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2024 Aspen-Columbia Global Energy Forum Report

**Managing a just and affordable clean energy transition
in the era of energy security and geopolitics**

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Executive Summary

In a year in which almost half the world's population was heading to the polls, energy security, inflation, and economic competitiveness are high on the agenda. These issues are supercharged not only by the transition to a new energy system but also by the increasing frequency and severity of extreme climate events, with 2024 on track to be one of the hottest years on record.¹

The 2024 Aspen-Columbia Global Energy Forum took place against this backdrop on June 5–7, 2024, in Rio de Janeiro, Brazil. This annual convening jointly organized by the Aspen Institute and Columbia University's Center on Global Energy Policy SIPA gathered leaders from government, civil society, industry and academia under the theme “**managing a just and affordable clean energy transition in the era of energy security and geopolitics.**” A guiding principle of the Global Energy Forum, and part of the reason why it took place in Brazil this year, is the belief that North-South dialogue is key to solving the climate crisis. A list of participants, the agenda, and sponsors is provided at the end of this report.

Under the principles of non-attribution, this report summarizes the rich discussion at the 2024 Aspen-Columbia Global Energy Forum, which centered around the following topics: (i) scaling up finance for the energy transition in emerging market and developing economies (EMDEs), (ii) green industrial policy and the redefinition of trade, (iii) what the 28th meeting of the Conference of the Parties' (COP 28's) “Transitioning Away from Fossil Fuels” means for the oil and gas industry, (iv) Brazil's energy transition and climate policies and lessons for other EMDEs, (v) the geopolitics of the energy transition, and (vi) challenges and opportunities in the development and processing of critical minerals in EMDEs.

Key takeaways are summarized here:

- 1. Investment in clean energy is accelerating but remains uneven and insufficient to align with a net-zero scenario.** Clean energy investment now needs to move into areas of the economy that provide more risk and/or lower returns. This includes scaling finance in emerging markets and developing economies where the high cost of capital and currency risk remain a major obstacle. Given the tight fiscal space in EMDEs, redirecting fossil fuel subsidies into clean energy could unlock additional sources of local financing.
- 2. Multilateral development banks (MDBs) and development finance institutions need new strategies to mobilize private capital, including in cofinancing structures with EMDEs' development banks.** Blended finance has largely failed to take off, although it still could prove an important model to mobilize more private capital in EMDEs. Phasing out coal in EMDEs will be harder than many assume and will require new financing solutions. Carbon credits for early phaseout could be part of the incentives, underscoring the unrealized potential of carbon markets to mobilize capital in EMDEs.
- 3. Industrial policy has made a comeback** as a way for advanced economies to achieve progress on climate while addressing geopolitical competition. Some EMDEs believe that Europe's carbon border adjustment mechanism (CBAM) is discriminatory and needs to be paired with time, and capital, for countries to comply with European standards. Most EMDEs also lack the fiscal space to match the scale of subsidies in the United States (U.S.) Inflation Reduction Act (IRA) and are excluded due to local content requirements. The net effect of industrial policy in advanced economies could be an outflow of capital from EMDEs.

¹ Austyn Gaffney, “2024 on Track to Be the Hottest Year on Record,” *New York Times*, August 8, 2024, <https://www.nytimes.com/2024/08/08/climate/heat-records-2024.html>.

4. **Trade and climate are on a collision course, with a debate around whether the World Trade Organization (WTO) is still the right forum to provide solutions. Yet the global economy desperately needs new trade rules** given that trade is a key requirement for net-zero targets. In the meantime, protectionism might delay the energy transition, making clean energy technologies less fungible and more costly to produce. Protectionism could also fracture supply chains and lead to unintended geopolitical risks. This is already occurring, with Chinese overcapacity pouring into EMDEs, placing pressure on nascent clean energy supply chains, and potentially leading to deepening energy dependence on China. While many EMDEs see Chinese overcapacity as a serious issue, many also believe it is still outweighed by the benefits of open trade and investment.
5. **Oil and gas companies are putting the brakes on renewables given the lack of compelling returns.** This shift in strategy is currently being rewarded by equity markets. While most base case scenarios forecast oil demand peaking in the early to mid-2030s, there is significant uncertainty about the outlook thereafter. Uncertainty may already be impacting longer term capital allocation in the lower margin segments of the value chain such as refining. Base case scenarios of “business as usual” for oil demand in the medium term also do not consider how continued fossil fuel consumption could impact climate change. Unmitigated climate change could severely impact markets, economic growth, health, national security, and politics and thus ultimately affect demand.
6. **In the near term, the oil and gas industry has a gigaton-level opportunity to reduce methane emissions.** National oil companies (NOCs) can be key actors in these efforts. In the longer term, questions remain around which oil producers will be the last ones standing. The answers to those questions will entail difficult trade-offs between cost, emissions, energy security, geopolitical, and equity considerations.
7. **Multinationals see Brazil as an immense laboratory to test and scale technologies** given that the country’s power sector already operates with 80 percent plus renewables and is supported by a massive, integrated, and high-tech transmission system. These successes are a testament to Brazil’s strong policy framework and energy planning. Brazil’s biofuels sector is another outcome of sustained industrial policy. While exports of low-carbon goods represent a huge opportunity for Brazil, they require an international trading system that rewards goods produced with a lower carbon footprint (i.e., a green premium).
8. **Global geopolitical competition seems to be a headwind for the path to net zero and for economic growth in EMDEs.** Some believe that China’s non-market behavior is creating major threats to the energy transition. Yet China’s dominance over many clean energy technologies is unlikely to change in the near term. While some believe that EMDEs might have an opportunity to leverage competition between the Group of Seven (G7), China, and so-called middle powers, acting strategically as “swing states” to maximize investment, others see risks to that strategy.
9. **Governments face a series of difficult trade-offs in scaling the production of critical minerals** while minimizing their environmental impact and ensuring local communities capture a fair share of the value. Countries are also increasingly attempting to create more diverse and resilient critical mineral supply chains. There is an increasing likelihood that efforts to diversify mineral supply chains will create bifurcated markets to reflect higher sustainability standards and geographic origin. However, it remains unclear whether end users will be willing to pay for the resulting cost premia.
10. **U.S. elections in 2024 could have a significant impact on U.S. climate targets, North Atlantic Treaty Organization (NATO), European security, permitting reform, and the review of a U.S.-Mexico-Canada trade agreement.** Elections might not make much difference on the overall trajectory of U.S. trade policy but rather its intensity. Some participants believe there will be less potential impact on U.S. oil and gas production or on the fiscal support for certain clean energy technologies.

Scaling Up Finance for the Energy Transition in EMDEs

Investment in clean energy is accelerating but remains insufficient and uneven. Investment in clean energy is on track to reach a record \$2.0 trillion in 2024 according to the International Energy Agency (IEA).² Of total spending in energy today, about half is from private companies, one-third from governments, and 18 percent from households.

Some of the most significant progress has occurred in the power sector. Eighty-six percent of new power capacity added in 2023 was from renewables.³ Solar power was the main winner, with more new solar generation capacity added in 2023 than additions from all other renewable generation combined.⁴ Grid investment also picked up from around \$300 billion in 2019 to likely around \$400 billion in 2024, reflecting an acknowledgment that grids must be upgraded to meet rising electricity demand.⁵

Only several years ago, there was a roughly equal amount of investment in clean energy and fossil fuels. Today, investment in clean energy is now double the investment in fossil fuels. But investment in clean energy must still increase by \$2.5 trillion annually to reach the \$4.5 trillion required in a net-zero scenario.⁶ The challenge is that capital now needs to move into areas of the economy that provide more risk and/or lower returns.

Last year, 98 percent of renewable deployment came from solar and wind.⁷ Moving forward, capital will also need to go into technologies such as geothermal, bioenergy, carbon capture, and green hydrogen. Yet the economics in many of these areas are often not favorable for final investment decisions. Other areas of investment are equally important for a net-zero pathway but often do not receive adequate focus. One of these is ancillary infrastructure, which in some ways is the “great invisible” in the conversation around clean energy investment.

Investment needs to flow toward not only new technologies but also new jurisdictions. EMDEs (ex-China) were expected to receive only \$320 billion in clean energy investment in 2024.⁸ That needs to rise closer to \$1.5 trillion by 2030.⁹ EMDEs only represent 15 percent of clean energy investment despite holding one-third of the world’s gross domestic product (GDP) and two-thirds of its population.¹⁰ Africa, for example, has comparative advantages for solar generation due to its abundant sunshine and low land costs but only added 2.7 gigawatts of renewables in 2023, which was less than 1 percent of global capacity additions.¹¹ Investment in new technologies and countries also faces a headwind from inflation and interest rates, which disproportionately impact EMDEs.

² IEA, *World Energy Investment 2024*, June 2024, <https://www.iea.org/reports/world-energy-investment-2024>.

³ International Renewable Energy Agency (IRENA), “Record Growth in Renewables, but Progress Needs to Be Equitable,” March 27, 2024, <https://www.irena.org/News/pressreleases/2024/Mar/Record-Growth-in-Renewables-but-Progress-Needs-to-be-Equitable>.

⁴ IEA, *World Energy Investment 2024*.

⁵ Ibid.

⁶ IEA, *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach*, September, 2023, <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach>.

⁷ Lucia Fernandez, “Renewable Power Capacity Additions Worldwide in 2023, by Technology,” Statista, August 23, 2024, <https://www.statista.com/statistics/1394145/global-renewable-capacity-additions-by-source/>.

⁸ IEA, *World Energy Investment 2024*.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

Private capital is essential for EMDEs to finance the energy transition, but existing policies and financial instruments are not mobilizing enough investment. Governments can respond by adopting key fiscal measures and focusing on reducing country-specific risk. Phasing out fossil fuels subsidies in EMDEs could unlock further resources for the energy transition while leveling the playing field with clean energy technologies.

State-owned capital currently accounts for about one-third of investment in clean energy in EMDEs, compared to 14 percent in advanced economies.¹² There is little fiscal room for further state spending, especially given that debt-to-GDP ratios are hovering around 75 percent in EMDEs. The next decade needs to see a surge in private capital to fill clean energy financing gaps in EMDEs. Yet EMDEs are struggling to mobilize long-term, patient private capital.

Most of the cost of capital for clean energy technologies in emerging markets is explained by country-specific risk.¹³ This includes macroeconomic risk, sovereign risk, and currency risk. In comparison, only a smaller percent of risk comes from project- and sector-specific issues.

Currency risk plays a particularly prominent role in EMDEs. Many emerging markets cannot provide investors with a way to hedge their currency and often struggle with more volatile currencies, compounding the issue. Even in EMDEs that do offer such hedging, it is prohibitively expensive.

Policymakers have an important role in reducing risk and mobilizing private capital. Countries could potentially see the best returns from ensuring macroeconomic stability; a clear, stable, and predictable regulatory framework; and a competitive business environment.

Other fiscal tools could also have a meaningful impact. These include phasing out fossil fuel subsidies (despite the political challenges) and enacting a carbon pricing system. Targeted tax reductions are also an option in specific areas such as clean energy investments and infrastructure.

One example is Colombia, where tools such as long-term power purchase agreements and renewable purchase agreements, paired with carbon pricing, are estimated to increase investment in renewables from a negligible level up to around \$2 billion in 2024.¹⁴ These fiscal tools could also help countries access international financing from multilateral development banks.¹⁵

Multilateral development banks, development finance institutions (DFIs), and national development banks (NDBs) can mobilize more private capital by increasing cofinancing, offering more risk insurance, and improving tools for currency hedging.

Currently, every dollar invested by MDBs in emerging markets is mobilizing less than one dollar of private capital.¹⁶ MDBs are also heavily inclined to provide concessional loans denominated in hard currency and often will not lend in local currency.

One participant at the Global Energy Forum argued that MDBs are risk averse and often try to maintain risk exposure even more conservatively than a AAA rating would require. This leads to investments in renewable projects that are often already derisked. Although such an investment strategy looks good on a balance sheet, it might be less effective at accelerating the energy transition. Another participant commented that not all the loans from multilateral and development finance institutions are concessional and almost all the debt is in hard currency or the currency of donors.

¹² Ibid.

¹³ IEA, *Reducing the Cost of Capital*, February 2024, <https://www.iea.org/reports/reducing-the-cost-of-capital>.

¹⁴ United States Agency for International Development, "The Economics of Renewable Energy Auctions," <https://www.usaid.gov/energy/colombia-clean-energy-future/economics-auctions>.

¹⁵ For example, the International Monetary Fund has \$40 billion committed to help countries in cases where climate change could impact balance of payment but access to that capital is conditioned on fiscal reform.

¹⁶ Kriztina Tora and Gila Norich, "Time to Accelerate," GSG Impact, December 2023, https://www.gsgimpact.org/media/ycr11amn/time_to_accelerate_gsg.pdf.

Despite all the talk about blended finance, it has largely failed to take off and only led to \$15–\$20 billion in annual investment over the last couple of years.¹⁷ Strengthening EMDEs’ national development banks and increasing partnerships between those banks and DFIs could help mobilize more private capital. In Brazil, the National Bank for Economic and Social Development (BNDES) is one of the world’s largest national development banks and has over \$150 billion of assets under management.¹⁸ BNDES benefits from robust funding, understanding of the local context, and agility in granting approvals.

Countries can not only learn from BNDES but also think about how NDBs could cofinance with DFIs. Many DFIs are constrained by their lack of ability to provide concessional finance, equity, or debt in local currency. However, these institutions can still play an important role in mobilizing private capital through political risk insurance and a signaling effect to investors. Partnerships between NDBs and DFIs could provide a more holistic package of benefits and a stronger likelihood of attracting private capital.

MDBs can also play a larger role in currency hedging. While the cost of hedging is often very high for a single currency, it is much more economic to hedge a basket of currencies. Some MDBs are now working on creating one-stop shops for risk instruments and evaluating how else to play a better role in this area. More still needs to be done and more quickly.

Phasing out coal in EMDEs will be harder than many assume and will require country-led platforms. Various participants in the Global Energy Forum agreed that phasing out coal is an urgent priority to reduce emissions. Yet there was also a fair dose of caution about how difficult it is to phase out coal in EMDEs. Coal is deeply embedded in many EMDEs and involves a large value chain with many workers, communities, and interests. Disassembling this value chain will inevitably create challenges, particularly as it competes with economic development.

Indonesia, for example, has built many coal-fired plants in the last few decades, and the average age of the coal fleet is only 13 years old.¹⁹ In comparison, the average age of the United States’ coal fleet is 45 years old.²⁰ The cost of phasing out an average coal-fired plant is thus far higher in Indonesia. Additionally, Indonesia is made up of 17,000 islands. This necessitates a unique grid in which fossil fuel generation located next to demand could offer an advantage over scattered renewable generation spread across large distances.

There is also an unanswered question around who will finance the phaseout of coal in EMDEs and a gap between ambitions and capital. Most finance is currently geared toward commercial viability. While this is fine for renewables, it does not work for phasing out a new coal plant.

A financial alternative could be to offer special drawing rights for long-term loans. But some participants in the Global Energy Forum noted that there is likely not much appetite for this. A better approach could come through carbon credits. Oil companies, for example, could help finance the early decommissioning of coal-fired power plants by purchasing credits.

Coal plays different roles in different countries. In Brazil, coal has a minimal impact on the power sector. In Colombia, the growing attractiveness of renewables helped accelerate the phaseout of coal through the expansion of renewable auctions. But in countries such as Indonesia and South Africa, the context is quite different and more challenging. Policymakers can account for these differences by convening country-led platforms to design customized policies and build a project pipeline that connects finance to renewable generation and the phaseout of coal.

Functional carbon markets can accelerate decarbonization but will need stronger disclosure, standards, and taxonomies to reach their full potential. While participants in the Global Energy Forum highlighted barriers to carbon credits, many

¹⁷ Natasha White, “Wall Street Helps Build \$15 Billion Pot of Blended Finance,” Bloomberg, April 30, 2024, <https://www.bloomberg.com/news/articles/2024-04-30/wall-street-helps-build-15-billion-pot-of-blended-finance>.

¹⁸ BNDES, “The Brazilian Development Bank,” https://www.bndes.gov.br/SiteBNDES/bndes/bndes_en/.

¹⁹ Thang Nam Do and Paul J. Burke, “Phasing Out Coal Power in Two Major Southeast Asian Thermal Coal Economies: Indonesia and Vietnam,” *Energy for Sustainable Development* 80 (2024): <https://doi.org/10.1016/j.esd.2024.101451>.

²⁰ U.S. Energy Information Administration, “Of the Operating U.S. Coal-Fired Power Plants, 28% Plan to Retire by 2035,” December 15, 2021, <https://www.eia.gov/todayinenergy/detail.php?id=50658>.

were optimistic about the role that carbon markets can play for lowering emissions. Some participants argued that carbon markets are a market-based solution to mobilize private finance into EMDEs and reduce emissions at a relatively lower price.

There are still concerns around carbon credits and nature-based credits in particular. Nature-based credits are increasingly a reputational and legal risk for companies. However, a participant noted that some financial institutions are finding nature-based solutions to be an investable asset class. Certain projects such as deforestation credits carry more substantial reputational risk. Reforestation, in contrast, may be more reputable, although it requires time and patient capital.

Taxonomy plays an understated role for efficient carbon markets. Unclear taxonomy makes it difficult to fully mobilize investment in crucial areas. For example, until recently in the Association of Southeast Asian Nations (ASEAN), there was a long period of uncertainty around whether financing a coal exit would qualify for carbon credits. The quicker these questions are identified and resolved, the more efficiently climate finance can be deployed.

Green Industrial Policy and the Redefinition of Trade

Industrial policy has made a comeback but is generating international tensions and showing signs of going rogue.

Climate policies are only sustainable if they can function within a country's political context. The new wave of green industrial policy seems to tick that box. Policies have sought to align climate with popular electoral values around reshoring jobs and strengthening national security. This is helping to build an electoral coalition for green industrial policy.

While green industrial policy has its strengths, there are also valid criticisms emerging from EMDEs. Policies such as Europe's carbon border adjustment mechanism are viewed by some as discriminatory. Many EMDEs lack European standards and will require time, and capital, to comply. While CBAM is imposing higher standards, Europe is not pairing it with the finance needed to help EMDEs decarbonize. Some participants in the Global Energy Forum highlighted that this policy approach is often viewed as unilateral and unfair.

Policymakers in the United States and Europe argue that new industrial policies even the playing field with imports that are subsidized and lack strict environmental and labor standards. CBAM, for example, is seen by many in Europe as a positive measure to levelize production costs (European companies already pay a carbon tax) and incentivize decarbonization.

Yet the industrial policies that are striving to "level the playing field" with China might be creating an uneven playing field between advanced economies and EMDEs. This unevenness threatens to widen economic inequality. Most EMDEs lack the fiscal space to match the scale of subsidies in legislation such as the Inflation Reduction Act. As a result, investment is at risk of flowing away from EMDEs and into advanced economies. Meanwhile, many EMDEs are left out of industrial policy incentive frameworks due to local content requirements. The net effect may be an outflow of capital from EMDEs to richer countries with greater fiscal flexibility.

Some participants in the Global Energy Forum argued that if industrial policy continues its current trajectory, it could even harm the long-term interests of the advanced economies that are deploying it. This could occur through various avenues.

Tariffs and local content requirements in advanced economies, for example, might be beginning to cause Chinese overcapacity to move into EMDEs. Most of these countries lack the domestic industries and political support to levy tariffs on Chinese goods. As a result, cheap Chinese products are placing pressure on nascent clean energy supply chains in EMDEs. This could lead to less diversification in the long term and cause EMDEs to deepen their dependence on China.

EMDEs are responding by creating their own policies to attract clean energy supply chains. Since most EMDEs lack the fiscal space to deploy meaningful subsidies, policymakers are turning to export restrictions as an industrialization tool, as seen with critical minerals.²¹ These restrictions may have their logic at a domestic level but could slow the energy transition.

As trade grows more fractured, there is a serious risk of fragmentation in supply chains. Rising protectionism is making clean energy technologies less fungible and more costly to produce.

Industrial policy in advanced economies might also be leading to resentment from the rest of the world. In the United States, the Biden administration often underlines the importance of global alliances. But one participant in the Global

²¹ Jared Cohen, "Resource Realism: The Geopolitics of Critical Mineral Supply Chains," Goldman Sachs, September 13, 2023, <https://www.goldmansachs.com/insights/articles/resource-realism-the-geopolitics-of-critical-mineral-supply-chains>.

Energy Forum debated whether U.S. climate policy is helping to rebuild, or actually undermining, the strength of those relationships.

Trade and climate are on a collision course. Every country has its own rationale and perspectives, and its actions are often logical measures to secure its own self-interests. Yet there is a major disconnect between policies that prioritize self-interest and policies that generate the speed and scale needed to meet climate targets. Nonetheless, advanced economies are showing no signs of backing down from industrial policy. For the moment, there are few other politically acceptable ways to achieve at least some progress on climate.

While the global economy desperately needs new trade rules, it is unclear whether the World Trade Organization is any longer the right forum. The period of globalization from the late 1980s to the early 2010s led to increases in global trade and economic growth.²² The WTO played an essential role during this period. It established a multilateral forum for discussion, upholding rules that most countries could agree on. Multilateralism created a benchmark of discipline in trade policy. In theory, countries could not just act unilaterally and do what they wanted. There were clear rules to follow.

Yet various participants in the Global Energy Forum argued that the WTO had major, and perhaps even irreparable, flaws. Some participants discussed how in the United States both political parties seem to agree that the WTO failed to adequately address issues of non-market forces and Chinese overcapacity. There is also a belief that the WTO was not ready to meet the challenge of climate change. In Europe, there is more rhetorical commitment to multilateralism. But some participants believe that Europe has also become a global leader in enacting unilateral policies that have a huge impact on trade yet are made in the name of climate, such as CBAM, the new deforestation regulation, and other product standards. In advanced economies and EMDEs alike, it seems there is an increasing belief the WTO is losing the capability to properly enforce trade rules.

The collapse of the global trade system is coming at an inconvenient time for climate. Trade is a key requirement for net-zero targets. No country can do everything on its own. One participant cautioned that as multilateralism gives way to unilateralism, it seems inevitable that trade will decline and tensions will grow as countries pursue their self-interests without shared rules or a common system.

Participants in the Global Energy Forum were divided when it came to choosing the best path forward and determining the future role of the WTO. One large camp was pessimistic about the WTO. These participants reasoned that the global trade system failed in key areas over the last few decades and is simply too difficult to reform. According to this view, the old model of globalization is not coming back. Countries need to accept that there will not be some idealized version of a perfect playing field.

A more practical approach expressed by some participants is to prioritize getting different systems, such as the IRA and CBAM, to talk to each other. Full harmonization would be complex since each country needs to cater to its domestic politics. Rather than harmonization, participants stressed the need for interoperability. CBAM is already difficult enough for compliance; more regulatory fragmentation between countries would be a nightmare for trade. Countries can also promote bilateral trade through creative mechanisms such as limited free trade agreements. The United States is experimenting with this approach for countries seeking to qualify for IRA Section 30D credits.²³ Japan has signed such an agreement, and more could be on the horizon after elections in November.

Another group of participants argued that the WTO could play a more useful role if countries pursue creative technocratic work-arounds. These could include using a three-quarters majority for certain interpretations rather than having

²² Douglas A. Irwin, "Globalization Enabled Nearly All Countries to Grow Richer in Recent Decades," Peterson Institute for International Economics, June 16, 2022, <https://www.piie.com/blogs/realtime-economics/2022/globalization-enabled-nearly-all-countries-grow-richer-recent-decades>.

²³ Office of the United States Trade Representative, "United States and Japan Sign Critical Minerals Agreement," March 28, 2023, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/march/united-states-and-japan-sign-critical-minerals-agreement>.

to gain consensus. Additionally, countries could continue using defensive measures more assertively and creatively. Technocratic work-arounds will not fix core challenges but could produce positive change at the margin.

The third camp of participants in the Global Energy Forum argued that, rather than seeking to work around the WTO, countries could try to create real reform that builds a stronger system, addressing considerations around nonmarket forces, overcapacity, and climate change. Proponents argued that productive trade requires rules and standards that all countries abide by. Otherwise, trade policy could enter a negative spiral that is harmful for geopolitics, climate, and development. Options for WTO reform could include modifications to Articles 20 and 21, which may allow for climate-related exceptions given climate's role as a global public good.

In the eyes of many EMDEs, Chinese overcapacity is a serious issue but is outweighed by the benefits of open trade and investment.

Chinese policymakers are signaling that they will continue to invest in clean energy manufacturing, particularly as the country sees slower growth from its construction sector.²⁴ Chinese investment will also likely continue to play a large role in EMDEs. Most EMDEs welcome Chinese capital and are not enacting capital controls. From their perspective, according to some participants in the Global Energy Forum, it seems that the balance of trade and investment with China is still net positive.

Some countries such as Mexico must be careful navigating Chinese investment given their proximity to the United States. Other countries such as Brazil might be generally less concerned about Chinese foreign direct investment. In Brazil's case China, not the U.S., is the country's largest foreign investor and trade partner.²⁵

In fact, Brazil provides a prime example of the dynamic between EMDEs and China where two things can be true at once—while Chinese overcapacity threatens Brazil's bid to produce green technologies, Chinese investment supports it.

Chinese overcapacity in solar panels and other clean energy technologies is beginning to cause a surge in imports of cheap Chinese products.²⁶ One participant cautioned that this is threatening the competitiveness of nascent Brazilian producers. Domestic industry groups have called for tariffs, and some limited measures have been adopted.²⁷ But the scale of tariffs is likely too small to have an impact.

Participants in the Global Energy Forum noted that there might be a perception in EMDEs that the United States and Europe are unwilling to invest capital at scale and across different sectors, while China, by contrast, continues to actively invest in EMDEs.

²⁴ Bloomberg News, "China Slams G-7 for 'Hyping' Overcapacity as Trade Tensions Soar," May 27, 2024, <https://www.bloomberg.com/news/articles/2024-05-27/china-slams-g-7-for-hyping-overcapacity-as-trade-tensions-soar>.

²⁵ Bernardo Caram, "Chinese Investment in Brazil Plunges 78% in 2022, Hits Lowest Since 2009," Reuters, August 29, 2023, <https://www.reuters.com/world/china/chinese-investment-brazil-plunges-78-2022-hits-lowest-since-2009-2023-08-29/>.

²⁶ Lais Martins and Luo Jieqi, "With the Reintroduction of Import Taxes on Chinese Solar Panels, Brazil Hopes to Develop Its Own Industry," Global Voices, June 5, 2024, <https://globalvoices.org/2024/06/05/with-the-reintroduction-of-import-taxes-on-chinese-solar-panels-brazil-hopes-to-develop-its-own-industry/>.

²⁷ Leticia Fucuchima and Peter Frontini, "Brazil to Resume Import Taxes on Solar Panels, Wind Turbines," Reuters, December 12, 2023, <https://www.reuters.com/business/energy/brazil-resume-import-taxes-solar-panels-wind-turbines-2023-12-12/>.

What Does COP 28's "Transitioning Away from Fossil Fuels" Mean for the Oil and Gas Industry?

The discussion in the forum underscored the tensions between “business as usual” scenarios that show a transition away from oil and gas looks premature, along with the consequences for climate change of such scenarios.

Some scenarios based on the world's current trajectory usually predict oil demand will rise from today's level, peak in the early 2030s, plateau, and then begin a slow decline. In many of these scenarios, oil demand does not drop below 100 million barrels per day until 2050.

Various reasons were presented to explain the potential for oil's stickiness. One participant estimated that approximately 600–650 million new passenger vehicles will be sold over the next 25 years due to growing global population and higher income. Oil demand from heavy-duty vehicles, petrochemicals, and aviation is also difficult to substitute. Even in countries such as Norway, where more than 90 percent of new vehicle sales are electric, oil demand is still relatively unchanged.²⁸

For some participants “business as usual” scenarios see stable oil demand over the next few decades, with natural gas seeing an even stronger outlook than oil. However, these scenarios assume that the world will function in the future as it does today.

One participant mentioned that such scenarios seems incongruous with studies on how climate change could affect markets, health, national security, and many other key areas of daily life. If the world continues to consume as much fossil fuels as it does today, it will not reach its climate targets. And if it does not reach its climate targets, it will not have life as usual. For this participant “business as usual” fossil fuel demand is incompatible with “business as usual” daily life, citing Stein's Law: “if something cannot go on forever, it will stop.” Climate change could cause disruptions that take us away from a “business as usual” scenario.

Some participants in the Global Energy Forum were unsure what exactly could cause demand for oil and gas to decline in the future. Some hypothesized that climate events could cause shifts in public opinion that could motivate political action. It is difficult to know what the tipping point will be. The world is facing a choice between acting preemptively to reduce fossil fuel demand or waiting to see whether the severity of future climate events is enough to motivate action. A proactive approach is likely a far less costly and disruptive route.

While oil and gas will continue to serve as the foundation of the global energy system, as the energy transition unfolds, there is uncertainty over the pace of decline and thus the required level of long-term capital expenditure. Investment in oil refining could be a leading indicator of the industry's future.

Participants in the Global Energy Forum speculated that the global oil market will likely stay balanced in the near term as growth from countries outside the Organization of the Petroleum Exporting Countries (OPEC) keeps pace with growth in global demand. This creates a conundrum for OPEC, which must decide between either increasing quotas and losing market share or raising production and lowering prices.

²⁸ Dan Eberhart, “Electric Vehicles No Magic Bullet for Curbing Oil Demand,” Forbes, September 5, 2023, <https://www.forbes.com/sites/daneberhart/2023/09/05/electric-vehicles-no-magic-bullet-for-curbing-oil-demand/>.

One participant speculated that the global gas market could remain tight through 2025. In the medium term, approvals in liquefied natural gas (LNG) projects could see LNG capacity rise 50 percent by 2030, led by Qatar and the United States with unclear consequences for future prices. One participant stated that natural gas could play a key role in power generation in Europe and the United States, both of which are phasing out coal just as they confront growing electricity demand powered by data centers and AI.

Most base case scenarios currently forecast fossil fuel demand peaking in the early to mid-2030s, before slowly declining thereafter. But the rate of decline is highly variable across different base cases and, more importantly, between base case scenarios and low-emission scenarios such as the International Energy Agency's "announced pledges" and "net-zero" scenarios.

Amid this uncertainty, capital allocation decisions are currently made based on stated policies, not on announced pledges or net-zero scenarios. However, certain trends could help reveal where markets are headed. Investments in oil refining might be one such leading indicator.

One participant noted that most international oil companies (IOCs) seem to no longer be making large investments for new refinery capacity. Lower investment in refining could imply a belief that oil demand from light vehicles may be nearing its peak. Refinery expansions are still occurring in some EMDEs, mainly driven by national oil companies that often do not have the same capital discipline of private companies and IOCs.

Oil companies typically generate the largest profit margin in the upstream segment of the value chain. By contrast, downstream (refining) is typically a low-margin business. Profitability in refining is significantly impacted when refinery assets operate at low utilization rates. In Latin America, for example, many refineries currently run at 50–60 percent utilization according to one participant and are therefore akin to stranded assets.

A participant in the Global Energy Forum noted that private oil companies and IOCs may now be beginning to realize they are no longer in a growth industry. Their capital allocation strategies may be thus increasingly shaped by capital discipline, shifting investment only to where it is required and concentrating on high-margin segments. This strategy, according to the participant, has led to continued investment upstream but a shift away from investments in refining.

The question around which oil and gas producers will be the last ones standing brings difficult trade-offs between cost, emissions, energy security, and equity considerations.

Even with inroads in carbon capture, sequestration, utilization, and storage, transitioning away from oil and gas demand as agreed in COP 28 is key to meet the targets of the Paris Climate Agreement. This raises questions about which countries and companies will be the last remaining oil and gas producers and how that will be determined.

In a world with entirely free markets, the last producers will be those with the lowest marginal cost of production. Leaving the allocation of production to markets will be the cheapest route. But most of the lowest cost oil and gas producers are in the Middle East, potentially leading to a high concentration of production and causing renewed threats to global energy security.

An alternative approach is to allow companies with the lowest emissions to be the last remaining oil and gas producers. This approach would be most conducive to lowering global emissions. The downside is that many of the lowest emissions producers are also the lowest cost producers, leading once again to a high geographic concentration of production.

Countries could also prioritize energy security and each seek to maintain some level of production. According to one participant, this is likely the most politically palatable solution. In the United States, for example, there will be much political resistance to offshoring oil and gas production, both due to concerns over employment and energy security. However, if every country prioritizes energy security, the global market will likely be oversupplied.

The last oil and gas producers could alternatively be determined based on equity. Under this approach, priority would go to countries with a shorter history of production, countries in which oil and gas are most vital to state revenue, and

countries with lower incomes. The risk is that these countries could spend scarce resources building infrastructure, only to find out that the rest of the world is still unwilling to stop its own production of oil and gas. This would then turn investments into uneconomic, stranded assets.

Companies and governments need to build resilience given high levels of uncertainty in oil demand. IOCs and NOCs should practice capital discipline and strengthen cash flow due to the lack of profitable alternatives. While governments should improve risk management, they face political obstacles to preemptive policy.

Some participants agreed that oil and gas producers face tremendous uncertainty over demand, particularly post-2030 given the lack of clarity about the timing and pace of the energy transition, with some believing that when uncertainty is high, entities must prepare for worst-case scenarios.

One participant offered the case of Venezuela as a case study of what could happen when an oil producer is unprepared for such stress test scenarios. Venezuela saw a collapse in oil revenues, and the country spiraled into a severe economic crisis that led to a humanitarian crisis. The irony was that as production and oil revenues fell dramatically in Venezuela and the NOC faced severe financial distress, methane emissions increased significantly since there was no capital investment in the safety and maintenance of operations.²⁹

Many IOCs and NOCs have the project management skills, engineering expertise, and capital budgets to do well in renewables. But renewables do not offer the same return on capital as fossil fuels do today. Some companies have nonetheless taken creative measures. For example, Ecopetrol (Colombia's NOC) acquired a 51 percent stake in Colombia's largest transmission company.³⁰ While the new returns are lower than those of fossil fuels, they help diversify Ecopetrol's portfolio and offer it exposure to a growing area of the energy sector such as the power sector.

However, many IOCs are putting the brakes on investment in renewables. Companies lack compelling returns on capital from alternative options and are rewarded by the market for doubling down on fossil fuels. If IOCs and NOCs are not diversifying, they can at least prepare for the future through capital discipline, argued one participant. This requires maintaining strong balance sheets and high levels of liquidity. In a scenario of increasing difficulty accessing capital markets, strong balance sheets will then become paramount.

For oil producing countries, there is a need to use higher rents today to save for the future and diversify their economies. The difficulty in executing this strategy is not technical but political. Many EMDE governments, including oil producing countries, are currently struggling with fiscal deficits while also facing demands to increase spending given social pressures, weak incumbents, and frequent election cycles.

The oil and gas industry has a gigaton-level opportunity to reduce emissions from methane.

Methane from oil and gas production accounts for nearly 2.4 gigatons, or 5 percent, of global greenhouse gas emissions.³¹

The world has now entered what one participant framed as the "Methane Moment" because of heightened awareness, improved measurement techniques, the availability of solutions, and recognition that the problem can be solved. Today, there are few gigaton-level decarbonization opportunities. Methane is one of them. Reducing methane emissions is one of the most important climate actions that can be done this decade. Various participants in the Global Energy Forum argued that as long as oil and gas are produced, they should be produced as responsibly as possible.

There have been significant milestones to countering methane emissions in recent years. These include monitoring initiatives such as the Oil and Gas Methane Partnership 2.0 (OGMP 2.0), which has over 140 members in more than 70

²⁹ Brian Nathan et al., "Assessing Methane Emissions from Collapsing Venezuelan Oil Production Using TROPOMI," *Atmospheric Chemistry and Physics* 24, no. 11 (2024): <https://acp.copernicus.org/articles/24/6845/2024/acp-24-6845-2024.pdf>.

³⁰ Oliver Griffin et al., "Colombia's Ecopetrol to Buy Government Stake in ISA for \$3.58 Billion," Reuters, August 11, 2021, <https://www.reuters.com/article/business/colombias-ecopetrol-to-buy-government-stake-in-isa-for-358-billion-idUSKBN2FD023/>.

³¹ Oil and Gas Climate Initiative (OGCI), "Tackling Methane Emissions," <https://www.ogci.com/methane-emissions/learn-more-about-methane-emissions>.

countries.³² It also includes technologies, such as the methane satellite that will enter the public domain in 2025, cover 80 percent of global oil and gas production, and provide much more granularity than current satellite technology.³³

Companies have also made progress. The Oil and Gas Climate Initiative includes 12 companies with over 30 percent of global production.³⁴ In just seven years, these companies have reportedly reduced methane emissions by nearly 50 percent.³⁵

While reducing methane emissions is an accessible opportunity, it will not necessarily be easy. One of the main barriers is helping NOCs reduce emissions, especially since these companies produce over half of global oil and gas.³⁶ Most NOCs are subject to pressure for short-term political wins, making it difficult to execute long-term investment in methane abatement solutions. Participants outlined ways to help ensure progress in NOCs, including more pressure from investors and consumers and more support and technology sharing from joint-venture partners.

³² OGMP 2.0, “Our Members,” <https://ogmpartnership.com/our-member-companies/>.

³³ MethaneSAT, “The Satellite,” <https://www.methanesat.org/satellite>.

³⁴ OGCI, “About OGCI,” <https://www.ogci.com/about>.

³⁵ Ibid.

³⁶ IEA, *The Oil and Gas Industry in Net Zero Transitions*, November 2023, <https://www.iea.org/reports/the-oil-and-gas-industry-in-net-zero-transitions>.

Brazil's Energy Transition and Climate Policy: Lessons for Other EMDEs

Multinationals see Brazil as a laboratory to test and scale technologies. The country has found success when it combines industrial policy, comparative advantage, and private capital, leading to breakthroughs in the power sector and biofuels.

Brazil's power grid today operates on more than 80 percent renewable energy, compared to an average of 25 percent in the rest of the world.³⁷ The country has a massive integrated transmission system operated with data on the cloud, active participation of the private sector, and some of the world's largest high-voltage direct current lines.

Many of the successes in Brazil's power sector are linked to policy that actively encourages private sector participation. Transmission and renewable energy auctions have played a particularly key role in expanding private sector involvement while reducing risks.³⁸ Auctions have succeeded over alternatives such as feed-in tariffs and are now a clear model for attracting private capital in EMDEs. Other EMDEs can learn from Brazil's auction system and work toward improving open access, regulatory frameworks, and supporting infrastructure.

Brazil's biofuels sector is another unique example of using industrial policy to develop innovation based on comparative advantage. The country's ethanol program began because of concerns over energy security after the 1973 oil shock. Industrial policies such as government purchasing and concessional finance helped promote the sector.³⁹ But the focus on biofuels was also motivated by Brazil's comparative advantages in areas such as crop production, industrial capacity, and abundance of arable land. Additionally, the Brazilian government stimulated domestic demand for biofuels by incentivizing adoption of flex-fuel vehicles and creating auctions for biomass electricity.⁴⁰ The combination of comparative advantage and industrial policy has encouraged the private sector to step into, and even lead the development of, biofuels.

Participants in the Global Energy Forum were optimistic about biofuels and the role they can play in Brazil's economy and global decarbonization. Brazil is leading on processes such as second-generation ethanol from sugarcane, which can add complexity to the country's economy and create a pathway for more efficient biofuel production.⁴¹

Some international participants raised the issue of how Brazil solves the tensions between promoting biofuels and the risk of deforestation, which contributes over half of Brazil's emissions.⁴² Local participants pointed out that ethanol production in Brazil takes place far from the Amazon. Policy could play a role in expanding biofuel production without compromising land use by incentivizing expansions on degraded land, which could help reduce damage, promote rehabilitation, and leverage Brazil's 20-plus million acres of degraded land.

³⁷ IEA, "Brazil," <https://www.iea.org/countries/brazil>.

³⁸ Mauricio T. Tolmasquim et al., "Electricity Market Design and Renewable Energy Auctions: The Case of Brazil," *Energy Policy* 158 (2021): <https://www.sciencedirect.com/science/article/pii/S0301421521004286>.

³⁹ IEA, *Biofuel Policy in Brazil, India and the United States*, July 2023, <https://www.iea.org/reports/biofuel-policy-in-brazil-india-and-the-united-states>.

⁴⁰ Alexandra Chapman, "Brazil Favours Ethanol Cars as 2022 Flex-Fuel Vehicles Continue to Overshadow EVs," *Fastmarkets*, January 20, 2023, <https://www.fastmarkets.com/insights/brazil-favours-ethanol-cars-flex-fuel-vehicles-overshadow-evs/>.

⁴¹ Roberto Samora and Marcelo Teixeira, "BP Plans Foray into 2G Ethanol, Sustainable Jet Fuel with Brazil Base," *Reuters*, June 21, 2024, <https://www.reuters.com/sustainability/bp-plans-foray-into-2g-ethanol-sustainable-jet-fuel-with-brazil-base-2024-06-21/>.

⁴² Gregory Asner, "Measuring Carbon Emissions from Tropical Deforestation: An Overview," *Environmental Defense Fund*, https://www.edf.org/sites/default/files/10333_Measuring_Carbon_Emissions_from_Tropical_Deforestation--An_Overview.pdf.

Brazil's experience demonstrates the difficulty of ensuring that industrial policy is consistent yet adjustable.

While most of the discussion centered on the successes of Brazil's energy planning, there was also a discussion about challenges. Brazil has faced two main challenges with industrial policy in its energy sector that are interrelated but contradictory. First, the country has struggled to end or adjust inefficient pieces of industrial policy. Participants in the Global Energy Forum argued that cross-subsidies for distributed renewable generation, for example, create excess capacity, largely benefit high-income households, and outweigh subsidies to provide energy to low-income households. Local content policies are another example of policy that has had an impact but might create inefficiencies. However, subsidies and protectionist policies are often very politically difficult to end, even when they might be inefficient or no longer needed.

At the same time, participants noted that Brazil has also struggled in other areas due to a lack of continuity in industrial policy. Over the last few decades, changes in government have made it difficult to build on progress and created uncertainty for the private sector.

Governments face the challenge of providing policy stability while also adjusting policy in the face of changing circumstances and data. Brazil's history of industrial policy shows the difficulty of this trade-off. Given this challenge, participants noted that it is important for policymakers to communicate uncertainty, clarify how things could change, delineate factors that could trigger changes, and explain the rationale for changes once they are made. Defined time horizons and sunset provisions can also help navigate the political challenges of phasing out subsidies.

Brazil has an opportunity to accelerate its production and exports of low-carbon goods, but it is not able to exert a green premium for them. Achieving a green premium requires a trading system that rewards low carbon and a stronger domestic regulatory framework.

Brazil's large supply of renewable electricity can reduce scope 2 emissions across a range of goods produced domestically. Additionally, Brazilian goods can also have a low scope 1 footprint by integrating biofuels or green hydrogen (which Brazil is competitively positioned to produce) into production processes. If Brazil can leverage its ability to lower scope 1 and 2 emissions to increase its production of low-carbon goods, it could increase its economic prosperity and monetary stability, while contributing to global decarbonization.

International trade frameworks and Brazil's domestic regulatory framework are not currently set up to reward the country's comparative advantage in low-carbon production. Without a functional global carbon market, Brazil is not receiving a price premium for its low-carbon production. Additionally, some participants argued that a lack of global consensus around the role of biofuels in the energy transition limits Brazil's potential export market for its biofuels.

Participants in the Global Energy Forum stated that Brazil also needs to improve its certification, taxonomy, and traceability around production to mobilize for a future that rewards low-carbon production. Similarly, Brazil still lacks a clear regulatory framework around new technologies such as energy storage and data sovereignty for data centers. Participants noted that the country also lacks free trade agreements to improve market access and the tools needed to attract capital in clean energy value chains such as renewable manufacturing or critical minerals.

Regional power integration could have major operational and economic benefits for EMDEs if countries can overcome political and regulatory barriers.

Regional integration of power systems can have major benefits for EMDEs across South America, ASEAN, and Africa. Operationally, regional integration allows countries with different generation resources to integrate in a way that improves resilience, efficiency, and overall renewable utilization. Economically, regional integration lowers costs and improves efficiency by taking advantage of different electricity price and demand patterns across countries.

One participant at the Global Energy Forum speculated that politics, not economics, is the main challenge to regional

integration of power systems. Neighboring countries often have long-standing disputes that make integration politically difficult. The politics of exporting electricity is particularly complex because it often implies raising the price on domestic consumers at a specific moment to lessen the costs across all consumers on the integrated grid. While this is good for the whole system, it is difficult for politicians to justify during the specific moments when they raise prices for domestic consumers.

Different political cycles between countries and concerns over energy security can also harm the viability of long-term regional power projects. Unlike commodity markets, there is no fluid global market for electricity nor any ability to stockpile, so in an integrated grid, countries are vulnerable to one another. Additionally, most countries have different regulatory frameworks and economic models, which further complicates integration.

Nonetheless, Latin America offers positive examples of regional integration of power systems. Six Central American nations now have the Central American Electrical Interconnection System.⁴³ Argentina, Brazil, and Uruguay are also increasing trade with one another, which has been facilitated by quiet regulatory changes.⁴⁴ ASEAN is also making progress on integration. Moving forward, institutions such as MDBs will be important to help formulate more cross-border electricity integration by standardizing frameworks, financing infrastructure, and providing continuity across political cycles.

⁴³ Fabian Barrera, "Central American Electrical Interconnection System (SIEPAC)," IRENA, https://www.unescap.org/sites/default/d8files/event-documents/2-3_IRENA_Barrera.pdf.

⁴⁴ MercoPress, "Surplus from Electricity Exports Benefits Brazilian Customers," February 13, 2024, <https://en.mercopress.com/2024/02/13/surplus-from-electricity-exports-benefits-brazilian-customers>.

The Geopolitics of the Energy Transition: Elections, China, and the Rise of Middle Powers

According to several participants, elections in the United States in 2024 could have a significant impact on U.S. climate targets, tariffs, and rules of origin; a debatable impact on NATO, European security, permitting reform, and a U.S.-Mexico trade agreement; and maybe less impact on the trajectory of U.S. oil and gas production, American foreign investment, and existing climate legislation.

Conversation at the Global Energy Forum highlighted varying levels of uncertainty around the impact of the various elections taking place globally in 2024, with the U.S. election being the dominant point of discussion. Some participants believe that the outcome of the U.S. elections will determine whether the country remains within the Paris Agreement. While the election will not change the trajectory of U.S. trade policy, it will likely determine the magnitude of new tariffs and rules of origin on products, particularly in relation to China.

Participants were split on whether U.S. elections could lead to a withdrawal from NATO. The implications for European security, and the resulting impact on Europe's prioritization of climate issues, are therefore unclear. There was also debate over the impact of elections on permitting reform in the United States. Some believe that permitting reform is a bipartisan issue but might not be an equal priority of both parties. Likewise, participants speculated that the U.S.-Mexico-Canada trade agreement that will come under review in 2026 will be influenced by elections but that the outcome is uncertain irrespective of what happens in November.

Some participants noted that U.S. elections are less likely to influence areas that are either bipartisan or resistant to change. These include U.S. oil and gas production, the lack of a firm U.S. response to China's Belt and Road Initiative, and the continuity of recent green industrial policy. While all these issues could change at the margin, several participants in the Global Energy Forum believe that none of them will be fundamentally altered by elections.

Last, although sanctions on Russian oil and dedollarization are hot topics, both issues may be slightly less subject to change according to one participant. The U.S. price cap on Russian oil has not had a large effect on Russian export volumes or prices.⁴⁵ Meanwhile, although the global monetary system will continue to evolve, a participant argued that the power of the U.S. dollar will likely not fade away anytime soon due to the architecture of the financial system and a lack of viable alternatives.

Despite recent efforts to diversify supply chains, China plays a crucial role in the energy transition, and there are few signs that will change. To advance in the energy transition, a more targeted collaboration with China is needed while being assertive against nonmarket practices that distort prices and make it difficult for clean energy markets to mature.

Just this last year, two-thirds of global capacity additions in solar, onshore wind, and offshore wind came from China.⁴⁶

⁴⁵ Bloomberg News, "Russian Government's Oil Revenue Was Up Almost 50% in June," July 3, 2024, <https://www.bloomberg.com/news/articles/2024-07-03/russian-government-s-oil-revenue-was-up-almost-50-in-june>.

⁴⁶ Aiquin Yu et al., "China Continues to Lead the World in Wind and Solar, with Twice as Much Capacity Under Construction as the Rest of the World Combined," Global Energy Monitor, July, 2024, <https://globalenergymonitor.org/report/china-continues-to-lead-the-world-in-wind-and-solar-with-twice-as-much-capacity-under-construction-as-the-rest-of-the-world-combined/>.

In one year, China added the entire solar capacity of the second and third largest markets in the world combined. China currently has over half of the world's installed capacity in solar, onshore wind, and offshore wind.⁴⁷ It continues to lead the way in clean energy investment and deployment.

According to a participant, China's scale, investment, integration, and innovation make it nearly unbeatable in many clean energy technologies. Industrial policy in advanced economies is seeking to break China's grip on clean energy manufacturing, but this likely will take time.

Countries can continue moving in the energy transition by working with China in targeted ways and on targeted technologies. One participant noted that Chinese battery companies have some of the best battery technology available and the most competitive costs, underscoring that Western efforts to create cheaper or better batteries are likely too optimistic in the medium term. According to this participant, there could be room for some technical collaboration and technology licensing between Western and Chinese companies. Technical collaboration could increase the speed of deployment, lower costs, diffuse advanced technologies, build jobs, and create some room for more positive relations with China.

At the same time, other participants highlighted that some of China's nonmarket behavior is creating major threats to the energy transition and needs to be addressed. One participant labeled Chinese behavior in many areas not as "competitive" but rather as "anticompetitive" by overproducing, overinvesting, and overpushing products into the marketplace. A clear system of market prices is essential to a smooth energy transition. This participant argued that China's nonmarket behavior distorts the reliability and effectiveness of market prices. According to the participant, nonmarket behavior also leads to heavy concentration of clean energy manufacturing in China. And a situation in which 80–90 percent of global clean energy products are produced in China may ultimately be economically and politically unsustainable.

Countries need to more clearly define which areas of trade and investment with China present threats to national security and which areas offer more room for collaboration.

Several participants in the Global Energy Forum argued that many of the national security concerns guiding industrial policies in advanced economies are legitimate. Yet some participants warned that policymakers should also be wary of casting too wide a net. Countries need to clearly define which technologies and investments present serious threats to national security. For example, Chinese growth in advanced semiconductors has major implications for the United States' defense interests, according to one participant.

Steel and aluminum also have broad implications for industrial capacity and the defense industrial base. While these products may not warrant the same protections as advanced semiconductors, a participant contended that it is still important to ensure that domestic investments are not fatally undermined by foreign subsidies and excess capacity.

Opinions were more divided on electric vehicles, batteries, and solar panels. Every country wants to onshore more production of these technologies, but the national security implications are less clear. Companies will benefit from some degree of collaboration with China due to its leading technology, competitive prices, and willingness to invest. At the same time, countries could negotiate market access in areas where they have comparative advantage.

One participant maintained that arrangements with China can also be managed to reduce national security concerns for critical minerals. China has shown it is a willing investor in projects that require large capital expenditure and have high risk profiles. Here, according to the participant, some degree of risk sharing between Western and Chinese financiers could help increase supply with few national security concerns if the capital structure is well monitored.

These types of agreements can help defuse tensions while accelerating clean energy deployment. But they require creative negotiations and a clearer definition of what constitutes a legitimate threat to national security.

⁴⁷ IEA, *Renewables 2023*, January 2024, <https://www.iea.org/reports/renewables-2023>.

EMDEs face tactical opportunities within global headwinds. These opportunities include conditioning market access on investment, exploiting great power competition, and creating regional and South-South arrangements to attract clean energy value chains.

A move away from collaboration and toward global power competition seems to be a headwind for the path to net zero and for economic growth in EMDEs, but it could also create new tactical opportunities. One important area for progress could come from new engagement with China. One participant noted that China currently needs two things: export markets for its overcapacity and continued imports of products for its manufacturing base. EMDEs such as Brazil, Indonesia, and South Africa can play a key role in both arenas.

As they negotiate terms with China, these countries can find room to attract investment in areas that China would not instinctively invest in. Indonesia, for example, has successfully paired exports of nickel with a requirement that China invest in Indonesian nickel processing.⁴⁸ Likewise, a country such as South Africa could grant Chinese products access to the South African market under the condition of receiving financial and operational support to build its infrastructure to deploy clean energy technologies. This would be a win-win for the host country, China, and global decarbonization efforts.

EMDEs also have an opportunity to leverage competition between the G7, China, and so-called middle powers. Participants noted that EMDEs can strategically act as “swing states” that develop a strategy to hedge their bets and use competition to attract investment. Such a strategy comes with geopolitical risks that would need to be managed carefully.

Last, some participants in the Global Energy Forum outlined the need for more collaboration between EMDEs themselves. Many EMDEs are currently racing to attract clean energy supply chains. But building these supply chains requires scale, and few EMDEs have a comparative advantage across an entire supply chain. Rather, countries need to start evaluating how to pool their comparative advantages and divide supply chains in a way that could collectively boost their economies, reduce dependency on outside investors, and support the energy transition. This will undoubtedly imply political and coordination challenges but remains the highest potential path for EMDEs to play a larger role in clean energy manufacturing and deployment.

⁴⁸ Angela Tritto, “How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold,” Carnegie Endowment for International Peace, April 11, 2023, <https://carnegieendowment.org/research/2023/04/how-indonesia-used-chinese-industrial-investments-to-turn-nickel-into-the-new-gold?lang=en>.

Challenges and Opportunities in the Development and Processing of Critical Materials

Governments should focus their fiscal and regulatory frameworks for critical minerals to reduce the difficult trade-off between attracting private capital and upholding social and environmental priorities.

Governments face a series of trade-offs as they determine fiscal and regulatory frameworks for the mining sector. How can countries increase production while minimizing the impact on the environment? What mix of policies can ensure local communities capture a fair share of value while also establishing an attractive climate for investors? How can countries engage with global supply chains while not getting caught up in tension between the United States and China?

While various models of state intervention can work, any successful model will need to mobilize private investment. In the oil industry, the Middle East has had success tendering contracts for operational and technical services.⁴⁹ Norway, meanwhile, has found success taking a direct financial interest in projects to capture fiscal rent.⁵⁰ Indonesia has adopted a similar approach in the mining sector. The country first attracted private investors and then later created divestment requirements that gave state-owned enterprises a share of equity but left operations to private companies.⁵¹

Chile took a different approach with direct state participation. This model helped boost production in the 1990s but has struggled since then due to a lack of reinvestment.⁵² Yet Chile's copper sector has remained robust due to an array of other private producers. A clear institutional framework, stable rules of the game, and a reasonable tax burden have led to diversification in Chile's copper sector. Meanwhile, the country's lithium sector only has two legacy producers due to a complicated institutional framework and heavy state involvement.

Bolivia presents one of the least successful examples of nationalization, having de facto nationalized gas in 2006 before running out of investment due to changes in the fiscal regime.⁵³ It has similarly failed to produce lithium due to heavy state involvement, despite having the world's largest resources.⁵⁴ Participants noted that states cannot be too heavy handed and need to provide continuous room for private investment. This is particularly true in high growth areas such as lithium. Nationalization could have a greater chance of success, and a lower probability of impeding the energy transition, when it occurs in more stable areas of economic activity.

Last, various participants insisted that the state must play a leading role in environmental regulation. Some companies will voluntarily uphold strong environmental standards; however, this cannot be expected of all companies. In Indonesia, for example, it was noted that there are large differences between the environmental impact of Chinese operators and other international operators. Companies have an environmental duty, but the state has a responsibility to set standards. Similarly, governments must begin to find new, creative, and enforceable policy solutions for benefit

⁴⁹ Adam Powell, "Understanding Petroleum Regimes in the MENA Region," Al Tamimi & Co., <https://www.tamimi.com/law-update-articles/understanding-petroleum-regimes-mena-region/>.

⁵⁰ Norwegian Ministry of Energy, "The Government's Revenues," Norwegian Petroleum, <https://www.norskpetroleum.no/en/economy/governments-revenues/>.

⁵¹ Andrew I. Sriro, "Foreign Mining Divestment Requirements," Mondaq, March 20, 2024, <https://www.mondaq.com/mining/1440058/foreign-mining-divestment-requirements>.

⁵² International Copper Association, *The Impacts of Copper Mining in Chile*, 2018, <https://sustainablecopper.org/wp-content/uploads/2018/05/ICA-Summary-Documents-The-Impacts-of-Copper-Mining-in-Chile-FV-04.04.2018.pdf>.

⁵³ Caron Zissis, "Bolivia's Nationalization of Oil and Gas," Council on Foreign Relations, May 12, 2006, <https://www.cfr.org/background-er/bolivias-nationalization-oil-and-gas>.

⁵⁴ Sarah Esther Maslin, "The Lithium Curse: Why Bolivia Has Failed to Turn Minerals into Gold," *Economist*, May 30, 2022, <https://www.economist.com/1843/2022/05/30/the-lithium-curse-why-bolivia-has-failed-to-turn-minerals-into-gold>.

sharing with local communities. This will not come from the private sector by itself.

Countries cannot do everything, everywhere, all at once, and should focus mineral policy on areas of comparative advantage.

Advanced economies and EMDEs around the world are competing to attract all stages of mineral value chains. But according to a participant, these countries face two risks. First, their efforts might flat-out fail. Second, even if they do succeed, countries could incur large opportunity costs along the way. In the worst case, and perhaps in most cases, countries could both fail and incur opportunity costs.

Various participants in the Global Energy Forum highlighted the need for policymakers to regain a focus on comparative advantage. The United States and Europe, for example, will struggle to reindustrialize in mining and processing given the required costs and poor private returns. One participant believes that advanced economies might be better off allocating capital to EMDEs such as Brazil, which could diversify away from China at a lower cost and on a quicker timeline.

EMDEs also need to be aware of their limitations. Chile, for instance, is a major lithium producer and wants to use that lithium to produce batteries. But lithium is only one of many factors that determine the cost of batteries and Chile is far from battery end markets.⁵⁵ One participant argued that Chile would therefore be better off focusing on lithium production. As another example, India would have a comparative advantage in battery recycling due to its local talent and future market of end-of-life batteries. But it does not have the geology to do mining, nor should it invest excessive resources trying to incentivize that, according to one participant.

Scale will also be key as countries try to enter new parts of value chains. Indonesia displayed this with its success in nickel processing, where it had scale in geological resources, scale in nearby Chinese markets, and scale in Chinese investment. Few countries may be able to replicate this, and Indonesia itself has struggled to do so in other materials such as aluminum. Regional agreements could be a better path to scale. Countries can pool their markets and comparative advantages. That, however, will require more collaboration and less of a zero-sum attitude.

While the exact path is unclear, the prices, trade flows, and financing of critical minerals will likely further bifurcate over the next decade.

Several participants in the Global Energy Forum argued that the markets for critical minerals are likely to grow increasingly bifurcated over the next decade. This could occur through a dual pricing structure. But most market participants are still unwilling to pay a premium for sustainable supply, particularly on the spot market. A more likely outcome is that bifurcation will occur through trade policy and market access, which would ultimately feed back into prices.

Some participants were guardedly optimistic about the benefits of bifurcated markets. Many of the best practices in the mining industry, such as using dry stack tailings instead of tailings dams or practicing desalination instead of using fresh water, are expensive to implement. The problem is that there are currently few financial incentives for adopting these measures. While regulation is needed, too much regulation could slow the energy transition and raise costs. Bifurcated markets, if based on environmental standards, can add a price incentive for environmental best practice. Additionally, as financial institutions establish their own norms for investing in critical minerals, they too may create financial bifurcation by only investing in “green” projects.

Bifurcation is already beginning to occur due to local content policies such as those in the Inflation Reduction Act. Individual companies are also becoming more open to paying higher prices for assured, long-term offtake. To date, bifurcation is based more on local content policies than environmental and social standards. That logic holds up politically. But it may not be the most effective strategy for the energy transition. According to some participants, a shift toward incentives that are based on complying with shared standards, rather than exclusionary trade rules, could create a more productive system of market bifurcation for critical minerals.

⁵⁵ Nikhil Bhandari et al., “Batteries: The Greenflation Challenge,” Goldman Sachs, March 8, 2022, <https://www.goldmansachs.com/pdfs/insights/pages/gs-research/batteries-the-greenflation-challenge/report.pdf>.

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H.E. Rachmat Kaimuddin, Deputy, Ministry of Maritime Affairs and Investment, Indonesia
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Agenda

Wednesday, June 5, 2024

Opening Reception and Dinner

Thursday, June 6, 2024

Session 1 | Briefing Room

Moderator: Jason Bordoff and Mari Elka Pangestu

Energy markets remain vulnerable to supply and demand shocks caused by geopolitical and political risks, ongoing physical impacts of climate change, as well as high cost of capital. What are the major energy supply and demand trends in energy markets? How are energy markets adjusting to the heightened volatility and uncertainty ahead? What is the outlook for oil and gas demand and what does this mean for the energy transition? What are the major trends in energy investments? The past couple of years have seen explosive growth in renewables, particularly in the power sector and increasingly in EVs. Will this growth continue?

Discussants:

Lucila Arboleya, International Energy Agency

***Michael Cohen**, British Petroleum (bp)

Gauri Singh, International Renewable Energy Association (IRENA)

Session 2 | Scaling Up Finance for the Energy Transition in EMDEs

Moderator: Mari Elka Pangestu

Investments in the energy transition have picked up pace in advanced economies and China, but have stagnated at a low level in emerging markets and developing economies (EMDEs). To meet global climate goals, financing the energy transition in EMDEs is imperative given that they are already responsible for the bulk of emissions with the share rising. Higher cost of capital is a headwind to capital-intensive projects globally, but in EMDEs, the costs are magnified by many other risks, including currency, credit, operational, and regulatory. What can EMDE governments do to unlock the substantial amounts of investments needed? How can multilateral development banks (MDBs) and development finance institutions (DFIs) catalyze private capital flows into EMDEs more effectively? Why aren't de-risking mechanisms and blended finance approaches bearing as much fruit as expected? What is the role of other sources of financing, such as official development assistance, and local and regional development financial institutions? Can carbon offsets fulfill their potential as another financing vehicle for the energy transition? What are the lessons learned from one such effort, the "Just Energy Transition Partnerships" (JETPs)?

Discussants:

***H.E. Rachmat Kaimuddin**, Ministry of Maritime Affairs and Investment, Indonesia

Nadia Khawar, U.S. International Development Finance Corporation

Fábio Kono, National Bank for Economic and Social Development (BNDES)

Joaquim Levy, Banco Safra

Diego Mesa Puyo, International Monetary Fund (IMF)

* Participating Virtually

Session 3 | Green Industrial Policy and the Redefinition of Trade

Moderator: Jason Bordoff

The US Inflation Reduction Act and the EU's REPowerEU and Carbon Border Adjustment Mechanism (CBAM) have provided two models for how advanced economies can use industrial policy and trade measures to advance their climate and energy security goals. What has been learned so far about the effectiveness of these initiatives? What is the implication of such policies for EMDEs? How are advanced economies' industrial policies redefining supply chains through friend-and-near-shoring? How might the energy transition redefine regional integration and cooperation? How will global trade—and the rules and institutions that govern it—be impacted as a result of these state-led industrialization and carbon tariff policies? How should we view the recent U.S. decision to increase tariffs on Chinese clean energy products and the EU's investigation into Chinese electric vehicle subsidies in light of these broader shifts?

Discussants:

Julia Braga, Ministry of Finance, Brazil

***David Livingston**, Former U.S. Special Presidential Envoy for Climate

***Mike Pyle**, Former US Deputy National Security Advisor for International Economics

Trevor Sutton, The Center on Global Energy Policy at Columbia University's School of International and Public Affairs

Session 4 | What Does COP28 "Transitioning Away from Fossil Fuels" Mean for the Oil and Gas Industry?

Moderator: Jason Bordoff

COP28 concluded with an agreement to transition away from fossil fuels in the energy system in a just, orderly, and equitable manner, calling for accelerated action in this decade. What does this mean for the oil and gas sector? COP28 also saw the announcement of the Oil and Gas Decarbonization Charter, signed by 50 companies representing 40 percent of oil production, committing to drastically reduce methane emissions by 2030, with national oil companies representing 60 percent of the signatories. Is methane abatement the low-hanging fruit that it appears to be? What is the role of NOCs and IOCs in the future supply of oil and gas? What is the role of NOCs in the energy transitions of their own countries?

Discussants:

Verônica Coelho, Equinor Brazil

Viviana Coelho, Petrobras

***Tim Gould**, International Energy Agency (IEA)

Andrew Howell, Environmental Defense Fund

***Bjørn Otto Sverdrup**, Oil and Gas Climate Initiative (OGCI)

Forum Reception and Dinner

Friday, June 7, 2024

Session 5 | Brazil's Energy Transition and Climate Policy: Lessons for Other EMDEs

Moderator: Luisa Palacios

Brazil is one of the largest economies in the world, a large oil producer, and one of the world's largest food exporters. Home to the Amazon rainforest—the world's largest carbon sink—it is also among the 10 largest greenhouse gas emitters globally despite having a relatively green power grid. How will the country balance its energy transition in a just and orderly way? What lessons can Brazil offer other EMDEs on the institutional and infrastructure capacity needed to manage the reliability and affordability of the power sector amidst the physical impacts of climate change and a more diversified grid with an increasing share of non-hydro renewables? What are the roles of bioenergy and low-carbon fuels in Brazil's energy transition, and what lessons can Brazil also offer about the decarbonization of hard-to-abate sectors?

Discussants:

Thiago Barral, Ministry of Mines and Energy, Brazil

Andre Clark, Siemens Energy Brazil, Siemens

Paula Kovarsky, Raizen

Ludmila Nascimento, Vale

Session 6 | The Geopolitics of the Energy Transition: Elections, China, and the Rise of Middle Powers

Moderator: Jason Bordoff

Geopolitical factors such as the ongoing tensions between the US and China, Russia's war on Ukraine, and, more recently, the evolving conflict in the Middle East have the potential to impact the speed at which the energy transition evolves. The avalanche of elections this year might also curtail the current momentum of the energy transition. What is the likely impact of the US election on the country's climate policy and energy diplomacy? What kind of role is China playing in the energy transition and decarbonization efforts of EMDEs? The war in Ukraine has altered long-established patterns of trade, creating space for more South-South collaborations. A more assertive group of middle powers are intensifying calls for a rethink of global governance. What does this mean for the future of energy security and the risks of geopolitical fragmentation? As the energy transition evolves and the market share for oil and gas supply concentrates among the lowest-cost/lowest-carbon barrels (e.g., in the GCC), what will be the political and geopolitical implications for higher-cost oil and gas producers with stranded assets?

Discussants:

***Adnan Shihab Eldin**, Organization of the Petroleum Exporting Countries (OPEC)

Chris Garman, Americas Eurasia Group

***Kelly Sims Gallagher**, Tufts University

***Michal Meidan**, Oxford Institute for Energy Studies

Session 7 | Challenges and Opportunities in the Development and Processing of Critical Materials

Moderator: Mari Elka Pangestu

Critical minerals like copper, lithium, cobalt, and nickel, are essential to the energy transition. Many challenges remain for their development to meet the world's energy needs including how to mine these resources responsibly. How do price volatility and sustainability risks impact much-needed investments in the sector? What are the supply risks linked to copper and lithium production of which Latin America is a key producer? Can the geopolitical risks linked to China's dominant position in the refining of critical minerals and EV supply chains be addressed? And what is the role of China in the development of critical materials in emerging markets? Some mineral-rich countries are attempting to capture more value-added from the mining of these critical minerals through downstream diversification, is this working? Large consuming countries like the US are using fiscal incentives and trade barriers to incentivize their own sectors - is this working, and does it risk deepening the trade war with China? What is the impact of trade restrictions on the ability of advanced economies to develop supply chains in these clean energy technologies?

Discussants:

Matt Deyoe, Sigma Lithium

Juan Carlos Jobet, Universidad Adolfo Ibañez

Tom Moerenhout, Center on Global Energy Policy at Columbia University

Vitor Saback, Ministry of Mines and Energy

Alejandra Wood, National Copper Corporation of Chile (Codelco)

Closing Remarks and Forum Adjourns

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