

ExxonMobil posts \$23bn in 2021 profits on higher oil prices



ExxonMobil reported a profitable fourth-quarter Tuesday to conclude a strong comeback year in 2021 on higher oil prices amid recovering energy demand.

The oil giant reported annual profits of \$23 billion last year compared with a loss of \$22.4 billion in 2020 when demand was dented by the Covid-19 lockdowns. High oil prices helped boost results again during the quarter, although increased costs cut into gains in some operations.

“Our effective pandemic response, focused investments during the down-cycle, and structural cost savings positioned us to realize the full benefits of the market recovery in 2021,” said Chief Executive Darren Woods.

In the fourth quarter, ExxonMobil's upstream business benefited from higher prices in oil and natural gas, which surged 63 percent compared with the third quarter.

The company also benefited from a profitable run in its downstream business in a reversal from last year's fourth quarter, as well as increased earnings in chemicals.

However, ExxonMobil said profits in its European refining operations were limited somewhat by higher energy prices. The company also flagged higher feed and energy costs as a drag in its chemical business.

On Monday, ExxonMobil announced it was combining its chemical and downstream businesses as it enacts \$6 billion in cost savings through 2023. The company is also shifting its corporate headquarter to Houston from Irving, Texas near Dallas.

Higher oil prices set to lead to higher twin deficits, inflation in most Fitch-rated energy importers in Mena



Higher oil prices are set to lead to higher twin deficits and inflation in most Fitch-rated energy importers in the Middle East and North Africa (Mena), the agency has said in a new report. Most of these Mena countries with the exception of GCC sovereigns are net importers of hydrocarbons. “We assume oil prices will moderate to average USD70 a barrel in 2022 (similar to 2021) and fall further in 2023- 2024. However, price risks are to the upside,” Fitch Ratings said. In all but one Mena oil importers, regulated electricity prices are below the cost recovery level. Support to electricity sectors is a significant contributor to fiscal deficits and/or the build-up of indebtedness in Jordan, Lebanon and Tunisia, it said. Electricity prices for consumers have been flat through 2020-2021 in Morocco and Tunisia but have risen in Egypt, Jordan and Lebanon. In Egypt, this is part of a programme of tariff hikes. Countries are generally seeking to enact reforms over the medium term that will raise tariffs (at least for some consumers) while providing targeted assistance. Petroleum subsidies have largely been removed across the region, and prices adjust to oil market fluctuations, although subject to decisions by a pricing committee in most countries and a small monthly adjustment cap in Tunisia. Higher global oil prices have trickled through to transportation CPI inflation across

the region. According to Fitch Ratings, higher energy prices will widen current account deficits (CADs) of net energy importers, particularly Lebanon, Tunisia, Jordan and Morocco. In Tunisia, this will put pressure on (currently adequate) foreignexchange reserves, amid lack of access to external funding. In Lebanon, import volumes will be constrained by dwindling reserves, absence of external funding and a collapsing economy. Rising prices of hydrocarbon feedstock could eventually require changes in tariffs or higher fiscal outlays to support electricity sectors, although electricity companies can absorb higher losses in the short term. Gas pricing is linked to oil prices, but long-term supply agreements cushion the impact of hydrocarbon price swings (in Jordan and Tunisia), as does domestic hydrocarbon production (in Egypt, Israel and Tunisia) and electricity generation from renewables (most importantly in Morocco), Fitch said.

IMF's misstep on climate finance



The International Monetary Fund seems determined to dilute one of the best examples of global co-operation in response to the economic disruptions induced by the Covid-19 pandemic and climate change. It must change course now, before it is too late.

The IMF's allocation of \$650bn in special drawing rights

(SDRs, the Fund's reserve asset) in August was long encouraged and widely welcomed. Given the IMF's tight rules, it was clear from the start that the vast majority of SDRs would go to countries that did not need them. As a result, G7 leaders pledged to re-channel upwards of \$100bn of their allocations to "countries most in need of ... pandemic [support to] stabilise their economies, and mount a green and global recovery ... aligned with shared development and climate goals." While these moves seem small compared to the \$17tn that rich countries have spent to support their economies during the pandemic, they were nonetheless significant. In October, just two months after the allocation, the G20 backed a plan by the IMF and the World Bank to develop and implement a Resilience and Sustainability Trust, which would allow wealthy countries to channel their allotments to low- and middle-income countries vulnerable to economic shocks. Because the RST could be used to address risks related to climate change, it would fill a glaring gap in international finance. The IMF announced that it would have a proposal ready for its 2022 spring meetings.

But will it be enough?

Extreme weather events like floods and hurricanes can trigger financial instability in vulnerable countries as they wipe out capital stock and sources of foreign exchange. Likewise, countries dependent on fossil-fuel exports face fiscal uncertainty as demand for oil and gas decreases to meet climate goals. In both cases, spillover effects can negatively affect trade. Countries confronting such conditions must undertake a structural transformation of their economies. But many low- and middle-income countries lack access to the cost-effective, flexible financing they need.

A well-designed RST would make the IMF criteria for resource allocation and country eligibility more adaptable. Unfortunately, five design flaws in the IMF's approach would render the planned RST ineffective for most climate-vulnerable countries.

The first flaw concerns eligibility. IMF programmes

discriminate on the basis of income, but climate change does not. While the G20 explicitly called for the establishment of an RST covering low-income and climate-vulnerable middle-income countries, the IMF has adopted a narrow interpretation according to which middle-income countries would be eligible only if they do not exceed a certain income threshold.

But traditional measures of income are a poor criterion for determining eligibility. The IMF must adjust its thinking to actual circumstances and ensure that eligibility is based on climate vulnerability. It should not be controversial to integrate into the criteria simple measures such as susceptibility to physical climate risks like floods, droughts, and hurricanes, or economic factors like the share of fossil-fuel exports in total foreign-exchange earnings.

Second, there is a problem with the terms and accessibility of the funds. Developing countries lack the fiscal space to mobilise domestic resources to address the structural changes their economies need. Many also lack access to external resources on reasonable borrowing terms. But the IMF is proposing that RST users be charged the SDR interest rate (currently five basis points and on the rise) plus a margin of up to 100 basis points. These rates are not very different from what the Fund currently charges middle-income countries. More problematic is the access limits, which would be 100% of quota, or less than the SDR equivalent of \$1bn. These guidelines would do little to address the financing needs of all but the smallest countries.

The third flaw is the IMF's insistence on conditionality. The Fund sees the RST as a top-up scheme for existing programmes. This is deeply troubling. According to the IMF's own research, its existing lending facilities are stigmatised, owing to their high levels of conditionality and low levels of performance with respect to economic recovery and other social outcomes. The RST was supposed to be a new instrument that recognises and channels resources to the countries that are most vulnerable to climate change. But what the IMF plans is repackaged business as usual.

Climate-vulnerable countries have not applied for IMF support even during the pandemic, when the Fund has experienced the largest use of its facilities. Adding a small top-up at the same price and level of conditionality essentially will lock up much-needed financing for climate resilience.

The fourth flaw is that even though the IMF is only now devising a climate-change strategy, it would head the RST. Multilateral and regional development banks are also prescribed SDR institutions, and they have a longer view and a stronger track record on climate policy. They need to be part of the RST's governance.

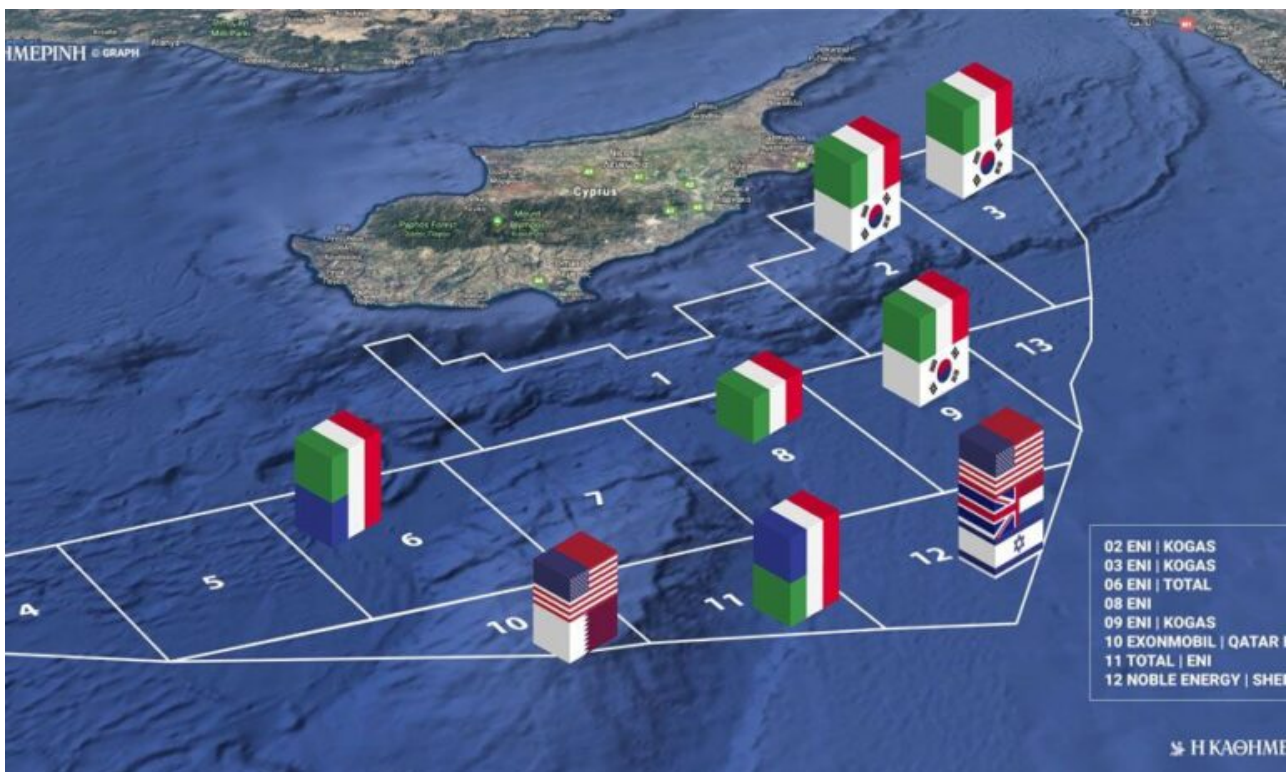
Lastly, there is the question of scale. IMF Managing Director Kristalina Georgieva has said the RST would be funded with around \$30bn initially and then scaled up to \$50bn. While the RST alone cannot be expected to substitute finance needed to address the intensifying effects of climate change, the needs assessment released by the Standing Committee on Finance of the United Nations Framework Convention on Climate Change put the figure at \$6tn, and other estimates are significantly higher. At the recent UN Climate Change Conference (COP26), Barbados Prime Minister Mia Amor Mottley, whose country is among the world's most vulnerable, proposed an annual increase in SDRs of \$500bn for 20 years to finance resilience and sustainability.

The IMF's shareholders and stakeholders must reconsider the RST's design. To succeed, it must include all climate-vulnerable developing countries, regardless of income level. It must provide low-cost financing that does not undermine members' debt sustainability and is not linked to pre-existing IMF programmes with onerous conditionalities. It must be governed by key stakeholders in development-finance institutions. And it must scale appropriately over time.

The IMF must make the necessary adjustments to its proposal for the RST. If it cannot, creditor countries should refrain from capitalising it. – Project Syndicate

- *The authors are members of the Task Force on Climate,*

Cyprus awards Block 5 gas right to ExxonMobil, Qatar Petroleum



The Cypriot government on Thursday awarded a license for natural gas exploration rights for an offshore block to a consortium made up of ExxonMobil and Qatar Petroleum.

Energy Minister Natasa Pilides said ExxonMobil would be administering the Block 5 concession with a share of 60 per cent.

“I have also been authorized to sign on behalf of the Republic of Cyprus, the exploration and production sharing contract agreed with the consortium after intense negotiations,” she told journalists after the approval.

The contract with the two companies will be signed at a ceremony to be held in Nicosia within the next few days, she added.

ExxonMobil and partner Qatar Petroleum plan on drilling an appraisal well in Block 10, where natural gas was discovered, towards the end of November or early December.

[Kathimerini Cyprus]

QatarEnergy announces long-term LNG supply agreement with China's Guangdong Energy Group



* Under the sale and purchase agreement with Guangdong Energy Group, Ras Laffan Liquefied Natural Gas Company will supply 1mn tons per year of LNG to China over a 10-year period, beginning 2024

QatarEnergy announced that its LNG producing affiliate, Ras Laffan Liquefied Natural Gas Company, entered into a long-term sale and purchase agreement (SPA) with Guangdong Energy Group Natural Gas Company (GEG) for the supply of 1mn tons per year of LNG to China over a 10-year period starting in 2024.

Commenting on the occasion, HE the Minister of State for Energy Affairs Saad Sherida al-Kaabi, also the President and CEO of QatarEnergy said, “We are pleased to enter into this long-term supply agreement with Guangdong Energy Group and look forward to establishing a successful and mutually rewarding relationship. This agreement further demonstrates our commitment to continue to be a trusted and reliable energy partner for the People’s Republic of China.”

Al-Kaabi expressed his thanks to Sheikh Khalid bin Khalifa al-Thani, the CEO of Qatargas, and the working teams from both sides for the successful conclusion of this new long-term LNG supply agreement.

Deliveries of LNG under the SPA will utilise Qatar’s fleet of conventional, Q-Flex and Q-Max LNG vessels, allowing GEG to receive LNG primarily at the Dapeng and Zhuhai LNG Receiving Terminals.

Opec+ agrees to go ahead with oil output rise, as US pressure trumps virus scare



Opec and its allies agreed on Thursday to stick to their existing policy of monthly oil output increases despite fears that a US release from crude reserves and the new Omicron coronavirus variant would lead to a fresh oil price rout.

Benchmark Brent crude fell more than \$1 after the deal was reported, before recovering some ground to trade around \$70 a barrel.

It is now well below October's three-year highs above \$86 but still more than 30% up on the start of 2021.

The United States has repeatedly pushed Opec+ to accelerate output hikes as US gasoline prices soared and President Joe Biden's approval ratings slid.

Faced with rebuffals, Washington said last week it and other consumers would release reserves.

Fearing another supply glut, sources said the Organization of the Petroleum Exporting Countries, Russia and allies, known as Opec+, considered a range of options in talks on Thursday, including pausing their January hike of 400,000 barrels per day (bpd) or increasing output by less than the monthly plan.

But any such move would have put Opec+, which includes Saudi Arabia and other US allies in the Gulf, on a collision course with Washington.

Instead, the group rolled over its existing deal to increase output in January by 400,000 bpd.

"Politics triumphs over economics. Consumer countries mounted enough pressure," said veteran Opec observer Gary Ross. "But weaker prices now will only mean stronger later."

Ahead of the talks, US Deputy Energy Secretary David Turk indicated there might be flexibility in the US release of reserves, telling Reuters on Wednesday that Biden's administration could adjust the timing if oil prices dropped substantially.

Opec+ remains concerned that the Covid-19 pandemic could once again drive down demand.

Surging infections have prompted renewed restrictions in Europe and the Omicron variant has already led to new clamp downs on some international travel.

“We have to closely monitor the market to see the real effect of Omicron,” one Opec+ delegate said after the talks.

Opec+ ministers are next scheduled to meet on January 4, but the group indicated in a statement that they could meet again before then if the market situation demanded. Before this week’s talks Saudi Arabia and Russia, the biggest producers in Opec+ had both said there was no need for a knee-jerk reaction.

Commenting after the Opec+ decision, Russian Deputy Prime Minister Alexander Novak said the oil market was balanced and global oil demand was slowly rising.

Opec+ has been gradually unwinding record cuts agreed last year when demand cratered due to the pandemic, slashing output by about 10mn bpd, or 10% of global supply.

Those cuts have since been scaled back to about 3.8mn bpd.

But Opec+ has regularly failed to meet its output targets, producing about 700,000 bpd less than planned in both September and October, the International Energy Agency (IEA) says.

The West’s wasted crisis



The silver lining in the gloomy cloud of the pandemic was the opportunity it gave the West to mend its ways. During 2020, rays of light shone through. The European Union was forced to contemplate a fiscal union. Then, it helped remove Donald

Trump from the White House. And a global Green New Deal suddenly appeared less far-fetched. Then 2021 came along and drew the blackout curtains.

Recently, in its financial stability review, the European Central Bank issued an angst-ridden warning: Europe is facing a self-perpetuating debt-fueled real estate bubble. What makes the report noteworthy is that the ECB knows who is causing the bubble: the ECB itself, through its policy of quantitative easing (QE) – a polite term for creating money on behalf of financiers. It is akin to your doctors alerting you that the medicine they have prescribed may be killing you.

The scariest part is that it is not the ECB's fault. The official excuse for QE is that once interest rates had fallen below zero, there was no other way to counter the deflation menacing Europe. But the hidden purpose of QE was to roll over the unsustainable debt of large loss-making corporations and, even more so, of key eurozone member states (like Italy).

Once Europe's political leaders chose, at the beginning of the euro crisis a decade ago, to remain in denial about massive unsustainable debts, they were bound to throw this hot potato into the central bank's lap. Ever since, the ECB has pursued a strategy best described as perpetual bankruptcy concealment.

Weeks after the pandemic hit, French President Emmanuel Macron and eight other eurozone heads of government called for debt restructuring via a proper eurobond. In essence, they proposed that, given the pandemic's appetite for new debt, a sizeable chunk of the mounting burden that our states cannot bear (unassisted by the ECB) be shifted onto the broader, debt-free, shoulders of the EU. Not only would this be a first step toward political union and increased pan-European investment, but it would also liberate the ECB from having to roll over a mountain of debt that EU member states can never repay.

Alas, it was not to be. German Chancellor Angela Merkel summarily killed the idea, offering instead a Recovery and Resilience Facility, which is a terrible substitute. Not only is it macroeconomically insignificant; it also makes the prospect of a federal Europe even less appealing to poorer

Dutch and German voters (by indebting them so that the oligarchs of Italy and Greece can receive large grants). And, despite an element of common borrowing, the recovery fund is designed to do nothing to restructure the unpayable debts that the ECB has been rolling over and over – and which the pandemic has multiplied.

So, the ECB's exercise in perpetual bankruptcy concealment continues, despite its functionaries' twin fears: being held to account for the dangerous debt-fueled bubble they are inflating, and losing their official rationale for QE as inflation stabilises above their formal target.

The scale of the opportunity Europe has wasted became obvious at the recent United Nations Climate Change Conference (COP26) in Glasgow. How could EU leaders lecture the rest of the world on renewable energy when rich Germany is building lignite-fueled power stations, France is doubling down on nuclear energy, and every other EU member state saddled with unpayable debts is left to its own devices to deal with the green transition?

The pandemic gave Europe an opening to devise a credible plan for a well-funded Green Energy Union. With a eurobond in place, and thus liberated from the purgatory of perpetual bankruptcy concealment, the ECB could be backing only the bonds that the European Investment Bank issues to fund a Green Energy Union. So, yes, Europe blew its opportunity to lead the world by example away from its addiction to fossil fuels.

We Europeans were not alone, of course. As US President Joe Biden was landing in Glasgow, the usual corrupt congressional politics back home were uncoupling his already much-shrunken green agenda from a very brown infrastructure bill, placing climate change on the back burner. While the United States, unlike the eurozone, at least has a Treasury Department that works in tandem with its central bank to keep debts sustainable, it, too, has missed a magnificent opportunity to invest heavily in green energy and the high-quality jobs implied by the transition from fossil fuels. How can the West expect to persuade the rest of the world to embrace ambitious

climate commitments when, after two years of waxing lyrical about the green transition, Biden and the Europeans arrived in Glasgow virtually empty-handed? As 2021 winds down, Western governments, having wasted their chance to do something about the clear and present climate emergency, are choosing to focus on exaggerated worries. One is inflation. While the acceleration in price growth must be checked, the widespread comparisons with the stagflation of the 1970s are ludicrous. Back then, inflation was essential for a US actively blowing up the Bretton Woods system in order to maintain the dollar's "exorbitant privilege." Today, inflation is not functional to American hegemony; rather, it is a side effect of the US economy's reliance on the financialisation process that imploded in 2008.

The West's other constructed panic is China. Initiated by former US President Donald Trump, and zealously perpetuated by Biden, the emerging new cold war has an unacknowledged purpose: to enable Wall Street and Big Tech to take over China's finance and technology sectors. Terrified by China's advances, like a functioning central bank digital currency and a macroeconomic stance that is vastly more sophisticated than their own, the US and the EU are opting for an aggressive stance that is a mindless threat to peace and to the global co-operation needed to stabilise our planet's climate. A year that began hopefully is ending grimly. Western political elites, unable (and perhaps unwilling) to turn a deadly crisis into a life-preserving opportunity, have only themselves to blame. – Project Syndicate

? Yanis Varoufakis, a former finance minister of Greece, is leader of the MeRA25 party and Professor of Economics at the University of Athens.

The case against green central banking



The fact that central banks could use their limited policy tools to pursue climate targets does not mean that they should. There are far more effective climate measures available to fiscal policymakers and regulators, and central bankers already have enough on their plates.

NEW YORK – One way or another, central banks' behavior will have to change with the climate. But it should evolve only because climate change will create new constraints and drive new forms of public and private economic activity. Central banks' primary function should not change, nor should they adopt "green" targets that could undermine the pursuit of their traditional objectives: financial stability and price stability (which in the United States is a dual mandate of price stability and maximum employment).

Climate change will be a defining global issue for decades to come, because we are still a very long way from ushering in a low-carbon, climate-resilient world. Three features of our

greenhouse-gas (GHG) emissions will impede the appropriate response. First, the benefits (cheap energy) are enjoyed in the present while the costs (global warming) are incurred in the future. Second, the benefits are “local” (they accrue to the GHG emitter) while the costs are global – a classic externality. Third, the most efficient methods of limiting GHG emissions impose disproportionate burdens on developing countries, while the task of compensating poor countries remains politically fraught.

The most efficient way to address climate-change externalities is through targeted fiscal and regulatory measures. Pigouvian taxes or tradable quotas would create the right incentives for reducing GHG emissions. Carbon taxes, as advocated by William D. Nordhaus of Yale University, must become the global norm (though it is difficult to envisage a global carbon tax working without a significant transfer of wealth from developed to developing countries). Rules and regulations targeting energy use and emissions can complement green taxes and quotas, and public spending can support research and development in the green technologies that we will need.

What does not belong in the mix is a green mandate for central banks. To be sure, legal mandates can change, and central banks have a well-established tradition of exceeding them. The European Central Bank’s financial-stability mandate is secondary to – “without prejudice to” – its price-stability mandate. This did not prevent it from acting decisively and quite effectively during the global financial crisis, the eurozone sovereign debt crisis, and the COVID-19 crisis, even when this meant overriding the price-stability target in 2021 and likely also in 2022. Moreover, Article Three of the Treaty on European Union explicitly provides for “a high level of protection and improvement of the quality of the environment,” so it is easy to see how the ECB’s financial-stability and monetary instruments *could* be used to target climate change.

But that does not mean they should be used in this fashion.

The standard monetary-policy instruments (one or more policy interest rates, the size and composition of the central bank's balance sheet, forward guidance, and yield curve control) are typically used to target price stability or the dual mandate. Judging by the results, there is no spare capacity in the monetary-policy arsenal.

These monetary-policy instruments impact financial stability as well, and not always in desirable ways. In addition, capital and liquidity requirements underpin micro- and macroprudential stability; and central banks can impose additional conditions on the size and composition of regulated entities' balance sheets. As the lender and market maker of last resort, the central bank can choose its eligible counterparties, the instruments accepted as collateral or bought outright, and the terms and conditions on which it lends or makes outright purchases.

There is no doubt that climate change affects a central bank's price-stability objective, including through current and anticipated changes in aggregate demand and supply, energy prices, and other channels. Climate change also could significantly alter the transmission of monetary policy, and thus will have to become an integral part of the models that guide central banks in pursuit of their primary objectives.

Green issues also affect financial stability in major ways. Extreme weather events can damage assets held by financial institutions and their counterparties. Climate-mitigation and adaptation efforts can depress the value of assets, potentially leaving many "stranded" or worthless. A central bank's financial-stability mandate requires it to recognize and respond appropriately to the foreseeable effects that climate change will have on asset valuations and on the liquidity and solvency of all systemically important financial entities and their counterparties in the real economy.

But anticipating and responding appropriately to these risks

now and in the future does not mean that higher capital or liquidity requirements should be imposed on “brown” loans, bonds, and other financial instruments. Financial-stability risks and global-warming risks are not perfectly correlated. Moreover, there are no redundant financial-stability policy instruments, and capital and liquidity requirements have a clear comparative advantage in pursuing financial-stability objectives, just as carbon taxes and emissions-trading systems have a clear comparative advantage in pursuing and achieving “green” objectives.

The shocks and disruptions caused by climate change will complicate central banks’ pursuit of their price-stability and financial-stability mandates. The last thing they need is to feel pressure to load additional objectives on their limited instruments. Just as it makes no sense to use carbon taxes or emissions-trading schemes to target financial stability, it makes no sense to use capital and liquidity requirements to address global warming. The appropriate tools to address climate change – fiscal and regulatory – are well-known and technically feasible. What is missing is the foresight, logic, and moral courage to deploy them.

Can small nuclear reactors really help the climate?



Much of the world has been turning away from nuclear power, with its ageing plants, legacy of meltdowns and radioactive waste. But some governments, big companies and billionaires including Bill Gates and Warren Buffett are convinced the technology can help save the planet.

Unlike wind and solar sources, nuclear power can be switched on and off at any time, and without the planet-warming emissions produced by gas and coal.

Investments of hundreds of millions of dollars are going toward a new generation of so-called small modular reactors (SMRs), which ultimately could provide a safe and nimble source of carbon-free energy – if they can overcome challenges related to economics, safety and public opinion.

HOW SMALL IS SMALL?

Of the more than 70 such reactors that the International Atomic Energy Agency lists as in some stage of design or development, the smallest are less than 5m in diameter and 10m in height. (The plant that would be built to operate the reactor would be bigger, of course.)

SMRs typically have less than 300 megawatts of generating capacity, about a third of that of existing reactors. The “M” in SMR – modular – means these reactors can largely be built in factories and shipped in standardised parts for assembly on-site. That means shorter construction times and greater flexibility to expand to meet demand.

WHY AREN'T TRADITIONAL NUCLEAR PLANTS ENOUGH?

Since the Fukushima Dai-ichi meltdowns in Japan in 2011, there has been a dearth of investor interest in building expensive new plants, with China, Russia and India as notable exceptions.

Instead, utilities have gravitated toward carbon-intensive coal and gas plants to supplement less reliable solar and wind resources. That has led climate advocates such as James Hansen, one of the first scientists to publicly warn about the danger of global warming, to call for more nuclear energy.

DO SMRS ALREADY EXIST?

The only ones currently in commercial operation are two 35-megawatt units on a floating power plant deployed by Russia in the Arctic in 2020. China expects to begin trials in 2026 on an SMR being built near an existing power plant on Hainan island.

The first commercial SMR project in the US, planned for the site of the Idaho National Laboratory, will consist of six reactors capable of producing a combined 462 megawatts. It's supposed to be operational by the end of this decade.

ARE THEY SAFE?

Proponents say SMRs will be safer than earlier generations of nuclear power plants.

The basic idea remains the same – splitting atoms to release energy, a process known as nuclear fission, that heats water to produce steam that spins turbines to make electricity. About half of the SMR models under development use water as a coolant, as most currently operating reactors do.

Explosions at Fukushima and at Three Mile Island in the US in 1979 were caused by heat from exposed fuel rods splitting the hydrogen from the steam used to cool the reactor.

Some SMR designs, by contrast, use molten salt and metals as coolants. SMR designs also integrate new kinds of fuel and backup emergency systems that should reduce the likelihood of meltdowns.

On the other hand, smaller reactors would ideally be located closer to population centers, increasing the possible danger from an accident. And like their larger brethren, SMRs produce radioactive waste that must be stored safely for centuries.

WHAT ARE THE ECONOMIC CHALLENGES?

Cost competitiveness is an uphill climb. US manufacturer NuScale Power, to cite one example, is aiming for an SMR that can sell power for US\$55 per megawatt-hour.

Yet wind power in much of the world is now about US\$44 a megawatt-hour, solar is US\$50, and in some regions, renewable energy will be below US\$20 a megawatt-hour by the end of the decade, according to BloombergNEF.

A 2020 study by professors at the University of British Columbia found that on a lifetime basis, the cost of

electricity produced by SMRs could be 10 times greater than the cost of electricity produced by diesel fuel.

The economics might be more favorable when considering SMRs as alternatives to large-scale batteries to serve as at-the-ready backups for solar and wind power when the sun isn't shining or the wind isn't blowing.

WHO'S INVESTING IN SMRS?

Electricite de France, China National Nuclear, Japan's Toshiba and Russia's Rosatom are pushing SMR designs, as is NuScale. Gates and Buffett have teamed up to build and test a reactor at an abandoned coal plant in Wyoming.

Rolls-Royce Holdings raised £455 million (US\$608 million) to fund the development of SMRs, with almost half of the financing coming from the UK government. The Canadian and US governments have also offered hundreds of millions of dollars in subsidies to kick-start the SMR industry.

What's Behind Europe's Skyrocketing Power Prices



Europe's energy ambitions are clear: to shift to a low-carbon future by remaking its power generating and distribution systems. But the present situation is an expensive mess. A global supply crunch for natural gas, bottlenecks for renewable energy and wind speeds in the North Sea among the slowest in 20 years, idling turbines, have contributed to soaring prices for everything from electricity to coal. Governments are preparing to intervene if needed in volatile energy markets to keep homes warm and factories running.

1. What's the problem here?

Energy prices skyrocketed as economies emerge from the pandemic – boosting demand just as supplies are falling short. Coal plants have been shuttered, gas stockpiles are much lower than normal and the continent's increasing reliance on renewable sources of energy is becoming a vulnerability. Even with mild weather, benchmark gas prices traded as high as 100 euros per megawatt-hour on Oct. 1, the first day of the official heating season for the European energy markets. That's up almost 400% from the start of the year. Italy's ecological transition minister, Roberto Cingolani, said he

expected power prices to increase by 40% in the third quarter. In the U.K., CF Industries Holdings Inc., a major fertilizer producer, shut two plants, and Norwegian ammonia manufacturer Yara International ASA curbed its European production because of high fuel costs. Mining company Boliden AB says the record prices will boost costs for the industry for years to come.

2. What do gas prices have to do with electricity?

Some 23% of European Union electricity was generated from gas in 2019, just behind the 26% that came from nuclear plants. Electricity is very hard to store, which means that big swings in fuel costs translate quickly into price volatility. Large batteries exist, of course, and that technology is developing quickly, but it will be many years before they can offer serious storage capacity for renewable energy. Some European countries have become increasingly dependent on electricity exports from others with an abundance of power.

3. Why is there a supply shortfall?

Storage sites in Europe reached late summer, when natural gas inventories usually get replenished, at their lowest levels in more than a decade for the time of year. Supplies from Russia were limited because it was rebuilding its own inventories, while Norwegian gas flows were lower than average during maintenance work at its giant fields and processing stations. That said, prices in Europe would need to rise even higher in order to attract cargoes of liquefied natural gas away from Asia, where China is stockpiling to power its economy and build reserves for winter.

4. Why is China important for European energy markets?

It's by far the biggest consumer of energy and commodities in the world, and it has ordered state-owned companies to secure supplies at all costs.

5. How are power prices set in Europe?

Utilities and big companies buy and sell power years in advance, relying heavily on forecasts about the economy and long-term fuel costs. The broader European power market has traditionally been focused on the price for the following day, with auctions supplying a day-ahead price functioning as the benchmark. Traders submit bids and offers for each hour based on their calculations of supply and demand, and then an average price is calculated by the exchange handling that market. Consumer prices are set by state regulators after utilities request rate changes based on how much they've paid for wholesale power, transmission investments and overall upkeep of their grids.

6. What's new in the system?

The explosion of renewable energy, which is more intermittent than fossil- or nuclear-fuel generators. Because weather patterns can create big price shifts, markets for shorter time periods later the same day have also become vital.

7. How reliant is Europe on wind?

Northern coastal countries including the U.K., Germany and Scandinavian nations have become leaders in wind generation and technology. In Spain, the growth in wind and solar plants helped send its share of renewable energy to a record 44% of total power in 2020. France also is producing more power from wind, but its electricity generation is still dominated by nuclear plants.

8. Which countries are most at risk of running out of power?

Those with limited cable links to their neighbors. In a crisis, they are less able to benefit from Europe's interconnected market, which enables power to flow to where it's needed the most and where it fetches the highest price. Ireland's grid operator warned in September that there was a risk of blackouts due to lack of wind. Many U.K. plants are old and break down from time to time. If big outages coincide

with little wind or sun, the nation could be close to running out of electricity.

9. What does this mean for Europe's climate goals?

Renewable energy brings volatility, and that's going to make it very costly for the continent to reach its targets. In Germany, for instance, outgoing Chancellor Angela Merkel's energy policies have cost citizens hundreds of billions of euros in subsidies. EU climate chief Frans Timmermans has said higher prices must not undermine the bloc's resolve to expand renewable power and that the industry should speed up instead to make more cheap green energy available.

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