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Specialist Knowledge.
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Transitional Technologies - alternative fuels, green diesel, batteries

DPI – Exploring beyond diesel



A Carbon Neutral Future

“By 2050 the carbon market could provide income of \$40 billion to the land sector (with particular opportunities for agriculture).”

CSIRO

100% renewables powered electricity

- Electric farm vehicles
- Renewable hydrogen generated on farm
- Zero reliance on grid power, farm anywhere that has water and sunlight

We can make small steps towards this right now.

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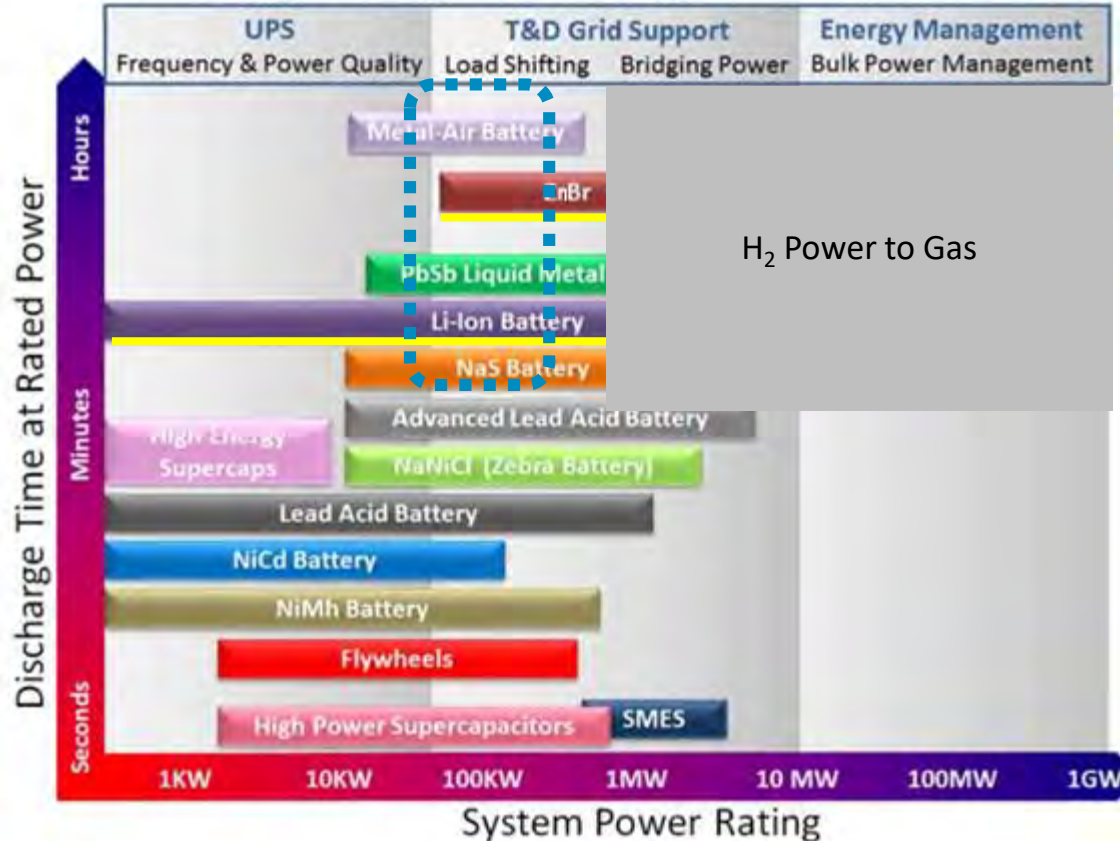
Source



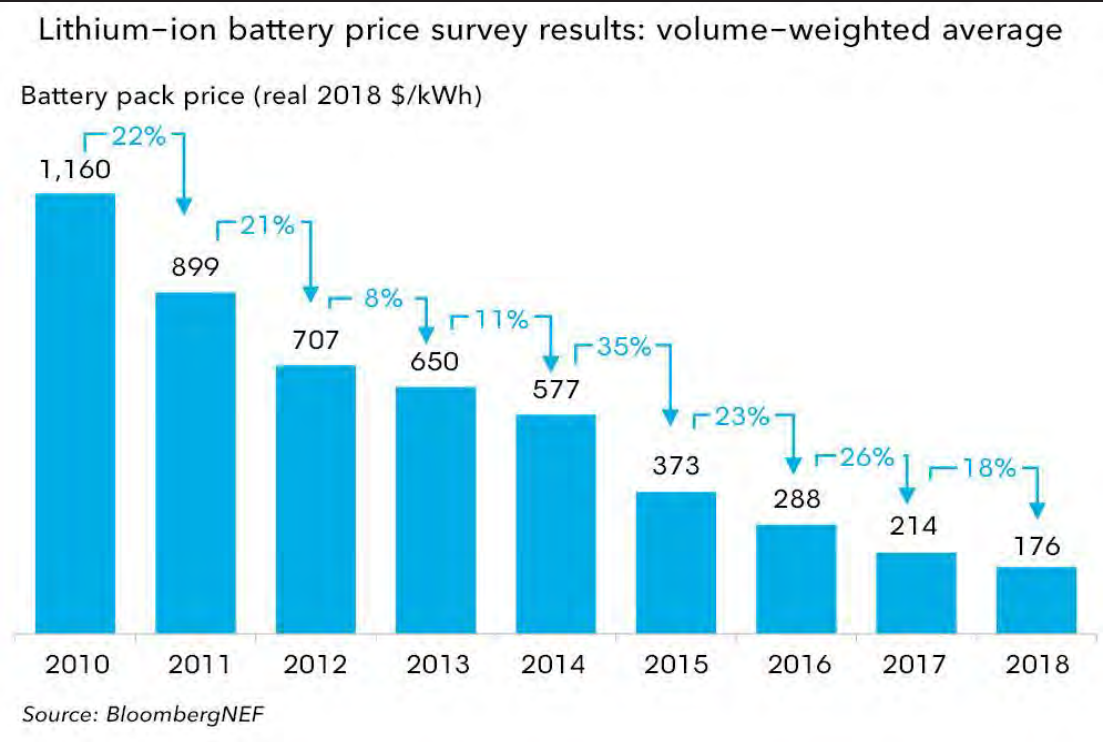
Importance of Diesel in Agriculture



Grid Energy Storage Technologies and Applications



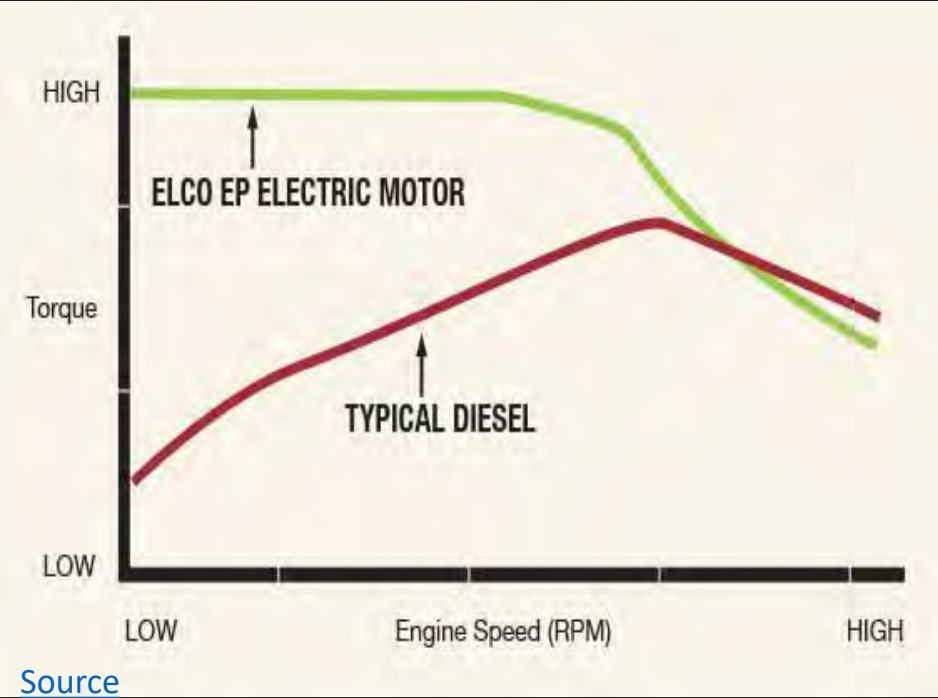
Recent Battery Developments



Batteries for Tractors



Electric Motors vs Diesel Engines



Source

Fuel	Cost of mechanical energy delivered
Diesel	\$0.217/kWh
Electricity	\$0.294/kWh

Limitations

- Grid stability

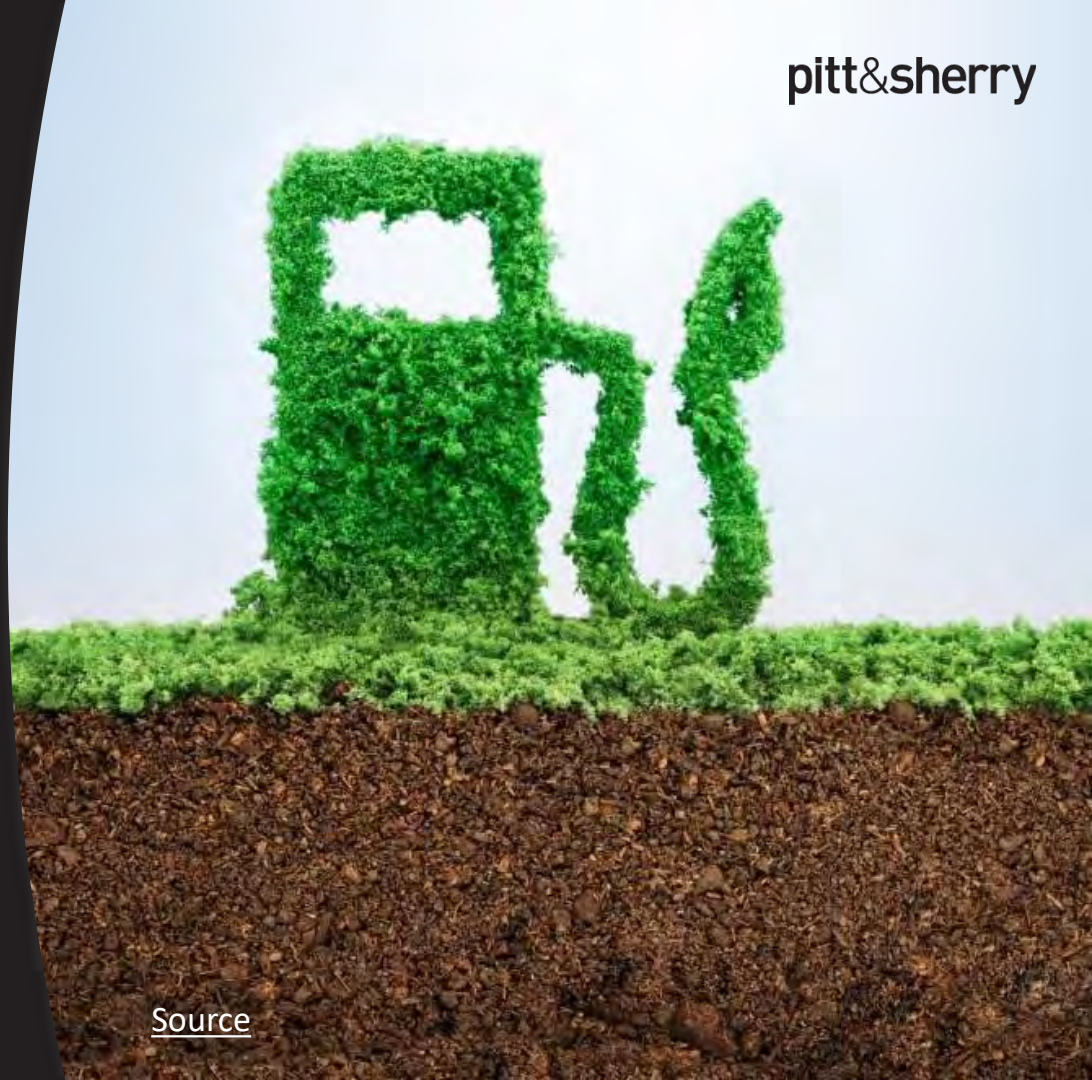
The Sydney Morning Herald

NATIONAL EXTREME WEATHER

Australia's summer of extremes pushed grid to the limit, AEMO says

Other alternatives to diesel

- Renewable hydrogen
- Biogas
- Biodiesel and bioethanol
- Portable solar system



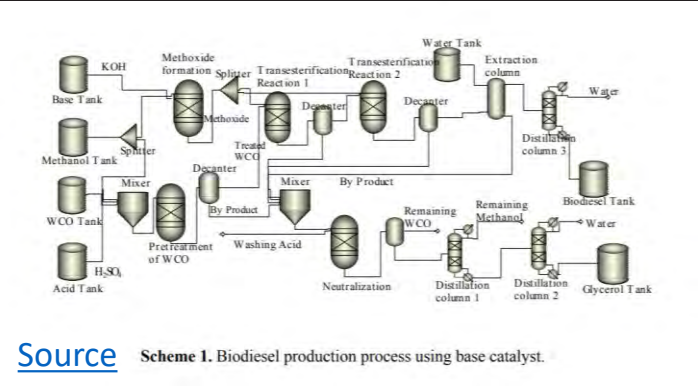
Biogas

- A mix of methane and other gases.
- Used for electricity and heat generation
- Generated from anaerobic digestion
- Additional benefits include fertiliser, reduced odor, and GHG reduction
- Suitable for piggeries, dairies, horticulture communities, or farms with neighbours who has organic waste issues.



Biodiesel

- A fuel with similar properties to regular diesel
- Can be fed into existing diesel engines (blended with diesel)
- Produced from vegetable oils



Source Scheme 1. Biodiesel production process using base catalyst.



Source

Bioethanol

- Produced through fermentation of sugars
- Fuel is largely a petrol replacement



Portable Solar Systems

- Useful for lease hold lands
- Suitable for off grid pumping
- Relatively expensive to move each time
- Grid connection each time can be an issue



What can you do?

- Start thinking of electrification
 - Understand your grid constraints. What is possible?
 - Consider new technologies when purchasing new equipment
- Can any waste streams be turned into energy?
 - A community based approach is usually more effective
- Start planning on when you would like to go on the journey to carbon neutrality.

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Thank you!

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