

# China is doubling down on coal despite its green ambitions



Bloomberg / Beijing

China is building a vast array of new coal-fired power stations, potentially more than the operating capacity of the US, even though it knows the plants will probably never be fully used.

The puzzle of why the world's leading installer of clean energy is investing so much in the worst polluting – and increasingly expensive – fossil fuel shows the depth of Beijing's concern over the global squeeze in energy supplies. But it also reflects planning for a gradual relegation of coal's role, from prime power source to a widely available but often idle backup to China's rapidly expanding renewables fleet.

Work on at least 165 gigawatts of plants powered by coal should begin by the end of 2023, the National Development and Reform Commission told executives at a meeting in September,

according to state-backed Jiemiao News. The chairman of China Energy Engineering Corp, meanwhile, has forecast the country could add a total of 270 gigawatts in the five years to 2025 – more than currently exists in any other nation.

New coal permits have already increased, and while the final extent of the ramp-up isn't known, adding 270 gigawatts could cost 568bn to 766bn yuan (\$79bn to \$106bn), according to a calculation based on BloombergNEF data. Excluding China, the rest of the world's pipeline of coal power projects stands at about 101 gigawatts, data compiled by Global Energy Monitor show.

China's strategy is designed to avoid the pitfalls that have hobbled parts of the US and Europe, which stopped investing in fossil fuel production and infrastructure before renewables were ready to take over. That's led to an over-reliance on imports in some places, and in others a dependence on grids that can fall prey to the unreliability of sunshine and wind.

At the recent party congress, President Xi Jinping laid out how China's energy transition would be different by following "the principle of building the new before discarding the old." In practice, that means adding both clean power and more coal to try and eliminate economy-crippling power shortages and create a buffer against volatile global fuel prices, while at the same time advancing the country's long-term climate goals. As China's economy grows, it requires ever more power, and it has said it plans to peak coal consumption only by the middle of the decade.

But even as new plants are built, the intention is for them to be used less and less as they're displaced by increasing amounts of clean energy.

In the context of global energy insecurity, it's not surprising that China would ramp up its coal capacity, said Yan Qin, an analyst in Oslo, Norway, at Refinitiv. "But the push to add more clean energy to the grid hasn't slowed down, meaning that growing renewables will squeeze the running hours of coal plants," she said.

The plan carries big risks. Coal financiers are directing

capital to investments that are almost designed to be stranded. If they protest because their projects are being underutilised, it could slow the decarbonisation of the planet's worst polluter. And the world's carbon budget is finite, which means that any coal burned at all in China increases the chances of missing targets to avoid catastrophic warming.

The NDRC's proposal is already facing some pushback from utilities and local lenders, according to a person familiar with the matter. Many coal power generators are losing money amid high fuel prices and aren't enthusiastic about funding and running plants that would only be used during times of peak demand, the person said, declining to be identified because the talks are private.

Still, it's clear that the regulator's tone on coal power has changed since last year's energy crisis, according to the person. More plants will be built in areas that are reliant on hydropower, and near the massive wind and solar farms being built in the desert interior, to ensure reliable supply when intermittent renewables generation stalls, the person said.

China is also making efforts to lessen the burden on coal power generators, in large part by leaning on miners to boost output to record levels and keep the Chinese market well below sky-high international prices. The government has also given utilities leeway to charge higher rates to industrial customers. And, it's making progress in developing a mechanism that would compensate coal plants that sit idle while on backup duty, Refinitiv's Qin said.

In any case, the rate at which clean energy is added will probably be more instructive than power plant spending in determining when coal burning starts to dwindle, said Dave Jones, a lead analyst at the climate think tank Ember in London.

Once renewables are installed they're basically free to produce, which means they'll be prioritised over coal. The moment that new clean energy generation outpaces new power demand is when coal use begins to fall, he said.

China is by far the world's largest renewables market, and its expansion continues to accelerate. Spending in the first half of this year more than doubled to \$98bn, compared to \$12bn in the US. As wind, solar and hydropower all charted strong growth over the period, mostly coal-based thermal power generation dropped 3.5%.

Although the historic drought in the summer curtailed hydropower so much that coal is back on track for a year-on-year increase, it won't be long before new clean energy capacity puts the fuel into permanent decline, Jones said.

"There is so much wind and solar being built and generating clean electricity," he said. "As long as China's not inventing a whole new use for thousands of terrawatt-hours of power, then from a demand perspective it's got to be reducing coal power, because there's nowhere else for that electricity to go."

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## **No security without climate security**



By Anne-Marie Slaughter/ Washington, DC

In July, CIA Director William Burns gave a 45-minute interview at the Aspen Security Forum. Only at the very end, following questions about the Russia-Ukraine war, China, Taiwan, Iran, and Afghanistan, was Burns asked what the CIA can do to identify where climate change is most likely to cause conflicts to erupt.

Burns's answer was unequivocal. First, he noted that climate change is "an important priority for the CIA and the US intelligence community." He then said that while he considers China "the biggest geopolitical challenge that our country faces in the 21st century," he also views climate change as the "biggest existential threat" to the United States.

Existential risk, as the Stanford Existential Risks Initiative defines it, is a risk that "could cause the collapse of human civilisation or even the extinction of the human species." Burns probably had something less extreme in mind – perhaps a catastrophic event that would wreak irreparable harm and change life as we know it. But still, in this week-long forum dedicated to national and international security discussions, no panel focused specifically and entirely on climate change. That's not unusual. As Burns pointed out, climate change does

not fit the traditional definition of a national-security threat. As such, it falls within the jurisdiction of other government departments.

Yet if climate change poses an existential threat to the US, then the US defence apparatus must participate in the fight against it. Under Burns's leadership, the CIA has established a mission focused on helping "policymakers in the US government understand the consequences of climate change in already fragile societies." The National Security Council, the State Department, and the Pentagon all have units that focus on climate-change-related conflicts abroad. Still, what about the direct impact of climate change on the US? Generals, after all, do not stop fighting wars when the fighting spreads from foreign to American soil.

Science-fiction writers have no trouble bringing the future home to the present. For example, Omar El Akkad's 2017 novel *American War* opens with a map of the US in 2075: Florida, New Orleans, New York City, Long Island, and Los Angeles are all underwater. Kim Stanley Robinson's 2020 novel *The Ministry for the Future* begins with a heatwave in India that overwhelms the power grid and kills 20mn people.

In the scenario Robinson imagines, temperatures in Uttar Pradesh reach a "wet bulb temperature of 42 degrees centigrade." An extreme scenario? Consider that in California's recent heatwave, temperatures in the Bay area and Sacramento Valley reached 46.6C (115.9F) and that California prepared for brownouts and blackouts. As the thermometer breaks records, the prospect of hundreds of thousands of Americans dying in a heatwave does not seem far-fetched.

Perhaps the problem is that an existential "risk" is not yet an existential "threat," whereas the war in Ukraine, Chinese militarism, and Iranian nuclear aspirations demand immediate attention. But tell that to the hurricane, fire, and flood victims who have suffered the consequences of catastrophic weather over the past decade. The Colorado River, Lake Mead, and the Great Salt Lake are disappearing now. Sea-level rise is already making itself felt in Norfolk and Miami. The

future, as scientists keep telling us, is already here.

To be fair, Congress and President Joe Biden have done more than any previous administration. With the Inflation Reduction Act, Biden has secured a historic legislative victory that will enable the US to meet its international obligations to reduce carbon dioxide emissions. At the most recent United Nations climate change conference, Special Presidential Envoy John Kerry negotiated a crucial deal with the Chinese to allow the world to move forward with its climate commitments.

Moreover, US national-security officials have their hands full. The risk that Russia will use a nuclear weapon in Ukraine is real and rising, and violating the nuclear taboo could draw Nato countries into a nuclear great-power war that could wipe out all of humanity. A nuclear conflict with China would be equally deadly, and Iran's acquisition of nuclear weapons would also lead to nuclear proliferation across the Middle East, effectively gutting the Nuclear Non-Proliferation Treaty and significantly increasing the risk of nuclear war and nuclear terrorism.

Still, the real measure of how much importance the American government attaches to a particular threat is the amount of time and money it invests in addressing it, and I doubt that Biden and his advisers spend more than 10% of their time on preparing for the impact of climate change. The issue is one of perspective: national-security officials operate in a world of geopolitics, competition, and co-operation among countries. They are trained to deter, prevent, and fight wars or to negotiate peace with other governments, not to deal with global threats that transcend national borders. As the adage goes, when all you have is a hammer, every problem looks like a nail.

Bill Burns got it right. Climate change is an existential threat, and the Biden administration and the US national-security establishment must treat it like one. Doing so would require reallocating substantial funds from the military to government agencies that focus on building domestic resilience and civil protection. It would also require creating new



security agencies whose mandate would be to address global threats.

Minimising the risk of climate change will not be easy, but we have no choice. To paraphrase Game of Thrones, a long and deadly summer is coming. If we do not rise to the challenge, many Americans will not survive. – Project Syndicate

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## The high stakes of climate-risk accounting



By Gernot Wagner And Tom Brookes/ New York



Economists are supposed to be good at understanding risk. Decision-making in the face of uncertainty, after all, is the discipline's bread and butter. Yet at a time when real-world risks – geopolitical, macroeconomic, financial, public-health, and environmental – are piling up, many economists seem to be at a loss.

Although businesses and investors stand to make a lot of money if they can properly assess and navigate the current risk environment, no one seems to have a good explanation for why we are where we are. This is especially true in the case of climate change: It is now clear that the risks have been systematically underestimated, and thus mispriced, all along.

One explanation for this is that market participants have failed to understand the size and the probability of the risk, because they have been thinking about the issue in the wrong way. The climate system is not like a casino with well-defined outcomes and probabilities. As a 1987 comment in *Nature* put it, changes within our planet's systems may bring all kinds of "unpleasant surprises." It is as if we were playing with decks of cards that include some unknown number of jokers. Moreover, one also must account for the inherent conservatism of the science. Climate researchers, especially, tend to err on the side of caution.

A classic case is the quantification of sea-level rise. Broadly speaking, sea levels rise for three reasons: melting polar ice caps, melting inland glaciers, and the fact that warmer water takes up more space. But in the Intergovernmental Panel on Climate Change's reports in the early 2000s, the headline figures fully accounted only for melting glaciers and thermal expansion. Scientists of course knew that global warming would melt polar ice, and that this effect might be the most consequential of the three. But because the estimates for how much faster the poles would melt differed by so much at the time, they were excluded from the headline figures.

That omission has long since been corrected. But it is now economists who are lagging behind in quantifying the economic damages associated with rising seas and the many other

interlinked risks and uncertainties accompanying climate change. Quantifying climate-related damage is painstaking work; and in an academic environment that prizes new ideas over what might seem like a mere “accounting” exercise, it is not the kind of work that brings much reward or recognition. Nonetheless, economists going back to Simon Kuznets, the “father” of the gross domestic product, have been some of the leading critics of economic metrics that purport to represent overall well-being. GDP is central to macroeconomic analysis, but it leaves out many other important indicators, such as those measuring human and planetary health. Standing forests and clean air and water have no value in national-income accounting unless they enter the economy directly as factors of production.

Fortunately, an initiative by US President Joe Biden’s administration aims to correct this shortcoming by developing a new set of “statistics for environmental-economic decisions.” While this effort is not the first of its kind in the world, it is among the most ambitious. The goal is to supplement GDP with a far more comprehensive set of accounts, and then to use this new metric to guide policy decisions.

Such a change is long overdue. Climate change might not have grown into the problem that it has become if its damages had been incorporated into national accounts all along.

This points to a second, equally important reason why climate and other risks have been mispriced. It is one thing for scientists, economists, and informed members of the public to recognise that many risks and uncertainties are not priced; it is quite another to adopt policies that discourage businesses from pushing those risks onto society.

For business leaders, the top climate risk, according to a recent Federal Reserve Bank of San Francisco survey, is that climate change will influence “rules and regulations related to our business.” Executives correctly anticipate that policymakers will want them to pay for greenhouse-gas emissions and other negative externalities instead of being permitted to socialise those costs.

Such measures inevitably will fall into the realm of politics, but economists must not confuse their political preferences with sound policy. Those who are ideologically inclined to look to the “free” market as a guiding principle for organising society must recognise that a market can function well only when no externality is left unaccounted and unpaid for.

Another Biden administration accounting initiative could help here. The US Securities and Exchange Commission’s proposed rules for climate-related disclosures would compel companies to standardise and report both the impact of their operations on the climate and the risks that climate change poses to those operations. The SEC’s effort stops short of asking all polluters to pay for their own pollution; instead, it leaves it up to investors to decide what to do with the new information.

Economists must defend the pivotal role their advice plays in policymaking. The political forces and special interests that bear on this issue will skew their advice and skewer the advisers. But that must not become an excuse for inaction. Intellectual honesty demands that economists and policymakers grapple with how new risks and uncertainties can and will affect outcomes.

Tallying what’s known is hard enough. Accounting for hard-to-price risks and uncertainties like climatic tipping points is harder still. But recognising those risks and uncertainties makes clear that political action must come sooner rather than later. – Project Syndicate

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# The EU's carbon border tax could hurt developing nations



By Miriam Gonzalez Durantez And Calli Obern/ Stanford

In July 2021, the European Commission did something that no other major governing body had ever attempted: It tied trade policy to climate policy. Reaching the European Union's goal of cutting net greenhouse-gas emissions by 55% by 2030 will require the EU to reduce emissions both at home and beyond its borders. To this end, the Commission's Fit for 55 initiative, a package of proposals aimed at meeting the bloc's emissions-reduction target, includes a carbon border adjustment mechanism (CBAM) – an import tax designed to corral other countries into tackling climate change.

The CBAM would tax imported goods sold in EU markets on the basis of their carbon content (the emissions required to produce them), which depends on their material and energy inputs. The proposed levy is intended to address so-called

carbon leakage, which occurs when businesses in the EU move production to non-member countries with less stringent emissions rules.

In other words, Europe would no longer ignore the climate effects of foreign goods. But while the measure could help to reduce emissions and level the competitive playing field for EU-based firms, the trade protectionism that it entails risks hurting developing countries.

The CBAM will initially apply to the highest-emitting industries most at risk of leakage – iron and steel, cement, fertilisers, aluminium, and electricity generation – and will likely be expanded to other sectors in the coming years. Currently, EU-made products in these industries are taxed under the domestic carbon price, but those from outside the bloc are not. If a country already has a domestic carbon price, the border tax will be lowered or waived; this is meant to encourage countries to tax carbon in their own markets. Those that cannot or will not institute a carbon tax will have to pay the full levy.

The EU tax will be phased in over the next four years. By 2023, importers will be required to report emissions embedded in the goods they import, though the tax on those emissions will not be imposed until 2026. The €1bn (\$1.1bn) of annual revenue expected from the CBAM, as well as the €9bn in annual revenue expected from the EU Emissions Trading System from 2023-2030 and taxes on multinational corporations, will support the Union's €750bn Covid-19 pandemic recovery fund. These new sources of revenue will embed EU priorities – including the green transition – in the bloc's budget for the first time.

Though not yet approved, the proposed tax is already influencing the decisions of policymakers and companies in the EU's trading partners. For example, Turkey and Indonesia plan to introduce carbon taxes to mitigate the CBAM's effects on their economies. Turkey is highly exposed, because the EU accounts for 41% of its exports. Indonesia exports billions of euros' worth of palm oil and chemicals to the EU – goods that

could fall under a broader border tax. Adopting a domestic carbon price will allow them to avoid some or all of the CBAM and keep the tax revenues instead of transferring them to the EU.

Meanwhile, some EU-based companies in industries such as computer hardware are looking to reshore manufacturing operations ahead of the CBAM's introduction. Their main motive does not reflect the cost of the tax so much as the likely complexity, bureaucracy, and unpredictability of the system. It is easier and cheaper for companies to relocate production to the EU and avoid the administrative hurdles that the CBAM could create.

Such shifts will be a win for the EU's economy and the environment. And Russia's invasion of Ukraine could accelerate the EU's efforts to achieve greater economic self-sufficiency, not least by reducing its dependence on energy-intensive imports of Russian iron and steel.

But developing economies, which often depend on manufactured products, will likely experience an outflow of activity as firms relocate to the EU. Rather than addressing only carbon leakage and leaving developing countries to adapt as best they can, the EU should allocate part of the revenue from the proposed CBAM to help foster a just green transition for poorer countries.

It is not easy or cheap to decarbonise energy-intensive goods like cement and steel. But the EU could prevent negative knock-on effects for developing economies – not only by waiting for lower-income countries to introduce their own carbon taxes (which will be a challenge given their limited administrative capability in the field), but also by supporting those that need the most help to reduce their emissions.

Such support could be provided by dedicating resources and technology to improve the efficiency of industrial processes, financing renewable energy projects, and exempting the poorest countries from the CBAM where necessary. The EU should also dedicate part of the CBAM revenue to help developing countries

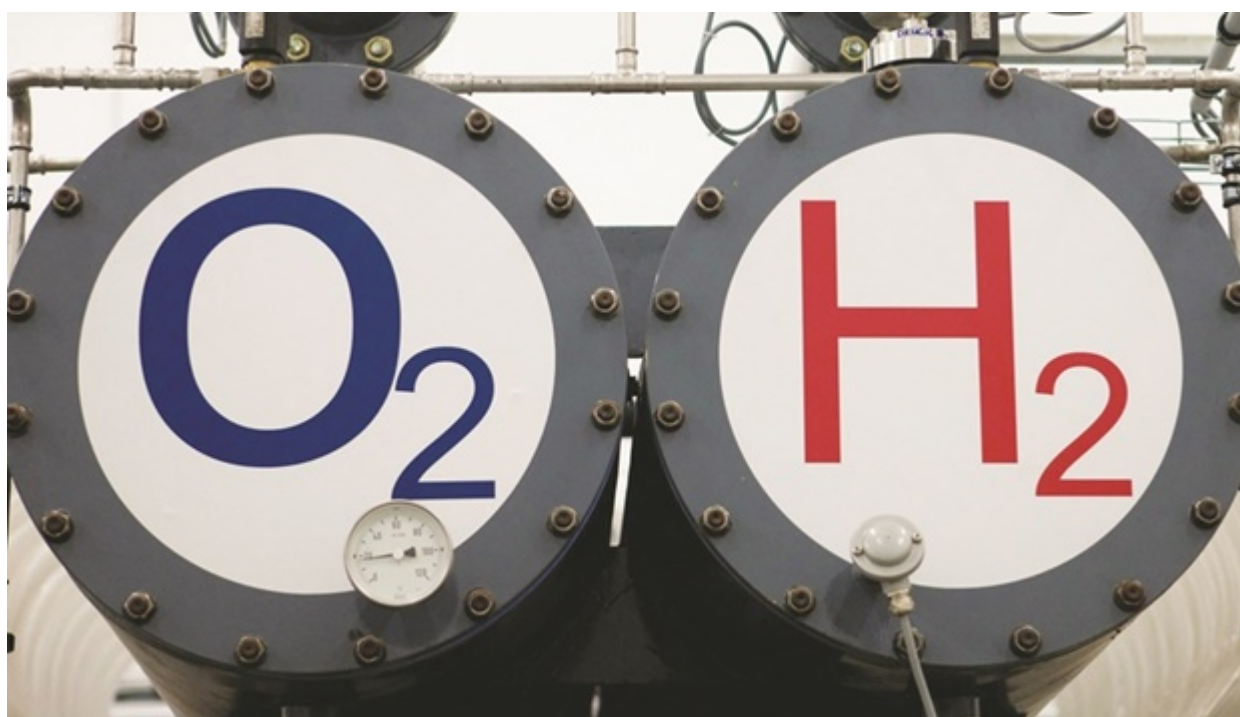
adopt cleaner technologies – to produce greener cement in Vietnam or chemicals in Indonesia, for example – and thus reduce emissions in the long run.

Europe sees itself as a global leader in the race to net-zero emissions. By helping to finance the developing world's green transition, the EU could mitigate the protectionist threat in its own climate agenda. – Project Syndicate

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## The coming green hydrogen revolution



By Jean Baderschneider/ Washington, DC



Human-induced climate change is causing dangerous and widespread environmental disruption and affecting the lives of billions of people around the world. According to the Intergovernmental Panel on Climate Change, the world faces unavoidable climate hazards over the next two decades. But, with average annual global greenhouse-gas emissions reaching their highest levels in human history between 2010 and 2019, we are simply not doing enough to limit global warming to 1.5C.

The IPCC report released in April recommended that the world rapidly reduce fossil-fuel supply and demand between now and 2050: by 95% in the case of coal, 60% for oil, and 45% for natural gas. But how can we possibly achieve such ambitious targets?

The answer is by switching to green hydrogen, which can be produced from all forms of renewable energy, including solar, wind, hydro, and geothermal. Green hydrogen is a zero-emissions fuel; when produced through electrolysis, the only “emission” is water. It is a practical and implementable solution that, by democratising energy, decarbonising heavy industry, and creating jobs globally, would help revolutionise the way we power our planet.

A rapid acceleration of the green-energy transition can also fundamentally alter the geopolitical landscape, since countries will no longer be powerful simply because of the fossil fuels they produce. In 2021, Russia provided 34% of Germany’s crude oil and 53% of the hard coal used by German power generators and steelmakers. Russian-piped natural gas was Germany’s largest source of gas imports in December 2021, accounting for 32% of supply. Since Russian President Vladimir Putin launched his horrific, unjust war in Ukraine in February, fossil-fuel exports to Europe have been earning Russia roughly \$1bn a day.

But since the start of the invasion in February, European Union countries in particular have moved quickly to reduce their energy dependence on Russia, recently agreeing to ban all seaborne imports of Russian oil. These new sanctions

against Putin's war machine could cut the amount of oil the EU buys from Russia by 90% this year. The United States has declared a complete ban on Russian oil, gas, and coal imports, while the United Kingdom is phasing out imports of Russian oil by the end of 2022.

These policies have sent fuel prices soaring. But sharply higher prices have also highlighted the opportunity to drive down energy costs by investing in renewables and the production of green hydrogen.

New research suggests that green hydrogen will be competitive with fossil fuels over the next decade. The cost of green hydrogen is expected to decline significantly by 2025 and to fall to \$1 per kilogram by 2030 in favourable locations such as Australia. For comparison, grey hydrogen, which is made using polluting liquefied natural gas, currently costs around \$2 per kilogram.

Some advocate using LNG to "solve" the current energy-security crisis, but "natural gas" contains methane, and the IPCC says that we must reduce use of natural gas by almost 45% by 2050; adding more to the energy mix now would be a catastrophic mistake.

So, there is now a global race for green energy, and specifically for green hydrogen. Dozens of countries that have abundant renewable-energy sources can develop energy independence by producing green hydrogen at scale. And energy importers will not have to rely only on the few countries (such as Russia) that have a natural endowment of fossil fuels.

In a recent report, the International Renewable Energy Agency said that (green) hydrogen can bolster energy security in three main ways: by reducing import dependence, mitigating price volatility, and boosting energy systems' flexibility and resilience through diversification. As technologies improve, the cost of green hydrogen will fall. We must do everything we can to accelerate this process.

Companies like Fortescue, where I am a board director, are investing significantly in green hydrogen and will help to

replace Russian fossil fuels with green energy. Fortescue recently announced an agreement with Germany's largest energy distributor, E.ON, to supply Europe with 5mn tonnes of green hydrogen a year by 2030 – the equivalent of one-third of the calorific value of the energy that Germany currently imports from Russia.

But while rapid changes in the energy and geopolitical landscape present a clear opportunity to address the energy and climate crises simultaneously by investing in green energy, there is a clear perception of unfairness when developed countries claim that relatively low-emitting developing economies need to shut down fossil-fuel use. Why should they risk slowing their development to address a problem they played no part in causing?

It's a valid question. Policymakers will need to account for developing countries' interests during the green transition and enhance funding and incentives for them to move to clean energy as the basis of industrialisation.

The world is clearly at a fork in the road. We can remain locked into a costly, polluting future that is hideously inefficient and empowers only a handful of fossil-fuel-rich countries. Alternatively, we can choose a green revolution of low-cost energy for all that keeps our future secure from pollution, global warming, and dictators. Given that green energy has the power to democratise global supply as more countries achieve energy independence, the choice is not difficult. – Project Syndicate

- *Jean Baderschneider is a non-executive director of Fortescue Metals Group.*

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# Cheaper, changing, crucial: the rise of solar power



AFP/Paris

Generating power from sunlight bouncing off the ground, working at night, even helping to grow strawberries: solar panel technology is evolving fast as costs plummet for a key segment of the world's energy transition.

The International Energy Agency says solar will have to scale up significantly this decade to meet the Paris climate target of limiting temperature rises to 1.5 degrees Celsius above pre-industrial levels.

The good news is that costs have fallen dramatically.

In a report on solutions earlier this year, the Intergovernmental Panel on Climate Change said solar unit costs had dropped 85 percent between 2010 and 2019, while wind fell 55%.

"There's some claim that it's the cheapest way humans have ever been able to make electricity at scale," said Gregory Nemet, a professor at the University of Wisconsin-Madison and a lead author on that report.

Experts hope the high fossil fuel prices and fears over energy security caused by Russia's invasion of Ukraine will accelerate the uptake of renewables.

Momentum gathered pace last Sunday with the ambitious US climate bill, which earmarks \$370bn in efforts to cut greenhouse gas emissions by 40% by 2030.

An analysis by experts at Princeton University estimates the bill could see five times the rate of solar additions in 2025 as there were in 2020.

Nemet said solar alone could plausibly make up half of the world's electricity system by mid-century, although he cautioned against looking for "silver bullets".

"I think there really is big potential," he told AFP.

### **Rapid changes**

The "photovoltaic effect" – the process by which solar cells convert sunlight to electrical energy – was first discovered in 1839 by the French physicist Edmond Becquerel.

After decades of innovations, silicon-based solar cells started to be developed in the United States in the 1950s, with the world's first solar-powered satellite launched in 1958.

The IPCC said of all energy technologies, small-scale ones like solar and batteries have so far proved quicker to improve and be adopted than bulkier options like nuclear.

Today, almost all of the panels glimmering on rooftops and spreading across vast fields are made in China using silicon semiconductors.

But the technology is changing quickly.

In a recent report, the IEA said these new solar cells have proven to be one-fifth more efficient in converting light to energy than standard modules installed just four or five years ago.

There are also a host of new materials and hybrid cells that experts predict could supercharge efficiency.

These include cheap, efficient and lightweight "thin film" technologies, like those using perovskites that can be printed

from inks.

Experts say they raise the prospect of dramatically expanding where solar energy can be harvested – if they can be made durable enough to withstand a couple of decades of use.

Recent research has raised hopes that it could be possible.

In one study, published in the journal *Science* in April, scientists added metal-containing materials to perovskite cells, making them more stable with efficiency near traditional silicon models.

Other research mixes materials for different purposes.

One study in *Nature* used “tandem” models, with perovskite semiconductors to absorb near-infrared light on the solar spectrum, while an organic carbon-based material absorbed ultraviolet and visible parts of the light.

And what happens after sunset?

Researchers from Stanford said this year they had produced a solar cell that could harvest energy overnight, using heat leaking from Earth back into space.

“I think that there’s a lot of creativity in this industry,” said Ron Schoff, who heads the Electric Power Research Institute’s Renewable Energy and Fleet Enabling Technologies research.

### **Location, location**

Generating more energy from each panel will become increasingly crucial as solar power is rolled out at greater scale, raising concerns about land use and harm to ecosystems.

Schoff said one efficiency-boosting design that is becoming more popular for large-scale projects is “bifacial” solar.

These double-sided units absorb energy not just directly from the sun’s rays, but also from light reflected off the ground beneath.

Other solutions involve using the same space for multiple purposes – like semi-transparent solar panels used as a protective roof for strawberry plants or other crops.

India pioneered the use of solar panels over canals a decade ago, reducing evaporation as they generate power.

Scientists in California have said that if the drought-prone US state shaded its canals, it could save around 63bn gallons. Construction on a pilot project is due to begin this year.

### **All shapes, sizes**

Experts say solar will be among a mix of energy options, with different technologies more suitable for different places.

Schoff said ultimately those energy grids with more than 25% solar and wind need ways to store energy – with batteries or large-scale facilities using things like pumped water or compressed air.

Consumers can also play their part, said Nemet, by shifting more of their energy use to daytime periods, or even hosting their own solar networks in an Airbnb-style approach.

He said the modular nature of solar means it can be rolled out in developing countries with sparse access to traditional grids.

“You could have solar on something as small as a watch and something as big as the biggest power plants in the world,” he said.

“I think that’s what’s making people excited about it.” – Reuters

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## **No net zero without nature**





By Nigel Topping And Mahmoud Mohieldin/ London

Businesses, investors, and governments that are serious about fulfilling net-zero emissions pledges before 2050 should be rushing to protect, conserve, and regenerate the natural resources and ecosystems that support our economic growth, food security, health, and climate. Yet there appear to be worryingly few trailblazers out there.

Worse, we are quickly running out of time. The science makes clear that to avoid the most catastrophic effects of climate change and to build resilience against the effects that are already inevitable, we must end biodiversity loss before 2030. That means establishing lasting conservation for at least 30% of land and sea areas within eight years, and then charting a course toward living in harmony with nature by 2050.

Though the challenge is massive, ignoring it makes no sense from a business perspective. A World Economic Forum white paper estimates that nature-positive policies “could generate an estimated \$10tn in new annual business value and create 395mn jobs by 2030.” Among other things, such policies would use precision-agriculture technologies to improve crop yields – diversifying diets with more fruit and vegetables in the process – and boost agroforestry and peatland restoration.

A nature-positive approach can also be more cost-effective. For example, the Dasgupta Review (the Final Report of the United Kingdom's Independent Review on the Economics of Biodiversity) finds that green infrastructure like salt marshes and mangroves are 2-5 times cheaper than grey infrastructure such as breakwaters.

Nonetheless, private-sector action is lagging, including in economic sectors where the health of value chains is closely tied to that of nature. That is one key finding from an analysis just released by the UN Climate Change High-Level Champions, Global Canopy, Rainforest Alliance, and others.

Out of 148 major companies assessed, only nine – or 6% – are making strong progress to end deforestation. Among them are the Brazilian paper and pulp producer Suzano and five of the largest consumer goods companies: Nestlé, PepsiCo, Unilever, Mars, and Colgate-Palmolive.

Unilever, for example, is committed to a deforestation-free supply chain by 2023, and thus is focusing on palm oil, paper and board, tea, soy, and cocoa, as these contribute to more than 65% of its impact on land. Nestlé has now made over 97% of its primary meat, palm oil, pulp and paper, soy, and sugar supply chains deforestation-free. And PepsiCo aims to implement regenerative farming across the equivalent of its agricultural footprint by 2030, and to end deforestation and development on peat.

These are positive steps, but they represent exceptions, rather than any new normal. Moreover, the financial sector has also been slow to turn nature-positive. Since the COP26 climate-change conference in Glasgow last year, only 35 financial firms have committed to tackle agricultural commodity-driven deforestation by 2025. The hope now is that more firms will join the deforestation commitment by COP27 this November. Under the umbrella of the Glasgow Financial Alliance for Net Zero, 500 financial firms (representing \$135tn in assets) have committed to halving their portfolios' emissions by 2030 and reaching net zero by 2050. And now, the Alliance has issued new net-zero guidance that includes

recommended policies for addressing deforestation.

Nature functions as a kind of global capital, and protecting it should be a no-brainer for businesses, investors, and governments. The World Economic Forum finds that “\$44tn of economic value generation – over half the world’s total GDP – is moderately or highly dependent on nature and its services.” But this profound source of value is increasingly at risk, as demonstrated by the current food crisis, which is driven not just by the war in Ukraine but also by climate-related disasters such as drought and India’s extreme heatwave, locust swarms in East Africa, and floods in China.

Businesses increasingly have the tools to start addressing these kinds of problems. Recently, the Science Based Targets initiative released a methodology for targeting emissions related to food, land, and agriculture. Capital for Climate’s Nature-Based Solutions Investment platform helps financiers identify opportunities to invest in nature with competitive returns. And the Business for Nature coalition is exploring additional moves the private sector can make.

Governments have also taken steps in the right direction. At COP26, countries accounting for over 90% of the world’s forests endorsed a leaders’ declaration to halt forest loss and land degradation by 2030. And a dozen countries pledged to provide \$12bn in public finance for forests by 2025, and to do more to leverage private finance for the same purpose. They can now start meeting those commitments ahead of COP27 in Sharm El-Sheikh, by enacting the necessary policies, establishing the right incentives, and delivering on their financial promises.

Meanwhile, the UN-backed Race to Zero and Race to Resilience campaigns will continue working in parallel, helping businesses, investors, cities, and regions put conservation of nature at the heart of their work to decarbonise and build resilience. The five strong corporate performers on deforestation are in the Race to Zero, and the campaign’s recently strengthened criteria will pressure other members to do more to use biodiversity sustainably and align their

activities and financing with climate-resilient development. The world is watching to see if the latest promises of climate action are robust and credible. By investing in nature now, governments and companies can show that they are offering more than words. – Project Syndicate

• *Nigel Topping is the United Kingdom's High-Level Climate Champion for COP26 in Glasgow. Mahmoud Mohieldin is Egypt's High-Level Climate Champion for COP27 in Sharm El-Sheikh.*

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## Why Biden's climate agenda has faltered



Instead, he has seen his legislative ambitions defeated by Congress, the Supreme Court has delivered a hammer blow to the federal government's ability to regulate greenhouse gasses, and the Ukraine crisis has been a boon for fossil fuels.

As the Democrat is poised to announce a series of new executive measures, including additional funding to help protect communities from extreme heat and boosting wind production, here is an overview of his term so far.

– What's at stake –

Shortly after taking office, Biden announced he was targeting a 50-52 percent reduction from 2005 levels in US economy-wide net greenhouse gas pollution in 2030, before achieving net zero in 2050, as part of the country's Paris Agreement goals.

"Biden has said he thinks that climate change is the existential issue of our time," and has been more emphatic than any of his predecessors including Barack Obama, Paul Bledsoe of the Progressive Policy Institute told AFP.

The president has framed the issue as key to the economic and national security of the United States, as well as public safety – and climate scientists are sounding the alarm now more than ever.

"I think that more and more people are realizing that we're living through what could eventually cause us to lose everything in terms of habitability and everything that we value in life," climate scientist Peter Kalmus told AFP.

Europe's punishing heatwave serves as a timely reminder that warming won't be an issue confined to the Global South, but instead threatens civilization as we know it, he added.

– Congress, the Supreme Court, and Ukraine –

The main legislative plank of Biden's agenda was to have been the Build Back Better bill, which would have plowed \$550 billion into the clean energy and climate businesses – much coming from tax credits and incentives.

That effort is now in tatters after Democratic Senator Joe Manchin, a fossil fuel booster who wields outsized power in

the evenly split Senate, walked away last week from the bill that he'd promised to back.

At the end of June, the conservative supermajority Supreme Court found that the federal Environmental Protection Agency cannot issue broad limits on greenhouse gasses, such as cap-and-trade schemes, without Congressional approval.

"So we're on two strikes," said Bledsoe, who served as a climate aide to former president Bill Clinton.

What's more, the oil industry has pushed for more drilling in the wake of Russia's invasion of Ukraine, casting the issue as one of energy security.

A recent analysis by the Institute for Energy Research said that Biden's government picked up the pace of drilling permits on public land from March onward "to mollify the political pressure rising along with pump prices."

Biden had vowed to end new drilling on public lands, but his "pause" was overturned by a Trump-appointed judge in 2021.

On the other hand, there have been some partial wins: the administration has promulgated tighter emissions standards for vehicles, and toughened regulations on super-polluting methane emissions, said Bledsoe.

The bipartisan infrastructure law, passed last November, also contained some climate provisions, including \$7.5 billion for a nationwide network of electric vehicle chargers and investments in carbon capture and hydrogen technologies.

– What's next? –

But without the big ticket items, the United States is falling far short of its goals.

The Rhodium Group, an independent research firm, finds that "as of June 2022, we find that the US is on track to reduce

emissions 24 percent to 35 percent below 2005 levels by 2030 absent any additional policy action.”

The White House has not ruled out declaring a “climate emergency,” which would grant Biden additional policy powers, but given a hostile judiciary, this would likely be subject to legal challenge.

Bledsoe said to achieve real change, Biden should instead push for broad public backing.

“Democrats should make popular consumer clean energy tax br

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## No trash goes to waste on recycling Greek islands



By Sebastien Malo/ Tilos

Before the tiny Greek island of Tilos became a big name in recycling, taverna owner Aristoteles Chatzifountas knew that



whenever he threw his restaurant's trash into a municipal bin down the street it would end up in the local landfill.

The garbage site had become a growing blight on the island of now 500 inhabitants, off Greece's south coast, since ships started bringing over packaged goods from neighbouring islands in 1960.

Six decades later, in December last year, the island launched a major campaign to fix its pollution problem. Now it recycles up to 86% of its rubbish, a record high in Greece, according to authorities, and the landfill is shut.

Chatzifountas said it took only a month to get used to separating his trash into three bins – one for organic matter; the other for paper, plastic, aluminium and glass; and the third for everything else.

"The closing of the landfill was the right solution," he told the Thomson Reuters Foundation. "We need a permanent and more ecological answer."

Tilos' triumph over trash puts it ahead in an inter-island race of sorts, as Greece plays catch-up to meet stringent recycling goals set by the European Union (EU) and as institutions, companies and governments around the world adopt zero-waste policies in efforts to curb greenhouse gas emissions.

"We know how to win races," said Tilos' deputy mayor Spyros Aliferis. "But it's not a sprint. This is the first step (and) it's not easy."

The island's performance contrasts with that of Greece at large. In 2019, the country recycled and composted only a fifth of its municipal waste, placing it 24th among 27 countries ranked by the EU's statistics office.

That's a far cry from EU targets to recycle or prepare for reuse 55% of municipal waste by weight by 2025 and 65% by 2035.

Greece has taken some steps against throwaway culture, such as making stores charge customers for single-use plastic bags.

Still, "we are quite backward when it comes to recycling and reusing here," said Dimitrios Komilis, a professor of solid

waste management at the Democritus University of Thrace, in northern Greece.

Recycling can lower planet-warming emissions by reducing the need to manufacture new products with raw materials, whose extraction is carbon-heavy, Komilis added.

Getting rid of landfills can also slow the release of methane, another potent greenhouse gas produced when organic materials like food and vegetation are buried in landfills and rot in low-oxygen conditions.

And green groups note that zero-waste schemes can generate more jobs than landfill disposal or incineration as collecting, sorting and recycling trash is more labour-intensive.

But reaching zero waste isn't as simple as following Tilos' lead – each region or city generates and handles rubbish differently, said researcher Dominik Noll, who works on sustainable island transitions at Vienna's Institute of Social Ecology.

"Technical solutions can be up-scaled, but socioeconomic and sociocultural contexts are always different," he said.

"Every project or programme needs to pay attention to these contexts in order to implement solutions for waste reduction and treatment."

Tilos has built a reputation as a testing ground for Greece's green ambitions, becoming the first Greek island to ban hunting in 1993 and, in 2018, becoming one of the first islands in the Mediterranean to run mainly on wind and solar power.

For its "Just Go Zero" project, the island teamed up with Polygreen, a Piraeus-based network of companies promoting a circular economy, which aims to design waste and pollution out of supply chains.

Several times a week, Polygreen sends a dozen or so local workers door-to-door collecting household and business waste, which they then sort manually.

Antonis Mavropoulos, a consultant who designed Polygreen's operation, said the "secret" to successful recycling is to

maximise the waste's market value.

"The more you separate, the more valuable the materials are," he said, explaining that waste collected in Tilos is sold to recycling companies in Athens.

On a June morning, workers bustled around the floor of Polygreen's recycling facility, perched next to the defunct landfill in Tilos' arid mountains.

They swiftly separated a colourful assortment of garbage into 25 streams – from used vegetable oil, destined to become biodiesel, to cigarette butts, which are taken apart to be composted or turned into materials like sound insulation.

Organic waste is composted. But some trash, like medical masks or used napkins, cannot be recycled, so Polygreen shreds it, to be turned into solid recovered fuel for the cement industry on the mainland.

More than 100 tonnes of municipal solid waste – the equivalent weight of nearly 15 large African elephants – have been sorted so far, said project manager Daphne Mantziou.

Setting up the project cost less than € 250,000 (\$254,550) – and, according to Polygreen figures, running it does not exceed the combined cost of a regular municipal waste-management operation and the new tax of €20 per tonne of landfilled waste that Greece introduced in January.

More than ten Greek municipalities and some small countries have expressed interest in duplicating the project, said company spokesperson Elli Panagiotopoulou, who declined to give details.

Replicating Tilos' success on a larger scale could prove tricky, said Noll, the sustainability researcher.

Big cities may have the money and infrastructure to efficiently handle their waste, but enlisting key officials and millions of households is a tougher undertaking, he said.

"It's simply easier to engage with people on a more personal level in a smaller-sized municipality," said Noll.

When the island of Paros, about 200km northwest of Tilos, decided to clean up its act, it took on a city-sized challenge, said Zana Kontomanoli, who leads the Clean Blue

Paros initiative run by Common Seas, a UK-based social enterprise.

The island's population of about 12,000 swells during the tourist season when hundreds of thousands of visitors drive a 5,000% spike in waste, including 4.5mn plastic bottles annually, said Kontomanoli.

In response, Common Seas launched an island-wide campaign in 2019 to curb the consumption of bottled water, one of a number of its anti-plastic pollution projects.

Using street banners and on-screen messages on ferries, the idea was to dispel the common but mistaken belief that the local water is non-potable.

The share of visitors who think they can't drink the island's tap water has since dropped from 100% to 33%, said Kontomanoli.

"If we can avoid those plastic bottles coming to the island altogether, we feel it's a better solution" than recycling them, she said.

Another anti-waste group thinking big is the nonprofit DAFNI Network of Sustainable Greek Islands, which has been sending workers in electric vehicles to collect trash for recycling and reuse on Kythnos island since last summer.

Project manager Despina Bakogianni said this was once billed as "the largest technological innovation project ever implemented on a Greek island" – but the race to zero waste is now heating up, and already there are more ambitious plans in the works.

Those include CircularGreece, a new €16mn initiative DAFNI joined along with five Greek islands and several mainland areas, such as Athens, all aiming to reuse and recycle more and boost renewable energy use.

"That will be the biggest circular economy project in Greece," said Bakogianni. – Thomson Reuters Foundation

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# Double-edged sword: Global hunger and climate goals



Poor or rich, societies across the world are now suffering from an unprecedented food and hunger crisis.

A United Nations gauge of world food prices has jumped more than 70% since mid-2020 and is near a record after Russia's invasion of Ukraine.

Battling hunger has garnered heightened attention this year, as the Ukraine crisis choked exports from one of the world's biggest crop suppliers, stoking food inflation and potentially leaving millions more undernourished.

The global agriculture sector won't eradicate hunger by the end of the decade or meet climate goals from the Paris Agreement without a major overhaul, key agencies have cautioned.

A UN pledge to eliminate hunger by 2030 appears out of reach, as low-income nations struggle to afford better diets, the Food and Agriculture Organisation said in a joint report with the Organisation for Economic Co-operation and Development.

Greenhouse gas emissions from agriculture are also seen continuing to rise on a business-as-usual path.

The challenges are two of the most vital issues facing the world's food sector.

Reversing current trends to meet both goals would require a 28% increase in agricultural productivity this decade – triple the rate of the last ten years – highlighting the scale of the problem.

The world's hunger problem has already reached its worst in years as the pandemic exacerbates food inequalities, compounding extreme weather and political conflicts.

The prolonged gains across the staple commodities are trickling through to store shelves, with countries from Kenya to Mexico reporting higher food costs.

The pain could be particularly pronounced in some of the poorest import-dependent nations, which have limited purchasing power and social safety net.

Soaring food and fuel costs recently helped send US inflation to a 40-year high. The US Department of Agriculture now expects retail food prices to gain 5% to 6% this year – roughly double its forecast from three months ago.

In Lebanon, poverty rates are sky-rocketing in the population of about 6.5mn, with around 80% of people classed as poor, says the UN agency ESCWA.

Last September, more than half of families had at least one child who skipped a meal, Unicef has said, compared with just over a third in April 2021.

Amid a devastating foreign exchange crisis, Sri Lanka, a country of 22mn people, is unable to pay for essential import of food items, fertiliser, medicines and fuel due to a severe dollar crunch.

Food costs account for 40% of consumer spending in sub-Saharan Africa, compared with 17% in advanced economies.

In 2020, Africa imported \$4bn of agricultural products from Russia.

Across the world, approximately 1.2bn people live in extreme poverty, on less than one dollar per day, according to a 2018 World Health Organisation report.

At least 17mn children suffer from severe acute malnutrition around the world, which is the direct cause of death for 2mn children every year.

Here's the disturbing other side of the lingering tragedy.

One-third of all food produced – around 1.3bn tonnes a year – is lost or wasted, according to the FAO. It costs the global economy close to \$940bn each year.

In the Gulf, between a third and half of the food produced is estimated to go to waste.

Improving food access through social safety nets and distribution programmes, especially for the most vulnerable, is key to reducing global hunger, according to the latest joint FAO-OECD report. Curbing emissions, reducing food waste and limiting calorie intake in rich countries are measures needed to meet climate goals, it said.