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POTENTIAL ENERGY CHALLENGES FROM A CHINA-TAIWAN CONFLICT SCENARIO

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Military conflicts have affected energy availability and energy markets, from World War II's supply chain challenges in the Atlantic and the Pacific to the 1973 Arab Israeli War to today's Russian invasion of Ukraine. The specific consequences, however, are greatly influenced by whether the belligerent is a major energy importer or exporter.

In today's war in Ukraine, the belligerent—Russia—is a major exporter, including to nations supporting Ukraine. These oil and natural gas exports are major contributors to Russia's economy and, as a result, Moscow's war effort.[1] The implications are three-fold: 1. the belligerent is losing revenues from one of its major energy exports, natural gas, 2. Russia is selling less crude oil volume but making up the revenue shortfall from higher global oil prices, and 3. the war is contributing to energy market volatility through reduced global energy supplies, resulting in price increases for global energy markets (that also have been affected by COVID related energy demand volatility).[2]

A major military engagement could also occur in the Asia-Pacific region in the form of a possible conflict between the People's Republic of China ("PRC" or "China") and Taiwan. And there are scenarios that could trigger Western-allied nations, such as the US, Australia, and Japan, to engage in such a conflict. One possible action by Western-allied nations in such scenarios would be enacting energy import restrictions on the PRC.

Compared to Russia, the PRC is a major energy importer, and that exposure has been growing. China is now the world's largest importer of both oil and liquified natural gas (LNG).[3] Much of China's oil and natural gas come from seaborne deliveries, and if Western-allied nations decided to interdict those tanker deliveries in a conflict scenario, it could have a material impact on the Chinese economy and on global crude markets.

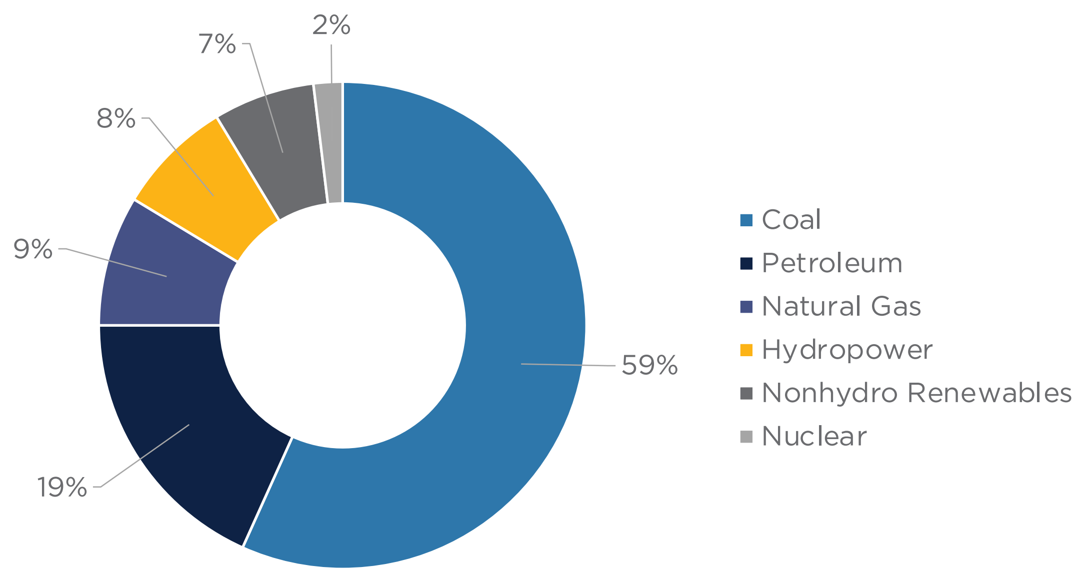
This commentary considers China's energy import exposure and discusses potential impacts that an energy embargo of the country sparked by a conflict with Taiwan might have on China and on global energy markets.

China's Total Energy Consumption and Supply

China's total energy consumption was approximately 3,600 million tons-oil-equivalent (Mtoe) in 2021.[4] Energy consumption in the country has risen rapidly, at an average rate of 6.5 percent annually from 2001–2021.[5]

Coal is China's largest energy supply source, at 59 percent of Mtoe (see Figure 1). Most of China's consumed coal is produced domestically and therefore has a relatively low exposure to potential import disruptions. In 2021, China produced 4,126 million tons (MT)[6] of coal domestically and imported 323 MT.[7] While China's exposure to imported coal is relatively minor, China has recently experienced some coal supply stresses related to building a significant amount of additional coal power plant capacity, mining challenges of increasing domestic production given COVID-policy labor restrictions, China's coal pricing policies,[8] and the challenges of procuring additional imports due to increased coal demand globally from the current energy crisis.[9] China reduced its coal import exposure during 2022, cutting imports by 10.5 percent and increasing domestic production by 10 percent January through October versus the same period in 2021.[10]

Figure 1: China's total primary energy consumption by fuel type, 2021

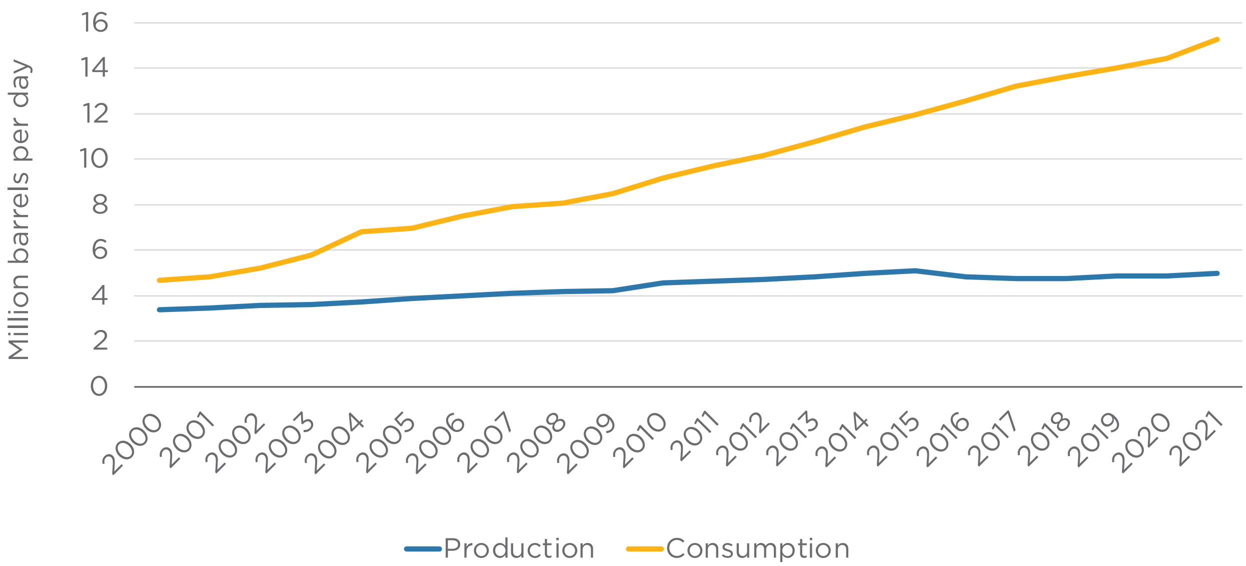


Source: BP Statistical Review of World Energy 2022, cited in US Energy Information Administration, "Country Analysis: China," August 8, 2022, https://www.eia.gov/international/analysis/country/CHN.

China's Oil and Oil Products Posture

While oil and its products make up only 19 percent of energy consumption in China,[11] oil is critical for certain segments of the Chinese economy, especially transportation, logistics, and agriculture. China domestically consumed approximately 15.4 million barrels per day (mm bbl/day) of crude oil in 2021, of which 4.0 mm bbl/day (or 26 percent) was domestically produced, and 11.4 mm bbl/day (74 percent) was net imported (see Figure 2).[12] Having three-quarters of crude sources imported represents a large risk to the energy and economic security of China.

Figure 2: China's petroleum and other liquids production and consumption, 2000–2021



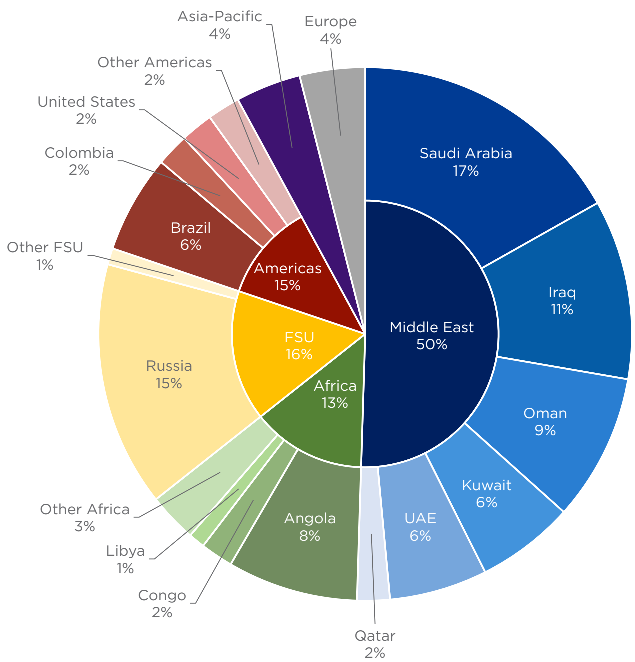
Source: US Energy Information Administration, "Short-Term Energy Outlook," last updated December 6, 2022, https://www.eia.gov/outlooks/steo/.

For comparison's sake, the US imported only 40 percent of its crude oil during the 1973 OPEC oil embargo.[13]

Russia is the only major overland supplier of crude oil to China, through the direct Eastern Siberia-Pacific Ocean (ESPO) pipeline and through a small connection through Kazakhstan.[14] China's overall crude imports are dominated by seaborne deliveries and, as a result, are exposed to sea lines of communications (SLOCs). While SLOCs are more at risk for import disruption, pipelines can also be subject to disruption from external events, as seen in 2022 with the Nord Stream 2 pipeline.[15]

PRC crude imports are dominated by Middle East suppliers, as shown in Figure 3. This largest fraction is followed by approximately equal portions from Africa, Russia, and Western Hemisphere suppliers. Given China's high exposure to sea deliveries, the energy outcomes that a potential conflict between the country and Taiwan might have if Western countries conduct a seaborne interdiction of China's energy supplies are explored further in this commentary.

Figure 3: China's crude imports by source, 2021

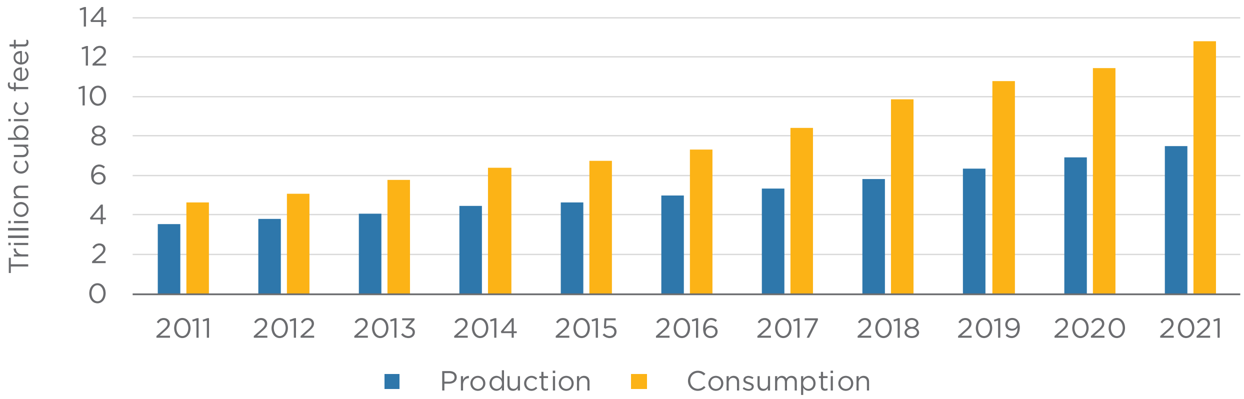


Note: Numbers may not add up to 100 because of rounding. FSU refers to countries that were formerly part of the Soviet Union.
Source: Global Trade Tracker, cited in US Energy Information Administration, "Country Analysis: China."

China's Natural Gas Posture

While only 9 percent of China's energy supplies are derived from natural gas, the energy source is critical for certain sectors of the economy, such as mining and manufacturing.[16] In addition, the demand for natural gas in China has grown much faster than overall energy demand from 2019 to 2021, and, as a result, its portion of the overall energy supply mix has been increasing.[17] Similar to oil, the PRC imports a significant portion of its natural gas. In 2021, China domestically produced 7.4 trillion cubic feet (Tcf) of natural gas (55 percent of natural gas consumed) and imported 6.0 Tcf (45 percent of natural gas consumed).[18] See Figure 4. And like crude oil, China's natural gas demand has been growing faster than domestic production. China is now the number one importer of LNG in the world.[19]

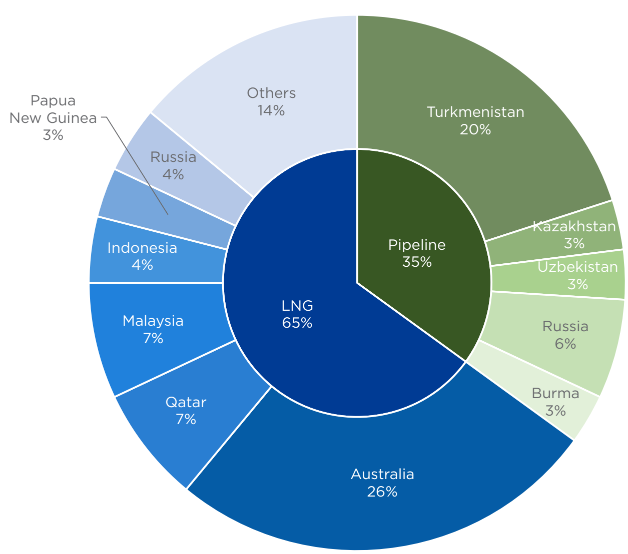
Figure 4: China's dry natural gas production and consumption, 2011–2021



Source: BP Statistical Review of World Energy 2022, cited in US Energy Information Administration, "Country Analysis: China."

China sources 65 percent of its natural gas imports from LNG tanker deliveries[20,21] and imports 35 percent via pipeline from Central Asia countries (see Figure 5). Russia started providing natural gas from the Power of Siberia pipeline in December 2019.[22] In a potential regional conflict, China's high exposure to sea deliveries could have an impact on energy disruption outcomes.

Figure 5: China's natural gas imports by source, 2021



Source: Global Trade Tracker, cited in US Energy Information Administration, "Country Analysis: China."

China's exposure to natural gas imports, including from the US, is increasing.[23] In 2021, US LNG companies Cheniere and Venture Global and Chinese energy companies ENN, Sinopec, Sinochem, and Foran Energy signed four long-term LNG purchases.[24] This US LNG supply to China, in combination with supplies from Australia, now makes up more than half of the PRC's LNG imports.[25]

China's Efforts to Reduce Energy Posture Risk

Reducing dependence on imported energy is a dominant and longstanding priority of the Chinese government. During the past decade, Beijing has taken various steps to reduce its exposure to energy imports, particularly those with SLOCs.

One major effort was entering into new agreements with Russia in 2006 to import more crude via direct pipeline routes. These supplies travel primarily via the ESPO, which now connects Mohe, on the Russian border, with the Chinese city of Daqing.[26] The current capacity of the ESPO pipeline is 0.7 mm bbl/day, and further expansions are being contemplated.[27] China's imports from Russia have increased from about 0.8 mm bbl/day in 2010–2014 to more than 2.1 mm bbl/day in 2019.[28] But even with additional pipeline flows, Russian crude via pipeline composes only approximately 15 percent of total Chinese crude imports. Global seaborne deliveries still dominate these imports.

Another major effort was building a 771 km oil and gas pipeline in 2009–2017[29] from the coast of Myanmar to Yunnan province.[30] China's first cross-border oil pipeline was the Kazakhstan-China oil pipeline, built in 2003–2009,[31] through which Russia ships 200,000 bpd. Kazakhstan ships only a small amount of oil through the pipeline, which is underutilized.[32]

China has also taken steps to reduce its dependence on foreign suppliers. For instance, Beijing has increased domestic drilling, attempting to develop unconventional oil and gas production in areas such as Gulong[33] and conventional oil production in the South China Sea.[34],[35] China has also invested heavily in electrification of energy consumption, including promoting electric vehicles purchases to Chinese consumers. But China's domestic oil and gas production has not materially increased, and demand of both fuel types continues to outstrip domestic production growth. As a result, China faces a steadily deteriorating energy security posture.

China has also been adding to crude oil storage capacity. The PRC strategic oil reserve now has about 290–370 mm bbl of capacity, and oil industry companies such as refiners Shandong Hongrun and Hengli[36] have about 900 mm bbl of capacity.[37] This storage capacity would afford China approximately 80 days' worth of supplies[38] that could be used to cover a reduction in imports in the event of a supply disruption. China has relatively little natural gas storage, but the government plans to expand that capacity.[39]

China has confirmed that it will continue to purchase Russian energy exports amid that country's war in Ukraine. China has increased its purchases of crude oil,[40] which comprises the majority of the PRC's energy imports from Russia. In May 2022, these imports surged 55 percent from the prior year's levels, though after May imports dropped as a result of the slowing Chinese economy. Overall, China's crude oil imports from Russia in January through September 2022 are up 7.31 percent over the same period in 2021.[41] In addition, China has been purchasing Russian oil at a significant discount, displacing oil imports from other nations.[42] And while recent reports of China's crude oil imports have been opaque, the country has reportedly purchased more oil from Iran and Venezuela over the last 18 months,[43] including transshipments through intermediate countries, in part because of the Biden administration's loosening of Iranian oil sanctions enforcements.[44]

How Energy Market Reactions to the Ukraine War May Translate to a PRC Conflict

The energy market's reactions to the Ukraine war could offer a preview of potential scenarios should a China-Taiwan conflict arise. Energy market volatility has been accentuated by corporations and nations taking steps around the Russian energy sector, and a China conflict could also roil markets.

Many corporations around the world, without being mandated by their governments, extricated themselves from Russia quickly after the country's invasion of Ukraine—including many Western oil and gas companies and some commodities-trading companies. As a result, engagement by the private sector with Russian energy flows diminished rapidly. However, certain traders are exploiting the Russian energy price discounts and selling Russian oil and gas into countries that are more interested in cheaper energy than the politics of the conflict. Many Western energy companies also unilaterally announced divestiture plans from Russian energy investments—including Royal Dutch Shell, BP, and Equinor[45]—many at a significant financial loss.[46]

Additionally, many Western nations developed new policies to extricate themselves from Russian energy imports as quickly as was economically feasible.[47] The most noticeable sovereign moves were by countries in the European Union, including some of its largest members such as Germany and France.[48] However, Russia has been able to find buyers for a good portion of their production in countries such as China, India, and Turkey.[49]

But China's energy posture is almost a reverse image of Russia's posture, as Beijing is a very large importer versus a major exporter. So any change in China's ability to import energy could have the reverse effect on markets than the current situation in Russia.

Most of the current energy suppliers to China either have close relationships with the country or have avoided taking political sides in the Ukraine war, or both. In addition, most of these countries' balance of payments are significantly exposed to energy exports. It is therefore unclear if those countries would unilaterally make a decision to stop exporting energy to China if a conflict between the country and Taiwan arose.

Many natural gas suppliers to China similarly have avoided taking sides in the current Ukraine war and have balance of payments exposure to energy exports, meaning they depend on sales to China to finance their imports. It is therefore also unclear if those countries would unilaterally stop exporting energy to China.

It is therefore likely that a similar list of countries and their private energy companies might somewhat replicate their responses to the Ukraine conflict in a large PRC war scenario (such as a war with Taiwan). Energy companies and countries individually, in other words, could decide to stop delivering energy to China.

One country that might act against China in a Taiwan conflict is Australia, given its regular strong comments around possible actions it might take if such a conflict arises.[50] In addition, recent increased exports of natural gas to China from the US could be at risk in a conflict scenario, given US policy positions around possible support for Taiwan. The US started selling LNG to China at some scale in 2021, at an annual average of approximately 1.2 billion cubic feet per day (Bcf/day); those exports may be restricted in a conflict scenario.

Potential Energy Outcomes for China in a Taiwan Conflict

As noted, it is possible that most of the countries currently supplying energy to China would decide to continue delivering oil and gas in a conflict scenario. A positive outcome for China would be having nearly 100 percent of current oil imports continue, as well as about 70 percent of natural gas imports (i.e., all but possibly those from the US and Australia, strong supporters of the Taiwan status quo[51]). Under this scenario, with little crude disruption and 5.5 Bcf/day of LNG disruption, there would be little disturbance to both the PRC's energy posture and global energy markets. Based on an average energy intensity per unit of China GDP of 203 MTOE/trillion US dollars of GDP,[52] a reduction of 5.5 Bcf/day of LNG supply needed for the Chinese economy would represent a drag of approximately 1.4 percent on the Chinese economy and would have a negligible impact on the much larger global LNG market.

One potential complicating factor for the conclusion that every nation except Australia and the US might continue Chinese energy deliveries is that a few of the companies that operate oil and gas production in those nations are Western-based private oil and gas concerns. They might have political or legal flexibility, including the ability to invoke "force majeure" terms of their sales agreements, to stop sales to China. Force majeure clauses typically allow companies to terminate sales for various crises, including wars.

Additional steps by sovereign opponents of a China action could include a sanctions regime that targets shipping companies, insurance providers, and other facilitators of energy trade. This sort of sanctions regime is being implemented by countries against Russia in the current conflict.[53]

Seaborne Interdiction

An additional action that could be taken by the US and its allied nations in a Taiwan war scenario is a global oil and gas export interdiction of China. History is replete with examples of sea denial of energy supplies and energy embargoes over the last century, such as in both the Atlantic and Pacific during World War II. And given that the locations from which air and naval assets may be deployed to effectuate an energy imports interdiction can be well beyond the geography China can exert control over, China has little ability to prevent such an interdiction militarily.[54,55]

Given that a maximum 9.7 mm bbl/day (63 percent)[56] of China's crude usage that normally comes via SLOCs could be eliminated in a Taiwan-ally embargo situation as well as 10.7 Bcf/day (29 percent)[57] of its natural gas, delivered via LNG tankers, the energy and economic posture of the PRC would be significantly affected. Based on the average energy intensity per unit of China GDP described earlier, a reduction of 9.7 mm bbl/day of crude supply needed for the Chinese economy could roughly mean a drag of approximately 14 percent on the Chinese economy. A reduction of 10.7 Bcf/day of natural gas supply needed for the Chinese economy would represent a drag of approximately 3 percent on the Chinese economy. A complete interdiction of SLOC imported crude and natural gas, assuming no Chinese energy conservation programs that minimize negative impacts on economic output, could therefore represent an approximately 17 percent GDP hit to the China economy. This assumes using a long-term cross elasticity of demand of oil and natural gas of 1.0.[58,59]

The impact on the PRC of this complete elimination of seaborne oil and gas would be dramatic. Losing 60 percent of total needed crude oil supply would have major impacts on the transportation, logistics, chemicals, and materials sectors, causing significant ripple effects across the country. China's crude oil storage capacity of 900 mm bbl, assuming it was fully filled before a conflict, could make up for about 100 days of the supply reductions, which is not a materially long time compared to certain large conflicts such as the current Ukraine war. Even a conflict that resulted in a short-term victory by China could instigate an enduring interdiction of their energy supplies. In either scenario, Beijing would need to impose significant rationing to manage the impact.

An elimination of 29 percent of total needed natural gas supply would have major impacts on China's largest users: the manufacturing, heating, and mining sectors. Interestingly, one of the major users of natural gas is the coal mining industry, so this natural gas supply reduction could have follow-on negative impacts to the broader energy sector, affecting power availability and home heating and adding to manufacturing challenges.

A China energy interdiction does not necessarily imply that 100 percent of the energy supplies via SLOCs would be eliminated. Past energy embargoes conducted by US administrations on Iran and Venezuela included waivers for certain countries to continue to conduct energy transactions with those countries. Over the course of time, waivers were eliminated, and energy transaction restrictions increased. In a current example, the energy delivery reductions Russia is imposing on Ukrainian allies in Europe have been intermittent and incremental.

Potential Energy Outcomes for Global Markets in a China Energy Interdiction Scenario

The reduction of energy usage from the China energy interdiction scenario described above would have a significant global impact. Removing 9.7 mm bbl/day of crude demand from global markets (out of approximately 100 mm bbl/day of typical demand) would likely lead to significant price drops for crude, as was seen during the early stages of COVID-19. COVID-related economic shutdowns in March 2020 drove rapid energy demand destruction of about 20 million bbl/day,[60] leading to short-term negative oil prices and a more sustained approximately 40 percent reduction in crude prices until demand recovered.[61]

The reduction in natural gas demand of 10.7 Bcf/day in a China energy interdiction scenario would also have a global pricing impact, but it would likely be less than that for the oil market since the natural gas disruption to China would be a smaller portion of the approximately 391 Bcf/day[62] global market.

Such demand destruction and related price drops could generate financial distress for many exporting countries and oil companies. One of the biggest challenges of maintaining a long-term embargo is the impact on exporting nations whose economies rely on the export income. Taking approximately 9.7 mm bbl/day of demand off the market would have a dramatic impact on those countries, similar to the 6.6 mm bbl/day reduction in global demand during 2020 as result of the COVID pandemic.[63] Keeping support for any length of time with oil and gas export dependent countries like Saudi Arabia, UAE, Kuwait, and Qatar would be a challenge diplomatically. And the US could be subject to political pressure domestically to keep supplies flowing, given the strong export position of the US in oil and gas. The US alone could militarily and financially maintain the embargo indefinitely, but political considerations and export economic pressures would increase over time.

Price drops could be exacerbated if suppliers suddenly possess too much production and try to quickly sell it in the spot market, similar to what happened in April 2020. Similar implications the world experienced then, such as US Strategic Petroleum Reserve purchases and significant production cuts by producers around the world, could happen again in a full China energy interdiction scenario. Impacts on LNG markets would be similar but more muted, since China constitutes a smaller portion of the global natural gas market.

Given the material impacts of a China energy interdiction, national security professionals could conduct further analysis of the potential energy challenges and develop mitigants. In addition, member nations of the International Energy Agency (IEA) could direct it to review possible implications of such a conflict and potential policy options if it came to pass. Having such national security and IEA plans in place could be very valuable given that a conflict could occur without significant preparation time.

Conclusion

Large-scale military conflicts have often had significant impacts on energy markets. The Russian war in Ukraine, for example, has generated the largest energy crisis in generations. As a result, the world is absorbing significant energy market volatility and energy price increases. Countries are considering energy posture policy implications to prepare for any future decision-making brought on by additional conflicts.

A material number of current energy exporters might not embargo China in a major conflict, like a confrontation with Taiwan. But if such a conflict were to lead to a broader interdiction of energy imports to China, it would have considerable impacts on the Chinese economy—each year the country's energy posture risk has been increasing. A full interdiction of seaborne energy imports into China could translate roughly to a 17 percent hit to China's GDP, based on the energy intensity of the country's economy and its import volumes, with significant impacts on the transportation, mining, and other sectors heavily dependent on oil and natural gas. And the amount of reduced China crude demand that this would cause could impact global crude markets more than the world experienced during the COVID market disruption, straining energy exporting nations in the process.

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About the Author

The Honorable Paul M. Dabbar is a Distinguished Visiting Fellow at the Center on Global Energy Policy at Columbia University SIPA. He is also CEO and Co-founder of Bohr Quantum Technology, developing and deploying technologies for the emerging quantum internet.

Prior to that in 2017, the U.S. Senate unanimously confirmed Mr. Dabbar to serve as the Department of Energy's fourth Under Secretary for Science, where he served from 2017-2021. He managed several areas of the Department, as well as serving as the Department's principal advisor on fundamental energy research, energy technologies, science, and commercialization of technologies. He managed over 60,000 people with a budget of $15 billion p.a. at over 100 sites, including managing the majority of the U.S. National Laboratories.

Areas of research he managed included basic energy sciences, nuclear and high energy physics, advanced computing, fusion, and biological & environmental research. He also led the largest environmental remediation program in the U.S., addressing the operations of nuclear weapons and commercial power production, completing several multi-billion dollar construction projects. He also led various new efforts to commercialize innovations arising from the National Labs. He co-led several new energy innovation efforts, including the Energy Storage Grand Challenge, as well as the passage and implementation of the National Quantum Initiative Act.

Mr. Dabbar was awarded in 2021 the Secretary of Energy's senior DOE award, the James R. Schlesinger Medal, for leadership on developing energy technologies, discovery science, environmental management, and the National Quantum Initiative.

During his time in government service, Mr. Dabbar traveled to both the geographic North and South Poles. He traveled to the North Pole by submarine to conduct environmental research while in the Navy, and to the South Pole in support of high energy physics astronomy missions of DOE at South Pole Station.

Prior to confirmation as Under Secretary, Mr. Dabbar worked in operations, finance, and strategy roles in the energy sector. As a Managing Director at J.P. Morgan, he had over $400 billion in transaction experience across all energy sectors. In addition, he had a senior leadership role for the company's commodity trading business, including energy. Before joining J.P. Morgan, Mr. Dabbar served as a nuclear submarine officer. He has been a lecturer at the U.S. Naval Academy, and conducted research at the Johns Hopkins University Applied Physics Laboratory. Mr. Dabbar is a member of the Council on Foreign Relations.

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