ASX Announcement

Otway CCS opportunity and sustainability update

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Beach Energy Limited (ASX: BPT, Beach) is pleased to advise that it has completed a pre-feasibility study on a carbon capture and storage (CCS) opportunity adjacent to its Victorian Otway Basin operations (Beach 60% and operator, O.G. Energy 40%) and is now moving into the assess/select phase.

Subject to joint venture approvals, the next phase will refine the pre-feasibility study, focusing specifically on storage capacity, reservoir selection, injectability, integration and environmental approvals to establish a facility that can capture ~200kt CO_2e per annum, an amount that would be greater than Beach's current Otway Basin scope 1 and 2 emissions combined. The assess/select stage is anticipated to be completed by the end of FY23. Later stages will examine the potential for the facility to become a regional hub for third-party CO_2 sequestration.

Beach has an aspiration to achieve net zero by 2050 and in August 2022 announced a target to achieve a reduction in net equity emissions intensity across its operated and non-operated portfolio of 35% by 2030 when measured against a 2018 baseline[1]. The company views CCS as a key component to achieve this target and is already a participant in the Moomba CCS project in the Cooper Basin with joint venture partner and operator Santos, with the facility currently under construction and targeting first CO_2 injection in 2024.

A second stage membrane separation unit at the Beharra Springs Gas Plant is also being planned, along with further fuel, flare and vent projects across Beach's operated portfolio. Beach is also assessing electrification of the Lang Lang Gas Plant (BassGas) to reduce its greenhouse gas emissions in the near-term.

Beach continues to take a proactive approach to its emissions reduction strategy by maintaining regular dialogue with its Australian and New Zealand stakeholders, providing disclosure through its sustainability reporting requirements, developing a scope 3 emissions reduction strategy, and investigating renewable and emerging energy opportunities that could possibly offer significant sustainability benefits over the medium to long-term.

New Zealand emissions

In FY22, Beach's scope 1 emissions from its New Zealand Kupe operations were ~130kt CO_2e. While scope 2 emissions are not reported in the annual emissions return to the New Zealand Environmental Protection Authority, the company has calculated its scope 2 emissions to be ~13kt CO_2e.

Beach's emissions are presently compensated for under the New Zealand Emissions Trading Scheme.

[1] See ASX Announcement "Beach Energy Ltd FY22 Full Year Results", released 15 August 2022

Scope 3 emissions

The Australian National Greenhouse and Energy Reporting Framework requires Australian businesses to report scope 1 and 2 emissions. Disclosure of scope 3 emissions is not required in this context, given the emissions are already reported as the scope 1 and 2 emissions by each stakeholder in the value chain. However, Beach views understanding and reporting on scope 3 emissions to be an important step in the transition to a lower carbon future.

The Department of Industry, Science, Energy and Resources publishes emissions conversion factors for a range of liquid and gaseous fuels that can be used to estimate the total scope 3 emissions that result from the end use of those fuels. These factors applied to products Beach sells to its customers indicate Beach's total scope 3 emissions to be ~8Mt CO_2e per annum[2].

Given this methodology approximates scope 3 emissions, Beach will introduce a more direct methodology to calculate and monitor its scope 3 emissions in relation to its Victorian Otway operations by the end of FY23. The company aims, subject to the support of its customers, to extend that methodology to be fully compliant with applicable standards (world resources institute greenhouse protocol technical guidance for scope 3 emissions or IPIECA value chain greenhouse gas emissions methodology) and report total scope 3 emissions across the whole business as soon as is reasonably practicable. At present, ~90% of Beach's customers are targeting net zero emissions.

Further initiatives

Beach is currently assessing a number of opportunities to participate in renewable and emerging energy markets near existing operations and where value can be created for Beach's stakeholders. These opportunities, none of which have yet been sanctioned and are at different stages of maturation, include:

- Offshore/onshore wind energy opportunities in the Taranaki Basin where Beach's current assets and infrastructure may provide a competitive advantage in what is already a key wind energy region for New Zealand;
- Hydrogen production at the Otway Gas Plant as either a direct supply to the local industry/transport sector and/or blended into sales gas supply;
- Underground hydrogen storage in the South Australian Otway Basin where Beach is participating in a study with Curtin University to assess the suitability of depleted local gas reservoirs adjacent to the Katnook Gas Plant; and
- Opportunities in the Cooper Basin to produce low and zero carbon future fuels such as ammonia and hydrogen.

Beach also recently announced a partnership with Deakin University's Blue Carbon Lab on a project to trial new technologies to restore coastal wetlands, which are considered efficient carbon sinks.

Comments from Beach Energy CEO Morné Engelbrecht

Beach Chief Executive Officer Morné Engelbrecht said that the company will continue to provide energy security to Australia and New Zealand, while playing a role in limiting the impacts of climate change.

"As a key supplier of energy for Australia and New Zealand, it is important that Beach explores all sensible opportunities to reduce our portfolio emissions," Mr Engelbrecht said.

"We know that natural gas will enable a steady transition to a clean energy future as it displaces coal in our energy mix, supplying a reliable source of power with lower emissions.

[2] "National Greenhouse Accounts Factors", Australian Government Department of Industry, Science, Energy and Resources (2020)

"As the International Energy Agency confirms, carbon capture and storage will play a leading role in getting to net zero, and Beach is already a 33% partner in the Moomba CCS project, one of the most significant emissions reduction projects in the nation's history.

"Our Victorian Otway operations are vital for the energy needs of Australia's east coast market, so it is a logical next step for CCS investigations.

"From Beach's perspective, CCS is just the beginning, and while proudly an oil and gas exploration and production company, we know that we must do more to modernise our role as an energy producer in the 21st century.

"Our focus on assessing new energy opportunities has gained momentum and where we can use our existing infrastructure and create value for stakeholders, Beach intends to participate. We are currently assessing a number of opportunities including hydrogen in Victoria, wind energy in New Zealand and other future fuels in the Cooper Basin, and I believe all can play an important role in the future energy mix. These new energy opportunities are incurring minimal spend at present while feasibility studies are progressed.

"Our industry has excellent people with the skills to help drive this transition. Beach is proud of its role as a provider of energy security in Australia and New Zealand and will take an active role in the transition to a lower carbon future."

Activities to support the delivery of stated emissions reductions targets

Beach has committed to a number of opportunities that will see it reduce its greenhouse gas emissions intensity by 35% by 2030.

Carbon capture and storage projects

Beach recognises the necessity for CCS in the global transition to net zero emissions and has demonstrated this with an $84 million commitment (net to Beach) to develop Moomba CCS. This project will allow for the safe storage of up to 1.7Mt CO_2 per annum and represents one of the world's largest scale CCS projects. On completion, it will be responsible for abating approximately 7% of South Australia's greenhouse gas emissions.

In addition, Beach has now completed a pre-feasibility study that assesses CCS potential in the Victorian Otway Basin and will refine this study in FY23 to focus on storage capacity, reservoir selection injectability, integration and environmental approvals in the region. If successful, the company aims to develop a facility with capacity to capture ~200kt CO_2e per annum.

The Company will commence an assessment of CCS viability at its other operational sites post Moomba CCS completion.

Fuel, flare and vent projects

Beach has implemented a number of fuel, flare and venting initiatives in FY21 and FY22 to increase plant efficiencies and reduce start-up waste. The company plans to implement additional optimisation initiatives in FY23 including the removal of a hot oil dump cooler at the Kupe Gas Plant, advanced process control for inlet and export gas compression at the Otway Gas Plant and purge gas optimisation at BassGas.

Beharra Springs Permeate

The Beharra Springs Gas Plant processes natural gas, removing CO_2 and other components before the sales gas enters the pipeline. The CO_2 removed by membrane units contains quantities of methane gas which will

be recovered by the installation of a compression and secondary membrane system and reduce the volume of methane flared, which may reduce emissions at the Beharra Springs Gas Plant by 50%.

Electrification

Beach is currently investigating the electrification of processes at its facilities where energy sources can be replaced with cleaner sources of fuel. An initial BassGas investigation assesses whether gas powered compressors can be replaced with electric motors that can be connected to the grid to source renewable electricity, reducing Beach's scope 1 emissions. The company intends to review potential electrification at each of its operated sites.

Renewable and emerging energy opportunities

In conjunction with the above near-term opportunities, Beach is progressing early-stage analysis on a range of opportunities which could provide significant sustainability benefits in the medium-to-long-term. None of the projects listed below have been sanctioned and are at different stages of maturation.

Wind generation in Taranaki Basin

Beach and its joint venture partners in New Zealand have agreed to conduct a study exploring onshore and offshore wind power generation opportunities near the Kupe Gas Plant. This study will involve working with three offshore wind energy developers to install monitoring equipment on the Kupe well head platform, off the coast of South Taranaki, New Zealand.

New Zealand's wind resource currently ranks fifth largest in the world and the South Taranaki Bight is believed to be a prime wind location. If taken through to implementation, this opportunity would reduce Kupe electricity costs and carbon emissions in the region.

At this early stage, Beach's capital investment in the necessary feasibility studies and data collection is limited. The company is forming strategic partnerships to progress the project and achieve Beach's primary objectives with credible partners, whilst also maintaining options on a range of secondary objectives, where possible.

Hydrogen at Otway Gas Plant

Beach is undertaking preliminary investigations into hydrogen production opportunities at the Otway Gas Plant with a notional electrolyser capacity of 12 MW. This work will include an options analysis that explores the local market for hydrogen, electrolyser technology, transport, integration opportunities, and blending with sales gas.

Hydrogen storage in South Australian Otway

The establishment of a competitive hydrogen production industry in Australia will require large-scale underground storage solutions. Therefore, Beach is partnering with Curtin University to undertake a series of studies focusing on underground storage of hydrogen in Australia. The collaborative study with Curtin entitled 'Enabling Large-Scale Hydrogen Underground Storage in Porous Media' will evaluate the feasibility of hydrogen underground storage in depleted gas reservoirs and develop a framework, as a screening tool, for hydrogen underground storage. This is specifically associated with the South Australian Otway producing reservoirs and Katnook Gas Plant. The Katnook Gas Facility provides the ideal infrastructure, plant and depleted reservoirs to use for modelling and application of the framework developed through the course of the research.

Low/zero carbon fuels in the Cooper Basin

Beach has been working with an external consultant to explore options to leverage infrastructure and resources in the Cooper Basin. Following a thorough analysis, production of low and zero carbon fuels was identified as a leading opportunity. Shipping, co-firing for energy generation and transportation requirements are creating significant demand for these future fuels. This opportunity has the potential to extend the productive life of the Cooper Basin and significantly increase Beach's production of low emissions fuels.

Approach to Sustainability

Governance

In the 2022 Sustainability Report, Beach affirmed that it will be enhancing its commitment to the Taskforce on Climate-related Financial Disclosures (TCFD) through a review on the four key areas of governance, strategy, risk management, and metrics and targets. Beach is developing a TCFD approach to manage this work as a key deliverable for FY23.

Reporting

Beach has been reporting its sustainability measures in accordance with the Global Reporting Initiative Sustainability Reporting Standards for several years. Beach remains informed of the development of international standards for climate disclosure and will update Beach's reporting frameworks as required.

For more information, see Beach's 2022 Sustainability Report: www.beachenergy.com.au/sustainability

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