

planet, too?

China is by far the largest investor in renewable energy. It added a record 356GW of wind and solar capacity in 2024. That same year, China's combined solar and wind power capacity hit a new record of 1,407GW, surpassing its 2030 target of 1,200GW six years early. The real focus now for Chinese companies is production overseas, including in the US and within the EU, but especially in developing countries where there is growing demand for clean-tech goods. PHOTO: REUTERS



Tan Dawn Wei **China Bureau Chief**



David Fogarty **Deputy Foreign Editor**



Wahyudi Soeriaatmadja Indonesia Correspondent

BEIJING/SINGAPORE/JAKARTA – On el imports from Cambodia, Malav- Energy Finance (CEF). the outskirts of the Indonesian sia, Thailand and Vietnam in No- The Trina Mas plant, which is in investments in energy projects. energy transition without China. city of Semarang in Central Java, a vember 2024. rying parts and components.

The Trina Mas Agra Indonesia ations there. Indonesian conglomerate Sinar Agra Indonesia solar plant. Mas and Indonesian state utility PLN.

first and largest integrated solar ist stance." pore.

In the past year, Chinese solar panel makers have been opening helped by falling solar costs and the years, including in Germany, China is also filling a gap left by chains can accelerate the global or ramping up manufacturing fa- rising energy demand, as well as Spain and Hungary. cilities in Indonesia to take advan- large-scale solar projects in Batam "The operation of these projects" rules-based order and any kind of would be fewer concerns over the tage of a burgeoning domestic that may send renewable energy requires a large number of talent- commitment to climate change, supply chain and energy security, market with a low solar energy to Singapore in the coming years. ed people in engineering, equip- said Dr Sam Geall, chief executive said Ms Belinda Schape, China penetration rate and cheap local labour.

The fear of being targeted by tar- **DEVELOPING COUNTRIES** iffs remains real, even though the Obama administration, then ex- profit margins. governments.

power equipment and electric of the US and EU countries, which The International Energy Agenvehicles (EVs) go to the US, ac- are faced with the dilemma of pro- cy (IEA) says the global market for HOW CHINA BECAME A cording to data from United Na- tecting their own industries while clean technologies is set to rise **CLEAN-TECH POWERHOUSE** tions Comtrade. A decade ago, the ensuring national security and not from US\$700 billion in 2023 to US – and European Union – were over-relying on Chinese providers. more than US\$2 trillion by 2035. China simply has all the right in-energy. key export markets.

demand for clean-tech goods. trade data.

Chinese solar manufacturing joint these host countries, including In- number grows by the week. They to match. ventures, including Trina Mas donesia, happy to accept their Agra Indonesia, according to Mr know-how in clean tech – along stitute for Essential Services Re- nue – and the help in transitioning form.

anti-dumping duties on solar pan- ney-based think-tank Climate

laysia or scaled back their oper- donesian.

ly on the US solar trade blacklist, production in April 2026.

in Indonesia. It is helping to accel- now on the Indonesian market, Aneka Tambang, oil and gas com- edge, which provide substantial This level of state support is diferate a much-needed energy tran- where there is strong growth in pany Pertamina and electricity business opportunities for Chi- ficult for many other nations to sition in South-east Asia's largest the demand for solar energy, said utility PLN. economy, and could in future Mr Kurniawan. Solar cells could in It is one of a number of plants Mr Bernard Aw, Asia-Pacific chief from competitors of unfair trade bring green electricity to Singa- future be exported to other coun- that CATL, which owns nearly 40 economist at Coface, a global trade practices and making China's extries in the region.

Strong domestic growth is for EV batteries, has set up over ment consultancy.

BEHIND CHINA'S SHIFT TO

US is becoming an increasingly In China, clean-tech companies HOLDING THE REINS IN A niche market for Chinese clean- squeezed by a hypercompetitive **TRILLION-DOLLAR** technology goods after years of domestic market are saddled with **CLEAN-TECH FUTURE** trade barriers first imposed by the excess capacity and razor-thin

panded by the Trump and Biden But in their pursuit of more lu-sailable lead in the clean-tech gy, if poor people getting energy SOUTH-EAST ASIA: A SOURCE crative markets overseas, they space, despite the best efforts of access for the first time are able to **OF GROWTH** Only 4 per cent of China's total have unwittingly rubbed up US and EU leaders to apply the go straight to renewables, it's fanexports of solar power and wind against governments such as those brakes. And the prize is immense. tastic," he told The Straits Times. South-east Asia is a major prize for

from fossil fuels.

be in the US' cross hairs - for now tries, because they are getting fac-renewables shield it from volatile markets and foreign - navigating America's trade pol- tories, wind farms, solar farms, icies is something of a cat-and- batteries and real jobs. A lot of **pressure**. mouse game for Chinese compa- them are getting research and denies, including in South-east Asia. velopment centres as well," said The US imposed a new round of Mr Tim Buckley, director of Syd-

since October 2024, is a US\$100 son Kurniawan, a senior officer Jakarta, a US\$1.2 billion factory – a ing bases and deploying clean Scale is also China's secret weapmillion (S\$134 million) joint ven- with Sinar Mas who has been joint venture between CATL, the energy tech directly to power gen- on. ture between China's Trina Solar, closely involved in the Trina Mas world's largest EV battery maker, eration projects, Chinese firms With a sizeable domestic market and Indonesia Battery Corpora- can mitigate the risk of trade sanc- and state-backed financing, com-"While Indonesia is not current- tion (IBC) – is expected to start tions by the US, EU and other panies can produce at volumes With an annual 1 gigawatt (GW) we are concerned about potential IBC is a government initiative na's dominance in clean tech.

CATL spokesman.

The Chinese have built an unas- leapfrog towards renewable ener-

Kendal Industrial Park, a joint ven- The deals range from multibil- Over the past 15 years or so, China new factory is cranking out solar The punishing taxes of between ture between Singapore's Semb- lion-dollar battery ventures in Eu- has transformed itself from pretty cells and assembling solar panels 21.31 per cent and 271.2 per cent corp and Indonesian developer Ja- rope and wind farms in Australia, much zero when it comes to rewith the help of robots, while au- have already bitten some Chinese babeka, employs about 350 peo- Laos and Uzbekistan to EV plants newable energy, to the leading tonomous carts whizz around fer- solar makers, who have exited Ma- ple, 80 per cent of whom are In- in Turkey and Thailand. They also force," said climate analyst Li include solar panel manufacturing Shuo, director of China Climate In the automotive hub of Kara- in Saudi Arabia and the US. solar panel plant, operational "We are cautious," said Mr Wil- wang on the eastern outskirts of By spreading their manufactur- stitute in Washington.

include joint ventures and direct "You can't manage the global

Hub at the Asia Society Policy In-

Local governments in China

Diversified clean-tech supply

"It could also lead to a faster up-

Chinese clean-tech companies.

With nearly 700 million people, it

is one of the world's fastest-grow-

ing regions. And it needs lots of

countries while entrenching Chi- others could not dream of.

total panel capacity that is set to trade barriers, especially given that aims to turn Indonesia into a "Global trends such as energy sweeten the deal with tax breaks." increase to 3GW, the plant is the America's increasingly protection- global EV battery manufacturer. It transition and climate change also free land and expedited permits, is owned by state-owned firms, in- create international demand for creating industrial ecosystems cell and solar panel manufacturer The solar plant is focusing for cluding nickel and gold miner clean-tech products and knowl- that draw talent and investment. nese clean-tech businesses," said match, triggering accusations per cent of the global market share credit insurance and risk manage ports an easy target for tariffs.

> the US' withdrawal from the global green transition because there ment, procurement, operations, of online environmental news site policy analyst for the Helsinkiresearch and development," said a Dialogue Earth and an associate based Centre for Research on fellow at the think-tank Chatham Energy and Clean Air (Crea). House in London.

> > "For a lot of emerging markets, take in clean energy in the manuthey're just starting in their devel- facturing countries, with local opment journey and building out production encouraging local deenergy infrastructure. If they can ployment," she told ST.

Given the rising barriers from The Trina solar joint venture gredients: a well-established local The IEA's 2024 South-east Asia The real focus now for Chinese developed countries, Chinese project in Indonesia is just one of supply chain, stable raw material Energy Outlook report said the recompanies is production overseas, businesses are focused on the de- many projects involving Chinese prices and cheap labour. Its vast gion could account for 25 per cent including in the US and within the veloping world, which is now the clean-tech firms that CEF has clean-tech industrial complexes at of global energy demand growth EU, but especially in developing largest market for their solar, wind been tracking globally. Since the home have slashed the costs of between now and 2035, second countries where there is growing and EV exports, according to Com- start of 2023, more than 180 deals green products globally, giving the only to India over the period. And worth more than US\$141 billion nation a technological edge that regional electricity demand In Indonesia, there are now four Chinese companies are finding have been announced – and the foreign competitors are struggling growth is set to grow about 4 per

cent annually. The problem is, the region remains deeply dependent on polluting fossil fuels and is struggling to ramp up clean energy investment, though more favourable policies in Malaysia, the Philippines, Singapore and Vietnam are changing the picture. But in Indonesia, South-east Asia's largest economy, the picture is less clear.

Fabby Tumiwa, executive director with investments and factories **At its core, its green revolution serves three goals:** of the Jakarta-based think-tank In- that create local jobs and tax reve- energy security, economic supremacy and geopolitical clout. By reducing its reliance on imported oil and gas While Indonesia appears not to "It's a win for the recipient coun- – China is the world's second-largest oil consumer –

with mixed signals about support for renewable energy. Special climate change and energy envoy Hashim Djojohadikusumo on Jan 31 said he considered the Paris Agreement no longer relevant for the country, days after US President Donald Trump announced his country's withdrawal from the UN climate pact for a second time. Renewable energy investment in the region remains far below

what is needed to match electricity demand growth or help the region meet its climate targets. Indonesia, for instance, had set a target of 23 per cent renewable energy by 2025 but later revised it to 17 per cent to 19 per cent.

The reality gap between the region's net-zero ambitions and true progress in its energy and green transition was highlighted in a 2024 report by global consultancy Bain & Company, Singapore's investment company Temasek, investment platform GenZero and Standard Chartered Bank.

An estimated US\$1.5 trillion is required to fund the transition until 2030, but only US\$45 billion has been invested across dedicatthe report said. Chinese companies are eveing

South-east Asia, which has already become a major base for solar panel and component manufacturing as well as a growing centre for EV manufacturing and battery materials production.

China Photovoltaic Industry Association data shows that by the end of 2023, nearly 20 Chinese solar companies had deployed upstream and downstream production capacity in South-east Asia through joint ventures, mergers and acquisitions, and investments. The region is also attracting Chinese investment to build wind and solar farms, including a soon-to-

be completed 600MW wind farm in Laos and high-voltage power line to supply the electricity to Vietnam. Globally, suspicions remain in

some countries about the true intention of Chinese green investment. These countries also fear that allowing local manufacturing may price out domestic clean-tech competitors, and they have labour practices.

"China's domestic clean-tech industry maturity and growing overseas investment can provide a real sidies under a new trade regime The UK's critical energy infras- Even in overseas markets where ply mooring systems for offshore inance amplifies its soft power. opportunity for many countries in for clean technologies.

host nation.

investment these days is by private planned wind farms in the blus- tors. owned enterprises.

And the companies have been farms. boosted demand for local prod- the Scottish wind industry. ucts. Mr Wilson said.

starting with its X9 and G6 models trolled by the manufacturer. bergNEF. in the second half of the year. China's EV giant BYD aims to

complete its US\$1 billion plant in West Java at the end of 2025, the Over in Thailand, BYD's plant –

its first passenger car production China's share of base overseas – has already creat- global clean-tech ed a large number of the more than **manufacturing capacity** 10,000 jobs it expects to generate. It continues to recruit and train lo- 2021 2023 cal workers "to face the challenges of cross-cultural coordination and management".

BYD says it has also helped to attract more parts suppliers and promoted the upgrading of Thailand's new-energy automotive industry.

HEADWINDS FOR CHINESE WIND POWER PLAYERS

While cheap Chinese clean tech has been embraced by developing countries that lack the expertise and have little concern over the politics of such transactions, it has created friction with other countries and regions.

The US as early as 2012 imposed tariffs on Chinese solar panels tariffs that have expanded under subsequent administrations to cover other clean tech such as EVs, battery components and wind turbine parts.

The EU, which has tariffs on Chinese EVs, in November 2024 proposed that Chinese companies be required to transfer intellectual property to European businesses in exchange for access to EU sub-



where the price of onshore wind turbines has tumbled nearly 60 per cent since the beginning of 2020. Even in overseas markets where they enjoy higher margins, Chinese onshore turbines were still nearly 30 per cent cheaper than those of US and European manufacturers between 2019 and 2024. PHOTO: AFF



employment and fair employment than 10,000 jobs it expects to generate. Chinese companies investing overseas have been eager to play up the benefits to the local economy and community. BYD says US, trails with just over 370GW of it has helped to attract more parts suppliers and promoted the upgrading of Thailand's new-energy automotive industry. PHOTO: REUTERS

South-east Asia to meet rising The latest tension is playing out ble, argue detractors, as electricity nese onshore turbines were still Chinese wind turbine makers Global Energy Interconnection, it energy demand and accelerate in Scotland, where Mingyang generated by the turbines is con- nearly 30 per cent cheaper than have a significant track record at aims to link grids worldwide, extransition to a low-carbon econo- Smart Energy – China's largest pri- nected to the power grid. cultures and norms, she said. a manufacturing plant.

In the past, some investments Scotland, which aims to reach queries from ST as at press time. companies are moving in. under China's Belt and Road Initia- net-zero emissions of all greentive were criticised for hiring only house gases by 2045, has the big- an investigation into subsidies re- turbine manufacturer, took over a these three players are also very ing influence. imported Chinese workers and ac- gest planned pipeline of floating ceived by Chinese wind turbine plant in Brazil in 2024 from GE Re- full. So if you have a small project To do that, it needs to dominate cused of being debt traps for the wind farms globally, targeting makers, alleging that these gave newable Energy, giving it its first requiring, say, seven or 10 tur- the entire supply chain, which in-15GW by 2030.

local economy and community. dom is no longer a part of the EU energy network. The Trina Mas Agra Indonesia so- bloc, pressure on its government is Chinese wind turbine manufac- ers could impose on the Chinese lar plant has created new jobs and mounting over Mingyang's role in turers like Mingyang have faced companies is making it difficult Many countries that adopt Chi- gered environmental groups.

tructure would become vulnera- they enjoy higher margins, Chi- wind turbines.

my," said Ms Caroline Wang, China vate wind turbine manufacturer Observers say Scotland – and facturers between 2019 and 2024. ing up against three international and technology to allies and develclimate and energy analyst at CEF. and a world leader in floating off- the UK – now risks sleepwalking As Western competitors retreat players – Vestas, GE Vernova and oping nations. But it is vital to cater to local de- shore wind systems – is facing into dependency on China to meet from certain markets to focus on Siemens Gamesa. velopment needs and respect local headwinds over its plans to set up its ambitious climate target. the US and Europe, where they can "I think there is a tension in how beyond, China pitches itself as a

In April 2024, the EU launched Goldwind, a major Chinese wind rently in the market. But the fact is global obligations while expandthe companies an unfair advan- factory outside of China.

Chinese companies, not state- tery North Sea, known collectively Lawmakers have called for the nese wind technology are devel- you can't go to China, then where But there are also environmental as ScotWind, are floating wind UK government to make rigorous oping countries, such as nations in do you go?" said Mr Sim. risk assessments before giving Central Asia and Africa. eager to play up the benefits to the Even though the United King- Chinese companies access to its But in Europe, uncertainty over **TREADING WITH CAUTION IN THEIR** these materials, especially the

significant cost pressures at home, for the manufacturers to navigate. nese clean tech or receive green fi- China also dominates the global At the heart of concerns is the where the price of onshore wind "It's a complicated space," said nancing recognise that they have processing of critical minerals. In March 2025, Chinese EV mak- operational software embedded in turbines has tumbled nearly 60 Mr Jaymes Sim, deputy CEO of to navigate the associated risks. er Xpeng said it planned to begin the turbines which is made up of per cent since the beginning of Singapore company Mooreast, "Chinese overseas investments the "global businessman" for now, local production in Indonesia, proprietary applications con- 2020, according to data by Bloom- which is planning to set up its first have in the past struggled with is- said Mr Li, the climate analyst.

those of US and European manu- home, but overseas, they are com- porting surplus renewable energy

what kind of controls policymak- **GREEN TRANSITION**

head of its local unit said in Janu-

Destinations for Chinese clean-tech exports ----- Global South ------ European Union ------ US ------ UK SOLAR WIND US\$ billion US\$ billion BATTERY 32 44.84 CELLS 78% 23.16 84% 3.24 ELECTRIC 1.97 VEHICLES <u>رو می</u> 2015 '17 '19 '21 '23 '24 2015 '17 '19 '21 '23 '24 57% 67% **ELECTRIC VEHICLES** BATTERIES US\$ billion US\$ billion 40 -16.53 MODULES - 32.34 30 74% **10.**1 21.61 82% 20 5.41 WIND **TURBINES** 0.83 -• 2.6 55% 2015 '17 '19 '21 '23 '24 2015 '17 '19 '21 '23 '24

Sources: INTERNATIONAL ENERGY AGENCY, DIALOGUE EARTH, UN COMTRADE STRAITS TIMES GRAPHICS

Mingyang had not responded to command higher prices, Chinese the Western world is going to de- climate advocate, not a leader – a fend the three players that are cur- nuanced stance that sidesteps bines, these three players are not cludes securing supplies of nickel But the majority of clean-tech About 60 per cent of Scotland's tage over their Western competi- Those who have seen the most interested in proposing something in Indonesia and lithium in Ausbenefit from relatively cheap Chi- to you. If you can't go to them, and tralia, and buying mines in Africa.

Schape.

political tensions, said Ms Wang. Greater investment in clean-

June 2026," she said.

pressures, too. provides a ready supply of prod- sition in UN climate talks. ucts the region needs for the green That could be a win for China But there has to be careful al climate action. thought about how this impacts Ultimately, China's great green the region's existing industrial march holds the promise of lower base. For instance, automotive greenhouse gas emissions and manufacturing in Indonesia and cleaner energy globally, and con-Thailand is not well positioned to tributes to the fight against accelrapidly transition to EVs and com- erating climate change. pete with rising imports from Chi- For now, China's green jugger-

rapid growth in low-cost solutions remains to be seen. from China and managing the transition of local supply chains dawntan@sph.com.sg that deliver GDP and jobs for many dfogarty@sph.com.sg economies," he said.

The new administration of President Prabowo Subianto has vet to fully clarify its energy policies, - Color දීවේ 64% NOTE: US\$1 billion = S\$1.3 billion

Chinese companies also need to ensure their offshore investments comply with local environmental, labour and safety standards to minimise the risk of one-off examples being geopolitically weaponised against all Chinese overseas foreign direct investments, Ms Wang said.

But the opportunities and benefits to the local economy, industry and low-carbon development have a greater potential to outweigh the risks, she added.

CLIMATE CHAMPION OR **POWER PLAY?**

China has positioned itself as the go-to supplier for a decarbonising world. Beyond capturing econom ic opportunities, what are its real motives?

At its core, its green revolution serves three goals: energy security, economic supremacy and geopolitical clout. By reducing its reliance on imported oil and gas – China is the world's second-largest oil consumer – renewables shield it from volatile markets and foreign pressure.

Economically, the sector fuels growth. In 2023, China had an estimated 7.4 million renewable energy jobs, or 46 per cent of the global total, according to the International Renewable Energy Agen-

Its clean-tech exports, projected to hit US\$340 billion by 2035, rival the oil revenues of Saudi Arabia and the United Arab Emirates combined.

The clean-tech sector is a major contributor to China's economy, adding a record 13.6 trillion yuan (S\$2.5 trillion) to its economy in 2024, or just above 10 per cent of the nation's gross domestic product. This could rise further in 2025, according to a recent report bv Crea.

The nation is by far the largest investor in renewable energy. I added a record 356GW of wind and solar capacity in 2024. That same year, China's com-

bined solar and wind power capacity hit a new record of 1,407GW, surpassing its 2030 target of 1,200GW six years early.

By contrast, the second-largest total solar and onshore wind capacity.

Geopolitically, China's dom Through initiatives such as the

In South-east Asia. Africa and

concerns about deforestation and pollution associated with mining quarrying and processing of nickel ore in Indonesia, which has an-

The nation primarily wants to be overseas plant in Scotland to sup- sues over transparency, consulting "And in this sense, what China is

local communities and adverse en- lagging behind now is a political vironmental impacts," said Ms and diplomatic strategy to enable it to be that climate champion." Increased dependency on Chi- China has been under increasing

nese-controlled supply chains of pressure to contribute to climate such a scale and dominance could finance as the largest greenhouse lead to economic and strategic vul- gas polluter and the second-larnerabilities, especially during geo- gest economy in the world.

"To safeguard local solar module tech manufacturing and renewaproduction, Brazil, South Africa ble energy generation in poorer and other countries have in- nations is one way China can boost creased tariffs on imported Chi- its support. President Xi Jinping nese photovoltaic products, while has personally pledged to promote India has mandated the use of lo- the advancement of renewable cally made solar cells in govern- energy in developing countries.

ment clean energy projects from Ms Wang said given China has a strong interest in ensuring the ac-For South-east Asia, there are celeration of the global energy transition, this could lead Beijing China's manufacturing scale to take a more forward-leaning po-

transition, said Mr Dale Hardcas- and developing nations, and could tle, who leads Bain & Company's also potentially slow the pace of sustainability and decarbonisa- climate change, despite the best tion business in South-east Asia. efforts of Mr Trump to derail glob-

naut seems unstoppable, but the "One needs to strike a balance journey is not without its challengbetween taking advantage of the es – and how sustainable it proves

wahyudis@sph.com.sg