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ENERGY AND CLIMATE CHALLENGES WILL CONTINUE IN 2023

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Executive Summary

Russia's invasion of Ukraine a year ago turned global energy markets upside down. Although oil and gas prices have come down from their highest points and energy issues have faded somewhat from the news, the effects of the war in Ukraine on energy will continue and evolve in 2023.

Western oil consumers are trying a new tactic in response to Russia's aggression — weaponizing their collective energy demand by sanctioning Russian oil and oil products. Not only have Western buyers pledged not to buy Russian oil, but their insurance and shipping companies are forbidden to insure or carry Russian oil unless it is sold below a specified price cap. This is a unique response to a specific problem — the world wants Russian oil supply to keep prices reasonable, but also wants to cut an important source of financing for Russia's war machine. The measures' effectiveness is not yet clear. The cap on oil products, which just came into effect in early February,[1] is likely to have greater effect through 2023, as global diesel supplies tighten further, and Russia reduces refinery runs in response to falling demand for its products.

The world's first global natural gas crisis will continue, and perhaps worsen, during 2023. Before the war, Russia supplied nearly 40% of Europe's natural gas, but it has now nearly cut off supply in an attempt to weaken Europe's support for Ukraine in the war.[2] Liquified natural gas (LNG) has been a lifeline for Europe, but LNG markets have also spread the crisis globally, as Europe has pulled supply away from other consumers. Warm weather and conservation efforts have also helped Europe get through this winter without crisis, but next winter is likely to be more difficult. Demand for LNG will rise as China's economy recovers and no significant new LNG supply will come online in 2023, making for tight markets and high prices. Europe should be pleased with its situation today but must continue efforts to conserve natural gas through next winter at least.

If the current energy market challenges have a silver lining, it is that they have clarified the need to feed the energy system we have today as we work to transform the system to eliminate greenhouse gas emissions. The energy system cannot change overnight, and governments must consider future-friendly ways to meet today's demand.

Finally, 2023 will see continuing global efforts to combat climate change, culminating in the annual Conference of the Parties (COP) meeting. Progress at recent COPs has been primarily on the sidelines, with groups of countries aiming to help South Africa and Indonesia phase out coal use,[3] and with a group of countries working together to reduce emissions of methane, a potent but short-lived greenhouse gas. These side deals are attractive since they involve significant emissions reductions and large business opportunities. However, there's little incentive for side deals on the thorniest issues of climate justice — paying for green energy development in the poorest countries, along with helping them adapt to the ongoing effects of climate change. These issues are stuck in the official U.N. negotiating process, where the need for consensus makes progress extremely slow. A key measure of success at this year's COP would be getting help for the world's poorest out of the slow lane.

Introduction

The energy and climate world has been through wild experiences in the past three years — from the first pandemic year in 2020 when oil demand and greenhouse gas emissions plummeted as travel nearly stopped, through recovery in 2021, and on to geopolitical disruption in 2022 resulting from Russia's invasion of Ukraine. Although many in the industry might crave a return to some semblance of normalcy, 2023 also looks to be an eventful year. The implications of Russia's invasion of Ukraine will play out for some years to come in global oil and gas markets. Growing ambition in the transition toward a greener energy system is running headlong into tight supply chains, global inflation, and the challenge of funding the energy transition in the developing world.

The effectiveness and knock-on effects of the West's efforts to cut Russian energy revenues, how Europe balances its need for current energy supply with its climate change ambitions, and the ability of climate negotiations to include benefits for the world's poorest are my most important trends to watch during 2023 in the world of energy and climate.[4]

Energy security will remain central in 2023

The "energy trilemma" is a term often used to describe the challenge of supplying sustainable, secure, and affordable energy. The emphasis in recent years, especially in Organization for Economic Cooperation and Development countries, has been on sustainability. For example, the European Union's (EU) Fit for 55 plan promises a 55% reduction in greenhouse gas emissions by 2030, on the way to net-zero greenhouse gas emissions by 2050.[5] (The United States has similar goals.) Plummeting costs for renewable electricity have been making those goals more affordable. Between 2010 and 2020, solar electricity costs fell by 85% and wind electricity costs fell by 56%.[6] Renewable electricity today is often cheaper to produce than electricity from fossil fuels.

However, with Russia's invasion of Ukraine, beginning in February 2022, the secure portion of the energy trilemma has come to the fore. The resulting situation in energy markets is different from past crises, turning old ideas about energy security upside down. Before the invasion, Russia was the world's largest exporter of fossil fuels. Today, energy buyers in the Western world are trying to move away from Russian supply to prevent energy profits from funding the war in Ukraine. The effort is unprecedented, and Russia's days as an energy superpower may be coming to a premature end.

Sanctioning one of the world's largest oil producers

Global oil markets are experiencing something entirely new. For the first time, the world's largest economies have sanctioned a major oil producer. Oil consumers are weaponizing demand for oil to reduce Russia's profits and to cut funding available

for the war in Ukraine. This situation is unlike the oil embargo of 1973, when the Gulf Arab states withheld supply to punish Western states for their support of Israel during the Yom Kippur War.

Russian oil exports were mostly unsanctioned during the first months of the conflict. Many Western buyers moved away from Russian oil after the invasion, but others (especially China and India) continued to purchase oil from Russia at a discount. The overall increase in global oil prices meant that even discounted sales increased Russia's oil revenue.

In response to Russia's continuing oil profits, the European Union, G7 countries, and Australia moved in December 2022 to prohibit imports of Russian oil by sea and forbid their companies to finance and insure Russian oil shipments, unless the oil is priced at or below a specified price cap.[7] The logic behind this policy is that the world wants Russian oil to reach the market to avoid very high prices, but Western countries do not want oil profits to fund Russia's aggressions in Ukraine. In an important sense, the price cap is a loophole in the sanctions on Russia, designed not to prevent Russian oil sales, but to encourage them. Even for countries that do not participate in the sanctions or the price cap, if the cap pushes down the price they pay for Russian crude oil, its backers will consider it a success.

As I write this piece in early 2023, it's yet unclear how the policy will play out. Enforcement of the price cap is difficult and complex as it relies on each party in the supply chain to attest to compliance. Russian Urals crude oil is already trading at a price below the cap, making the cap somewhat irrelevant to Russia's profit levels. Nonetheless, Russian oil exports fell slightly during the first month the cap was in place and overall Russian revenue dropped by $3 billion, or nearly 20%, from the previous month.[8] This is taking place against the backdrop of a relatively well-supplied crude oil market — the price of European benchmark Brent crude has fallen by about $50 since its June 2022 peak of nearly $130 per barrel.[9] Maintaining compliance with the price cap would be more arduous in a tight market with buyers searching for supply.

In January 2023, 30% of Russian oil shipments were still being transported in European tankers. This figure is down from about half of shipments before the sanctions.[10] The fact that any oil is being shipped in European tankers is a sign that the sanctions and price cap are likely working — Russian oil is reaching the market via sanctioned shippers, presumably at prices below the cap. However, in retaliation for the sanctions, Russia promised to end shipments of oil to countries that abide by the price cap on February 1, 2023,[11] and subsequently announced an oil production cut of 500,000 barrels per day for March 2023.[12] Russia is also increasing its sales to countries that are not abiding by the cap, including China, India, and Turkey. U.S. Assistant Secretary of State for Energy Resources Geoffrey Pyatt recently noted that India is buying oil from Russia at a discount of about $15 per barrel, an outcome he considers a success.[13]

Another aspect of the sanctions took effect on February 5 when Russian refined products were included in the sanctions and price cap.[14] This could be even more challenging than the crude sanctions have been to date, especially for diesel fuel. Global markets for diesel fuel are very tight and diesel prices rose much more in 2022 than crude oil prices. Europe could be especially impacted since Russia has been the source of about half of Europe's diesel imports.[15] The sanctions and price cap have the potential to cause much more disruption in the tight market for diesel, where Russia has more leverage, than in the well-supplied market for crude oil. The lack of demand for Russian refined products due to the sanctions could reduce Russian refinery utilization and internal crude oil demand. This would have the desired effect of reducing Russian revenues but the undesired effect of tightening world markets for crude oil and refined products, potentially increasing prices for both.

Even if Russia is largely maintaining its sales of oil and oil products, a bifurcation in oil markets is beginning to take hold, between those happy to take Russian oil supply and those willing to avoid it, even at costs to themselves. This change is necessarily making the market less efficient — consider a tanker carrying Russian oil that used to go to Europe

making the long trip to India instead. Greater shipping costs are a drag on Russian crude oil prices, in addition to the price cap. As Western countries largely learn how to live without Russian crude oil and oil products, this less efficient market for Russian oil is likely to continue and put downward pressure on Russian oil profits for years, perhaps long after the war in Ukraine is over.

Uncertainty about Russian supply is currently unsettling oil markets, but oil supply during the energy transition will be a tricky business, with or without Russia. The future of oil demand is uncertain as the European Union, United States, China, and other large economies work to electrify their transportation sectors. The pace of this change is difficult to predict (although transportation policies certainly try to dictate it), creating challenges for oil companies' investment decisions. Additionally, banks and investment managers are under pressure not to make loans to or hold stock in the oil and gas sector.

The energy transition is often described as a way to move the world away from dependence on oil-rich countries, especially in the Middle East. Ironically, however, in the coming decades, the world might become more dependent on these countries to meet its remaining oil demand. The national oil companies in these countries are not dependent on shareholders or banks for financing and also have the lowest-cost oil reserves in the world. They are well-positioned to maintain production in these uncertain times.

Europe's natural gas crisis is not over

The Russian invasion of Ukraine has also brought about the first global natural gas crisis. Before liquified natural gas was widely traded, pipelines linked sellers and buyers of natural gas in a long-term exclusive relationship, rather like a marriage. Even after the advent of LNG, pipelines remained crucial — in 2020 pipelines supplied about three-quarters of Europe's imported natural gas, primarily from Russia.

The United States has long expressed concern about Europe's dependence on Russian gas, culminating in US opposition to the Nord Stream 2 pipeline project from Russia to Germany.[16] However, Russian gas supply looked like a great deal to many in Europe as it moves through its energy transition. Certainly, some worried about overreliance on Russia, but the pipes were already in the ground, supply had been mostly reliable, and the gas was relatively cheap. Germany, in particular, continued to support Nord Stream 2.

Russia began slowing deliveries of pipeline gas into Europe in the fall of 2021, well before it invaded Ukraine. Germany halted certification of the completed Nord Stream 2 pipeline in February 2022, just before the invasion, an unthinkable act just weeks earlier.[17] Over the following months, Russian gas supply to Europe slowed to a trickle, in retaliation for Europe's support of Ukraine in the war. Sabotage disabled the operating Nord Stream 1 and non-operating, but complete Nord Stream 2 pipelines from Russia into Germany in September 2022; the culprit is still unclear.[18] The situation in the European gas market is the opposite of that in oil markets, with Russia weaponizing gas supply by withholding it from Europe, rather than the Western world weaponizing oil demand.

Going into the winter, Europeans were concerned not just about high natural gas prices, but of actual shortage, potentially requiring shutdowns of gas-reliant industry. In response, the European Union established a plan for member states to reduce their gas demand 15% by March 2023 and prioritized sectors to receive gas in case of shortage.[19] Subsidies are also softening the blow of tight supply and high prices, but at great expense to EU governments. Subsidies and other policies to cope with the natural gas crisis are 1.7% of GDP in Germany, 2.3% in Spain, 2.8% in Italy, and Greece has the highest subsidy level at 3.7% of GDP.[20] A price cap for natural gas in the EU came into force on February 15, although there are concerns that entities will work around the cap if necessary to secure supplies, potentially harming the functioning of the EU gas market.[21]

In addition to financial impacts, reduced natural gas supply required some difficult decisions by the EU and member governments. For example, Germany extended the lives of its last three nuclear power plants by several months, until April 2023.[22] The EU is favoring the development of natural gas supply in the Eastern Mediterranean and North Africa and more LNG receiving facilities in Europe.[23] Coal consumption in Europe increased in each of the last two years as a substitute for natural gas in power generation (and to make up for shortfalls in French nuclear power generation).[24] Each of these decisions would have been nearly unthinkable before the crisis.

LNG has been a savior for Europe in these last few months, although there is not enough LNG in the world to make up for the total loss of Russian pipeline gas. Europe's LNG imports increased by 65% in 2022 over their 2021 volume. The United States was the largest supplier, supplying more than 40% of the total.[25] Europe managed to enter the winter heating season, when natural gas demand is highest, with more than 90% of its reserve storage capacity filled.[26] The EU and United Kingdom have enough storage capacity to cover about 21% of their average annual gas demand.[27] Increasing the amount of storage isn't on the table, but Europe has issued new regulations mandating levels of storage at certain points in the year.[28]

But the advent of LNG trading means that Europe's supply crunch is now rippling through global natural gas markets. LNG customers in Asia, Africa, and Latin America are seeing very high prices as the world's flexible LNG cargoes go to Europe to capture higher prices there. Even in the United States, with its massive natural gas production, parts of New England that rely on LNG owing to a lack of pipeline infrastructure have seen record-high natural gas prices this winter.[29]

A combination of warm weather and efforts to conserve and replace natural gas have kept European gas demand this winter lower than average and averted a crisis. In fact, natural gas prices in Europe are now below their prewar level.[30] If these trends continue, storage could exit the winter approximately half full.[31]

However, I fear that Europe has not yet seen the high point of natural gas prices. A slowdown in China's economy due to COVID helped to keep LNG prices down somewhat in 2022, but China's economy looks to be rebounding as the population recovers from a burst of infections. New LNG receiving terminals are coming online in Germany, but global competition for LNG to feed those terminals is likely to be fierce. No new LNG production facilities are coming online in 2023, meaning that the global market is expected to be tight, and expensive. And there is no guarantee that the weather will cooperate next winter, as it has during this one. Europe seems poised to get through this winter comfortably but cannot let down its guard or pull back on demand reduction programs in advance of next winter.

Energy transition is the answer to multiple questions

Clearly, an energy system based on renewable electricity and other non-fossil sources prevents geopolitical dustups over fossil fuels, but the world just isn't there yet. Even for renewable electricity, which is affordable and feasible today, the transition takes time and investment capital. In other industries, the technologies to move away from fossil fuels are immature, such as those required for steel or ammonia production. Other uses of fossil fuels are diffuse and particularly time- and resource-intensive to replace. For instance, natural gas heating is prevalent in much of Europe. Changing to electric heat pumps means replacing the heating systems in millions of individual homes and businesses. Europe has used conservation and fuel switching as strategies to alleviate the current crisis, but a complete switch away from natural gas will take many years.

The great challenge for policymakers and the energy industry is that the world wants more fossil fuels right now, but not forever. We need to feed the energy system we have today while we work to transform it into the system we want for the future. In the meantime, it's helpful to remember that the goal is fighting emissions, not fossil fuels.

The key to supplying the energy system we have while transitioning toward the energy system we want is to find ways to meet current needs in future-friendly ways. This involves avoiding actions that lock-in fossil fuel infrastructure, through financial or technical means. Financially, that might mean structuring financing and contracts for new LNG import facilities in Europe such that they can recoup their costs faster. This would allow investors to achieve a return on their investment while still shutting down the facility when it is no longer needed or wanted. From a technical perspective, it might involve building natural gas pipelines that could carry hydrogen in the future. Not all natural gas infrastructure can be adapted to hydrogen because hydrogen is a much smaller molecule that is more prone to leaks, and hydrogen requires different metallurgy to prevent pipelines carrying it from becoming brittle and cracked. But if pipelines are designed to carry hydrogen up front, they could be repurposed later. Even running coal plants past their planned retirement dates, or turning on retired coal plants, could be good decisions in the short term. Although these plants will result in greater greenhouse gas emissions now, they are an inexpensive way to keep the lights on in a time of crisis, allowing focus on investments for the future that might result in lower greenhouse emissions over the long haul.

Europe is going through a particularly difficult time when achieving all three energy supply goals — sustainable, secure, and affordable energy — seems nearly impossible. Nonetheless, a future energy system less dependent on fossil fuels will be less prone to crises such as the one we are currently experiencing. Europe and the rest of the world can weather the energy market storm caused by Russia's aggression in Ukraine and come out stronger in the end. But a clear-eyed view of energy supply through the transition is the key to achieving this happy outcome.

Climate diplomacy: Likely more of the same at COP28 in the UAE

The United Nations' annual climate summits (Conference of the Parties meetings, or COPs) are where the world discusses the difficult issues related to mitigating climate change and dealing with the reality of a changing climate. The 2023 edition, COP28, will take place in the United Arab Emirates, beginning in late November. This COP will face the same obstacles as those in the past: relying on a cumbersome, consensus-based decisionmaking process to solve one of the world's thorniest problems.

One of the saddest aspects of the climate challenge is that the world's poor bear the worst burden of a changing climate — droughts, floods, heat waves, and other climate-related disasters, along with human migration that occurs as a result of these disasters. This situation epitomizes how climate change is fundamentally an issue of justice. On the one hand, the wealthy world is responsible for the lion's share of emissions in the atmosphere today, and thus the level of climate change happening now. On the other hand, developing nations contributed very little to today's climate change, and are least able to afford the investments needed to fortify themselves against a changing climate and to cope with today's climate-related disasters. Dealing with these issues is critical to a just response to climate change, but today's negotiation mechanisms are poorly designed to meet such sticky challenges.

Consensus is required on all official decisions at the COPs, meaning that progress is typically slow and incremental. Overnight negotiating sessions and last-minute changes to key words and phrases are common, and the resulting agreements generally represent the least common denominator. For instance, no COP document has yet stated the need to phase out fossil fuels (without greenhouse gas

emissions mitigation), the primary driver of global climate change. Instead, the strongest statement to date has called for "phasing down" the use of coal.[32]

This year's COP takes place in one of the world's largest oil exporters. The UAE has been very supportive of renewable energy development, but a strong push to phase out unmitigated fossil fuel use is unlikely this year as well. However, the UAE has the money and wherewithal to move the energy transition forward and has signaled that it wants this to be a COP focused on action.

In addition to the difficult official negotiations, COPs have become global gatherings of business leaders, bankers, politicians, civil society representatives, and scientists. More than 35,000 people attended COP27 in Egypt in 2022, less than half of whom represented governments taking part in the official negotiations.[33] Some of the most interesting agreements connected to recent COPs have come from side meetings, including the Global Methane Pledge and agreements for funding to eliminate coal in South Africa and Indonesia. Arguably since the Paris Agreement was completed in 2015, most of the progress at COPs has occurred outside of the official process.

These side agreements are successful because they don't have to achieve the consensus required in the official UN process. Coalitions of the willing can agree to take action without concern about whether recalcitrant countries will get on board. Additionally, business and NGO communities can help broker deals, provide financing support, and add creativity. Smaller, more specific agreements can be proving grounds for new financing and emissions reduction strategies.

Positive developments on the sidelines are encouraging and represent serious commitments to emissions reduction, but they continue to leave the world's poorest behind. Although climate suffering is most acute among the poor, the financial losses from climate change will be largest in the wealthy world, because there is more there to lose. Thus, deals with developing and middle-income countries tend to focus on very large countries, with significant emissions to mitigate. These markets also offer large business opportunities, and the prospect of positive cash flows from clean energy investments can be attractive to investors if the agreements have components to mitigate risk.

The most important climate justice issues, however, often do not meet the conditions necessary for a successful side deal. The unheralded work of developing low-carbon energy systems in the poorest parts of the world offers neither large cash flows nor significant emissions mitigation, the attributes that have made existing side deals attractive. Adaptation projects in developing countries have similar drawbacks, with their returns in the form of avoided damage rather than bankable cash flows. Finally, payments for climate-related loss and damage in countries that contributed very little to the greenhouse gases in the atmosphere today is a matter of justice and fairness, but also a pure liability that no business deal will ever manage.

These key justice issues are left to the official COP negotiations, where progress is slow, consensus is required, and promises are often not kept. At COP15 in Copenhagen, wealthy countries promised to deliver $100 billion in annual climate funding to the developing world by 2020.[34] That commitment is yet to be met.

At COP27 in 2022, countries did make progress on a key climate justice issue — loss and damage. Wealthy countries agreed to set up a fund to compensate developing countries for climate-related losses and disasters. This is a huge step. The United States and the European Union are the two largest cumulative emitters of greenhouse gases over time, but both went into the conference opposed to the measure. Despite this bit of progress, the agreement neither established any mechanism for making deposits to the fund nor for countries to apply for money from the fund. That issue was left to COP28. Once again, the developing world must wait for the consensus-based process to play out.

I see no simple solution to this problem. I have often written and spoken that the real action at the COPs is on the sidelines, as a way of expressing optimism in light of the slow action in the negotiating room. But as time goes by, I understand a key limitation of this approach — by its nature, it leaves out the poor. Amending the Paris Agreement to require such action is a non-starter since the voluntary nature of the Paris Agreement is what allowed it to succeed in the first place. Perhaps wealthy countries can consider adding a side dish of funding for the poorest countries as they negotiate their side deals for emissions reduction, maybe as a pledge taken on by a group of wealthy countries — an often mentioned "climate club." The emissions reductions and business opportunities in poor countries are smaller, but the justice issues should not be ignored. Applying lessons learned in larger developing countries to their smaller, poorer counterparts is a key action to achieving a truly just energy transition and preventing the worst effects of climate change for everyone.

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