

## FUTURE ENERGY AND ENERGY MATERIALS

### AUSTRALIAN ENERGY FACTSHEET 2022

#### OVERVIEW

Australia's energy mix is currently sourced from around 7% renewable energy derived and 93% non-renewable energy (*Australian Energy Statistics, 2021*). Electricity supply and transportation collectively account for over half of Australia's energy consumption (*Australian Government, 2021*). With electricity and transport also contributing over 60% of Australia's greenhouse gas emissions, that is, 35% and 25% respectively. (*Ritchie & Roser, 2020*).

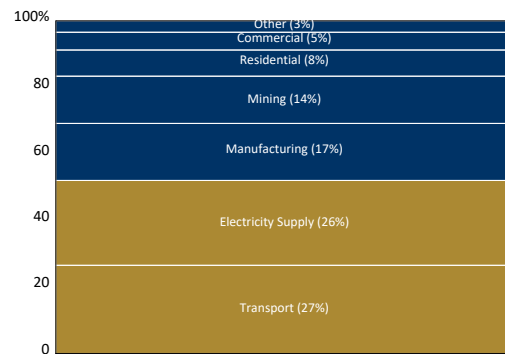
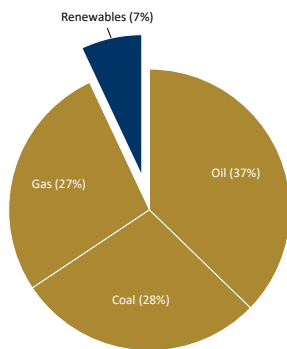


Figure 1 Australia's energy mix (*Australian Energy Statistics, 2021*)

Figure 2 Australia's energy consumption by sector (*Australian Energy Statistics, 2021*)

A key factor in enabling Australia's journey to decarbonisation is understanding what fuel sources are being utilised and how, and what lower carbon emissions technologies can be adopted and how, on a commercial basis.

#### ELECTRICITY

A complex relationship exists when it comes to balancing both supply and demand across Australia's electricity markets. Supply is dependent on sources (particularly whether the source is intermittent or base load impacting duration), quantum or capacity, reliability, access to distribution network and its capacity, cost of supply construction and operation of different technologies and pricing; and demand is based on consumption timing i.e. whether demand is at peak, shoulder or off peak times, minimum and maximum demand levels and duration, seasons, cost to access and customer choice. Australia's large area, relatively small mainly coastal population and past investments in distribution infrastructure (networks) have proven critical to decarbonisation & will continue to.

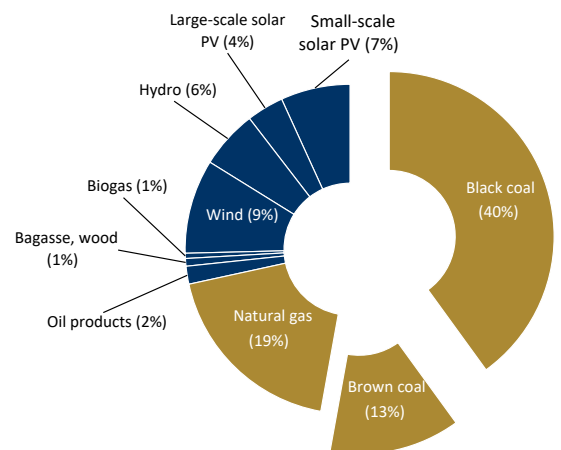


Figure 3 Australia's electricity generation by fuel source (*Australian Energy Statistics, 2021*)

In 2021, renewable sources comprised around 29% of Australia's total electricity generation (Around 12% solar, 10% wind, and 6% Hydro with <2% bioenergy, while non-renewable sources made up 71%. Coal accounted for the majority of electricity generation at over 50% (natural gas makes up around 20%) (*Energy.gov.au, 2022*). Even with ongoing

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technology improvements and higher installation rates of battery storage, coal in the short term will remain vital to stable, low cost baseload, reliable, Australian electricity supply.

Decarbonising Coal-fired power plants by using De-Carbonised (Blue and/or Green) Ammonia or **DCAmmonia** becomes critical to the mix. It has the potential to significantly reduce Australia’s carbon emissions.

### TRANSPORTATION

Transportation makes up Z% of Australian energy consumption and B% of Australia’s carbon emissions with road transport comprising around 73%, air 17%, maritime 4%, followed by rail and other sources(Australian Energy Statistics, 2021).

When it comes to road transportation Australia’s diesel vehicle fleet has more than doubled since 2011 (ABS, 2020), given diesel’s fuel efficiency and price.

Progress being made in electric vehicle technologies including recharging infrastructure installation are expected to see an ~80% adoption rate for passenger and light vehicles by 2050. With advances in hydrogen vehicles, particularly heavy vehicles, expected to result in major shifts.

For air and maritime transportation, developments are underway to deliver innovative, new engine technology that uses sole and mixed Ammonia/Hydrogen for combustion with no resulting carbon emissions.

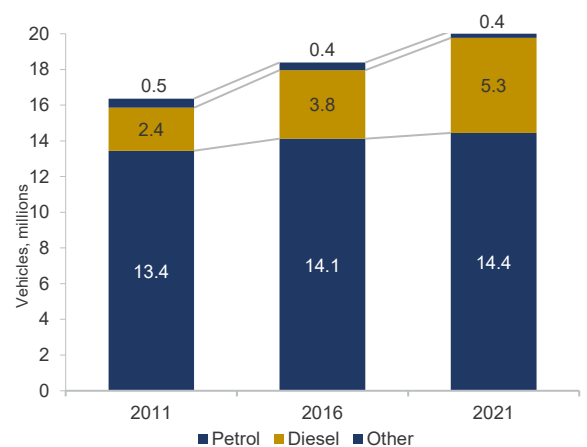


Figure 4 Australian motor vehicle registrations, by fuel type (ABS, 2020)

### DCAMMONIA ADVANTAGES IN ELECTRICITY AND TRANSPORTATION



Ability to co-fire **DCAmmonia** with existing coal fired power plants to reduce reliance on coal for electricity



**DCAmmonia** already proven as a drop in fuel with diesel for maritime shipping



Figure 5 Wärtsilä maritime Ammonia blend engine (Wärtsilä Corporation, 2022)



No CO<sub>2</sub> emissions directly attributed to using **DCAmmonia**



Low production, storage, and transport costs of **DCAmmonia** compared to other carbon-neutral fuels

### REFERENCES

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