

Australian State and Territory Emissions Intensity 2020

Summary

As nations worldwide increase debt to manage the Covid-19 crisis, investors are paying more attention to the climate risk attached to government bonds. Australia is well recognised as a poor climate performer, most recently by the FTSE Russell climate-adjusted bond index¹.

Sub-national governments are increasing their debt too. What then is the climate risk associated with Australian State and Territory bonds? This report presents the emissions intensity of Australia's State and Territory economies, with and without exported emissions, and shows a significant divergence in transition risk for different jurisdictions. It concludes by outlining actions that can be taken to better measure and understand this risk.

¹ <https://www.ftserussell.com/research/how-build-climate-adjusted-government-bond-index>
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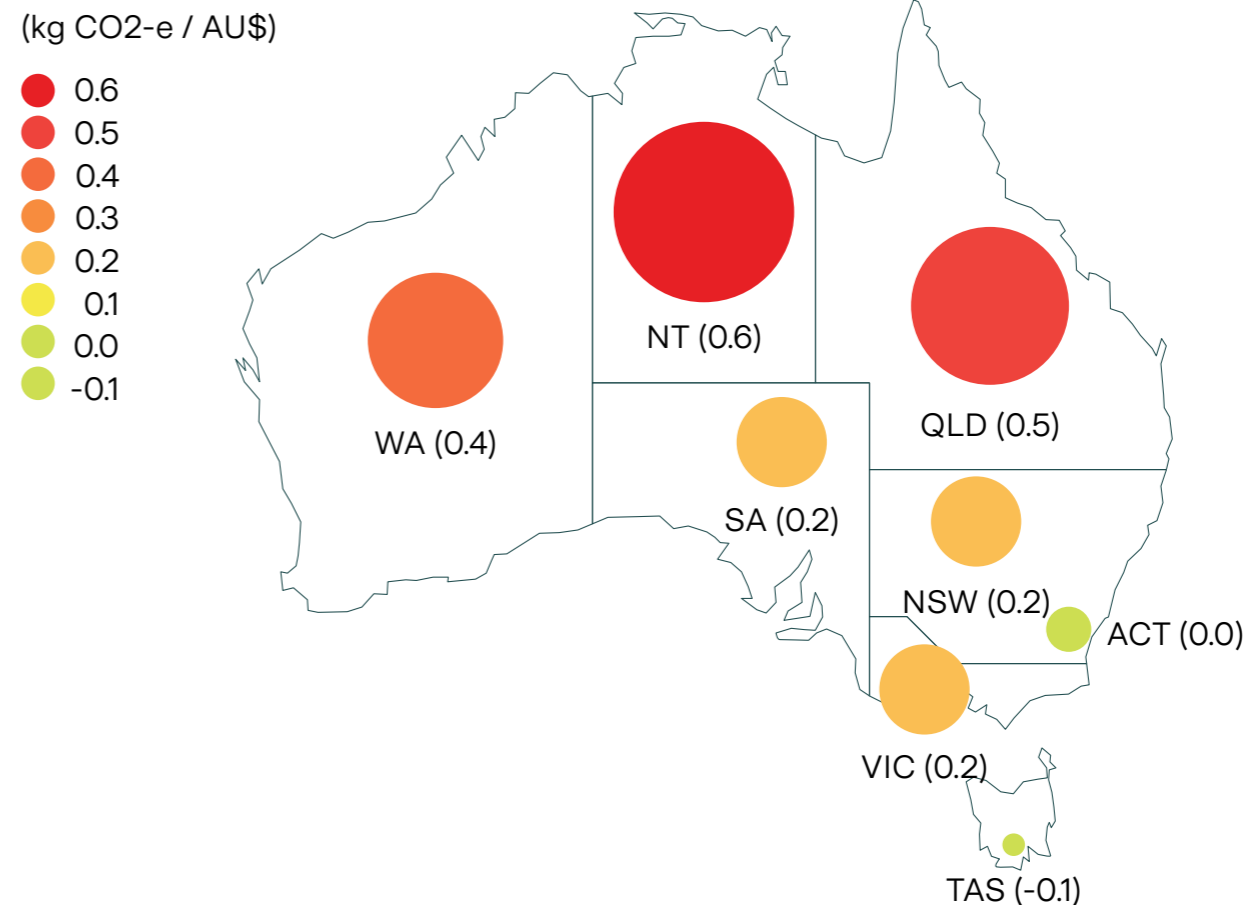
Emissions Intensity

Australia's State and Territory emissions intensity (annual territorial emissions divided by jurisdiction domestic product) range from -0.1 kg CO₂-e \$ in Tasmania to 0.4 in Western Australia, 0.5 in Queensland and 0.6 in the Northern Territory.

Figure 1 shows emissions intensity for each jurisdiction, expressed as kilograms of carbon dioxide equivalent per Australian dollar. This unit is equivalent to megatonnes (kilotonnes) of carbon dioxide equivalent per million of Australian dollars. We choose kg CO₂-e \$ for clarity and simplicity.

Data from State and Territory Greenhouse Gas Inventories and Australian National Accounts: State Accounts.

Figure 1: Gross state product exposure to greenhouse gas emissions, by jurisdiction in 2018



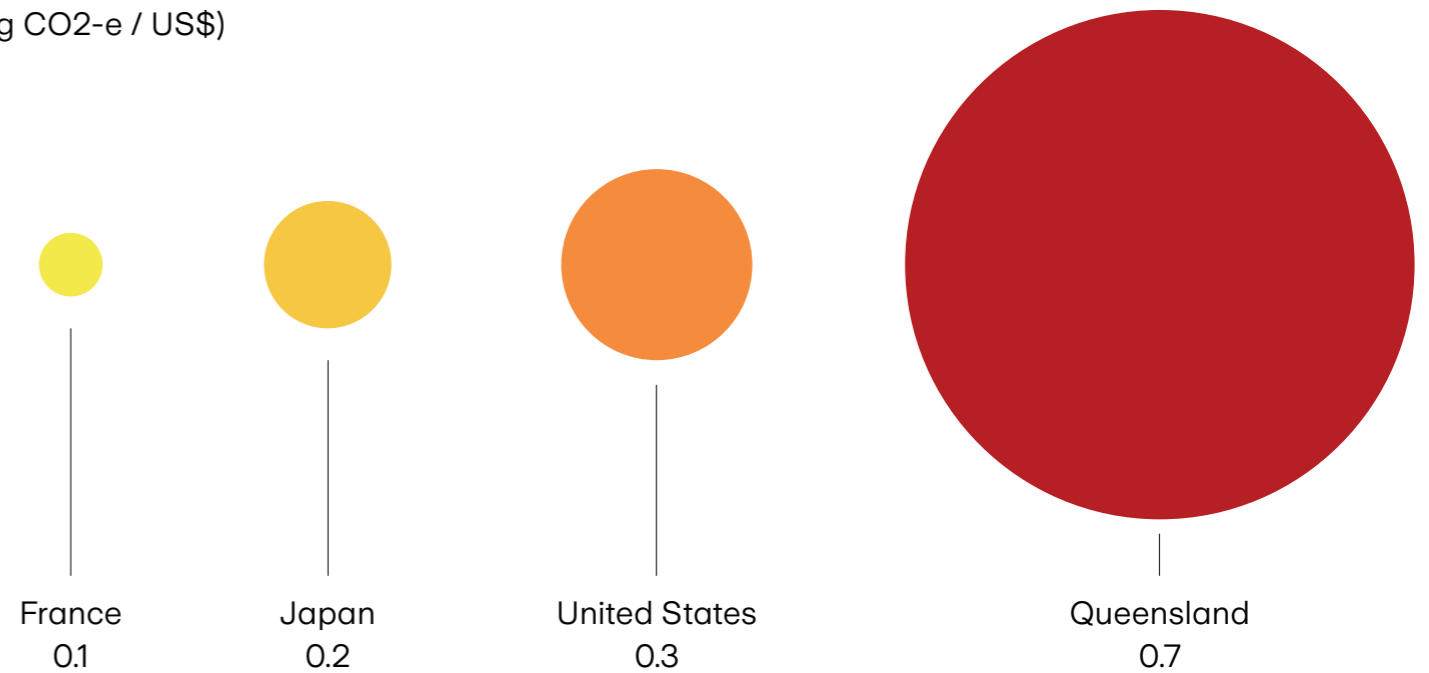
Emissions Intensity

The territorial emission intensity of Australia's most emissions intensive State economy, Queensland, is significantly greater than that of the United States, France, and Japan, as presented in Figure 2. Including the emissions from fossil fuel exports almost quadruples the Queensland economy's emissions intensity.

Data from UNFCCC National Inventory Report, The World Bank Data: GDP, State and Territory Greenhouse Gas Inventories and Australian National Accounts: State Accounts. Note that the figure of 0.7 for Queensland is in USD, whereas the figure of 0.5 in figure 1 is in AUD.

Figure 2: Territorial emissions intensity of Queensland, United States, Japan and France, 2018

(kg CO₂-e / US\$)



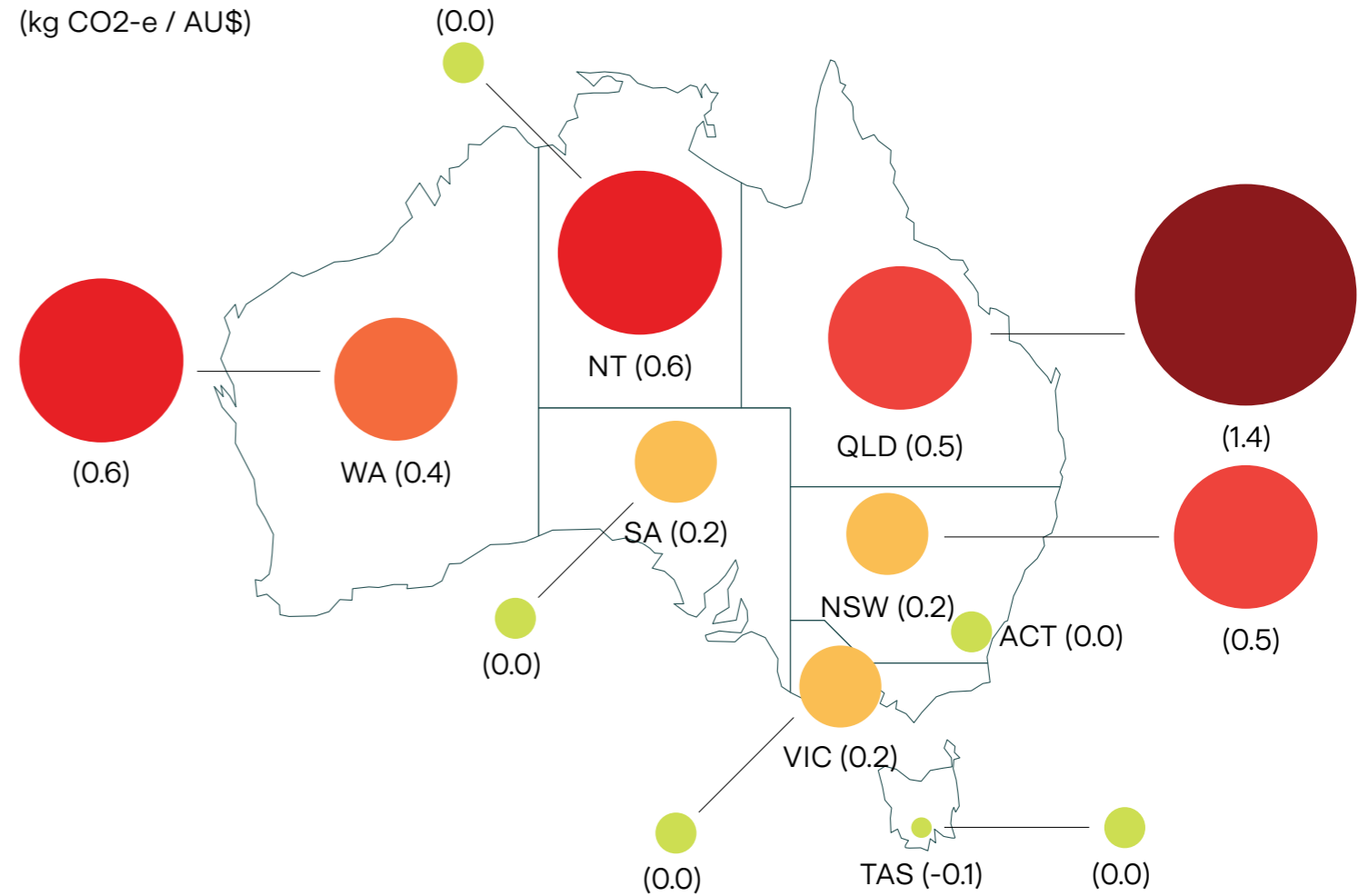
Emissions Intensity

The emissions intensity of economic activity using territorial emissions, represented as kg CO₂-e / \$, is one method for measuring the transition risk of national and subnational economies. Including the emissions from exported fossil fuels within the emissions intensity, as in figure 3, deepens this insight.

The bubbles outside of each state, located in the ocean, represent the emissions from exported fossil fuels divided by the Gross State Product.

Data from Australian National Accounts: State Accounts and the Australian Energy Update 2019

Figure 3: Gross state product exposure to greenhouse gas emissions including fossil fuel export emissions, by jurisdiction in 2018



Emissions Intensity

- * The UNFCCC emission reporting framework, for reporting under the Paris Agreement, does not include emissions from exported products. This more limited ‘carbon border’ differs from that used by the UN’s Sustainable Development Goal (SDG) ranking framework, under which Australia is the second worst performing nation in the world on climate change², and that proposed by the EU’s Carbon Border Adjustment Mechanism³.
- * The finance sector is becoming increasingly aware and proactive about the risks of climate change for assets, assisted by the Task Force on Climate Related Financial Disclosures (TCFD)⁴, and with the measurement of climate risk by FTSE Russell (see footnote 1).
- * Better data on emissions intensity and forward-looking climate policy analysis would support better identifying transition risk.

² 2020 Sustainable Development Report <https://dashboards.sdgindex.org/downloads>

³ <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-carbon-border-adjustment-mechanism> and <https://www.afr.com/companies/energy/australia-must-prepare-for-carbon-tariffs-carney-turnbull-20200930-p560ie>

⁴ <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>



Emissions Intensity

Australian Jurisdiction Emissions

There is a growing demand for data and analysis to assess the relative transition risk of companies and jurisdictions. Most attention is paid to national emissions, but important insights can be gained from considering sub-national jurisdictions.

Breaking down Australian emissions by jurisdiction shows the origin of these national emissions, highlighting each jurisdiction's exposure to transition risk. To illustrate the risk, the emissions are divided by the gross state product (GSP) of each jurisdiction. The emissions data used for Figure 1 is in line with the UNFCCC

framework⁵. Notably this includes land use, land use change and forestry (LULUCF).

This methodology reveals the emissions intensity of state and territory economies. To enable a more complete analysis of the jurisdiction emissions, the exports of fossil fuels can be included.

Jurisdiction Export Emissions

Considering the immensity of Australia's fossil fuel exports, and Australia's current ranking on the Sustainable Development Goals as 37th - one of the lowest in comparison to other OECD countries – and second last ranking worldwide on SDG 13 Climate Action, these

extraterritorial emissions need to be accounted for to provide a more complete picture of transition risk. The SDGs outline a different international carbon boundary from the Paris Agreement and include emissions from exports. Figure 4 shows Australia's poor progression towards SDG 13 Climate Action, with 'major challenges remaining' for all four indicators.

⁵ UNFCCC framework is defined by the categories: Energy, Industrial Processes, Agriculture, LULUCF, Waste and Other.

⁶ Based on graphics from the Sustainable Development Report — <https://dashboards.sdindex.org/profiles/AUS>

Figure 4: SDG Climate Action indicators, updated in 2020



INDICATORS

- → Energy-related CO₂ emissions
 - → CO₂ emissions embodied in imports
 - → CO₂ emissions embodied in fossil fuel exports
 - → Effective carbon rate
-
- → Major challenges remain
 - Score stagnating or increasing at less than 50% of required rate

Emissions Intensity

SDG Impact aims to escalate investment in the SDGs by 2030 to translate the goals into investment opportunities, strengthened by secure standards and reporting frameworks. The development of SDG Impact aims to mobilise international investment into SDG Bonds, building progress towards the SDGs. For Australia, SDG Impact will illuminate the emissions exposure of the economy and subject this exposure to greater international scrutiny.

Encompassing the jurisdiction export emissions provides a more informative analysis of the transition risk of the Australian states and territories, as well as depicting their contribution to global temperature rise and physical risk.

Figure 3 shows that when including exports of fossil fuels, the emission intensity of each jurisdiction changes markedly.

The stark increase in emissions intensity when including export emissions supports the SDG reporting framework that includes extraterritorial emissions within a country's carbon border. It also shows the difference in risk levels for each Australian jurisdiction, encompassing their contribution to global emissions.

The growing awareness of contributions to climate change is causing countries, organisations and institutions to make strategic decisions about their own exposure to emissions and emission-producing activities.

Available Data

The emissions intensity transition risk methodology is constrained by the availability of up to date and complete export and emissions data. As the Australian government and each jurisdiction uses the UNFCCC emissions reporting framework, there is no centralised fossil fuel export, or export emissions data. This limits a complete emissions intensity value. Furthermore, the State and Territory Emissions Inventory provides emissions data that is two years old, limiting the presentation of recent emissions.

Financial Implications

The financial implications of climate risk are becoming the subject of increasing focus and scrutiny by investors (see Figure 5).

Financial Disclosures

The Taskforce of Climate-related Financial Disclosures (TCFD) in 2017 released its landmark report highlighting a process to identify, assess and manage climate risk and distinguishes between physical risk⁹ and transitional risk¹⁰. It provides investors with an insight into the climate vulnerability of organisations, with the scope to expand to include governments and state bonds investments.

Divestment Decisions

In 2019, the Swedish central bank, Sveriges Riksbank, divested from the Queensland and Western Australian state bonds, alongside bonds from Canada’s Alberta province, home of Alberta tar sands. The motivation was the climate risk that the bonds were susceptible to, due to the high emissions intensity of these jurisdictions. The calculation used to determine this risk was emissions (kt CO2-e) divided by gross domestic product (million USD). This calculation informed the emission intensity methodology used for this report.

Debt Costs

In September 2020, FTSE Russell released a guide for a climate-adjusted government bond index. It ranks countries against the three pillars of transition risk, physical risk and resilience risk. It includes a methodology for comparing emissions, population, energy intensity and GDP to national emission budgets consistent with a 1.5 °C and 2°C temperature increase. According to this index, Australia is ranked as a poor climate performer.

The index accounts for the financial impacts of climate risk, such as the unprecedented costs for responding to climate-related natural disasters,

reduced revenue from fossil fuel assets and costs associated with adapting to changing markets and policies. These risks have not previously been priced into the government/sovereign bond market.

The index reflects the reality of climate impacted risks and enables investors to identify and quantify these risks in their investments.

Figure 5: Key Milestones in Financial Implications of Climate Risk



Financial Implications

Trade Impacts

China's recent announcement of carbon neutrality by 2060 will impact Australia's export market. In 2018-19 Australia's exported coal to China contributed to the economy \$10.2 billion for metallurgical coal and \$4.3 billion of thermal coal¹¹. This will cause a different impact to different Australian jurisdictions, notably impacting the coal exporting states of Queensland and New South Wales. This long-term risk is compounded by the immediate stalling of some Australian exports of coal to China¹² Japan's and Korea's recently announced targets of net zero emissions by 2050 will have a similar impact.

Stranded Assets

As investors, governments and industries move away from fossil fuel reliance to ensure long-term financial, social and environmental resilience, a transition risk is stranded assets¹³. There is a growing list of initiatives to avoid this risk:

- * Institutions such as the World Bank Group and the European Investment Bank have significantly limited or ruled out funding coal, oil and gas projects¹⁴.
- * Blackrock, the world's largest fund manager, will remove half a billion dollars in thermal coal shares, prioritising climate risk in their investment approach¹⁵.

- * In September 2020, New Zealand announced a requirement for businesses to report on climate risk, ensuring climate change is reflected in business decision-making¹⁶.

These examples present a snapshot of the global movements to shift away from fossil fuel investment and reliance and include climate change decision-making in business strategy, highlighting the increasing risk of stranded fossil fuel related assets.

⁸ <https://assets.bbhub.io/company/sites/60/2020/10/FINAL-2017-TCFD-Report-11052018.pdf>

⁹ <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>

Physical risks are exposure to impacts associated with global warming, including increased frequency and intensity of bushfires, heatwaves, extreme weather events and sea level rise.

¹⁰ Transition risks encompass the 'growing pains' of the modifications to a low-carbon economy. They are inclusive of policy and legal, market, reputation and technology risk, as illustrated by the TCFD.

¹¹ <https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2020/index.html>

¹² <https://www.abc.net.au/news/2020-10-14/bhp-deferment-confirms-chinas-reduced-demand-for-australian-coal/12768004>

¹³ Stranded assets occur when an environmental or economic risk deems an asset to be prematurely redundant.

¹⁴ <http://productiongap.org/2019report/>

¹⁵ <https://theconversation.com/blackrock-is-the-canary-in-the-coalmine-its-decision-to-dump-coal-signals-whats-next-129972>

¹⁶ <https://uk.reuters.com/article/climate-change-newzealand/new-zealand-to-require-financial-firms-report-climate-change-risks-idUKL4N2GB23E>

Policy Responses

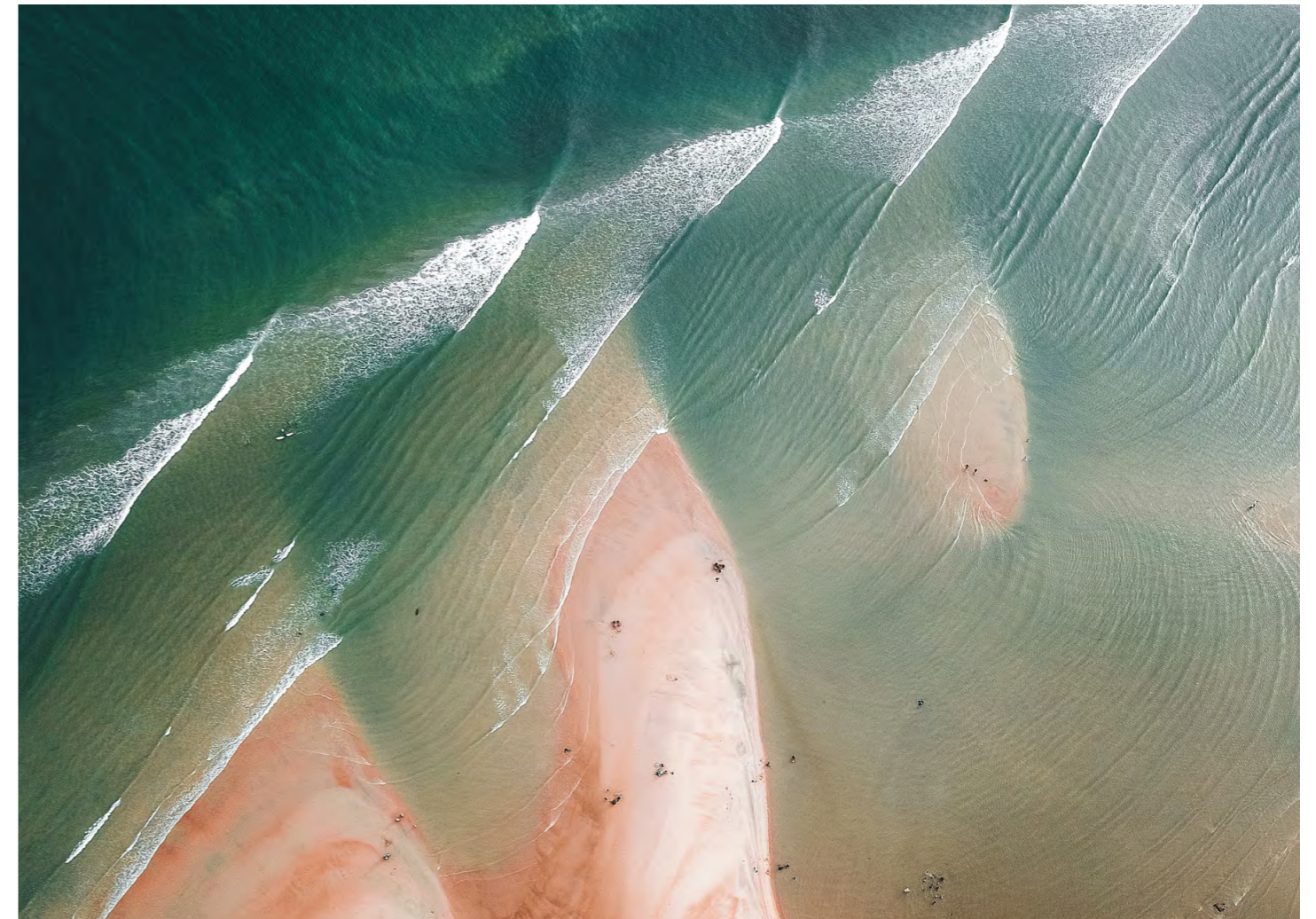
Given these financial implications, investors are increasingly pricing the climate resilience capacity of the socio-ecological system to which their investments are exposed, in terms of:

- * Preparing, absorbing and recovering from climate-related shocks and stresses.
- * Adapting and transforming structurally in the face of long-term uncertainty.

Accordingly, the jurisdictions which demonstrate the highest resilience capacity will benefit the most financially, in terms of investment outcomes, as well as real economic development.

The role of long-term public policy-making is central to investment outcomes and economic development in this regard.

In particular, the quality of whole-of-government climate and economic policy-making will help to determine the financial implications of jurisdictional emissions.



Conclusion

There is an increasing need for data and analysis to identify jurisdictions' climate risk to inform investment decisions. With the high exported emissions from states like New South Wales, Queensland and Western Australia, it is evident that they are exposed to a higher transition risk than other states and territories with less reliance on fossil fuel exports.

To adequately assess transition risk, access to complete and relevant emissions data is necessary. The inclusion of evidence of forward looking climate and economic policies will assist investment decision-making and the identification, assessment and management of climate risk.

Appendix 1 – Data table by jurisdiction, 2018

JURISDICTION	EMISSIONS (KT CO2-E)	STATE PRODUCT (AU\$ MILLION)	EMISSIONS INTENSITY (KG CO2-E/\$)	EXPORTED EMISSIONS (KT CO2-E)	EXPORTED EMISSIONS INTENSITY (KG CO2-E/\$)
New South Wales	131,685	603143	0.2	328,737	0.5
Victoria	102,189	432993	0.2	12,378	0
Queensland	171,743	352248	0.5	497,003	1.4
Western Australia	91,482	258120	0.4	150,77	0.6
South Australia	24,241	106477	0.2	99	0
Tasmania	-2,192	30710	-0.1	698	0
Northern Territory	16,035	26501	0.6	1,17	0
Australian Capital Territory	1,394	39686	0	n/a	0

Data Sources

Australian National Accounts: State Accounts (Australian Bureau of Statistics)

Provides the state and territory gross state product for emission intensity calculation. Reported annually by fiscal year, for the current year's data.

* <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-state-accounts/latest-release>

Australia Energy Statistics (energy.gov.au – Department of Industry, Science, Energy and Resources)

Provides data for the production and consumption of coal, oil and gas to calculate estimated exports of coal and gas from the jurisdictions. Reported annually by fiscal year, for the year prior.

* <https://www.energy.gov.au/publications/australian-energy-update-2020>

Australian Greenhouse Emissions Information System (Department of Industry, Science, Energy and Resources)

Provides the jurisdictions' territorial annual emissions data under the UNFCCC framework. Reported annually by calendar year, for two years prior.

* <https://ageis.climatechange.gov.au/SGGI.aspx>

About Proud Mary Consulting

Proud Mary Consulting creates public value with clients through advising on policy, strategy and governance in relation to water, climate change, environment and sustainability, energy and public administration.

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Michael brings extensive experience in developing policy, strategy and effective governance. He is renowned for his ability to shape and work within policy, institutional and regulatory frameworks and to navigate government. Michael is sought out for his ability to contextualise complex policy issues and articulate strategies to a wide range of audiences.

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Jon consults to boards and teams on strategy, law, finance and governance, across energy, climate, resources and health. Jon has more than twenty years of experience as an executive, leader and lawyer in over twenty countries, including ten years with Shell and the United Nations (UN) in Europe and Asia. As a lawyer, he has over ten years in energy, climate, water, resources, finance, infrastructure and health law. His legal roles have included at the Australian Energy Market Operator (AEMO), Coliban Water, Clayton Utz, Westpac and the UN.