



Smart Energy, Sustainable Future



MEDIA RELEASE

15 July 2022

Two Local Startups To Develop Sustainable Energy Solutions Under EMA-Shell Startup Partnership

Two local startups have been awarded grants to enhance and test-bed their sustainable solutions in underwater infrastructure inspection and the production of low-carbon hydrogen. The award is part of the \$8 million partnership between the Energy Market Authority (EMA) and Shell, with support from Enterprise Singapore (EnterpriseSG), to nurture local start-ups.

2. The companies awarded this year are BeeX Pte Ltd and SunGreenH2 Pte Ltd. As a deep tech spin-off from the National University of Singapore, BeeX Pte Ltd specialises in designing and building autonomous equipment used for inspection of underwater infrastructure. Their solution could potentially be used to remotely monitor and inspect underwater energy infrastructure such as subsea cables or floating solar photovoltaic systems. This reduces the need for manual inspections as Singapore scales up solar deployment on water bodies and taps on regional power grids to import low-carbon electricity. For their pilot, BeeX will be collaborating with Shell to trial a HAUV (Hovering Autonomous Underwater Vehicle), to make underwater inspections safer, more efficient and effective at the Shell Energy and Chemicals Park Singapore on Pulau Bukom.

3. The other awarded startup, SunGreenH2 Pte Ltd has developed a proprietary electrolyser technology used to produce low-carbon hydrogen. The Anion Exchange Membrane (AEM) technology has the potential to improve the efficiency and cost effectiveness of producing low-carbon hydrogen, a clean renewable energy source that may one day become an alternative fuel for power generation. More details of the two startups' solutions are in the Annex.

4. Mr Ngiam Shih Chun, Chief Executive of EMA, said, "As the energy sector advances towards a more sustainable future in support of Singapore's net-zero aspiration, we see a need for all stakeholders to play their part. EMA is therefore pleased to support our local startups in developing their innovative solutions and bring them a step closer to commercialisation. This will also enhance the overall vibrancy of

the energy ecosystem and foster greater collaboration among the different industry players.”

About EMA-Shell Partnership

5. EMA and Shell kicked off their partnership in 2019 to nurture local energy startups through the Shell StartUp Engine Singapore accelerator programme. The programme supports energy startups wanting to deepen their expertise in areas such as renewable energy, energy efficiency and low-carbon solutions. Support provided includes access to capacity-building workshops, mentorship and opportunities to showcase their solutions at key industry events. To date, the partnership has supported 18 startups. Among the supported startups, EMA has also provided grants to selected startups to further develop their solutions to advance the energy sector’s transition towards greener sources.

6. Mr Thomas Wong, General Manager of Shell Energy and Chemicals Park Singapore at Bukom and Chairman of Shell StartUp Engine Singapore Committee said, “We strongly believe that innovating and collaborating with the different players of the energy value chain is key in moving towards a low-carbon world. Startups are an exciting source of new ideas and innovation. We continue to be committed in partnering stakeholders like EMA to nurture the ecosystem. Supporting and working with local innovative startups like BeeX and SunGreenH2 is valuable in not only helping us to transform our business and the industry, but also contributing towards a net-zero world.”

7. Applications for the Shell StartUp Engine Singapore 2022 programme is now open. Interested startups may visit the [Shell website](#) for more details.

8. The partnership is also supported by EnterpriseSG under its Open Innovation initiative, which leverages lead demand from government agencies and business corporations to support small- and medium-sized enterprises (SMEs) and startups in developing innovative solutions.

9. Mr Jeffrey Siow, Managing Director & Chief Operating Officer of EnterpriseSG, said, “Enterprise Singapore is pleased to support EMA and Shell’s co-innovation partnership. Through this initiative, our startups and companies can build their track records and gain new capabilities. Such industry partnerships are important to develop a dynamic and collaborative energy ecosystem.”

Annex: Details of Awarded Projects

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About the Energy Market Authority

The Energy Market Authority (EMA) is a statutory board under the Singapore Ministry of Trade and Industry. Through our work, we seek to forge a progressive energy landscape for sustained growth. We aim to ensure a reliable and secure energy supply, promote effective competition in the energy market and develop a dynamic energy sector in Singapore. Visit www.ema.gov.sg for more information.

Instagram: @EMA_Singapore | Facebook: facebook.com/EnergyMarketAuthority |
Twitter: @EMA_sg | LinkedIn: linkedin.com/company/energy-market-authority-ema/

About Shell in Singapore

Shell is a global energy company that has been in Singapore since 1891. Around 3,000 employees in Singapore work together to power progress through more and cleaner energy solutions. We use advanced technologies and take an innovative approach to help build a sustainable energy future.

About Enterprise Singapore

Enterprise Singapore (EnterpriseSG) is the government agency championing enterprise development. We work with committed companies to build capabilities, innovate and internationalise. We also support the growth of Singapore as a hub for global trading and startups and build trust in Singapore's products and services through quality and standards. Visit www.enterprisesg.gov.sg for more information.

ANNEX: DETAILS OF AWARDED PROJECTS

Company Name	BeeX Pte Ltd (BeeX)
Project Title	Autonomous Inspections of Singapore's Energy Infrastructure Underwater
Partners	Shell, ST Engineering (Unmanned and Integrated Systems)
Description	<p>There is an increasing number of underwater infrastructure in Singapore, such as floating solar photovoltaic (PV) systems and subsea power cables to support energy imports from the region into Singapore. These infrastructures require inspections for maintenance which are traditionally conducted by divers or Remotely Operated Vehicles (ROV) hosted on workboats and require extensive manpower and resources.</p> <p>The Hovering Autonomous Underwater Vehicle (HAUV) will be attempting collaborative work with ST Engineering's Autonomous Surface Vessel to further optimise on resources and broadening of datasets to be collected</p> <p>Project Objective: BeeX will be developing a new HAUV that can work up to 3 knots of underwater current, with 10 kilowatts of lithium-ion batteries, for sufficient capacity and capabilities to broaden the operating weather windows and reduce labour needs.</p> <p>Located at Shell's Energy and Chemicals Park Singapore on Pulau Bukom, the pilot will validate the impact of the technology on the Park's infrastructure before being deployed to other sites.</p> <p>Project benefits: Given Singapore's plans to import electricity from the region to diversify and green its power supply and to harness solar energy, BeeX's solution can be used for the inspection and monitoring of related infrastructure (e.g. subsea transmission cables and floating solar PV systems).</p> <p>If successful, the new HAUV will be able to perform underwater work, with a 70% reduction in total man-hours.</p>

Photos



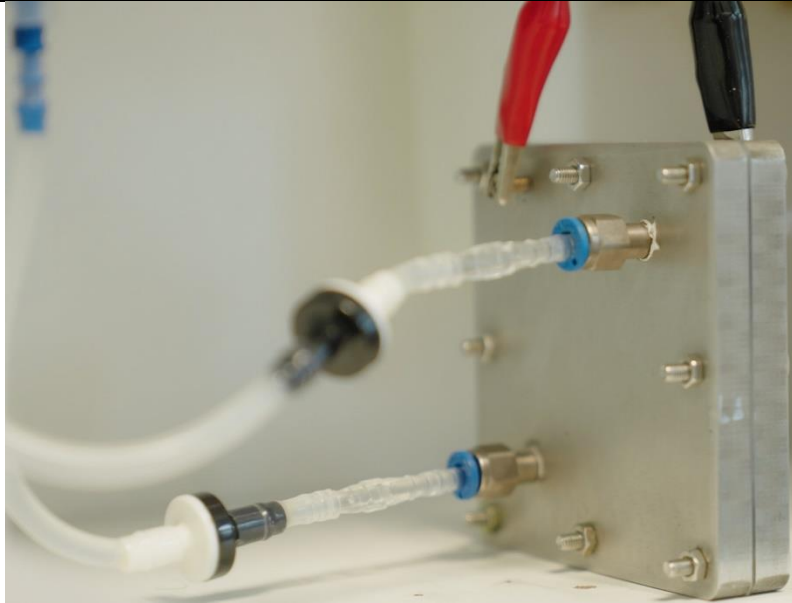
*Caption: Existing Hovering Autonomous Underwater Vehicle (HAUV) being deployed to remotely inspect or monitor underwater infrastructure
Video Link: <https://www.youtube.com/watch?v=yq0GvQSSeBE>
Credit: BeeX Pte Ltd*



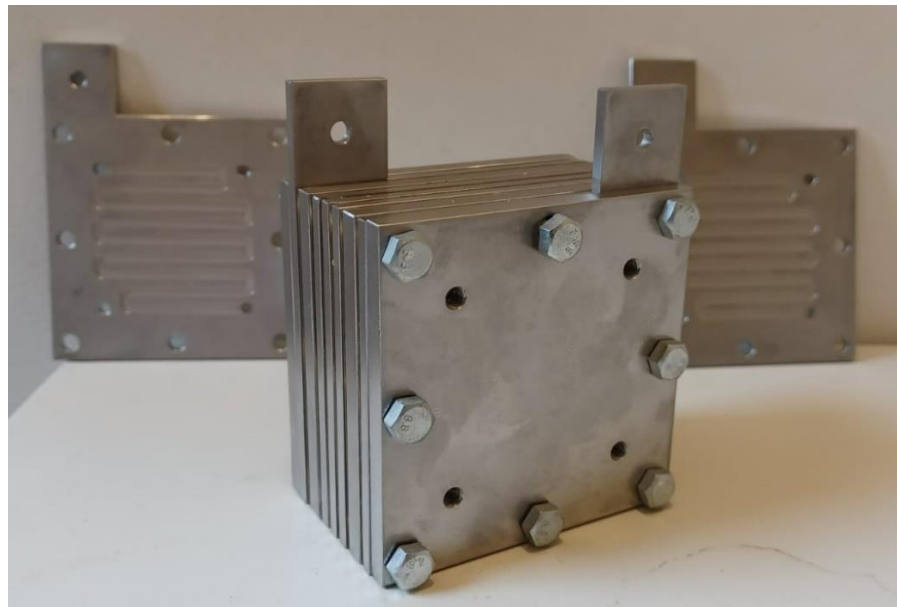
*Caption: Close-up view of BeeX Pte Ltd's existing Hovering Autonomous Underwater Vehicle (HAUV)
Credit: BeeX Pte Ltd*

Company Name	SunGreenH2 Pte Ltd (SunGreenH2)
Project Title	Novel Modular Electrolyser System for Low-Cost Low-Carbon Hydrogen Production
Partners	Keppel Gas Technology Development, EcoLabs Centre of Innovation for Energy
Description	<p>Hydrogen, which can be used to store and transport energy, does not emit carbon dioxide when used as a feedstock or fuel. While it has the potential to diversify Singapore’s fuel mix, the production of low-carbon hydrogen from renewable sources is still not commercially viable and remains costly.</p> <p>Project Objective: SunGreenH2 will be developing a novel, innovative hydrogen technology – a high performance Anion Exchange Membrane (AEM) electrolyser system that aims to make production of low-carbon hydrogen commercially viable and cost-effective in Singapore. This system will incorporate the use of the startup’s proprietary platform technology that incorporates high-performance advanced nanostructured materials into key electrolyser components to electrochemically split water molecules into hydrogen and oxygen. SunGreenH2’s proprietary platform technology offers a sustainable and scalable solution for deep decarbonisation via low-carbon hydrogen production that is the result of over 10 years of research in electrochemistry and nanotechnology.</p> <p>A test-bed of the solution will be piloted in Singapore with the project partners, which could potentially enhance and scale up the proposed electrolyser system for the next generation of hydrogen production requirements in Singapore. Further activities may also be conducted to address the technical and economic aspects of the project.</p> <p>Project Benefits: In comparison to existing traditional electrolyser technologies, SunGreenH2’s AEM electrolyser technology has the potential to generate twice the amount of low-carbon hydrogen, using 10% less energy and 50% less space when deploying the technology.</p> <p>If successful, insights from the test-bed could be used to scale up the production of low-carbon hydrogen locally in Singapore in aid of net-zero emissions by cutting fossil fuel dependence to tackle climate change. Having the hydrogen produced on-site locally also reduces costs and emissions associated with the transportation of hydrogen.</p>

Photos



*Caption: SunGreenH2's AEM electrolyser cell under demonstration at A*Star's Institute of Materials Research and Engineering in Singapore
Credit: Shell*



*Caption: SunGreenH2's electrolyser stack which is under development
Credit: SunGreenH2 Pte Ltd*