

Accelerating Cross-border CCS in APAC

Recommendations for Bilateral and Commercial Agreements

2024



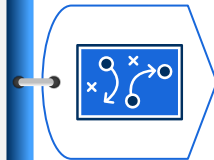
Cross-border CCS is an important pathway for APAC to decarbonize hard-to-abate sectors



- Cross-border CCS is critical for countries in Asia to **achieve their emission reduction goals** at the lowest cost



- Cross-border CCS also entails several **socio-economic benefits**, e.g. infrastructure development, job creation, technology and skills transfer, and financial incentives



- A regional approach by storage countries with a **fully integrated CCS hub** model would create access to intra-regional economic opportunities



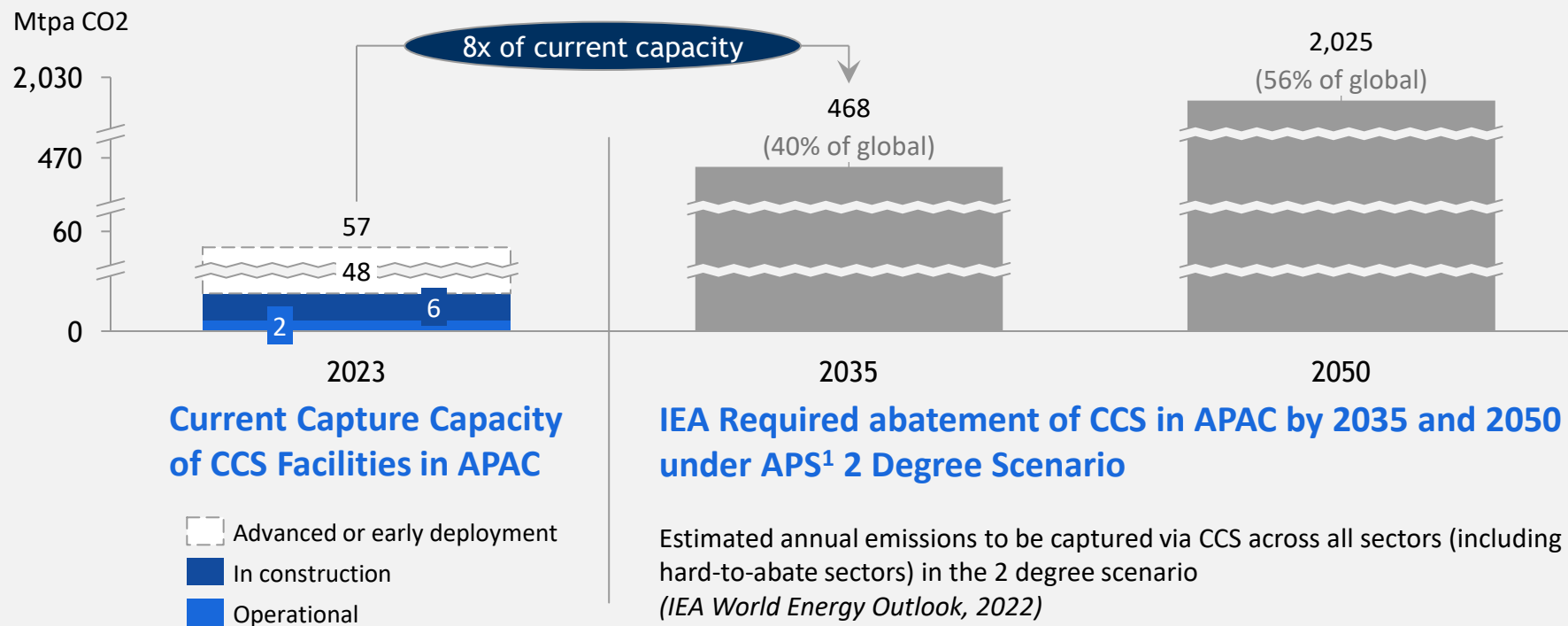
- **International climate finance** and foreign aid may provide the financial resources to support capacity development, early-stage pilot and demonstration projects



- To enable cross-border CCS, governments and private sector stakeholders need to agree on what to include in **bilateral and commercial agreements**

Urgent need for scaled-up CCS to meet abatement targets in APAC

APAC is 411 Mtpa CO₂ short of its 2035 IEA CCS abatement requirement, having achieved only 12% of the necessary reductions to meet the well under 2°C Paris Agreement target



Cross-border solutions needed to scale CCS in APAC

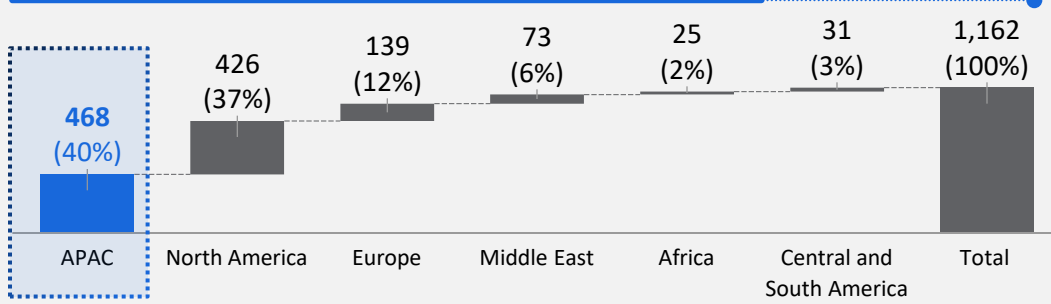
- **CCS requires significant investments**, particularly in infrastructure and transportation networks, which renders it uneconomic, especially in countries without sufficient incentive
- Countries with financial imperatives **do not have sufficient pore space** for CO₂ storage
- **Cross-border CCS provides a pathway** to meet global climate goals through collaborations between capture and storage countries including early investments in infrastructure and technology transfer, creating a foundation to scale up regional decarbonization efforts through CCS

1. Announced Pledges Scenario (<2.0°C by 2100); illustrates the extent to which announced ambitions and targets can deliver the emissions reductions needed to achieve net zero emissions by 2050.

CCS in APAC can support up to 300K jobs and add up to \$220 B in GDP annually by 2035

Employment multiplier

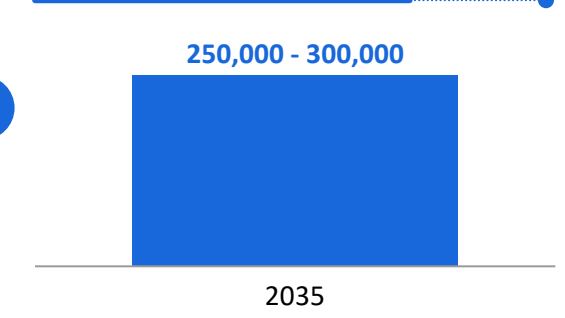
IEA required annual abatement of CCS in APAC by 2035 (Mtpa CO₂)
Announced Pledges Scenario (<1.5C by 2100)



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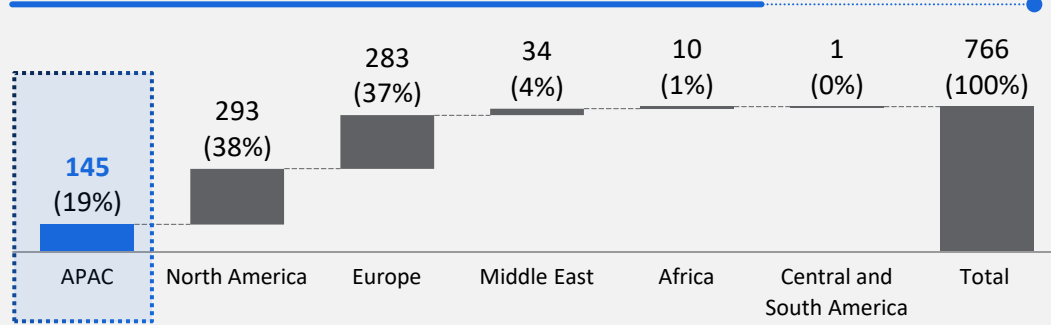
CCS jobs sustained per year per million ton of CO₂ (direct + indirect/induced)¹

Annual jobs supported through CCS in APAC by 2035



GDP multiplier

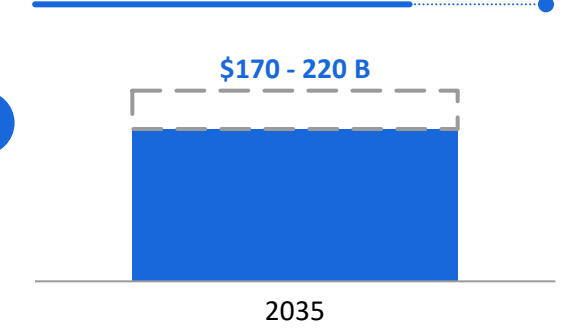
Annual CAPEX requirement by 2035 (USD B)
Announced pledges scenario (<1.5C by 2100)



\$1.2-1.5

Value added to GDP for every dollar spent in CCS²

Annual value added to APAC GDP by 2035



1. Multiplier derived from USA National Petroleum Council "Meeting the dual challenge: A Roadmap to At-Scale Deployment of CARBON CAPTURE, USE, AND STORAGE"
 2. Multipliers derived from USA IRA "An Economic Impact Analysis of Major Clean Energy Projects Announced In Year One of the Inflation Reduction Act" by BW research partnership and E2), UK economic analysis of CCS GDP multipliers "UK Preliminary Study on Developing Economic Multipliers for CO₂-EOR Activity by University of Strathclyde Glasgow Center for Energy Policy", and USA Oil and Gas GDP multipliers
 Source: Press search; Project team analysis

ANGEA | BCG Cross-border CCS study addresses key questions for bilateral arrangements and commercial agreements



Opportunity

- CCS is critical for decarbonization efforts in Asia Pacific.
- The region is pioneering cross-border CCS opportunities to advance towards its climate targets.
- The study focuses on initial 6 countries in the region.



Australia



Japan



South Korea



Malaysia



Indonesia



Singapore



Challenges

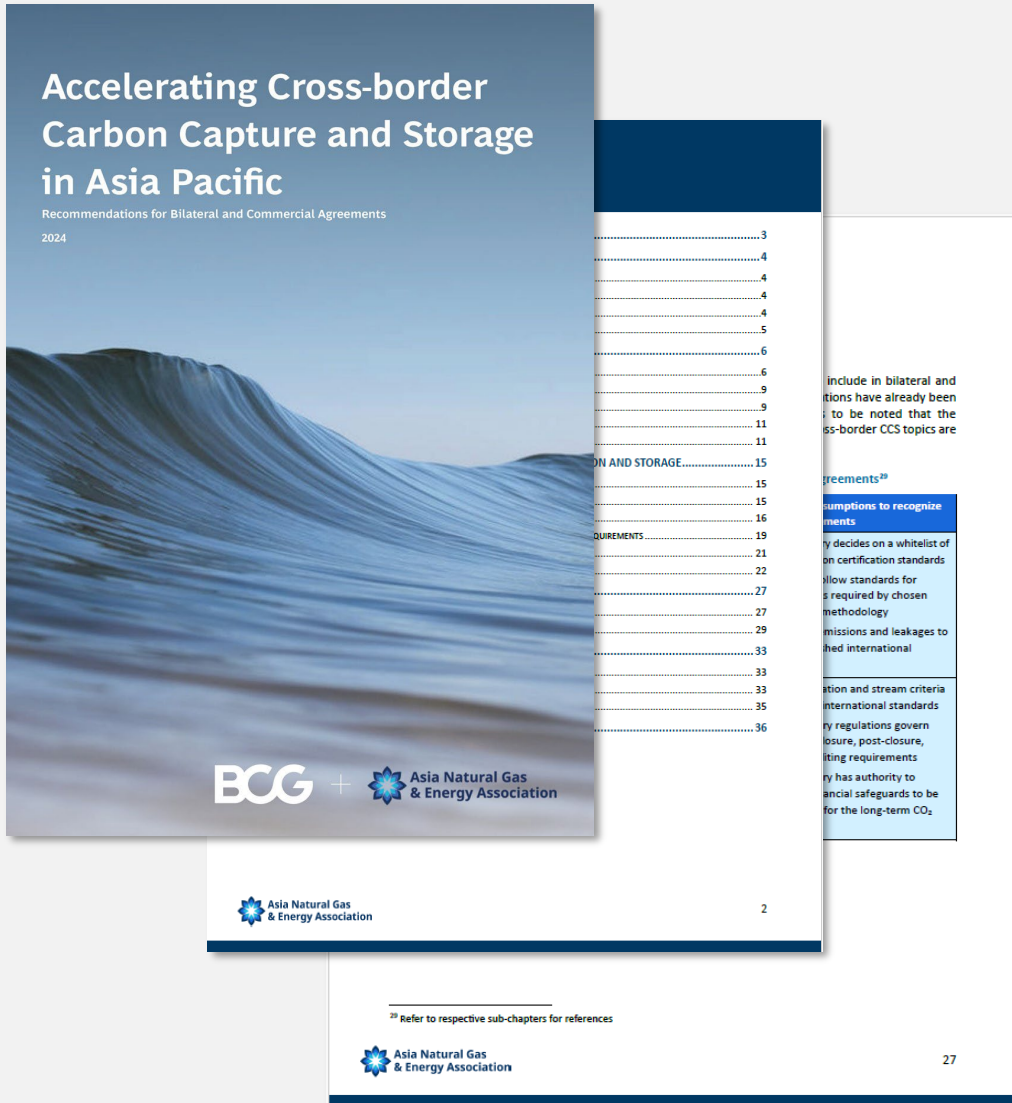
- Cross-border CCS is complicated by an array of international guidelines and the differing regulatory frameworks across countries in the APAC region
- For cross-border CCS projects to be commercially viable, G2G agreements are important in providing clarity and flexibility for commercial agreements to proceed on key issues including:
 - What types of certifications can be used?
 - How to ensure no double counting?
 - Clarify long-term liabilities in the event of leakages



Objectives of ANGEA's Study

- Examine existing international guidelines, domestic regulations, and carbon accreditation mechanisms for certifying emission reductions from cross border CCS
- Review potential business models, based on the intended uses of reduction units, to identify gaps and challenges that need to be addressed in the G2G agreements.
- Provide recommendations on what should be considered in the G2G agreements (vs. what to be included in the commercial agreements).

ANGEA | BCG “Accelerating Cross Border CCS in APAC – Recommendations for bilateral and commercial agreements”



Goal: Facilitate a common understanding of the issues and complexities in the region that need to be addressed in providing the necessary legal and regulatory clarity for cross-border CCS projects to move forward.

Recognizing that governments and commercial parties in APAC may have different perspectives on how to operationalize CO2 trade, the study outlines a set of principles with multiple options for parties to pursue.

The study enables governments to implement national policies and regulations and pursue options reflective of their needs

Scan for Study.....





Five key aspects underpin the application of this study

Accelerating Cross-border Carbon Capture and Storage in Asia Pacific

Recommendations for National and Commercial Agreements

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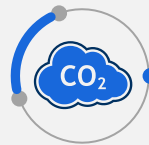
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1

Alignment with international standards and regulations on CCS and carbon financing mechanisms



2

Avoidance of double counting via clear rights to emission reductions and procedures to account for emission reduction reversals



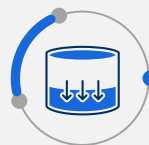
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Adoption of best practices in operationalisation of cross-border CCS projects, including best-in-class risk management measures and liability frameworks



4

Guidance to facilitate G2G and commercial agreement follows international standards yet is flexible to account for each country's regulatory environment and specific needs



5

Technology-neutral and applicable to all CCS projects

Five recommendations for bilateral agreements on cross-border CCS projects

Options provided to allow for flexibility of different objectives and contexts

Bilateral agreement recommendations	Options		
Agree on ownership rights to the emission reductions	Capture country retains rights to the emission reductions to claim towards their NDCs; no emission reduction benefit for storage country	Capture country retains rights to the emission reductions to generate Article 6.2 ITMOs, may share proportion of ITMOs with storage country	Capture country and storage country has joint ownership of the emission reductions, and can both agree on a split to claim towards their NDCs
Agree on jurisdictional accountability for emission reversals from leakages and acceptable mechanisms for the adjustment of such reversals	Capture country deducts emissions from NDCs as soon as CO ₂ crosses over to the storage country; any leakage within storage country's borders to be added to its NDCs	Capture country deducts emissions from NDCs after CO ₂ is transferred to receiving terminal at the storage country; any leakages after to be added to storage country's NDCs	Capture country deducts emissions from NDCs after injection at the storage country; any leakage post-injection to be added to storage country's NDCs
Agree to share data for emission reduction certification	N/A		
Agree on regulatory responsibility during CO ₂ transportation	Regulatory responsibilities determined as per international boundaries. In addition, relevant maritime / 3rd country regulations apply if transferring over international borders or 3rd countries	Countries mutually agree on a 'handover point' where regulatory responsibility shifts from one country to the other	
Agree on dispute resolution mechanisms , including arbitration forums etc.	N/A		

Recommendations for commercial agreements cover 12 topics

Topics	Recommendations for commercial agreements
1 Emission reduction unit generation	<ul style="list-style-type: none"> Project proponent has the right to use the CCS project for its chosen certification standard, and should ensure compliance with domestic carbon policies and CCS regulations
2 Rights to emission reductions	<ul style="list-style-type: none"> Only project proponent can claim for projects' emission reductions or use them to generate carbon credits or certificates
3 Cross-border emission reduction transactions	<ul style="list-style-type: none"> Project proponent has the right to transfer project's emission reduction units to other parties, and should ensure that transactions are aligned with international standards and domestic regulations
4 Carbon MRV	<ul style="list-style-type: none"> Project proponent is accountable for carbon MRV process and contracting an approved third-party auditor Other project operators will cooperate with project proponent to support emission reduction certification
5 Permanence	<ul style="list-style-type: none"> Establish necessary indemnity and risk allocation clauses for emissions accounting adjustments Decide on mechanism to account for emission reduction reversals caused by leakages post-CO₂ injection Where shared storage hubs are used, clarify share of storage site used – to determine share of leaked emissions to account for (if using a buffer)
6 CO ₂ stream criteria	<ul style="list-style-type: none"> Align on project-specific CO₂ stream criteria standards, and/or default to international standard Where shared storage hubs are used, CO₂ stream criteria should be range bound to account for potential stream varieties
7 Transportation modes and requirements	<ul style="list-style-type: none"> Ensure CO₂ transportation practices comply with the latest regulations and standards, and establish necessary indemnity and risk allocation clauses
8 Storage site permitting	<ul style="list-style-type: none"> Storage operator to strictly follow storage and site operation standards (e.g. pore space rights) and any additional requirements required by law and in the bilateral agreement
9 MMV & auditing requirements	<ul style="list-style-type: none"> Ensure compliance with local MMV and auditing requirements Storage operator to provide data on CO₂ leakages or irregularities to the project proponent and the relevant regulatory authority in a timely manner
10 Site closure procedures	<ul style="list-style-type: none"> Project proponent has the right to request for site closure and post-closure progress reports from the storage operator to assure the integrity of CO₂ containment
11 Liabilities	<ul style="list-style-type: none"> Operators should clarify liability for CO₂ leakage at designated transfer points across the value chain
12 Dispute resolution	<ul style="list-style-type: none"> Parties to establish dispute resolution process focused on addressing issues in relation to the commercial terms of the project



Thank You

