

## How the race for renewable energy is reshaping global politics

As the transition from fossil fuels to clean energy gathers speed, what does it mean for the balance of power?

Leslie Hook and Henry Sanderson FEBRUARY 3 2021

---

While the world was locked down by coronavirus last year, Andrew “Twiggy” Forrest, chairman of Fortescue Metals Group, was on the move. The billionaire mining magnate and his entourage [toured 47 countries over five months](#), managing to convince some of them to open their borders to the delegation despite the pandemic.

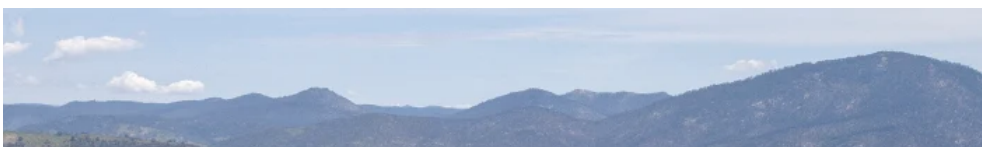
But Forrest wasn’t searching for mineral deposits — he was on the hunt for clean energy. From Kyrgyzstan to Korea to Bhutan, the group was scouting out the best sites for hydropower and geothermal energy. The advantage of travelling during a pandemic, Forrest explains, is that government officials have much more free time. (He did, however, contract Covid-19 en route, necessitating an emergency medical stop in Switzerland.)

When Forrest returned, fully recovered, to Australia, he declared Fortescue, a miner of iron ore, was going all-in on green hydrogen. He believes the market could be worth as much as \$12tn by 2050. “The journey to replace fossil fuels with green energy has been moving at glacial speed for decades — but is now violently on the move,” he said in a TV lecture series.

Over the phone, he is even blunter. “You’ll see change everywhere . . . In 15 years’ time, the world energy scene will look nothing like what it does now,” he says. “Any country which does not take green energy very seriously, but clings to polluting energy, will eventually get left behind.”



Australian mining magnate Andrew 'Twiggy' Forrest is driving a shift to green energy at Fortescue Metals Group © Getty Images





Williamsdale solar farm in Canberra, Australia. A growing lobby is pushing for the country to become a 'renewable superpower'  
© AAPIMAGE/Reuters

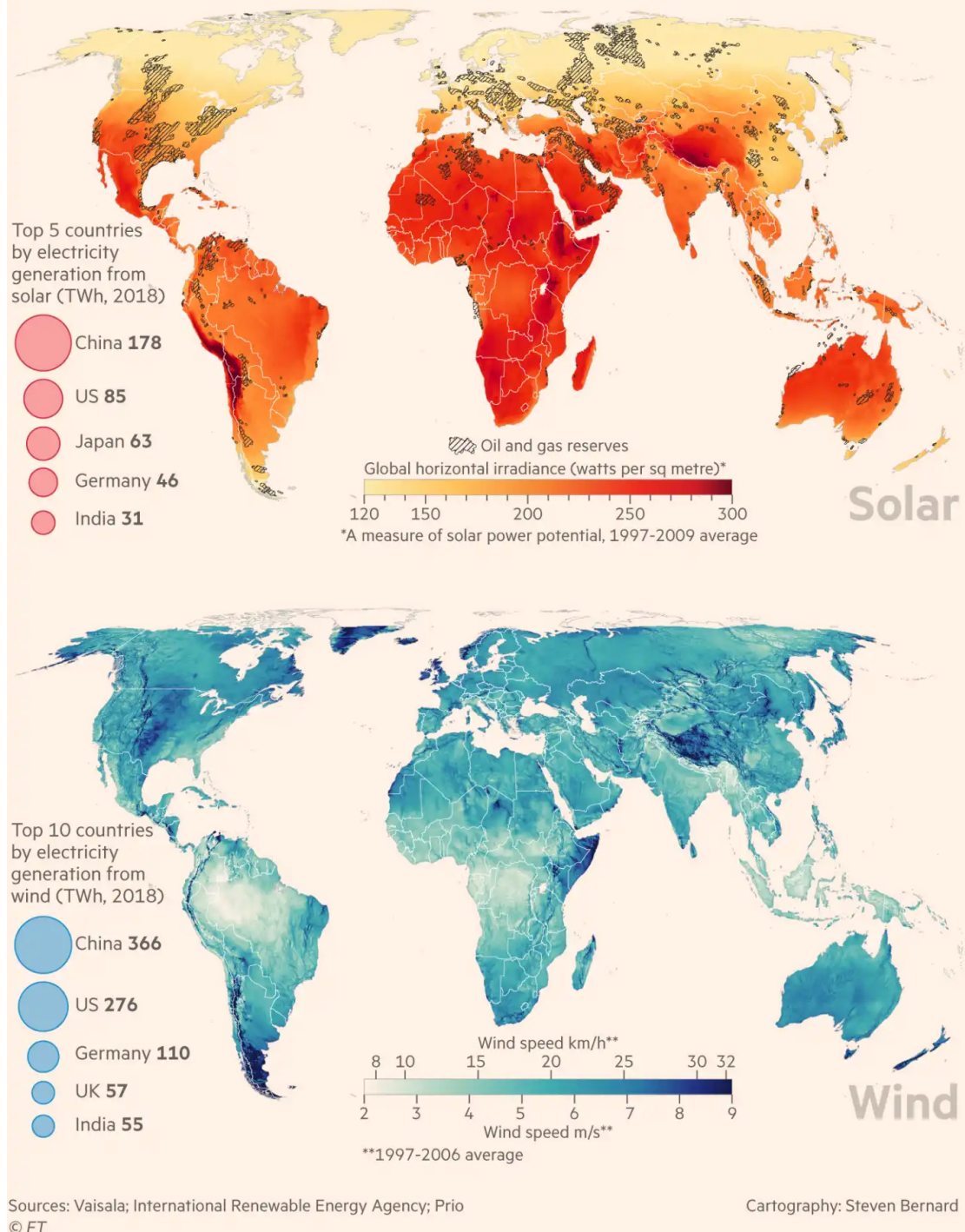
While many are cynical about the environmental conversion of a man who has made a fortune selling iron ore, Forrest is part of a trend. As climate concerns increase, the world is getting behind the energy transition — even in the most unlikely quarters. “We just can’t keep doing things the way we have always done them, otherwise our planet is going to be toast,” he says. He admits that his record in this respect is not exactly blameless: Fortescue’s carbon footprint is two million tonnes of CO<sub>2</sub> per year, about as much as a small island state.

Australia itself has long been a climate laggard and a major coal exporter, but as China and other [big customers plan to cut their emissions](#), taking their business with them, that may be changing. Dozens of the world’s biggest economies have adopted [targets for net-zero emissions of greenhouse gases by 2050](#). And 189 countries have joined the 2015 Paris climate accord, which aims to limit global warming to well below 2C. In a race to curb climate change, countries are rushing to cut fossil fuels, boost clean energy — and transform their economies in the process.

But as the energy system changes, so will energy politics. For most of the past century, geopolitical power was intimately connected to fossil fuels. The fear of an oil embargo or a gas shortage was enough to forge alliances or start wars, and access to oil deposits conferred great wealth. In the world of clean energy, a new set of winners and losers will emerge. Some see it as a clean energy “space race”. Countries or regions that master clean technology, export green energy or import less fossil fuel stand to gain from the new system, while those that rely on exporting fossil fuels — such as the Middle East or Russia — could see their power decline.

Olafur Ragnar Grimsson, the former president of Iceland and chair of the Global Commission on the Geopolitics of Energy Transformation, says that the clean energy transition will birth a new type of politics. The shift is happening “faster, and in a more comprehensive way, than anyone expected”, he says. “As fossil fuels gradually go out of the energy system . . . the old geopolitical model of power centres that dominate relations between states also goes out the window. Gradually the power of those states that were big players in the world of the fossil-fuel economies, or big corporates like the oil companies, will fritter away.”

## Where wind and solar could lead the renewables charge



In Australia, a growing lobby is pushing for the country to [become a “renewable superpower”](#) thanks to its abundant wind and solar resources. Forrest is an investor in a project called the Sun Cable, which hopes to lay an electric cable all the way to Singapore. He believes the country’s future is at stake. “The impact on the Australian economy, if we get this right, could be nothing short of nation-building,” he says.

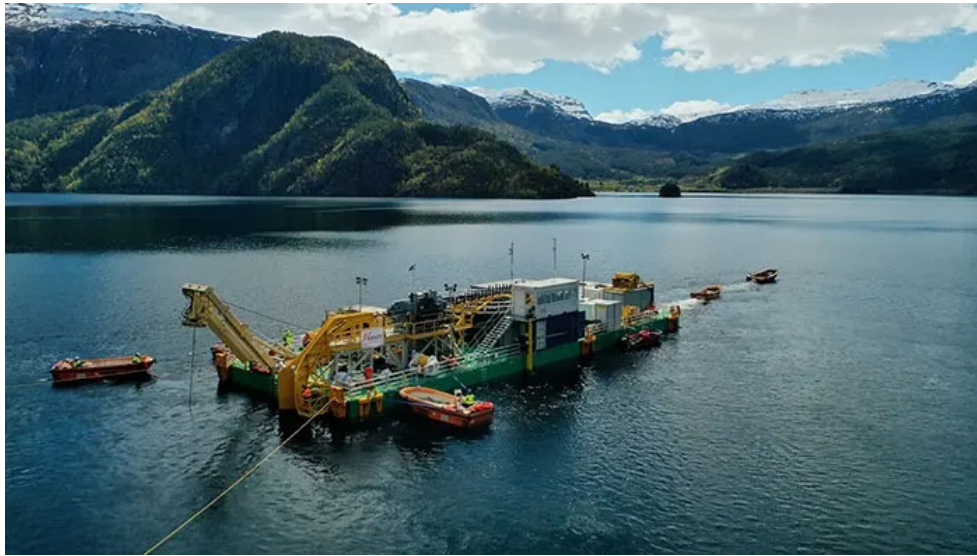
New power structures will emerge along with the transition. “The [old] levers of control, a lot of them will dissipate and simply cease to exist,” says Thijs Van de Graaf, associate professor at Ghent University and lead author of [an influential 2019 report from the International Renewable Energy Agency](#) (Irena). “This is a completely new constellation, so we cannot think just like the old days,” he adds. “There is a new class of energy exporters that may emerge on the global scene.”

---

## FROM CARBON TO ELECTRONS

When it comes to exporting clean electricity, countries such as Norway, Bhutan and France are already far ahead. In a few months’ time, Norway and the UK will finish constructing the world’s longest subsea electricity cable, [the North Sea Link](#). The Norwegian side of the cable runs through snow-capped mountains and a deep lake, then travels underwater for more than 720km, across the North Sea, until it reaches the UK. The highly specialised cable is also manufactured in Norway, in a factory located next to a fjord, so that it can be easily loaded on to ships and taken out to sea for installation. The North Sea Link will be Norway’s seventh subsea interconnector, allowing the country to export its abundant hydropower to its neighbours.

At its most basic, the new energy transition is a shift from oil and gas to electricity, says Auke Lont, chief executive of Statnett, Norway’s state grid company. “Electrification will be the answer to climate change, to put it at a very general level,” he explains. “The reason is that we now have access to very cheap electricity, and we see that cheap electricity can serve our energy needs in the future.” Whether in trucks or cars or home heating, the use of electricity is already surging. It provides about 20 per cent of energy today, and will have to rise to 50 per cent by 2050, if countries are to meet their climate commitments, according to the International Renewable Energy Agency.



Construction of the North Sea Link, an interconnector between Norway and the UK, included building a custom barge to lay cable across Lake Suldal on the Norwegian side of the connection

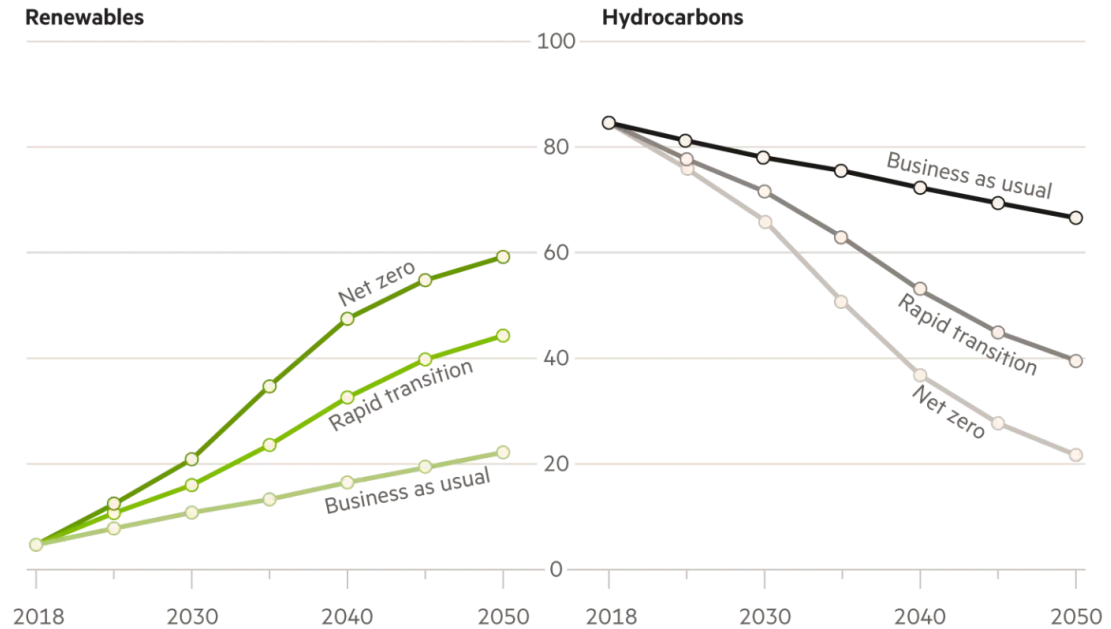
“Our world order has been based on oil,” says Lont. That is changing: “As we go from carbon [fossil fuels] to electrons, we will have a world order where the electron is more important than the carbon.”

The question of which countries will end up ahead is still subject to debate. But there is broad consensus that change is happening. Pascal Lamy, former head of the World Trade Organization, compares the global shift from one energy system to another with the advent of the industrial revolution. “There is an inflection taking place,” he says, from behind the frames of his red glasses in a video interview. “If you compare the world today to the world 18 months ago, the big difference is that . . . only 25 per cent of the world had a decarbonisation horizon. Today, 75 per cent of the world economy has a decarbonisation horizon. This is a major shift.”

The coronavirus pandemic has accelerated the trend. Last year, new [renewable power hit a record](#) 200 gigawatts, while the rest of the energy sector shrank. Amid the recession [triggered by the pandemic](#), demand for oil fell 8.8 per cent and demand for coal 5 per cent, compared to the year before, according to the International Energy Agency, the Paris-based oil watchdog. Clean energy was the only part of the energy sector that had growth in 2020. The pace and scale of the transition to renewables have already shot past the most optimistic projections.

## The world's energy transition

Renewable energy will increase, and fossil fuels decline, under three different future scenarios, according to BP (% of primary energy)



Source: BP Energy Outlook 2020  
© FT

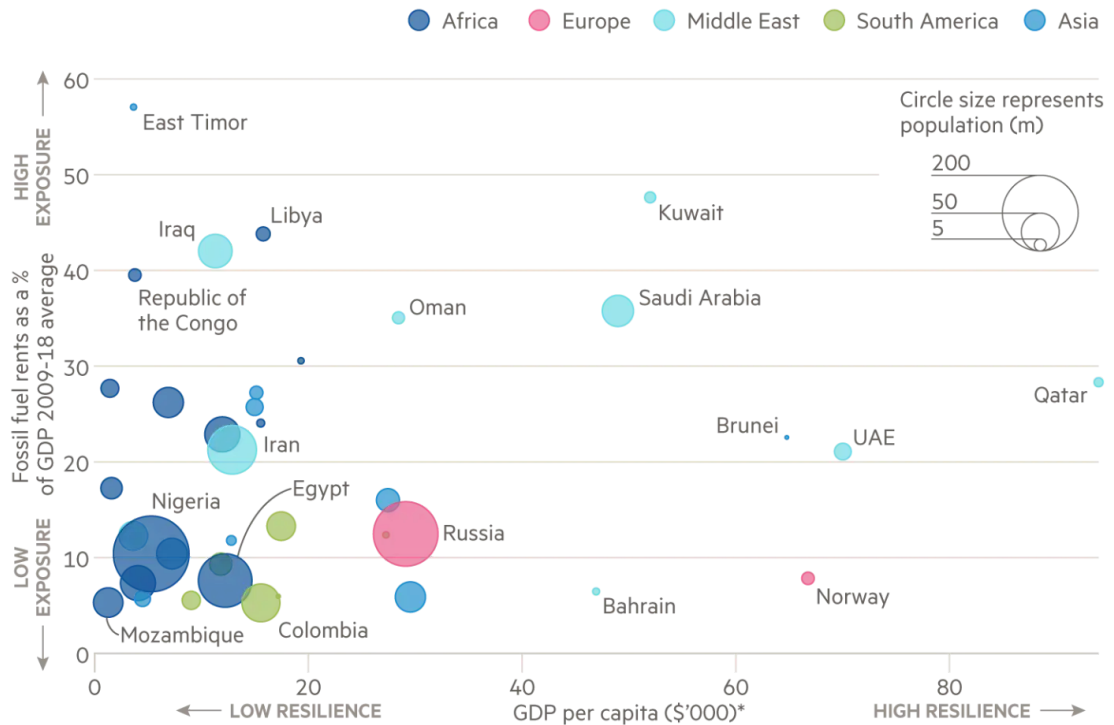
The IEA expects that renewables will soon pass coal as the biggest source of power generation. “We can say that renewables were immune to Covid. Both solar and wind saw significant increases [last year],” Fatih Birol, head of the IEA, said at a press conference in January. “Our numbers show that renewables are set to become the largest source of generation by 2025, overtaking coal — and ending the fossil-fuel domination of the last decades.”

That’s a grim thought for regions such as the Middle East that rely on oil and gas exports for revenue. Countries that have the most to lose are already pushing back. At the annual UN climate talks, Saudi Arabia and Russia routinely play a disruptive role. (Saudi Arabia wants to have it both ways: a big plan to expand its solar power while continuing to produce oil and gas.) Meanwhile, Poland, a coal producer, dragged its feet for months before reluctantly agreeing to the EU’s net-zero emissions target. In a world disrupted by coronavirus, fossil-fuel-producing countries fear further job losses.

The transition will also be painful for energy companies that produce oil and gas. But even they acknowledge that it is picking up pace. In a statement that would have once been unthinkable, BP recently said peak oil may have already occurred in 2019.

## How prepared are fossil fuel exporters for the energy transition?

Countries which rely heavily on hydrocarbon exports and have lower GDP per capita are likely to struggle the most



\*GDP data are all for 2019 (in constant 2019 dollars) except for South Sudan (2014), Turkmenistan (2018), Venezuela (2011) and Yemen (2013)  
Source: World Bank Development indicators  
© FT

Ben van Beurden, Shell’s chief executive, says electricity will become a mainstay of its business. “The fundamentals of how we win in power are going to be really different from how you win in resources extraction,” he says. “In oil and gas, you need an asset base. It is about having the best rocks, the lowest cost of production.” That equation is turned on its head in the power sector, when the electricity from one solar farm is just as good as the next.

There are other differences too: unlike gas pipelines, electricity trading can go in both directions. Renewable power is also more dispersed, rather than concentrated in a few locations like fossil fuels. “When we talk about wind, solar, biomass, hydropower, ocean energy, geothermal — they are actually available in one form or another in most countries,” says Van de Graaf. [For places such as Morocco](#), which imports more than 80 per cent of its energy but also has abundant solar resources, the transition could be an economic gift.

The Irena report found three ways for countries to exert influence in the new system. One is by exporting electricity or green fuels. Another is by controlling the raw materials used in clean energy, such as lithium and cobalt. The third is by gaining an edge in technology, such as electric vehicle batteries. With renewable resources so readily available, Van de Graaf believes that it is technology which will end up being the biggest differentiating factor.

A tally of countries' activities in clean energy found one racing far ahead of the rest. "We have one country in pole position," he says. "China."

---

## CHINA PULLS AHEAD

The southern tip of the Democratic Republic of Congo is famous for [the Tenke Fungurume copper and cobalt mine](#). The ore is so rich that in some places it can be dug up by hand — enterprising locals look out for the pale-purple "copper flower" that signals the presence of the mineral below.

Huge trucks travel at high speed along the narrow paved road that leads to the mine, carrying ore, equipment or acid used to process the minerals. And along the sides of the road, a foreign script is visible on storefronts and signs — Chinese.

### Share your views

---

*We'd love to hear from our readers around the world. What positive changes could your country make to help the transition to clean energy? Share your thoughts in the comments below*

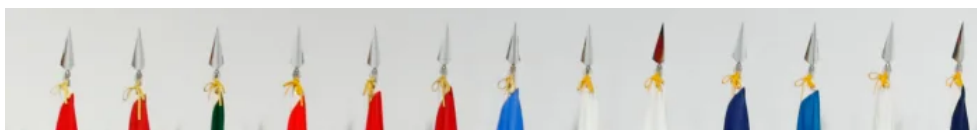
The area has long been the subject of power disputes, but China's arrival is recent. China Molybdenum, which is listed in Hong Kong and Shanghai, bought the mine from Freeport-McMoran, the US copper giant, for \$2.65bn in 2016. Initially, [it looked as if China's bet was struggling](#): copper and cobalt prices fell, and disputes with local suppliers caused the mine to lag behind in production.

But today, as [demand for copper and cobalt soars](#) due to the clean energy transition, it seems like a masterstroke. Copper is essential for electric cables and wind turbines, and cobalt is used in electric vehicle batteries. China Molybdenum now controls more than one-tenth of the world's cobalt. Tenke Fungurume is an "absolutely great asset", says copper analyst George Heppel of business intelligence company CRU. "I don't think there's anything quite like that size, in terms of gigantic deposits."

The purchase is just one in a series of moves that have put Chinese groups ahead in almost every area of clean tech. China produces more than 70 per cent of all solar photovoltaic panels, half of the world's electric vehicles and a third of its wind power. It is also the biggest battery producer and [controls many of the raw materials crucial for clean-tech](#) supply chains, such as cobalt, rare earth minerals and polysilicon, a key ingredient in solar panels.



Chinese-owned Tenke Fungurume mine in the Democratic Republic of Congo. China Molybdenum, the mine's owner, controls more than one-tenth of the world's cobalt © Reuters





Late last year Chinese president Xi Jinping announced that China aimed to reach carbon neutrality by 2060 © Getty Images

“If you talk about the clean energy technology race, in many ways, it looks as if the race has already been run, and the winner is China,” says Van de Graaf. “Other players are trying to catch up.” The US, for example, has limited domestic supplies of cobalt and lithium, and the state department has for the past few years tried to improve access to rare earth minerals, due to their strategic importance.

For China, [this advantage has been part strategy, part luck](#). Policymakers have long worried about the country’s dependence on imported oil and gas, and Beijing embraced renewable energy manufacturing relatively early, focusing particularly on solar panels and LEDs. All this was supercharged in September 2020, when President Xi Jinping announced at the UN General Assembly that China would reach carbon neutrality by 2060. “Covid-19 reminds us that humankind should launch a green revolution,” said Xi, in an announcement that came as a surprise to many. “Humankind can no longer afford to ignore the repeated warnings of nature,” he added.

Xi also spoke about [the “historic opportunities” created by this new phase](#) of “industrial transformation”. Last year, China installed a record 120GW of new wind turbines and solar panels domestically, more than double the year before. Meanwhile, China’s Belt and Road Initiative, the international development programme that has been criticised for being coal-friendly, invested more in renewable projects than fossil fuels for the first time.

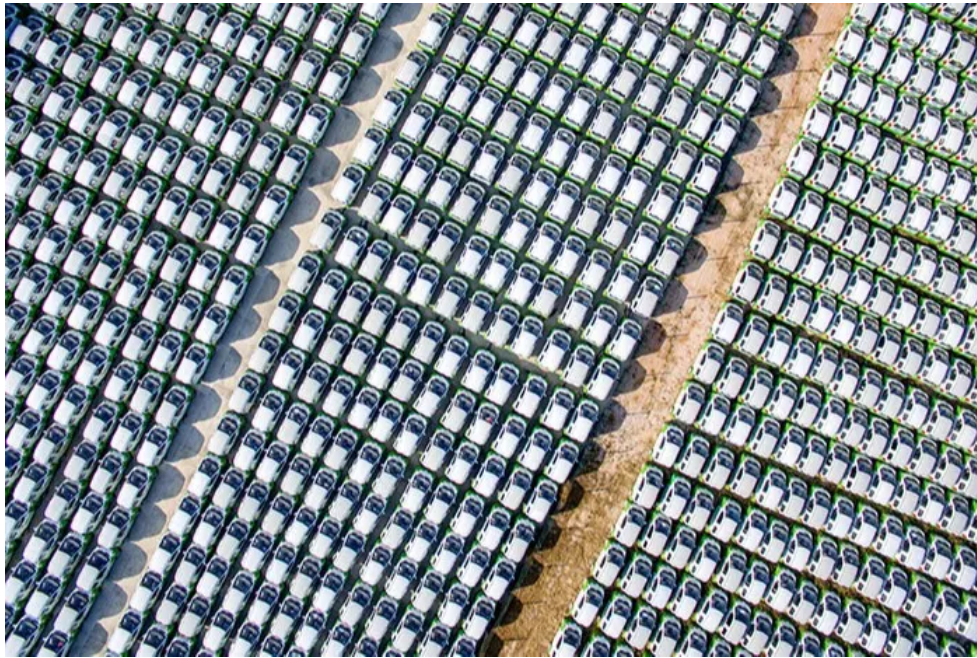
Making the transition won’t be easy — China is still [the world’s biggest emitter of greenhouse gases](#) and is heavily dependent on coal, which supplies 58 per cent of its electricity. But its companies are poised to benefit greatly, not only from the domestic energy transition, but from growing demand for clean-tech products around the world. As major economies work to reach their net-zero goals, they will have to buy more solar panels, batteries and critical minerals. The main supplier? China.

---

## THE RACE FOR BATTERIES

China’s sway over battery manufacturing reflects its long-term strategy. Its poster child is CATL, Contemporary Amperex Technology. Founded in 2011 in the mountainous eastern fishing town of Ningde, the company owes a large part of its success to government protectionism. In 2015, as China was pouring billions into its electric vehicle market, the government suddenly announced a list of approved battery-makers who were eligible for subsidies, none of which were foreign. This was a boon to domestic businesses: CATL grew from producing 6.2GWh worth of batteries in 2016 to 34GWh last year — a third of the global market. Now the biggest producer in the world, it has contracts with Daimler, BMW and [Tesla](#) among others.

Beijing dominates the supply chain from the mines in the DRC to the final production of lithium-ion batteries. Its companies control more than 85 per cent of the world’s refined cobalt chemical capacity, essential for most lithium-ion batteries. It also mines almost all of the world’s rare earth minerals, which are used in electric motors and wind turbines. Making an electric vehicle without involving China is almost impossible.



A fleet of electric cars at a Chinese plant. China produces half of the world's electric vehicles © Visual China Group/Getty Images

China's manufacturing prowess has helped to drive down the global cost of batteries, making electric cars more competitive. This echoes what has happened with other clean energy technologies, from solar panels to polysilicon production: subsidies led to overcapacity and a rush to produce, and ended up with China dominating global markets.

The cost of lithium-ion batteries today is just one-seventh what it was a decade ago, according to Bloomberg New Energy Finance. CATL is now building a battery plant in Germany. "It was actually a brilliant strategy," says Jim Greenberger, founder of NAATBatt, the North American trade association for advanced battery technology. "CATL was the winner and they have used that scale to compete very effectively in the export market. That's the issue we're dealing with in the west: how to compete with Chinese companies that have gotten to scale, via use of industrial policy."

As the world shifts from carbon to electron, China has been active in developing the electricity network that will be the backbone of the clean energy system. One of Xi's pet projects is the Global Energy Interconnection — [a network of high-voltage transmission lines](#) that would span the globe. The project envisages cheap electricity being shipped around the world — from dams in Congo to Europe. It is headed by Liu Zhenya, the former chief of State Grid, who describes it as the "internet of energy".

Climate Capital

---



Where climate change meets business, markets and politics.

[Explore the FT's coverage here](#)

While the Global Energy Interconnection will take decades to build, it signals how Chinese policymakers are thinking about the new global order. “The idea is to connect countries with [clean energy] resources, with those that have the demand,” explains Xu Yi-chong, author of *Sinews of Power: The Politics of the State Grid Corporation*.

China’s clean energy dominance has faced a backlash, which could grow as the energy transition gathers speed. The US and EU have repeatedly slapped tariffs on Chinese photovoltaic panels in trade disputes, while new rules in Europe could reduce imports of Chinese batteries. Recent revelations about [forced labour in Xinjiang](#) — a region that produces most of the world’s polysilicon — threaten further sanctions. Abigail Ross Hopper, president of the US Solar Energy Industries Association, said in January that the association has been telling “all solar companies operating in the Xinjiang region to immediately move their supply chains”.

Steven Chu, former US energy secretary, says that it is “absolutely” a concern for the US to rely on Chinese supply chains for its energy transition. “For strategic reasons, you don’t want to be beholden to a single country supplier,” he says, drawing an analogy to China’s dominance in making masks and other personal protective equipment during the coronavirus pandemic.

However he believes that the US — which could see as much as \$2tn invested in climate initiatives proposed by President Joe Biden — still has an edge in innovation. “I personally think [the most innovation] is still in the United States, in terms of laboratory innovation in new batteries,” he says. “But then it really is a matter of how you get that invention and discovery . . . to become large-scale manufacturing. And that’s where China excels.”

This is likely to be a challenge for Biden, who [has made climate change a top priority](#). He wants the US to adopt a net-zero emissions target, but he has also pledged to revive US manufacturing. Jonas Nahm, assistant professor of energy at Johns Hopkins University, says new US climate targets could benefit Chinese companies: “This administration is caught in a pickle, which is that all of the climate goals that are being promised will rely on China, at least in the short term.”

Other global leaders face a similar quandary: as they invest more in the energy transition, some of that money will filter back to China. “This is prompting a lot of anxiety, especially amid this proliferation of net-zero commitments,” says Van de Graaf, “because other countries, such as Japan, the US and the EU, will make a transition that is very costly, and the economic benefit of that will be reaped disproportionately by China.”

---

## WINDS OF CHANGE

Many of those countries are taking their own steps toward a clean energy future. In the town of Blyth, on the north-east coast of England, the harbour is full of wind farm activity. The former mining town is reinventing itself as a centre for the wind industry. A deep-water port makes it an ideal launch point for wind farm construction boats, and a blade testing facility that opened in 2017 has been certifying some of the longest in the world.

The UK is the largest producer of offshore wind power globally and Prime Minister Boris Johnson has [pledged to make it “the Saudi Arabia of wind”](#), with a plan to quadruple offshore wind capacity by 2030. Europe has long been ahead in this industry, and European companies still hold a lead in turbine manufacturing. In the North Sea, many of the companies that used to work in the declining oil and gas sector are shifting their focus.



Scroby Sands, located off the coast of Norfolk in the North Sea, was one of the UK's first offshore wind farms © Universal Images Group/Getty Images

Blyth also happens to be the arrival point for the high-voltage subsea cable between the UK and Norway. Nigel Williams, project director of the North Sea Link for National Grid, sees it as the “perfect landing spot”. “What we are doing, really, is to find a way to maximise the renewables we generate in the UK,” he says. When the UK has surplus power on windy days or during storms, it will export electricity to Norway. When the weather is calmer, it will import power from Norwegian dams. The interconnector can provide about the same amount of energy as Blyth’s two coal-fired power plants, which are both now closed.

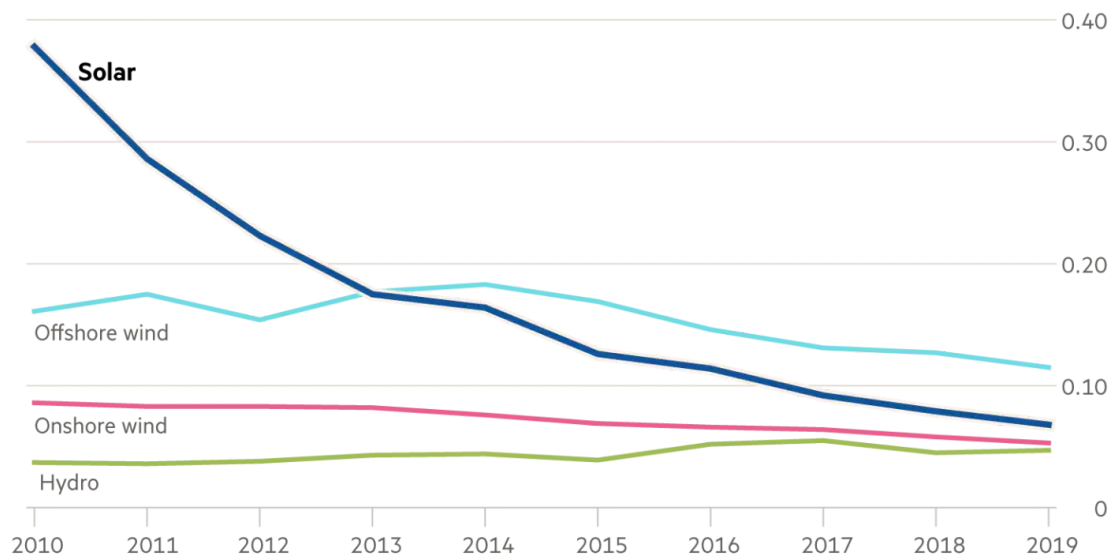
But Blyth is also set to be the home of Britishvolt, a start-up seeking to build the UK’s first battery gigafactory. (Construction has yet to begin on the site, [a £2.6bn project](#) that is still to receive full funding.) Chief strategy officer Isobel Sheldon says Britishvolt aims to have a competitive edge by tailoring its batteries to each car manufacturer and making them in a more environmentally friendly way. The company, whose website is covered in pictures of the Union Jack, plans to start production in 2023. Sheldon still nurses a grudge that current lithium-ion battery technology — invented at Oxford in 1980 — has been slow to catch on in the UK. “It’s always irritated me to death that we created the technology and the rest of the world has capitalised on it,” she says. “The west has been caught sleeping on this.”

The EU’s plans for green recovery will give a boost to several clean energy technologies, such as the hydrogen industry, which will receive about €30bn. As Brussels edges closer to adopting a carbon border adjustment tax — which [would slap a tariff on goods](#) like steel from countries with no carbon pricing — that could give a shot in the arm to the manufacturing of green steel and aluminium.

---

## Solar has largest price drop of renewable energy sources

Levelised cost of energy (\$ per kWh, 2019 prices)



Source: Source: International Renewable Energy Agency  
© FT

As the EU prepares for its target of net-zero emissions by 2050, some countries are planning to trade more green fuels. [Portugal recently agreed to ship green hydrogen to the Netherlands](#), while Germany is weighing a deal to buy hydrogen from Morocco. “This is giving rise to a whole new constellation of bilateral trade relationships,” says Van de Graaf. “There is a new class of energy exporters that may emerge on the global scene.” Countries with lots of sunshine, such as Spain and Portugal, are eager to find ways to convert that into a commercial fuel. Trading power is also on the rise: there are already more than 80 cross-border interconnectors in Europe, with 20 planned or under construction.

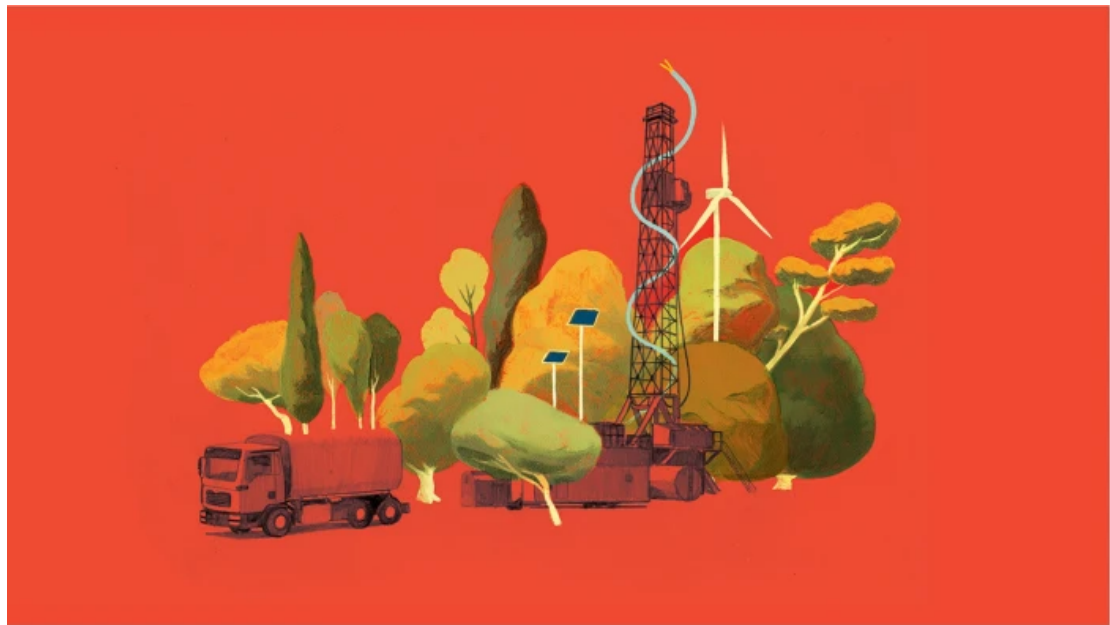
---

## WAR OR PEACE?

There are two schools of thought about the energy transition. One believes it is a kind of clean energy realpolitik, marked by the desire to gain economic advantage. The actions of China, the US and Europe reflect this kind of thinking. But the other is that clean energy will involve a lot less geopolitics and might help reduce conflict — a more utopian future.

Paul Stevens, a fellow at think-tank Chatham House, subscribes to the latter view. “It’s like the geopolitics of carrots,” he says. “There are no geopolitics of carrots, and renewables are the same as carrots. You can be self-sufficient with them, and you don’t need to rely on somebody to keep the Strait of Hormuz open.” The spread of renewable energy will reduce potential conflicts by ending the dependence on oil-producing countries, he adds.

Levers of control in the clean energy system will still exist, but will never be as powerful as in the fossil-fuel world, says former Iceland leader Grimsson. Even though China is ahead in many respects, that should not be seen as a threat: “China can help countries on the road to renewable energy. But once they are there, they can no longer exert power, as the oil-rich countries have done over the years.”



© David de las Heras

Danish climate and energy minister Dan Jorgensen agrees. “Hopefully this will lead to a more peaceful world, where international geopolitics in energy is less of a zero-sum game,” he says. “We depend on each other’s renewable energy sources, in a completely different way than if you just take it out of the ground.” That view is reflected in Denmark’s policy: the country is a significant trader of electricity with neighbours, and its grid will be fully [powered by renewables by 2027](#).

During the next few years, as the energy transition gathers pace, the biggest resistance is likely to come from countries that produce fossil fuels. Even in the rosier scenario, it will be decades before oil and gas are removed from the energy system. Many producers will keep pulling hydrocarbons out of the ground as long as possible. Australia is one example of how challenging the journey will be: the government has maintained its support for the coal industry and refused to adopt climate targets in line with the Paris agreement.

## Twice weekly newsletter



Energy is the world's indispensable business and Energy Source is its newsletter. Every Tuesday and Thursday, direct to your inbox, Energy Source brings you essential news, forward-thinking analysis and insider intelligence. [Sign up here.](#)

power.

*Leslie Hook is the environment and clean energy correspondent. Henry Sanderson is the metals and mining correspondent. Additional reporting by Jamie Smyth. Maps and data visualisation by Steven Bernard*

*This article was [amended](#) following publication to reflect that Fortescue does not produce coking coal*

*This article is the first in a FT series about the global boom in renewable energy*

*Follow [@FTMag](#) on Twitter to find out about our latest stories first. Listen to our podcast, [Culture Call](#), where FT editors and special guests discuss life and art in the time of coronavirus. Subscribe on [Apple](#), [Spotify](#), or wherever you listen.*

Forrest, the mining magnate, believes companies will push back against the energy transition. “Let’s not underestimate the challenge. The fossil-fuel sector will react to falling green hydrogen prices by slashing the cost of oil and gas until it’s almost zero,” he said in a TV lecture. “At the end, it will be grim — think of a knife fight in a telephone box.”

Whatever the resistance, the green transition has now gathered so much momentum — with net-zero goals enshrined in law in many countries — that what once looked impossible now seems inevitable. Just as the advent of coal and oil remade the world, clean energy is set to do the same. The energy transition will not only cut emissions: it will redistribute

