



Northern Territory Low Emission Carbon Capture Storage and Utilisation Hub

An overview of the Northern Territory's economy, industry and emissions

CSIRO has reviewed the Northern Territory's economy and future growth ambitions, key industrial activities, and historical greenhouse gas emissions.

This report has been delivered as part of the Northern Territory Low Emission Carbon Capture Storage and Utilisation (CCUS) Hub Business Case project.

The report builds understanding of the both current state of the Northern Territory's economy and its historical economic performance; the influence of key industrial sectors in the economy; historical emissions; and possible future emissions avoidance and abatement scenarios through to 2050.

The low-emission opportunity in the Northern Territory

The Northern Territory's abundant natural gas, solar resources, and CO₂ storage potential, along with its proximity to international markets, make it a key player in energy exports and decarbonisation in Australia and the region.

The NT Government has adopted a 2050 net-zero emissions target and is seeking ways to rapidly decarbonise existing energy supplies and attract future zero-emission industries.

Capital city Darwin, a gateway to South-East Asia and the location of globally significant liquid natural gas (LNG) export and industrial activity, is the proposed site for a large-scale Low Emission CCUS Hub. Led by CSIRO, a collaboration is underway on a business case project assessing the Hub's viability on the Middle Arm Peninsula.

If realised, the NT CCUS Hub could be one of the world's largest multi-user, multi-access hubs. One of the aims of the business case project is to identify transition pathways for industry in the region by sharing knowledge and experience that will help improve the likelihood of success. By taking a collaborative and regional view, an accelerated and sustainable industry transition can be explored.

The Northern Territory CCUS business case project

- CSIRO is working to identify decarbonisation and transition pathways for existing and potential future industries that may be established in a Low Emissions Hub in the Darwin region of the NT.
- We are working collaboratively with the NT Government and industry on the business case project to assess the viability of a large-scale low-emission CCUS Hub on the Middle Arm of Darwin Harbour.
- This project is also investigating other decarbonisation opportunities as well as CCUS including sector coupling and renewable electrification.
- Task 1 of this project was a report providing a snapshot of the NT's economy, industry and emissions; and an analysis of the magnitude of avoidance and abatement technologies required to enable emissions reduction from current and future industry development.
- The report provides useful framing and context for the other task reports associated with the NT Low Emissions Hub business case project.

Building an understanding of the NT's economy, industry and emissions

The NT Government has set an objective of reducing emissions to net zero by 2050, while also growing the NT economy to \$40 billion by 2030.

Achieving these dual objectives first requires a thorough understanding of the NT's current and historical economic performance, industry and emissions. This CSIRO report aims to provide this understanding to a general audience and support informed decision making.

Throughout the report, researchers have used data that is publicly available.

The Northern Territory is a small, open economy, representing just 1.3% of Australia's Gross Domestic Product (GDP). This is roughly in proportion to the NT's share of the total population.

The economy is dominated by natural resource production, including mineral mining and oil and gas, both onshore and offshore. Other major contributors to the economy include the public sector and the defence forces.

In 2022-23, activities in the Northern Territory emitted around 3% of Australia's total greenhouse gas emissions. The 16.7 Mt of CO₂-e emissions for that year were reported as originating from five sectors: energy; industrial processes and product use; agriculture; land use, land change and forestry and waste.

Key findings

The Northern Territory Government's aspiration to reach a \$40 billion economy by 2030 will require compound annual growth of 5.6% p.a., significantly above historical average growth of 3.7% p.a since 2014.

Meeting the government's economic and emissions trajectory targets will require investment in established sectors such as mining and energy, and will also require the development of new industries. This will need to occur whilst materially reducing interim and long-term emissions.

The proposed Middle Arm Sustainable Development Precinct (MASDP) been identified as a prospective location for such industries to be established.

For this report, researchers developed two scenarios to forecast emissions and avoidance and abatement alternatives.

- The NT Base Scenario, which includes only the operation of approved projects.
- The NT Reference Scenario, which includes both the MASDP 'Balanced Scenario' developments and future mining and energy developments.

The Scenario models for each of the avoidance and abatement technologies show that no single emission reduction technology can achieve rapid decarbonisation of point source emissions in the NT.

Rather, a combination of approaches, including renewable electrification, hydrogen, and CCUS, will be required to reduce emissions as the economy expands.

NT BASE SCENARIO – COMBINED AVOIDANCE AND ABATEMENT

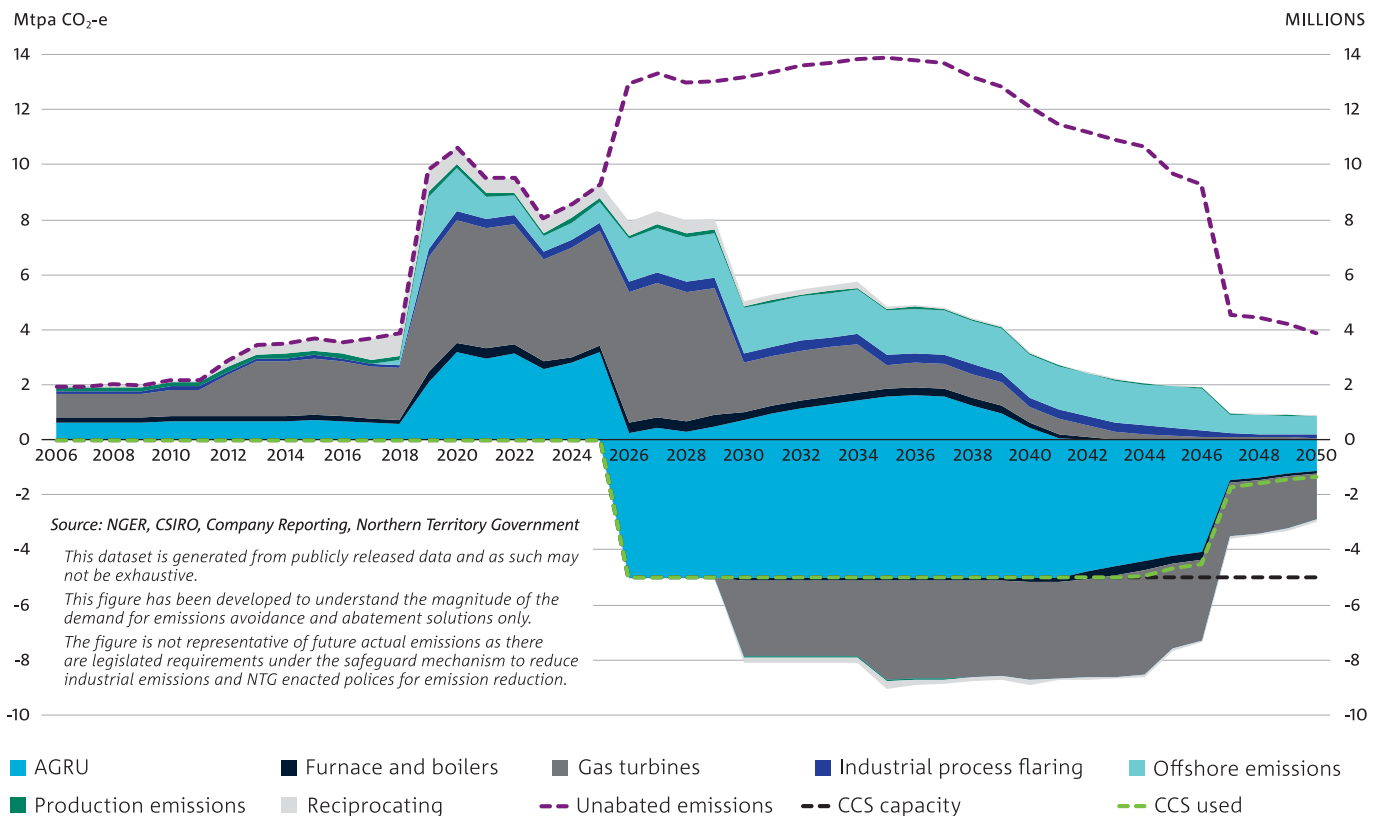


Figure 1: Emissions outlook with all abatement options – NT Base Scenario (Source: NGER, CSIRO, Company Reporting, Northern Territory Government)

NT REFERENCE SCENARIO – COMBINED AVOIDANCE AND ABATEMENT

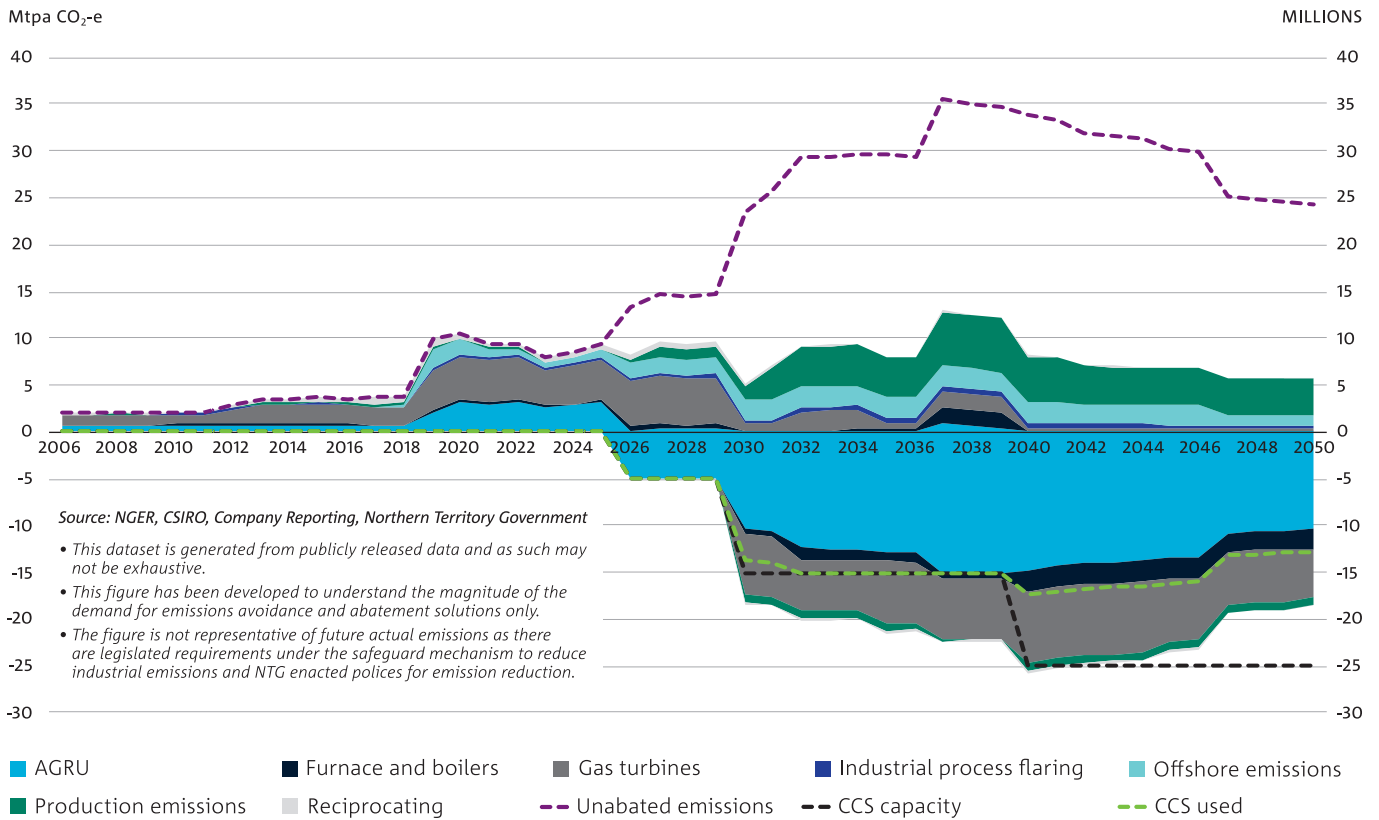


Figure 2: Emissions outlook with all abatement options – NT Reference Scenario (Source: NGER, CSIRO, Company Reporting, Northern Territory Government)

The analysis modelled two scenarios (above and previous page). In both cases emissions were modelled to identify the magnitude of need for emission reduction technologies including renewable electricity, low emission fuels (hydrogen) and CCUS (mitigation and abatement) out to 2050. These emissions will not be realised as the Federal Government’s Safeguard Mechanism and other regulations would not allow such emissions to occur.

Under the base scenario, the demand for emission reduction requirement peaks in the mid-2030s at 14 million tonnes per year (Mtpa) of carbon dioxide equivalent (CO₂-e), and by 2050 there are residual emissions of around one Mtpa of CO₂-e.

Under the NT reference scenario, the emissions reduction requirement also peaks in the mid-2030s at 35 Mtpa CO₂-e, and by 2050 there are residual emissions of around 6 Mtpa CO₂-e.

In both cases no use of offsets was assumed, and no assumptions about the role of emerging technologies such as direct air capture were made.

The CCUS business case project includes inputs from the wider Northern Territory Low Emissions Hub (NT LEH) collaboration group, whose current members include the Northern Territory Government, Xodus, INPEX, Santos, Woodside Energy, Eni, Total Energies, SK E&S and Tamboran Resources. CSIRO has sought feedback from government and industry on the technical content of the report, CSIRO has sole discretion on including such feedback.

More information

[Read the report](#)

Learn more about the [NT Low Emission Hub Research](#)

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