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ndevr environmental

TRACKING 2 DEGREES REPORT

Quarterly Report for December 2020 – Q2/FY2021

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Introduction

Under the Paris Agreement, the Australian Government has legally committed to reducing our emissions by 26-28% below 2005 levels by 2030. However, to ensure global warming remains under 2 degrees, independent body The Climate Change Authority (CCA) has proposed Australia set a national Science Based Target (SBT). This is a target calculated from Australia's share of emissions for a 2°C global outcome. Ndevr Environmental has used this target to model a quarterly emissions budget for Australia.

This report tracks Australia's performance against our Paris target and the CCA's carbon budget based on the latest available data, trends, and industry movements for the months of October, November, and December (Q2/FY2021)**.** Our results are presented in tonnes of carbon dioxide equivalents (t CO_2-e). 1 t CO_2-e is roughly equal to the emissions of a standard 5-seat passenger vehicle driving around 5,400 km.

1 Headline Results

- Emissions for Q2/FY2021 are projected to be 123.7 Mt CO_2-e, a 4.7 Mt CO_2-e decrease on last quarter. This represents a reduction of 5.8 Mt CO_2-e on the corresponding quarter, the year prior (Q2/FY2020) and is due primarily to decreased electricity and transport emissions.
- Total emissions for the 12-month period to 31 December 2020 declined by around 4.95% (26.3 Mt CO_2-e) on the previous 12-month period.
- Victoria recorded its highest ever quarterly renewable energy generation, reaching 30.5%.
- If emissions follow the long term trend since 2015 (represented by the dashed olive line in the figure below), the upper Paris target would not be met until 2033, with the lower target being achieved in 2036.
- Electricity emissions for Q2/FY2021 are projected to be the lowest on record (dating back to 2002), with renewable energy generation across the NEM states achieving the highest penetration rate on record for the third consecutive quarter (~29%).
- For the quarter ending in December 2020, transport emissions have almost recovered to the same period in 2019, with a difference of only 1.3 Mt CO_2-e compared to the peak quarterly difference of 5.97 Mt CO_2-e in the quarters ending in June.

Figure 1: Australia's Quarterly Emissions Projections to a 2 Degree Target, 2005 - 2050

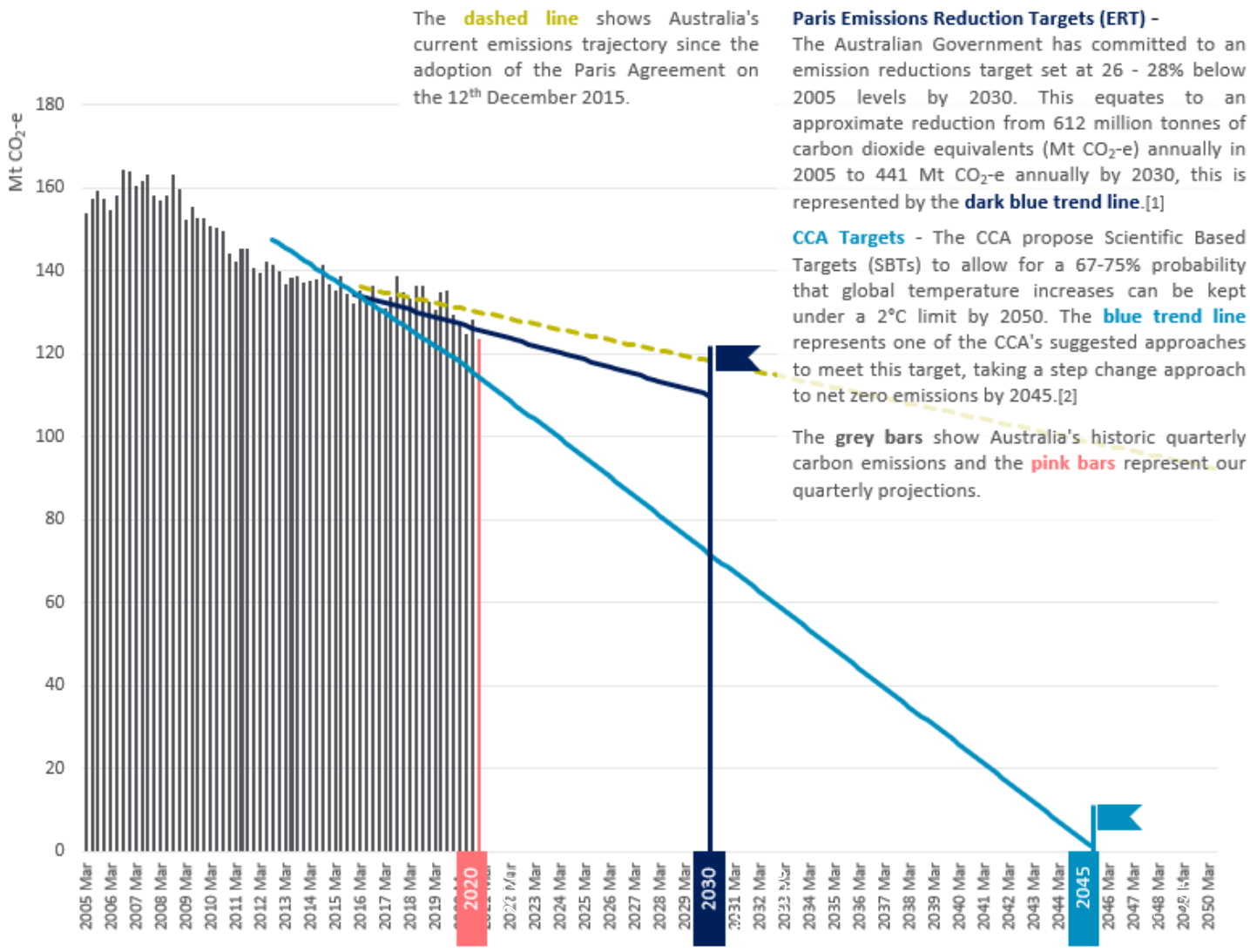
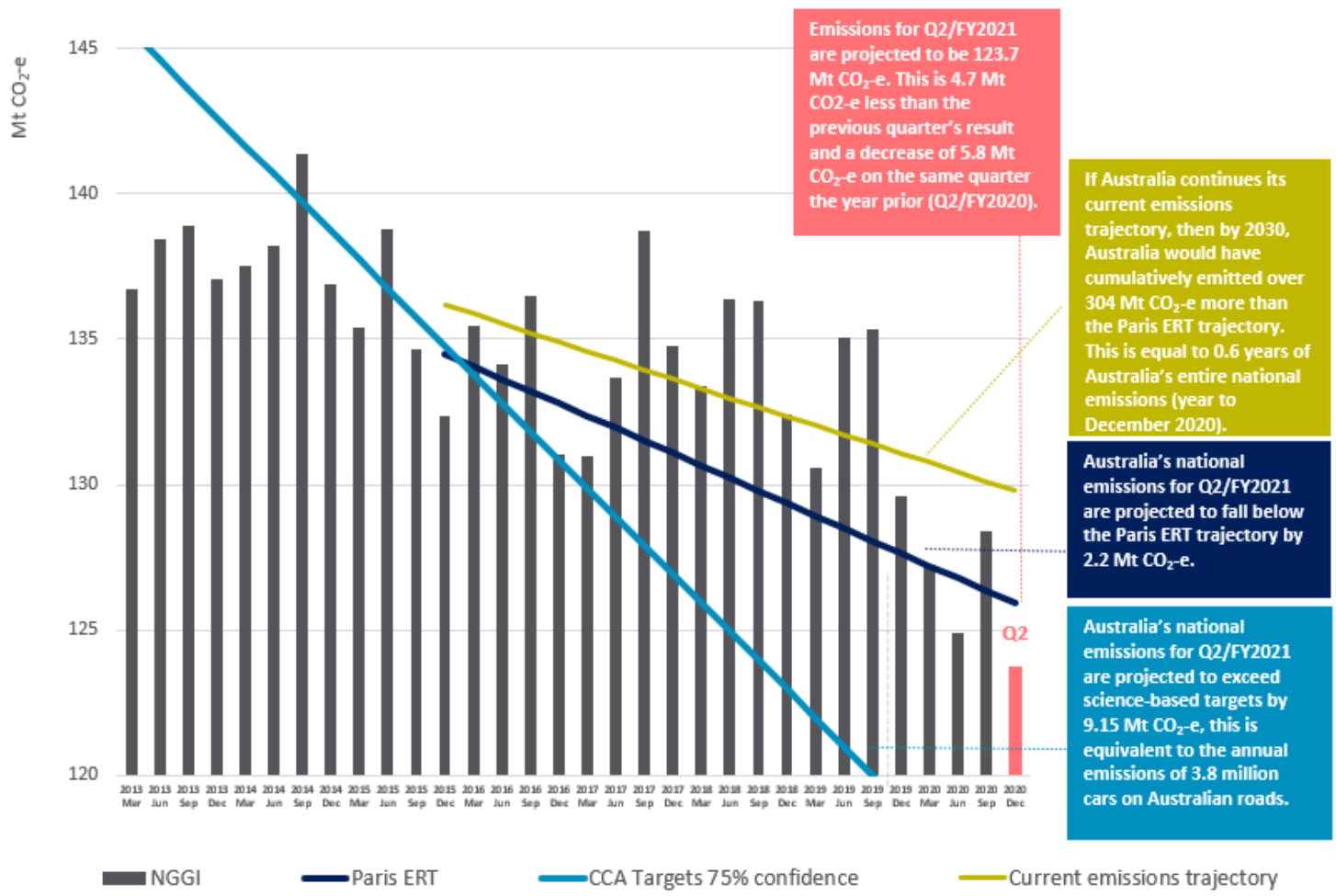


Figure 2: Australia's Quarterly Emissions Projections to a 2 Degree Target, 2013 – 2020



2 Detailed Findings

2.1 Increased Renewable Generation Leads to Reduced Electricity Emissions, Partially Offset by Rising Stationary and Transport Emissions

For the third consecutive quarter, the National Electricity Market (NEM) has achieved its highest ever quarterly renewable energy penetration in Q2/FY2021, achieving 29% and beating the previous all-time high by almost 3% (Q1/FY2021). This contributed to a significant projected drop in electricity related emissions of 5.8 Mt CO_2-e nationwide.

While total energy generation in the NEM has remained reasonably stable since 2005 (averaging 50.2 TWh per quarter), rising renewable energy penetration has continued to produce a downward trend in emissions from the Australian electricity sector. While electricity related emissions trend downwards, combined emissions from stationary energy and transport have been gradually rising. Transport and stationary energy emissions were almost equal with the electricity sector from 2012 to 2016, before overtaking and staying above electricity generation emissions through to 2021, despite COVID-19 travel restrictions in 2020.

Figure 3: Increasing Renewable Generation and Reducing Electricity Emissions

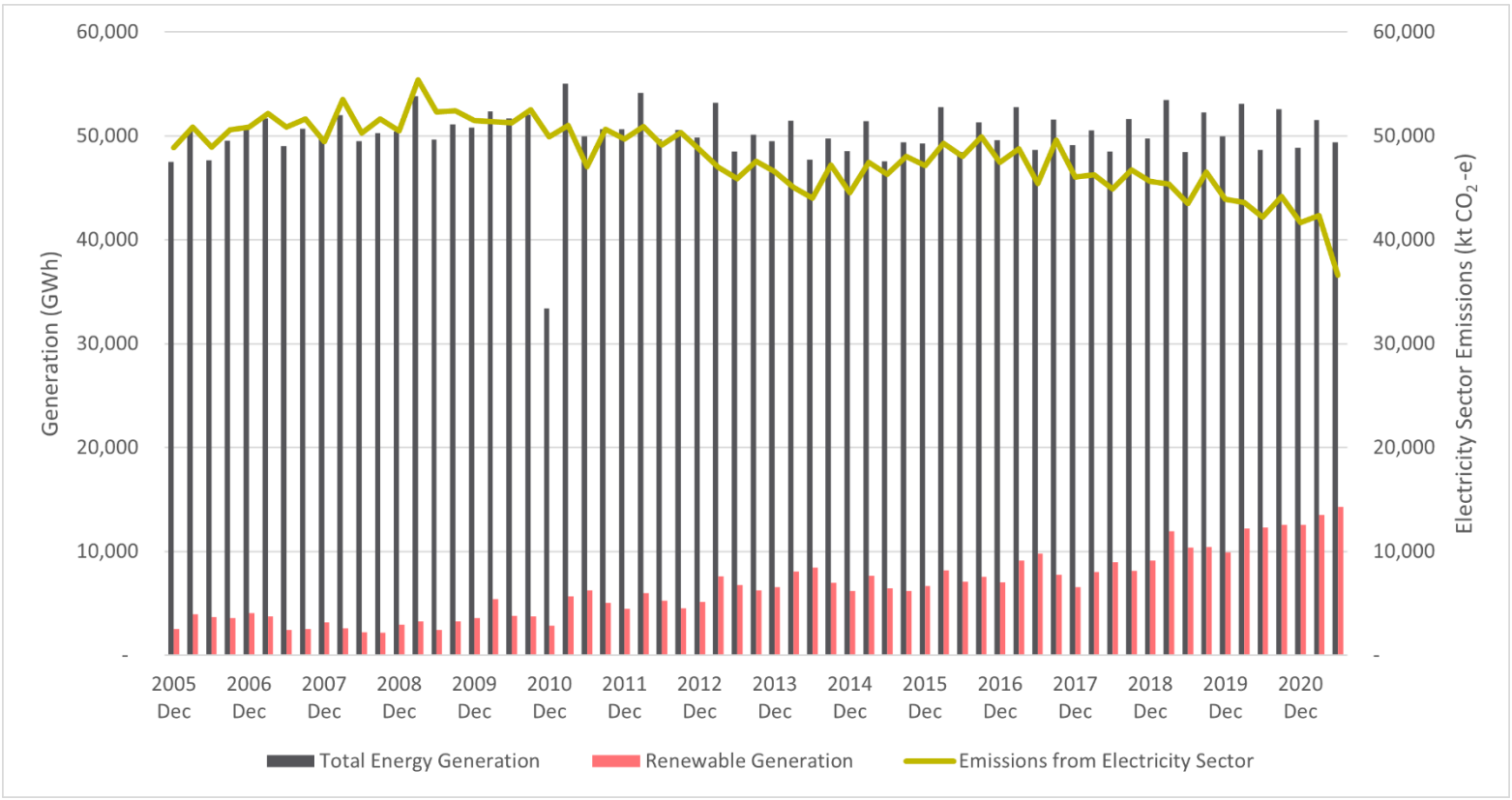


Figure 4: Electricity Emissions Decrease While Transport and Stationary Emissions Trend Upwards

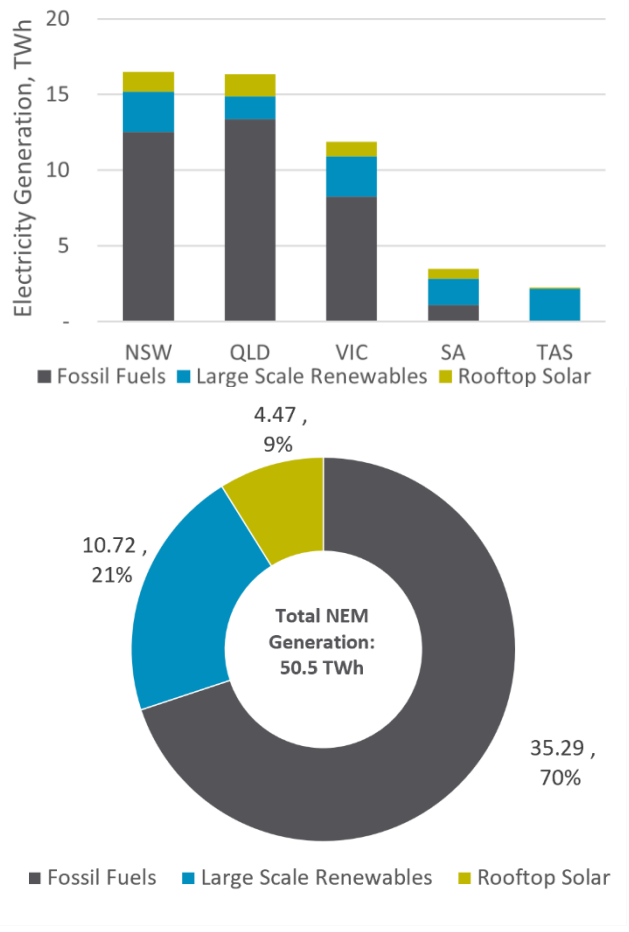
2.2 Electricity Analysis for the National Energy Market

- Electricity emission projections for Q2/FY2021 were the lowest on record across the entire data set, dating back to 2001 (39.5 Mt CO_2-e).
- With quarterly electricity demand relatively stable across the NEM, the decline has been driven by an increase in renewable energy generation from wind power, hydro power, utility-scale solar and rooftop solar.
- Renewable energy generation across the NEM states for the period was 29%, the highest penetration rate on record for renewable energy and the third such record in as many quarters.
- Quarterly black coal generation has also dropped by 1.6 TWh, contributing to a 70% fossil fuel powered grid.
- Electricity generation in the NEM for the year to December 2020 reduced by 0.8% or 1.7 TWh below the previous year.
- For Q2/FY2021, results for the NEM states are as follows:

  NSW generated 16.5 TWh of electricity with 70.3% from black coal, 5.7% from gas and 24% from renewable sources including wind, hydro, utility-scale solar and rooftop solar. NSW's renewable energy percentage has shattered the previous record of 19.3%, which occurred in Q2/FY2020.

  QLD generated 16.4 TWh of electricity with 73.7% from black coal, 8.1% from gas and the balance from renewable sources including utility-scale solar, rooftop solar, wind and a small portion of hydro energy. QLD's renewable energy percentage increased 2.3% on the previous quarter to achieve its highest ever rate of 18.2%, QLD's second such record in as many quarters.

Figure 5: Electricity Generation in the National Energy Market



VIC generated 11.9 TWh of electricity with 68% from brown coal, 1.5% from gas and 30.5% from renewable sources including wind, hydro, rooftop solar and utility-scale solar. VIC's renewable energy penetration is its highest on record, beating the previous high by almost 5% (Q1/FY2021). Contributing greatly to this was an 83% increase in rooftop solar generation compared to last quarter.

SA generated 3.5 TWh of electricity with 31.5% from gas and 68.5% from renewable sources such as wind, rooftop solar, utility-scale solar and battery (discharge). SA's renewable energy penetration has gained an incredible 15% on last quarter and 8.1% on its previous all-time high (Q2/FY2017).

TAS generated 2.3 TWh of electricity with 99.4% from renewable sources such as hydro, wind and rooftop solar and the balance from gas. TAS's renewable energy percentage has been higher before, but has not dropped below 90% since Q3/FY2019.

Figure 6: Australia's Annual Emissions

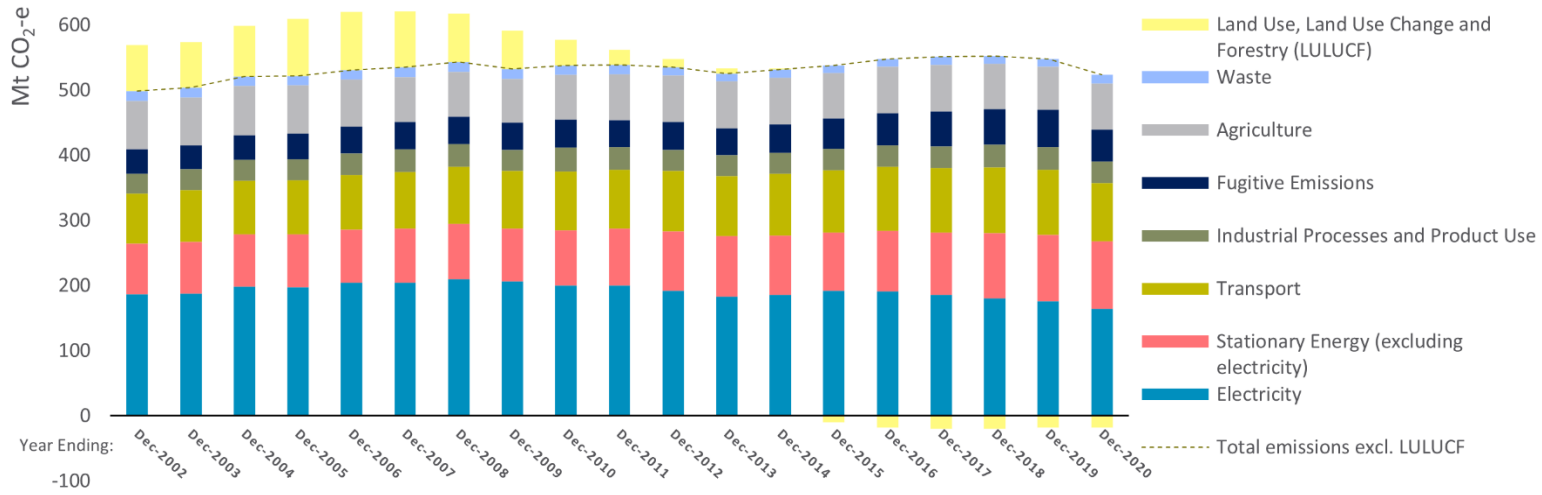
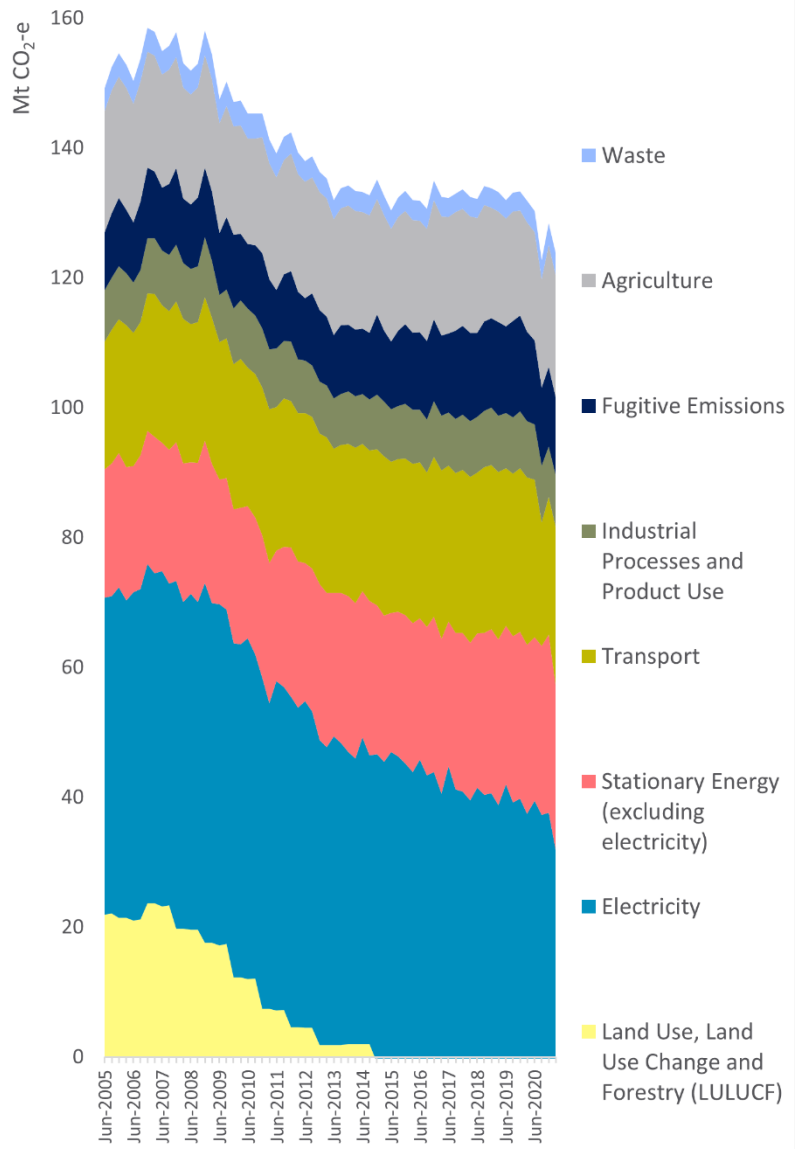
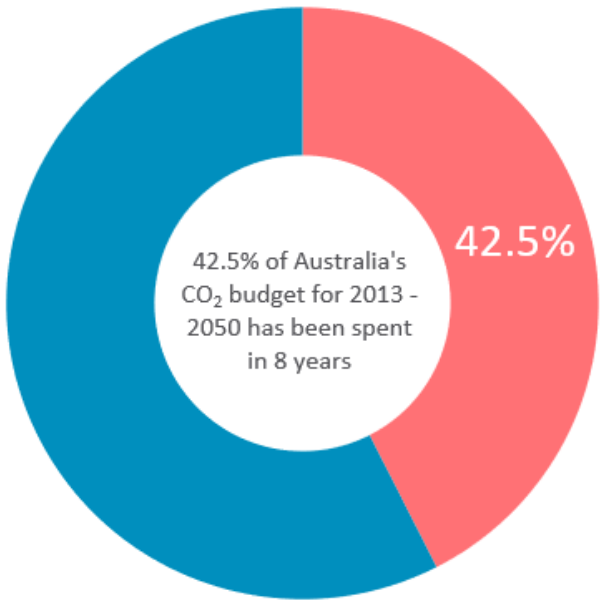


Figure 7: Australia's Quarterly Emissions by Sector*



*Negative LULUCF sector emissions cannot be seen on the above chart

Figure 8: 2 Degree Budget Expenditure to Date



3 COVID-19 Recovery

Changes in emissions from the electricity sector are typically variable at both quarterly and annual intervals. With significant reductions in emissions from the electricity sector recently, the expected link between economic COVID-19 recovery and rising emissions has been slightly clouded. We had expected emissions to be back on the rise as the recovery and mobility increases however this has been offset by such strong, zero carbon electricity production for the quarter.

It is important to note that industrial and transport emissions were the hardest hit by lockdowns, restrictions and flexible work-from-home arrangements. For this reason we have analysed key indicators of the COVID-19 recovery:

- Total national quarterly emissions in 2020 have been consistently lower than in 2019, giving no clear indication of economic recovery based on total emissions (Figure 9).
- Fugitive and electricity emissions have also been consistently lower in 2020.
- The quarter ending in December presents the most significant reduction in electricity emissions, despite this quarter being expected to be the least affected by COVID-19 in CY2020 (see Figure 10). Cooler temperatures in 2020 compared to 2019 would have played into this, with 2019 being Australia's warmest year on record and December 2019 being the warmest December in 110 years. 2020 reached the fourth warmest year on record in comparison, according to the Bureau of Meteorology. This would likley result in reduced cooling loads in the milder Summer of 2020/21.
- Transport emissions seemed to be relatively indicative of the impacts of the pandemic and showed significant reductions in the quarters ending in June 2020 and September 2020, compared to the same quarters in 2019 (Figure 11). For October to December 2020, transport emissions have almost recovered compared to the same period in 2019, with a difference of only 1.3 Mt CO_2-e compared to the peak quarterly difference of 5.97 Mt CO_2-e in April to June.
- Additionally, industrial emissions in 2020 went from a 0.7 Mt CO_2-e deficit for January to March, to a 0.46 Mt CO_2-e surplus for October to December compared to 2019 (Figure 12).
- The idea of industrial and transport emissions approaching 2019 levels (see Figures 11 and 12) being an indicator of economic recovery is bolstered by a gain of 3.1% for Australian GDP for October to December 2020. Australian GDP growth was at 3.4% for July to September 2020, -7% for April to June 2020 (during the peak of the pandemic and travel restrictions), and -0.3% for January to March 2020.

Figure 9: Total Quarterly Emissions (2019 vs 2020)

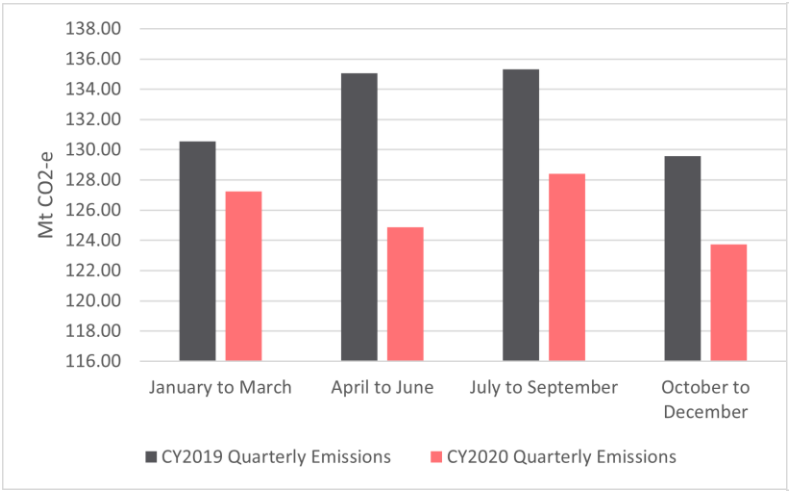


Figure 10: Quarterly Electricity Emissions (2019 vs 2020)

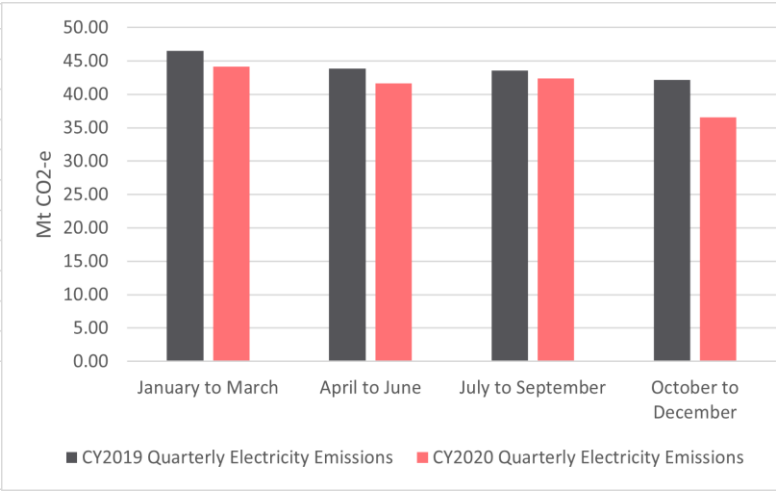


Figure 11: Quarterly Transport Emissions (2019 vs 2020)

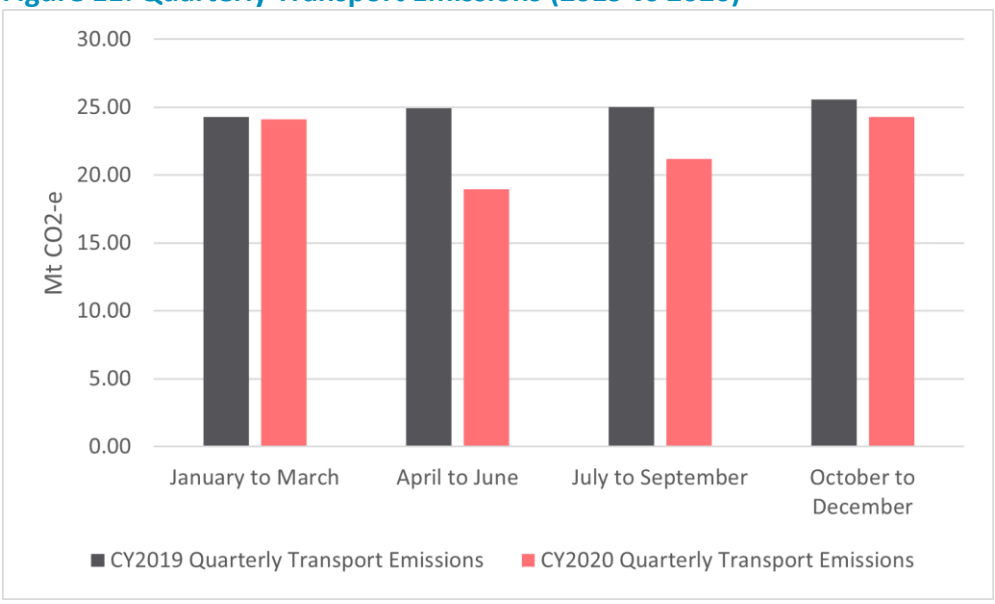
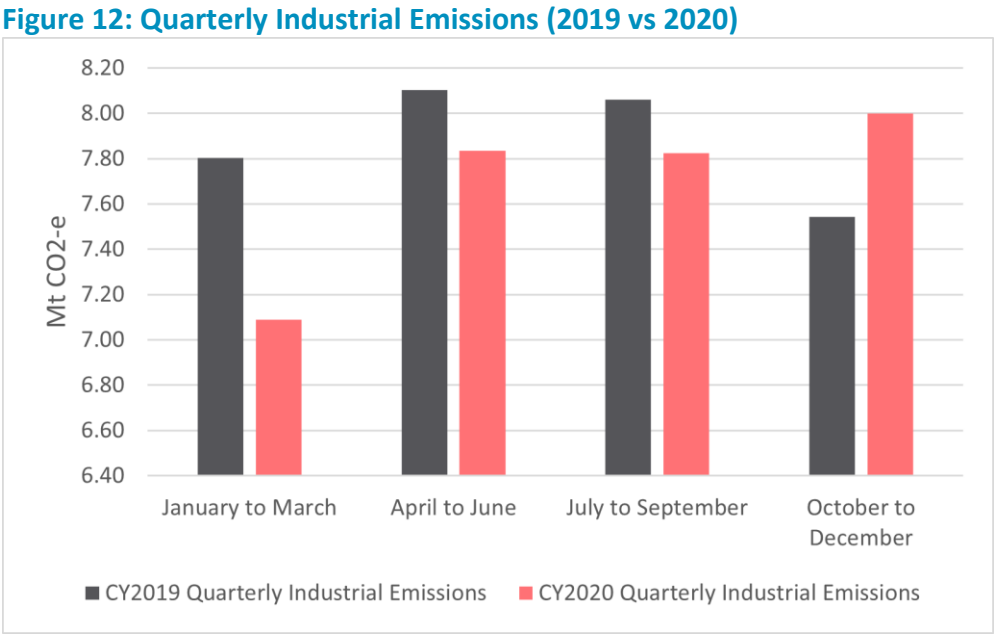


Figure 12: Quarterly Industrial Emissions (2019 vs 2020)



This report has been compiled by Ndevr Environmental Pty Ltd, using the latest information available from: AEMO, Office of the Chief Economist, Australian Petroleum Statistics and the Department of the Environment and Energy's National Greenhouse Gas Inventory (NGGI) reports. Detailed electricity generation data for the National Energy Market (NEM) are sourced from Open NEM.

GDP trends are sourced from Trading Economics, information about Australian car use is sourced from the National Transport Commission, 2018 and the Australian Bureau of Statistics. Emission factors are sourced from National Greenhouse and Energy Reporting (Measurement) Determination 2008.

Government and CCA target information is available at the following sources:

[1] - Australian Government (2015), Australia's 2030 Climate change target, Commonwealth of Australia

[2] - CCA (2014), Reducing Australia's Greenhouse Gas Emissions – Targets and Progress Review, Final Report (page 9)

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