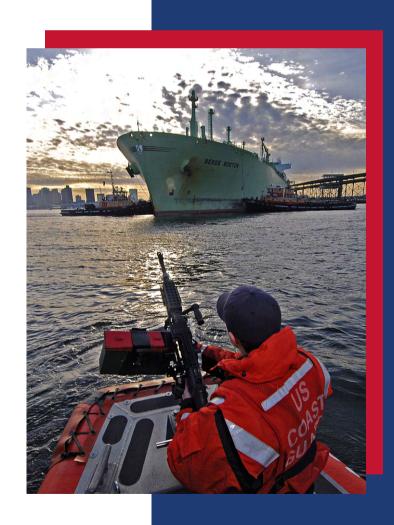
The U.S.-China LNG Export Dilemma

Reclaiming Leverage in an Imbalanced Trade Relationship

PERSPECTIVE





In this Report

In its attempts to reduce its trade deficit with China, the United States is sacrificing its strategic advantage in global energy markets. Rather than building its dependence on U.S. supply, cheap LNG exports are subsidizing China's renewable energy development, expanding its geopolitical influence, and fueling its authoritarian objectives. As Europe moves away from fossil fuels and domestic gas production continues to soar, a new competitive strategy is needed to mitigate oversupply risks and avoid a race to the bottom.

As long as U.S. prices consistently and significantly undercut its competitors, China will continue to reap asymmetric benefits from U.S. LNG exports. To avoid becoming caught in Beijing's fossil fuel trap, the United States should adjust supply volume and reinvest short-term LNG gains into long-term sustainable investments. Improving margins on current exports and better aligning prices with regional market dynamics are critical to this strategy. Strengthened revenues can replace drying wells, incentivize renewable energy development, and expand strategic initiatives in technology and security at home and abroad. The following comprehensive energy competition strategy rebalances trade relations with China while amplifying the economic potential of the United States energy revolution in the 21st century.

IN BRIEF

- The U.S. is the world's leading oil and gas producer. After decades as a net energy importer, this transformation has reshaped global energy dynamics, bolstered global energy security, and altered trade relations with China, which has seen a dramatic rise in gas import demand.
- Beijing avoids energy dependence on the U.S. by bypassing traditional LNG partnerships. By prioritizing intermediary contracts, foreign investments, spot trading, and portfolio sales agreements, China maximizes its import volume while minimizing its accountability and oversight.
- China is accelerating its predatory resale of low-cost U.S. LNG. State-managed inventories, preferential contracts, and market control allow Beijing to purchase and store gas volumes during periods of oversupply and re-export these volumes at a premium during supply shortfalls.
- The Chinese Communist Party reinvests profits from U.S. LNG resale into renewable energy and infrastructure projects. In addition to maintaining over three times as much domestic renewable energy capacity as the United States, China has accumulated over \$125 billion in upstream gas assets in the Global South. These activities expand the CCP's geopolitical influence, reduces its dependence on the U.S., and fuels its authoritarian objectives at home and abroad.
- Washington must leverage short-term economic gains from LNG into long-term renewable energy solutions. Global adoption of the Henry Hub Index, strong trade relations with regional allies, and tiered export taxes, bond rates, and tolling fees can keep prices competitive, avoid oversupply risk, and maximize return on investment. Taxes and royalties from gas exports should expand clean energy capacity and transmission, reduce the ecological damage caused by oil and gas infrastructure, and support America's domestic and international priorities.

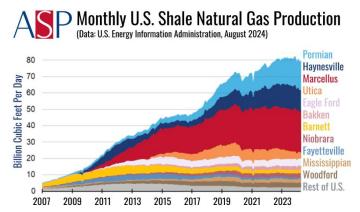
About the Author

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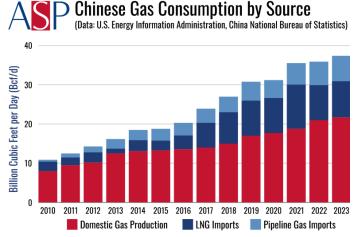
Introduction

After half a century of being a net energy importer, a novel combination of hydraulic fracturing, horizontal drilling, and improved rig mobility made the United States the world's top oil and gas producer. By 2013, there were eight times more gas-producing horizontal wells than just ten years earlier. With carbon emissions at record levels and coal demand at its peak, this unprecedented production was expected to irrevocably alter U.S. energy market dynamics.

In a report released that year, American Security Project predicted that exporting liquified natural gas (LNG) would improve global energy security, erode oil-indexed gas contracts in Asia, expedite the global transition from coal, and reduce the ability of unfriendly nations to use oil and gas as political weapons.⁵ The report also posited that Europe was dangerously dependent on Russian fossil fuels, Asia would become the leading demand driver, and—despite its interim benefits as a transition fuel—natural gas should not become a long-term energy solution due to its political risk, non-renewability, and impact on global methane emissions.



Over the next decade, each prediction would come to pass. The fracking revolution bolstered industrialization and energy security in developing states while limiting carbon dioxide emissions. Monthly exports of liquified natural gas rose from 3 billion cubic feet (Bcf) in 2016 to over 400 Bcf in 2023, protecting Europe from the potentially catastrophic impacts of Russian gas cuts following its invasion of Ukraine and reducing NATO energy dependence on a belligerent Iran. As the U.S. LNG boom increased the accessibility of gas, markets were liberated from crude oil prices and pegged to the new U.S. Henry Hub Index, further improving pricing transparency and liquidity.



There was one trend that our analysts did not predict: an unprecedented and protracted demand spike from China. From 2010 to 2023, China's annual gas consumption more than doubled and imports rose from 15% to 42% of its total gas supply. This trend could have formed the foundation of a strong and mutually beneficial economic partnership. Instead, as Chinese authoritarianism and encroachment in the Indo-Pacific raised alarm bells around the world, U.S. policymakers were split between courting Chinese gas buyers to gain leverage over Beijing and cutting supply to hold it accountable for its violations of state sovereignty and human rights. Reciprocal tariffs would slow and eventually suspend U.S.-China gas trade relations from 2018 to 2020. 10

China's energy demands eventually outweighed its hesitation. After tariffs were dropped, America became China's fourth-largest origin source of natural gas. Despite years of rock-bottom prices, however, the U.S. has not succeeded in making the Chinese Communist Party (CCP) dependent on its exports. The CCP strictly keeps to the goals of its 14th Five-Year Plan: to avoid dependence on any single partner or energy source, to redirect the destructive impacts of rapid industrialization onto other states, and to exploit the openness of global markets to serve the party and its priorities. Within this strategy, a declining fraction of China's imports is expected to come from U.S. firms under traditional bilateral contracts. Instead, the Chinese state employs alternative procurement avenues and resale markets to evade U.S. oversight and accountability, exercising its tight control over its domestic firms to prioritize long-term state goals over short-term profits. As American policymakers lack the capacity or desire to impose similar economic controls, they will need to work closely with partners, allies, and the private sector to balance the promotion of free and fair global market practices with their efforts to deter China's political and military ambitions.

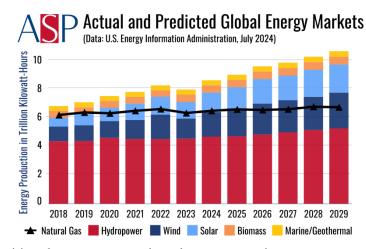
China's 21st Century Energy Competition Policy

Beijing is acutely aware that Washington aims to reduce its trade deficit, compete with it in global energy markets, and impose economic costs for its political malfeasance at home and abroad. In response, the Chinese Communist Party aims to benefit from the free-market system maintained by the U.S. and its partners while exerting protectionist and mercantilist policies to maximize its gains. CCP energy policy, spread over several documents, has three primary goals.

Goal 1. Gain a Strategic Advantage in Renewable Energy Markets

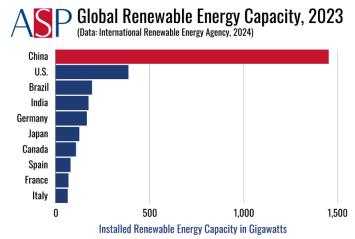
According to its 14th Five-Year National Plan, the People's Republic of China strives for an asymmetric trade relationship with the U.S. that enhances its position in global value chains by trading cheap U.S. commodities and raw materials for advanced computing and clean energy technologies.¹³ By importing low-priced U.S. fossil fuels and reselling the surplus when profitable, the CCP is able to increase its investment in renewable energy capacity, meet the energy needs of its rapid industrialization, and set back U.S. clean energy goals instead of its own.

This strategy offers significant economic advantages. The global renewable energy market is projected to grow at a compound annual rate of 4.2% until 2029, 14 more than twice the fossil fuel market's anticipated 1.8% growth during the same period. 15 Total employment in clean energy surpassed fossil fuel jobs for the first time in 2023, with salaries approaching parity. 16 The CCP has seized this opportunity by introducing environmental policies, green investment incentives, and market reforms to encourage renewable energy development even when nonrenewables yield higher profits in the short term. 17 By simultaneously increasing global LNG import demand, Beijing aims to lure U.S. firms into chasing temporary gains and becoming



further entrenched in fossil fuel extraction while China prioritizes long-term growth and energy security.

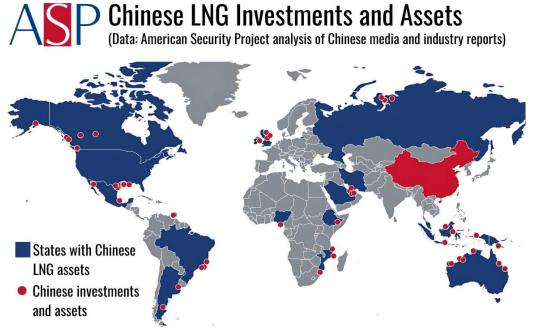
The plan seems to be working. In part due to federal incentives and grants for natural gas projects and sales, ¹⁸ American LNG export capacity is expected to double by 2030. ¹⁹ However, because gas wells deplete over time, recurring investments in new shale gas infrastructure is required to maintain consistent export supply. While Qatar, Oman, and the United Arab Emirates reinvest profits from their Chinese gas exports into carbon capture and renewable energy infrastructure, ²⁰ the U.S., Australia, and smaller Indo-Pacific countries have no similar regime.



Goal 2. Redirect Environmental Impacts of Rapid Industrialization

According to its New Industrialization Theory and Made in China 2025 policy, the CCP aims to utilize government subsidies, state-controlled investment vehicles, protectionist economic policies, and intellectual property acquisition to make China the global leader in high-tech manufacturing.²¹ To mitigate its carbon and methane output while meeting its industrial growth objectives, China has installed over three times as much domestic renewable energy capacity as the United States while investing heavily in foreign natural resource extraction and transport. This strategy forces other

states, predominantly states in the Global South, to shoulder the ecological and environmental burden of China's rapid economic growth and allows China to offset its carbon footprint without reducing its energy consumption.

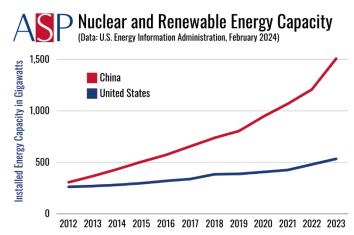


This behavior has not gone unnoticed. After offshoring over \$52 billion in foreign coal production through its Belt and Road Initiative between 2001 and 2021,²² United Nations Secretary-General Antonio Guterres and U.S. climate envoy John Kerry urged Chinese General Secretary Xi Jinping to discontinue the practice.²³ That year, in a virtual speech at the U.N. General Assembly, the General Secretary pledged to stop building coal-fired power plants abroad and begin investing in green and low-carbon energy projects.²⁴ Since then, however, Chinese state-owned enterprises (SOEs) have heavily invested in foreign oil and gas, accumulating over \$125 billion in upstream assets outside China.²⁵

Goal 3. Diversify Energy Sources and Reduce Dependence on Trading Partners

Energy independence is the cornerstone of Chinese energy policy. ²⁶ According to its 14th Five-Year Plan, China aims to satisfy nearly all its energy demands by 2050 by reducing domestic energy consumption, expanding power generation, and improving energy efficiency. ²⁷ This state-led push for energy autonomy not only strengthens China's economic resilience but also broadens the policy options available to the CCP by allowing it to mitigate the potential consequences of its poor trading practices and aggressive military behavior. Eliminating reliance on foreign imports allows Beijing to shield itself from the impacts of sanctions, supply chain disruptions, and geopolitical risk.

While energy autonomy presents significant economic and political appeal for Beijing, this goal is unlikely to be achieved by the middle of the century. Despite its added nuclear and renewable energy capacity setting global records each year, China's economic growth continues to outpace its clean energy production. As a result, the CCP must continue to import coal, oil and gas in record volumes as well as bolster domestic production of these fossil fuels to sustain its rapid industrialization. Although intentional diversification of its energy sources reduces reliance on any single import, this rising energy demand creates dependence on partners who may exploit this vulnerability for their own advantage.



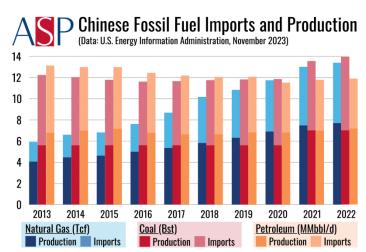
Beyond high energy consumption, practical advantages also effect Chinese import demand. Opportunities for stockpiling and re-exporting U.S. LNG make long-term deals with the U.S. more attractive. However, this activity carries significant political risk. Transporting U.S. LNG to the Chinese East Coast remains cheaper than moving pipeline gas from Turkmenistan, but tradeoffs exist between better prices and minimizing supply chain interruptions.²⁸

Chinese Liquified Natural Gas Market Forces

Rather than cooperate with the U.S. and its allies, engage in fair trade deals, and avoid antagonizing its neighbors, the CCP pushes its firms towards trade alternatives that provide avenues for profit even in risky political climates. Chinese public and private sector firms, investors, traders, and banks now leverage a combination of foreign investments, portfolio sales agreements, and spot trading to maximize their economic gains while mitigating their political risk.

State-Managed Inventories

China is the world's largest energy consumer, importing the most coal, oil, and natural gas of any country in 2023.²⁹ Like the strategic stockpiles of medical equipment, petroleum, and other materials maintained by the U.S.,³⁰ Beijing uses inventories of oil, gas, and other commodities to stabilize domestic prices and mitigate market volatility and supply chain disruptions.³¹ The CCP does not publish reports on its commercial or strategic stockpiles, but international trading data demonstrates that when global LNG supply is high and prices are low, Chinese state-owned enterprises purchase large volumes of LNG and accumulate them in storage facilities within the mainland. When global energy prices rise or domestic supply declines, the state depletes



these inventories to keep commodity prices stable. With American spot prices often half those of Asia, China also substantially profits from re-exporting its stockpiles.³² The CCP's 14th Five-Year Plan stipulates doubling LNG storage capacity between 2023 and 2025, which would allow for additional purchase and profit from cheap U.S. gas.³³

Long-Term Contracts

Long-term contracts offer continuous LNG volumes at predictable prices, making them popular with global energy players. However, these contracts have high up-front costs, increase a state's dependence on its trading partners, and reduce market flexibility. Once signed, buyers must purchase LNG even when domestic demand is low, at prices that may not be competitive in an over-supplied market. These contracts are also vulnerable to political interference, tariffs, and price caps, as seen during U.S.-China trade tensions in 2019. As tensions rise with the U.S., China increasingly avoids traditional long-term sales purchase agreements. Traditionally, long-term gas sales purchase agreements also incorporated destination clauses that prohibited resale to secondary markets. As China was the second-largest LNG reseller in 2023, sales contracts without destination clauses are prioritized and often mandated.

ASP Share of Global Liquified Natural Gas Trade Spot Trading



Spot trading, defined as contracts where shipments are delivered within three months of purchase, made up 38% of global trading volume in 2023. While long-term contracts, one-off LNG purchases allow Chinese firms to capitalize on regional opportunities and temporary supply hikes without locking into long-term commitments. However, this flexibility comes at the expense of greater uncertainty and pricing variability. High global risk disproportionately disrupts short-term markets; this occurred most recently in Summer 2024, when adverse weather events and heightened tensions in the Middle East jeopardized supply chains and caused spot prices to spike from \$11 to over \$14/MMBtu.³⁹

Portfolio Sales Purchase Agreements

Multinational oil and gas companies have increasingly shifted to selling fractions of their global portfolios rather than gas produced by a single plant or country. 40 Portfolio Sales Purchase Agreements (SPA) maximize market stability and flexibility, as acute supply shortages or gradual output declines in one plant can be counteracted by the firm's other global assets. This also enables producers and third parties to profit from arbitrage, or the purchase of assets in a lower-priced market for resale in a higher-priced market. These alternatives to bilateral and long-term contracts are increasingly lucrative as global supply volumes increase and profit margins from direct gas sales shrink. 41

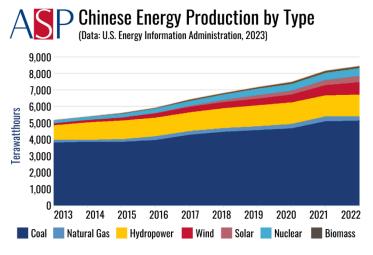
Portfolio sales purchase agreements benefit Chinese buyers for two main reasons. First, they allow for supply shocks, political risk, and economic policy shifts in one country to be mitigated by an intermediary who takes on the responsibility of maintaining consistent output volume. Second, they enable Chinese buyers to diversify their LNG sources similarly to how an index fund diversifies stocks: they grant broad market access without needing to engage directly with hundreds of individual plants and export terminals. The convenience of working with market aggregators comes at a cost, however, as middlemen in the LNG market profit from fees imposed on both suppliers and buyers.

Infrastructure Investments and Exploration Rights Agreements

Due to the high initial investment costs of new oil and gas projects, pre-final investment decision agreements allow China to secure LNG at competitive prices for fixed periods in exchange for funding planned and in-construction wells and other infrastructure. Some of these projects are designed and operated by the Chinese firms themselves, while others are co-owned or operated by foreign firms. While most oil and gas assets owned by Chinese SOEs are located in the Global South, China National Offshore Oil Corporation (CNOOC) owns several producing and exploration projects in North America and the United Kingdom. Exploration rights agreements, which grant the right to investigate and survey new oil and gas drilling locations, are more common in states with existing extraction, regasification, and transport infrastructure. These agreements are typically signed between the foreign LNG buyer, often a Chinese SOE, and a domestic entity that owns and operates a nearby LNG liquefaction and export terminal.

Foreign Investments and Bank Loans

In regions with limited or nonexistent gas production and transportation infrastructure, Chinese banks finance new LNG projects in exchange for equity interest, loan interest, and margin on future sales. This strategy allows firms to bring in revenue and employ Chinese nationals in high-skilled jobs while gas projects are still under construction. In 2020, the Nigeria LNG Complex received \$3 billion from a joint lending vehicle for a new expansion project that included the Bank of China and the Industrial and Commercial Bank of China. This activity also occurs in the United States. In 2018, the Bank of China and sovereign wealth fund CIC Capital Corporation invested \$40 billion in Alaska's North Slope LNG project, with employees of Chinese SOE Sinopec providing engineering and technical services.



Domestic Production and Diversification

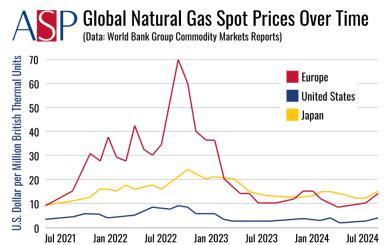
China aims to reduce its dependence on U.S. LNG by supplementing imports with domestic production of gas and other energy sources. China's 14th Five-Year Plan stipulates a production target of 22.3 Bcf per day of gas by 2025,⁴⁶ which it is expected to meet as domestic wells supplied 58% of China's supply last year.⁴⁷ Despite being the world's top investor in renewable energy sources and nuclear power,⁴⁸ however, China is also the top producer and importer of coal.⁴⁹ In part due to powerful coal plant owners within the CCP, Chinese coal production accounts for 52 percent of global volume and it remains the primary form of energy produced and consumed domestically.⁵⁰

U.S. Mechanisms to Compete with China

As the United States rapidly becomes the global LNG market mover, it must maximize value for its private sector while promoting global energy security and ensuring its sustainability goals are met. Threading this needle requires a flexible and responsive natural gas export strategy that opposes Chinese mercantilism and opportunism. The norms and values underpinning this strategy will inevitably influence the behavior of other actors in the system.

The U.S. Henry Hub Index

Before the shale gas revolution, global natural gas prices were linked to crude oil due to its higher trading volume and the assumed energy substitutability of oil and gas.⁵¹ However, as American fracking increased the liquidity of the natural gas market, settlement prices for natural gas decoupled from those of oil markets. The Henry Hub distribution center in Louisiana became the source of a new, independent price benchmark for U.S. natural gas.⁵² This shift lowered transaction costs, accelerated price discovery, and improved transparency in volume and price formation.⁵³ International traders quickly adopted the Henry Hub benchmark to set futures and options prices in Europe, the Middle East, and Africa.



Widespread adoption of the Henry Hub index as a global gas price reference has several strategic advantages for the U.S. and its allies. Henry Hub pricing allows countries to shield their gas trades from unrelated oil market fluctuations. Similar to global currencies pegged to the dollar, its stability and liquidity make smaller, more volatile regional indexes less appealing. In return, pegging prices to Henry Hub lets the U.S. oversee and, when necessary, influence global gas pricing. China recognizes these advantages, and as a result, Chinese SEO China Oil & Gas Pipeline Network Corp. is designing China's own competing price index. To ensure ongoing U.S. leadership in global gas markets, Washington must maintain the high liquidity of the Henry Hub index and motivate its partners and allies to use it over other benchmarks. Diplomacy and cooperative agreements can further this goal without lowering prices.

Cooperation with Europe

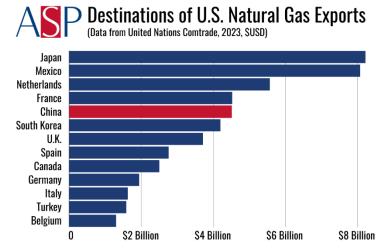
Natural gas markets have been chronically oversupplied since the winter of 2018, when American exports began to usurp global market forces.⁵⁶ Surplus cargoes flowed to Europe, where states like France and the United Kingdom took advantage of lower gas prices by transitioning their coal plants to natural gas. This allowed Europe to drastically accelerate its green energy transition by absorbing excess gas volume from the Sabine Pass, Corpus Christie, and Cove Point plants. After the Russian invasion of Ukraine, Russian supply cuts and Western sanctions further spiked demand for U.S. LNG in Europe, with Poland and Bulgaria being the first to be entirely cut off from Russian gas.⁵⁷

As of 2023, European LNG import demand is reaching its expected peak. From January to August 2024, unprecedented solar and wind energy generation led to electricity prices falling below zero for a record 7,841 hours, a sign that electricity supply is regularly exceeding demand.⁵⁸ This scenario will become more frequent as Europe transitions to renewables, which have a higher energy return on investment than fossil fuels. However, U.S. influence in European gas markets is expected to persist in the near term, as Europe still recieves nearly 15% of its gas supply from Russia.⁵⁹ As Germany and Italy continue decoupling, North American gas supply is set to rise from 22% to 34% of global market share by 2030, granting U.S. firms substantial leverage in pricing by virtue of market dominance as they fill Russian supply gaps.⁶⁰ Unlike in China, where demand tends to sink when U.S. prices rise, European market demand is less elastic and therefore less sensitive to price changes. A competitive pricing model with lower export taxes and tolling fees for responsible gas importers would benefit U.S. allies and motivate Chinese cooperation.

Tolling Fees

Liquified natural gas export terminals liquefy, store, and load natural gas onto carriers and land vehicles for long-distance transport. There are seven currently operating LNG export terminals in the United States, with an additional fifteen either under construction or approved to be built. Together, these plants process, store, and ship natural gas from nearly one million oil and gas wells around the United States.

To cover the cost of these activities, U.S. banks and gas developers charge tolling fees to buyers. Though fees climbed 20 percent over 2023,⁶³ extremely low Henry Hub-linked prices meant customers sustained

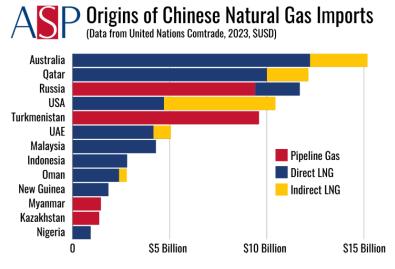


and even increased their gas contracting at these new rates. Chinese net imports continue to rise as local regasification utilization rates are declining,⁶⁴ indicating that an increasing volume of U.S. liquified natural gas is being re-exported without being reverted back into gas for domestic consumption. Raising tolling fees would limit China's ability to exploit cheap U.S. gas for resale; although Chinese customers react more strongly to tolling fee hikes than those in Europe,⁶⁵ any gas not purchased due to higher tolling fees would likely have been resold for profit anyways. Given Asia's broad and growing gas demand,⁶⁶ U.S. LNG exporters should be more aggressive in their negotiations with Chinese gas buyers and expand their gas sales to countries that purchase re-exported U.S. natural gas from China.

Responsible Production

The United States must be cautious not to flood global markets with unwanted LNG volumes. Given China's decision to restrict its imports of U.S. LNG to a fraction of its total supply even when American prices remain at a significant discount when compared to other regions, there is no indication that further increasing supply will increase China's dependence on U.S. LNG. In line with its national energy strategy, ⁶⁷ Beijing will continue to opportunistically import natural gas when it feels it has the upper hand over American firms and undercut U.S. profits when it is able to.

If the U.S. continues massively expanding its export capacity without proportionate, long-term purchase agreements with China, the worst-case scenario is a crisis similar to the 2008 global oil market collapse. From 2006 to 2008, China's flooding of oil markets with a surprise 500,000 barrels per day overwhelmed Middle Eastern and North American purchasing quotas. The Organization of Petroleum Exporting Countries (OPEC) rapidly imposed stringent production cuts, but a global oil demand rebound and the rising political risk of the Arab Spring were necessary to



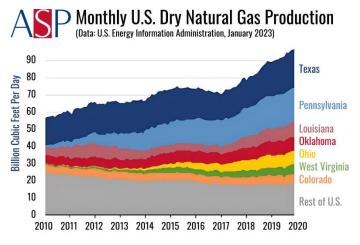
stabilize market forces.⁶⁸ These coincidentally timed factors are unlikely to converge again given a collapse in global gas markets due to U.S. oversupply. Unlike OPEC, the U.S. is not an oligopoly with the power to mandate its firms cut production, and without the ability to reliably predict supply interruptions, there is no guarantee that prices won't go negative. Despite this, some political levers can slow such an avalanche before it peaks. The Biden Administration's temporary pause on LNG export approvals to countries not under free trade agreements temporarily slowed shale gas approvals and drilling in early 2024, allowing time for federal agencies to weigh the impact of already-approved deals and develop a more comprehensive and strategic national LNG export strategy.⁶⁹

The Best Path Forward for U.S. LNG

In its attempts to reduce its trade deficit with China, the United States is sacrificing its long-term advantage in global energy markets. Suppliers can regain the upper hand by strategically reducing contract volumes, retargeting towards Indo-Pacific and American buyers, and keeping prices competitive in Asia. Policymakers can support these efforts by incentivizing domestic renewable energy production and instituting international policy levers for allied cooperation.

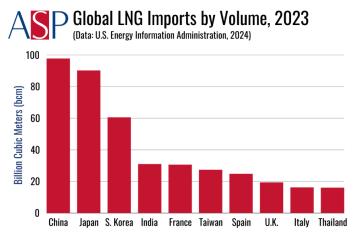
Right-Size U.S. Natural Gas Export Volumes

As a result of nearly a decade of policies and initiatives to increase U.S. export volume at any cost, global gas supply is expected to far exceed demand over the next century. Prices continue to fall even as short-term demand rises, 70 making unchecked construction of new LNG export projects with a twenty-to-thirty-year production horizon ecologically and financially risky. Instead, the United States should leverage its anticipated market dominance to improve profit margins on existing exports and better align gas volumes and prices with other regional markets. This improvement in returns can drive responsible investments in additional export capacity to replace depleting wells and increase tax revenues to support clean energy transmission infrastructure abroad and local priorities such as education, small businesses, and job growth.



Promote Renewable Energy Competition

China aims for the United States to exhaust its natural resources for cheap while Beijing invests in advanced energy projects with high returns on investment. Industry supporters argue that LNG is needed to transition from coal, but the proven ease and pragmatism of coal-to-gas conversion⁷¹ means new gas infrastructure is not replacing existing coal plants as much as it is replacing potential renewable and nuclear energy projects. Worse, natural resource extraction imposes additional risks in workplace safety, biodiversity, and land use. To avoid falling into a fossil fuel trap, the U.S. federal government and its state and local counterparts should leverage taxes from LNG exports to fund domestic renewable energy projects. Given that U.S. LNG prices are consistently half those of other markets, this will incentivize longer-term thinking on energy security without significantly reducing global import demand.



Critics of the Biden Administration's 2023 LNG export pause also posit that affordable U.S. exports are needed to "keep the lights on" in countries with energy insecurity. However, 72 percent of U.S. LNG contracts over the past two years have had unspecified import destinations, making multinational oil and gas middlemen the primary buyers of contracted LNG volumes. These firms report record earnings year-over-year by re-selling U.S. LNG, with most resale volumes going to China, Japan, and South Korea. Beyond the natural gas bought by multinationals, the next-largest direct sales volumes of U.S. LNG go to Europe and developed Asia, regions that have already greatly reduced their coal consumption and choose LNG for its artificially

low prices and readily available infrastructure, not out of necessity. To promote global energy security in developing states, policymakers should develop financing mechanisms to support foreign renewable energy projects in the Global South and offer technical assistance and expertise to help states build more resilient and efficient energy infrastructure.

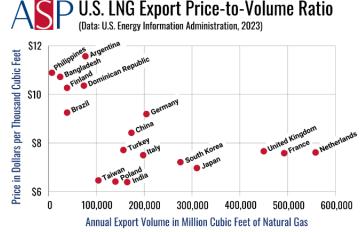
Mitigate Adverse Environmental Effects

The methane emissions of natural gas production and transport make LNG an unsustainable long-term energy source. While gas combustion emits half as much carbon dioxide as coal combustion, the rise of super-emitting gas production systems places life-cycle gas emissions on par with coal.⁷⁵ Independent auditors like the Environmental Defense Fund have found that actual methane emissions far exceed U.S. Environmental Protection Agency standards,⁷⁶ with gas leaks and venting in New Mexico alone costing the state an estimated \$43 million annually in lost taxes and royalties.⁷⁷

A second adverse effect is the ecological damage of oil and gas drilling. The U.S. government has leased public lands at low prices for decades, with royalty and bond rates that rarely cover the cost of capping and remediating orphaned wells. An estimated 2.3 million orphaned oil and gas wells pollute American water and air, cause explosions and fires, and produce unmonitored emissions that contribute to rising global temperatures. The U.S. Department of the Interior has needed to invest more than \$4.7 billion to plug these wells and reduce their ecological effects since 2022.

Increase Focus on Partners and Allies

Given China's decoupling from the United States, ongoing tensions in the Indo-Pacific, and supply chain disruptions in the Middle East and North Africa, the United States should prioritize strengthening its trade relationships with trans-Atlantic partners. Latin American and Caribbean natural gas import demand is expected to triple by 2035, with depleted hydropower production in Brazil making it the world's sixth largest gas importer. ⁸¹ Despite this, U.S. export volumes to Latin America are disproportionately small and average spot prices are the highest of any region, exceeding \$10.30 per thousand cubic feet (Mcf) in 2023. ⁸²



European trade, while expected to plateau in the long term, remains highly lucrative in the short term. Not only is Europe more willing to sign LNG export contracts at higher contract and fee levels, but transportation costs from the U.S. Gulf Coast are significantly lower. U.S. firms supplied more than 400,000 million cubic feet of natural gas each to the United Kingdom, France, and the Netherlands while keeping prices below \$7.70 per Mcf in 2023, 83 which was only possible due to a combination of efficient tankers, good weather patterns, and short travel times. On the contrary, shipping gas from the U.S. to China incurs significant additional transportation time and costs. 84

Conclusion

Like the United States, China leverages global energy markets to maximize its development and prosperity. Unlike Washington, however, the Chinese Communist Party tightly controls economic activities in these markets, only allowing firms to pursue opportunities that give the state an asymmetric advantage over its trading partners. Rather than increasing China's dependence on the U.S., flooding global energy markets with cheap LNG weakens American influence in global markets and allows Beijing to import and resell American commodities while bypassing bilateral partnerships that ensure accountability and limit exploitation. If Washington does not act quickly, this race to the bottom will continue to subsidize Chinese sustainable energy development and give it additional capacity to bolster its military capabilities, tighten its grip on critical technology supply chains, and extend its influence over weaker states.

A strong United States gas export policy must ensure energy access for American families, facilitate stable and sustainable economic growth, and protect the natural environment and its limited resources. To secure this vision and incentivize better behavior from China, Washington must re-assess its export volume and tax strategy, promote renewable energy, and enact preferential policies for cooperative partners. Implemented correctly, these actions can rebalance trade relations with China while ensuring humanity's ongoing growth and survival in the 21st century.

Endnotes

- ¹ "U.S. Energy Facts Explained," U.S. Energy Information Administration, accessed September 20, 2024, https://www.eia.gov/energyexplained/us-energy-facts/imports-and-exports.php.
- ² "United States produces more crude oil than any country, ever," U.S. Energy Information Administration, March 11, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61545; "Pad drilling and rig mobility lead to more efficient drilling," U.S. Energy Information Administration, September 11, 2012, https://www.eia.gov/todayinenergy/detail.php?id=7910.
- ³ "U.S. Oil and Natural Gas Wells by Production Rate," U.S. Energy Information Administration, December 27, 2023, https://www.eia.gov/petroleum/wells/.
- ⁴ Justin Gillis, "Global Rise Reported in 2013 Greenhouse Gas Emissions," New York Times, September 21, 2014,

https://www.nytimes.com/2014/09/22/science/earth/scientists-report-global-rise-in-greenhouse-gas-emissions.html; Jos Olivier et al.,

"Trends in Global CO2 Emissions: 2013 Report," PBL Netherlands Environmental Assessment Agency, October 31, 2023,

https://www.pbl.nl/en/publications/trends-in-global-co2-emissions-2013-report; Carlos Fernández Alvarez and Fabian Arnold, "What the past decade can tell us about the future of coal," U.S. International Energy Administration, December 2, 2020, https://www.iea.org/commentaries/what-the-past-decade-can-tell-us-about-the-future-of-coal.

- ⁵ Nick Cunningham, "The Geopolitical Implications of U.S. Natural Gas Exports," *American Security Project*, March 2013, https://www.americansecurityproject.org/ASP%20Reports/Ref%200116%20-
- %20The%20Geopolitical%20Implications%20of%20U.S.%20Natural%20Gas%20Exports.pdf.
- ⁶ "How much carbon dioxide is produced when different fuels are burned?" U.S. Energy Information Administration, July 10, 2024, https://www.eia.gov/tools/faqs/faq.php?id=73&t=11.
- ⁷ "Liquified U.S. Natural Gas Exports," U.S. Energy Information Administration, August 30, 2024, https://www.eia.gov/dnav/ng/hist/n9133us2M.htm.
- ⁸ Henry Rome and Noam Raydan, "Infographic: A Visual Guide to Iran's Soaring Oil Exports," *Washington Institute for Near East Policy*, September 15, 2023, https://www.washingtoninstitute.org/policy-analysis/infographic-visual-guide-irans-soaring-oil-exports.
- ⁹ "China's natural gas consumption, production, and imports all increased in 2023," U.S. Energy Information Administration, August 14, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62804.
- ¹⁰ Ewelina Czapla and Jay Patel, "LNG Exports and the Trade Deal," *American Action Forum*, October 26, 2020, https://www.americanactionforum.org/insight/lng-exports-and-the-trade-deal/.
- ¹¹ International Merchandise Trade Statistics, UN COMTRADE, United Nations Statistics Division, http://comtrade.un.org.
- ¹² For full text, see "中华人民共和国国民经济和社会发展第十四个五年规划和2035年远景目标纲要 [Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035]," Xinhua News Agency, March 12, 2021, https://cset.georgetown.edu/publication/china-14th-five-year-plan/.
- 13 "中华人民共和国国民经济和社会发展第十四个五年规划和2035年远景目标纲要 [Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035]," Xinhua News Agency. For more information on China's informatized computing and warfare objectives, see Courtney Manning, "Code War: How China's AI Ambitions Threaten U.S. National Security," *American Security Project*, October 17, 2023, https://www.americansecurityproject.org/perspective-code-war-how-chinas-ai-ambitions-threaten-u-s-national-security/.
- ¹⁴ "Renewable Energy Worldwide," Statista Market Insights, July 2024, https://www.statista.com/outlook/io/energy/renewable-energy/worldwide.
- 15 "Fossil Fuels Worldwide," Statista Market Insights, July 2024, https://www.statista.com/outlook/io/energy/fossil-fuels/worldwide.
- ¹⁶ Mark Jaffe, "Clean energy jobs growth worldwide surpasses fossil-fuel sector jobs which saw a decline," *Energize Weekly*, November 29, 2023, https://www.euci.com/clean-energy-jobs-growth-worldwide-surpasses-fossil-fuel-sector-jobs-which-saw-a-decline/; "World Energy Employment 2023 Executive Summary," IEA, https://www.iea.org/reports/world-energy-employment-2023/executive-summary; "Sustainable Recovery: Electricity," IEA, accessed September 20, https://www.iea.org/reports/sustainable-recovery/electricity.
- ¹⁷ Xinhua, "China Achieves Desired Results in Clean Air Action Plan: Official," *ChinaDaily.com*, January 31, 2018,
- http://www.chinadaily.com.cn/a/201801/31/WS5a71b4fba3106e7dcc13a041.html; PRC State Council, "国务院关于印发大气污染防治行

动计划的通知 [State Council Notice on Issuing the Air Pollution Prevention and Control Action Plan]," September 10, 2013, http://www.gov.cn/zhengce/content/2013-09/13/content 4561.htm.

- ¹⁸ Alternative Fuels Data Center, "Natural Gas Laws and Incentives in Federal," *U.S. Department of Energy*, accessed September 20, 2024, https://afdc.energy.gov/fuels/laws/NG?state=US.
- ¹⁹ "Unpacking the misconceptions surrounding the DOE's LNG update," *Department of Energy*, February 8, 2024, https://www.energy.gov/articles/unpacking-misconceptions-surrounding-does-lng-update.
- ²⁰ Alistair Walsh, "How the Gulf region is planning for a life after oil," *DW*, November 21, 2023, https://www.dw.com/en/how-the-gulf-region-is-planning-for-a-life-after-oil/a-67067995.

- 21 "国务院关于印发《中国制造2025》**的通知** [Notice of the State Council on the Publication of "Made in China 2025"]," PRC State Council, May 19, 2015, translated by Etcetera Language Group for CSET, https://cset.georgetown.edu/wp-content/uploads/t0432 made in china 2025 EN.pdf.
- ²² Lihuan Zhou, "China Overseas Finance Inventory Database," *World Resources Institute*, October 20, 2023, https://datasets.wri.org/dataset/cofi? gl=1*1kxqe7z* gcl_au*MTM3Mzk3OTM2MC4xNzI2NTg0ODEz.
- ²³ Valerie Volcovici, David Brunnstrom and Michelle Nichols, "In climate pledge, Xi says China will not build new coal-fired power projects abroad," *Reuters*, September 22, 2021, https://www.reuters.com/world/china/xi-says-china-aims-provide-2-bln-vaccine-doses-by-year-end-2021-09-21/.
- ²⁴ Ibid.
- ²⁵ Chen Aizhu, "FACTBOX: China CNPC's global oil, gas investment," Reuters, August 28, 2024, https://www.reuters.com/business/energy/china-cnpcs-global-oil-gas-investment-2024-08-27.
- ²⁶ "Energy Transition Outlook China 2024: A national forecast to 2050," *DNV*, May 2024, https://energy.pku.edu.cn/docs//2024-05/3eee62e2f8644f9bb7999cd3f5fc5208.pdf.
- 27 "第十四个五年规划 [People's Republic of China 14th Five-Year Plan]," Xinhua News Agency, March 12, 2021.
- ²⁸ For example, transportation fees for pipeline imports from Xinjiang to Guangdong can reach about seven times the cost of the fuel being conveyed. See Jiaqi Lu and Ye QI, "U.S. gas to China: Positive energy for bilateral relations," *Brookings*, May 31, 2018, https://www.brookings.edu/articles/u-s-gas-to-china-positive-energy-for-bilateral-relations/.
- ²⁹ Jeffrey Nix, "China is Building Coal-Fired Power Plants at an Alarming Rate," *Taylor English Insights*, January 31, 2024, https://insights.taylorenglish.com/post/102iw50/china-is-building-coal-fired-power-plants-at-an-alarming-rate; "Leading importing countries of liquefied natural gas worldwide in 2023," *Statista Research Department*, September 20, 2024, https://www.statista.com/statistics/274529/major-lng-importing-countries/.
- ³⁰ Anshu Siripurapu and Noah Berman, "The State of U.S. Strategic Stockpiles," *Council on Foreign Relations*, March 2, 2023, https://www.cfr.org/backgrounder/state-us-strategic-stockpiles.
- ³¹ John Kemp, "China's LNG Imports Set to Slow," Reuters, June 24, 2024, https://www.reuters.com/markets/commodities/chinas-lng-imports-set-slow-kemp-2024-06-24/.
- ³² Therese Robinson, "China Moving More Aggressively to Trade Surplus LNG on Global Market," *Natural Gas Intelligence*, August 31, 2023, https://naturalgasintel.com/news/china-moving-more-aggressively-to-trade-surplus-lng-on-global-market/.
- ³³ U.S. Energy Information Administration Energy Statistics, "Gas Market Report, Q1-2023," *International Energy Agency*, February 2023, https://iea.blob.core.windows.net/assets/c6ca64dc-240d-4a7c-b327-e1799201b98f/GasMarketReportQ12023.pdf, 20.
- ³⁴ For example, China's average long term LNG contract is 18 years, with contracts often incorporating multi-year waiting periods for wells and export terminals to be constructed. This is based on an analysis done by the author of 49 long term contracts signed by Chinese firms between 2018 and 2023. See full data sheet here: https://www.americansecurityproject.org/wp-content/uploads/2024/09/Chinese-Global-LNG-Contracts.xlsx.
- ³⁵ Scott DiSavino, "U.S. Liquified natural gas shipments to China face mounting tariffs," *Reuters*, May 13, 2019, https://www.reuters.com/article/business/us-liquefied-natural-gas-shipments-to-china-face-mounting-tariffs-idUSKCN1SJ1O4/.
- ³⁶ These destination restrictions have become increasingly unpopular as buyers in Europe and Asia seek additional flexibility in their contracts. See G2M2 Team and Jane Li, "Trends in LNG Contracting and Why They Matter," *RBAC Energy Market Simulation Systems*, April 26, 2022, https://rbac.com/trends-in-lng-contracting-and-why-they-matter/.
- ³⁷ Chen Aizhu, Emily Chow and Marwa Rashad, "Top LNG importer China re-selling more cargoes, eyes trading gains," *Reuters*, November 12, 2023, https://www.reuters.com/markets/commodities/top-lng-importer-china-re-selling-more-cargoes-eyes-trading-gains-2023-11-10/.
- 38 "2024 World LNG Report," International Gas Union, June 26, 2024, https://www.igu.org/resources/2024-world-lng-report/.
- ³⁹ Cindy Liang and Melody Li, "High spot LNG prices, ample piped gas supply delay Chinese winter procurement," *S&P Global*, August 21, 2024, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/lng/082124-high-spot-lng-prices-ample-piped-gas-supply-delay-chinese-winter-procurement.
- ⁴⁰ Anne-Sophie Corbeau and Sheng Yan, "Implications of China's Unprecedented LNG-Contracting Activity," Columbia SIPA Center on Global Energy Policy, October 7, 2022, https://www.energypolicy.columbia.edu/publications/implications-of-chinas-unprecedented-lng-contracting-activity/.
- ⁴¹ Alessandro Agosta et al., "LNG portfolio optimization: Putting the business model to the test," *McKinsey & Company*, April 12, 2021, https://www.mckinsey.com/industries/oil-and-gas/our-insights/lng-portfolio-optimization-putting-the-business-model-to-the-test.
- ⁴² For a full list of foreign holdings owned by CNOOC, see "Key Operating Areas," CNOOC Limited, accessed September 1, 2024, https://www.cnoocltd.com/col/col7321/index.html.
- ⁴³ Ezekiel Adesina et al., "Understanding Natural Gas and LNG Options: Global Edition," United States Department of Energy, September 2017,
- $\frac{https://www.energy.gov/sites/prod/files/2017/09/f36/Understanding\%20Natural\%20Gas\%20and\%20Lng\%20Options_general\%20no_\%20appendix.pdf.$

- ⁴⁴ "Bank of China contributes to \$3 billion loan for the Nigeria LNG Complex Train 7 Expansion Project (Linked to Project ID#92103)," AIDDATA A Research Lab at William & Mary, accessed September 1, 2024, https://china.aiddata.org/projects/92104/.
- ⁴⁵ Tim Bradner and Keiron Greenhalgh, "Developers say Alaska LNG project remains on track despite trade war with China," S&P Global, August 10, 2018, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/081018-developers-say-alaska-lng-project-remains-on-track-despite-trade-war-with-china.
- ⁴⁶ China National Energy Administration, "清洁低碳 安全高效 "十四五" 现代能源体系这样建 [Clean, low-carbon, safe and efficient: The modern energy system of the 14th Five-Year Plan]," People's Republic of China, March 25, 2022, http://www.nea.gov.cn/2022-03/25/c 1310529475.htm.
- ⁴⁷ Victoria Zaretskaya and Faouzi Aloulou, "China's natural gas consumption, production, and imports all increased in 2023," U.S. Energy Information Administration, August 14, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62804.
- ⁴⁸ "World Energy Investment 2024: China," International Energy Agency, June 2024, https://www.iea.org/reports/world-energy-investment-2024/china; Sara Schonhardt, "China Invests \$546 Billion in Clean Energy, Far Surpassing the U.S.," *Scientific American*, January 30, 2023, https://www.scientificamerican.com/article/china-invests-546-billion-in-clean-energy-far-surpassing-the-u-s/.
- ⁴⁹ "China Coal Supply," International Energy Agency, accessed September 1, 2024, https://www.iea.org/countries/china/coal.
- ⁵⁰ "Coal and lignite production," Enerdata, accessed September 1, 2024, https://yearbook.enerdata.net/coal-lignite/coal-production-data.html.
- ⁵¹ Mübariz Hasanli, "Re-examining crude oil and natural gas price relationship: Evidence from time-varying regime-switching models," *Energy Economics* 133 (May 2024): https://www.sciencedirect.com/science/article/abs/pii/S0140988324002184.
- ⁵² Even though the New York Mercantile Exchange chose Henry Hub as its futures pricing point in 1989, U.S. price points varied widely depending on regional supply and demand indicators until liquidity increased in the late 2010s. For example, in summer 2014, the Dominion South hub's local spot prices averaged \$2.66 per mmBtu while Henry Hub averaged \$4.15, and it was uncertain whether Henry Hub would remain as the U.S. gas price proxy. See Scott DiSavino and Barani Krishnan, "Henry Hub, king of U.S. natural gas trade, losing crown to Marcellus," *Reuters*, September 26, 2014, https://www.reuters.com/article/world/henry-hub-king-of-u-s-natural-gas-trade-losing-crown-to-marcellus-idUSKCN0HL173/.
- ⁵³ Paul Wightman, "Henry Hub Natural Gas futures expands global reach," *CME Group*, December 1, 2023, https://www.cmegroup.com/articles/whitepapers/henry-hub-natural-gas-futures-expands-global-reach.html.
- ⁵⁴ "Joe Biden, master oil trader," *The Economist*, May 16, 2024, https://www.economist.com/finance-and-economics/2024/05/16/joe-biden-master-oil-trader.
- 55 "China Pipeline Giant Developing New Gas Price Index for Country," Bloomberg, April 10, 2024,
- https://www.bloomberg.com/news/articles/2024-04-10/china-pipeline-giant-developing-new-gas-price-index-for-country.
- ⁵⁶ "US gas driving TTF & LNG prices: 4 charts," *Timera Energy*, June 29, 2020, https://timera-energy.com/blog/us-gas-driving-ttf-lng-prices-4-charts/.
- ⁵⁷ Jorge Liboreiro, "Which EU countries have been totally or partially cut off from Russian gas?" *Euro News*, July 7, 2022, https://www.euronews.com/my-europe/2022/07/07/which-eu-countries-have-been-totally-or-partially-cut-off-from-russian-gas.
- ⁵⁸ "Negative European energy prices hit record level," *Financial Times*, September 14, 2024, https://www.ft.com/content/1f94d0b4-c839-40a2-9c8d-782c00384154.
- ⁵⁹ "Where does the EU's gas come from?" Council of the European Union, 21 March 2024,
- https://www.consilium.europa.eu/en/infographics/eu-gas-supply/.
- ⁶⁰ "What happens to LNG market if Henry Hub rises?" *Timera Energy*, July 15, 2024, https://timera-energy.com/blog/what-happens-to-lng-market-if-henry-hub-rises/.
- ⁶¹ Federal Energy Regulatory Commission, "Powerpoint Presentation: North American LNG Export Terminals," U.S. Department of Energy, February 16, 2022, https://www.energy.gov/sites/default/files/2022-
- 03/FERC%2C%20N.%20American%20LNG%20export%20terminals 0.pdf.
- 62 "U.S. Oil and Natural Gas Wells by Production Rate," U.S. Energy Information Administration, December 27, 2023, https://www.eia.gov/petroleum/wells/.
- 63 "US LNG prices creep higher as banks want to see higher tolling fees," LNG Journal, October 6, 2023,
- https://lngjournal.com/index.php/north-america/item/109503-us-lng-prices-creep-higher-as-banks-want-to-see-higher-tolling-fees.
- ⁶⁴ Kai Dong, "China's regas capacity is on the rise but low utilisation persists," *Wood Mackenzie*, September 4, 2023, https://www.woodmac.com/news/opinion/chinas-regas-capacity-rise-low-utilisation-persists/.
- 65 "US LNG prices creep higher," LNG Journal.
- 66 "5 charts show drivers of Q2 gas price recovery," *Timera Energy*, June 10, 2024, https://timera-energy.com/blog/5-charts-show-drivers-of-q2-gas-price-recovery/.
- ⁶⁷ Melanie Hart, Luke Bassett, and Blaine Johnson, "Do Not Fall for the Hype on U.S.-China Natural Gas Trade," *Center for American Progress*, April 18, 2018, https://www.americanprogress.org/article/not-fall-hype-u-s-china-natural-gas-trade/.
- ⁶⁸ Jason Bordoff and Akos Losz, "Oil Shock Decoding the Causes and Consequences of the 2014 Oil Price Drop," *Center for International Relations and Sustainable Development*, Horizons Spring 2015, https://www.cirsd.org/en/horizons/horizons-spring-2015--issue-no3/oil-shock-%E2%80%94-decoding-the-causes-and-consequences-of-the-2014-oil-price-drop.

- ⁶⁹ "FACT SHEET: Biden-Harris Administration Announces Temporary Pause on Pending Approvals of Liquefied Natural Gas Exports," *The White House*, January 26, 2024, https://www.whitehouse.gov/briefing-room/statements-releases/2024/01/26/fact-sheet-biden-harris-administration-announces-temporary-pause-on-pending-approvals-of-liquefied-natural-gas-exports/.
- ⁷⁰ Global gas demand rises from Fall to Winter each year. In 2023, global gas demand rose by just 0.5%, with Chinese natural gas demand growing by 7% while European natural gas consumption falling by 7%. See "Global gas demand set for stronger growth in 2024 despite heightened geopolitical uncertainty," *International Energy Agency*, January 26, 2024, https://www.iea.org/news/global-gas-demand-set-for-stronger-growth-in-2024-despite-heightened-geopolitical-uncertainty. A Wood Mackenzie report found that European gas storage is expected to reach 100 percent by October 2024. See "LNG freight rates, European prices climb," *LNGPrime*, June 14, 2024, https://lngprime.com/americas/lng-freight-rates-european-prices-climb/114762/.
- ⁷¹ "Coal to Natural Gas Conversions A Bridge to a Lower Carbon Future," *Woodway Energy*, November 28, 2023, https://www.woodwayenergy.com/coal-to-natural-gas-conversions/.
- ⁷² Amy Joi O'Donoghue, "What is the future of U.S. liquified natural gas exports?" *DescretNews*, May 29, 2024, https://www.descret.com/utah/2024/05/29/what-is-the-future-of-us-liquified-natural-gas-exports/.
- ⁷³ Jake Schmidt, Ade Samuel, Shruti Shukla, "Liquefied Natural Gas Has Limited Impact in Displacing Coal Emissions," *Natural Resources Defense Council*, January 24, 2024, https://www.nrdc.org/bio/jake-schmidt/us-liquified-natural-gas-has-limited-impact-coal.
- ⁷⁴ "Global trade in liquefied natural gas continued to grow in 2023," U.S. Energy Information Administration, July 11, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62464.
- ⁷⁵ Deborah Gordon et al., "Evaluating net life-cycle greenhouse gas emissions intensities from gas and coal at varying methane leakage rates," *Environmental Research Letters* 18 No. 8 (July 2023): https://iopscience.iop.org/article/10.1088/1748-9326/ace3db.
- ⁷⁶ "New Data: Permian Oil & Gas Producers Releasing Methane at Three Times National Rate," *Environmental Defense Fund*, April 7, 2020, https://www.edf.org/media/new-data-permian-oil-gas-producers-releasing-methane-three-times-national-rate.
- ⁷⁷ Jon Goldstein et al., "Explore New Mexico's oil and gas pollution," *Environmental Defense Fund*, November 20, 2020, https://www.edf.org/energy/explore-new-mexicos-oil-and-gas-pollution.
- ⁷⁸ Maxine Joselow, "The U.S. just changed how it manages a tenth of its land," *The Washington Post*, April 18, 2024, https://www.washingtonpost.com/climate-environment/2024/04/18/biden-public-lands-conservation-rule/.
- ⁷⁹ "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2016: Abandoned Oil and Gas Wells," *U.S. Environmental Protection Agency*, April 2018, https://www.epa.gov/sites/default/files/2018-04/documents/ghgemissions_abandoned_wells.pdf.
- 80 "Biden-Harris Administration Invests \$775 Million from Investing in America Agenda for States to Plug Orphaned Oil and Gas Wells," U.S. Department of the Interior, August 14, 2024, https://www.doi.gov/pressreleases/biden-harris-administration-invests-775-million-investing-america-agenda-states-plug.
- 81 Jessica Casey, "LNG in Latin America: A tale of two markets," *LNG Industry*, July 15, 2024, https://www.lngindustry.com/special-reports/15072024/lng-in-latin-america-a-tale-of-two-markets/.
- 82 "Natural Gas Data U.S. Energy Information Administration," U.S. Energy Information Administration, accessed September 1, 2024, https://www.eia.gov/naturalgas/data.php.
- 83 "U.S. Natural Gas Exports and Re-Exports by Country," U.S. Energy Information Administration, accessed September 1, 2024, https://www.eia.gov/dnav/ng/ng/move/expc/s1/a.htm.
- ⁸⁴ Cindy Yeo and Melody Li, "Rising freight costs, summer demand cast uncertainty on East-West LNG arbitrage," *S&P Global*, June 27, 2024, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/lng/062724-rising-freight-costs-summer-demand-cast-uncertainty-on-east-west-lng-arbitrage.