



EV Boats
Coming to Indonesia

Semaai
Gets Seed Funding

iPhone Assembler
Takes on EV

Java's Vast
Floating PV Plant

Indonesian
Geothermal:
Full Steam Ahead

Energy Transition to Create 1,000 Green Unicorns

How can a mythical animal typically represented as a horse with a single straight horn projecting from its forehead be part of energy transition? In the world of business there is another meaning: As you know, a unicorn company refers to a privately held start-up that has reached a valuation of US\$1 billion. Most unicorns are associated with Silicon Valley, though there's a growing number based in New York, Stockholm and China. Here in Indonesia there are six: Bukalapak, Gojek, J&T Express, JD.ID, OVO and Travelok.

Larry Fink, the CEO and Chairman of giant money manager Blackrock Inc., says climate change, as terrible as the potential consequences could be, presents massive opportunities for start-ups. Fink says that the next 1,000 unicorns won't be search engines or media companies but businesses developing all things green: hydrogen, agriculture, steel, cement, essentially products and services that provide healthier environments.

Fink is well recognized for publicly supporting sustainability when making finance decisions particularly in his much-awaited annual letters to leading global CEOs. So why does Fink believe in cleantech so much? In the last five years, we can see a rising trend in green unicorns, which reveals two issues that are sorting themselves out.

The first is much of cleantech science has proven to be increasingly (and finally!) profitable and secondly answers why – because those same commercially successful companies are showing us that start-up culture can move towards solving environmental issues with real solutions.

***Keeping it Clean
The HUB Team***

**Editor/Curator/
Publisher:**

Tom O'Brien

tom@accommcan.com

Government Relations:

Vira Soekardiman

Events & Podcasts:

Edira Putri

Advisory Panel:

Strategic Partnerships:

Roland Staehler

Waste-to-Energy:

Dewi Lestari

Energy Storage:

Muhammad Iqbal

Smart Energy Management:

Bill Russo

EV Infrastructure:

Robert Tjandra

Renewables:

Agung Pratama

Agri-Tech:

Intan Budiarto

Geothermal:

Natalia Nagi

Design:

Surface Design Consultancy

Big catch for Indonesia's e-Fishery, its data-based pond management system receiving the largest ever venture capital financing for an aquaculture start-up globally.

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CLEAN LOOK
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OnePointFive^o

DECARBONIZING UPDATES & EVENTS

Japanese Partners Conduct RI Energy Survey



Japanese utility companies have teamed up with the Japan International Cooperation Agency (JICA) to develop a proposed roadmap for the decarbonisation of the power sector in Indonesia. According to [Smart Energy International](#), Tokyo Electric Power Company (TEPCO), TEPCO Power Grid, and Tokyo Electric Power Services Company (TEPSCO) have agreed to co-conduct the “Data Collection Survey on the Power Sector in Indonesia for Decarbonisation” and to deliver the project by March 2022. As the largest energy consumer in the Association of Southeast Asian Nations (ASEAN), Indonesia accounts for nearly 40 per cent of ASEAN’s total energy use.

Report: Corporate Greenwashing Revealed

According to a [report](#) by the Germany-based New Climate Institute, IKEA, Amazon and Google are among numerous companies overstating their work towards decarbonising. The analysis, conducted in collaboration with Carbon Market Watch, reveals that 25 of the world’s largest companies are not meeting their own climate targets, only reducing their emissions by an average of 40 per cent rather than 100 per cent which they claim. The authors of the report say as pressure to act on climate change increases, many inflated claims are without validity. Moreover, part of the issue is that many businesses exclude upstream and downstream emissions in their value chain.

Net Zero Ambitions

French Industrial Gas Company, Air Liquid and Pertamina [recently announced](#) they will explore solutions to decarbonise Pertamina’s activities in Indonesia with an aim of reaching net zero by 2060. The energy companies will study how best to reduce CO2 using Carbon Capture Utilization and Storage (CCUS) to produce low-carbon hydrogen. Air Liquide will leverage its expertise in hydrogen and proven carbon capture technology while Pertamina will bring its experience in the energy sector.

One Hundred to Zero

Minister of State-owned Enterprises (SOE) Erick Thohir recently announced at a Cyber Media Network meeting that Indonesia is on a path to grow as a green energy consumer and green power energy producer, encouraging all SOEs to have a measurable road map towards zero emission by 2060 to reach a future where the country uses 100 per cent clean energy.

Report Finally Gaining Attention

The Institute of Essential Services Reform (IESR) published a paper titled “[The Role of Electric Vehicles in Decarbonizing Indonesia’s Road Transport Sector](#)” that is increasingly relevant to today’s EV news. Produced as part of the work of Climate Transparency – an international partnership of over a dozen research organizations and NGOs – the 2020 report examines Indonesia’s policy and regulatory framework in regards to the development of EV and the reduction of GHG emissions.

Deloitte's 2030 Decarbonisation Challenge

The recently released must-read "Path to the Future Energy" [report by Deloitte](#) provides remarkable cross-sector decarbonisation solutions leading up to 2030. This report explores how companies in certain sectors of the E&R industry—chemicals, oil and gas, mining and metals, and power, utilities



and renewables—can accelerate decarbonization over the next decade and achieve meaningful interim targets by 2030.

Time to Retire

The world's 15th-biggest owner of coal power plants, PLN, has pledged to retire three of its plants by 2030 and shut the rest by 2055. [The Asian Development Bank's Energy Transition Mechanism](#), announced last year, aims to retire 50 percent of coal-fired power plants in Indonesia, Vietnam, and the Philippines over the next 10 to 15 years, a goal that requires US\$30bn-\$60bn in financing based on calculations of US\$1m-\$1.8m per megawatt.

Heavy Duty Alliance

Mitsubishi Heavy Industries Ltd. (MHI) and Institut Teknologi Bandung (ITB) have signed a five-year memorandum of understanding to conduct joint research on clean energy solutions to help drive decarbonisation in Indonesia. The collaboration will include feasibility studies and R&D for technologies that will power the country's energy transition. The alliance is timely as Indonesia is stepping up its efforts to decarbonize its energy sector with a commitment to reduce GHG emissions by nearly 30 per cent by 2030 and achieve 23 per cent renewable energy use by 2025.

The Key to Locking Up CO2

Researchers at [Melbourne's RMIT University claim](#) to have developed an efficient new way of capturing carbon dioxide and converting it to solid carbon for the decarbonisation of industrial processes. In Indonesia decarbonisation is an immense technical challenge for heavy industries like cement and steel, which are not only energy-intensive but also directly emit CO2 as part of the production process. The advanced technology as stated by RMIT researchers, uses liquid metals as a catalyst to convert carbon dioxide as it is produced and then locks it permanently in a solid state, keeping CO2 out of the atmosphere.

UK Cleantech Alliance on Track

At the heart of the UK rail network for over 25 years, [Porterbrook](#), which owns roughly a quarter of the national passenger rail fleet, has partnered with [Rolls-Royce](#) to support the decarbonisation of the British railway sector. The collaboration will explore the use of synthetic and net zero fuels (including hydrogen) for rail transport. Porterbrook has been at the forefront of developing alternative traction systems for rolling stock over recent years through innovations and a long-term asset management approach. Rolls-Royce, for its part, has extensive experience of rail technology and will be able to draw on expertise from across its business in new net zero and zero emissions technologies.

2022 Virtual & In Person HUB Events

April 10

Virtual - Location: Sanur, Bali

Harnessing Indonesia's Ocean Energy

Panel discussion with live Q&A, and Post-event open networking session

May 27

Virtual - Location: Sanur, Bali

Providing Incentive for battery recycling

Panel discussion with live Q&A, and Post-event open networking session

June 10

In Person - Location: Sanur, Bali

Unlocking Rooftop Solar Opportunities

Panel: Associate Director- Business Development, Cleantech Solar, Indonesia

Panel discussion with live Q&A, and Post-event open networking session

July 30

In Person - Location: Sanur, Bali

A Net Zero Future for Bali Tourism

Post-event open networking session

August 31

In Person - Location: Sanur, Bali

Financing Cleantech Entrepreneurs

Panel discussion with live Q&A, and Post-event open networking session

September 28

In Person - Location: Nusa Dua, Bali

Decarbonizing Expectations from the G20

Panel discussion with live Q&A

October

In Person - Location: Nusa Dua, Bali

G20 Coverage

Post-event open networking session

About Hub

HUB is published quarterly for the Indonesian Cleantech Hub in association with PT Mandarin Media (Indonesia) and Accomcan Communications Ltd (Canada)

Sponsors and partners: HUB is an independent media outlet dedicated to promoting cleantech innovation and chronicling Indonesia's transition to a decarbonized economy and society. We welcome participation for supported and branded content from mission-driven corporate and non-profit organizations who share our goal to bring forward cleantech news and a commitment to Environmental, Social, and Governance (ESG) metrics.

HUB is distributed to a database of business executives and thought leaders in Indonesia and Canada as well as select media outlets in Southeast Asia and Canada.



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secretariat@iccc.or.id

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Agri-Tech.

Agri-tech Company to Grow with Seed Funding

Semaai, an agri-tech start-up based in Indonesia, has announced US\$1.25 million in pre-seed funding led by Sequoia Capital, India's accelerator programme Surge and Singapore-based venture capital firm BeeNext. Semaai provides a comprehensive end-to-end solution for Indonesian farmers supported by offices in Jakarta and Singapore, with a new Indian office to open soon. A large part of the start-up funding for engineering and product teams will take place in India with plans to grow its tech talent in India by at least three times towards the end of 2022. Semaai refers to itself as a "farmer-first" company revolutionising agriculture through technology and providing a solution for rural communities centered around enhanced knowledge for farmers to help maximise their earning potential. Indonesia's agriculture industry is estimated to be worth US\$100 billion, making up 13.5 per cent of the nation's GDP while providing a livelihood for more than 40 million farmers and small rural businesses.



HUB Chats with Semaai Co-founder Yoga Anindito

Can you tell HUB readers what agri-tech innovations Semaai has benefited from?

We advocate good agricultural practice by introducing sustainable innovations to farmers through agri-retailers. Some of the innovations that we find beneficial are sprayer drones and microbes, since they are proven to be able to encourage farmers to reduce synthetic fertilizer usage.

Has climate change become an issue?

Farmers are not accustomed to extreme rainy seasons or extreme dry seasons. As the climate continues to fluctuate dynamically, farmers need to adapt faster. We have not dealt with this issue yet.

How has technology assisted with diversified food products?

We observed that the unprecedented level of connectivity has helped middlemen and led farmers to plant more high-value horticulture crops. We at Semaai are committed to further strengthen the network and convince more farmers to supply these diversified food products to improve their profit.

eFishery Nets US\$90 Million Series C

Marking the largest-ever venture capital financing for an



aquaculture start-up globally, Indonesia's **eFishery** announced it has raised US\$90 million in

Series C funding. This round of investment was co-led by Temasek, SoftBank Vision Fund 2, and Sequoia Capital India, with participation from existing investors including the Northstar Group, Go-Ventures, Aqua-Spark, and Wavemaker Partners. The funds will be used to scale up eFishery's platform and to bolster its digital products, making it the world's largest digital "cooperative" for fish and shrimp farming. eFishery also aims to expand regionally, targeting the top 10 countries in aquaculture, such as India and China. Based in Bandung, eFishery revolutionizes traditional farming methods and provides solutions designed specifically to improve outcomes for fish and shrimp farmers. It offers an end-to-end platform providing farmers with access to technology, feed, financing, and markets. Since launching in 2013, the company has deployed thousands of smart feeders, serving over 30,000 farmers across 24 provinces in Indonesia. Since December 2020, at the peak of the pandemic, eFishery has scaled its network by tenfold.

Plant-based Cheese Market Grows in Canada

Protein Industries Canada recently announced a new project that will leverage the combined strengths of Lumi Foods, Winecrush Technology and Save-On-Foods to enhance Canada's plant-based cheese market. The partners will use Lumi Foods' cultured cheesemaking methods—which enables the continued use of the term "cheese"—to create a new line of plant-based cheeses made from Canadian-grown crops, including oats, legumes and pulses. Together with industry, they've invested more than CDN\$451 million into Canada's plant-based food, feed and ingredients ecosystem. Protein Industries Canada CEO Bill Greuel tells HUB: "The development of new ingredients means there's plenty of opportunity for Canada's plant-based cheese sector and as entrepreneurs in the space with innovative new products, they're better able to expand their footprint—including into some of Asia's top markets."

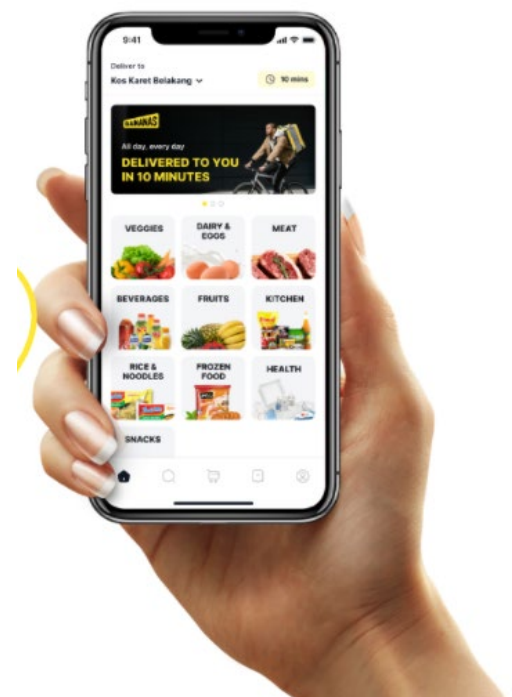
Indonesian Start-up Goes Bananas

According to venture capital and private equity firm East Ventures, **Bananas**, a quick commerce start-up based in Indonesia has secured US\$1.5 million in seed funding led by East Ventures with the participation from SMDV, ARISE, MDI Ventures and several angel investors. Founded in late 2021, Bananas aims to bridge the market with the future of grocery shopping. On the

Wholefood Revolution

Indonesian plant-based food start-up **Green Rebel Foods** has launched a cheddar-style "cheeze" within its dairy-free category, a new line of products that also includes beef alternatives made from shiitake mushroom and "chick'n," a chicken alternative made from non-genetically modified soy and wholefood protein. The company says its cheddar is made from locally sourced cashew nuts, organic rice, and potatoes and can be sliced or grated as well as melted in cooking and baking.

Bananas mobile application, customers shop for their desired grocery item, pay, and expect delivery within 10 minutes via the company's network of tech-enabled micro-hubs (dark stores) located near high-density residential neighbourhoods in Jakarta and other tier-one Indonesian cities.



EV Batteries.

Startup Genome Releases Cleantech Edition

Startup Genome's latest publication, "Global Startup Ecosystem Report: Cleantech Edition," delves into the globally competitive landscape of technology-based startups committed to reducing environmental impact. Included are start-ups with a focus on renewable energy, logistics, transportation, and more. Unsurprisingly, North America and Europe dominate the cleantech ecosystems while Asia has two in the top 25. The report also notes that while Asia has seen a decline in Series A deals in recent years, the region recorded a two-time increase in total late-stage investments in 2020, from US\$1.17 billion in 2019 to US\$2.47 billion, in 2020, driven in part by several huge investments in EV companies.

Old Batteries Find New Life

The transition to EV is accelerating worldwide with more than 10 million battery-powered vehicles on the road today, and the International Energy Agency estimates that number could rise to 230 million by the end of the decade. But what can prevent all those batteries ending up as toxic trash at the end of their life cycles? One possible solution lies with Massachusetts start-up [Ascend Elements](#), which claims it can take spent lithium-ion batteries

and make them "better than new"—longer-lasting, faster-charging and less-polluting. While details on Indonesia's efforts for battery recycling are vague, Pertamina, together with members of Indonesia Battery Holding (IBH), are developing an EV ecosystem which includes recycling. Bill Russo, CEO of Shanghai-based [Automobility](#)



[Ltd.](#), tells HUB: "With the shift to electric propulsion, upstream stakeholders must focus on how resources are extracted and how energy stored in the battery is generated while downstream stakeholders need to focus on the life of the battery beyond the vehicle and the creation of a circular economy for recovery and reuse of the materials inside the battery."

ADB Loan to Support Green Recovery in Indonesia

The Asian Development Bank (ADB) [reports](#) it has approved a US\$150 million loan to support accelerating Indonesia's economic recovery from the coronavirus pandemic; the capital will further support green and bankable infrastructure

projects to help the country reach its UN-mandated Sustainable Development Goals (SDGs). Referred to as "Sustainable Development Goals Indonesia One—Green Finance Facility," the loan is considered a first of its kind in Southeast Asia with an intention of financing at least 10 projects, with no less than 70 per cent of the financing supporting green infrastructure while the remainder will be for SDGs. The financial service program will design projects to attract funding to supplement public expenditure, including from private, institutional, and commercial sources. The project is in line with Indonesia's 2030 Sustainable Development Agenda. It also follows ADB's country partnership strategy (2020–2024), which focuses on accelerating economic recovery and strengthening resilience.

iPhone Assembler Takes on EV

Taiwan-based [Foxconn](#) will invest in the manufacturing of a sustainable new energy ecosystem in Indonesia that focuses on electric batteries, electric mobility and associated industries. The iPhone assembler will build a factory on 200 hectares of an industrial zone in Batang, Central Java with a total investment of US\$8 billion amongst the consortium that includes the Indonesian Ministry of Investment/BKPM, IBC, Indika, and Gogoro.

Renewables.

Indonesia to Manufacture Polysilicon

Indonesia is considering manufacturing polysilicon, a ray of hope for the domestic solar panel industry that relies on importing the material. According to HUB sources, the first plant will be built in Batang, Central Java, at the cost of US\$800 million, with opening plans set for the third quarter of 2022 and an estimated production of 40,000 tons of polysilicon in its preliminary phase. A second plant worth US\$3.2 billion is planned for North Kalimantan with a projected output of 160,000 tons of polysilicon. With plans to transition to clean energy from fossil fuels and generate some 5.3 gigawatts of power through 2030, Indonesia is encouraging factories, offices and households to install solar rooftop panels.

The government may also wish to consider another mineral for its solar drive. Bali-based solar expert Marc Pop tells HUB: “We are very excited about the prospect of perovskite solar cells getting closer to an industrial manufacturing stage given its potential of low-cost, highly efficient, lightweight and flexible solar modules.” According to [EnergyGov](#), perovskite comes from a family of materials with a specific crystal structure that has shown impressive potential for its high performance. “It would be interesting to see the government consider some



R&D into developing perovskite, which would neatly dovetail with the country’s industrial battery ambitions,” says Pop.



With plans to transition to clean energy from fossil fuels and generate some 5.3 gigawatts of power through 2030, Indonesia is encouraging factories, offices and households to install solar rooftop panels.

Fast Food Fast Charge

The January 2022 edition of HUB reported that Indonesian shopping malls are planning to include EV charging stations

West Java Finishing its Vast Floating PV Plant

According to the International Energy Agency ([IEA](#)), one of the world’s largest floating solar photovoltaic (PV) power plants located in Cirata (West Java) is close to completion. The plant’s innovative design with floating PV arrays provide power along with an existing hydropower plant. The 145 MW floating PV installation on the Cirata Reservoir is expected to be completed this year. Indonesia plans to develop a further 60 floating PV installations to contribute to its target of 23 per cent of power generation from renewables by 2025. Floating solar farms have been around for over ten years or so but water-bound



panels have become much more well known in the last few years states [Popular Science](#). Essentially, solar panels are attached to plastic floats which then drift securely on a body of water. These floating solar arrays are typically placed on man-made bodies of water like Cirata. The floating solar industry is expected to grow dramatically over the next decade in Indonesia given there are some 400 large and suitable bodies of water in the country.

Waste-to-Energy.

in their parking construction designs. Will restaurants be next? A recent announcement by America's Taco Bell seems to indicate the trend will be a regular feature at malls and restaurants globally. The fast-food chain, working with EV charging start-up ChargeNet, will soon provide a comprehensive charging solution to one of its restaurants in San Francisco as part of its roll out. ChargeNet calls itself a "software start-up that brings together



EV fast chargers, on-site battery storage, solar power, and a payment platform" for an end-to-end system designed to be added into existing fast-food restaurant parking lots. Once operational, the company claims customers will be able to get 160km of driving range in about a 15-minute charge for under US\$10. The fast-food franchisees are also set to benefit from adding ChargeNet's system to their parking lots. By integrating solar panels and on-site energy storage, ChargeNet believes the restaurants will be able to reduce their power costs with the excess energy generated by solar panels.

Insightful Report Talks Trash

A report by the World Economic Forum, "[Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership.](#)" provides an in-depth and sobering analysis on the issue of what to do with the country's mountains (and oceans) of trash. Here is the report's essential five-point plan: 1) Reduce or substitute plastic usage to prevent the consumption of more than one million tonnes of plastics per year by 2025; 2) Redesign 500,000 tonnes of plastic products and packaging for reuse or high-value recycling; 3) Double plastic-waste collection from 39 per cent to 84 per cent by 2025 by boosting state-funded and informal or private sector collection systems; 4) Double current recycling capacity to process an additional 975,000 tonnes per year of recycled plastic by 2025; 5) Build or expand controlled waste-disposal facilities to manage an

additional 3.3 million tonnes of plastic waste per year by 2025.

Eastern Canadian Companies Need Garbage

Could Nova Scotia-based [Sustanetech](#) be a worthy partner for Indonesia's waste-to-energy issues? Using technology that is able to repurpose almost 90 per cent of garbage from a landfill, the company turns waste into biomass pellets, synthetic diesel and other recycled materials. It needs garbage to operate, and lots of it: to offset the costs of production and operate sustainably, Sustane requires around 70,000 tonnes of waste annually to meet minimal targets.

Located in neighbouring New Brunswick, [PLAEX Building Systems](#) has been quietly engineering a revolutionary brick that is stronger than concrete. Founder Dustin Bowers tells HUB: "I was driven to find a solution for what is an insane amount of plastic, trash and waste in the building industry." The outcome: Bowers and



EV Roadways & Waterways.

his team designed a modular construction block that is low-waste, reusable, and almost entirely made of recycled waste materials. PLAEX won the Canadian Technology Accelerator (CTA) programs, Energia and VOLTA, in the Maritimes, and caught the attention of the CTA in Singapore, which signalled its support for the company in Southeast Asia. “We aim to create a meaningful impact utilizing waste while helping to build sustainable structures in Asian communities that will last generations,” says Bowers.

Jakarta Entrepreneurs Find Strength in Bricks

When Jakarta entrepreneurs Ovy Sabrina and Novita Tan became alarmed by the mountains of plastic waste finding their way into Indonesian rivers, they founded **Rebricks**, a company that recycles such rubbish into hollow blocks and pavers. Today Rebricks staff reduce waste plastic into micro bits that are then mixed with cement and sand and finally molded into strong and conventional building bricks that comply with Indonesian National Standard (SNI) criteria. Ovy and Novita tell HUB: “We believe that to create an impact in tackling the waste problem, no one person or no single institution can do it alone. Everyone needs to join hands and collaborate in order to start the change.”



Stylish. Tough. Fast. Zero Emissions

Brooklyn-based **Tarform** offers two distinct variants of its fully electric, zero-emission top-end motorcycles, both of which feature the elegance of a mid-century motorcycle but are loaded to the teeth with innovative technology. The company uses natural, biodegradable, and recyclable materials “to eliminate toxicity and move towards a zero-waste way of building vehicles.” Made from flax seed fiber, bio resin and algae-based pigment, the lightweight composite materials sounds edible but it’s as solid as it looks, with an engine sound enhanced by an acoustic resonator to give the bike an unmistakable presence. CEO Taras Kravtchouk tells HUB: “As an electric vehicle company focused on sustainability, Indonesia offers an incredibly exciting market because the demand for emissions-free transportation is rising and



The company uses natural, biodegradable, and recyclable materials “to eliminate toxicity and move towards a zero-waste way of building vehicles.”

so far the big players haven’t responded to that need, creating an opportunity for innovative young companies to step in and shape the new landscape.” Tarform motorcycles feature a vehicle control that is constantly connected to the cloud using a 4G connection and enables the user to see the live status of the motorcycle’s health, ranging from battery charge to temperature, and provides recommendations for optimal range. EV batteries charge via a household outlet in two to four hours. Top speed: 193kph with nearly 200km city range distance.

Cool Vintage Canadian

How do you build a product with the climate-consciousness of an e-bike and the cool factor of a vintage café racer? In the case of Toronto-based Beachman—a one-year-old company with three sold-out product lines in its repertoire—the spark was a chance encounter between neighbours. Ben Taylor, who had a background in branding and a penchant for all things retro, met Steve Payne, a sound engineer and mechanical whiz who builds motorcycles in his garage for fun. They put their skills together and launched Beachman Bikes—a brand of '60s-inspired two-wheelers with the bodies of vintage café racers and the guts of modern e-bikes. Advances in lithium ion technology have made batteries lighter, cheaper and more efficient, which in turn has accelerated the development of electric vehicles and bikes. Ben Taylor tells HUB: “We think our bikes have a strong future in Southeast Asia and Indonesia. Our build uses a wealth of standardized motorcycle parts which makes production simple and affordable to the average consumer, and we are simply unmatched when it comes to style and ride quality by any electric bike company in our price range.”

E-Boat Builder Shatters Speed Record

Enterprising e-boat company Vision Marine (cover image) has introduced its powerful E-Motion



180 hp fully electric outboard motor, propelling the Montreal-based company as a leader in the electric recreational boating industry. With a focus on power, speed and performance, Vision Marine is well positioned to take advantage of growing and accelerating demand to shift to zero-emission electric technology in Indonesia. The move towards more powerful engines with increased torque, and the expanded availability of pure electric optionality, is projected to increase throughout the Southeast Asian market in the very near future says boating experts. Paul Whelan, the general manager of Jakarta-based Simpson Marine, tells HUB: “Vision Marine has built exactly the sort of clean and powerful technology we need in a country such as Indonesia which requires to look ahead and find alternatives to protect its waters from emissions and as the infrastructure grows the investment of end-to-end support systems to maintain electric technology.”

“

With a focus on power, speed and performance, Vision Marine is well positioned to take advantage of growing and accelerating demand to shift to zero-emission electric technology in Indonesia.

Harley-Davidson E-Bikes Quietly Hit the Streets



Harley-Davidson was founded in 1903 by attaching a single-cylinder petrol engine to a bicycle chassis hence becoming a “motorcycle.” The first motorised bicycle that Harley-Davidson built was called the Serial 1, so the name of its newly launched e-bike brand is a fitting tribute to the original bike. Its e-bikes offer a range of about 165km to 185km and can be fully charged in three to five hours. Serial 1 e-bikes are like other Harley products with a high entry price, though the company’s strategy is clear and simple: introduce a new generation of e-bikes to its loyalists.

The Circular

8 Questions

with **Elora Hardy, Founder and Creative Director of Bali-based IBUKU, a studio rooted in architectural bamboo design innovation merging artisanal, technological, natural, and modern elements.**



Photo credit: Suki Zoe

Elora Hardy - Founder and Creative Director of Bali-based IBUKU

1 HUB: The global bamboo products market is set to surge at six per cent value through 2030; do you feel like you are in the centre of another wave of love for bamboo?

Elora: People easily enjoy the idea of bamboo as a novelty, and we've been in the position to inspire both a local trend and an international excitement around this material. But in a much more lasting way, by allowing the inherent advantages to shine through, our bamboo buildings are embraced as treasured luxuries, and we also see more and more bamboo items becoming practical necessities. In our work we've revealed bamboo's beauty while also designing it to transcend the material itself. So we've captured the hearts of people with a new sense of space, offering a hint of how it can feel to be both inspired by and at home in nature, proving a beautiful green future is possible.

2 HUB: Designing a sustainable building should not be a daunting prospect; why is it that so many fail in doing the right thing?

Elora: While designers and artists romanticise and idealize the goal of being innovative and creating something truly new, the direction of "sustainability" in recent decades has been slanted towards the less sexy goal of problem-solving, reducing, reusing, recycling. That constraint doesn't often inspire. You can't think outside the box while being in or focusing on the box itself. And even when individual designers do think big, and even when there is truly a budget to innovate, there are many people and practicalities involved in every building so aligning everyone towards achieving a goal that is off the known track though the duration of a project is very rare.

3 HUB: Inspiring aside, I think you would agree the 5Rs... reduce, reuse, recycle, refurbish, renew are an effective combination to help find a sustainable place for Indonesian communities.

Elora: I am very glad to hear that Indonesia has a national commitment to a circular economy. Sure, it's a good start to be working on the 5R's, but

what will get us to a beautiful future is more dynamic creative thinking toward solutions that go beyond fixing old problems and into true innovation.

4 HUB: From the initial design phase, does IBUKU employ strategies for waste reduction, water efficiency as well as operations and maintenance optimization?

Elora: We always emphasize the importance of sustainable strategies to our clients and recommend that they also engage specialists in sustainable MEP, for example PT. Mantra Bali.

5 HUB: Do composite building materials with natural and vegetable fibres hold up the building challenges?

Elora: There are many examples of composite wood as well as bamboo beams and planks in use internationally that have passed codes. There is some, but much less so in Bali, where our skilled craftspeople allow us to utilize bamboo poles in practical and artisanal ways. For overseas projects we are planning to

include composite and laminate bamboo structural elements.

6 HUB: What are your quick thoughts on climate change and how bamboo can play a role?

Elora: It's remarkable that when we build a home, it uses material that didn't exist five years before, and didn't require watering, pesticides, fertilizers or even a need to be planted in order to grow. Bamboo can be optimized in plantations, but also grows abundantly in the wilderness as well as on land damaged by mining and deforestation. Each bamboo pole only takes three to four years to become fully mature, sequestering carbon efficiently—only if it's then harvested and used in a permanent structure or item. There are few other materials that are this "green."

7 HUB: Soon enough electric vehicles will be plugging into your buildings; how will that modify designs?

Elora: I am sure that along with electric vehicles will come many other technologies

that help buildings become more comfortable, effortless, and sustainable. It's exciting to merge our hand crafted, nature-centric materials and processes with new innovations. We already do this as part of our design process, designing in real 3D with bamboo models, as well as in software to then be experienced on an Oculus Quest headset, creating Lidar scans of tree roots to avoid damaging them when building close by.

8 HUB: What are your thoughts to bamboo as an alternative to paper rolls and toilet? Recently a company called Cloud Paper raised US\$5 million from investors to expand its bamboo toilet paper line.

Elora: Bamboo's abundant and efficient growth make it an inevitably practical resource alternative for many uses, and it's exciting to see more and more sustainable innovations in the machines, chemicals and other processes that are needed to turn it into things like paper.

Sustainable Travel.

Emission Regulations Enforce Clean Cruising

Oslo-based [Northern Xplorer](#) has announced its zero-emission cruise ships will be commercially available before the zero emissions requirements for Norway's World Heritage-listed fjords (Geirangerfjord and Nærøyfjord) come into effect in 2026. Northern Xplorer's ships will feature clean technologies including fully electric propulsion, battery energy storage, hydrogen fuel cells and auxiliary renewable energy supply (wind and solar). Time will tell whether Indonesia will also commit to similar regulations for cruise ship companies in sensitive regions of the archipelago.

Hotels Get Net Zero Methodology

Announced by [Greenview](#), a global sustainable hospitality consultancy, a new methodology to guide hotels on how to set a net zero pathway has been released by a group of global hospitality, travel and tourism sector organisations. The [Net Zero Methodology](#) for the lodging industry provides detailed guidance on how hotels can approach the technical aspects of net zero with milestones to be reached by target years 2025, 2030 and 2040, and how to approach decarbonisation through renewable energy.



The methodology also provides guidance on alignment with frameworks such as the Science Based Targets Initiative, Race to Zero and the Glasgow Declaration.

Impact Awakening from Online Travel Agencies

According to a [Booking.com survey](#), travelers now have a more eco-conscious mindset with over half (53 per cent) of global travelers wanting to travel more sustainability in the future. As a result, more than two-thirds (69 per cent) expect the travel industry to offer more sustainable travel options; travelers will consequently visit alternative destinations to avoid overcrowding (48 per cent).

[Expedia's Traveler Value Index Report 2022](#) points out that sustainable trips will rise in popularity with a growing number of travelers looking to minimize impact to the

environment – even when doing so requires extra investment: 59 percent say they are willing to pay more fees to make a trip sustainable; 49 per cent will choose a less crowded destination to reduce effects of over tourism; and 43 per cent will travel locally.

Travel Slow To Change

In collaboration with Accenture, the World Travel Tourism Council has released "[A Net Zero Roadmap for Travel & Tourism](#)," an invaluable 60-page report that proposes ambitious milestones for climate action and emissions reduction for the travel sector. Anyone in the Indonesian travel space should download this essential breakdown of the immediate urgencies facing the world's largest industry. The study looks at carbon emissions, essential industries in focus, climate targets and key decarbonisation challenges.

Marine & Ocean Energy.

Mooring Charge

[Maersk Supply Service](#) will launch its innovative offshore vessel-charging venture, Stillstrom, to support the decarbonisation of the maritime industry by eliminating idle emissions. Together with and Danish wind giant Ørsted, [Stillstrom](#) (the name means “quiet power” in Danish) will demonstrate the world’s first full-scale offshore charging buoy for vessels at a wind farm in the North Sea, scheduled for installation later this year. Maersk Supply Service’s pioneering new company will deliver offshore electric charging solutions to vessels at ports, hubs and offshore energy operations. Stillstrom is an early-stage technology spin-out whose full-scale product launch will be the first-to-market in offshore charging, enabling idle vessels to power from clean electricity. By substituting fossil-based fuels with green electricity, virtually all emissions, even noise, are

eliminated while the charging buoy is in use.

Sebastian Klasterer Toft, Stillstrom’s Venture Program Manager, tells HUB: “We see a global application for reducing offshore idling emissions by the use of the novel offshore charging concept. Stillstrom’s cleantech charging infrastructure is therefore also relevant in areas of Indonesia where congestion outside ports is an issue, and other areas of the maritime industry, e.g. cruises where the technology can support the transition to a decarbonised future.”

Aussies Find Solutions in Renewable Mooring

Founded in Western Australia, [Carnegie Clean Energy](#), a leading wave energy developer, recently announced its MoorPower Scaled Demonstrator project in conjunction with Blue Economy Cooperative Research Centre.

MoorPower is a CETO (wave-energy technology that converts kinetic energy from ocean swells into electrical power) wave energy product designed for moored vessels, a solution to secure clean and sustainable energy for offshore activities that reduces diesel generation. The company’s initial roll out will assist offshore vessels such as feeding barges for the aquaculture sector though the company says its future market is broader and includes the many other offshore operations that require energy. The company says that, like remote off-grid Indonesia islands, wave energy has the benefits of consistency and predictability, and in some places, wave and ocean energy may be the only renewable energy that is practical.

Report: New Wave for Ocean Energy

A report titled “[Wave and Tidal Energy Market and Ocean Thermal Energy Conversion Plant Market](#)” offers a comprehensive study of the ocean energy market development by size, share, growth rate, future trends, drivers, opportunities, and challenges in key regions. A rise in the investments by public and private sectors in the field of renewable energy resources is one of the driving forces of the global wave and tidal energy market. The report



Click image to view video

Sustainable Construction.



states that rising awareness of the environmental hazards associated with burning fossil fuels is projected to boost the global wave and tidal energy market during the forecast period. It adds that depleting fossil fuels across the globe is anticipated to accelerate the overall tidal energy market.

Indonesian Ocean Energy Efforts Swelling

UK-based tidal energy developer [SBS](#) has recently teamed up with state-owned enterprise [Indonesia Power](#) to develop tidal energy projects in Larantuka and Boleng straits. As reported in the HUB January 2022 edition,

Larantuku Strait is the site of another ocean energy project with Scotland's [Nova Innovation](#). This further ocean energy agreement fits well with tidal projects to decarbonise state-owned PLN and its off-grid diesel power generation with renewable energy. According to Energy Offshore, SBS has been providing its subsea and marine developer expertise in Indonesia for over 20 years and previously secured exclusive ocean energy site-development rights directly through an MOU and draft power purchase agreements with PLN in some of Indonesia's prime tidal resource locations.

Three PhDs Pen Constructive Report

[Concrete and Cement](#)

[Reinvented: Growing the Market.](#)

[Decarbonising 2022-2042](#) written

by Drs Peter Harrop, Hydra Rodrigues and Richard Collins, provides new hope with potential earning streams from emerging processes, applications, electrification, energy storage and decarbonisation in the cement, concrete and allied industries. The trio even concludes that construction-related industries today face an exciting 20 years of transformation in all respects. Newly released (by subscription), the report takes a multifaceted look at how the construction industry can go from causing six to ten percent of global warming to astonishingly almost none. The research looks at decarbonizing cement with little or no emissions or with carbon capture techniques that even absorb CO₂. Facilities they cite will increasingly go off-grid, making all the electricity to run sites and vehicles by zero-emission solar, wind and water power.

The Future of Steel Construction: Net Zero, Sustainable & Circular

A new [roadmap](#) setting out how the UK structural steelwork industry will decarbonise to meet the UK's net zero carbon target by 2050 was drafted by companies working in the



sector, together with the BCSA. In its introduction, [Continued Professional Development](#) states much progress has been made to decarbonise the UK structural steelwork sector in recent decades yet more is required to meet climate targets from all parts of the supply chain: designers, steelwork contractors, steel producers and stockholders, and demolition contractors, all working closely together on both demand-side and supply-side reduction measures. “The prize is a big one, namely a truly circular and sustainable model in which steel structures are constructed, adapted and extended to prolong building lifetimes and, ultimately, routinely deconstructed and reused.”

Report: Companies Prepare for Sustainable Sourcing

A recently released [study](#) by McKinsey Sustainability looks

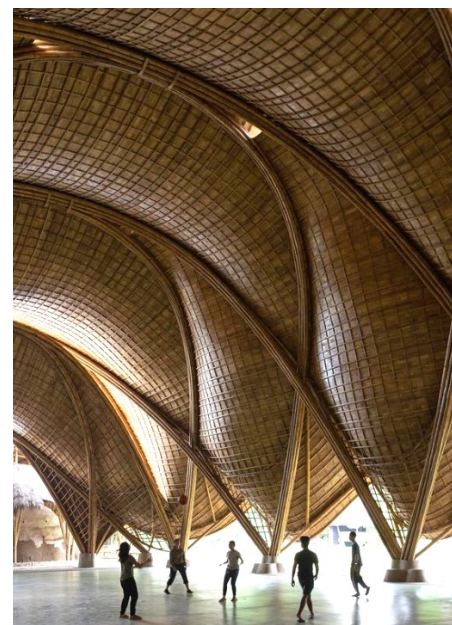
at how smart companies are preparing for the increasing shortage of green steel, recycled plastic, and other materials with low emissions intensity. The study states that “such market imbalances will squeeze makers of industrial goods and consumer products that have pledged to reduce their supply chain emissions and those companies that fail to secure adequate supplies of scarce green materials may need to pay steep premiums, or else they will fall short of their target commitments, potentially harming their relationships with customers, investors, and other stakeholders.” Growing demand has pushed the prices of some types of recycled plastic much higher than the prices of virgin resins. Expecting such risks, prudent companies across value chains are now working to build the capabilities and strategies needed to avoid supply disruptions in the near term and beyond.

Indonesia’s Climate-Smart Bamboo Construction

Circular entrepreneurship is sparking change in Indonesia and at the forefront of the alternative construction sector is Bali-based IBUKU. Sourcing bamboo from the river valleys and mountains of Bali and Java in a sustainable manner, the

company harvests from clumps that, once established, grow a new generation of shoots each year. The company takes care to ensure that only the mature poles are harvested, creating an incentive for the bamboo farmers to allow the younger shoots to grow to maturity for subsequent harvests. IBUKU is an example of a growing number of eco-conscious entrepreneurs worldwide looking to change how we construct and deconstruct buildings. Increasingly, Indonesian farmers and buyers are seeking to shift to more regenerative, less wasteful methods whether it’s for single-family homes, multifamily projects, a school or even larger public and commercial infrastructure.

In this edition of HUB, see The Circular Q&A, a talk with IBUKU Founder & Director Elora Hardy



Geothermal.

Full Steam Ahead for Indonesian Geothermal

According to [ThinkEnergy](#) the Indonesian government is targeting an IPO of state-owned Pertamina Geothermal Energy by June 2022 in a bid to maximize the development of green hydrogen and green ammonia. Given that 40 per cent of the country's fuel needs are supplied from imports, local energy sources—especially geothermal—are needed to bring clean energy in the context of creating national energy independence.

Java Geothermal Deal Announced

Texas-based civil engineering firm Jacobs was [recently appointed](#) by PT Geo Dipa Energi as Subsurface Project Management Consultant for the expansion of the Dieng and Patuha geothermal power plants. The development will increase the power generation output of the Dieng and Patuha geothermal fields from 110 megawatts (MW) to 220 MW and help expand renewable power generation in support of Indonesia's transition towards a cleaner energy future. Jacobs will undertake the geoscientific study, well targeting, geological prognosis, and well programming, together with the development of the drilling strategy and drilling risk mitigation. The power plants are the first geothermal projects that are financed by



the Asian Development Bank (ADB) under a direct lending scheme. The project will provide job opportunities to the local communities, renewable electricity to the Java-Bali network, and reduce carbon emissions by more than 700,000 tons per year.

Innovative Drilling Finds Funds

A geothermal start-up, Massachusetts-based [Quaise Energy](#) says it has discovered how the earth's hardest-to-reach heat resources can be reached using high-frequency beams to melt and vaporise rocks. They have also discovered a way to finance their plans: a Series A financing round led by Safar Partners along with Prelude Ventures, The Engine and other investors. The funding will bolster Quaise resource's engineering team and begin broadening its innovative drilling system from lab to actual

demonstrations. The financing is considered one of the largest geothermal deals to date, raising US\$63M including \$18M in seed funds and \$5M in grant money.

University Geo-Exchange Project

For the past two years, a geothermal project of epic scale has been underway deep below the University of Toronto's St. George Campus. Called the [King's College Circle Geothermal Project](#), it is hailed as the largest urban geo-exchange system in Canada (crews have bored over 370 wells with pipes reaching a staggering 250 meters) and is expected to reduce the institution's annual greenhouse gas emissions by 15,000 tonnes of CO₂ (equivalent by 2024). The project also provides a learning opportunity, giving engineering students up-close and hands-on experience with green energy systems.

Clean Look.

The boutique EV motorcycle market is booming worldwide with a variety of designs, specs and categories



Wildlife Poachers Fear CAKE

Swedish e-bike manufacturer CAKE has introduced a sturdy and dependable off-grid, off-road electric motorbike to support South Africa's anti-poaching efforts. Dubbed ösa AP, the new bike—created in collaboration with wildlife rangers and a South African college—is designed to offer fast, zero emission bush transportation for the arrest of poachers, a task aided by

the noiseless stealth of EV. In addition to the lack of motor sound, the solar-charged vehicle's further advantage is there is no need for fossil-fuel burning truck or helicopter deliveries of petrol into remote areas. Rangers are equipped with mobile power stations and solar panels for charging, allowing them to operate independent of traditional power sources.

The design of the ösa AP features a frame that provides a modular, highly flexible clamp-on configuration for rangers to attach bags, tools and weapons.