

Kwinana to Cliff Head Seaborne CO₂ export and permanent offshore storage

Kwinana Major Projects Conference

21 August 2023

PILOT ENERGY LIMITED
ASX:PGY



Compliance Statements



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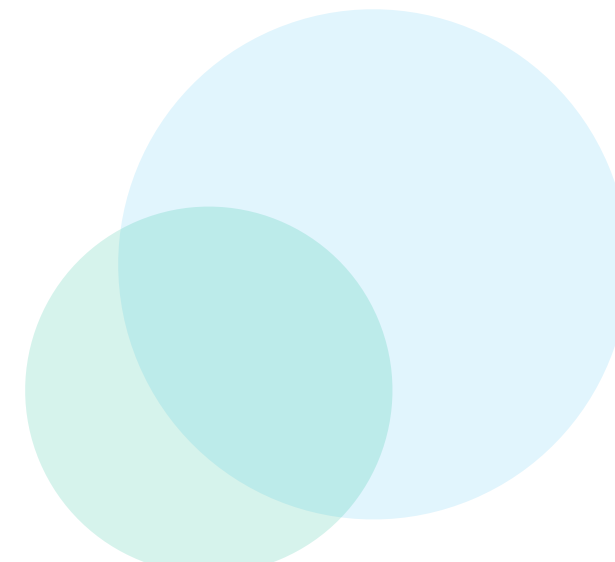
This announcement contains information on conventional petroleum and CO₂ Storage resources which is based on and fairly represents information and supporting documentation reviewed by Dr Xingjin Wang, a Petroleum Engineer with over 30 years’ experience and a Master in Petroleum Engineering from the University of New South Wales and a PhD in applied Geology from the University of New South Wales. Dr Wang is an active member of the SPE and PESA and is qualified in accordance with ASX listing rule 5.1. He is a former Director of Pilot Energy Ltd and has consented to the inclusion of this information in the form and context to which it appears.

Authorisation

This presentation has been authorized by the Chairman and Managing Director on behalf of the Board of Directors of Pilot Energy Limited

Mid West Renewable Energy Reporting Conditions

Pilot has agreed to certain conditions with the ASX in respect its renewable energy activities in relation to nature of activities and expenditure limits. Proceeding beyond the conditions will constitute a change in the nature and scale of the Company’s activities in terms of Listing Rule 11.1 and as such the Company will be required to comply with all of the requirements of Chapters 1 and 2 of the Listing Rules before it proceeds beyond the agreed limits.



Key messages



The Cliff Head CO₂ Storage Project is the development of a material permanent offshore CO₂ storage facility

- Pilot is a producing oil and gas company *transitioning to supply permanent CO₂ storage and clean, low-cost energy*
- CO₂ storage in depleted oil & gas reservoirs is a *proven, safe and effective* means of permanent reduction in CO₂ emissions
- Cliff Head Oil Field is highly suitable for *low cost, low risk conversion* into major permanent offshore CO₂ storage operation
- Cliff Head CO₂ Storage Project can provide industrial emitters with a *low-cost, long-term abatement solution*
- Pilot is aiming to provide *permanent injection* of over a 1 million tonnes of CO₂ annually through 2050
- Offshore location provides opportunity for *direct CO₂ injection/storage via LCO₂ carriers*
- Transport of CO₂ by dedicated & multi-purpose gas carriers is an *established practice utilizing proven technologies*
- CO₂ ship transport to Cliff Head storage facility is a *realistic, affordable abatement solution* for Kwinana CO₂ emitters
- Safeguard Mechanism reforms *significantly increases the requirement for industrial CO₂ emitters to reduce carbon emissions*
- Carbon abatement through *permanent CO₂ storage is essential to meet newly legislated* Safeguard Mechanism reforms

Pilot has formed alliance with Knutsen NYK Carbon Carriers to provide a seaborne CO₂ transportation solution for Kwinana

Corporate Overview

Vision

Transform existing assets and infrastructure to deliver an integrated cost competitive clean energy solution

Current Operations

Cliff Head Oil
Field

&

Existing
Infrastructure



Transition
& Transform

Permanent
CO₂ Storage



Integrated Clean Energy Portfolio

Wind



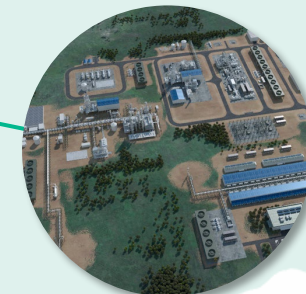
Solar



Clean Energy
Resource hub

Perth

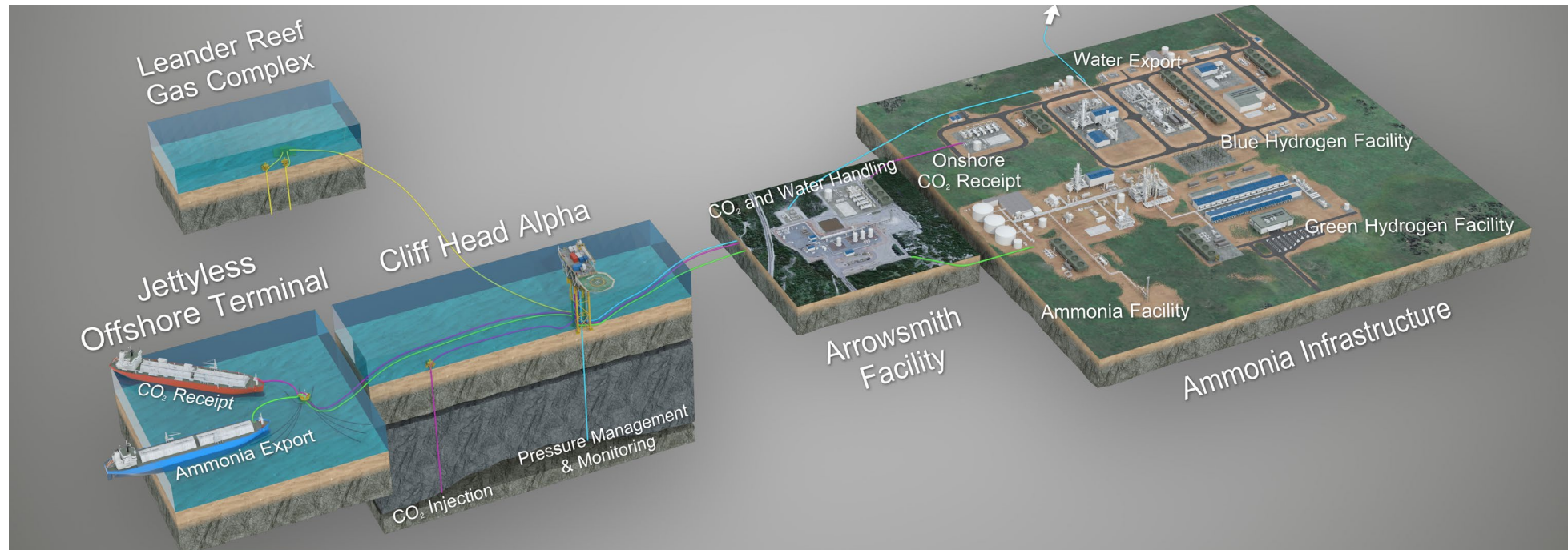
Bunbury



Clean
Hydrogen / Ammonia

Western
Australia

Mid West Clean Energy Project



A Clean Ammonia export project with full carbon capture through integrated CO₂ storage

Carbon Storage*

Timing: ~2026

- Conversion of Cliff Head Offshore oil field to CCS
- Permanent CO₂ storage in depleted offshore oil field
- Offshore facilities to include direct offshore LCO₂ receipt capability
- Over 1 million tpa CO₂ injection from 2026
- Targeting continuous CO₂ injection through to 2050

Clean Ammonia Production*

Timing: ~2027/2028

- Targeting Clean Ammonia production of over 1.2 million tpa
- Clean Ammonia produced from combined Blue & Green Hydrogen Plant
- Blue H₂ with full carbon capture through integrated Cliff Head CO₂ storage
- Green H₂ from self-sourced industrial water supply + low-cost, behind-the-meter renewables
- Estimated levelized cost of ammonia (LCOA) of A\$400/tonne

Corporate Overview



ASX Code: PGY

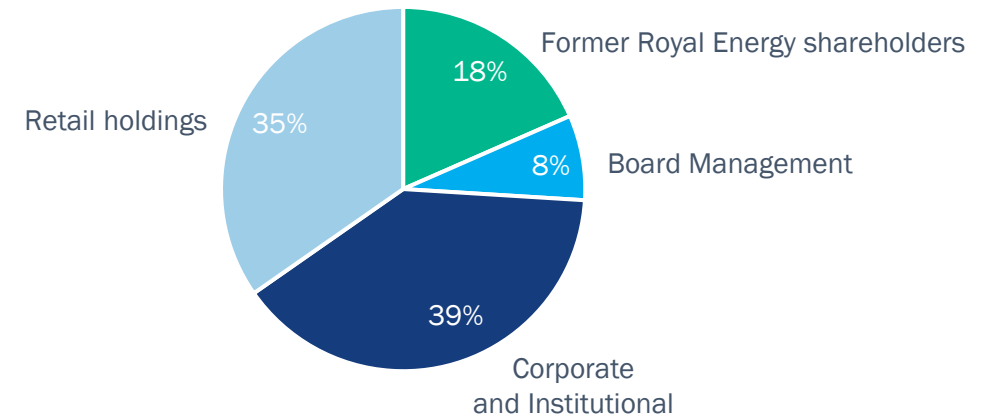
Capital Structure

Issued shares	1,017.7 million
PGY share price	~\$0.030 (9/08/23)
• 52-week range	~\$0.010 to \$0.032
Market Capitalisation	~\$30 million
• 52-week range	~\$10 million to ~\$32 million

Development Pipeline*

Stage 1	Carbon Management	over 1 million tpa
Stage 2	Clean NH3 Production	1.2 million tpa

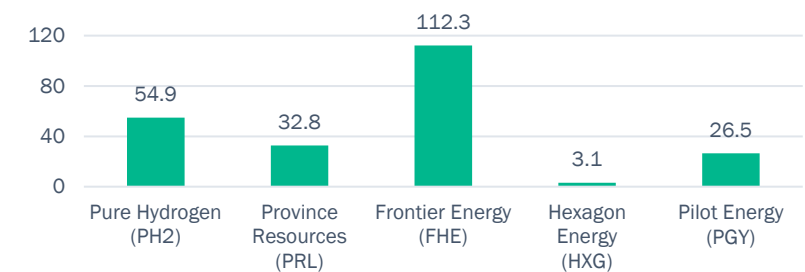
PGY Shareholder Analysis



Share Price



Clean Energy Companies Enterprise Value (\$m)¹



- Enterprise Value = Market Capitalisation at 9 August 2023 less cash balance as of 30 June 2023. Source: Company Financial Reports & ASX closing prices 9/8/23.
- Prepared by Media Capital Partners

Proven & Experienced Board



Brad Lingo

Executive Chairman

30+ years international senior executive experience

Upstream/midstream energy, energy infrastructure, finance

Proven track record of creating & growing shareholder value

Drillsearch

el paso



Tony Strasser

Managing Director

Extensive oil & gas experience including project and financial management, corporate finance and M&A 25+ years

Proven record in oil & gas with shareholder backing through multiple ventures



Daniel Chen

Non Executive Director

17+ years of international business, project management and leadership experience in large scale transport and logistics

Corporate advisor to private Australian oil & gas companies since 2018



Bruce Gordon

Non Executive Director

Corporate Finance and Corporate Audit Specialist in the Natural Resources Sector

25+ years acting for, and advising, ASX and International oil and gas companies.

Extensive public company accounting, financial reporting and corporate governance knowledge



Management Team



Cate Friedlander

Company Secretary & General Counsel

Experienced corporate / commercial lawyer in upstream & midstream energy - ASX and international.

Chartered Governance Professional.

Member of Governance Institute of Australia.



Nick Watson

GM Corporate Development

Over 20 years energy industry experience

Corporate/strategic development and operational experience across hydrogen, energy and oil & gas



Jonas Jacobsen

Development Director - MWCEP

20 years global experience as technical leader specialising in emerging technologies within clean energy generation, transmission and infrastructure sectors.



Mike Lonergan

Head of Upstream

Michael is a petroleum geophysicist with 35 years of domestic and international oil and gas experience across a wide range of E and P assets. He has held senior technical and project management roles during his career, having worked for Delhi Petroleum, Oil Company of Australia, Origin Energy, Rohol-Aufsuchungs Aktiengesellschaft, Mosaic Oil, AGL, Pangaea Resources and Denison Gas.



Cliff Head CO₂ Storage Project

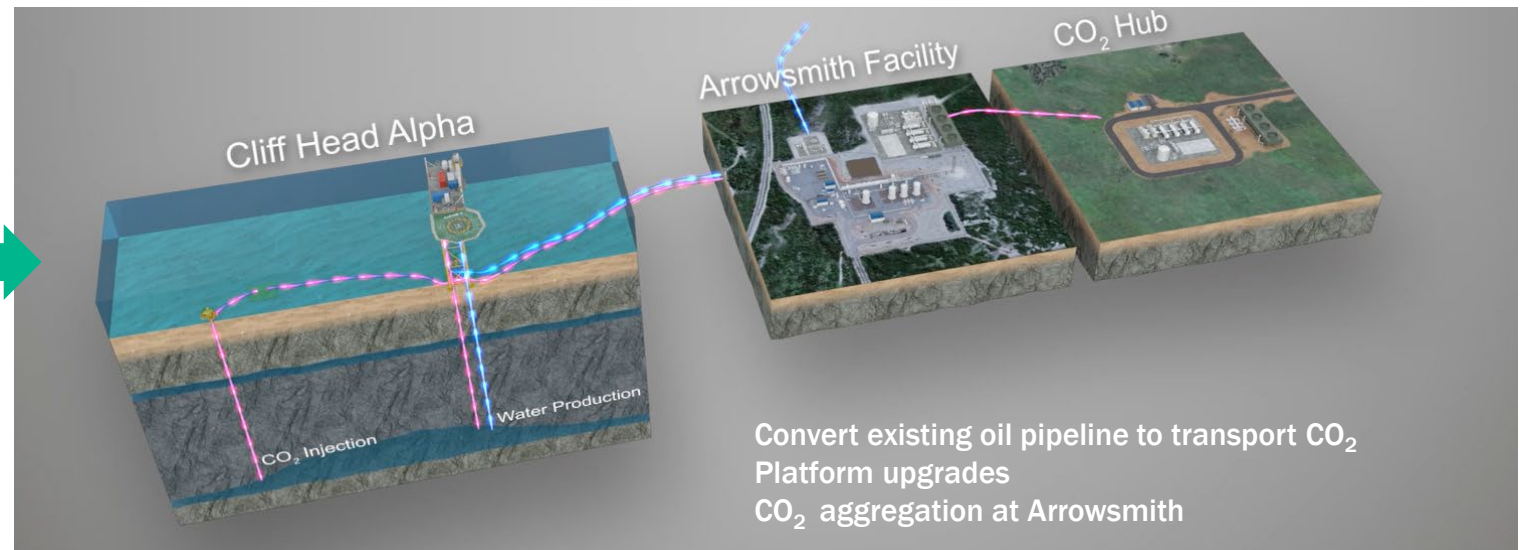
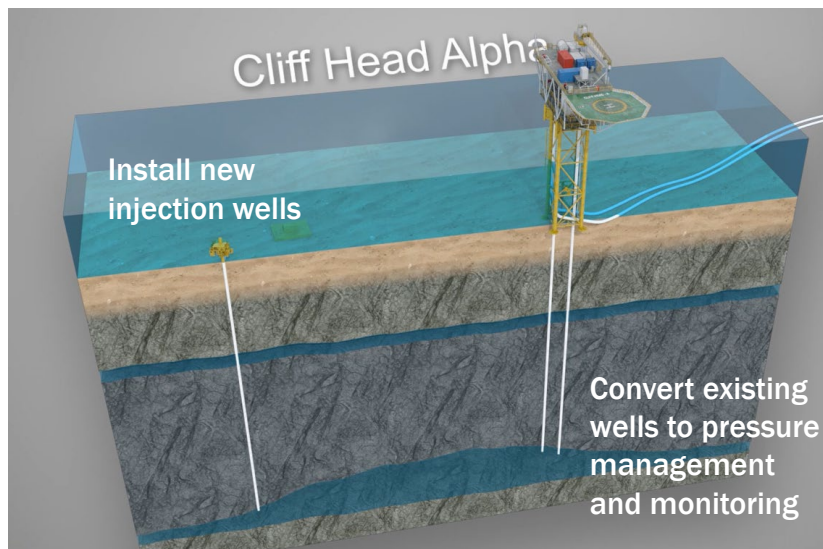
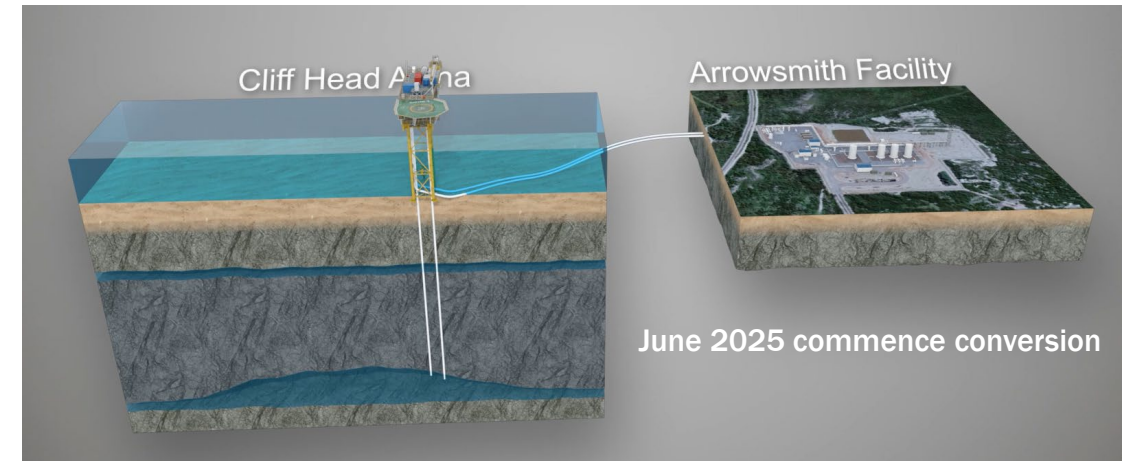
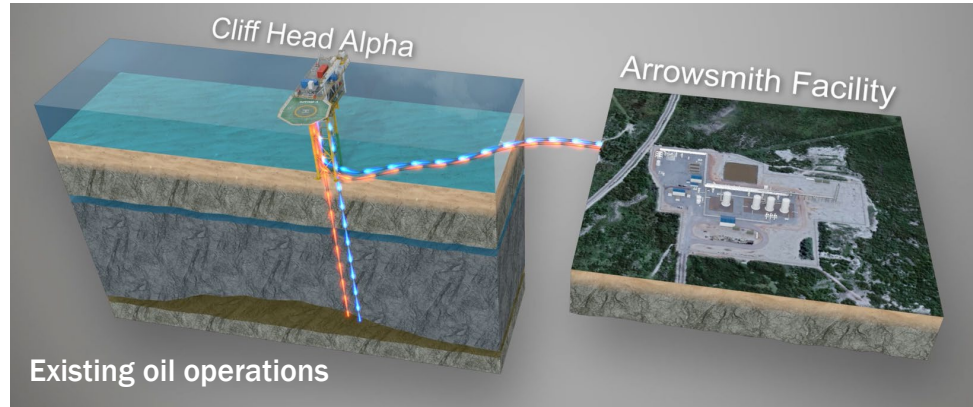
Cliff Head CO₂ Storage Project – Overview

Low-cost permanent offshore CO₂ storage

- Brownfield re-development utilizing existing Cliff Head Oil Field onshore/offshore facilities located approximately 90km south of Geraldton / 325km north of Perth
- Clear Commonwealth regulatory pathway to conversion into permanent CO₂ storage facility with initial application lodged with NOPTA
- Minimal risk and capex requirements through re-use of existing reservoir & facilities
- Project to include onshore and offshore CO₂ receiving terminals, injection and storage facilities
- Aiming to provide over 1 million tpa of permanent CO₂ storage continuing through 2050
- Offering to provide “Carbon Management Service” including transport and permanent CO₂ storage to third-party customers
- Focused on achieving levelized cost of storage (LCOS) of less than A\$20/tonne of CO₂
- Targeting first CO₂ injection 2026

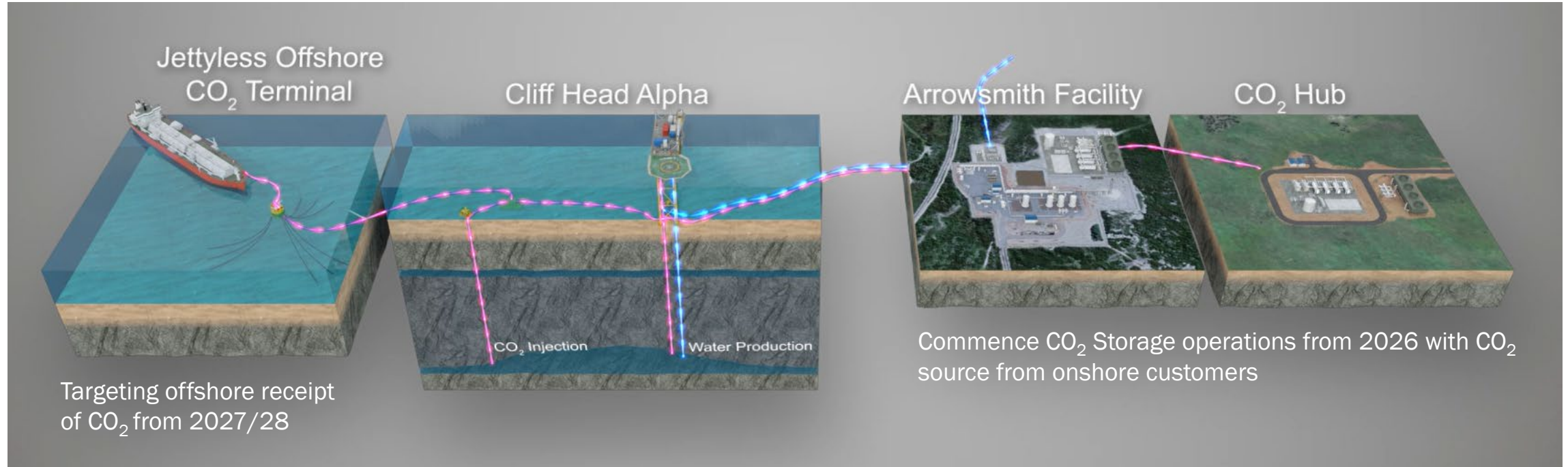


Conversion from oil production to CO₂ storage operations



Conversion from oil production to CO₂ storage operations

Project to be configured to receive CO₂ via an onshore and offshore terminal



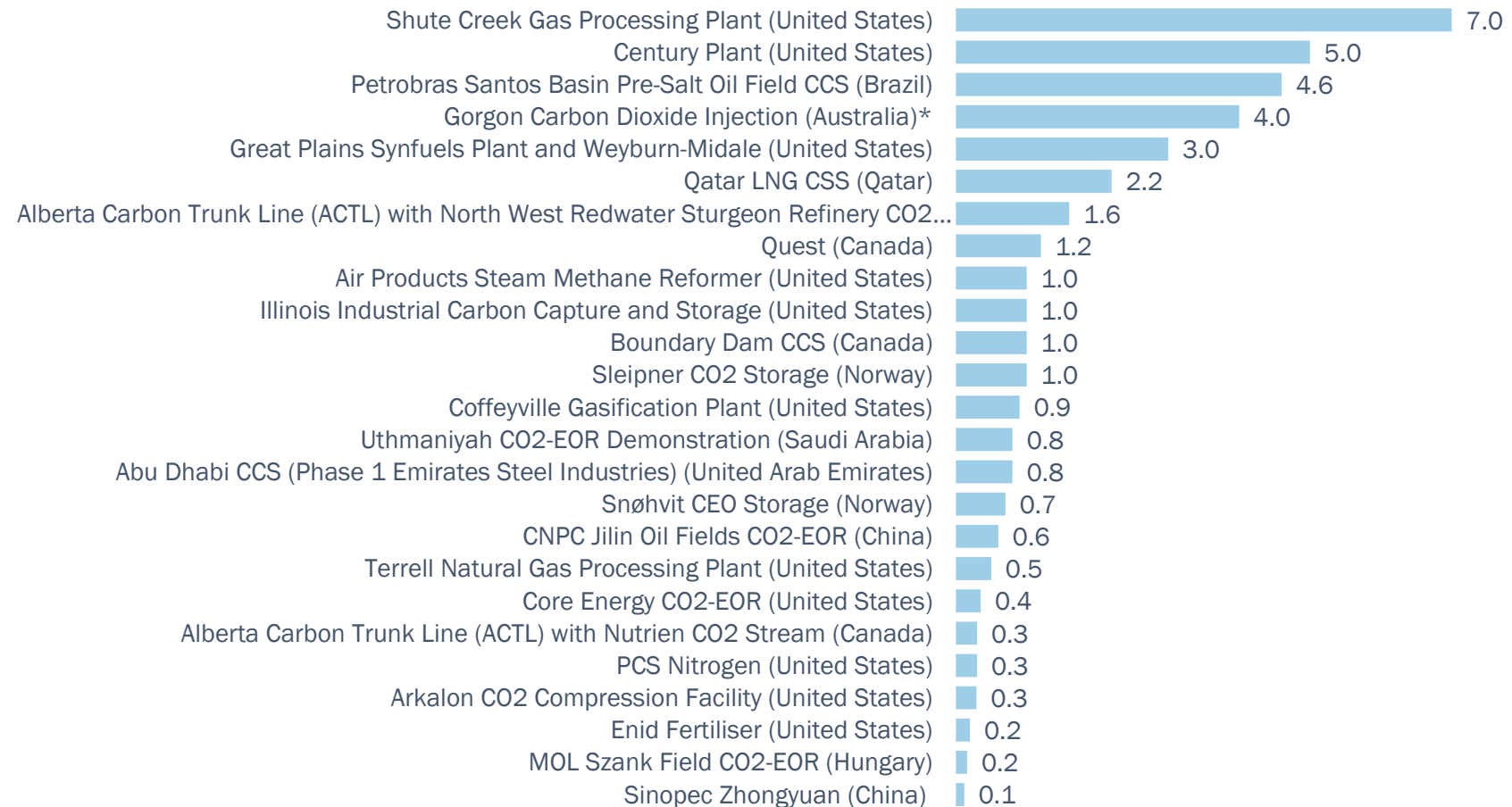
Project status

- Regulatory approval underway with Declaration of Storage Formation application submitted December 2022
- Project team established and Genesis (Technip Energies) engaged as owners engineer and preparing to commence FEED
- Active engagement with prospective carbon management service customers and project partners ongoing
- Commence works/studies for remaining regulatory approvals (environmental, etc.) from September 2023
- Targeting submitting injection license application end CYQ1 2024

Global CCS Facilities In Operation*

Cliff Head CO₂ storage project forecast to be a Global Top 10 CO₂ Injection Capacity Project

Carbon Dioxide Injection and Storage Capacity in million metric tons per year, 2021



*Information was sourced from www.statista.com/statistics/1108355/largest-carbon-capture-and-storage-projects-worldwide-capacity/ around June 2022

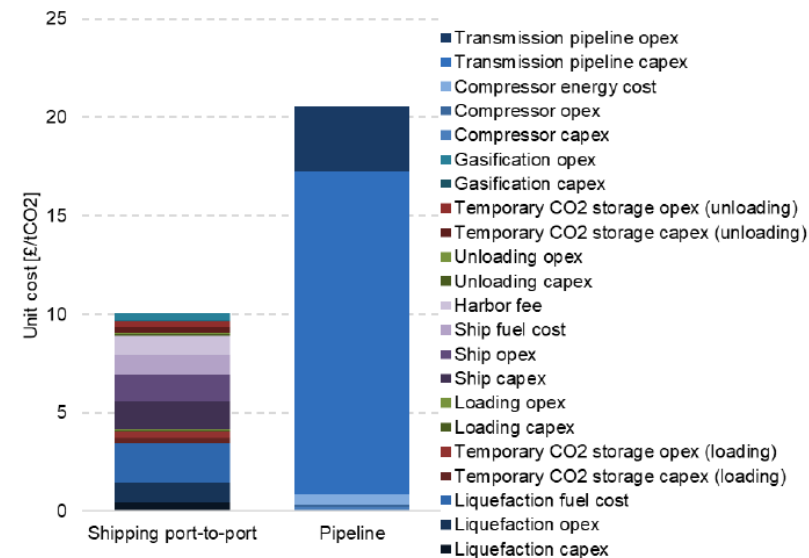
Seaborne CO₂ Transportation from Kwinana

Ship transport of CO₂

A flexible, economic transportation solution

- Ship transport of CO₂ is mature and technically feasible¹
- CO₂ ship transport has been taking place for 35-years / First dedicated CO₂ tanker launched in 1988²
- As a flexible option requiring less fixed infrastructure, shipping is an attractive alternative for CO₂ transport³
- Ship transport is also scalable and less sensitive to fluctuations in CO₂ volumes and capture profile than pipeline transport⁴
- In general shipping is more economically favourable than pipelines with lower CO₂ flowrates (less than ~5 Mtpa), shorter project durations (less than ~20 years) and longer transport distances⁴
- Recent UK Government studies have established the cost of CO₂ transporting 1 million tpa of CO₂ 600km via ship, is less than half that of CO₂ pipeline transport²

Figure 1-3 Comparison of the unit cost of CO₂ transport for transporting 1 MtCO₂/year over a distance of 600 km and timeframe of 20 years. All other central case assumptions were used.



1, 3, 4 Source: CCUS Projects Network Paper - CO₂ ship transport: Benefits for early movers and aspects to consider, 4th Report of the Thematic Working Group on:CO₂ Transport, Storage, and Networks, 23 December 2021

2 Source: CO₂ Shipping CO₂ – UK Cost Estimation Study Final Report for Business, Energy & Industrial Strategy Dept - 2018

Kwinana Industrial Area CO₂ Aggregation Project



Opportunity to deliver material reduction in CO₂ emissions from Western Australia's major industrial precinct

- Kwinana Industrial Area (KIA) is a primary centre of CO₂ emissions in Western Australia
- Kwinana Industries Council (KIC) is undertaking a Carbon Reduction Project with the purpose of moving the KIA to a net zero carbon emissions*
- Pilot has completed a feasibility study on the capture and aggregation of industrial CO₂ emissions within the KIA
- Pilot's feasibility studies indicate that by 2026 up to 250,000 tpa of CO₂ growing to over 1 mmtpa of CO₂ could be captured by 2027
- Pilot is now undertaking feasibility/shipping studies for the direct transport of LCO₂ from the KIA via dedicated LCO₂ carriers
- All major CO₂ emitters have direct access to and are current users of Fremantle Port's Kwinana jetties
- Potential for CO₂ to be transported by ship via Freemantle Ports Kwinana jetties to Cliff Head CO₂ Storage Project offshore terminal7**

Collective emissions of KIC members Scope 1*

KIC members	Scope 1 emissions CO _{2-e}
Full members (Safeguard Mechanism)	4,147,082
Full members (non-Safeguard Mechanism)	70,468
Energy Companies	1,799,026
Associate members	1,131,319
Total	7,147,895

GHG Emissions from KIC Full members (Safeguard Mechanism) *

KIC members	Facility Name	Reported emissions CO _{2-e}
Cockburn Cement	Kwinana & Munster	947,905
CSBP	CSBP Kwinana	722,204
Alcoa	Kwinana Alumina Refinery	1,258,124
Tronox	Kwinana Pigment Plant	311,503
BP	Kwinana Refinery	711,680
BHPNW	Nickel West	181,233
Total (Scope 1)		4,115,494

*Source: Kwinana Industries Council [Carbon Reduction Project \(Phase1\) Report](#) June 2021

** Refer to slides 21 and 22

Seaborne CO₂ transportation

Pilot has formed alliance with Knutsen NYK Carbon Carriers to provide a seaborne CO₂ transportation solution for Kwinana

- June 2023 – Pilot entered MOU with Knutsen NYK Carbon Carriers (KNCC) to collaborate on offering an integrated solution for marine transportation and offshore injection of CO₂ storage at the Cliff Head CO₂ Storage Project
- KNCC has developed innovative/unique technology for marine CO₂ transportation and storage system
- KNCC has developed a unique “LCO2-EP” (Liquified CO₂ – Elevated Pressure) technology
- June 2023 KNCC received approval from DNV for LCO2-EP system for General Approval for Shipping Application (GASA)
- Solution delivers lower CAPEX, OPEX and energy use
- System is flexible and scalable and can be deployed in retrofit of existing vessels
- Storage system can be deployed both onshore and offshore as integral part of CO₂ shipping terminal facilities



Introduction



Company	Knutsen NYK Carbon Carriers AS
CEO	Anders Lepsøe
Location	Haugesund, Norway
Scope of business	Liquefied CO ₂ marine transportation & storage service (incl R&D)

- Our Owners
 - Knutsen OAS: Pioneer in the offshore shuttle tankers business
 - NYK: Global logistics enterprise centered on various forms of marine transport operating over 800vsls.
- Our Approach
 - Unique technology “LCO2-EP (Liquified CO₂ – Elevated Pressure)”
 - Wholistic approach across the CCS value chain

©KNCC



40 K LCO2-EP with Submerged Turret OffLoading System



©KNCC

KNCC LCO2-EP export terminal storage solutions

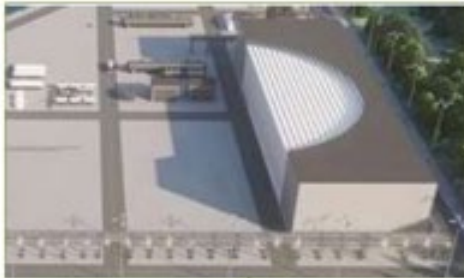
LCO2-EP storage solution is flexible, scalable and suited for deployment both onshore/offshore providing seamless export system

5

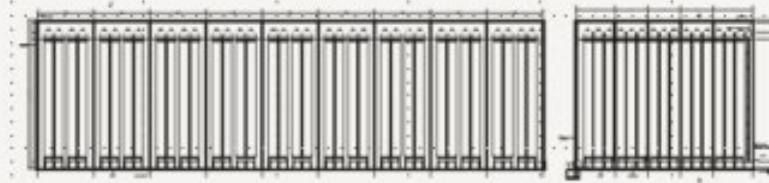
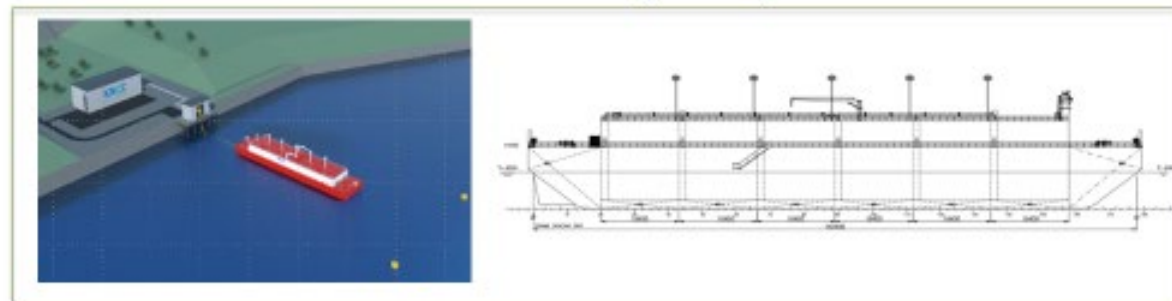


Adopting KNCC CTCs for Onshore and offshore Storage

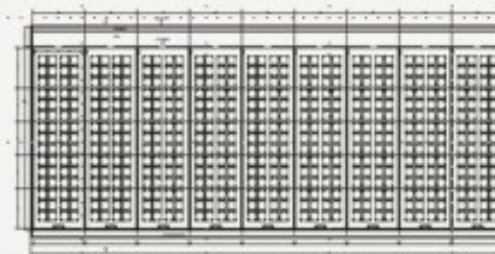
Onshore LCO2-EP Storage



Inshore LCO2-EP Barge Storage



Horizontal view



Vertical view

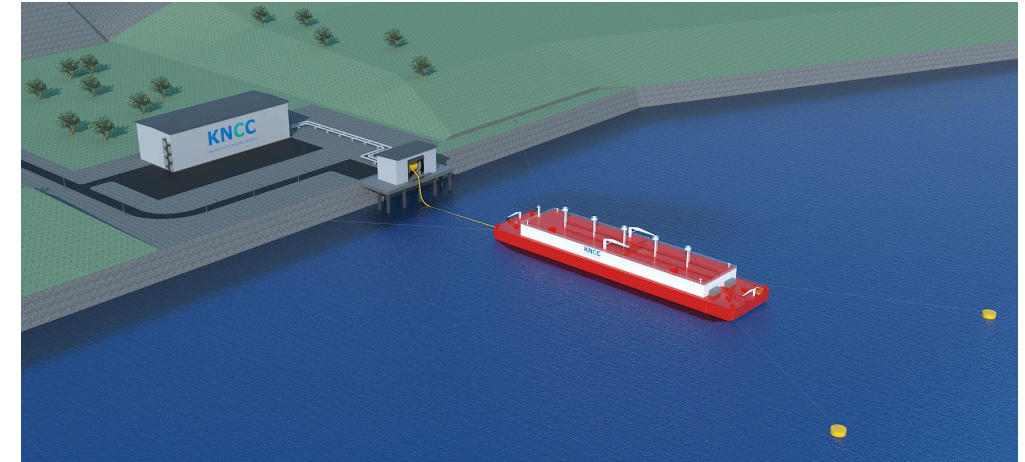
Kwinana CO₂ export terminal solutions

Multiple options for providing both onshore and offshore temporary storage and export terminal facilities that can be deployed to support seaborne CO₂ exports from Kwinana Industrial Area

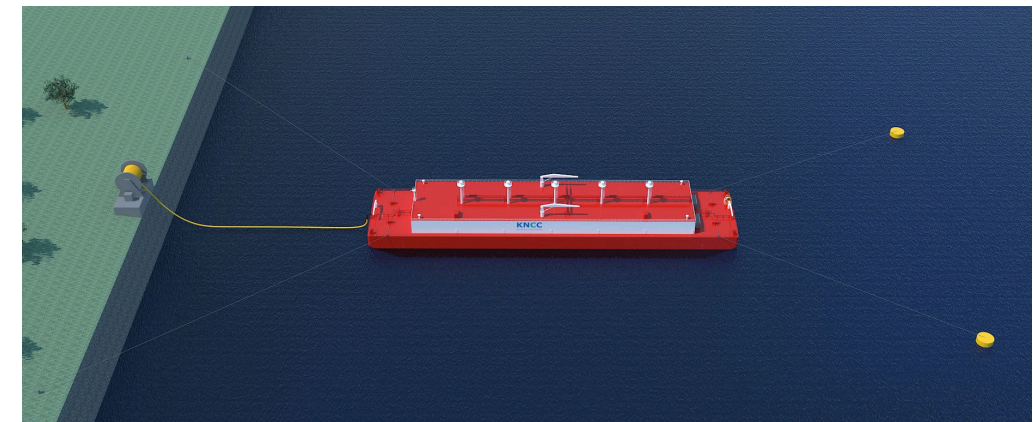
Concept 1 - CO₂ Export Terminal, offshore barge storage utilizing existing jetty facilities



Concept 2: Standalone Onshore CO₂ Export Terminal & Storage

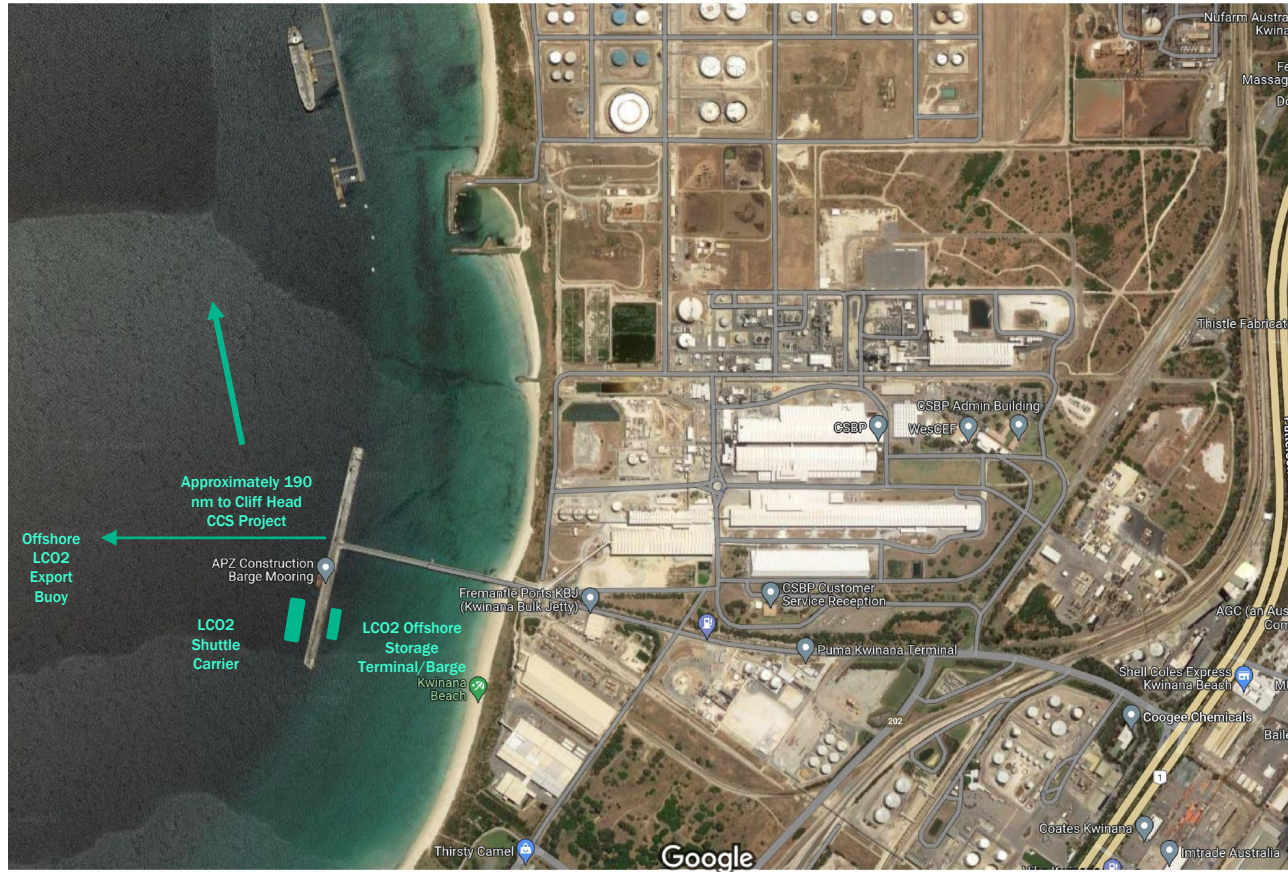


Concept 3: Standalone Offshore CO₂ Export Terminal & Storage

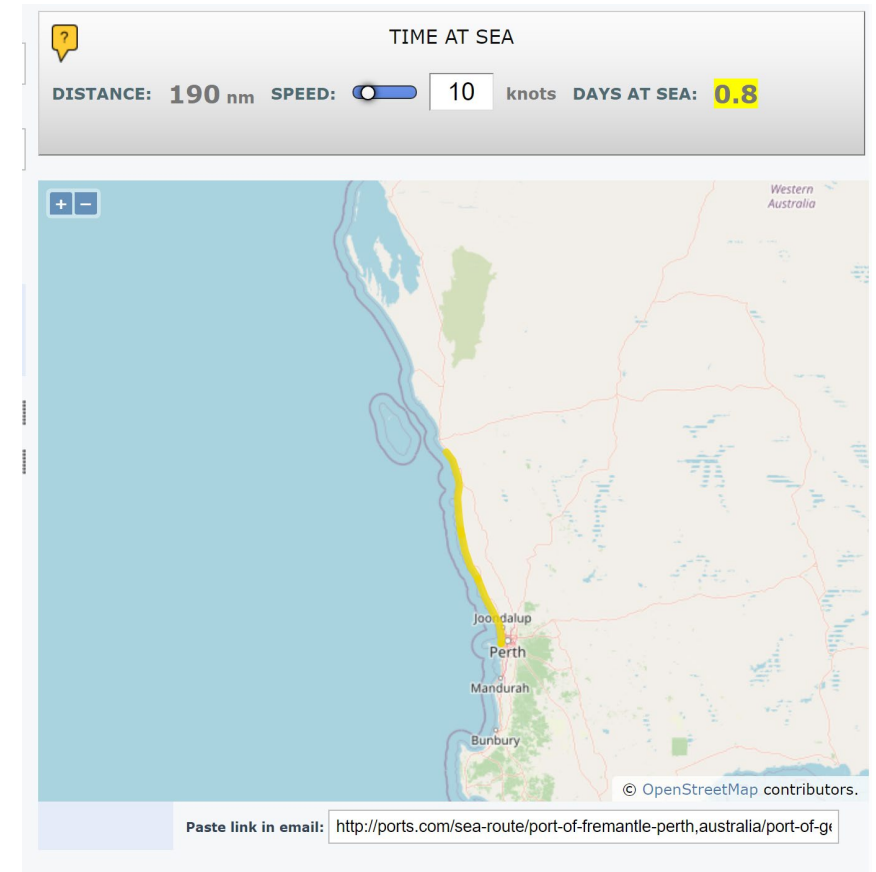


Kwinana CO₂ Exports – The journey from Kwinana to Cliff Head

A manageable distance with dedicated Jettyless CO₂ receiving facilities makes LCO₂-EP shuttle tanker operations an attractive transport option



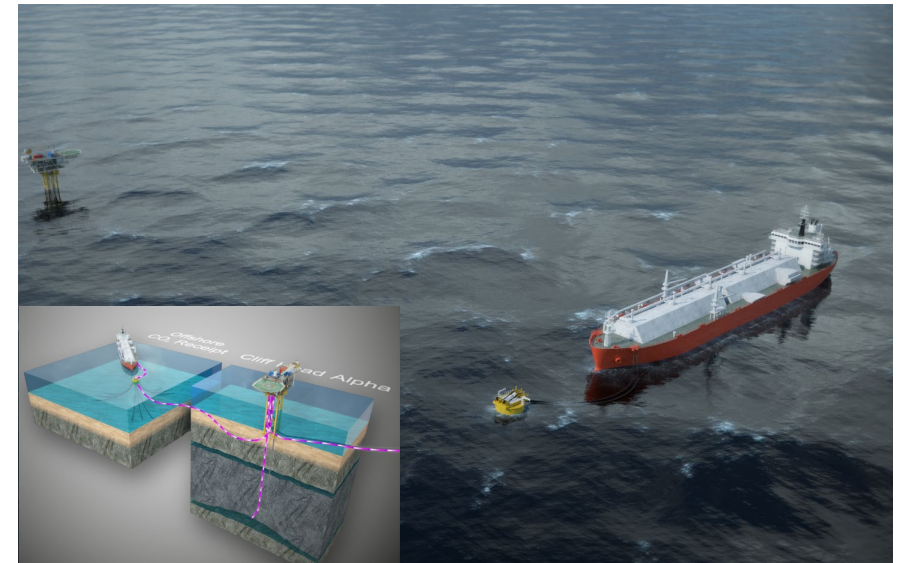
Port of Fremantle (Perth) to Port of Geraldton



Direct offshore CO₂ receipt & storage

Offshore location of Cliff Head CO₂ Storage Facility combined with KNCC LCO2-EP shipping technology provide opportunity for efficient transport and direct CO₂ delivery for permanent storage

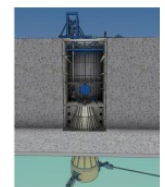
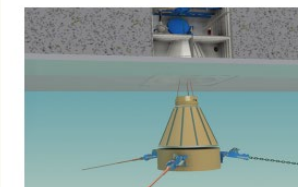
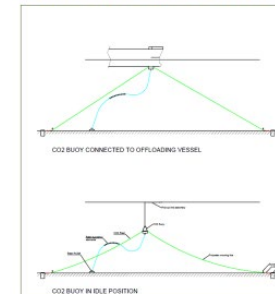
- Existing offshore facilities make Cliff Head CO₂ Storage Facility ideal for direct offshore LCO₂ receipt
- Offshore Jettyless mooring systems already in use in Australia Commonwealth Waters for oil & gas production and product transfer
- Offshore Jettyless CO₂ receiving terminal with direct CO₂ injection provides minimal development footprint
- Offshore receiving terminal provides Cliff Head CO₂ Storage Project with significant scale for expansion
- Direct offshore CO₂ receiving terminal enables providing CO₂ storage solutions for both local industrial and international CO₂ emitters



KNCC
KNUTSEN NYK CARBON CARRIERS

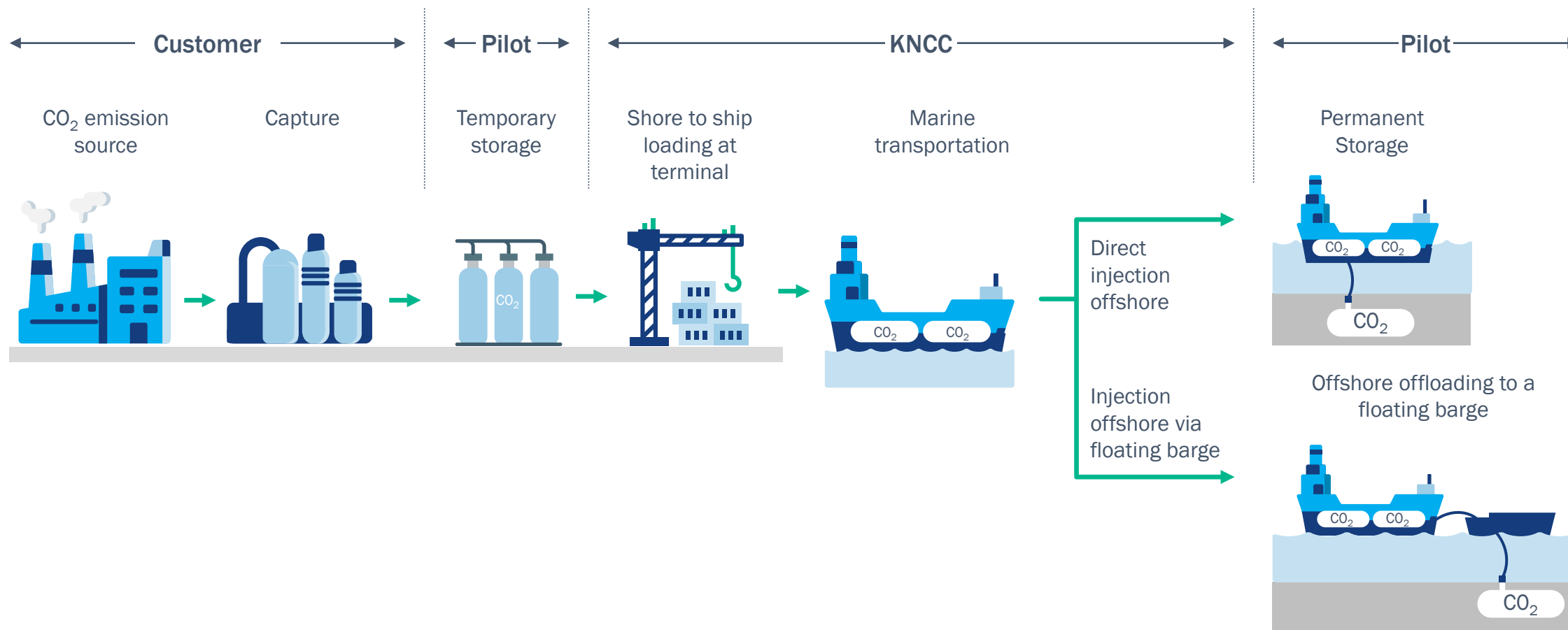
LCO2-EP applied for direct CO₂ injection Turret solution

- Less compression and heating required prior to injection compared to “LP” and “MP”.
- No need for onshore CO₂ receiving terminal. (=Faster and flexible instalment to projects)
- Lower CAPEX & OPEX achieved with more flexible operation. (Most terminals/ports are already congested.)



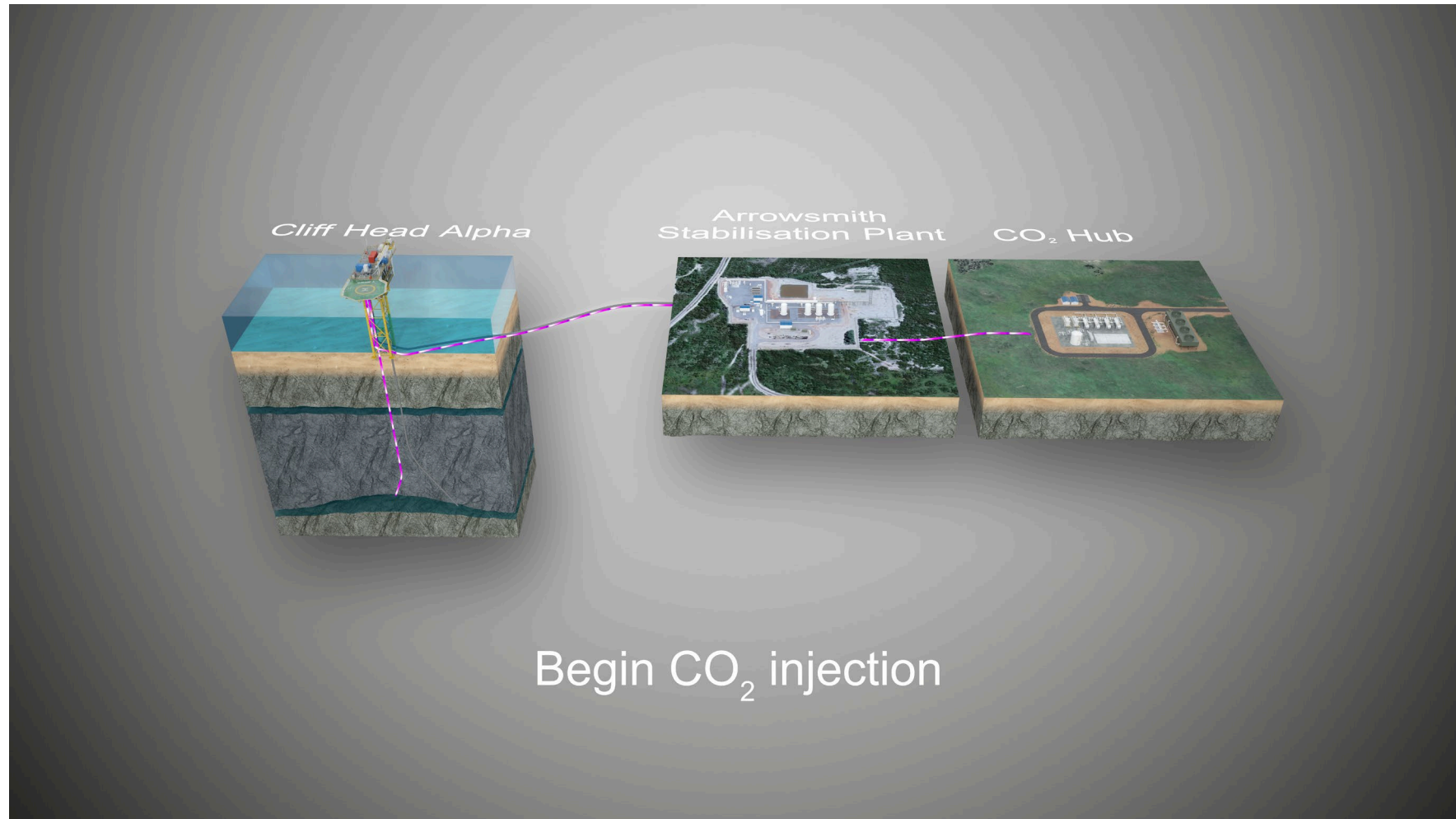
Kwinana to Cliff Head – From CO₂ capture to permanent storage

Putting it all together - a straight-forward solution opening the door to material CO₂ emissions reduction for Kwinana



Cliff Head CCS Project Video

Visit the Pilot web page to watch a short video on the Cliff Head CCS Project



To watch Cliff Head CCS Project video (7 September 2022) please visit Pilot Energy videos at: <https://www.pilotenergy.com.au/videos-webcasts>

Safeguard Mechanism

Benefits of abatement through CO₂ storage

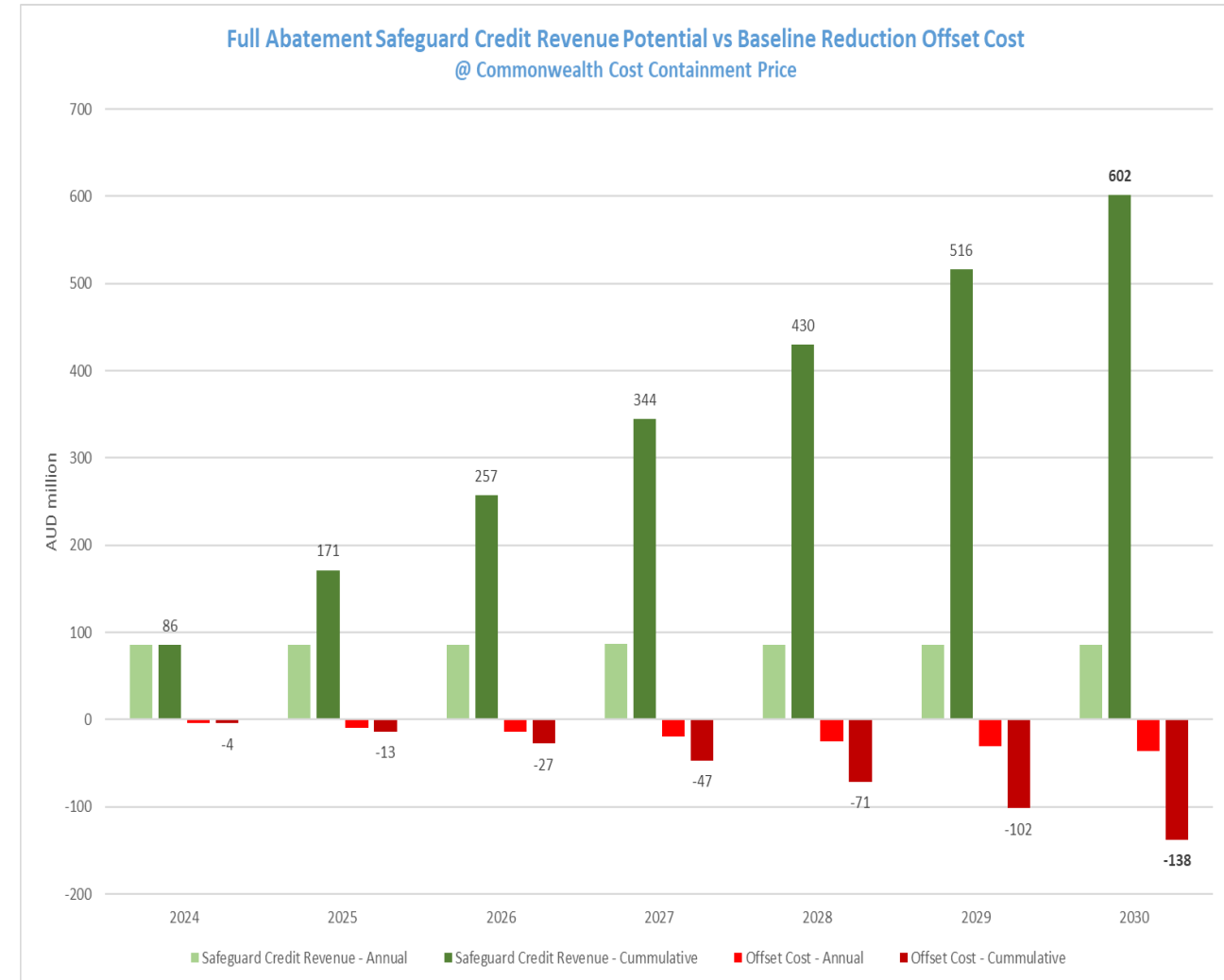
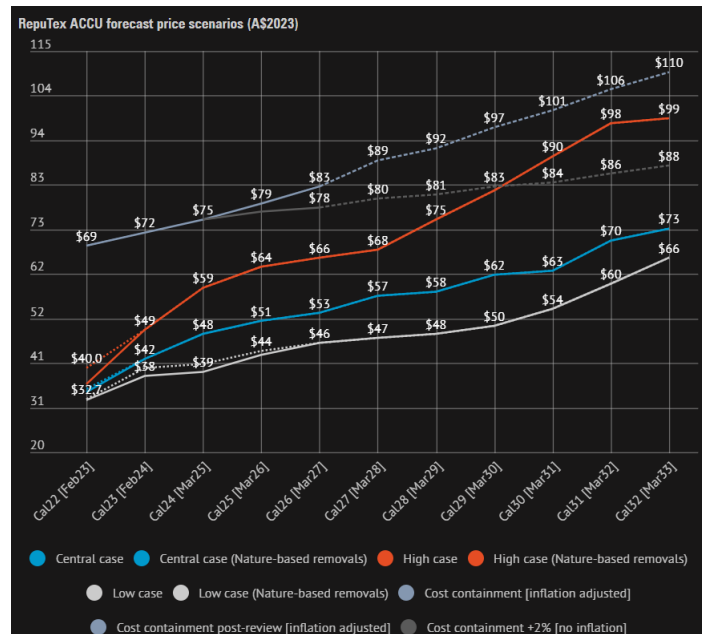
Safeguard mechanism*: business case for emissions reduction



Significant revenue potential can flow from investment in abatement versus operating cost from purchasing offsets

Safeguard facility emissions reduction abatement vs offset case study**

- Safeguard Mechanism Facility Annual Production = 2.2 million tpa
- Assumed Annual Product Price = AUD 550/tonne
- Assumed opening Safeguard Facility emission baseline (2023) = 1.2 million tpa
- Production Pre-Abatement CO₂ intensity = 0.55 tonne CO₂e/product tonne
- Commonwealth Safeguard Cost Containment = \$75 base escalated @ CPI + 2%
- 2030 Offset Cost per Product tonne = AUD 16.30/tonne
- 2030 Safeguard Credit Revenue per Product tonne = AUD 38.80/tonne



Next Steps

Key next steps

Over the next 12-months Pilot will be focused on the activities to deliver the Cliff Head CCS Project




Corporate

- Engagement with prospective project partners & customers



Project implementation

- Cliff Head CO₂ Storage Project permitting
- Complete LCO₂ shipping studies
- Secure CO₂ and LCO₂ commercial offtake arrangements
- Complete FEED for Cliff Head CCS Project
- Begin prospective EPCM Contractor engagement

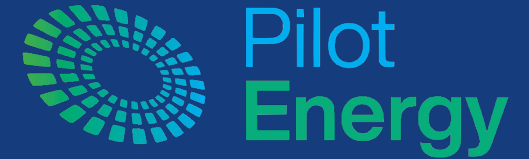


Next 12-months aimed at securing all necessary regulatory approvals, securing commercial off-take arrangements and completing FEED to enable final investment decision (FID) for the Cliff Head CO₂ Storage Project.

Contact Details

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