

The true cost of ocean plastic pollution



The problem of maritime plastic-waste pollution first became apparent in the 1970s. In the half-century since then, the problem has become ever more widespread, as scientific expeditions conducted by the Tara Ocean Foundation (of which I am executive director) have shown. Large pieces of debris, such as fishing nets, and their disastrous effects on marine life, are the most visible symptom. Such waste is estimated to kill more than one million seabirds and over 100,000 marine mammals annually, often through entanglement or suffocation, and promotes transport of invasive species, triggering a cascading effect on the ecosystems in which they play a central role.

Less visible, but more pervasive, are microplastics, which

have been found in the deepest ocean trenches and all types of marine life. Microplastics can, among other things, modify bacterial and viral communities and disperse chemical toxins in food chains (often after being ingested by marine organisms). Some of these toxins, such as phthalates, are associated with the chemistry of plastics, while others, such as pesticides and heavy metals, are absorbed by the plastic before it reaches the ocean and enters the food chain.

How these toxic substances interact with plastics has been the subject of much study. Plastic is comprised of monomers that have been chemically bonded to form long chains of polymers – ethylene, styrene, and propylene become polyethylene, polystyrene, and polypropylene. But the process of polymerisation is often imperfect, and some of the unpolymerised monomers that remain in plastic, like different types of styrene and bisphenol, pose major environmental and health risks.

Moreover, other chemical additives, including plasticisers, fillers, colorants, flame retardants, and antioxidants, are incorporated into polymer formulations to modify their properties. And non-intentionally added substances (NIAS) – impurities, raw materials used in manufacturing, byproducts, and degradation products – bind to finished plastics. In most cases, because free monomers, additives, and NIAS are simply trapped within the tangle of polymer chains, rather than being chemically bound to them, they are more likely to leach out during the production, use, and disposal of plastic, migrating into liquids, gases, and solids. Some 16,000 such molecules have been identified, but their effects are still not fully known, nor is their toxicity, which can change depending on how they are combined. What we do know is that one-quarter of these 16,000 molecules are pose a hazard to human health or the environment by disrupting biochemical processes in living organisms.

Halting the flow of microplastics and toxic pollutants into

the world's bodies of water is a Sisyphean task. Nevertheless, scientists are trying to stem the problem. For example, the Tara Europa expedition, in coordination with the European Molecular Biology Laboratory and more than 70 scientific institutions across the continent, has spent the past two years investigating how these hazardous substances make their way into the seas and oceans bordering Europe. The mission plans to share its findings soon.

But the generation of toxic waste and debris is not the only way that plastic can harm ocean health. The plastics industry has been a major driver of climate change, accounting for an estimated 3.4% of global greenhouse-gas (GHG) emissions. Plastic production is on track to contribute 15% of GHG emissions by 2050, exacerbating global warming and thereby increasing the threats to marine life, which is sensitive to rising water temperatures.

Because plastic degrades the entire biosphere, not just the ocean, it is not a waste problem that can be solved by a few sustainability-minded citizens' recycling efforts. This is a systemic crisis that requires an economy-wide solution. A better approach is to understand plastic as one of the "new entities" that must not leak into the environment, a view initially formulated by the Stockholm Resilience Centre in its work on planetary boundaries and later endorsed by the United Nations. While acknowledging the impossibility of defining a precise threshold for harm, such an approach highlights the need for a drastic reduction in plastic use.

Research suggests that it would be economically feasible to halve global plastic production at a cost which would almost surely be less than the cost of inaction. But, according to a recent study by researchers at the University of California, Berkeley, even this reduction would not be enough to limit global warming to 1.5° Celsius above preindustrial levels, the target set by the Paris climate agreement. Instead, they found that meeting this goal would require a 75% reduction in

plastic production compared to 2015.

'THE POSSIBILITIES ARE ENDLESS': ENERGY EXPERT LAUNCHES NEW BOOK ON RESOLVING MARITIME BOUNDARIES



ZOUK MOSBEH, 23-04-2025: Energy expert Roudi Baroudi signed copies of his latest book during a launch event at Notre Dame University – Louaize on Wednesday.

The book, "Settling Maritime Boundaries in the Eastern Mediterranean: Who Will Be Next?", is part of Baroudi's years-long effort to promote regional energy cooperation. In it, the author makes the case that if East Med countries are serious about exploiting their offshore hydrocarbons, they need to settle their maritime borders in order to attract the major

energy companies whose technical and financial muscle are virtual prerequisites for undersea oil and gas activities.



Co-hosted by the Office of NDU Publications (which published the book) and the university's Office of Research and Graduate Studies, the signing event took place at NDU's Pierre Abou Khater Auditorium. All proceeds from sales of the book will go toward Student Financial Aid at NDU.

Inspired by the landmark US-brokered October 2022 agreement that saw Lebanon settle most of its maritime boundary with old foe Israel, the new tome stresses the need to define other East Med borders as well, including those between Lebanon and Cyprus, Lebanon and Syria, Syria and Cyprus, Cyprus and Turkey, and Turkey and Greece.

Publication was delayed by the outbreak of the Gaza war in October 2023, but the author says that conflict – which also led to massive destruction and loss of life in Lebanon – only underlines the need for regional players to find a new modus vivendi.



“We can’t keep doing the same things over and over again, and then expecting a different outcome,” Baroudi said during the NDU event. “For the first time in many years, all of Lebanon’s branches of government – Parliament, Cabinet, and Presidency – are fully functional. We have to start thinking of ways to reduce the scope for friction, to open the way for foreign investment, and hopefully start producing offshore gas.”

“Almost all of Lebanon’s energy needs are met by imported hydrocarbons; imagine if we discover enough gas to provide 24/7 electricity to all Lebanese,” he added. “And what if we had enough to start exporting it, too? Lebanon’s coast is less than 100 kilometers from Cypriot waters: this means that once the island and its partners have built a pipeline and/or a liquified natural gas plant, Lebanese gas could flow straight into the entire European Union, one of the world’s largest energy markets. The possibilities are endless. And now imagine all of the countries of the region having similar prospects – just because they finally got around to figuring out where their national waters begin and end.”

In addition to the manifold benefits of energy security and lucrative export revenues to fund domestic investment in things like education, healthcare, fighting poverty, and transport, Baroudi said the exercise of negotiating sea

borders could help build trust and good will.

“There isn’t enough of those commodities in the East Med region, and often for good reason,” he explained. “But we have to start somewhere, and maritime boundaries are a great place to do that because they open the way for investment and various forms of cooperation, direct or indirect, including fisheries monitoring and regulation, marine protected areas, tourism, weather forecasting, search and rescue, etc.”

With more than 47 years of experience, Baroudi has worked in multiple fields, from electricity, oil and gas, and petrochemicals to pipelines, renewables, and carbon pricing mechanisms. He also has led policy and program development with, among others, the World Bank, the US Agency for International Development, the International Monetary Fund, and the European Commission. The author of several books – including “Climate and Energy in the Mediterranean: What the Blue Economy Means for a Greener Future” (2022) – as well as numerous studies and countless articles, his expertise has made him a highly sought-after speaker at regional energy and economic conferences. Currently serving as CEO of Energy and Environment Holding, an independent consultancy based in Doha, he is also a Senior Fellow of the Transatlantic Leadership Network, a Washington think-tank. In 2023, he received the TLN’s Leadership Award in recognition of his efforts to promote peace.

**ENERGY EXPERT’S NEW MARITIME
BOUNDARY BOOK ARRIVES AMID**

**WAVE OF EAST MED BORDER
DIPLOMACY**

Roudi Baroudi

SETTLING MARITIME BOUNDARIES IN THE EASTERN MEDITERRANEAN: WHO WILL BE NEXT?

 **NDU**
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LEBANON
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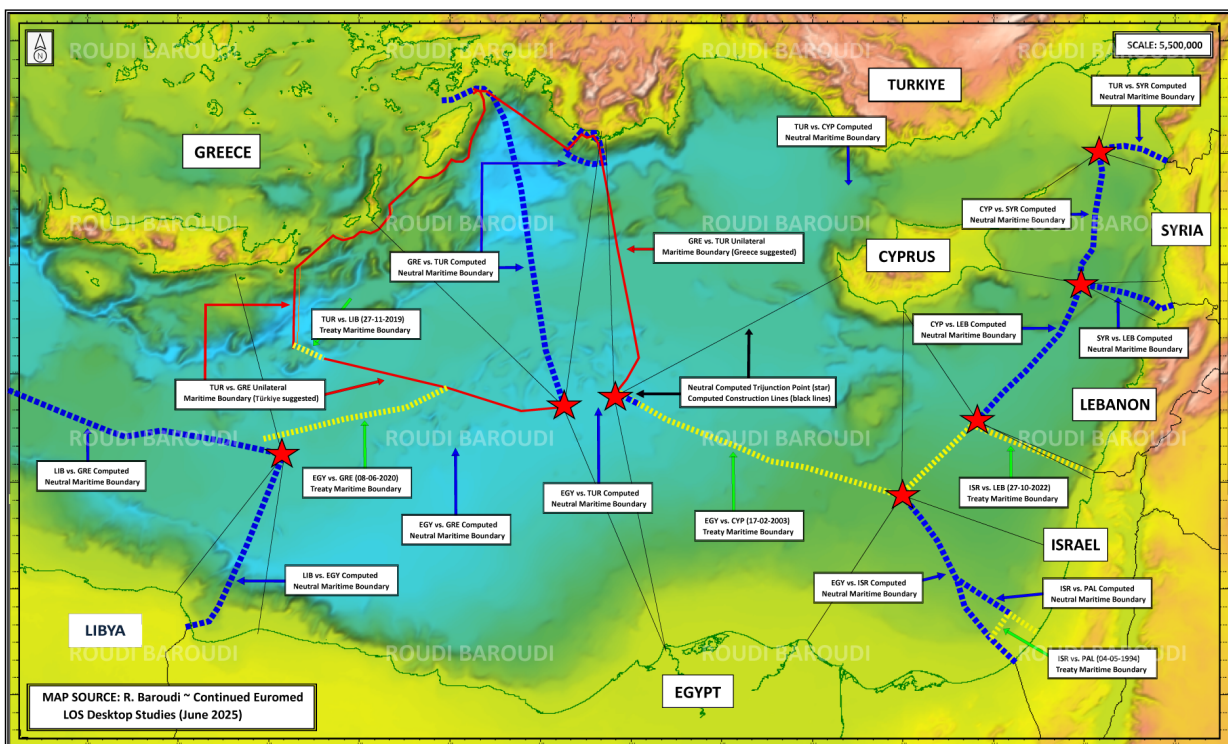
Recent weeks have seen multiple contacts among several countries including – Cyprus, Greece, Lebanon, and Syria – aimed at increasing cooperation among East Mediterranean

countries.

This flurry of diplomatic activity provides the perfect backdrop as Notre-Dame University – Louaize is pleased to announce that it will host a book launch and signing on April 23rd, welcoming international energy expert Roudi Baroudi as he releases his latest work, “Settling Maritime Boundaries in the Eastern Mediterranean: Who Will Be Next? ”

The book outlines the need for countries in the region to resolve their maritime boundaries, the energy and other economic opportunities that doing so could open up, and the legal, scientific, and technical means of ensuring that delimitation is fair and equitable. The volume even carries exclusive, high-precision maps indicating with unprecedented accuracy where the negotiated or adjudicated sea borders of several East Med countries would be, as per United Nations rules.

EURO MED RESOLVED & UNRESOLVED MBL 2025



Yellow lines - Fully Treated MBs.

Dark Blue dashed lines - 100% neutral strict equidistance lines (unresolved/disputed)

Red solid lines - Unilateral Claimed MBL

The book emphasizes that settling these unresolved boundaries – including those between Lebanon and Cyprus, Lebanon and Syria, Greece and Turkey, Turkey and Syria, Syria and Cyprus, and Turkey and Cyprus – is a necessary first step for those seeking to develop offshore energy resources. The advent of energy security and possible lucrative exports could have a profound effect on several states, allowing them to make historic investments in schools, hospitals, and transport infrastructure, all while creating well-paying jobs and reducing poverty and inequality. Baroudi also highlights a series of cross-border benefits, including reducing potential irritants between neighbors, building trust, and opening up new avenues for cooperation.

As a 47-year veteran of the energy industry, Baroudi has a wealth of experience to share, and does so frequently as an author and speaker, promoting energy as a catalyst for dialogue and peace wherever and whenever he can. He will be on hand for the launch at NDU's Pierre Abou Khater Auditorium beginning at 12:00 noon, answering questions and signing copies of the book for anyone who purchases one.

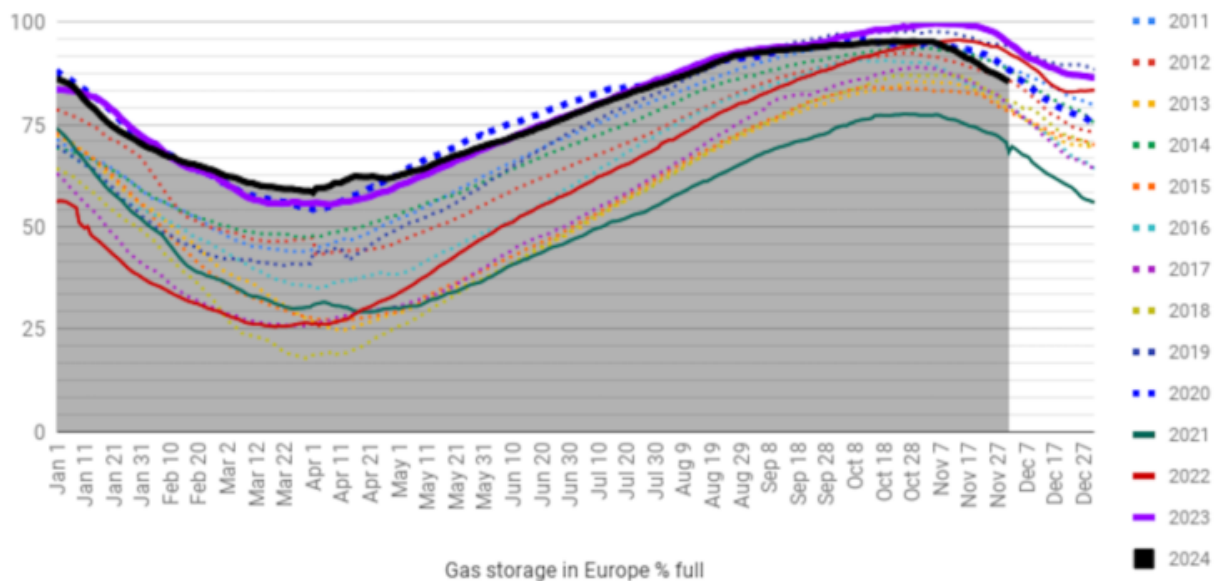
All sale proceeds will go toward Student Financial Aid at NDU.



**Europe gas storage concerns
fuel market uncertainty**

European gas storage % full

source: GIE AGSI



The gas held in storage covers about 30% of the EU's daily needs during the winter, rising to 50% on the chilliest days

The relatively low amount of gas in storage in the European Union – with levels 36% below where they were this time last year – is putting upward pressure on prices, according to the International Energy Agency.

Europe's stockpiles of natural gas have been a closely watched metric since the invasion of Ukraine triggered a dramatic downturn in Russian supply to the region.

The network of gas storage sites across the European Union is the second largest in the world after the US and has become an increasingly important buffer against supply shocks and price spikes.

As Moscow squeezed the flow of pipeline gas, the EU had managed to avoid a winter supply crunch by curtailing overall gas demand and boosting its imports of liquefied natural gas. But 2025 could up the pressure.

Europe leans on its gas inventories in the winter, when average consumption doubles as the heating is turned up.

While the continent's gas suppliers – from Norway and Algeria to Qatar and the US – typically boost their production to maximum levels, it's not enough to meet the increased demand.

As a result, the gas held in storage covers about 30% of the EU's daily needs during the winter. This proportion can top 50% on the chilliest days, especially if wind speeds are low and electricity output from renewable sources slumps.

The energy crisis sparked by Russia's invasion of Ukraine saw the EU introduce legally binding targets for gas storage across the bloc from 2022. This was to ensure security of supply.

Inventories must be at least 90% full by November 1 and there are also interim milestones to be met in February, May, July and September. Some countries fell short of their goals in February 2025.

The five-year agreement allowing Russian gas to transit through Ukraine and into Europe expired at the end of 2024. Prior to the deal coming to an end, the route had accounted for less than 5% of Europe's gas needs, down from more than 15% at the start of the accord.

Moscow didn't completely turn off the taps to the region; Russian pipeline gas is still flowing via the TurkStream line through Türkiye.

If US President Donald Trump succeeds in brokering a peace deal between Russia and Ukraine, there's a possibility that the transit agreement could be revived.

The EU's gas stockpiles quickly depleted over the 2024-25 heating season. Colder weather than a year earlier and more windless days increased demand for gas and forced countries to tap their storage.

Combined with the loss of Russian pipeline gas via Ukraine, the bloc's depots were only 44% full in mid-February, well below the 65% seen a year prior and the lowest level for this time of year since the 2022 energy crisis.

There's no immediate threat of Europe running out of gas, but there are concerns about the pace of storage refills needed to be ready for the next winter.

Fears over how Europe will replenish its storage stoked a surge in the price of summer gas contracts and drove near-term prices to a two-year high on February 10. In turn, energy

bills have remained elevated, prolonging pain for Europe's households and businesses, just as recession risks are back in focus for the likes of Germany and the UK.

European consumers and governments are now entering their fourth year of high and volatile gas prices.

If a peace deal is reached between Russia and Ukraine, it could revive the transit of gas via that route into Europe. Whether the EU would return to importing Russian pipeline gas remains to be seen.

It's unlikely the bloc would want to relinquish control of its energy security back to Moscow.

MPHC plans to invest QR2.5bn in capital expenditure over next five years



MPHC spent QR415mn in 2024 on maintenance, safety, and environmental projects, including its share in a new PVC plant (QR219mn last year)

Mesaieed Petrochemical Holding Company plans to invest QR2.5bn in capital expenditure over the next five years, Abdulla Yaaqob al-Hay, manager, Privatised Companies Affairs at QatarEnergy, said at the MPHC Annual General Assembly on Monday.

He said MPHC spent QR415mn in 2024 on maintenance, safety, and environmental projects, including its share in a new PVC plant (QR219mn last year).

The project is progressing as per the timetable for completion by second half of 2025, with a capacity of 350,000 tonnes per

year.

Furthermore, in the petrochemical segment, capital expenditure for this year focused on several key projects aimed at enhancing operational efficiency and sustainability, while upholding the best standards for HSE.

In addition to adding value for shareholders and attracting investment opportunities, the Group has signed a memorandum of understanding (MoU) with key stakeholders to develop a state-of-the-art salt production facility under QatarEnergy's TAWTEEN localisation programme.

This facility will produce industrial and food-grade salt, ensuring Qatar's self-sufficiency and supporting the local market. The Group is currently in the feasibility study phase and will announce progress in the future.

In 2024, MPHC maintained its excellent HSE record, receiving international certifications, improving process safety, and achieving 17 consecutive years without heat-stress incidents at some facilities.

MPHC, he said, remains committed to maintaining its position as a low-cost operator without compromising HSE standards.

In his opening remarks, Ahmad Saif al-Sulaiti, Chairman, MPHC said, "In 2024, uncertainty and oversupply challenges persisted, complicating margin evolution amid softened global demand. Energy and commodity prices decelerated as global supply was restored, easing supply chain bottlenecks and allowing producers to restart capacities. This added pressure on global markets and influenced price trajectories.

"Additionally, hawkish monetary policies to combat inflation led to high-interest rates, impacting global GDP, reducing consumer spending, and affecting demand for most commodities. Despite these hurdles, global downstream demand began to stabilise during the second half of the year."

He noted the supply and demand environment were impacted by several factors throughout the year. Notably, the global economic environment presented challenges, particularly in the first half of the year, which constrained consumer purchasing power and softened demand.

Despite challenging macroeconomic conditions, MPHC demonstrated resilience and agility, achieving commendable results throughout 2024, even with segmental shutdowns.

These turnarounds were essential to ensure the long-term reliability and efficiency of the assets, and maintaining the competitive edge in the market.

“Our dedication to HSE, product quality, and comprehensive employee safety remains unwavering, ensuring operational reliability in accordance with international standards,” al-Sulaiti said.

MPHC achieved a net profit of QR719mn in 2024 and recorded an earnings per share (EPS) of QR0.057.

Considering the current market projections in both the medium and short terms, as well as the company’s capital spending and operational programs, the Company’s Board of Directors proposed a second half 2024 dividend distribution of QR377mn, equivalent to QR0.03 per share.

This brings the annual dividend distribution to QR0.057 per share for the full year. This dividend represents a 100% net earnings payout ratio.

Trump's move to exit Paris accord to hit harder than last time



This US withdrawal will take effect in one year, faster than the 3.5-year exit period when Trump first quit the accord.

A second US withdrawal from the world's primary climate pact will have a bigger impact – in the US and globally – than the country's first retreat in 2017, according to analysts and diplomats. One of President Donald Trump's first acts on returning to office on Monday was to quit the Paris Agreement as part of his plans to halt US climate action.

The impact will be to increase the chance of global warming escalating, to slow US climate funding internationally, and leave investors struggling to navigate the divergence between European and US green rules.

This US withdrawal will take effect in one year, faster than the 3.5-year exit period when Trump first quit the Paris accord in 2017.

Since then, climate change has become more extreme. Last year

was the planet's hottest on record, and the first in which the average global temperature exceeded 1.5C (2.7F) of warming – the limit the Paris Agreement commits countries to trying to stay below.

“We are looking at overshooting 1.5C – that is becoming very, very likely,” said law professor Christina Voigt at the University of Oslo.

“Which, of course, brings to the forefront that much more ambitious global action on climate change is needed,” she said.

Today's climate, measured over decades, is 1.3C warmer than in pre-industrial times, and on track for at least 2.7C of warming this century. While perilous, that is less severe than the 4C projected before countries negotiated the 2015 Paris Agreement. Each country's pledge toward the Paris goal is voluntary. Nevertheless, Trump is expected to scrap the US national emissions-cutting plan and potentially also Biden-era tax credits for CO₂-cutting projects.

All of this will “further jeopardise the achievement of the Paris Agreement's temperature goals,” Michael Gerrard, a legal professor at Columbia Law School, said.

“That has obviously an impact on others. I mean, why should others continue to pick up the pieces if one of the key players once again leaves the room?” said Paul Watkinson, a former French climate negotiator who worked on the 2015 Paris Agreement.

Some US states have said they will continue climate action.

Regardless of politics, favourable economics drove a clean energy boom during Trump's first term – with Republican stronghold Texas leading record-high US solar and wind energy expansion in 2020, US government data show. But Trump has already taken steps to try to prevent a repeat of that, on Monday suspending offshore wind leases and revoking Biden's electric vehicle targets.

The US produces around 13% of global CO₂ emissions today but is responsible for most of the CO₂ released into the atmosphere since the Industrial Revolution.

As part of the Paris Agreement exit, Trump on Monday ordered an immediate cessation of all US funding pledged under UN climate talks.

That will cost poorer nations at least \$11bn – the US government's record-high financial contribution delivered in 2024 to help them cope with climate change.

Together, all rich countries' governments combined contributed \$116bn in climate funding for developing nations in 2022, the latest available OECD data show.

That does not include the huge climate-friendly government funding Biden rolled out domestically, whose future under Trump is uncertain.

Total US climate spending – counting domestic and international, from private and public sources – jumped to \$175bn annually over 2021-2022, boosted massively by the 2022 Biden-era Inflation Reduction Act, according to non-profit research group the Climate Policy Initiative. The US is also responsible for funding around 21% of the core budget for the UN climate secretariat – the body that runs the world's climate change negotiations, which faces a funding shortfall.

The We Mean Business Coalition, which is backed by Amazon and Meta, said Trump's disruption of the US business environment could drive green investment elsewhere.

It could "open the door for other major economies to attract greater investment and talent," the non-profit group said.

Three investors told Reuters the transition to green energy, including in the US, will move forward regardless.

One impact of the Paris exit will be to prevent US businesses from selling carbon credits into a UN-backed carbon market that could be valued at more than \$10bn by 2030, according to financial information provider MSCI.

While no longer able to make money from selling any surplus credits, US companies would be able to buy them on a voluntary basis. – Reuters

Shell dividend hike drives shares higher despite profit miss



By Arunima Kumar

(Reuters) -Shell reported a 16% drop in profit for 2024 on Thursday amid weakness in oil and gas prices and in demand, but shares rose after it raised its dividend by 4% and extended its share buyback programme.

The oil major also announced a \$3.5 billion buyback for the current quarter, making this the 13th consecutive quarter of at least \$3 billion of share repurchases.

Its shares gained over 2% even as the group reported that its

2024 adjusted earnings, its definition of net profit, fell to \$23.72 billion from \$28.25 billion in 2023, dented by narrower liquefied natural gas (LNG) trading margins, lower oil and gas prices, and weaker refining margins.

That fell short of a \$24.64 billion consensus compiled by LSEG and \$24.11 billion forecast by analysts polled by Vara Research.

Shell, the first major energy company to report results, said fourth-quarter earnings nearly halved from the previous year to \$3.66 billion, also missing analysts' expectations.

"As expected, Shell reported 4Q results this morning which showed relatively soft earnings, but continued strong cash generation," RBC Capital Markets analyst Biraj Borkhataria said in a note, also highlighting the consistency with which the group has been returning cash to shareholders.

In his prepared remarks, CEO Wael Sawan said the share buybacks were "underpinned by the significant progress that we are making as an organisation."

Sawan has been focused on cutting costs and pivoting the company back to its most profitable sectors – oil, gas, and biofuels – while shifting away from renewable power.

"We achieved a (cost) reduction of \$3.1 billion by the end of 2024, one year ahead of our end-2025 target date, and above the range of \$2 to \$3 billion that we set in 2023," he said.

Shell's fourth-quarter earnings included \$2.2 billion in impairments, part of which was a \$1 billion write-off for a U.S. offshore wind project.

CF0 Sinead Gorman told reporters that the project did not align with company's capabilities or return goals, and Shell was looking to monetize it.

The world's leading oil and gas companies experienced a

decline in profits through 2024, following record earnings in the previous two years, as energy prices stabilised and oil demand weakened.

Shell also expects 2025 capital expenditure to fall below last year's \$21 billion range, with more details to be shared at its capital markets day in March.

The group's refining operations reported an adjusted loss of \$229 million in the chemicals and products unit, compared to a \$29 million profit last year.

Refining margins weakened globally due to reduced economic activity and new refineries opening in Asia and Africa.

Executives said on a call with analysts that Shell had no plans to get out of refining altogether, but was not looking to expand there either.

The company is trying to sell its stake in a German refinery and intends to shut down a plant in Wesseling, Germany, following the sale of its Singapore refining and chemicals hub last year, one of the largest of its kind in the world.

In the fourth quarter, Shell ran its refineries at 76% capacity, and said it expected to increase that to 80-88% in the first quarter.

Shell also said it did not have a timeline for arbitration over LNG supply from Venture Global's Calcasieu Pass facility.

Venture Global, whose \$58 billion market debut fell short of high expectations last week, began generating proceeds in 2022 with its Calcasieu Pass facility.

However, delays in commercial operations have caused contract disputes with customers, including BP, Shell and Italy's Edison, over missed cargoes.

(Reporting by Arunima Kumar in Bengaluru; editing by Savio

Climate displacement is also a health crisis



By disrupting care services, climate displacement deprives affected communities of access to doctors, hospitals, and pharmacies.

Every year, 21.5mn people are forcibly displaced by floods, droughts, wildfires, and storms. This number is set to rise dramatically over the coming decades, with up to 1.2bn people expected to be driven from their homes by 2050. The unfolding climate crisis is not just a humanitarian disaster but also a global health emergency.

Climate displacement poses both direct and indirect threats to

public health. By disrupting care services, it deprives affected communities of access to doctors, hospitals, and pharmacies. Climate-induced migration also exacerbates poverty, overcrowding, and social instability. Food production is often severely affected, while unsanitary living conditions fuel the spread of infectious diseases.

As the climate crisis threatens to derail global efforts to achieve the UN Sustainable Development Goals, the health and well-being of hundreds of millions of people across the developing world are at risk. High-income countries are not immune: in the US, 3.2mn adults were displaced or evacuated due to natural disasters in 2022 alone.

Pharmaceutical companies must play a pivotal role in bolstering global health resilience. Their involvement is particularly critical in conflict zones at the forefront of the climate-displacement crisis, where life-saving medicines and vaccines are often in short supply.

While the pharmaceutical industry has made strides in reducing carbon dioxide emissions and adopting more sustainable practices, its efforts fall far short of mitigating climate-related disruptions to supply chains.

Some pharmaceutical companies, such as Novartis and Novo Nordisk, have launched targeted programmes to aid populations displaced by extreme weather events, while others have donated cash or supplies in response to natural disasters. The demand for these donations has risen with increasing climate and humanitarian needs. Hikma, a generic medicine manufacturer founded in Jordan, reported \$4mn in donations in 2020, and \$4.9mn in 2023, mostly serving the needs in the surrounding region.

No company has developed a comprehensive strategy to ensure that displaced communities have sustained access to health products. A more holistic approach is needed. Amid the ongoing climate-displacement crisis, pharmaceutical companies should adopt a four-pronged strategy to strengthen healthcare systems. For starters, they could help deliver medicines to vulnerable communities in remote areas by revamping their

supply-chains, from building redundancy into shipping networks to redesigning products to be more stable in hot climates where refrigeration may be unavailable.

Second, pharmaceutical companies must invest in research and development to create vaccines, diagnostics, and therapeutics targeting climate-sensitive diseases. Rising global temperatures are accelerating the spread of mosquito-borne illnesses such as dengue, malaria, and Zika, as well as waterborne diseases like cholera and shigella, putting displaced populations at even greater risk.

Third, pharmaceutical companies should forge long-term partnerships with humanitarian organisations focused on climate displacement. Public-private collaborations have also proven effective in strengthening health resilience. Since 2010, for example, leading vaccine manufacturers like GSK and Pfizer have supplied Gavi, the Vaccine Alliance, with billions of vaccine doses, protecting vulnerable populations in some of the world's most resource-constrained countries.

Lastly, pharmaceutical companies must boost efforts to cut greenhouse-gas emissions across their value chains. While the climate impact of pharmaceuticals may get less attention than that of traditional manufacturing industries, the sector emits more CO₂ per \$1mn of revenue than the automotive industry.

The active support and engagement of shareholders, employees, and other stakeholders is crucial. Investors, in particular, must encourage companies to align their business practices with global health and climate goals.

Climate displacement is not a distant or hypothetical threat; it is a rapidly escalating health emergency. The pharmaceutical industry has a moral responsibility to act. To do so effectively, companies must get ahead of the curve and provide vital, life-saving treatments to those on the front lines of the climate crisis.

Ensuring Europe's supply of critical minerals



The European Union's plan to achieve net-zero emissions by 2050 has an Achilles' heel: the EU relies on external sources – particularly Chinese companies – for 70-90% of the massive amount of critical raw materials needed to manufacture wind turbines, solar cells, batteries, and other green technologies. This dependency poses a serious risk: China's recent ban on exports of gallium, germanium, antimony, and other dual-use materials to the US suggests that it could take similar action against Europe, especially in light of EU tariffs on Chinese electric vehicles.

The new European Commission has rightly put critical raw materials at the top of its agenda. Fortunately, it will not

be starting from scratch. Last year, the EU adopted the Critical Raw Materials Act, which calls for the bloc to extract 10%, process 40%, and recycle 25% of what it consumes annually by 2030, and limits the share of any external supplier to 65%. To meet the CRMA's targets, the Commission must focus on co-ordinating funding, engaging in resource diplomacy with Africa, and establishing secondary material partnerships.

Mining is a capital-intensive industry, and overseas upstream activities require public support in terms of both equity and debt. The CRMA anticipates mobilising finance from various sources, including the EU's Global Gateway initiative and the European Investment Bank. Some member states have also established their own national funds. Germany launched a €1bn (\$1.04bn) raw-materials fund, while Italy introduced a €1bn "Made in Italy" fund for critical minerals, and France dedicated €500mn under its 2030 investment plan to enhance domestic industry's resilience to disruptions of the metal supply chain.

But while several public-finance streams are available, the funding landscape is scattered and not well aligned, creating confusion. Moreover, there are no explicit rules governing how the Critical Raw Materials Board, which was established to support the CRMA's implementation, designates projects as "strategic" and thus eligible to receive EU funds. The European Commission can address these issues by streamlining existing funding lines, which would ensure that national and EU finance work in tandem to achieve the best results and scale, and by establishing timelines for decision-making, which would provide clarity for corporate investment in upstream, midstream, and downstream assets.

The CRMA must also establish partnerships with resource-rich countries that deliver quick and tangible results. Bolstering ties with African countries, which hold some 30% of the world's mineral resources, will be especially important. But,

compared to other regions, investment in mineral exploration on the continent remains low, and China funds most of it. The EU's resource diplomacy should focus on lowering investment barriers while helping African partners move into higher-value-added activities, such as downstream processing, and invest in industrial upgrading.

AfricaMaVal, an EU-funded project promoting sustainable partnerships and responsible mining on the continent, should become a vehicle for linking European and African firms and addressing extraction needs. Building on comprehensive assessments of mining prospects across Africa, and taking into account the STEM (science, technology, engineering, and mathematics) skills of local workforces, AfricaMaVal can identify new business opportunities along the value chain. This could evolve into a joint investment platform for the sustainable production of critical raw materials. The European Commission would thus be doing what it does best: catalysing private investment toward its policy goals, which, in this case, is building the infrastructure and clean-energy systems required for future mining projects.

Lastly, the Commission should address the CRMA's major blind spot: the lack of domestic feedstock to meet its recycling targets. Global competition for secondary materials is already stiff, as evidenced by businesses' increasing efforts to secure enough steel scrap. Recycling input rates – the share of total demand – are just 3% for light rare-earth elements and zero for battery-grade lithium.

Establishing secondary-materials partnerships with emerging economies, which have rapidly growing markets for cell phones, laptops, and other appliances, would boost the EU's supply of recycled critical raw materials, particularly rare-earth elements. The focus should be on optimising the recycling value chain by providing financing and capacity-building assistance for waste-sorting and collection systems in partner countries, creating mutually beneficial economic and

environmental outcomes.

The EU is facing an uphill battle to source and produce the critical raw materials that will define its future. And while the CRMA hardly represents an easy fix for the bloc's import dependency, it can strengthen supply-chain resilience, contribute to EU sovereignty, and bolster Europe's economic security – in other words, boost the bloc's industrial competitiveness against a worsening geopolitical backdrop. But to realise the CRMA's full potential, the Commission must make it fit for purpose. – Project Syndicate

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Clean energy progress hinges on policy, science and action



It is tough to be optimistic about the climate these days. While the costs of extreme weather events like the Los Angeles wildfires pile up, the US federal policy pendulum is swinging away from facts, reason, and basic human decency. Nonetheless, even as the US government moves in the wrong direction, trends in science, economics, and increasingly local politics indicate that the pendulum will swing back in due course. After all, no-one can argue with the physics of today's clean energy technologies. Heat pumps, induction stoves, and electric vehicles (EVs) – to name just three – are fundamentally better technologies than what came before. The best gas furnaces might reach 95% efficiency, meaning they are converting 95% of the energy they use into heat; but most heat pumps easily top 200%, with some reaching 400% or more. Similar comparisons can be made between induction and gas stoves, and between EVs and gasoline- or diesel-powered vehicles. By and large, we know what technologies we should be using to eliminate greenhouse-gas emissions; and in cases where we don't, we know what kinds of things to try. This knowledge extends well beyond EVs and heat pumps to

entire industrial sectors like cement or iron and steel. Here, outgoing US President Joe Biden's administration has made an important contribution with the Department of Energy's Liftoff Reports, which chart pathways to commercialisation for a broad selection of low-carbon technologies.

Consider cement, which accounts for some 8% of annual global greenhouse-gas emissions. Ordinary Portland cement, patented 200 years ago, has dominated the sector for decades. While measures like clinker substitution and efficiency improvements can abate up to 40% of emissions, getting to zero will require additional steps. These generally fall into two categories: cutting emissions from producing Portland cement or switching away from it altogether. Promising US start-ups like Brimstone and Sublime Systems are racing to demonstrate that either path is commercially viable.

One key ingredient is public subsidies to help firms climb the learning curve and slide down the cost curve toward faster commercialisation. Both Brimstone and Sublime Systems received early research and development funding from the US Advanced Research Projects Agency-Energy (ARPA-E) and have now advanced to the deployment stage, receiving up to \$190mn and \$90mn, respectively, to build their first commercial plants. All told, the Bipartisan Infrastructure Law and the Inflation Reduction Act allocated around \$100bn for such purposes, with public funding contingent on matching private investments.

Moreover, these sums are dwarfed by the Department of Energy's loan programme. With just \$17bn in taxpayer funds, the IRA authorises the department's Loan Programs Office to lend \$350bn for investments in clean energy and domestic EV manufacturing. And those public funds then catalyse multiples more in private investments. While some Republicans and members of Donald Trump's incoming administration want to cut this programme, doing so would only hurt US competitiveness.

Can we restore sanity to our national policies? It might be trite to say that change begins at home, but what is trite is often true. A good place to look is New York. While the city has many problems, its climate policies are not among them.

Around 70% of New York's direct emissions come from heating and cooling buildings, while the other 30% comes from cars and trucks. Fortunately, Local Law 97 is already addressing the former. The law is one of the most ambitious decarbonisation measures for buildings anywhere, requiring most to reduce their emissions by 40% this decade, and by 100% by 2050. And while New York can do only so much about vehicle emissions, its long-delayed congestion pricing programme is finally being implemented. That is a good start.

Given that New York used to be the world's most congested city, the quality-of-life improvement from less traffic can already be felt. The same goes for another measure that took an absurdly long time to address: the lack of trash bins. Over the past year, the city has finally issued official trash, recycling, and compost bins, with enforcement for residential buildings beginning this month. Cleaning up our own act – including with mandatory composting and other policies – will not save the planet. But effective government just might.

Physics alone will not push the pendulum all the way back to where it was before. That will require policies based on sound economics. As long as Trump does not break the fulcrum and bring the entire pendulum crashing down, policies pioneered by his predecessor and by local communities will continue to be a force applying pressure in the right direction. – Project Syndicate