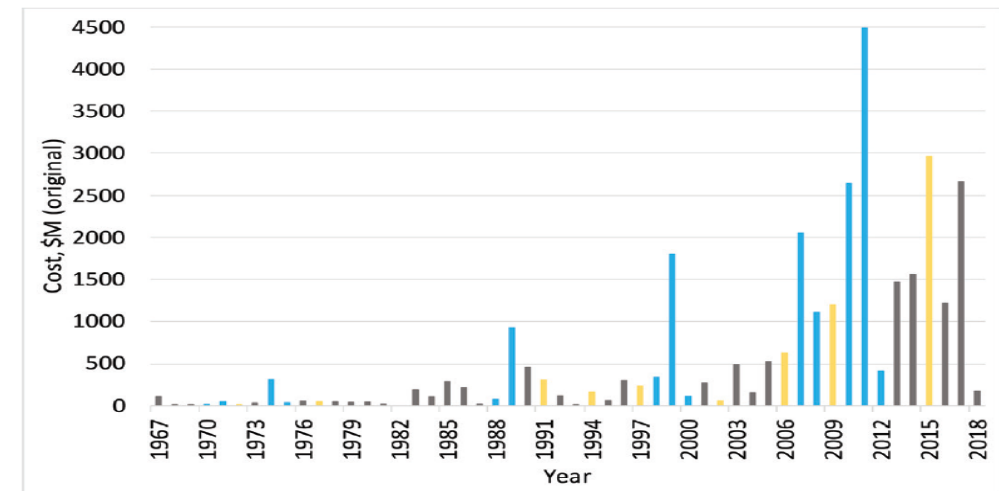
Most outages very short duration.

Doesn't include extreme weather outages > skewed data

Increasing Extreme Events & Insurance Costs due to those events



Source: AEMC analysis and estimates based on publicly available information from: AEMO's extreme weather event and incident reports and the AER's RIN economic benchmarking spreadsheets.



Source: Insurance Council of Australia

Most Vulnerable Plant

- Aging Coal and Gas Plant > unscheduled maintenance
- Large capacity loss in one hit E.g. Callide C = 825 Megawatts – turbine explosion and cooling tower collapse
- Shortages of Coal – flood of mines/railway damage
- Shortage of Gas – Market sells overseas and buys back from Japan
- Loss of Transmission Infrastructure: SA tornadoes 2016 – 23 power towers collapse



What happened to Customer Service?

Too much choice – too much complexity E.g. Billing format and discounts not consistent

Disputes increases > Need for multiple Ombudsman Services

In Queensland alone, there have been over 5600 complaints to the electricity ombudsman in the first 6 months of 2022.

Choice Survey 2022 Elect. Retailers

- “Unfortunately, as you'd expect, there are some pretty ordinary companies out there – and you might be surprised to know that some of the biggest players are among the worst.”
- That includes AGL, Origin Energy and Energy Australia. All three rated badly in customer service.

(Source: Choice, 8 April, 2022)

Power Industry Cartel and Regulatory Problems

- Origin Energy, AGL, & Energy Australia
- AEMO – Integrated System Plan for transition to Renewables
- Vertically integrated
- 60% of Market
- Amongst biggest polluters
- Accused of market manipulation and price gouging
- Not acceptable to LNP who supported gas transition
- Sometimes Plan at odds with other regulatory bodies E.g. AEMC

So Why an Energy Crisis?

Converging Local Issues

- Privatisation's failure
- Failure to integrate Climate/Energy Policy
- More Extreme Weather – adding stress on NEM management
- Aging coal/gas infrastructure
- Failure to build RE systems and upgrade transmission infrastructure



Converging International Issues

- Globalised supply chain issues
- Dependence on China
- Pandemic – worker shortage
- Russia/Ukraine War
- Prices Coal/Gas locked to international markets

Australia's Other Energy Crises

Transport Oil Supply and Security

- **Prices** linked to **international prices**
- **Little** remaining **conventional reserves**
- 55 days **Net Import Cover** including in America – 30 days away
- **Little** reserves held in **storage- 25 days petrol, 20 days diesel**
- **Two** oil refineries - \$1.8 bill. Subsidy

Gas Industry Claims & Reality

- **Green gas** is the solution BUT high cost, inefficient and being publically subsidized
- **Need more Supply** – BUT- biggest global LNG exporter yet setting up import terminals
- **Market is working!** – BUT it's a CARTEL of 4 – pay little or no tax up to 2020.
- **Massive income and jobs** to Australia – BUT reality, mining 1.5 to 2% jobs in Qld, 10 -12% Gross State Product

(Source: Michael West Media and TIA)

Observations re Toondah Harbour EIS

- Local Environmental Impacts of Population Pressure, Resource Consumpt. and Pollution (including GHGs) already evident in Redlands.

“Extreme pollutant loads in 2022 led to declines in downstream estuarine and bay water quality..... Mud stimulates algal blooms and creates turbid waters that impact the health of seagrass meadows and intertidal habitats. These areas are critical for foraging migratory birds and supporting species of cultural significance, including fish, turtles and dugong”

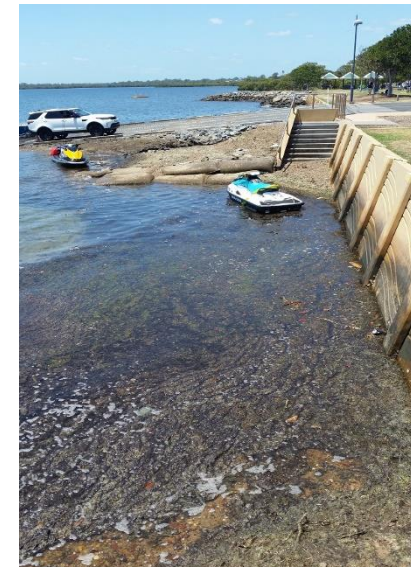
(Source: 2022 Healthy Land & Water Report Card)



Redlands Water Quality Report Card to 2022

Large Blue-green algal bloom - Wellington Point 2020 resulting in closure to water activities

- Toondah's Large Scale - can only exacerbate this decline



Off-sets – A failed management strategy

- 2017 Study of Performance of 42 Off-set Projects in Qld and WA
- *We find that application of key biodiversity offsetting principles (e.g. ecological equivalence) was frequently incomplete or absent. For approximately 50% of reviewed projects we were unable to identify public information concerning how offsetting requirements were established. The current environmental outcomes of [marine biodiversity](#) offsetting in Australia are unclear but there are indications that it is unlikely to achieve no net loss of biodiversity. (Niner & Styan, 2017: Abstract*
- A 2021 paper, surveying over 1400 studies globally
- *Still, it is unclear whether biodiversity offsetting can fully mitigate losses to natural values..... we found only 40 evaluations with primary outcome data on biodiversity or ecosystem services. Among these, we found no evidence that biodiversity gains from offsets actually compensate for development-associated losses, because losses were never estimated. (Jonas et al, 2021: Abstract).*

Failure to address the Climate Crisis

- Right in the path of sea level rise and insufficiently address this
- Will be subjected to extreme weather > deterioration of infrastructure
- Building code not allowing for cyclonic conditions in SEQ

Rapidly warming climate +1.47C in Aust. since 1910 (BOM – State of Climate report 2022)

- Warmer water temps.
- Increased nutrient flows
- More freq. & severe Toxic Algal blooms
- Declining sea grass/shell fish
- Stress on Migratory Birds – unseasonal weather /
- Coastal Erosion



Currumbin SLSC rapid deterioration



Erosion - Wellington Point



Dead Shearwater

Failure to address the Climate Crisis

Buildings, Energy and Emissions

- Buildings > 37% GHG Emissions
- Australian Energy Efficiency Regulatory requirements poor by OECD standards

- Toondah ignores World's Best Practice
- Should aim for better than net zero emissions > carbon sink
 - Passive solar design
 - Max Effic. HVAC / Fittings / Appliances
 - Water capture /use
 - Green space including food product.
 - Generate more Clean Energy than they use in construction and operat.
 - Circular Econ. - Use recycled materials

Energy Crisis & Toondah Harbour - Failure of Good Governance

Energy / Climate Policy

- Lack of bi-partisan agreement on Policy and Actions
- Political donations / Lobbying
influence of large industry groups ahead of public good
- Environmental legislation – Not fit for purpose
E.g. no full inclusion of external costs
- Ecologically Sustainable Development Strategy (ESD) (greenwash ?)

(See critique of ESD here: <https://research-repository.griffith.edu.au/handle/10072/413341>)

Toondah Harbour Proposal

- Local Govt. - Sworn to secrecy
- State Govt.- Jobs Jobs Jobs / PDAs
- Federal Govt. – failure at all levels - EIS process, Environmental Legislation and RAMSAR agreement
- ESD Strategy failure to implement
 - Precautionary Principle
 - Intergenerational Equity

Conclusions - Energy Crisis and Toondah

- Failure of good Governance – at all levels – lack of transparency / political donations and influence on Policy/Actions
- Failure to manage The Commons on which all life depends – recognise need to and live within Planetary Boundaries.
- Neo-liberal privatisation model has failed in the Energy Sector
- Need a New Functional Governance / Economic Model



Solutions – Energy Crisis?

(Source: The Conversation 22 June 2022, Quiggin, J.)

1. Need **SINGLE** government agency
2. Use **power purchase agreements** (PPAs)
3. Employ the **Merit Order** Dispatch Method
4. **Return** Transmission and Distribution System to **government ownership and operation**.
5. Guiding principle should be moving to a **decarbonised energy system**, rather than the “[net market benefit](#)” test.

Details

1. Buys wholesale electricity from generators. & sells electricity directly to customers or electricity retailers.
2. Long-term contracts between buyers and generators to purchase energy - prices, availability and reliability are set.
3. Generators that consistently produce electricity at very low prices are the first to be called on to supply - leads to lower prices for consumers.

Solutions – Community Ownership Models?

- Power Generator/Retailer? owned by Local Community
- Structure – Often Co-op Model

Examples –

- Wind – Hepburn, Vic
<https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/in-your-community/support-community-energy>
- Wind – Denmark, WA <http://www.dcw.net.au/>
- Solar PV - Majura Valley, ACT
<https://solarshare.com.au/solar-farm-project/greenfield-project>
- Solar PV – Yackandandah and Lismore
<https://totallyrenewableyack.org.au/>

Benefits

- Maximise local ownership and decision making
- Generate local jobs
- Use resources efficiently and sustainably
- Match energy production to local energy needs and circumstances
- Help address climate crisis

Solutions - Agri-Solar (UQ Solar Farm 64MW/155ha + 600 sheep)

FORMS OF AGRISOLAR



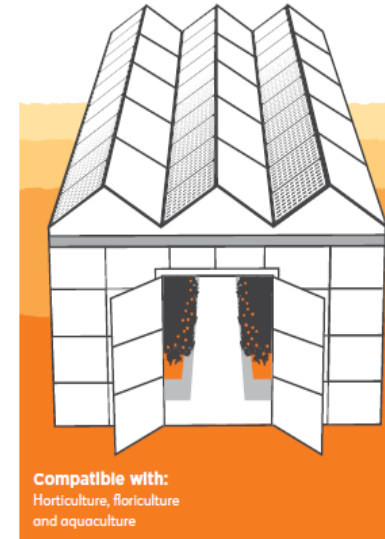
GROUND-MOUNTED PV PANELS



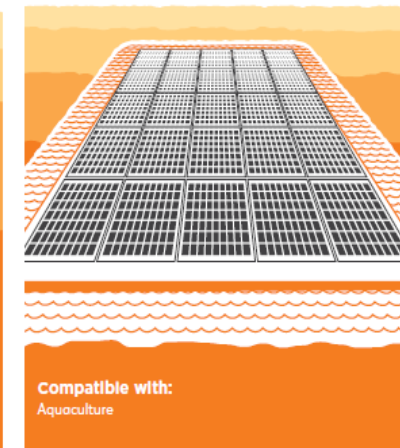
ELEVATED PV PANELS



FORMS OF AGRISOLAR



PV GREENHOUSES/ROOFTOPS



FLOATING PV SYSTEMS

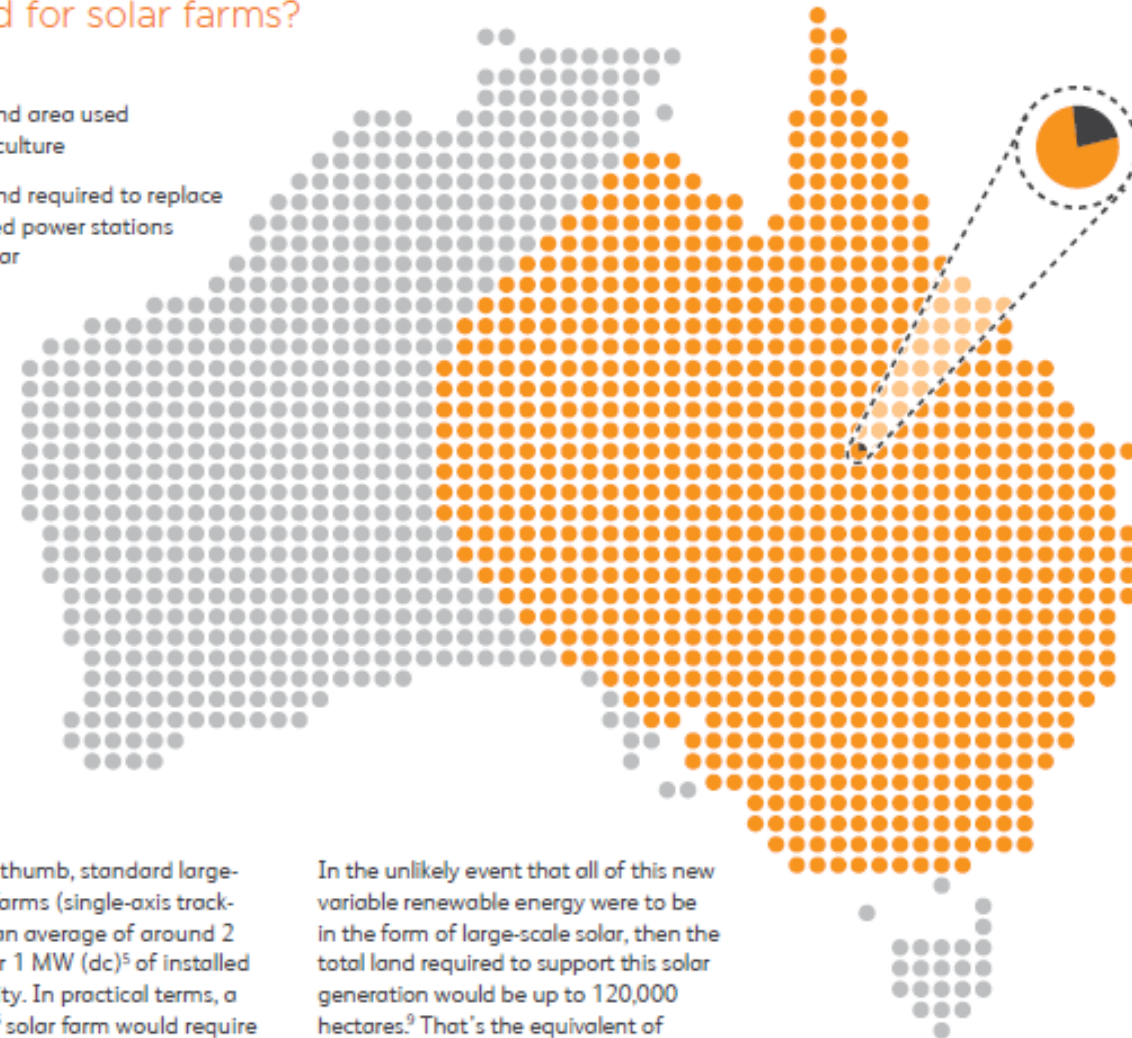
Land Area for Solar to Replace Existing Coal Power Stations

- 50GW of Solar PV required
- 120,000 hectares
- 0.016% of total land area
- 0.027% of agricultural land area

BOX 1

How much land is needed for solar farms?

- Total land area used for agriculture
- Total land required to replace coal-fired power stations with solar



As a rule of thumb, standard large-scale solar farms (single-axis tracking) utilise an average of around 2 hectares per 1 MW (dc)⁵ of installed solar capacity. In practical terms, a 100 MWdc⁶ solar farm would require access to approximately 200 hectares of land. (The land area needed for

In the unlikely event that all of this new variable renewable energy were to be in the form of large-scale solar, then the total land required to support this solar generation would be up to 120,000 hectares.⁹ That's the equivalent of less than 0.016 per cent of Australia's total land area, or 0.027 per cent of

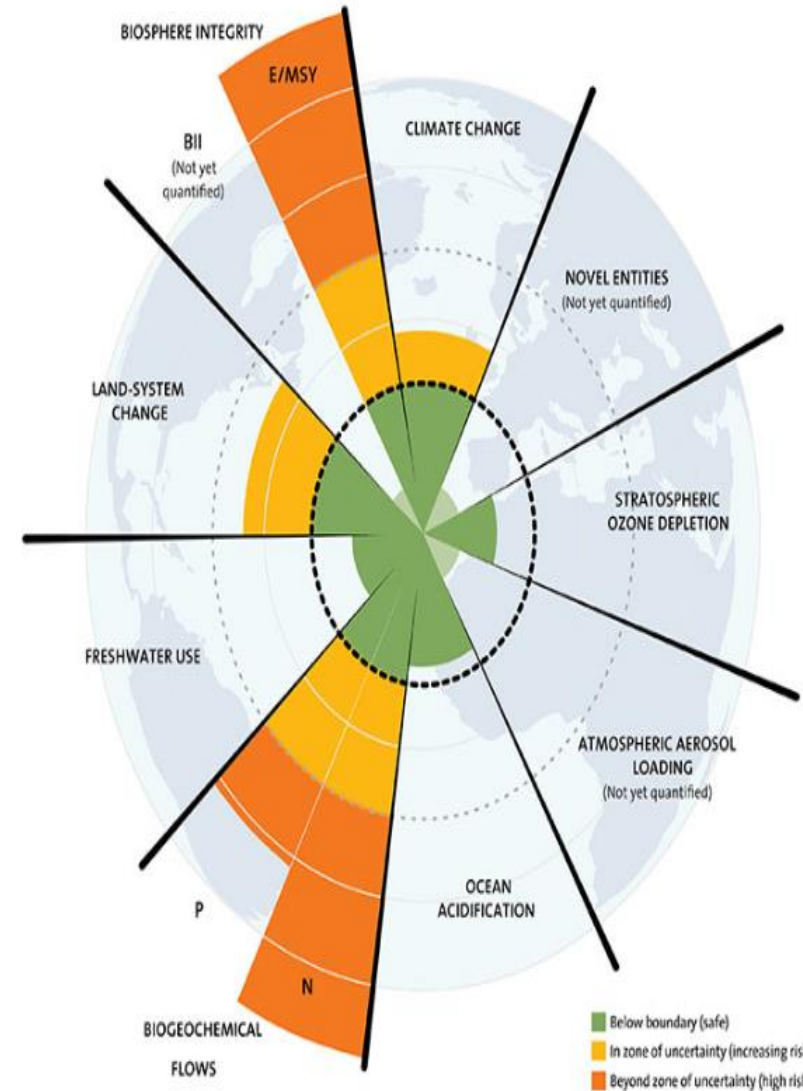
Conclusions – Energy Crisis specifically

- Neo-liberal privatisation model has failed
 - Full System return to public ownership very difficult
 - T&D must be public ownership
 - Need a New Functional Model
- Community Ownership of Generators / Retailers?
 - Agri-Solar and Wind for commercial agriculture thru co-ops

Appendix

The nine planetary boundaries

- Biosphere integrity
- Biochemical flows such as nitrogen and phosphorous
- Global warming
- Land system change
- Atmospheric aerosols levels



Estimates of how the different control variables for seven planetary boundaries have changed from 1950 to present. The green shaded polygon represents the safe operating space.

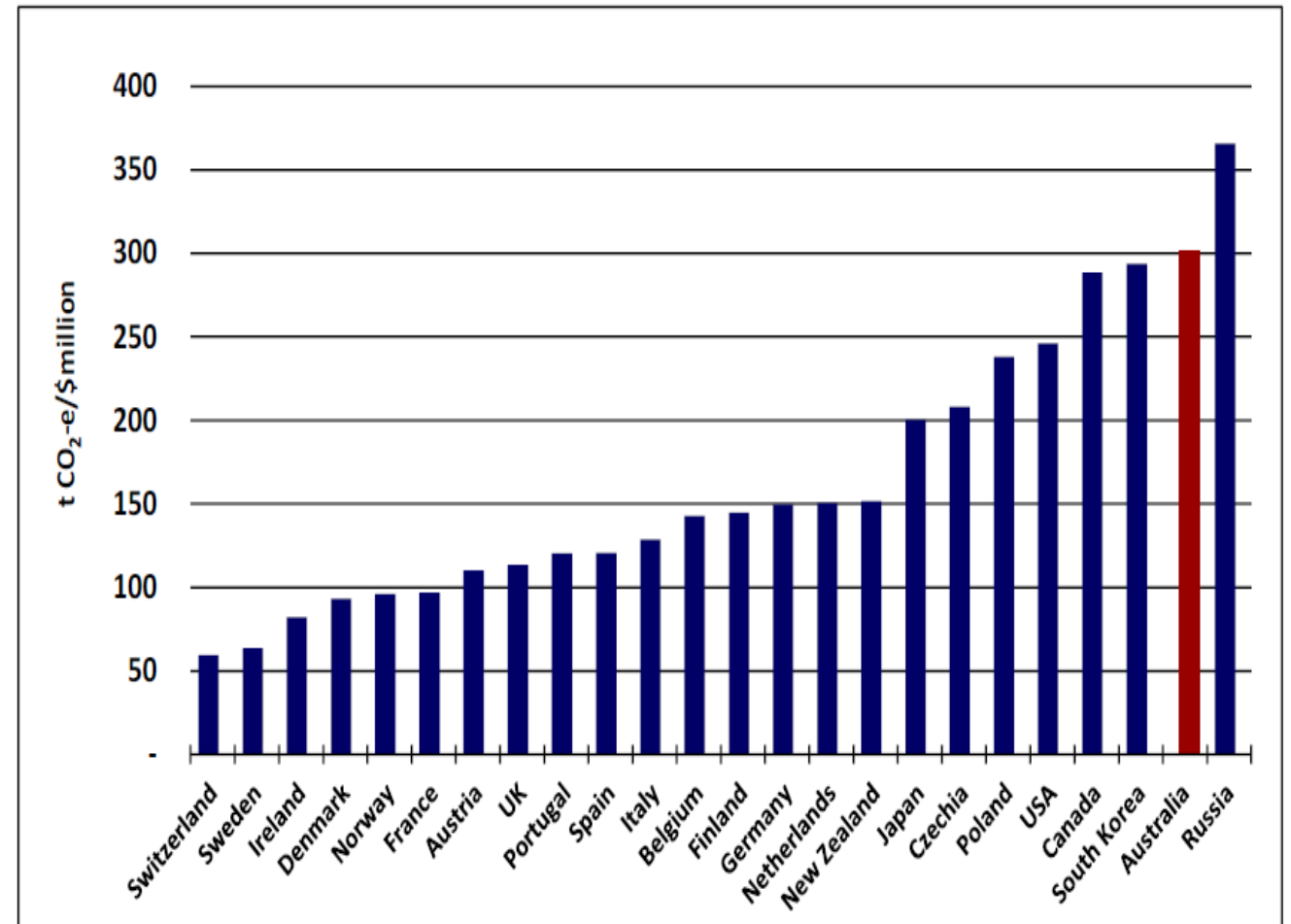
Source: Steffen et al. 2015

Appendix - Australia's Poor De-carbonisation Ranking

- *Although there has been a significant increase in the share of wind and solar generation in the last decade, Australia still did not move forward in rankings given faster energy transitions taking place in the other OECD countries.*

• (Source: TAI:2021)

Figure 6: Total energy combustion emissions per \$ of GDP in 2019



Appendix- GHG Emissions 2021

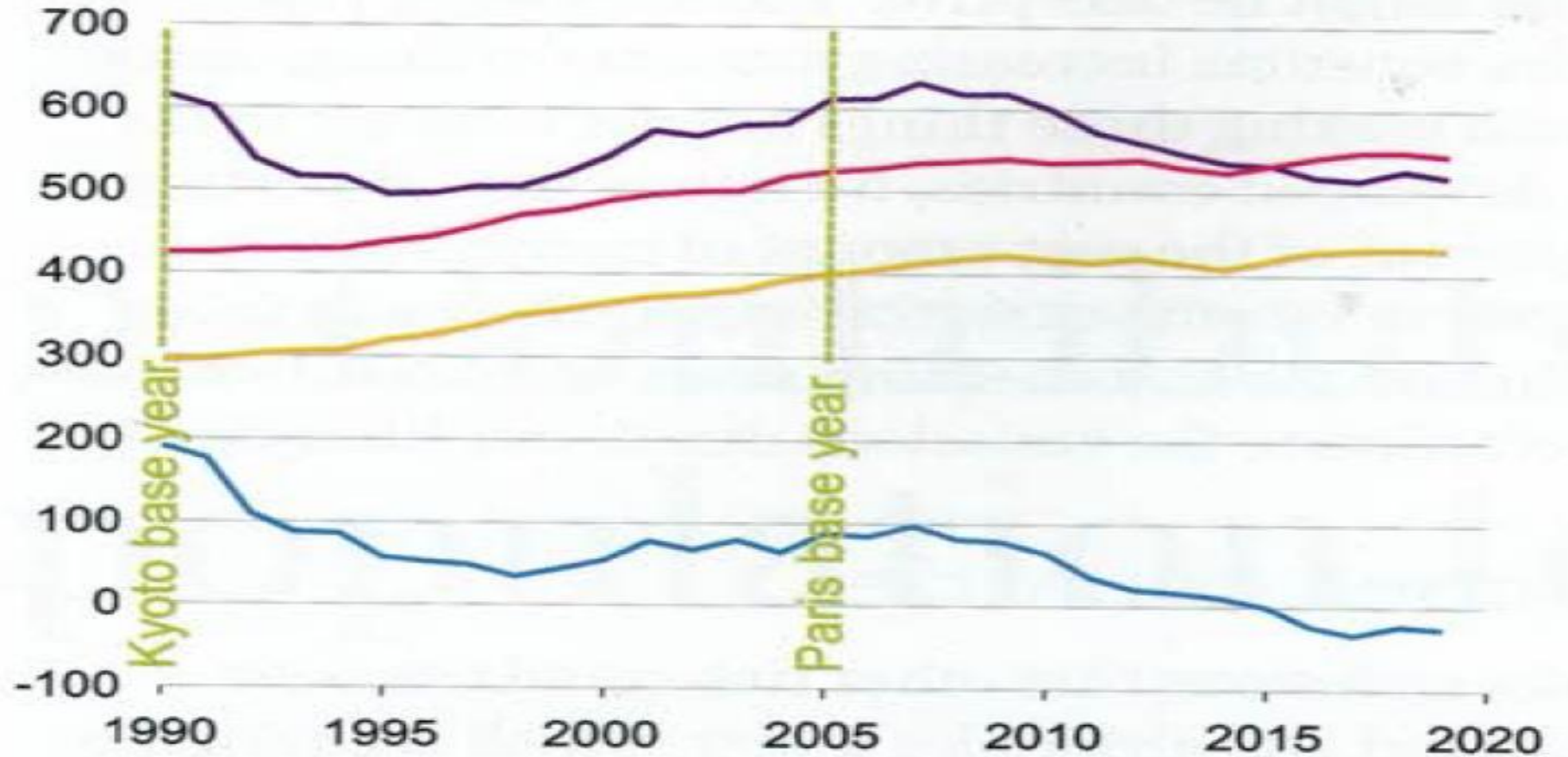


Source: Department of Industry, Science, Energy and Resources

Australian GHG Emissions

Multiplication of:
GDP/per cap. X
joules/\$ of GDP X
CO₂e/joule X
Population

A: Australian emissions Mt CO₂-e per year



- Total Emissions
- Emissions excluding LULUCF
- Emissions from Energy
- Emissions from LULUCF

LULUCF = Land Use Land Use Change Forestry

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