

# Tracking 2 Degrees. Quarterly Report September 2021. Q1/FY2022

January 2022

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## 1.1 Introduction

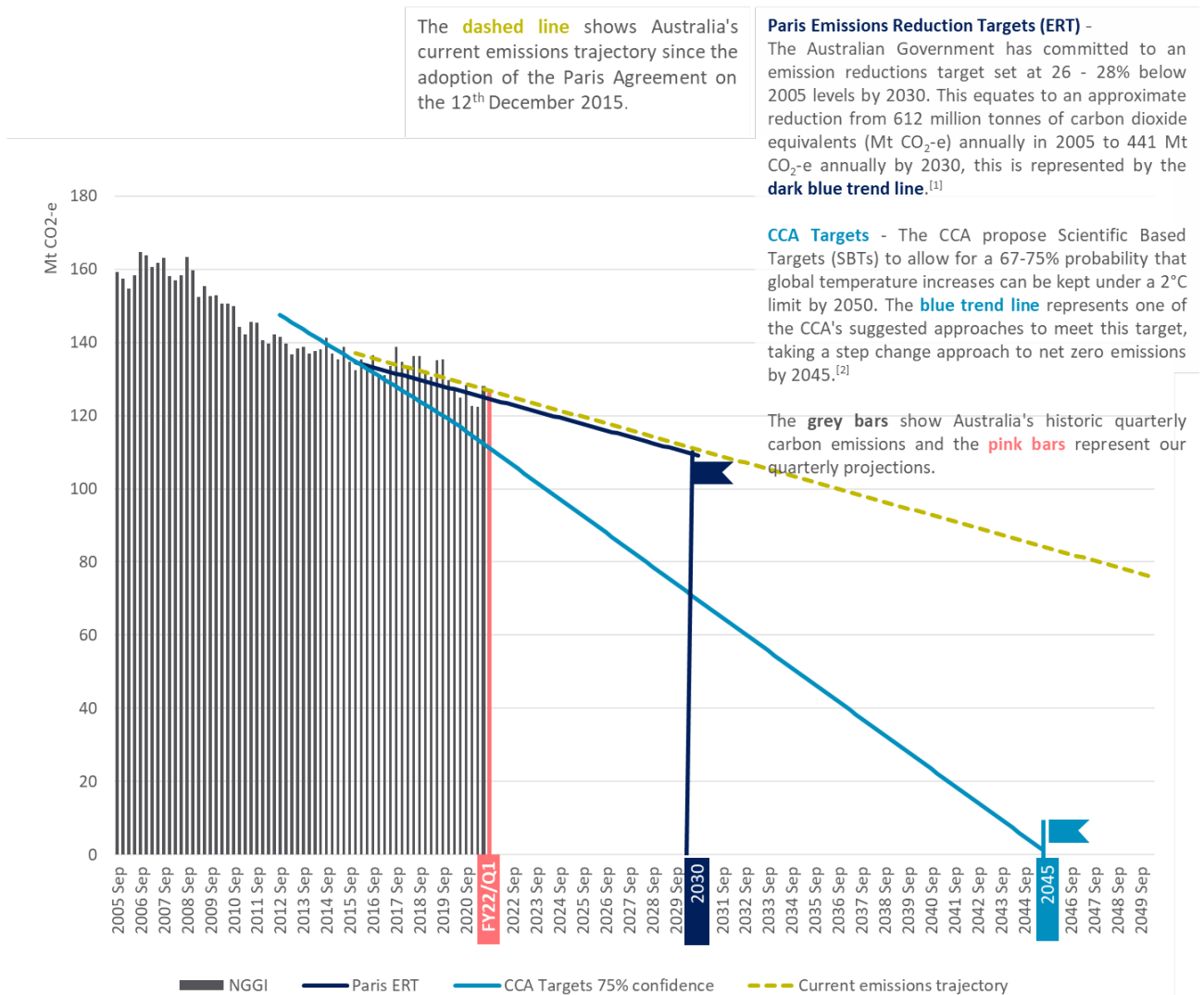
Under the Paris Agreement, the Australian Government has legally committed to reducing our emissions by 26-28% below 2005 levels by 2030. However, to ensure global warming remains under 2 degrees Celsius, the independent body Climate Change Authority (CCA) has proposed that Australia set a national Science 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 the Paris target and the CCA's carbon budget based on the latest available data, trends, and industry movements [for the months of July, August, and September \(Q1/FY2022\)](#). Our results are presented in tonnes of carbon dioxide equivalents (t CO<sub>2</sub>-e). 1 t CO<sub>2</sub>-e is roughly equal to the emissions of a standard 5-seat passenger vehicle driving approximately 5,400 km.

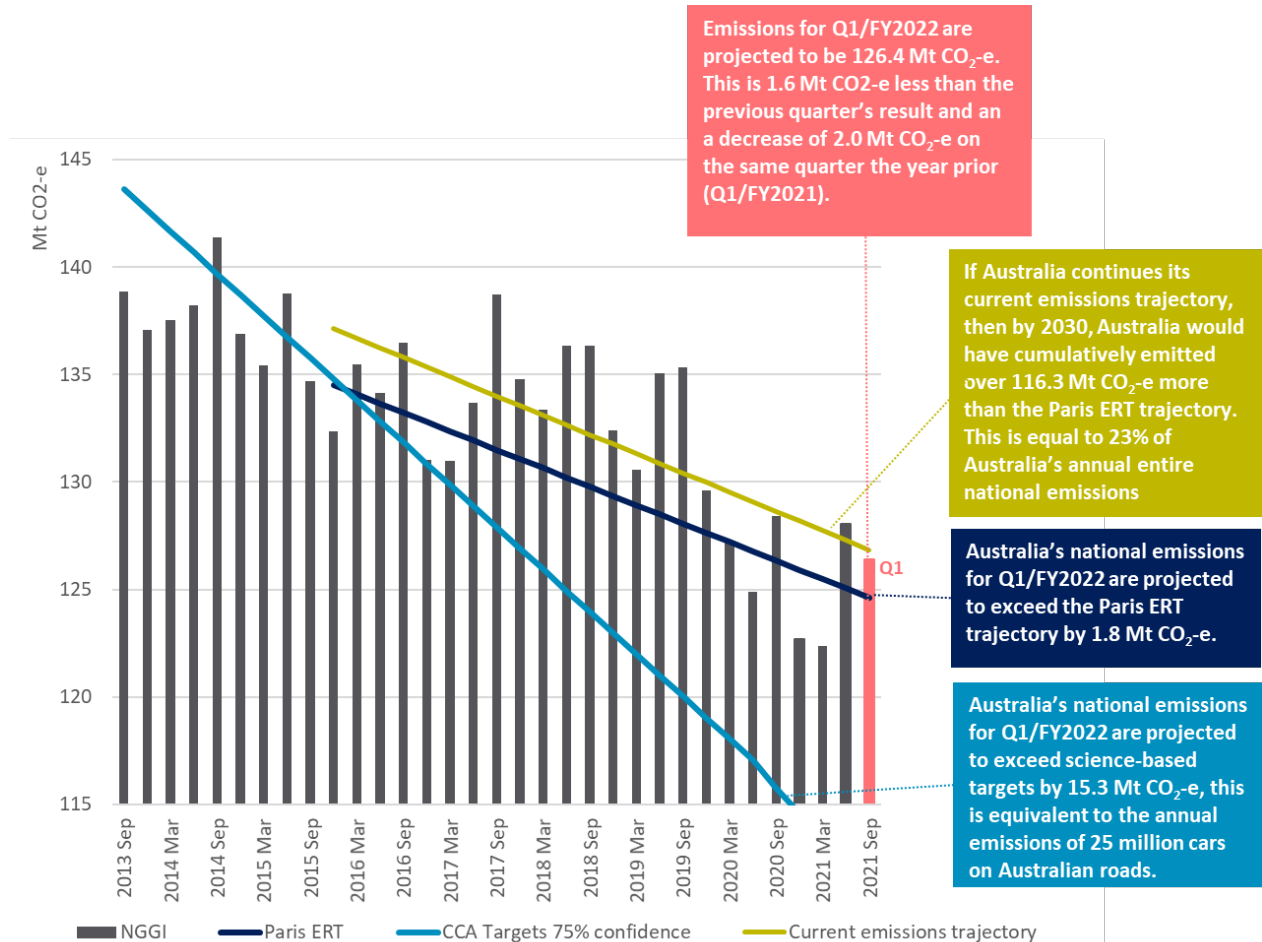
## 1.2 Headline results

- Year-to-September 2021 total emissions are projected to be 499.5 Mt CO<sub>2</sub>-e, a 2.1% decrease on the previous year. This reduction is highly influenced by the rapid increase in renewable energy penetration and effects of COVID-19 lockdowns.
- Emissions for Q1/FY2022 are projected to be 126.4 Mt CO<sub>2</sub>-e, this is a decrease of 1.6 Mt CO<sub>2</sub>-e on the previous quarter and an increase of 2.0 Mt CO<sub>2</sub>-e on the same quarter the year prior (Q1/FY2021).
- For Q1/FY2022, Australia's emissions are 1.8 Mt CO<sub>2</sub>-e higher than the trajectory to meet Paris targets and 15.3 Mt CO<sub>2</sub>-e higher than recommended safe Science Based Targets (SBTs).
- Despite a quarterly fall of 8% or 1.9 Mt CO<sub>2</sub>-e on the previous quarter, Q1/FY2022 transport emissions are starting to rise compared to the year prior (Q1/FY2021) with a 2% increase.
- Despite year-to-September 2021 data showing a declining trend in emissions from stationary energy, quarterly results show subtle signs of the sector's recovery of its historical upward trajectory. Q1/FY2022 stationary energy emissions are projected to be 26.8 Mt CO<sub>2</sub>-e, 3.5% up on the previous quarter (Q4/FY2021)
- Industrial and mining related emissions, including stationary energy and fugitive emissions are expected to bounce back to a pre-COVID growth trend as coal and LNG international demand increases.
- Transport emissions have started to trend upwards as COVID-19 state-wide lockdowns cease and international borders open.

**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, 2013-2021 – Zoomed in view**





“Global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO<sub>2</sub> and other greenhouse gas emissions occur in the coming decades.”

— IPCC Sixth Assessment Report, 2021.



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## 2 Detailed Findings



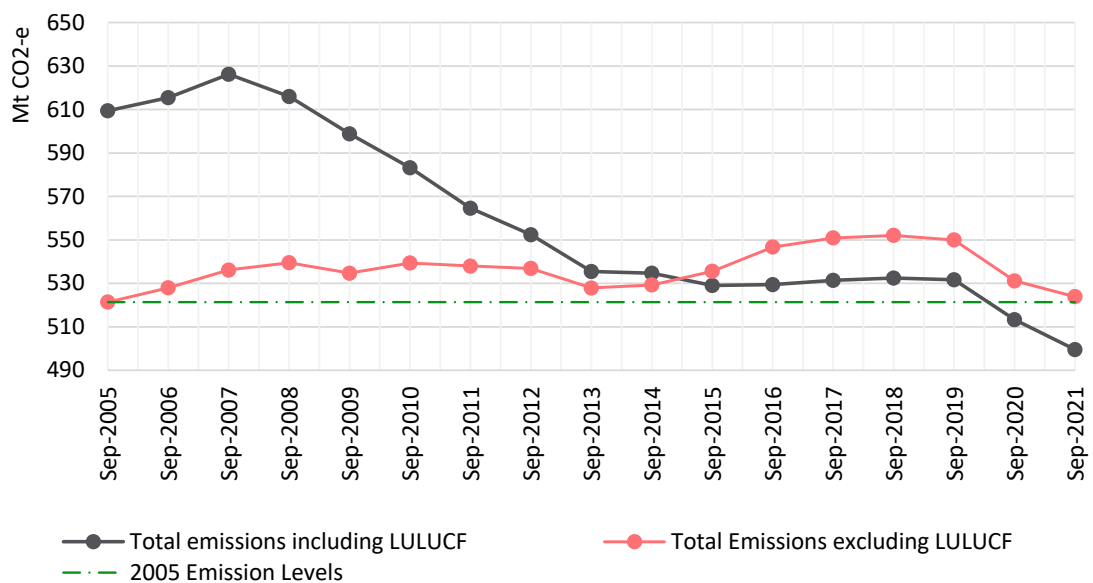
## 2.1 Detailed Findings

### 2.1.1 Renewable energy transition and COVID-19 continue deep reductions

When excluding Land Use, Land Use Change & Forestry (LULUCF) emissions, the annual emissions for the year-to-September 2021 resulted in 523.91 Mt CO<sub>2</sub>-e. This is the lowest total since the year-to-September 2005, when 521.4 Mt CO<sub>2</sub>-e was recorded.

Including LULUCF, the expected emissions for the quarter are 499.5 Mt CO<sub>2</sub>-e, 2.1% decrease on the previous year.

**Figure 3: Total annual emissions, year-to-September 2005-2021**

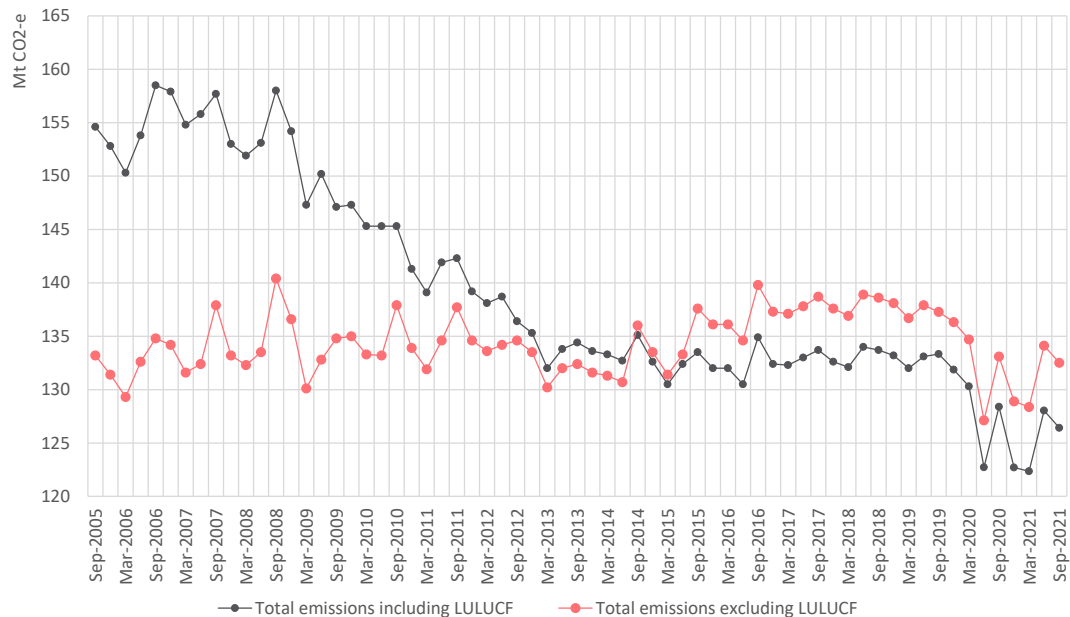


Total National emissions for the September 2021 quarter (Q1/FY2022), estimated at 126.4 Mt CO<sub>2</sub>-e, are expected to decrease 1.3% or 1.6 Mt CO<sub>2</sub>-e on the previous quarter. This represents a reduction of approximately 1.5% or 2.0 Mt CO<sub>2</sub>-e on the corresponding quarter the year prior (Q1/FY2021).

Small increases across stationary energy and fugitive emissions during the quarter are offset by the ongoing decreases in the electricity sector and the effects of COVID-19 lockdowns on transport emissions.



**Figure 4: Total Emissions by quarter, Sep 2005 to Sep 2021**



### 2.1.2 The renewable energy revolution is gaining momentum

Emissions from the electricity sector continue to fall. For Q1/FY2022 Australian's electricity emissions were calculated at 40.4 tCO<sub>2</sub>-e<sup>1</sup>, a decrease of 2.7% compared to Q4/FY2021 and a 4.7% decrease compared to Q1/FY2021.

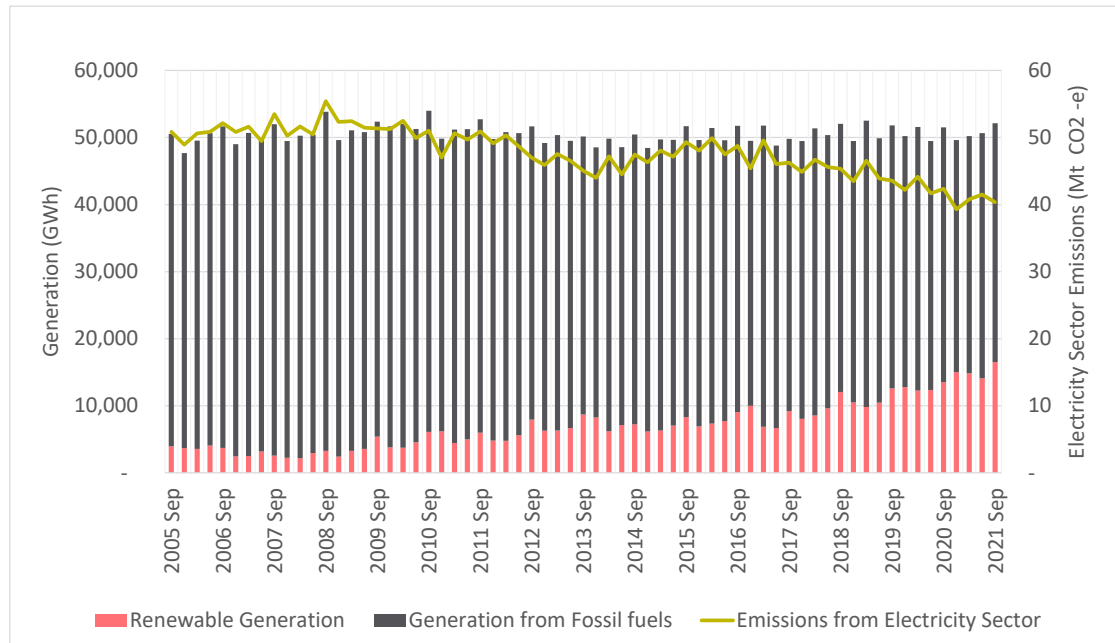
The steady decline in emissions from electricity generation is driven by the increasing penetration of renewables in the grid. Quarterly results for the NEM showed a renewable energy market share of 31.7% for Q1/FY2022 (including rooftop solar), this is an increase of 1.7% on Q3/FY2021, exceeding the quarter the year prior (Q4/FY2020) by 2.8%.

The accelerating shift to renewable energy sources is being supported by state policies such as Renewable Energy Zones in Victoria and NSW, 'RenewablesSA' in South Australia, and ambitious jurisdictional targets such as 100% renewables in the ACT.

<sup>1</sup> Actual emissions for the September quarter 2021. Quarterly Update of Australia's National Greenhouse Gas Inventory.



**Figure 5: Increasing renewable generation and reducing electricity emissions**



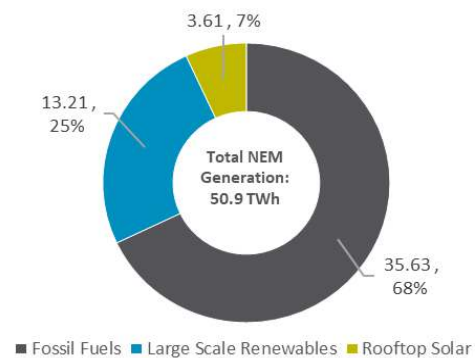
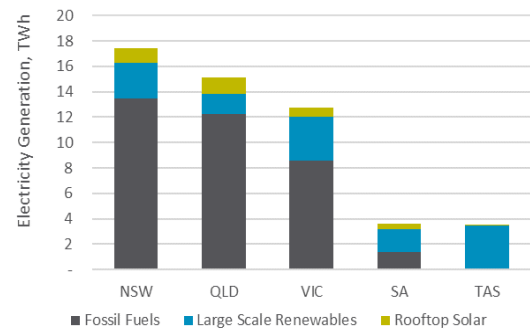
### An overview of NEM and WEM performance

- Renewable energy generation penetration for the September 2021 quarter was:
  - 31.7% for the NEM states (NSW, VIC, QLD, ACT, TAS and SA). This is a 3.9% increase from Q4/FY2021.
  - 29.3% for the WEM (WA) through the Southwest Interconnected system (SWIS), representing an increase of 6% on Q4/FY2021.
- Compared to same quarter from the previous year:
  - Black and brown coal generation in the NEM decreased by 3% and 4%, respectively.
  - Generation from natural gas in the NEM experienced a 25% drop.
  - Total Aggregated generation from fossil fuel sources decreased by 2.6% in the NEM.
  - Including rooftop solar, electricity generation from renewable sources in the WEM increased 26% while total Aggregated generation from fossil declined by 5.4%.

For Q4/FY2021, results for the NEM states are as follows:

- **NSW** generated 17.46 TWh of electricity with 75.1% from black coal, 2.1% from gas and 22.8% from renewable sources including wind, hydro, utility scale solar and rooftop solar.
- **QLD** generated 15.14 TWh of electricity with 73.3% from black coal, 7.5% from gas and 18.6% from renewable sources including utility-scale solar, rooftop solar, wind and a small portion of hydro energy. QLD's gas usage for electricity generation has decreased by 2.7% compared to the Q4/FY2021.
- **VIC** generated 12.73 TWh of electricity with 64.5% from brown coal, 2.6% from gas and 32.8% from renewable sources including wind, hydro, rooftop solar and utility-scale solar. VIC's renewable energy penetration increased by 4.5% on the previous quarter.
- **SA** generated 3.59 TWh of electricity with 38.0% from gas and 62.0% from renewable sources such as wind, rooftop solar, utility scale solar and battery (discharge). SA's renewable energy penetration has fallen 16.3% on last quarter. Solar rooftop penetration in SA is the largest among the states, with 12% of the SA's grid-mix share.

**Figure 6: Electricity market generation in the NEM**



- **TAS** generated 3.54 TWh of electricity with 100% of generation from renewable sources.

The increasing expansion of renewable energy in the grid is also noted across the Wholesale Electricity Market (WEM) through the Southwest Interconnected system (SWIS).

- **WA** generated 5.0 TWh of electricity during Q4/FY2021 with 29.3% from renewable sources such as solar (including rooftop), wind and biogas. Black coal share fell by 0.3% compared to Q4/FY2021.

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### 2.1.3 COVID-19 slashes transport emissions while stationary energy shows signs of recovery

Together, stationary energy and transport account for more emissions than the electricity sector. Quarterly projections of stationary energy resulted in 26.8 Mt CO<sub>2</sub>-e for Q1/FY2022. This is 3.5% more than the previous quarter (Q4/FY2021) but 2% below the same quarter the year prior (Q1/FY2021). Quarterly fluctuations are affected by the growth in commodity exports, particularly Thermal coal, LPG, refinery products and LNG (Figure 10).

Continuous increases in stationary sector emissions up to late 2019 is evident in the year-to-September graph (Figure 8). The emissions decline experienced by this sector since early 2020 has been driven by international market prices. Stationary emissions are expected to bounce back to a growth trend as the coal and LNG benchmark prices continue to surge in future quarters (Figure 10).

Quarterly emissions from transport (fuels in transportation by road, rail, and domestic aviation and shipping) for Q1/FY2022, are expected to be 22.1 Mt CO<sub>2</sub>-e. This is 8% less than Q4/FY2021 but 4.4% more than Q1/FY2021. Although movement of goods and passengers was affected during the period by the COVID-19 outbreaks, the year-to-September 2021 data shows signs of an upward trend when compared to the year-to-September 2020 (Figure 8).

As shown in Figure 7, emissions from the transport sector had a steady upward trend since 2005 until Q3/FY2020, when restrictions were imposed due to the pandemic. Transport emissions are expected to bounce back to a growth trend for Q2/FY2022 as international and state border restrictions continue to ease, an upward resurgence can be seen in Figure 7.



Figure 7: Stationary and Transport emissions by quarter, Sep 2005 to Sep 2021

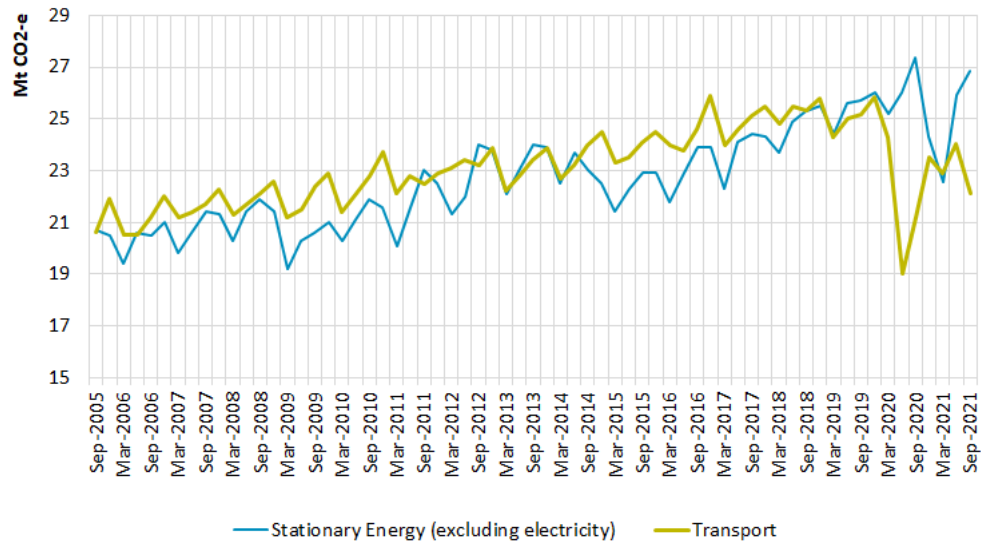
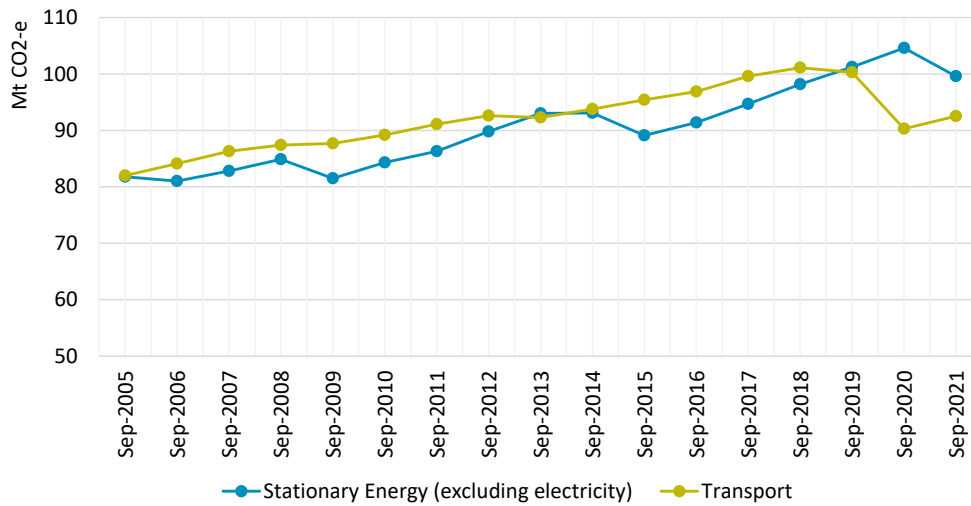


Figure 8: Stationary and Transport emissions annual results. Year-to-September



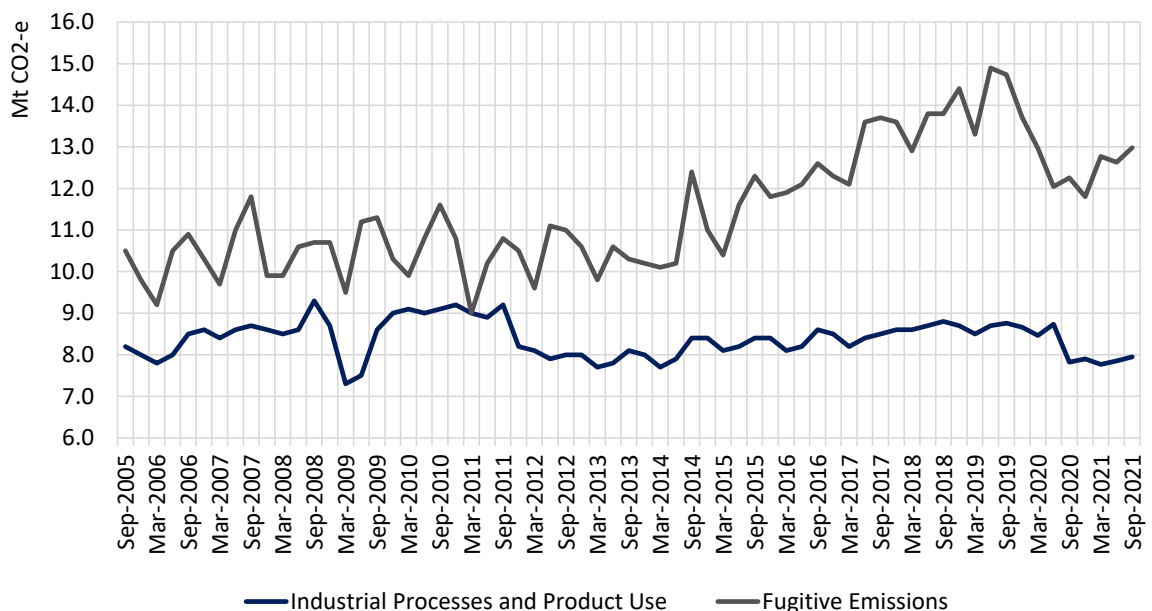
#### 2.1.4 Commodity demand drives up industrial and fugitive emissions

For the September 2021 quarter, emissions from Industrial processes, including fugitive emissions, showed a slight increase compared to Q4/FY2021. It is projected that fugitive emissions for Q1/FY2022 will reach the 13Mt CO<sub>2</sub>-e mark while emissions from industrial processes will reach 7.95Mt CO<sub>2</sub>-e. This is a 2.8% and 1.2% increase on Q4/FY2021, respectively.

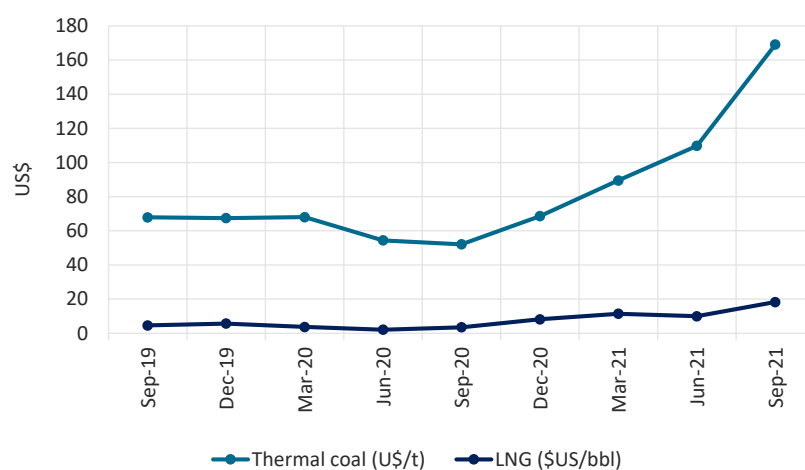
Q1/FY2022 fugitive and industrial emissions are expected exceed Q1/FY2021 by 5.9% and 1.6%, respectively. The recovery for the quarter is highly influenced by the increasing thermal coal demand from the European and Chinese markets as the northern hemisphere winter approaches. Q1/FY2022 thermal coal and LNG unit exports increased by 16% each on the same quarter the year prior.

Coal exports and associated emissions are expected to rebound as demand from China and India increases. The international Energy Agency estimates that global coal production will reach its highest ever levels in 2022. Early evidence can be seen not only in the increase in emissions but also in the sharp rise in commodity prices since last quarter (Figure 10).

**Figure 9: Emissions from fugitive and industrial processes by quarter, Sep 2005 to Sep 2021**

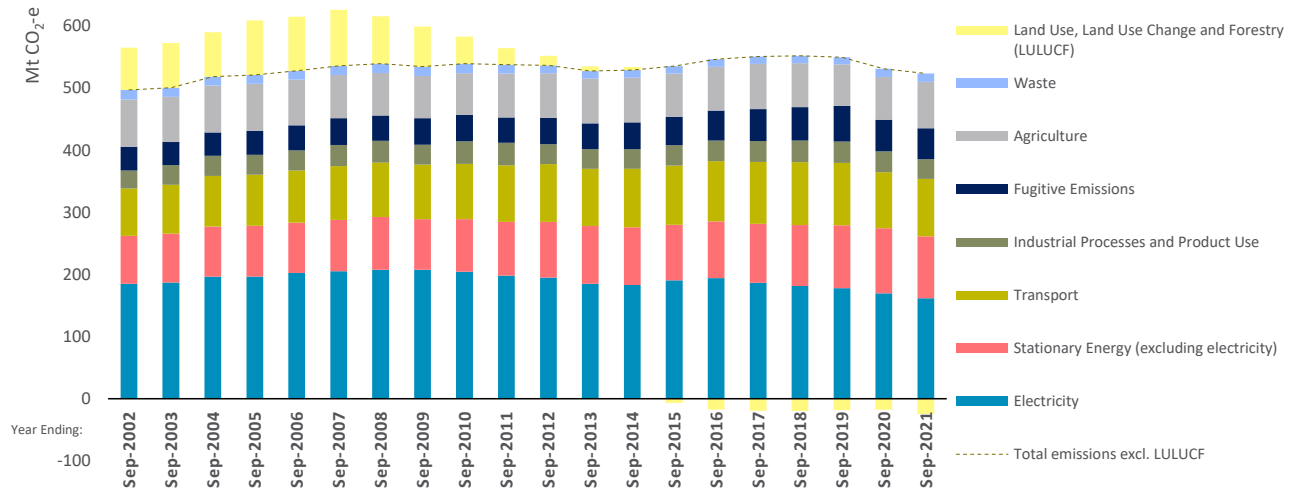


**Figure 10: Thermal coal and LNG Average Benchmark Prices by quarters, Sep-19 to Sep 2021**

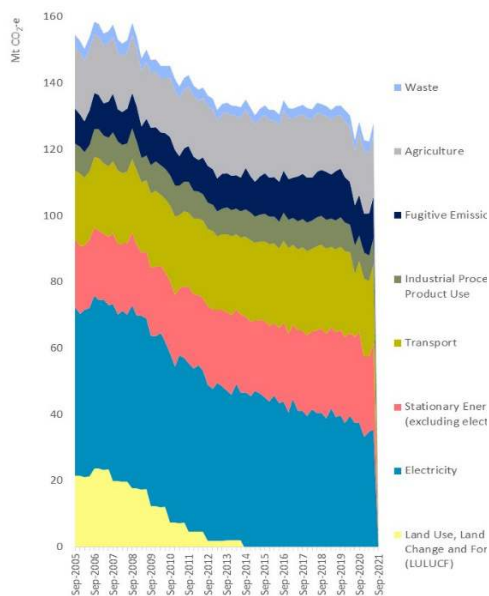




**Figure 1: Australia's annual emissions by sector, year to September 2021**

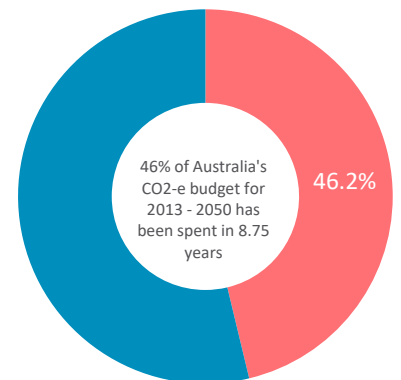


**Figure 2: Australia's quarterly emissions by sector\***



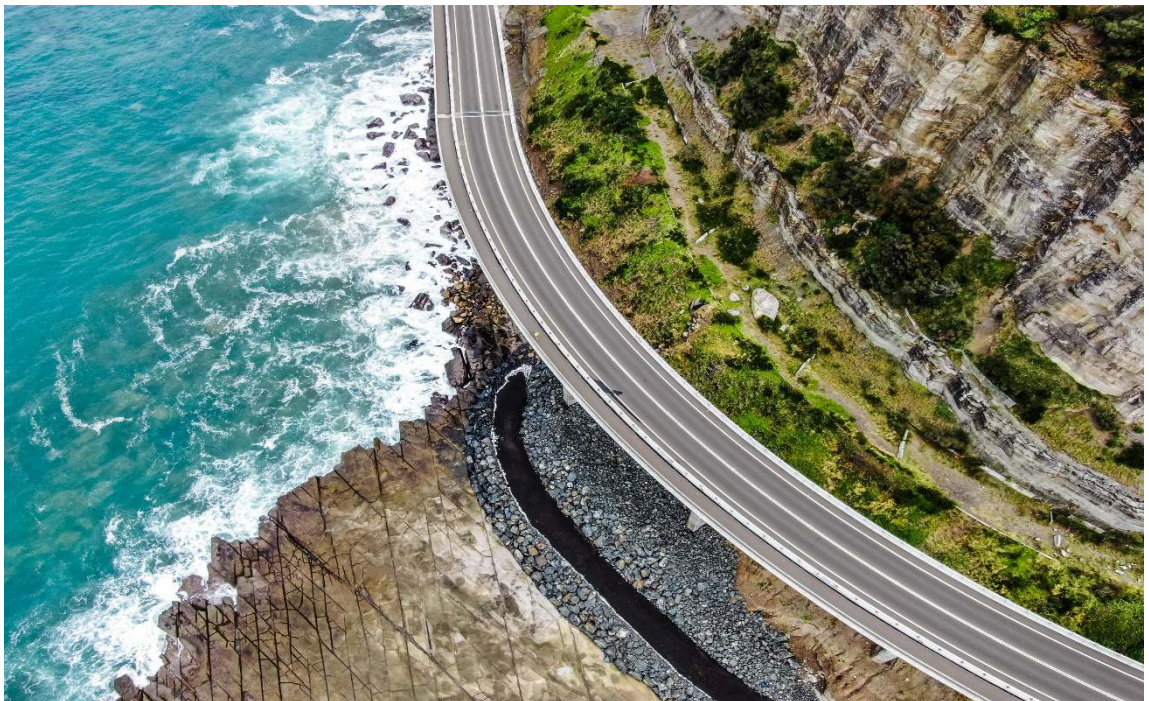
\*Negative LULUCF sector emissions cannot be seen on the above chart

**Figure 3: 2-Degree budget expenditure to date**



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This report has been compiled by Ndeivr Environmental Pty Ltd, using the latest information available from: AEMO, Office of the Chief Economist, Australian Petroleum Statistics, Australia Resources and Energy quarterly and historical reports 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) and South West Interconnected System (SWIS) are sourced from Open NEM.

GDP trends are sourced from Trading Economics, information about Australian car use is sourced from the National Transport Commission, 2020 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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