Brunei energy storage technologies

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Brunei''s 420,000 residents are Southeast Asia''s biggest polluters despite contributing just 0.025 per cent of global greenhouse gas emissions in 2018. The hefty carbon footprint is due to the sultanate''s complete dependence on hydrocarbons for its domestic energy requirements. Gas powers 98.95 per cent of its electricity needs. Oil takes up one per cent, while a 1.2 megawatt (MW) demonstration solar plant - currently Brunei''s only source of renewable energy - supplies 0.05 per cent.

This is unlikely to budge much in the coming years. Throughout its chairmanship of the Association of Southeast Asian Nations (Asean) this year, the sultanate repeatedly called for a larger role for natural gas in the region''s energy transition effort, noting that it is "one of the cleanest fossil fuel options", efficient, and accessible. Geographical constraints--i.e., its small size--mean that the technical potential for renewable energy is limited leaving the country to rely on nascent, unproven, technology to drive down its emissions.

“The challenge is going to be how Brunei - and how other governments, companies, countries - will allocate the cash from oil and gas [to reducing carbon emissions] over the next decade," said Andrew Harwood, research director for Asia Pacific Upstream Oil & Gas at global energy consultancy and research group Wood Mackenzie.

The economy with a gross domestic product (GDP) per capita of US$31,400 - the region''s second highest after Singapore, which has a GDP per capita of around US$60,000 - derives its wealth from exporting oil and gas. The industry accounts for 55 per cent of its economy and up to 90 per cent of its exports and government revenues.

Despite global efforts to shift away from oil and gas energy, the sultanate continues to strengthen upstream oil and gas activities to ensure long-term energy security and sustainability of its reserves. Brunei has the fourth largest proven reserves of gas in Southeast Asia, after Indonesia, Malaysia and Vietnam.

Demand for oil and gas is likely to be strong through the next decade as larger economies try to extract themselves from extracting fossil fuels. At current prices, significant cash flows will be generated for oil and gas producers like Brunei.

Oil and gas is a pillar of its economy and Brunei is determined to ramp-up the energy sector''s contribution to its GDP to US$31 billion in 2035 from US$7.43 billion in 2010. It also wants oil and gas sales to account for 90 per cent of the energy sector’s contribution to GDP by 2035, under an oil price assumption of US$120-145 per barrel.

Brunei is looking to attract investments of about US$60 billion in the sector for the development of enhanced oil recovery (EOR) technologies that will maximise oil reserves and extend the life of fields. Brunei estimates production in its fields could rise 10-20 per cent with EOR and encourages operators to deploy technologies for it. It is also looking for cash to develop small and marginal fields; new downstream industries; local energy goods and service industries and renewable energy.

Harwood is optimistic funds will come in for Brunei’s oil and gas, as energy giants Petronas, Shell, and Total continue to operate in the country. "[They] all still have major stakes in the producing blocks or in undeveloped resources within the country, and so you can expect those companies to be looking at how they can develop those resources," he said. Brunei Shell Petroleum (BSP), a joint venture between the Dutch giant and the sultanate, contributes 90 per cent to the country"s oil and gas revenues.

Brunei is banking on technology to reduce its emissions without cutting into its mainstay economy. Investing in pollution-reducing technology buys the industry time for its transition towards sustainable energy sources, say analysts.

However, instead of ramping up renewables, the petrostate"s decarbonisation policy appears to be largely reliant on energy efficiency targeting a 45 per cent reduction in energy intensity by 2035, from a baseline year, 2005 in line with its regional commitment to the Asia-Pacific Economic Corporation.

"To ensure that you can continue producing, in a sustainable manner, your existing oil and gas resources, you need to look at how you reduce your emissions for now. You need to look at how you can decarbonise that and that gives you more time with which to build up some of these alternative sources of energy," Harwood said.