

SUSTAINABILITY

Green gold rush

BY SREEREMA BANOO

Driven by climate change and sustainability concerns as well as emerging technologies — from carbon capture and sequestration to green hydrogen and predictive analytics — that are enabling new innovations, there is no doubt that the clean technology (cleantech) or climate tech sector is having a moment.

Emerald Technology Ventures, a global cleantech venture capital (VC) firm that has been active in the climate tech sector for more than two decades, is observing both a growth in entrepreneurship and investment in this space.

First popularised in the 1990s, cleantech refers to a wide variety of environment-friendly practices and technological innovations that contribute to sustainability and decarbonisation, from emissions reductions and renewable energy to water and waste management.

Although the sector is more developed in Europe and North America, it is gaining ground in Asia and Southeast Asia, says Anandhi Gokhale, investment manager in energy at Emerald. “It is in the infancy stage, but it is growing very quickly; the evidence is that we’re seeing more start-ups from the region as part of our regular deal flow, as well as more VCs flowing into the Southeast Asian and South Asian markets in the cleantech space.”

Established in Zurich in 2000, Emerald has expanded its operations globally over the years and in 2020 opened its first Asia office in Singapore, launching a dedicated water fund that same year. Although water is an important part of its investment focus, more than half of Emerald’s investments in cleantech are in the energy sector. In 2021, the firm launched a dedicated energy fund, capitalising on the US\$4 trillion estimated by the United Nations that is needed to be invested in energy-sector decarbonisation every year to 2030 to reach net zero emissions by 2050. Within the cleantech energy space, the firm focuses on four key pillars: (i) decarbonisation of power generation; (ii) digitalisation; (iii) electrification; and (iv) synthetic fuels or synfuels. Additionally, Emerald also invests in solutions related to industrial automation; food and agriculture; and the circular economy.

Investors in Emerald’s cleantech funds are mostly corporates, the exception being in the water fund, where Singapore state-owned investment company Temasek is the anchor investor. Elaborating on the firm’s limited partner base of corporates from Asia, Anandhi, who is based in Singapore, says these include cement players, material science companies, industrial automation players and heavy machinery corporations that are looking to decarbonise their operations and move away from traditionally fossil fuel-powered facilities.

“Investing in cleantech solutions that enable decarbonisation of existing industrial processes is something that’s quite attractive to large corporations who are also looking to set up (if they haven’t already) net zero goals and work towards those ambitions,” she says.

Some of the firm’s recent investments include Mumbai-based water treatment systems maker Indra, which has a proprietary technology to remove a wide range of unwanted substances from heavy metals and suspended solids to certain dissolved organics like dyes. Earlier this year, together with Piva Capital and several other investors, Emerald co-invested in Ineratec, a Germany-based start-up that provides sustainable aviation fuel for airlines and other companies. Piva Capital is a venture capital firm based in San Francisco; it manages Petronas Ventures’ (the corporate venture capital arm of Petronas) North American and European investments.

BRIDGE BETWEEN CORPORATES AND START-UPS

When evaluating potential start-ups, the first thing Anandhi looks for is product-market fit. “One of the things we like to do when we conduct due diligence on a start-up is to speak to its customers and one of the questions that we like to ask the customer is ‘can you

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Mumbai-based Indra leverages electrical reactions to rid wastewater of pollutants. Its proprietary technology can remove a wide range of unwanted substances.



Sustainable fuels start-up Ineratec manufactures reactors that synthesise liquid fuels (also known as synfuels) from non-fossil-based feedstocks. The current most promising end-use for synfuels is sustainable aviation fuels, largely viewed as the only viable pathway for airlines to achieve net zero goals.

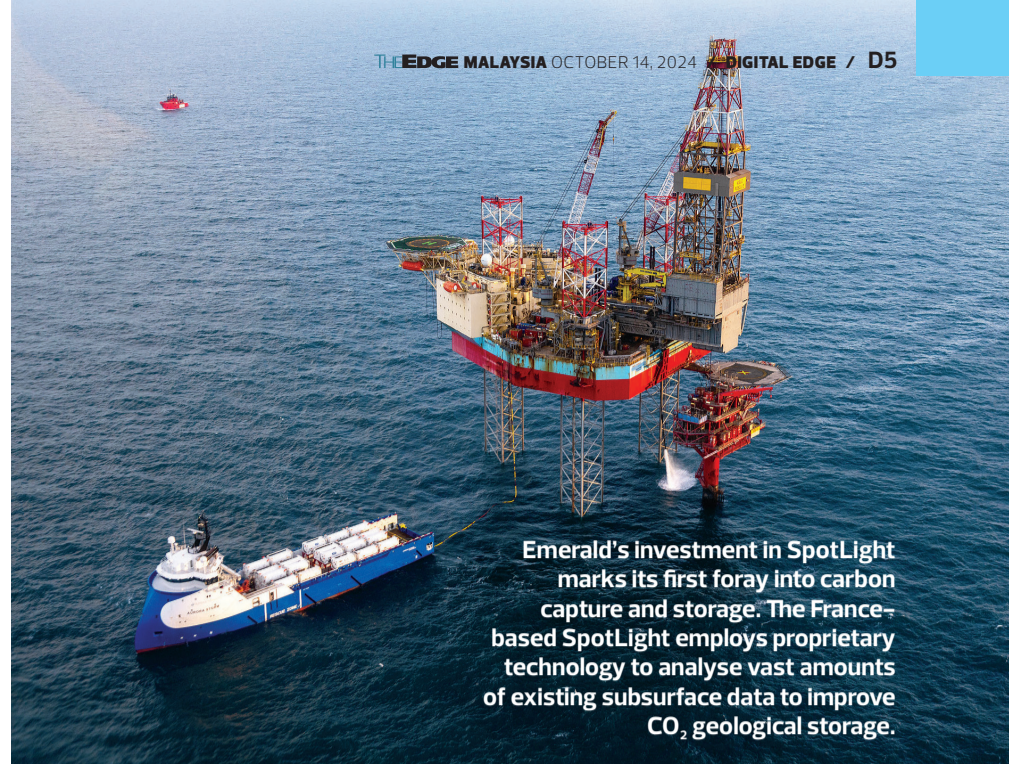
live without this product?’, which immediately tells us whether the start-up is solving a real pain point for the end customer. If it is not a firm ‘no’, then you know that there is potential that either the start-up can be replaced or maybe the product is not satisfactory enough,” she says, adding that other factors such as market size, the management team and the company’s path to profitability are also crucial.

“We see ourselves as smart money and, by that, one of the things that we like to do is for the team involved in doing the due diligence to remain in contact very

closely with the company. Usually, one of the partners at Emerald would also sit on the board of the company, on the audit committee, for example, and be closely involved in strategic decisions and even forging connections through our large corporate network.”

Anandhi, who was a speaker at Maybank’s Invest Asean conference held in Penang in June, says in addition to Emerald being a financially driven venture capital firm, it also sees itself as an open innovation partner. “In the past, perhaps most corporates did all their innovation and research and development (R&D) in-house. But increasingly, the pace of development of technology has been so quick that corporates are leaning outwards to look for external partners to enable more rapid innovation and product development. And so, we see ourselves as a bridge between large corporations and the start-up world to take forward novel technologies and products into the market quicker.”

Emerald’s partnership with Japan’s Nabtesco Corp, for example, saw the launch of Nabtesco Technology



Emerald’s investment in SpotLight marks its first foray into carbon capture and storage. The France-based SpotLight employs proprietary technology to analyse vast amounts of existing subsurface data to improve CO₂ geological storage.

Ventures in 2018. The fund invests primarily, but not exclusively, in robotics, motors, sensors, additive manufacturing, artificial intelligence and Internet of Things technologies. In 2023, Emerald and Nabtesco Technology Ventures invested in SpotLight, a company that develops a non-invasive subsurface surveillance solution for carbon dioxide geological storage.

This marriage between the innovation and agility of the start-ups and the experience of the larger corporates is catalysed through Emerald’s team of sector specialists. These subject matter experts in the various verticals review start-ups in the respective sectors and share the new trends they observed through monthly exchange sessions with the corporate partners. “We share start-ups we’re seeing globally and if there’s interest from the corporates, usually the corporate venture capital arm (CVC) of these corporates or R&D team, we can then make the introductions,” she says.

What’s interesting, she notes, is that apart from investing in Emerald’s funds, companies are also investing directly into cleantech start-ups. Piva Capital’s investment in Ineratec, for instance, is part of Petronas’ focus on solving the world’s biggest challenges, one of them being decarbonising hard-to-abate sectors such as transportation, aviation and chemicals.

Through corporate venturing, she says, companies can forge collaborations with the start-ups in the early stages and be involved in their growth. There’s a clear case to be made for corporate venturing given that corporates are the ultimate customers of these cleantech start-ups. “So, it makes sense for corporates to engage with start-ups to carry out pilot testing to ensure that the technology can indeed be validated and scaled at a commercial level.”

GROWING THE CLEANTECH SPACE

Although cleantech entrepreneurship is building up in the region, Anandhi points out that it is still early days yet. Based on the experience and successes of North American and European cleantech entrepreneurs, one path to growth is to increase access to non-dilutive funding. “In Europe and North America, there are a lot more programmes from universities and governments to have non-dilutive funding [in the form of grants or subsidies], which helps in the early days.”

Equally important, she adds, is the ecosystem building. “One of the things that we have been enjoying here in Singapore is that the ecosystem is getting to the point of critical mass, which is a combination of academia, industry, venture capital, accelerators and incubators needed to help early-stage companies.”

The pace of entrepreneurship in the cleantech space in North America and Europe is also propelled by the regulatory push in these regions. The drive — from stakeholders to stock markets and regulators — to have commitments to decarbonisation is pushing a lot of the activities in the cleantech space, and although it is slower in this part of the world, it’s growing nonetheless, she points out.

The firm, she adds, is actively seeking opportunities in the cleantech energy space, from novel technologies, software or materials that address the issues of transmission and distribution in renewables to electrification. The latter is crucial given the number of process industries in the region, many of whom are putting an emphasis on decarbonising their operations. “Enabling technologies such as electric motors are also something we’d be excited about and given the large oil and gas resources in this part of the world, there is also this push towards sustainable aviation fuel. We continue to look for opportunities in this space.”