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# Australia – Korea Closed Carbon Loop

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# Agenda

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# Why entertain this idea?

## Emissions Reduction Targets

- Australia:
  - 2030: a 26–28% reduction of greenhouse gas emissions below 2005 levels – with the Labor Government proposing to increase this to 43% on 2005 levels; and
  - 2050: Net Zero
- Korea:
  - 2030: a 40% reduction in emissions compared to 2018 levels; and
  - 2050: Net Zero

## Incentives to reduce industrial emissions

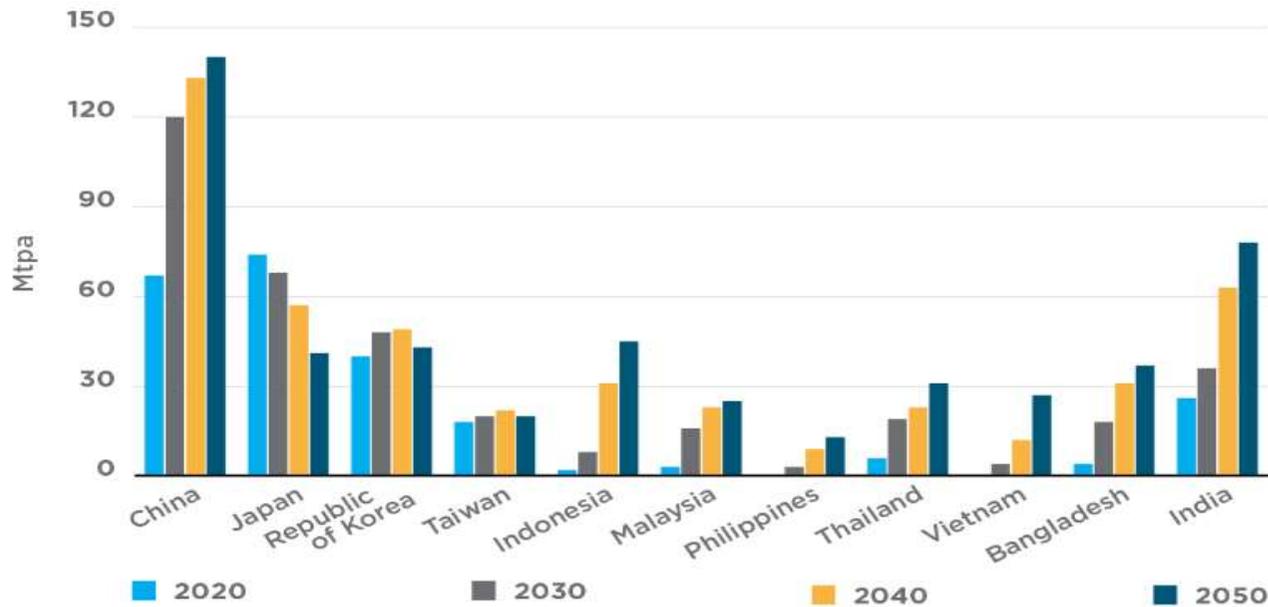
- Australia: Safeguard Mechanism under the NGERs scheme.
- Korea: Greenhouse gas emissions allocation system and national cap-and-trade system.



# Why entertain this idea?

- Australia needs to export LNG – it's worth \$30.5 billion to our economy p.a.
- Korea needs to import LNG – it makes up 17% of its domestic energy with very limited domestic supply.
- LNG will be an important transition fuel as we move toward renewable energy, although its green credentials need to be improved.
- Australia's largest LNG producers have their own targets: Shell, Chevron, Woodside and Santos all want to achieve net zero by at least 2050, with emerging scope 3 reduction targets.

Figure 7: Forecasted LNG demand for the 11 identified high potential markets by decade to 2050. Source: Wood Mackenzie (December 2021)



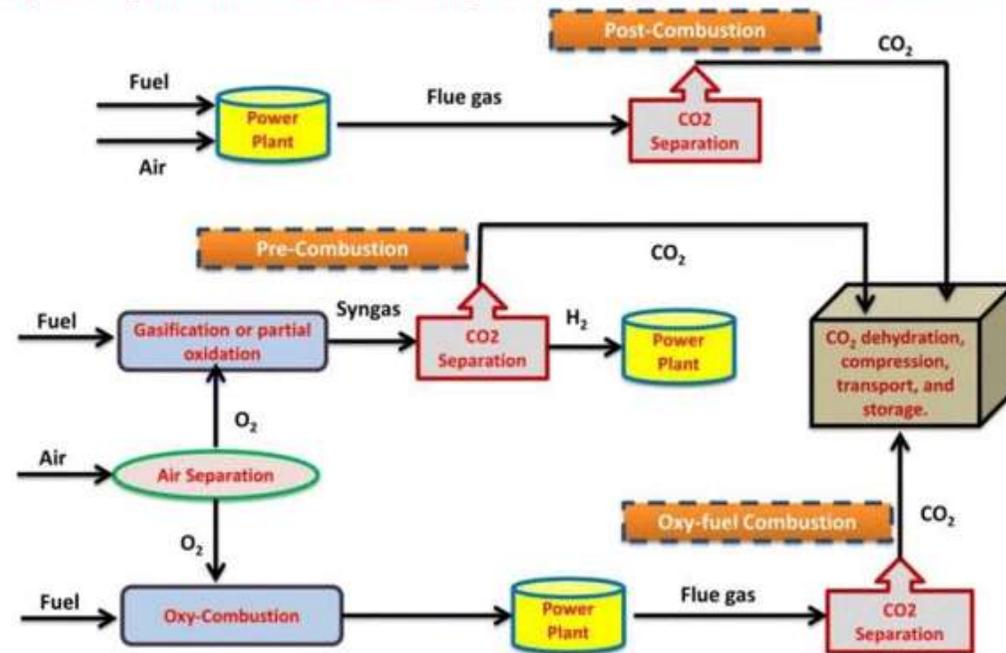
<https://www.industry.gov.au/data-and-publications/global-resources-strategy-commodity-report-liquefied-natural-gas/the-australian-lng-industry>

# Could it be feasible?

From: Carbon capture and sequestration in power generation: review of impacts and opportunities for water sustainability

There are some hurdles to feasibility:

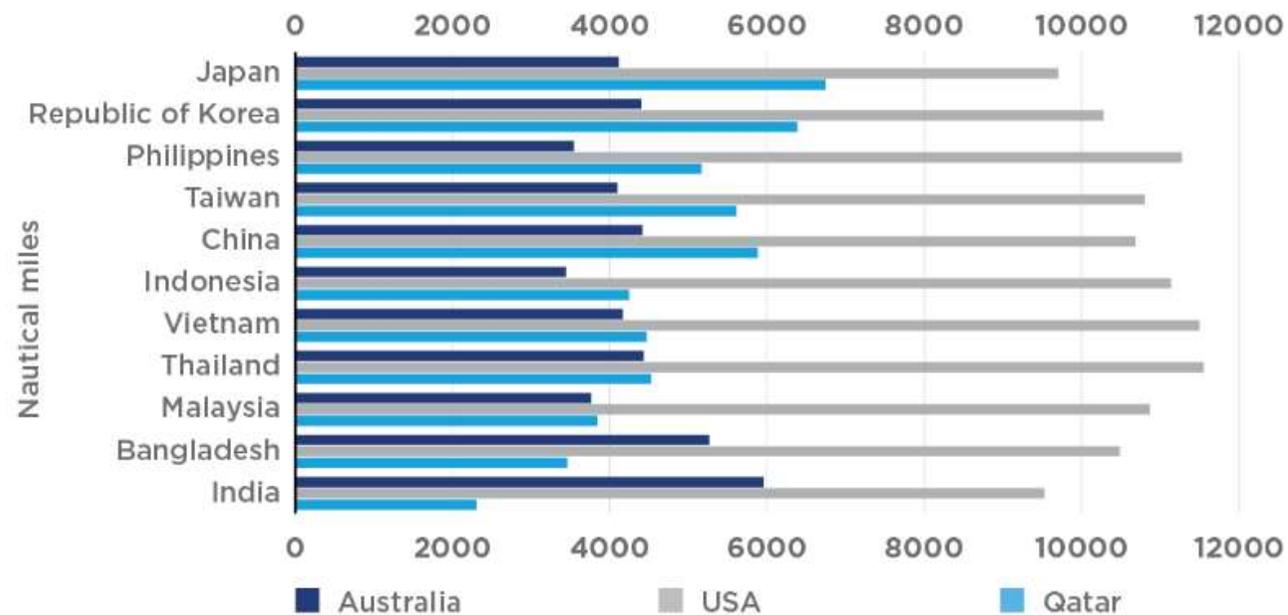
- Technical difficulties around capture:
  - Water usage
  - Efficiency
  - Additional energy consumption
- Short term storage capacity and transport to the out-loading port.



# Could it be feasible?

- Marginal economics - distance and shipping cost
- Shipping has lower CAPEX but higher OPEX as opposed to pipelines
- Dual use LNG and Co2 carriers greatly improve the economics

Figure 6: Average LNG shipping distance between the 3 major LNG exporters and identified high potential Asian markets.  
Source: Wood Mackenzie (December 2021)



<https://www.industry.gov.au/data-and-publications/global-resources-strategy-commodity-report-liquefied-natural-gas/the-australian-lng-industry>

# Some legal hurdles and considerations

## London Protocol

- Article 6 of the London Protocol prohibits the shipping of Co2 across international borders for permanent storage below the seabed.
- A 2009 amendment to the London Protocol which would allow for the export of Co2 for permanent storage provided that the shipping country and receiving country are party to an agreement to manage:
  - the allocation of permitting responsibilities under the London Protocol and applicable international law; and
  - if one of the contracting parties is not party to the London Protocol, then the agreement must contain terms at least equivalent to the London Protocol.
- The provisional application of the 2009 amendment to Article 6 of the London Protocol means that two or more countries can agree to export CO2 for geological storage. They must:
  - deposit a formal declaration of a provisional application with the Secretary-General of the International Maritime Organization; and
  - provide copies of the agreement struck between the parties for the transport of the CO2 in compliance with the Protocol.

## KAFTA

- Article 18.4: Trade Favouring Environment: *Each Party shall endeavour to facilitate and promote trade and investment in environmental goods and services, including environmental technologies, sustainable renewable energy, and energy efficient goods and services, including through addressing related non-tariff barriers.*

# Some legal hurdles and considerations

## CCUS Reservoir Tenure

- There is a lack of consistent CCUS legislation across Australia.
- Conversion of an existing petroleum reservoir into a CCUS storage facility is not as simple as it may seem. Only the Commonwealth and Victorian petroleum legislation allows for the smooth transition from a petroleum production licence or retention lease into a GHG injection licence or holding lease (respectively).
- In December 2021 the Commonwealth Government released five acreage areas for offshore greenhouse gas storage exploration off the coast of WA and the NT. Bids closed on 10 March 2022.

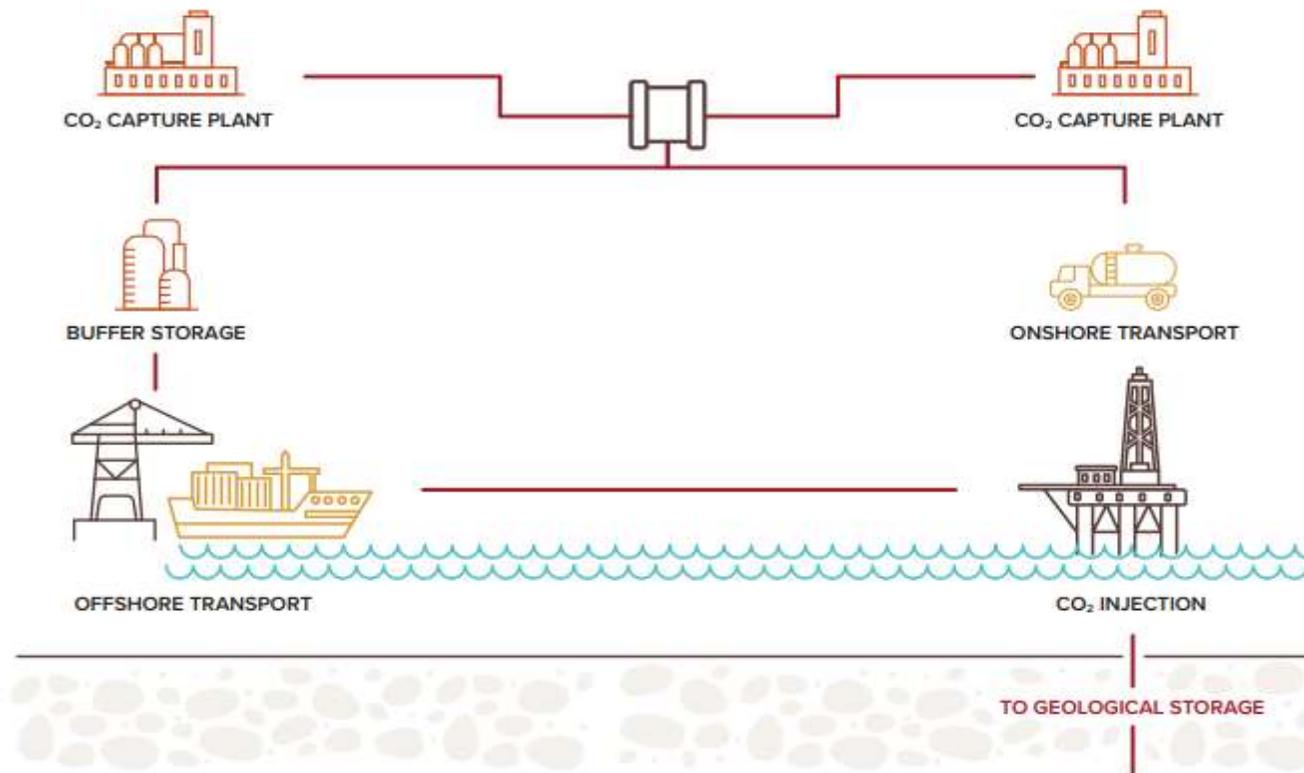
## Grant Schemes

- Commonwealth \$250 million CCUS Hubs and Technologies grant program to support adoption of commercial CCUS:
  - The technologies stream will help fund the research, development and commercialisation of CCUS technologies and identification of viable CO<sub>2</sub> storage sites.
  - The hubs stream will help fund the design and construction of shared CCUS infrastructure between co-located CO<sub>2</sub> emitters.
- Pre-election grant scheme, which we expect to be upheld by the current Government.

# Contracting considerations

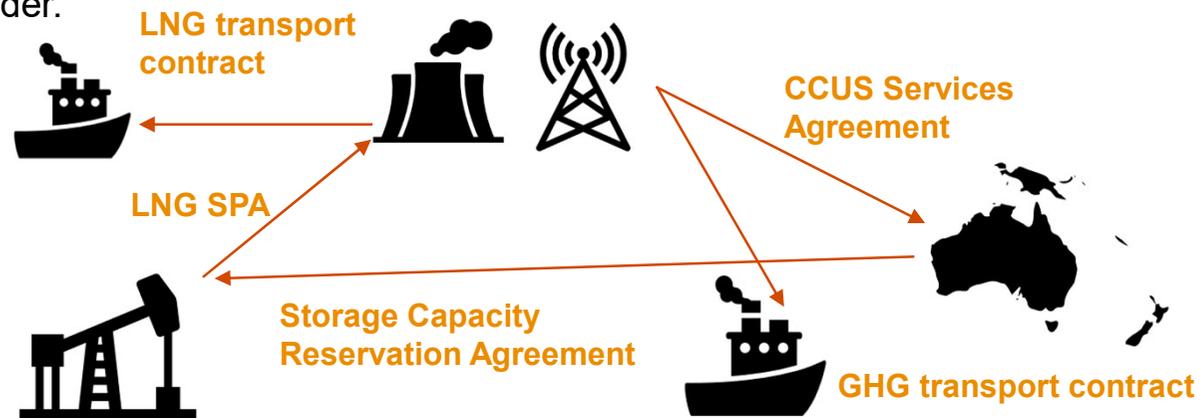
- How is risk and title in the Co2 addressed throughout the supply chain and long-term?
- CCUS legislation in Australia addresses the title holders liability for reservoir leaks.

Figure 1: Transport overview of CCS technologies



# Contracting considerations

- Pricing Net Zero LNG (scope 1 and 2) vs Green LNG (scope 1, 2 and 3)
  - Premium covers the cost of Co2 abatement for LNG production as well as the scope 3 emissions arising from its end use. This then offsets the cost of CCUS for the LNG producer; or
  - Premium only covers the cost of Co2 abatement for LNG production, the cost of abating the scope 3 emissions is addressed through a separate CCUS services agreement and tariff.
- CCUS services agreement framework:
  - Pricing is difficult to set, but is a combination of the cost of providing the CCUS facility (including the risk of leakage) and the opportunity cost of not abating the GHG (i.e. the cost of a carbon offset permit).
  - Title and risk would typically pass at the Australian receival point.
  - Multi-user facilities are likely to become the norm unless the CCUS is for project only emissions.
  - Potentially the CCUS service provider is not also the owner of the LNG production facility. There may be a tripartite arrangement between the LNG Producer, LNG Customer and the CCUS Service Provider.



# Eligibility for ACCUs

- Could the CCUS project in Australia be eligible for ACCU generation?
  - *Carbon Capture and Storage Method 2021*
  - The methodology guide states: “*The project must be carried out entirely in Australia. This includes all relevant infrastructure within the project, including capture facilities, pipelines and the storage site or sites.*”
  - ‘Within Australia’ means a project that takes place on shore, or offshore within state, territory or Commonwealth waters as defined under section 7 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.
  - **Capture Point** means any plant, building, structure or stationary equipment at which greenhouse gases:
    - (a) generated from industrial processes (including electricity generation); or
    - (b) extracted from a hydrocarbon field or basin,are captured for the purpose of permanent storage by the holder of a relevant authority in a storage site or any part of it.
  - **Relevant Authority** means the holder of an injection licence in the various Australian jurisdictions.
  - Query whether the delivery of GHG to an Australian receipt point could be regarded as “capturing” the emissions in Australia?

# Eligibility for ACCUs

$$A = (CGG - Q_{CM} - CCSE) \times 0.97$$

CGG	Means the quantity of greenhouse gases captured at the project's capture points for the reporting period during the crediting period in tonnes CO <sub>2</sub> -e.
CCSE	Means the CCS Emissions: <ul style="list-style-type: none"><li>• capture related emissions</li><li>• processing, compression and transportation emissions</li><li>• transportation and injection site fugitive emissions</li><li>• storage site monitoring emissions</li><li>• any storage site fugitive emissions in tonnes CO<sub>2</sub>-e</li><li>• any off-take of greenhouse gases for purposes other than permanent storage.</li></ul>

- There is a 3% risk of reversal discount to account for the risk that injected greenhouse gases are released from the storage site after the end of the 25 year crediting period.
- Crediting period of 25 years could be limiting if the CAPEX of the project is very high.
- ACCU's cannot be sold to generate income and also be used to offset the project emissions.

# Concluding thoughts

- International trading of GHG (and any associated carbon credits) will become necessary to provide a global solution to the global problem of climate change.
- Legal hurdles still exist, however in the next five years we expect there to be significant movement on the regulation of:
  - CCUS projects through more consistent legislation throughout Australia;
  - ACCU methodologies to address CCUS technology and various project structures as the sector evolves;
  - Adoption of the 2009 amendments to the London Protocol to allow the international transport and permanent storage of Co<sub>2</sub>;
- Commercially the economics of CCUS and a closed carbon cycle will shift and evolve as consumer demand for green energy increases and the pressure to meet net zero targets builds.
- Energy supply crisis and price spikes could reduce demand for premium “green energy” unless emissions reduction regulation in Australia and its trading partners maintains pressure on emitters to decarbonise through an effective price on carbon (in one form or another).

# Thank you

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