



Australian Government
**Department of Industry,
Innovation and Science**

Carbon Capture & Storage

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Carbon Capture and Storage

- **Has aligned with global trend of CCS Development.**
- **Australia's current focus for CCS**
 - Improving knowledge base of Australia's CCS resources - storage
 - Demonstrate domestic CCS capacities and capabilities
 - Reducing cost
 - Strategic Partnering
 - Building Australian skills and capacity
- Australian Government commitment of approximately AUD 590 million to a range of low emission technology activities including CCS.
- Supported by Energy White Paper 2015. Primarily grant based support.
- Industry support: significant co-funding and recent CCS Roadmap.

Australia: Major CCS Projects

- **CarbonNet:**

- Feasibility of commercial scale CCS; project investigating full end-to-end CCS chain
- Kawasaki Heavy Industries (KHI) has noted interest in partnering with CarbonNet

- **Callide:**

- Government of Japan – Australian industry collaboration
- World first oxyfuel combustion pairing with carbon capture in March 2015
- J-POWER significant project partner

- **Gorgon:**

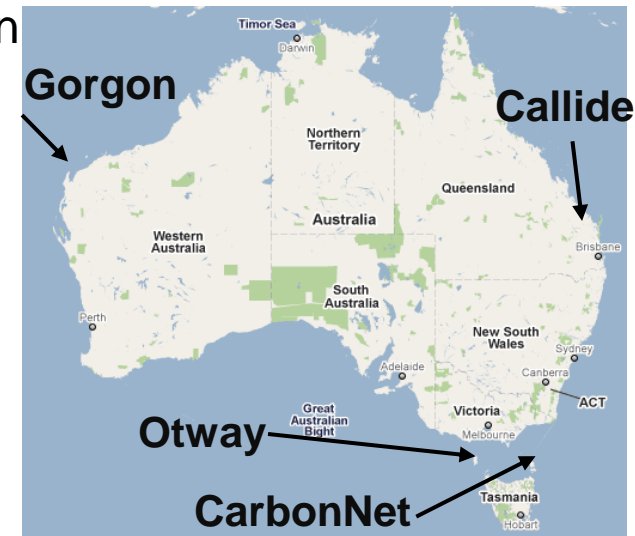
- Set to be world's largest commercial scale CCS project
- Reduce Gorgon's GHG by 40%

- **Otway:**

- World class CO₂ injection testing facility
- Internationally significant contribution to CO₂ storage science and engineering

- **CCS RD&D:**

- New AUD 25 million Programme supporting CO₂ storage and RD&D.



CCS Research Development & Demonstration Fund

Launched in August 2016 with a total grant of \$23.7 million, and dollar-for-dollar matched investments by grant recipients.

Seven CCS projects selected:

1. Glencore Carbon Transport and Storage Company's (CTSCO) Integrated Surat Basin CCS Project
2. The Northern Australia CO₂ Store
3. Australian Subsurface Carbon Sequestration Simulator
4. In situ laboratory to de-risk commercial deployment of carbon storage
5. Emissions study with IHI's PCC pilot plant at AGL Loy Yang power station
6. Improving safety and efficiency of CO₂ pipelines
7. University of Queensland Surat Deep Aquifer Appraisal Project



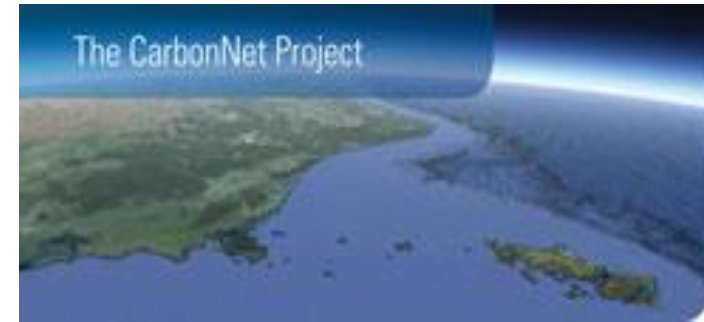
Gorgon CO₂ Injection Project

- Operated by Chevron Australia Pty Ltd and fully integrated into the Gorgon LNG Project.
- The Australian Government has committed \$60 million under Low Emissions Technology Development Fund
- The project plans to inject 100 Mt CO₂ at rates of 3.5 ~ 4 Mt CO₂/year into the Dupuy Formation saline aquifer under Barrow Island
- It will reduce emissions from the Gorgon LNG Project by approximately 40 percent.
- CO₂ injection is planned to start in mid-2018



CarbonNet Project

- Australian Government has committed \$95.2 million
- The project will bring together multiple CO₂ capture projects in Victoria's Latrobe Valley, transporting CO₂ via a shared pipeline and injecting it into offshore storage sites in the Gippsland region
- Injection rate is expected to be from 1 to 5 Mtpa over 25 years
- Prioritised storage site (an anticline or dome structure) is located approximately 4km offshore, and expected to have a capacity of at least 125 Mt
- The project has progressed to Stage Three – 'Declaration of Storage', obtain an injection license



CCS Challenges to date in Australia

- Economic barriers to the commercialisation of CCS include high cost of deployment and lack of incentives for investment
- Social barriers in terms of enhancing the public and political perception and understanding of CCS
 - Not just the power sector
- Addressing skills and workforce needs
- Continual development of policy, legislation and regulation as technology is deployed.
- Focus is still on CCS not CCUS – realistic opportunity?

CEFC mandate change to include CCS

What it seeks to do

- The Clean Energy Finance Corporation (CEFC)
 - \$10 billion fund to increase finance into Australian based renewable energy, energy efficiency and low emissions technologies.
 - invested more than \$3.3 billion in eligible clean energy projects,(total project value of \$8.3 billion).
 - delivering a positive return for the taxpayer.
- 31 May 2017 – Federal legislation amendment introduced to remove prohibition of CCS in CEFC Mandate.
 - Status: House of Representatives
 - Will provide a significant signal of support and reduce risk for potential investors
 - Technology neutral approach. Complements other low emissions investment by the Federal Government.

Recent domestic activities that impact on CCS

- **A Roadmap for CCS – February 2017**
 - Centred on energy security & need for CCS across industry in a low carbon economy
- **CO2CRC Retrofit Studies – March/April 2017**
 - Insight into coal and gas costs and opportunities noting ageing fleet.
- **Low Emissions Technologies Roadmap – CSIRO – June 2017**
 - Highlights areas of potential growth in Australia's clean technology sector
 - map development of new emissions reduction technologies
 - identify opportunities to be part of future global energy supply chains.
- **Finkel Review – June 2017**
 - National reform blueprint to maintain energy security and reliability in the National Electricity Market
 - Federal Government Response to come. Key discussion on CET, EIS, Lifetime limits on Generators.
- **Climate Review – due by end 2017**
 - Review climate change policies to take stock of Australia's progress in reducing emissions
 - Ensure policies remain effective in achieving Australia's 2030 target & Paris commitments.

Where to from here?

- **Drivers of energy security, affordability and international commitments.**
- **2017**
 - Year of review, engagement and policy development.
- **2018 and onwards**
 - Implementation of outcomes of the reviews
 - Where does CCS sit in this context? Immediate needs/long term ambitions.
- Maximise benefits from current project portfolio.
- Ongoing bilateral and multilateral engagement
 - Mission Innovation – CCS Challenge – initially Texas September 2017
 - Australia-China Joint Co-ordination Group on Clean Coal Technology - Xian, China September 2017
 - Carbon Sequestration Leadership Forum – Hosting in Melbourne in October 2018
 - GHGT-14 Conference - Hosting in Melbourne October 2018

Thank you