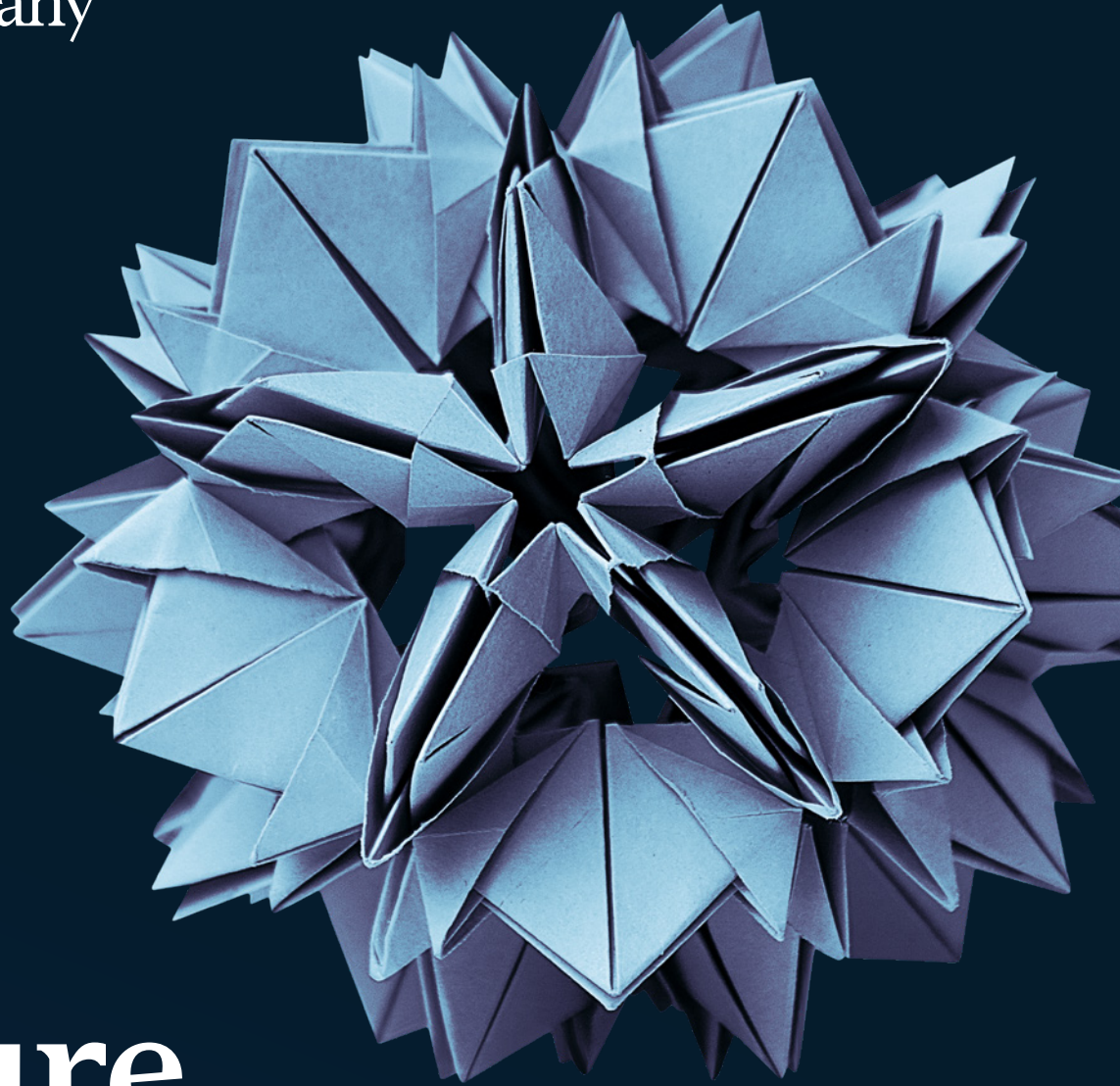


McKinsey
& Company



Future of Asia

Seizing green
business growth for
Asia's energy players

April 2022

Globally, sustainable energy and low-carbon solutions top national and corporate agendas. For regional energy players, the time to commit to new, planet-friendly ventures is now.

The rise of green businesses

While carbon-heavy technologies still have a role to play, green businesses are coming to the fore. In the past three years, the world has seen:

- **More green unicorns.** Over 25 green businesses have joined the global unicorn club, with combined valuations exceeding US \$70 billion.¹
- **Increased green startup investment activity.** There has been a more than 67 percent increase in deals since 2018, with a total of US \$2 billion invested globally in sustainability-themed startups across 260-plus deals.² Europe and North America currently lead in terms of investment size, with Asia rapidly catching up.

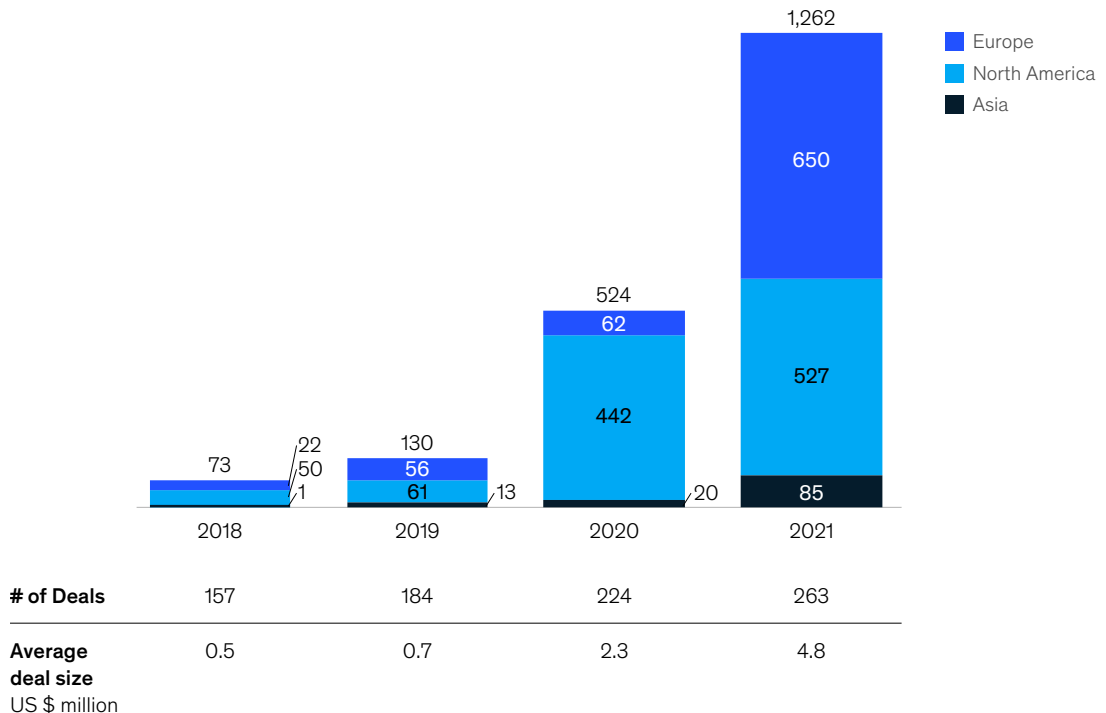
McKinsey analysis finds that building on this potential, Asia could potentially see up to a ten-fold increase in startup activity over the next three to four years.

With advances in technology, financing, and regulatory policies, opportunities for building green businesses are more attractive than ever—and much of this momentum is concentrated in the energy industry. All that's required is for Asian energy players (both established firms and startups) to seize the moment and apply the lessons learned globally.

Exhibit 1

A total of US \$2 billion was invested globally in sustainability-themed start-ups

Capital invested in sustainability-linked startups, 2018–21



Source: Pitchbook

¹ Crunchbase, November 2021.

² Pitchbook, November 2021.

Sustainable energy comes to the fore

Energy sector end-users such as transportation and power generation contributed to over two-thirds of global emissions as recently as 2019,³ while around 85 percent of the world's primary energy supply still comes from fossil fuels such as coal, oil, and natural gas.⁴

In recent years, developments in technology and government policy have decisively shifted momentum towards sustainability in the energy sector. Governments are working towards carbon neutrality, with over 80 percent of the global economy now covered by net-zero commitments⁵; more than 130 nations have committed to or are considering a net-zero target (albeit with differing time frames)⁶, while one in five global Fortune 2000 companies have pledged the same⁷. At the same time, consumers are paying more attention to the environmental credentials of the brands they consume.⁸ Certain energy-related industries are particularly impacted by, and instrumental in, these shifts:

- **Power generation.** Although there are regional differences, global coal consumption peaked over the course of the last decade. From now, renewable energy (RE) sources will only grow, and are expected to account for half of all power generation by 2035.⁹
- **Shipping.** International regulation to reduce sulfur emissions has shifted marine fuel consumption from high- to low-sulfur fuel oil.¹⁰ Pressure to decarbonize has also encouraged the development of alternative fuels such as liquefied natural gas (LNG), hydrogen, and ammonia.¹¹
- **Road transport.** Peak oil demand is expected to occur within the next ten years, involving a major shift from internal combustion engines (ICEs) to hybrid and electric vehicles (EVs).⁹

In Asia, investment activity in green energy and related heavy industries has accelerated, doubling over the last decade, with particular growth in the last year. Two sectors have played a particularly significant part in this: RE and EVs.

Traditional models joined by new wave of growth opportunities

Renewable energy already dominated Asian green-investment activity over ten years ago (2010), accounting for almost 80 percent of sustainability-themed transactions, with an estimated total of US \$14 billion transactions closed. Over the past decade, RE investment activity matured, stabilizing at around US \$17 billion annually by 2019–20.¹²

Traditionally, close to half of all regional renewables investment has been located in China, India, and Australia, with small pockets in Taiwan, Vietnam, and Thailand, along with emerging hubs in Japan and South Korea. The region has seen the rise of a handful of local RE champions. In India, ReNew Power is the most recent RE unicorn to list publicly in 2021; Indian peers include Greenko and Adani Green Energy Limited, which has announced a target of 20GW at the time of writing. Multi-country renewable portfolio company Vena Energy was valued at US \$5 billion when sold to Global Infrastructure Partners in 2018.

Historically, a common factor has been the availability of a supportive regulatory framework, incorporating measures such as feed-in-tariff (FIT) policies for utility-scale renewables. However, as markets and technology mature, and FITs taper off, the next wave of growth opportunities for companies may include commercial and industrial (C&I) applications, energy as a service (EaaS) business models, and “green” corporate power purchase agreements.

³ *Greenhouse gas emissions from energy: Overview—Emissions by sector*, IEA, 2019.

⁴ *The net-zero transition: What it would cost, what it could bring*, McKinsey, January 25 2022.

⁵ Ciara Nugent, “The world’s top carbon emitters now all have net zero pledges. Most of them are too vague,” *Time*, November 4, 2021; Khaled Diab, “The ‘net zero’ myth,” *Aljazeera*, November 22, 2021.

⁶ *For a livable climate: Net-zero commitments must be backed by credible action*, UN.

⁷ *Greenhouse gas emissions from energy: Overview—Emissions by sector*, IEA, 2019; *World energy balances: Overview*, IEA, August 2021.

⁸ “NEF Spotlight: The path forward for retail’s sustainable future,” McKinsey, January 26, 2021.

⁹ *Global Energy Perspective 2021*, McKinsey, 2021.

¹⁰ *IMO 2020 – cutting sulphur oxide emissions*, International Maritime Organization, 2020.

¹¹ Rajesh Nair and Surabhi Sahu, “SINGAPORE DATA: Bunker sales up 5% to 49.83 mil mt in 2020, Dec down 3.9% on year,” S&P Global, January 13, 2021.

¹² Capital IQ, November 2021.

Local players are moving to build capabilities. Partnerships, new ventures, and select international investments are in play: Indika Energy has formed a joint venture with Indian Fourth Partner Energy to bring solar-power solutions to Indonesia, while the Philippines' AC Energy group has announced a rooftop solar venture with solar-solutions player NEFIN, and has plans to operate across Asia.¹³

Another area to explore is RE's challenge of intraday generation peaks, which could be solved by teaming RE solutions with local energy-storage systems. While there are limited examples of commercial feasibility, multiple pilots are underway, such as the Neoen and Tesla "Big Battery" facilities in Australia. The 150 megawatt (MW) Hornsdale Power Reserve, built from multiple Tesla batteries, provides backup to the renewables-heavy South Australian grid, while a second 300MW facility is currently being built in Victoria, Australia.

Electric vehicles: China takes the lead; growth in rest of Asia

EV production is surging in Asia: the industry grew almost tenfold from 2010 to 2019, with a doubling in investment activity from 2019 to 2020 alone. Today this activity is overwhelmingly concentrated in China, which hosts over 90 percent of investment for both original equipment manufacturers and components.¹⁴ China has achieved this leading role with a suite of regulations and incentives: financial boosts such as subsidies and tax exemptions, and other encouragements such as license-plate and parking-priority systems. There is also ample state backing for industry, including R&D support and subsidies for EV-charging infrastructure. India is running second to China in terms of investment with activity from emerging brands such as Ather, Ola Electric, Hero Electric, and Revolt tapping into India's robust 15-million-units-a-year two-wheeler market.

The expanding EV market has given birth to several Asian EV unicorns. China is home to multiple EV companies crossing the one billion mark—Byton, NIO, NIU, WM Motors, and Youxia to name but a few. Outside China, India's Ola Electric was valued at US \$3 billion in its latest fundraising exercise, and fellow two-wheeler player Ather Energy (valued at US \$400 million in 2019) has already announced plans to IPO, while a trail of startups are competing to replicate the feat. Similarly, Taiwanese startup Gogoro has announced plans to list on NASDAQ with a US \$2.3 billion SPAC deal.

By comparison, the industry in Europe offers a slight variation on this story: there, traditional car manufacturers are leading the charge, with Volkswagen taking the top EV investment spot in 2020. Regulation plays a part: consumers are encouraged by subsidies that reduce upfront costs by up to €9,000,¹⁵ and automakers are required to meet a fleet average-emissions target.

In contrast, traditional Asian automotive hubs such as Japan, South Korea, Thailand, and Indonesia are more nascent in their EV adoption. Here, emerging attacker brands are hoping to replicate the success of China and India's startups—examples include Swag EV in Thailand, Vinfast in Vietnam, and GESITS, Selis, and Viar in Indonesia—while players in today's petrol-vehicle value chain are exploring electrification as a defensive hedge. Thai oil giant PTT, which recently announced plans to develop an EV assembly facility, has signed a joint-venture agreement with Foxconn for local development of components.¹⁶

Investors can learn from successes and failures in other regions as they reach for a share of the sizable Asian EV pie. Key actions will be to develop a clear consumer value proposition, build or hire capability, and to engage with regulatory bodies to drive electrification.

¹³ "AC Energy and NEFIN joint venture to offer carbon neutrality solutions across Asia," NEFIN, August 4, 2021.

¹⁴ Capital IQ, November 2021.

¹⁵ In Germany, June 2020.

¹⁶ "PTT and Foxconn announce together venture on electric vehicle production platform," PTT, May 31, 2021.

Rapidly evolving business models and technology to watch

Many opportunities are being enabled by newly commercialized technologies: for example, costs of renewables technologies have fallen 90 percent over the past ten years, with similar trends for EV batteries and LED lighting. Some technologies to watch out for, which are on the verge of scaling and becoming more affordable, include:

- **Hydrogen.** Current investments in the hydrogen value chain are concentrated in North America and Europe (France, Norway, and the UK), and focus on conversion, transport and storage, infrastructure, and fuel cells. In APAC, the nascent industry is concentrated in Australia for upstream activities, and in Japan and Korea on the downstream, demand side. Investors can consider a watching brief here: hydrogen will be critical to decarbonize hard-to-abate sectors, but the economics of the sector are dependent on the availability of low-cost renewables, lower electrolysis capex, and carbon-pricing policy. South Korean company SK Energy is one company that has taken the plunge, acquiring a US \$1.5 billion stake in American hydrogen fuel-cell maker Plug, with plans to roll out in Korea and the broader Asian market.
- **Batteries and storage.** Attracting less than ten percent of total APAC investment activity in 2010, investment in batteries and storage has since doubled. This is partly due to the need for energy-storage systems to respond to the challenge of power-generation fluctuations via renewables, and to cater to the growing local EV and electronics industries. Indonesian state-owned International Battery Cooperation, for example, has teamed up with global leaders LG Chemicals and CATL to develop the local battery value chain, with future EV growth as one of the expected demand end-uses.
- **Recycling.** Especially for batteries and scrap metal, recycling is currently centered on China. Standalone recycling is not economically attractive as yet, with high volatility resulting from fluctuating commodities prices. However, scale may increase exponentially as more vehicles electrify, and governments raise standards for waste management.
- **Carbon markets and offsets.** The voluntary carbon market is gaining momentum as companies increasingly make commitments to net zero. Companies are developing carbon-offsetting projects for own use or sale to third parties, in order to meet carbon commitments or to bundle into “carbon neutral” products. Southeast Asia especially has significant potential for development of low-cost nature climate solutions that local players could develop in conjunction with voluntary carbon markets.
- **Carbon capture, utilization, and storage (CCUS).** Currently at an early phase of development, CCUS has significant growth potential. For instance, oil major ExxonMobil recently signed a CCUS collaboration with Pertamina (Indonesia). Investors will be watching closely as developing Asia presents one of the biggest future markets for these technologies. Beyond Asia, we see more significant investment in this area: for example, US-based Solidia Technologies emphasizes a process using carbon dioxide instead of water to cure concrete, which could result in up to a 70 percent lower carbon footprint.¹⁷ In another example, Shell, Storegga and Harbour¹⁸ are among investors working to deliver Scotland’s low-cost CCUS system Acorn by 2023.

¹⁷ Solidia Technologies website.

¹⁸ <https://theacornproject.uk/about/>

Seize the moment: Rethink, commit, and pivot

Amidst shifting value pools and strong consumer, investor, and regulatory commitment to sustainability, investors are faced with urgent decisions. To take their place in the Asian sustainable-energy landscape, they will need to make firm commitments, and rapidly pivot to greener avenues. Several paths lie ahead:

- **Identify replicable opportunities.** Given uneven global growth, companies can consider various green sectors (such as hydrogen or batteries) in Europe and the United States, or even across neighbors in Asia, and identify use cases to apply in their respective countries.
- **Build new businesses/launch new ventures.** New ventures are a pathway to organic growth—safeguarding at-risk revenue streams, but also capturing new growth areas.¹⁹ Top business builders focus on leadership, customers, and talent to achieve a balance combining the agility of a startup and the strength of an incumbent.
- **Seed options for growth—establish a screening ecosystem and invest meaningfully in startups that are innovating.** Taking a portfolio approach diversifies risk and allows a company to build its capability to launch new businesses. BP, for example,

created its Launchpad in-house business-building engine to set up five digitally led, low-carbon businesses.²⁰

- **Seek out partnerships to expand and replicate lessons learned.** Japanese onshore players Japan Wind Development (JWD) and Eurus Energy partnered with Orsted, in a bid to capture one of Japan's first offshore-wind projects.²¹
- **Collaborate with public sector to create win-wins.** Notable success stories in green business building have seen strategies aligned to capture regulatory incentives—but have also created value beyond the local. For example, Chinese EV players are now supplying vehicles and components to global markets, growing beyond domestic subsidies.

As consumers, investors, and regulators demand more sustainability from companies, the green-business value proposition will only accelerate. In this dynamic landscape, incumbents will find themselves defending their positions and competing against startups hungry for a slice of the pie. The winners will be those that can identify emerging trends, create clear value propositions, work hand in hand with policymakers, and execute decisively, at speed.

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¹⁹ Shaun Collins, Ralf Dreischmeier, Ari Libarikian, and Upasana Unni, "Why business building is the new priority for growth," *McKinsey Quarterly*, December 10, 2020.

²⁰ Anjli Raval, "BP sets target to create five unicorns by 2025," *Financial Times*, January 5, 2020.

²¹ "Ørsted, JWD, and Eurus form offshore wind partnership in Akita," *Ørsted*, May 19, 2021.