

The Energy Trilemma

An Australian transport perspective



91%

Of Australia's transport fuel (Petrol and Diesel) is imported as refined product or as crude oil to be refined¹

34

Days of fuel stocks (refined product and crude oil) in Australia²

\$25bn

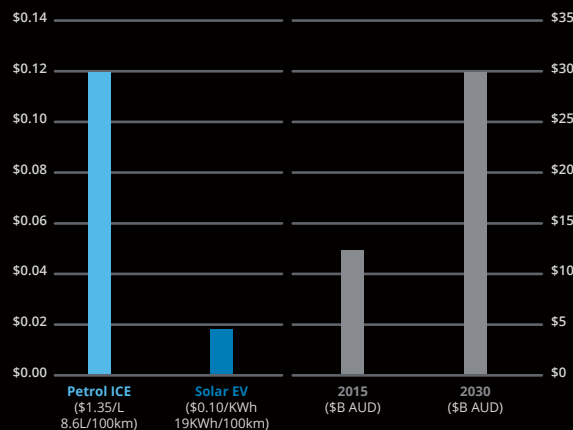
Spent annually on importing crude oil and refined product in 2017, the largest non-service commodity imported³

#1

Road transport is the single largest end use of energy in Australia with 33% of final energy consumption⁴

12.5

years of recoverable petroleum resource life at current production rates¹⁶



Fuel costs per km²

Avoidable cost of congestion⁹

#3

Transport is the third largest household expense after housing and food⁸

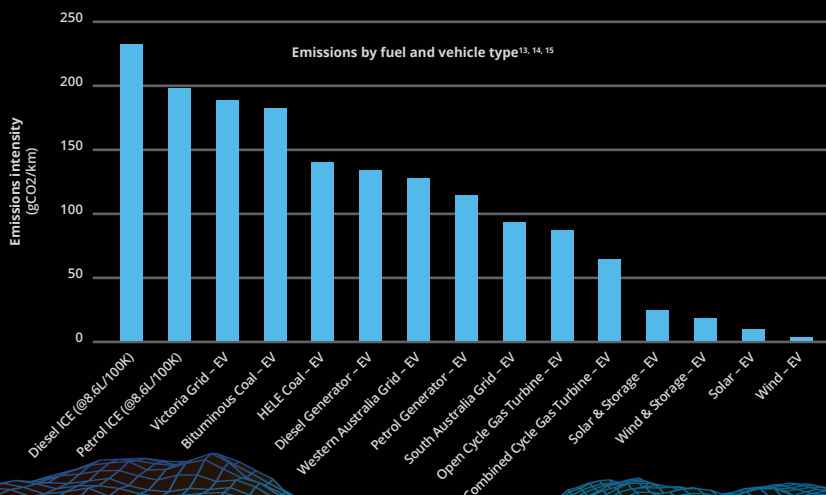
0.5%

of the energy in fuel of a modern ICE actually moves the driver¹⁰

SECURITY

AFFORDABILITY

SUSTAINABILITY



#1

Rooftop solar uptake in the world⁵

#1

Lithium producer in the world⁶

80%

Decrease in capital cost of solar PV since 2008¹²

70%

Decrease in cost of battery storage since 2008¹²

16%

Improvement in average fuel efficiency of Australian vehicles over 40 years from 12.6L/100km in 1976 to 10.6L/100km 2016¹¹

Sources:

1. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Transport_energy_resilience/Report/c02
 2. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Transport_energy_resilience/Report/c03
 3. <http://dfat.gov.au/about-us/publications/trade-investment/australias-trade-in-goods-and-services/Pages/australias-trade-in-goods-and-services-2016-17.aspx>
 4. <https://www.iea.org/Sankey/#?c=Australia&s=Final%20consumption>
 5. http://apvi.org.au/wp-content/uploads/2017/07/APVI-Press-201707_PV-in-Australia-Report.pdf
 6. <https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf>
 7. Based on solar at \$1.20/W, LCOE 10c/kWh EV efficiency at 19kWh/100km. Petrol at \$1.35/L, 8.6L/100km
 8. <http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/6530.0Main%20Features32015-16>
 9. https://bitre.gov.au/publications/2015/is_074.aspx
 10. Lovins, A., Odum, M. and Rowe, J. (2013). Reinventing fire. White River Junction, VT: Chelsea Green Publishing, p.18.
 11. Deloitte Access Economics Research (2017)
 12. http://www.irena.org/documentdownloads/publications/irena_rethinking_energy_2017.pdf
 13. <http://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications/national-greenhouse-accounts-factors-july-2017>
 14. <https://www.nrel.gov/docs/fy13osti/57187.pdf>
 15. <https://www.ivl.se/download/18.5922281715bdaebede9559/1496046218976/C243+The+life+cycle+energy+consumption+and+CO2+emissions+from+lithium+ion+batteries+.pdf>
 16. Australian Bureau of Statistics, 2017, 5204.0 Australian System of National Accounts, 'Table 62. Petroleum (Recoverable) - Crude oil - 5 year lagged moving average of resource life, time series spreadsheet, cat. no. 5204.02016. A2423679T, Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5204.02016-17?OpenDocument>
-



Bernadette Cullinane

National Oil and Gas Leader, Deloitte
Australia and Global LNG Leader, Deloitte

Tel: +61 8 9365 7137
bernadettecullinane@deloitte.com.au



Steve McGill

Energy Specialist, Deloitte Australia and
Director, TAWA Clean Energy

Tel: +61 8 9365 7076
smcgill@deloitte.com.au

Contact us

Deloitte
Level 9, Brookfield Place, Tower 2
123 St Georges Terrace
Perth WA 6000
Australia

Tel: +61 8 9365 7000

Fax: +61 8 9365 7001

www.deloitte.com.au

This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively the "Deloitte Network") is, by means of this publication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/au/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

About Deloitte

Deloitte provides audit, tax, consulting, and financial advisory services to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 150 countries, Deloitte brings world-class capabilities and high-quality service to clients, delivering the insights they need to address their most complex business challenges. Deloitte's approximately 264,000 professionals are committed to becoming the standard of excellence.

About Deloitte Australia

In Australia, the member firm is the Australian partnership of Deloitte Touche Tohmatsu. As one of Australia's leading professional services firms, Deloitte Touche Tohmatsu and its affiliates provide audit, tax, consulting, and financial advisory services through approximately 7,000 people across the country. Focused on the creation of value and growth, and known as an employer of choice for innovative human resources programs, we are dedicated to helping our clients and our people excel. For more information, please visit our web site at www.deloitte.com.au.

Liability limited by a scheme approved under Professional Standards Legislation.

Member of Deloitte Touche Tohmatsu Limited.

© 2018 Deloitte Touche Tohmatsu.

MCBD_PER_04/18_055714