IQ earns QR1.2bn net profit on QR4.8bn revenues in Q1

Industries Qatar (IQ) – the holding entity of Qatar Petrochemicals, Qatar Fertiliser and Qatar Steel – has reported net profit of QR1.2bn on revenues of QR4.8bn in the first three months of this year.

The group's operations continue to remain stable and strong as production volumes for the current period improved by 11% year-on-year to 4.4mn MTs in the first quarter (Q1) of 2023, largely driven by higher operating rates, and better plant availability across all the segments.

However, the group's net earnings were down 57% on an annualised basis.

The group's financial position continues to remain robust, with cash and bank balances at QR13.9bn as of March 31, 2023, after accounting for a dividend payout relating to the

financial year 2022 amounting to QR6.7bn. Currently, the group has no long-term debt obligations.

IQ's reported total assets and total equity reached QR39.1bn and QR36.5bn, respectively, at the end of March 31, 2023. The group generated positive operating cash flows of QR1.2bn, with free cash flows of QR0.8bn during Q2-23.

The petrochemicals segment reported a net profit of QR382mn for Q1-23, significantly down by 43% versus Q1-22. This decrease was mainly linked to a 26% decline in segmental revenues, which were affected by lower blended selling prices realised during Q1-23.

Blended product prices for the segment declined by 23% versus last year, as result of general decline in the petrochemical prices at the macro-level due to combined effect of declining crude prices and weakened consumer demand against a backdrop of deteriorating macroeconomic fundamentals, and general decline in demand due to recessionary fears.

Sales volumes also fell 4% year-on-year. On the other hand, production volumes improved by 7% against the backdrop of higher facility availability.

The fertiliser segment's net profit was QR510mn for Q1-23, a decline of 71% year-on-year, primarily driven by a 44% shrinkage in segmental revenue, due to a 45% plunge in selling prices, amid macro-pressures affecting fertiliser markets.

Sales volumes were marginally up 3% during Q1-23, mainly due to improved production levels which increased by 11% on year-on-year basis, amid relatively lower shutdown days reported for Q1-23 versus Q1-22.

The steel segment reported a net profit of QR134mn, down by 49% versus last year, on lower revenues, which fell 6% versus Q1-22. Additionally, the earnings were also impacted by higher volume related operating expenses, and marginally reduced other operating income.

The decline in revenue was primarily driven by lowered selling prices which declined by 16% on year-on-year basis. This was partially offset by higher sales volumes which increased by 12% mainly linked to higher production volumes.

Aramco in talks with Sinopec and Total on $10bn Saudi gas deal

Sinopec and TotalEnergies SE are among companies holding talks to invest in the Jafurah development in Saudi Arabia, according to people familiar with the matter, as the kingdom seeks to exploit one of the world's largest untapped gas fields.

The Chinese and French energy giants are in separate discussions with Saudi Aramco about the plans that may include the construction of facilities to export the fuel as liquefied natural gas, some of the people said, asking not to be identified because the matter is private. Aramco is seeking to raise a total of around $10bn for the projects, the people

said.

Saudi Aramco has been seeking equity investors that could help fund midstream and downstream projects at its more than $100bn Jafurah gas development in the east of the kingdom. The state-controlled company has been reaching out to private equity firms and other large funds that invest in infrastructure to offer stakes in assets such as carbon capture and storage projects, pipelines and hydrogen plants, Bloomberg reported in December.

Investment bank Evercore Inc is advising Aramco on the plans. Talks are ongoing and no final decisions have been made, the people said. Representatives for Aramco and TotalEnergies didn’t immediately respond to a request for comment. China Petroleum & Chemical Corp, as Sinopec is officially known, didn’t respond to emailed requests for comment made during China’s Labor Day holiday.

The war in Ukraine has led to a surge in demand for natural gas, led by European nations that traditionally got their supplies from Russia. This has led to Gulf States embarking on ambitious plans to expand their gas output.

Saudi Arabia has some of the biggest gas reserves in the world, but has barely exploited them in the past. Now, Jafurah is a key part of Riyadh’s strategy to diversify its exports beyond oil. The field is estimated to hold 200tn cubic feet of gas, and Aramco expects to begin production there in 2025, reaching about 2bn standard cubic feet per day of sales by 2030.

A decision to build an LNG export terminal would mark a u-turn for Aramco. The company has recently said that the majority of the gas from Jafurah and other fields would be used for the domestic market and to make blue hydrogen.

Since Aramco was fully nationalised in 1980, most foreign investment in the kingdom’s energy industry has been restricted to downstream assets such as refineries and petrochemical plants. In the past, Aramco has struck joint ventures with firms including Shell Plc and TotalEnergies for the exploration and drilling of natural gas within its

borders.

Opec output falls on Iraq pipeline halt, Nigeria strike

Bloomberg
London

Opec’s oil production fell last month as Iraq’s exports were reduced by a pipeline suspension while a labour strike cut shipments from Nigeria.
Output from the Organisation of Petroleum Exporting Countries declined by 310,000 barrels a day to an average of 28.8mn, the lowest level in almost a year, according to a Bloomberg survey.

Opec and its allies have announced new production cutbacks starting this month to shore up global oil markets, but the biggest supply changes in April were unintentional.
Iraq accounted for about 80% of the drop.
A political spat between the central government in Baghdad and the semi-autonomous Kurdistan region has led to the halt of a pipeline that normally carries 500,000 barrels a day to international markets via Turkiye.
In Nigeria, a production recovery seen in the run-up to presidential elections has fizzled, with industrial action forcing Exxon Mobil Corp to renege on shipments from several terminals last month.
Still, the supply losses by Opec and its allies — both deliberate and accidental — are barely propping up an oil market that's being roiled by fears over economic growth in China and the wider world.
Crude futures briefly sank below $72 a barrel in New York on Tuesday to the lowest since March.
While group leader Saudi Arabia drew another rebuke from the White House when the latest curbs were unveiled on April 2, the move is looking increasingly prescient as oil prices sag.
Production from the full 23-nation Opec+ alliance should decline by another 1.2mn barrels a day this month as those new curbs take effect. Russia, another member of the Opec+ coalition, also announced cutbacks in response to sanctions over its invasion of Ukraine, but the implementation so far remains unclear.
In terms of supplies in April, the largest adjustments were involuntary.
Iraq's output slumped by 250,000 barrels a day to 4.13mn — the lowest since late 2021 — after Turkiye suspended the northern pipeline following a ruling by an international business tribunal. While Baghdad and Kurdish authorities have struck a temporary deal to get oil flowing again, "technical matters" are delaying the restart.
Nigeria retreated by 120,000 barrels a day to 1.32mn, the survey showed, reversing a surge seen earlier this year when

the country reached an accord with a former warlord in the oil-rich Niger Delta region.
Workers at Exxon Mobil facilities in the country returned to work last week, allowing production and exports to resume after a two-week industrial action.
Bloomberg’s survey is based on ship-tracking data, information from officials and estimates from consultants including Kpler Ltd, Rapidan Energy Group and Rystad Energy.
Opec+ is due to meet on June 4 to review production levels for the second half of the year.

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.

China gas demand to surge in 2023 as Europe Slumps, says IEA

Rising demand for natural gas in Asia and the Middle East is set to offset a decline in other regions this year, helping to keep the global market tight, according to the International Energy Agency.

China’s consumption is forecast to jump by more than 6%, underpinning an increase of almost 3% in Asia on the whole, the agency said in its quarterly Gas Market Report. Demand in Europe’s advanced economies is poised to drop 5% as renewable energy takes up a larger share of power generation.

Gas markets were upended last year as Russia cut most pipeline flows to Europe amid its war in Ukraine. The continent was spared a harsh winter as it cut demand and relied on liquefied natural gas to help fill the gap. However, supply risks still lurk, including competition with Asia, the possibility of lower flows from Russia, and a potentially hot summer or cold winter.

“Global gas supply is set to remain tight in 2023, and the global balance is subject to an unusually wide range of uncertainties,” said the IEA, which advises major economies.

Asia’s consumption – and China’s recovery from the Covid era,

led by its the industrial sector – will be key for the market. The IEA expects the country's imports of LNG to jump by as much as 15% this year, while still remaining below 2021 levels.

India's gas demand is projected to increase by 4%, following a drop amid soaring prices in 2022.

Elsewhere, consumption of gas in the Middle East is expected to rise by 2%, in large part due to Iran and Saudi Arabia. In North America, it's set to drop by 2%, as less of the fuel is used in heating and power generation. Global demand is forecast to remain flat.

"The improved outlook for gas markets in 2023 is no guarantee against future volatility and should not be a distraction from measures to mitigate potential risks," the IEA said.

While the US is set to become the world's main LNG exporter this year, global supply of the fuel is expected to increase by just 4%. That's not enough to offset the forecast drop in Russian pipeline deliveries, according to the agency.

LNG imports in Europe's advanced economies are forecast to decline for the remainder of the year, after posting strong growth in the first quarter. The change is due to lower needs for storage and reduced gas demand.

European gas consumption dropped 16% for the 2022 winter heating period and marked the steepest drop in absolute terms for any winter in the IEA's records. Still, weather-related factors accounted for just 40% of the region's decline in demand. Other factors included gas-saving policies, fuel-switching and rising energy prices.

Qatar drives LNG exports of

GECF member countries, observers in March

Qatar has driven LNG exports of GECF member countries and observers with y-o-y growth of 6.7% (1.11mn tonnes) to reach 17.66mn tonnes in March, the Gas Exporting Countries Forum (GECF) said in its report released Tuesday.

The growth was primarily driven by Qatar (0.62mn tonnes), Norway (0.44mn tonnes), Mozambique (0.30mn tonnes), Trinidad and Tobago (0.15mn tonnes), Nigeria (0.09mn tonnes), the UAE (0.05mn tonnes), Algeria (0.02mn tonnes) and Peru (0.02mn tonnes).

The increase in Qatar's LNG exports was due to lower maintenance activity compared to the previous year.

According to GECF, gas and LNG spot prices in Europe and Asia continued to decrease for the third consecutive month.

In March 2023, Title Transfer Facility (TTF) and Northeast

Asia (NEA) LNG spot prices averaged $13.87/mmBtu and $13.35/mmBtu, falling by 17% and 16% m-o-m, respectively, and representing a 65% decrease y-o-y.

Despite lower LNG sendout in the region, European spot prices maintained their bearish trend.

Likewise, weak market fundamentals in Asia continued to put pressure on prices.

Moreover, the spread between spot prices and oil-indexed LNG prices in both regions has significantly narrowed in comparison to previous months, GECF said.

In March 2023, European Union pipeline gas imports rose by 14% month-on-month (m-o-m) to reach 13.7bcm. Global LNG imports increased slightly by 2.7% y-o-y to 35mn tonnes driven primarily by stronger imports in Europe and, to a lesser degree, in Latin America and the Caribbean (LAC) and North America.

In contrast, LNG imports decreased in the Asia Pacific and Middle East and North Africa (Mena) regions.

Lower pipeline gas imports in Europe continued to support the increased LNG imports while, Asia Pacific’s y-o-y gain in LNG imports reversed from the previous month.

Mild winter weather and high LNG inventories led to reduced LNG imports in Japan and South Korea, contributing to an overall decline in imports in the Asia Pacific region.

In March, the EU gas consumption recorded a 13% y-o-y decline, reaching 34.1bcm. Factors contributing to the drop in the demand for gas in the EU include warmer than normal temperatures, windier weather conditions, and a year-extension of the implementation of the EU regulation on the voluntary gas demand reduction by 15% until March 2024.

In contrast, apparent Chinese gas demand rose by 4.6% y-o-y to

31bcm. According to the CNPC Research Institute, the country's gas demand would expand by 19bcm, or 5.1% in 2023, totalling 386.5 bcm.

Europe's gas production decreased by 3.3% y-o-y to stand at 15.3 bcm in February, primarily due to lower output from the Netherlands and UK.

Norway's production remained steady despite technical issues in certain gas fields.

Conversely, gas production from the seven major US shale gas/oil regions rose by 7% y-o-y in March reaching 84.5 bcm.

The global gas rig count declined by 7 units m-o-m but rose by 61 units y-o-y in March 2023, reaching a total of 410 units, GECF noted.

Qatargas supplies commissioning LNG Cargo to Indias Dhamra Terminal

Qatargas recently supplied a commissioning liquefied natural gas (LNG) cargo to Indias newest LNG receiving terminal ‘Dhamra’ on the vessel Milaha Ras Laffan in April 2023.
Qatargas sold the LNG on a Delivered Ex-Ship (DES) basis to the French multi- energy Company TotalEnergies, who delivered it to its 50-50 joint venture with Adani Group “Adani Total Private Limited”.
Commenting on this achievement, Qatargas CEO Sheikh Khalid bin Khalifa Al-Thani said: “Delivery of this commissioning LNG cargo to India’s Dhamra terminal is an important milestone for our company and for Qatar’s LNG industry. We are committed to meeting the growing demand for cleaner energy in India and around the world. Our reliable and safe supply of LNG will help India meet its energy needs and contribute to its economic growth. Qatargas remains committed to operating sustainably and to delivering value to our customers, partners, and stakeholders.”
“I would like to thank our valued partner, TotalEnergies, for their contribution to this successful delivery. Our partnership has been instrumental in helping us achieve this feat, and we look forward to continuing to work together to deliver cleaner and reliable energy to the world,” he added
Thomas Maurisse, Senior Vice President LNG at TotalEnergies,

said: “We are pleased to have completed the first delivery of LNG to the new Dhamra LNG terminal with a cargo from Qatargas, our long-standing strategic partner. This new LNG terminal will contribute to India’s security of energy supply and is in line with TotalEnergies’ ambition to support Indias energy transition and its goal of increasing the share of natural gas to 15% of its energy mix by 2030.”

Internal Dhamra is home to Indias seventh operational LNG terminal, the second of its kind on the east coast of the country. It is Adani Total Private Limiteds first LNG import terminal with a capacity of five million tonnes per annum (MTPA) and it is expected to boost gas utilization in the east coast of India. Once fully commissioned, Adani and TotalEnergies will provide regasification services to their downstream Indian customers.

The terminal features two tanks of 170,000 cubic meters (CBM) capacity each. The facilitys jetty is capable of handling LNG carriers from 70,000 to 265,000 CBM capacity. It also offers breakbulk services, enabling reloading of LNG to smaller vessels for further distribution and an LNG truck loading facility.

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.*

Qatar's North Field drives global LNG assets deal value in 2022: GECF

Deal value of liquefied natural gas assets in 2022 climbed 15% y-o-y to reach $23bn, driven by Qatar’s LNG development, says Doha-based Gas Exporting Countries Forum.

The deal value of liquefied natural gas assets in 2022 climbed 15% year-on-year (y-o-y) to reach $23bn, driven by Qatar’s LNG development, Doha-based Gas Exporting Countries Forum has said in a report.

Qatar’s North Field expansion project accounted for 43% of the growth in LNG deal value, GECF said in its ‘Annual Gas Market Report 2023’.

According to GECF, merger and acquisition (M&A) activity in the upstream sector declined to $154bn in 2022, 21% lower y-o-y, and below pre-pandemic levels.

This decline was essentially driven by the continued impact of Covid-related lockdowns particularly in China, high oil and gas price volatility and escalating geopolitical tensions in Europe. Most regions experienced a sharp decline except for the Middle East and Africa.

In the Middle East, M&A activity increased by 46% y-o-y, while in Africa the deal value more than tripled compared to the

previous year to reach a record $24bn.
North America accounted for almost 50% of asset and corporate acquisitions in 2022 amounting to $72bn, with private companies responsible for a large share of divestment as they opted to maximise their assets amidst the high price environment.
Europe and Africa accounted for 17% and 16% of M&A activity respectively, where high commodity prices increased the value of traded producing resources and spurred buying and selling activity.
In addition, a significant increase in demand for gas and LNG assets was observed in the midst of heightened concerns about energy security.
In 2023, upstream M&A activity is likely to be remain around 2022 levels or increase.
Furthermore, global energy security concerns are likely to drive investment for gas and LNG assets, and more so, increase acquisitions by European majors in Africa and the
Middle East to secure production assets.
Additionally, net-zero emission targets may also support demand for gas and LNG assets as the cleanest burning fossil fuel.
According to GECF, oil and gas investment has increased by 7% y-o-y to reach $718bn, partly due to higher petroleum services and EPC costs.
In 2023, oil and gas investment is expected to rise further, on the back of greater investment in the upstream industry and LNG import terminals.
However, several looming uncertainties, including a slowdown in global economic growth, tight financial conditions, inflation, and high energy price volatility may deter investment, GECF noted.

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).*