The Climate Elephants in the Room

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As tempting as it is to rely on multilateralism to solve a shared global problem like climate change, the world simply does not have the time for such an approach. A far more pragmatic and effective strategy is to focus on the biggest polluters that contribute disproportionately to total greenhouse-gas emissions.

NEW HAVEN – Now that the falsehoods and obfuscation of climate denialism have finally been silenced, addressing climate change has become the world's top priority. But time is running out, and the International Monetary Fund warns that any further delays on implementing policies to mitigate global warming will only add to the economic cost of the transition to a low-emissions economy. Worse, we still lack a concrete, pragmatic strategy for tackling the problem. Although economists have made a robust case for why carbon taxes are the best solution, this option has proven politically infeasible, at least in those countries that account for some of the highest emissions (namely, the United States).

Commentators have also stressed that climate change is a shared problem involving important cross-border externalities that must be addressed through a multilateral approach to global coordination. But, as with carbon taxes, this argument has fallen on deaf ears. And, given the current geopolitical climate and the increasing fragmentation of the global economy, there is little hope that the message will get through anytime soon.

Having committed to assisting developing economies as they confront climate change, the World Bank finds itself limited by the country-based model underlying its financing operations. It is earnestly weighing its options and considering how it could coordinate climate-related financing across borders. But while such efforts are well meaning and consistent with the spirit of multilateralism, they inevitably will delay concrete action. World Bank financing would have to be completely restructured, and coordinating action across multiple countries that have limited financial resources and often conflicting interests seems an impossible task. For example, while some developing economies are rich in fossil fuels, others are starved for energy sources.

Given these limitations, pragmatism dictates focusing on the biggest polluters. Global carbon dioxide emissions are concentrated among only a handful of countries and regions. China, the US, the European Union, Japan, and Russia collectively account for 63% of the total, and none of these top polluters is a low-income country anymore. China, the poorest of the group, represents around 30% of all emissions, making it by far the world's largest current polluter in absolute terms. But its government is taking steps to accelerate the transition to green energy – a winning strategy, given the country's abundance of rare earth metals.

India, the third-largest emitter, currently accounts for approximately 7% of global CO_2 emissions, and its size and

growth trajectory imply that it could easily surpass China as the leading polluter, barring stronger climate policies. In fact, when it comes to helping developing countries decarbonize, considerable progress could be made simply by targeting India alone. The big advantage of this strategy is that it would avoid the paralysis associated with attempts to adopt a multilateral approach in an increasingly fragmented world.

This does not mean that we should eschew projects aimed at climate mitigation or adaptation in other countries. But we would not need to wait until everyone is on board before doing anything. Those insisting on a multilateral approach should learn from the experience of the ultimate multilateral institution: the World Trade Organization. Its requirement that every single provision in every multilateral agreement gain unanimous support has left it increasingly paralyzed, prompting demands for institutional reform.

Of course, India is not low-hanging fruit. It is rich in coal and has little incentive (beyond the health of its citizens) to hasten the transition to green energy. In focusing on India, we would need to employ the carrot, not the stick.

Since the stick generally takes the form of pressure to implement carbon taxation, it is a non-starter. A tax would be ineffective, because it would incite massive domestic opposition (as has been the case in the US). It would also be morally objectionable, because it is unfair to ask a lower-middle-income country to bear the burden of reducing CO_2 emissions when rich countries (like the US) have failed to do the same. Moreover, even if China and India are now two of the world's biggest polluters, they bear little responsibility for the past, cumulative emissions that led to the current climate crisis.

That leaves the carrot, which would come in the form of tax incentives or subsidies to support green energy. When paired

with other policies, these can ease firms into adapting to higher environmental standards (such as those associated with a cap-and-trade program). But such policies are expensive, which means that tackling climate change will require richer countries to help finance them. Whether or not India becomes the new China, it is still in our power to ensure that it does not become the new outsize polluter.

https://www.project-syndicate.org/commentary/climate-change-prioritize-top-emitters-over-multilateralism-by-pinelopi-koujianou-goldberg-2023-05

Sustainable food – not more of it – needed as global hunger soars

LONDON – As global hunger swiftly rises – by more than a third last year – curbing it will require not growing more food but rethinking broader systems of trade and aid, farming's heavy reliance on fossil fuels, food waste and meat eating, experts said.

Farmers today grow sufficient crops to feed twice the current population – but but nearly a third of food produced globally is spoiled or thrown away, said Philip Lymbery, the chief executive of Compassion in World Farming International.

At the same time, grain that could feed billions of people is instead fed to factory-raised food animals – suggesting a reduction in meat consumption is one clear way to cut hunger, he said at a conference on global food systems in London last week.

In Europe alone, 60% of grain is now grown for animal food, said Tim Benton, a food systems expert at the London-based think tank Chatham House, which raises questions about whether scarce land could be better used.

As global leaders look for ways to keep food available and affordable, and prevent rising hunger, “it’s not about food scarcity because there’s no food scarcity,” Lymbery noted.

Surging hunger

Globally, hunger is surging, with 258 million people in nearly 60 countries facing acute food insecurity last year, a 33% jump from 2021, according to the Global Report on Food Crises 2023, released in March.

Problems are growing not just in traditional aid recipient countries such as Yemen, Somalia and Afghanistan but also in nations from Nigeria to the Democratic Republic of Congo, it showed.

The report, backed by agencies from the U.N. World Food Program to the World Bank, found that climate change impacts – from floods in Pakistan to drought in the Horn of Africa – were key contributors to the surge.

But conflicts – including Russia’s invasion of Ukraine, which slashed wheat exports from Ukraine and drove up the prices of energy and fossil fuel-based fertilizers – also played a major role, particularly in contributing to rising food prices.

“We depend more and more on a small number of countries for production of the major crops we depend on,” said Olivier De Schutter, co-chair of IPES-Food, an international expert panel on sustainable food systems.

That means when climate change slashes production in one or more key producers, or a conflict breaks out in one, “global supply chains are disrupted … (and) the whole global food system is impacted.”

In the wake of the Ukraine invasion, food costs also rose as speculators, hedge funds and a handful of big agribusiness companies that control most global food trade made profits,

said De Schutter, who is also a U.N. special rapporteur on extreme poverty and human rights.

He suggested that finding ways to wean global agricultural production off its heavy reliance on fossil fuel-based fertilizers could be a key way to protect access to food from volatile oil and gas prices.

Helping poorer countries escape their often heavy debt burdens could also help them shore up their food security, allowing them to focus more on growing food for their own people rather than raising export crops to bring in the cash needed to service debt, De Schutter said.

Competing answers

Benton, of Chatham House, said two very different views of how to achieve future security are now competing.

In the first, the assumption that the world will need 50% more food by 2050 – in part to meet growing demand for meat and dairy as poor countries grow richer – demands much more intensive production from limited agricultural land.

That view assumes agriculture in the future will become much more technological and centralized, with heavy use of drones, satellites and the "internet of things" driving smarter production – and likely resulting in fewer farm jobs.

The second view, however, envisions farmers shifting to more ecologically friendly, smaller-scale and less fossil fuel-intensive agriculture, with food demand not growing significantly because food waste is cut and meat-intensive diets decline.

"Everybody agrees food system transformation is needed" – just not what kind, said Molly Anderson, a food studies professor at Middlebury College in the United States.

Seth Watkins, a farmer in the U.S. state of Iowa, said at last week's food conference that he had seen first-hand how intensive farming systems were damaging soil health, raising questions about the long-term viability of farming, especially as climate change impacts worsen.

"Often (a focus on) technology holds us back from the sustainable solutions we need to fix our food system," he said, calling for a switch to more environmentally friendly and low-carbon ways of producing food.

Decisions made now are crucial because "it's our own regeneration or extinction we're talking about," Watkins said.

Susan Chomba, director of the Vital Landscapes in Africa program for the World Resources Institute, said efforts to cut food waste were particularly crucial as key farm resources from available land to water grow scarcer.

"No matter how much we try to produce, if we can't address what is lost and wasted it's a counterproductive process," she said in an interview.

A range of powerful vested interests stand in the way of shifting food systems to effectively manage growing hunger, climate threats and ecological decline, the analysts said.

Worsening disinformation and a rise in authoritarian governments around the world also are acting as a brake on change, they said.

But with hunger growing fast and new challenges appearing – from an expected drought-spawning El Nino weather pattern emerging this June to new conflict in Sudan, adding to humanitarian burdens – public discontent and pressures on politicians for change are also likely to increase.

"Because we're not tackling the environmental crisis, the disruptions we see are going to get bigger and bigger," warned

Benton of Chatham House.

Climate change continues to causeuncertainties for commodity prices

It can alter rainfall patterns, increase temperatures, and cause extremClimate played a major role in commodity prices last year and looks like doing so again in 2023.

Scorching heatwaves in the northern hemisphere hit production of wheat in the US and Europe in 2022, and climate change means that catastrophic weather events are becoming more frequent.

These include La Niña, which is stretching into an unprecedented third consecutive year and will be detrimental

to maize and soybean production in the first half of 2023, in addition to other crops like sugar and coffee, according to Economist Intelligence Unit (EIU).

Wheat, which was heavily affected by war-related supply disruptions in 2022, faces significant climate risks. In the US large swathes of the southern plains remain under drought conditions, and crops are in unusually poor condition heading into winter dormancy. Extremely dry, occasionally frosty weather in Argentina is causing damage across major producing provinces there, but Russia and Australia are on course for a second consecutive year of bumper crops, which, for the moment, is alleviating concerns about production in the western hemisphere.

Weather will loom large in energy markets as well, EIU noted. Europe's heatwave drove up demand last summer, causing gas and electricity prices to spike, especially as winds dropped to levels insufficient to generate enough power to meet Europe's electricity needs while drought affected hydropower generation in many countries.

These dry conditions, together with rising water temperatures, also hit nuclear power generation.

In addition, the severity of Europe's current energy crunch depends largely on how cold temperatures fall over the winter, not just in 2022/23 but in 2023/24 as well.

"The colder the winter, the more countries will have to draw down stockpiles built up over 2022. Below-normal temperatures will not only raise the spectre of energy rationing, but also put upward pressure on prices over the summer as Europe scrambles to refill reserves—this time without Russian supplies," EIU said.

Obviously, climate change can have significant impacts on commodity prices by affecting their production, transportation, and demand for various goods.

Climate change can impact commodity prices by affecting crop yields, energy prices, water availability, and transportation costs.

It can alter rainfall patterns, increase temperatures, and

cause extreme weather events like droughts and floods, which can reduce crop yields.
This can lead to lower supply and higher prices for commodities like wheat, corn, soybeans, and other agricultural products.
Climate change can also impact energy prices by affecting the production and transportation of oil, natural gas, and other energy resources.
For example, extreme weather events can disrupt oil and gas production and transportation infrastructure, leading to supply disruptions and higher prices.
Changes in rainfall patterns and increased water scarcity due to climate change can impact the availability of water for agricultural production and energy generation. This can result in higher prices for water-intensive commodities like meat, dairy, and processed foods.
Climate change can also affect transportation costs, particularly for goods that rely on sea or river transportation.
Rising sea levels and changes in ocean currents can disrupt shipping routes and increase shipping costs, which can lead to higher prices for imported goods.e weather events like droughts and floods, which can reduce crop yields

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Fight over subsidies amid $200tn energy transition narrative

Biden’s $370bn plan to support businesses, leading the transition to a low-carbon economy, has riled some of the largest US trading partners

The global energy transition is estimated to bring close to $200tn in opportunities and its own series of challenges. Now a global green trade and subsidy war is accelerating

US President Joe Biden’s $370bn plan to support businesses, leading the transition to a low-carbon economy has riled some of America’s largest trading partners, who say the measures unfairly benefit US companies and harm free trade.

Now the European Union is striking back with state support for industries that could generate as much as $1tn in green investments by 2030.

Asian allies are following suit, too.

Last August, Biden signed into law the US Inflation Reduction Act (IRA) to finance projects over the current decade and relies entirely on higher tax revenues, to the tune of $739bn.

The IRA offers tax credits and other incentives for the

production of electric vehicles, renewable energy, sustainable aviation fuel and hydrogen.

European nations are upset at the IRA's raw protectionism. The biggest flash point is the consumer tax credit of up to $7,500 that is available only for electric vehicles assembled in North America.

Policymakers in Europe, Japan and South Korea worry that the law could lure investment to the US that might otherwise flow to their regions.

German carmaker Volkswagen, for example, opted in March to build a $2bn factory for its new electric Scout brand in South Carolina and picked a site in Canada for its first battery plant outside of Europe, describing the incentives on offer as akin to "a gold rush."

Japan's government initially complained that the US measures were "discriminatory" but Washington and Tokyo ultimately struck a deal to allow critical minerals sourced in Japan to qualify for the US subsidies.

South Korea's Hyundai Motor Co and its affiliate Kia Corp said the law puts them at a disadvantage because they don't have any EV plants in the US yet, though they soon will.

South Korea has announced its intention to jump into the fray with a 550tn won ($413bn) investment plan focused on public-private partnerships in chips, batteries, robots, EVs, displays, biotechnology and other areas.

Europe is advancing its own subsidies and tax breaks. The proposed Net Zero Industry Act aims to spur the investments required to meet at least 40% of the EU's "clean technology" needs from within the bloc's own borders by the end of the decade.

The hope is that companies will prioritize manufacturing in

Europe and resist the lure of Biden's tax breaks. The EU also passed a €43bn ($47.5bn) subsidy programme in April called the Chips Act to support advanced semiconductor manufacturing in the bloc.

When deep-pocketed governments attempt to outspend each other to produce national champions, companies in small and developing economies are usually impacted the most because their governments can't muster the same scale of funding.

Despite the global outcries, the chances of the current tensions evolving into a full-fledged trade war are seen less likely.

Biden has sought to dial down the tension, acknowledging the US law has some "glitches" and that there's room for tweaks to make it easier for European countries to participate.

He has said he wanted the legislation to be a "win-win" and that it had not been "designed to hurt China."

But Biden's law and the EU's initiatives are partially seen as a response to China. Their aim is to redirect global supply chains for clean-energy products away from China so that Beijing can't abuse its dominant position in some key raw materials.

This would be a radical shift for the EU especially, as it relies on China for 98% of its rare-earth minerals and magnets.

While greater funding for clean energy production and green technologies is essential, a fight over subsidies runs the risk of focusing too much on geography and not enough on the bigger picture.

Europe must tax brown and subsidise green

After years of global climate-policy leadership, the European Union is looking warily at the United States' sudden embrace of ambitious clean-energy subsidies. Ultimately, America's entry into the clean-energy race is good news for both the planet and Europe. But will US generosity toward its own companies under the recent Inflation Reduction Act (IRA) hollow out Europe's industrial base even further? Will dirty industries continue moving east and south as clean ones move west across the Atlantic?

Europe must prevent this outcome. But how should EU leaders proceed?

Unlike in the US, European policymakers have long heeded the economists who suggest that carbon pricing is the best strategy for tackling climate change. That means making dirty energy more expensive, in line with the external costs that it imposes on society. Though the EU's Emissions Trading System

is far from perfect, it now prices roughly half of Europe's carbon pollution at around €100 ($109) per tonne; and several national governments in the bloc have introduced their own carbon taxes. None of this is sufficient on its own. But Europe's carbon-pricing policies are clearly much better than America's incomplete state-level patchwork and its complete lack of a federal carbon price.

Now, US policymakers have seemingly taken the easy way out, subsidising clean energy instead of pricing dirty energy. But while giving handouts is politically easier than imposing taxes, there is in fact a strong economic argument for subsidies in this case. Yes, Economics 101 calls for pricing negative externalities, but Economics 102 calls for subsidising positive externalities that arise from learning by doing. The argument is simple: installing the thousandth, and especially the millionth, solar panel will be much faster and cheaper than installing the first, owing to all the efficiencies and improvements that have been developed along the way.

The same logic extends to research and development more broadly. Innovators deciding on how much to invest in R&D will generally spend less money than is socially optimal, because their decisions typically do not include the possibility that the result will create shoulders for others to stand on. That, too, calls for subsidies.

Policymakers from California to Germany have embraced the learning-by-doing logic with solar subsidy schemes that start high in the first year and decrease almost immediately thereafter. Germany's feed-in tariffs (payments to solar-energy producers above the market price) started as high as €0.40 per kilowatt-hour for small rooftop solar units, but have since been scaled back to under €0.15. That tapering is appropriate, given how cheap solar power has become in recent years. It also demonstrates that the subsidies worked.

While solar feed-in tariffs have decreased, EU carbon prices have risen some tenfold, from as low as €10 per tonne. It is here that the EU's climate policy shines. European

policymakers recognise that carbon pricing is crucial, and they have acted on that insight.

But neither carbon pricing nor subsidisation is enough on its own. Just as the US ought to take a page from Europe's book on carbon pricing, Europe should follow the US in pursuing green subsidies. Early economic analyses of the IRA calculate that the legislation's provisions, like its various tax credits for clean energy, create an implicit carbon price of around $12 per tonne – scarcely one-tenth of Europe's explicit one.

Whatever reasons Europe had for avoiding green subsidies in the past, European competitiveness and energy security demand that they be reconsidered in the context of the IRA. China currently produces the vast majority of the world's clean-energy technologies: including three-quarters of all solar panels and batteries sold globally, well over half of all wind turbines, and around half of all electric vehicles. In some clean technologies, like heat pumps, Europe is behind not only China but also North America, which produce 39% and 29%, respectively, compared to Europe's 16% share.

This import dependency translates into significant geopolitical vulnerabilities. Relying on China for solar panels may be less dangerous than depending on Russia for gas; but that hardly makes it prudent. The EU urgently needs to create new incentives for domestic manufacturers and invest in a more resilient clean-energy supply chain.

The IRA should be welcomed around the world. Of course, its immediate effect will be to boost US clean-energy investments, and it will inevitably rankle some foreign manufacturers and governments as it generates headlines around the world about companies being lured to the US. But it is important to remember that just as economic growth is not a zero-sum game, neither is clean growth.

In a recent paper, Costas Arkolakis of Yale University and my Columbia Business School colleague Conor Walsh show that the IRA's subsidies will pay for themselves through increased global GDP, owing to the positive spillovers from learning-by-doing dynamics. The implication is that the EU and the rest of

the world will ultimately benefit from the US subsidies. And Arkolakis and Walsh's analysis does not even account for the positive welfare effects of helping to address climate change. Add those in, and US clean-energy subsidies (or future European ones) look like a win-win-win.

The massive costs of unchecked climate change are already mounting and should be sufficient to show that much more needs to be done on both sides of the Atlantic, as well as around the world. For their part, US policymakers should recognise that their long-awaited clean-energy push would be strengthened enormously by additional measures to make polluters pay for the costs of their pollution.

The EU, meanwhile, must take the arguably easier step of ramping up its own clean-energy subsidies. It can and must afford to do so. The result will be a race to the top, with the global economy and the planet as clear winners – a truly rare occurrence in the annals of global economic competition. – Project Syndicate

- *Gernot Wagner is a climate economist at Columbia Business School.*

In defence of nature-based carbon markets

Voluntary markets for carbon offsets have recently come under fire, with critics questioning the efficacy of contracts that aim to reduce atmospheric carbon dioxide relative to what would have happened in the contract's absence. The biggest concerns are about "nature-based" projects involving various land-use changes – such as protecting forests, planting new ones (afforestation), and so forth.

But these instruments' imperfections are no secret. For well over two decades, ecologists and foresters have been working to develop more sophisticated methods to satisfy economists' faith in market instruments, and they have made good progress. Though offset schemes are still riddled with complexity, there is no question that they pay for something that matters.

Imagine seeing what the atmosphere sees. The Intergovernmental Panel on Climate Change's Sixth Assessment Report provides an outline of the planet's carbon cycle, which makes evident the fundamental role of plants' conversion of CO2 into cellulose and back on a massive scale. Terrestrial photosynthesis alone draws down 113bn tonnes of carbon every year. By comparison, humanity added about 11bn tonnes of carbon to the atmosphere

last year.

The problem, of course, is that humans' cumulative contributions go in only one direction, whereas the carbon captured by vegetation is normally balanced by an equal, opposite flow from plant respiration and degradation. By interfering with the climate system, we have thrown this balance off, adding a net flow of about 5.9bn tonnes to the landscape and the ocean every year. In other words, the planet is drawing down only half of what we inject into the atmosphere.

Even a relatively small perturbation in this vast natural cycle can reach an enormous scale. That is why nature is such an attractive climate-mitigation option. Suppose we succeed in eliminating fossil-fuel combustion. Keeping global average temperatures within 1.5C or 2C of pre-industrial levels will still require substantial carbon removal. Estimates vary, but they are on the order of 200-300bn tonnes removed by plants before 2100.

Nor will the story end there. The atmosphere contains about 870bn tonnes of carbon in the form of CO2 (one-third of which has been added since industrialisation), and the carbon cycle connects that atmospheric stock to vast reservoirs. The largest is the ocean, which holds 900bn tonnes at the surface and another 37tn tonnes deeper below. Terrestrial vegetation and soils also hold about 2.15tn tonnes, and permafrost contains another 1.2tn. As far as the atmosphere is concerned, losses from any of these reservoirs could easily exceed the carbon we burn (from the 930bn tonnes that are sequestered in fossil fuels).

Far from being a secondary concern, managing the stocks and flows of carbon through the planet's ecosystems is essential to keeping the entire Earth system in balance. But to carry out that task, we will need to think differently about the landscape. Landscapes and seascapes are not just the backdrop to our life. They are public infrastructure, and like all infrastructure, they must be paid for and maintained.

Since the 19th century, however, we have known that paying for

infrastructure by rewarding its marginal benefit (as offsets do for nature-based interventions) almost never covers the total cost. Because public-utility infrastructure like a highway or an airport tends not to command a high enough marginal value, taxation must cover the rest. Whom to tax then becomes the most important question.

To illustrate the point, consider Brazil, whose ecosystems contain some 60bn tonnes of carbon in above-ground biomass. One way to estimate how much this stock is worth is to assume that we value carbon at a given price, say, $50 per tonne (halfway between the price in the regulated European market and nature-based offsets in voluntary markets). In this scenario, Brazil is home to ecosystems worth $10tn, which is over six times the country's GDP and far greater than the value of its 13bn barrels of oil reserves.

Now, how much should the world pay Brazil to keep that forest in trust for everyone? Assuming a 2% fee on the value of the assets (a reasonable rate for most asset managers), the country ought to receive $200bn per year. On those terms, Brazil would almost certainly put a stop to deforestation in the Amazon.

But here we run into a sad truth. There is simply no evidence that the international community has any appetite to pay such sums. In 2022, total overseas direct assistance amounted to just $186bn. For years, rich countries have failed to honour a 2009 pledge of mobilising $100bn per year to help developing countries adapt to climate change.

By thinking of natural assets not as infrastructure but as service producers, we end up relying on the voluntary payments companies make at the margin in exchange for "offsetting" some other reduction that they cannot or will not carry out. But, for all this mechanism's shortcomings, at least it directs some money – albeit a drop in the ocean – toward carbon-landscape management.

Of course, additional scrutiny of offsets is welcome for driving improvements. But it would be a fatal mistake to conclude that protecting forests or augmenting Earth's carbon

sink is any less urgent than reducing fossil-fuel emissions. Nature-based offsets traded in voluntary carbon markets should be seen as merely a first step. In the end, we will need to do "all of the above": end fossil-fuel combustion, maintain ecosystems, and augment nature's capacity to draw down carbon, regardless of whether we can prove that such reductions would not have happened anyway.

The atmosphere does not care about our motivations, counterfactuals, or moral hazards. All it sees is carbon flowing in and out. Ecosystems store carbon and draw it from the atmosphere at scales that matter. All of us – taxpayers, consumers, and companies – must pay for this critical public good. – Project Syndicate

- *Giulio Boccaletti, an honorary research associate at the University of Oxford's Smith School of Enterprise and the Environment, is the author, most recently, of* Water: A Biography *(Vintage, 2022).*

The High Cost of Carbon Pricing

Amid the growing enthusiasm for carbon border taxes, Western policymakers have largely ignored the negative impact on the world's poorest countries. For carbon-pricing policies to succeed, developed countries must show their commitment to shared prosperity by enabling knowledge-sharing and fostering equitable climate finance.

NEW DELHI – Carbon pricing is all the rage these days, at least in the developed world. But while global leaders and experts – most of them from rich countries – increasingly embrace the idea of putting the "right price" on carbon, the concept remains vague and ill-defined. Worse, its growing acceptance and increasingly protectionist bent may have the perverse effect of impeding efforts to decarbonize the global economy.

The idea of carbon pricing seems like a no-brainer. Meeting even the least ambitious climate goals requires decarbonizing developed and developing economies alike. Changing the relative prices of carbon-intensive activities would encourage investors to finance renewable sources of energy and the technological innovation needed to achieve net-zero emissions.

Fossil fuels account for most of the world's greenhouse-gas emissions, so hydrocarbons seem like a good place to start.

But how? Should policymakers consider the relative price of fossil fuels, or production based on consuming them?

The two most commonly discussed forms of carbon pricing — cap-and-trade schemes and carbon taxes — are based on the carbon intensity of production. A cap-and-trade system is designed to limit greenhouse-gas emissions by dividing the total target amount into allowances that can be traded among high and low emitters. While this supposedly establishes a market price for carbon dioxide emissions, it does not consider their negative social and environmental externalities. A carbon tax, by contrast, sets a price on carbon by taxing emissions-heavy activities.

But these two models reflect a very narrow (and possibly even distorted) view of how carbon should be priced into the economic system. A 2017 report by the High-Level Commission on Carbon Prices, chaired by Joseph E. Stiglitz and Nicholas Stern, provided a much more nuanced analysis. In addition to cap-and-trade and carbon taxes, the report recommended reducing or eliminating fossil-fuel subsidies and creating new financial incentives for low-carbon projects; offsetting the negative distributional impact of carbon pricing by using the proceeds to finance policies to protect poor and vulnerable populations; and complementary policies, such as investment in public transport and renewable power. Perhaps most important, the authors noted, countries must be able to choose instruments that fit their specific circumstances, resources, and needs.

Amid the growing enthusiasm for carbon pricing and border adjustment measures, policymakers and experts have largely ignored these points. The European Union's Carbon Border Adjustment Mechanism is a case in point. When the CBAM takes effect in October, it will impose a tax on carbon-intensive imports in order to "put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU" and to "encourage cleaner industrial

production in non-EU countries” (emphasis added).

The CBAM will initially apply to imports of cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen. At first, firms will simply have to report the (direct and indirect) emissions embedded in the goods they import. But, beginning in 2026, the EU will impose tariffs on these emissions based on the weekly average auction price of cap-and-trade allowances.

The stated purpose of this measure is to eliminate so-called “carbon leakage” and ensure that the EU’s climate efforts are not undermined by production moving to countries with lower emission standards. Effectively, it protects European firms from competitors in such countries.

By taxing imports to the EU, the CBAM imposes on exporters in other countries the nearly impossible task of measuring emissions. Most developing countries (and many developed ones) lack granular data on firm-specific emissions, not to mention the ability to track the emissions of all the inputs used. Even if such data were available, the costs of collecting and analyzing it over time would be enormous. As the United Nations Conference on Trade and Development noted in 2021, the CBAM attempts “to impose on developing countries the environmental standards that developed countries are choosing.”

The EU wants to be viewed as a global leader on climate change, but it is difficult to see the CBAM as anything but a protectionist device. While the CBAM purports to encourage countries outside the bloc to reduce emissions by imposing their own carbon taxes, the EU has done nothing to help exporting countries attract new green investment or gain access to new technologies. In fact, it has persistently reneged on its (paltry) promises on climate finance and the commitments European leaders made as part of the 1992 Rio Agreement, restricting access to green

technologies controlled by EU-based companies.

For decades, advanced economies have exported their emissions to developing countries by offshoring carbon-intensive production and then importing those goods. Now that greener technologies are available to (and largely controlled by) Western companies, developed countries promote reshoring without sharing knowledge or finance, thereby undermining low- and middle-income countries' economic prospects and ability to achieve a green transition.

In February, Republican US Senator Bill Cassidy said he would unveil an emissions tariff bill in the coming months, following similar proposals by Senate Democrats. Meanwhile, lawmakers on both sides of the Atlantic have done little to limit fossil-fuel production and trade – by far the biggest sources of CO2 emissions. The CBAM does not cover trade in fossil fuels, and neither would the proposed tariffs in the United States. If decarbonization is the real goal, rather than protecting domestic industries, then regulation and reducing direct and indirect fossil-fuel subsidies are far more promising policies.

For carbon pricing to succeed, developed countries must demonstrate their commitment to shared prosperity by enabling knowledge-sharing and fostering equitable climate finance. If they continue to focus on border taxes on goods produced (mostly) in developing countries, their carbon-pricing efforts will fail. Worse, they will exacerbate global inequality and reinforce the perception that all their lofty rhetoric about the need for international cooperation to fight climate change is merely a fig leaf for cynical and self-serving policies.

BYD Challenges Tesla for Global Electric Vehicle Sales Supremacy

A (Jan 13): In the last edition of Bloomberg’s Hyperdrive newsletter, BloombergNEF offered up three predictions for the electric vehicle market in 2023: that sales will keep growing, albeit at a slower pace; that this will be a big year for plug-in trucks and vans; and that the global public charging station network will continue to steadily expand.BYD SD Motors Malaysia as part of Sime Darby Motors (SDM), with the distributorship agreement between both parties having been signed in September 2022.A (Jan 12): Chinese carmaker BYD Co is planning a bold push into India’s electric car market, joining a rush of foreign carmakers jockeying for a bigger share of the world’s fourth-biggest auto market.HANOI (Jan 13): Chinese electric vehicle (EV) maker BYD Auto Co plans to build a plant in Vietnam to produce car parts, three people

with knowledge of the plan told Reuters , in a move that would reduce the company’s reliance on China and deepen its supply chain in Southeast Asia as part of a global expansion.

Today, let’s look at four more prognoses for the year, having to do with Tesla’s budding rivalry with BYD, the outlook for EV startups and battery prices, and the impact of the US Inflation Reduction Act.Might BYD overtake Tesla in battery-electric vehicle sales? Betting against Tesla historically has been a bad wager more often than not, but BNEF’s team of analysts reckon 2023 could end with a new EV volume leader.Both feature Blade EV batteries which the manufacturer has developed in-house, and both power a front-mounted electric motor rated to produce 204 PS and 310 Nm of torque.BYD has been expanding its model lineup, geographic footprint and manufacturing capacity very rapidly in the last two years.India is a good bet because “people are realizing the need for EVs and the charging infrastructure is picking up.If you include the company’s plug-in hybrid electric vehicles, it already overtook Tesla in 2022, and its sales of fully electric vehicles soared to around 911,000 last year from 321,000 in 2021.3 seconds.BNEF still expects Tesla’s sales to grow by 30% to 40% in 2023 as its new plants near Berlin and in Austin, Texas, continue to ramp up.Backed by Warren Buffett’s Berkshire Hathaway, BYD makes both plug-in hybrids and pure electric vehicles.

But the macroeconomic environment is shifting rapidly, with higher interest rates, falling home prices and battered stock markets all starting to weigh heavily on consumers’ purchase decisions.Standard kit for the Atto 3 Standard Range includes a panoramic sunroof, heated electric wing mirrors, 5.MG Motor India, a unit of China’s SAIC Motor Corp on Wednesday said it plans to launch three electric models by the end of next year, while South Korea’s Kia Corp said it plans to invest 20 billion rupees (US$245 million) in India over the next four to five years to develop electric vehicles and launch its first

domestically made EV in 2025.Elon Musk’s Twitter antics also are turning off some potential buyers just as the competition heats up.Tesla’s Model Y will still be the best-selling EV in the world in 2023 and likely will make it into the top-three models of any type after cracking the top five in 2022.BYD Atto 3 – click to enlarge Next up, the Extended Range adds an electronic tailgate, multi-colour gradient rhythmic ambient lighting on the door handles (single colour on the SR) and eight speakers with “Dirac HD” sound, PM2.Tesla’s Supercharger network is also still a major differentiator, particularly in North America, where public charging is less developed.It’s planning to sell 15,000 electric vehicles this year.This race will go down to the wire and depend heavily on pricing strategies.Rolling stock distinguishes the two; the SR rolls on 215/60 R17 tyres, while the ER wears 215/55R18 rubber.One said construction was planned to start by mid-year.

With major price cuts just made in the US and Europe, and already in play in China, Tesla is showing willingness to wage a price war to keep its volume growing.Tesla has room to manoeuvre here and probably can stay ahead for much of the year, but BYD may be able edge out its competitor in the final months.Meanwhile, the drive unit in the Atto 3 gets its own warranty as well, with eight-year, 150,000 km coverage for the motor, motor controller, DC assembly and electric control assembly.The company’s expansion comes at a time when India is increasing scrutiny of Chinese firms.BYD’s sales are still mostly concentrated in China, so its success will depend in large part on how the country unwinds its Covid Zero policy.Both will remain miles ahead of legacy automakers, with Volkswagen finishing a distant third place.Driving heaven to him is exercising a playful chassis on twisty paths; prizes ergonomics and involvement over gadgetry.Battery prices stay elevated, averaging US$152 per kilowatt-hour In 2022, the volume-weighted average prices of lithium-ion battery packs across all sectors averaged US$151 per kWh, a 7% increase and the first time BNEF recorded a rise.BYD will position itself

as a “global” technology powerhouse to overcome the barriers of operating as a Chinese company in India and bring “confidence to customers,” Gopalakrishnan said.BYD is looking to lease 80 hectares of industrial land, more than doubling its footprint in Vietnam, where its electronic unit rents 60 hectares, a second source said.

BNEF expects the average battery pack price to rise slightly this year to US$152 per kWh..Lithium prices will remain elevated, but should stay below earlier highs and pave the way for battery prices to decline again in 2024.The US Inflation Reduction Act puts the US in the EV and battery-making game One of the big surprises of 2022 was the Inflation Reduction Act and its provisions to help boost EV adoption and on-shore EV manufacturing and the battery supply chain.Gopalakrishnan said consumers are no longer so price-sensitive, with 41% of the 3.While some details are still forthcoming, automakers and battery manufacturers are already responding.BNEF tracked almost US$28 billion in new investment announcements in North America related to e-mobility and batteries after the law passed in August.If finalised in May, that finding would mean those companies would be subject to duties on products made in Vietnam and some other Southeast Asian countries.

China’s lead here is formidable, but it’s still early days for this transition.It will explore adding manufacturing facilities when demand increases in the next two to three years, Gopalakrishnan said.Only 2% of cars on the road globally are electric today, and there’s a lot to play for as nations and regions looks to build the next clusters of technology and manufacturing.Importantly, with much of the investment in the US flowing into red states, EVs should be a less-partisan issue this year and beyond.We expect that more than US$80 billion will be committed to the North American battery supply chain in 2023.Despite Prime Minister Narendra Modi’s ‘Make in India’ push, BYD doesn’t have immediate plans to localize battery production and will continue importing

them.These decisions are complex and often evaluated over many years, so pinning causality purely on IRA isn’t appropriate.

Still, incentives are tipping the scales, and we’ll gradually get more clarity on how other regions will respond.Industrial policy is back in vogue, with EVs and batteries at center stage.A wave of bankruptcies and consolidation There are too many automakers, and 2023 will make this painfully clear.The number of auto producers has been rising steadily for the last decade as the combination of cheap money and a window of opportunity with respect to electrification enticed new entrants.Slowing EV sales growth will cause a reckoning, as many realize they either don’t have the capital to reach scale, the segments they’re targeting are already crowded (for example, the premium end of the market) or consumers are simply not interested in taking a leap on a relatively unknown brand during a time of economic uncertainty.

The window of opportunity for new entrants has closed, and the number of automakers will decline this year.Other areas of the e-mobility value chain should fare better but also could see a thinning of the ranks.Subscribe to Mid-day email alert We deliver news to your inbox daily.

Debunking Solar Geoengineering

Proponents of solar geoengineering say that lowering Earth's average temperature by reflecting sunlight into space will tackle global warming. But if we are to avoid a climate catastrophe, there is no substitute for phasing out fossil fuels.

BERLIN – As climate chaos threatens the Global North and the lifestyles of the world's richest people, we might expect to hear elites demand a rapid exit from reliance on fossil fuels. Instead, a controversial idea is coming to the fore: dimming the sun. Advocates claim that through science fiction-like methods, known as solar geoengineering, we can dial down the planet's thermostat by decreasing the amount of energy that reaches the atmosphere. The idea has gained enough traction for rich philanthropists to notice and for the White House to fund research. There's just one problem: it's a recipe for disaster.

One technological proposal currently making headlines is Stratospheric Aerosol Injection (SAI), with advocates claiming releasing aerosols into the upper atmosphere and bouncing sunlight back into space would reduce surface temperatures. This idea is gaining traction at a time when some contend that we should be working on a plan B because it is too late to limit global warming to 1.5° Celsius as agreed in the 2015

Paris climate agreement. But giving up this ambition would be a gift to carbon polluters, as International Energy Agency Executive Director Fatih Birol recently explained, and the notion that solar geoengineering could ever be a plan B is false and dangerous.

Experts have repeatedly debunked the idea that we can "control" the earth's thermostat. The world's foremost authority on climate science, the Intergovernmental Panel on Climate Change, has warned that solar geoengineering is not a credible solution. Climate models show that masking global heating with sunlight reduction could bring massive changes in atmospheric circulation and alter rainfall patterns – such as the monsoon – with especially pronounced effects in countries that are already experiencing increasingly severe and frequent storms, droughts, fires, and other climate-related events.

To work, solar geoengineering technologies like SAI would require unprecedented international cooperation. Governments would need to align to get chemical-spraying airplanes off the ground, for example, implying that only powerful countries or military regimes could provide the necessary infrastructure. Chemical mining and production would require additional infrastructure on a massive scale. And all of this would need to be sustained for decades or longer. If a new government stopped an aerosol injection program after regime change, it could trigger a "termination shock" that sent global temperatures soaring, in line with existing greenhouse-gas levels in the atmosphere.

Despite this, Harvard University is set to test the equipment associated with SAI in the context of a controversial research project. But this method is effectively ungovernable. That is why hundreds of academics are calling for a Solar Geoengineering Non-Use Agreement to block public funds for the technology, ban outdoor experiments, patenting, and deployment, and to counter support in international fora and policy discussions.

In addition to the technological and political limitations, prominent lawyers say solar geoengineering is at odds with international human rights and environmental law. If geoengineering changes weather patterns, it could infringe on people's rights to life, health, and a livelihood. Moreover, SAI could violate the legal duty to avoid causing transboundary environmental harm. A technology set to impact the climate on the global scale would also require everyone potentially affected to have a say – an impossible idea.

But if we know these schemes won't work, are full of risks, cannot be tested or governed, and delay near-term climate action, why are we seeing increased momentum and support for them? Put simply, they give big polluters a get-out-of-jail-free card and allow them to patent and profit from the relevant technologies and associated infrastructures.

Oil and gas companies have been researching and patenting (solar and other) geoengineering technologies for decades. In fact, most solar geoengineering models rely on large-scale deployment of Carbon Dioxide Removal to deal with the continued production and combustion of fossil fuels. Proponents of CDR offer carbon removal offsets to polluters, undermining long-term solutions and exacerbating the climate emergency. Worryingly, calls for CDR gained momentum at this year's COP27, which risks blowing a massive hole in the Paris agreement.

While geoengineering supporters often say it is in the interest of the disadvantaged Global South, the Global South isn't buying it. In fact, most groups in the global climate movement reject solar geoengineering entirely. Indigenous communities have rallied against solar geoengineering experiments in places such as Alaska and Sweden. In reality, it is the richest and most polluting countries (especially the United States) that are researching and funding these technologies.

Once the world awakens to the reality that there is no quick fix to remove carbon from the atmosphere and no substitute for a rapid phaseout of fossil fuels, solar geoengineering might gain undeserved credibility as a last-ditch option – full of risks but supposedly without alternative. We must not allow that scenario to come true.

This means that we must not allow it to become normalized through policy debates, private initiatives, government proposals, and research. The science is clear: We can still prevent irreversible harms to ecosystems and human rights. But the only way to avoid further climate disasters is real climate action now. We must accelerate the transition away from fossil fuels – and leave the science fiction on the shelf.

Green power is the first domino

As world leaders convene at the UN Climate Change Conference (COP27), it is obvious to all that bolder action is needed to avert disaster. The UN warns that global efforts to reduce greenhouse-gas (GHG) emissions remain insufficient to limit temperature increases to 1.5C, relative to pre-industrial levels.

To meet this target, decarbonising the power sector is critical. Electricity accounts for about 25% of the world's GHG emissions, and it also will play a critical role in decarbonising other sectors, such as buildings, transportation, and manufacturing. The challenge, then, is to achieve "24/7 carbon-free energy" (24/7 CFE): the total elimination of carbon from the electricity sector – at every hour of every day, in every grid around the world.

Research in the United States and Europe has shown that 24/7 CFE strategies have a greater impact on the decarbonisation of electricity systems than the current practice of purchasing electricity from renewable sources to match annual consumption patterns. Recent International Energy Agency modelling for India and Indonesia shows that hourly matching strategies lead to more diverse technology portfolios, with the clean, dispatchable generation and storage needed for net-zero transitions in the power sector. Critically, this approach helps electricity systems shift away from fossil fuels by accelerating uptake of the full suite of carbon-free technologies needed to deliver around-the-clock clean power.

Decarbonising energy systems worldwide is possible, but it will require collective action to accelerate the development and deployment of advanced clean-energy technologies. New investments, supportive public policies, and partnerships among stakeholders are all part of the solution. That is why the UN, Sustainable Energy for All (SEforALL), Google, and a diverse group of signatories launched the 24/7 CFE Compact in 2021. The compact represents a growing global community of stakeholders that are committed to providing the support, tools, and partnerships needed to make 24/7 CFE a reality everywhere.

Among the most recent to join the 24/7 CFE Compact is the Scottish government. “Scotland was the first country in the United Kingdom to declare a climate emergency, and indeed among the first in the world to recognise the importance of taking immediate and bold action,” notes Scottish First Minister Nicola Sturgeon. “Governments must hold themselves to account in limiting global temperature rise to 1.5C. We are committed to putting accountability at the centre of all that we do. Our position is clear that unlimited extraction of fossil fuels is not consistent with our climate obligations.”

Similarly, just last month, Google and C40, a network of almost 100 cities, launched a first-of-its-kind 24/7 CFE programme focusing on regional electricity grids. With urban areas accounting for over half the world’s population and more than 70% of global carbon dioxide emissions, cities have a critical role to play in driving the changes needed to tackle the climate crisis.

Developing and emerging economies will need more energy to bridge energy-access gaps, and to support economic growth and development. But as capacity expands, it must be clean. A 24/7 CFE approach can serve both purposes, providing both greater access and cleaner energy. We therefore must move faster to make 24/7 CFE cheaper and more accessible globally. According to the latest IEA data, the number of people living without electricity will rise by almost 20mn in 2022, reaching nearly 775mn. Most of that increase will be in Sub-Saharan Africa, where the size of the cohort lacking access has nearly returned to its 2013 peak.

The world cannot achieve net-zero emissions without first ensuring universal electricity access. That will require annual investments of at least $30bn – two-thirds of which will need to go to Sub-Saharan Africa – between now and 2030. Fortunately, not only is 24/7 CFE a moral imperative, but it also represents the most cost-effective option for connecting underserved populations.

Many of these populations will otherwise continue to rely on dirtier sources of energy. Small island developing states such

as Nauru, Palau, the Bahamas, and Trinidad and Tobago, for example, all have electricity grids that depend heavily on inefficient, carbon-intensive technologies such as diesel generators. These countries' experience shows why 24/7 CFE must not be framed merely as a European or North American issue. It is a global one, and it has become increasingly urgent for developing countries on the front lines of climate change.

Implementing 24/7 CFE strategies globally will require not only funding but also measures to scale up the deployment of advanced technologies, to create more favourable market conditions, and to share best practices and data. If we can fully decarbonise our grids, the rest of the green transition should become cheaper and easier.

The 24/7 CFE Compact provides an opportunity to drive the much-needed policy change, investment, and research in this crucial next phase of climate action. We invite all governments, companies, and organisations to join us and help chart a more sustainable path toward a net-zero future. — Project Syndicate