



## Northern Territory Low Emission Carbon Capture Storage and Utilisation Hub

# International hub examples

CSIRO has provided a summary of selected low emission hub developments to identify key learnings that could be applied to future NT CCUS hub development.

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

It provides insights from international CCUS hub experiences, offering valuable learnings for the development of similar initiatives in Australia and the Northern Territory.

The report combines publicly available data with findings from CSIRO interviews with hub proponents, participants and policy makers in other jurisdictions.

### The low-emission opportunity in the Northern Territory

The Northern Territory's abundant natural gas, solar resources, and CO<sub>2</sub> 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. These include including sector coupling and renewable electrification.
- Task 4 of this project was to provide an overview of international CCUS projects, and a review of selected low emission hubs – with an emphasis on European examples.
- The report presents a number of key learnings applicable to Australia, including the need for long-term government visions, the importance of collaboration, and the role of a hub co-ordinating body.

### International learnings

Over the past decade, the number of CCS projects worldwide that are in construction or development has significantly increased. In regions where there is a strong geographic cluster of capture facilities, CCUS hubs have emerged as a key focus.

Various hub models are being pursued. Examining the key drivers of success and failure for these developments can help inform and guide best practice for establishing a similar hub in Australia.

The report highlights critical insights into which approaches have worked and which have not. Factors such as policy, legislation, regulation, investment, long-term vision and governance all play a significant role and warrant careful consideration.

Particular emphasis is placed on European hub examples, which typically involve close collaboration between government and industry. These examples are well documented and provide valuable lessons for the Australian context.

In addition to the synthesis of publicly available information, the report includes summarised results of CSIRO interviews with hub proponents, participants and policy makers in these jurisdictions. These revealed unique perspectives and information that otherwise would not have been disclosed, offering a deeper understanding of the learnings that can be obtained from these developments.

## Key considerations

The report identifies eight key learnings that could be applied to CCUS hubs in Australia and the Northern Territory.

### The emergence of CCUS hubs

CCUS hubs model mitigate the risks associated with single source and single sink models. While hubs still require anchor emitters, the inclusion of multiple emitters and in some cases multiple sinks, enables phased development and larger CO<sub>2</sub> storage volumes.

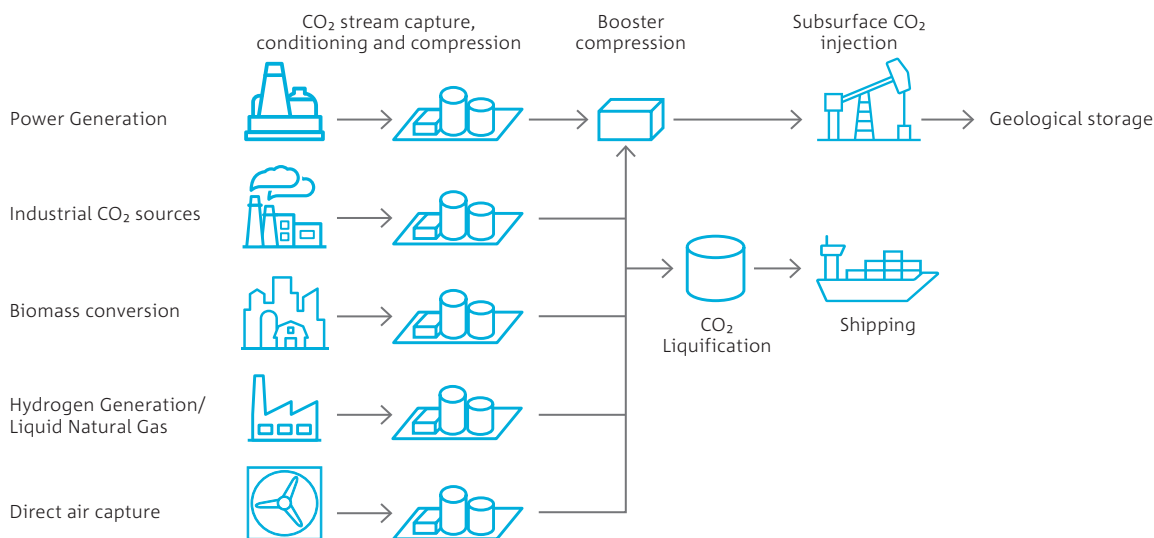


Figure 1: Simplified low emission hub or cluster model

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.

### A long-term vision

Many individual countries as well as the European Union emphasise the role of CCUS hubs in long-term emissions reduction strategies, providing clear market signals for future capacity and negative emissions goals.

### Building on prior work

CCUS hubs often evolve from prior studies, adapting business models and expanding in scale to enable their implementation and operation.

### Reducing business model uncertainty

Government support – via direct funding, tax incentives, and regulation – provides certainty and enables risk reduction to allow private sector investment. To unlock private investment having certainty on return on investment is critical.

### The role of the coordinating body

A single representative organisation – either a joint venture, or government company – is key to successful management of a CCUS hub and can help integrate research expertise, minimise risk, build public trust and develop future work force capacities.

### Collaboration is critical

Effective collaboration that supports alignment of goals, cost reduction, and knowledge sharing is essential across the complex activities of design, development and deployment of low emissions hubs and clusters – no matter their geographical location.

## More information

[Read the report](#)

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

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