

Rival Energy Orders: Great Power Competition and the Politicization of Energy Trade

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March 27, 2026

(First, incomplete, draft. Contact the author for comments and a version suitable for citation and attribution)

Abstract

In the past decade, the shale revolution transformed the United States into the world's largest oil and gas producer and a major energy exporter, while China became the world's largest oil importer and the dominant manufacturer of clean energy technologies. How does the emergence of two competing great powers with dominance in rival energy domains affect global energy trade and, more broadly, the international order? I first examine four theoretical pathways through which these changes can affect international cooperation and conflict: a domestic political economy channel, increased weaponization of energy dominance, changed incentives for cooperation and public goods provision, and realignment. I then examine the implications for one area of international cooperation: global energy trade. I argue that both fossil fuel and green energy trade increasingly follow a political rather than a market-based logic, signifying the weakening of the liberal international order (LIO). However, the causal pathways differ. In fossil fuel, global markets were sustained through US security guarantees. I find that targeted US sanctions have led to fragmentation where states outside of the US security realm now source fuel primarily from opponents of the LIO. By contrast, in green energy, states inside the US security realm increasingly adopt targeted restrictions on green energy trade with China driven by a combination of competitiveness concerns and geopolitical concerns. The result is increasing geopolitical fragmentation in both types of energy markets.

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1 Introduction

Patterns of interdependence in global energy markets have changed markedly over the past decade. The shale boom transformed the United States from the world’s largest oil importer, one that still maintained a ban on crude oil exports as recently as 2015, into the world’s largest producer and a major exporter of oil and gas just ten years later. During that same period, China leveraged industrial policy to become the dominant manufacturer of green-energy products, including solar panels, wind turbines, batteries, and electric vehicles. Meanwhile, wars, most notably the 2022 Russian full-scale invasion of Ukraine and the 2026 Iran war, have caused major supply shocks. On the demand side, developing countries, especially in South and South-East Asia, are driving rapidly growing consumption of all forms of energy, while projections for electricity demand in advanced economies have recently shifted upward due to the rapid expansion of data centers.

How does the emergence of two competing great powers with dominance in rival energy domains affect international cooperation and, more broadly, the international order? Energy remains a central input to economic production and household consumption and is thus of great strategic concern for states. Yet, for much of the post-Cold War period, energy was traded on global markets with relatively few bilateral political constraints on who could trade with whom. This has changed. Most notably, states have returned to using energy as a weapon: increasing targeted sanctions and exploiting the vulnerability of other states by leveraging control over pipelines, critical minerals, and LNG exports as coercive tools to advance foreign policy objectives (O’Sullivan and Bordoff, 2025). While the potential and limitations of the energy weapon are relatively well-understood, structural changes in global energy markets have also produced new patterns of complex interdependence that are less commonly analyzed, especially in tandem. I argue that these structural shifts have politicized both fossil fuel and clean energy trade and that they could reshape patterns of conflict and cooperation more broadly.

This paper first examines four pathways through which changes in the energy supplier status of major powers could theoretically affect patterns of international conflict and cooperation: a domestic political economy channel, increased weaponization of energy dominance, changed incentives for cooperation and public goods provision, and realignment. This yields four arguments. First, incentives to invest in the LIO stem in large parts from the domestic political economy of states. The shale revolution has had a modest economic effect on the U.S. national economy but a much larger effect in select geographic areas of the United States. This has contributed to significant polarization over energy policies, conflicting priorities over oil prices, large inconsistencies across Administrations, and increased uncertainty

in global markets. By contrast, China’s market dominance in green energy was the product of central planning and industrial policies. The sector has become a major engine for growth and (slowly) contributes to shielding the Chinese economy from the negative effects of oil price volatility. China’s energy strategy is clear and credible.

Second, the shale revolution has reduced the incentives that once led the United States to underwrite stability in global energy markets. After the United States lost its hegemonic position in global energy markets in the 1970s, Washington provided order through “security for oil” arrangements: maintaining freedom of navigation, extending security guarantees to major producers, and supporting institutions that enabled oil, and to a lesser extent natural gas, to be traded on global markets largely irrespective of the political allegiances of exporters (Colgan, 2021). The shale boom has substantially weakened these incentives. More broadly, the shale revolution has removed structural constraints on U.S. foreign policy that had been in place for decades, creating conditions that have facilitated, though not determined, the increasingly coercive posture of the second Trump Administration. Yet, even before that such looser constraints were visible, including a greater willingness to impose targeted sanctions on oil producers. This has contributed to the political fragmentation of global oil markets.

Third, while green energy imports do not create the same continuous-flow dependencies as oil or gas, China’s dominance and cost advantages in green energy manufacturing have nonetheless resulted in the politicization of green energy trade. A combination of geopolitical rivalry and competitiveness concerns has led states to adopt industrial policies aimed at building their own green energy industries and to erect trade barriers that reduce the importation of Chinese green energy products (e.g. Meckling, 2025). These policies undermine the rules-based global trading regime, just as, critics argue, China’s original industrial policy strategy did before them. Moreover, countries that are not aligned with China increasingly substitute cheap Chinese green energy imports with more expensive products from geopolitical partners, contributing to geoeconomic fragmentation.

Fourth, asymmetries in the energy vulnerabilities of the major powers could, in theory, contribute to rising geopolitical contestation and reshape geopolitical alignments. Despite its ascendancy in green energy, China is now also the world’s largest oil and gas importer. In 2016, when the United States and China each imported roughly 8 million barrels of crude oil per day, the two countries shared a strong interest in stability and in keeping maritime trade routes open. Disruptions to global oil trade now affect China far more than they do the United States, which helps explain why Beijing has built substantial strategic oil reserves in recent years to mitigate this vulnerability. Other major importers, particularly the European Union, now share certain interests with China, most notably a desire to insulate themselves from the volatility of fossil fuel markets and to pursue decarbonization to limit

the effects of climate change. By contrast, the United States has grown increasingly hostile to green energy policy. While these dynamics could, in principle, create new geopolitical alignments, I argue that they have not yet done so. Oil and gas trade generates immediate, continuous dependencies that lock states into existing relationships and make reorientation costly. Moreover, competitiveness concerns pervade green energy trade: even states that share China’s interest in decarbonization are reluctant to deepen dependence on Chinese supply chains, limiting the incentives for political realignment.

The paper proceeds as follows. I first examine the four theoretical pathways drawing on qualitative evidence to illustrate them. I then test observable implications in one domain: trade in green energy and oil and gas. The results show that, even before the second Trump Administration, countries outside the U.S. security umbrella had begun importing more fossil fuels from their geopolitical partners. This effect is mostly driven by increased targeted sanctions, which affected U.S. security partners more than states outside of the U.S. security realm. Gravity regressions on green energy trade reveal a similar and growing influence of geopolitical alignment on trade flows. However, the underlying mechanism differs. Countries with their own industrial bases that are geopolitically misaligned with China have increasingly adopted trade restrictions targeting Chinese products. These restrictions, in turn, predict greater trade with geopolitical partners. Thus energy trade increasingly follows a political rather than a market-based logic, signifying the weakening of the liberal international order.

These arguments contribute to several active debates in international relations. First, scholarship on contemporary U.S. foreign policy has identified a range of explanatory factors for Washington’s retreat from multilateral engagement: populist backlash against globalization, great-power competition with China, and the idiosyncratic preferences of particular administrations (Broz, Frieden and Weymouth, 2021; Ikenberry, 2018; Lake, Martin and Risse, 2021). This paper identifies an additional, structural driver: the transformation of the United States into the world’s dominant producer and exporter of oil and natural gas. This shift has had profound domestic and international political economy implications that complement, and in some cases reinforce, other explanations such as the China shock.

Second, the recent literature on economic statecraft and geoeconomics has focused heavily on weaponized interdependence (Farrell and Newman, 2019): how states exploit chokepoints and network vulnerabilities to achieve foreign policy objectives. Oil and gas have a long, and mixed, history as instruments of coercion (Hughes and Long, 2014; LaBelle, 2023). China has similarly leveraged its dominance in critical minerals, especially rare earths, as a tool of international coercive bargaining; also with mixed success (Gholz and Hughes, 2021). Yet the focus on discrete episodes of coercive bargaining understates the more structural

changes in complex interdependence (Keohane and Nye, 2012) that shape long-term incentives for cooperation and competition. China’s dominance in green energy, for instance, has geopolitical implications that extend well beyond its choke hold on critical minerals. Green technology is a major driver of economic growth in an otherwise slowing Chinese economy, and it is central to Beijing’s quest for energy independence, which, if achieved, would remove constraints on Chinese foreign policy in much the same way that the shale revolution has done for the United States. Moreover, while green energy imports do not create the same type of dependence as continuous flows of oil and gas, they tie importing countries into Chinese infrastructure and technological ecosystems in ways that could carry significant long-run consequences.

Third, the political implications of these new interdependencies matter for the trajectory of the global energy transition. The growing importance of geopolitical alignment in green trade is a mixed blessing. On the one hand, politically motivated trade is inefficient: countries that forgo the cheapest green energy products in favor of geopolitically acceptable alternatives may slow the pace of decarbonization. This concern would be considerably more serious if clear geopolitical fault lines were emerging between fossil-fuel-dominant and clean-energy-dominant states, as some analysts have suggested. On the other hand, China’s near-oligopolistic position in key clean technology markets poses its own medium- and long-term risks, and political incentives to invest in clean technology for competitiveness reasons may spur the development of alternative producers and products (Meckling, 2025). Moreover, the politicization of fossil fuel trade may itself accelerate the energy transition by making green energy products more attractive, especially for states with strained political relationships with the United States.

Finally, the rapidly expanding geoeconomics literature has established that transnational economic flows are increasingly driven by geopolitical alignments rather than purely economic incentives; even suggesting that we may be witnessing a new Cold War in which trade primarily takes place within rather than between geopolitical blocs (Gopinath et al., 2025). Yet, this literature has less to say about the political economy logic underlying this, other than an abstract reference to growing geopolitical conflict between the US and China. This paper demonstrates that we are indeed seeing growing politicization in energy trade but for different reasons in green and fossil fuel energy.

2 Hydrocarbons, Green Energy, and Great Power Politics

The US has long been a significant oil producer but exports declined sharply from the late 1950s as domestic consumption outpaced production and the US became a growing net importer (see figure 1). Before the 1970s US oil firms controlled significant production abroad but nationalizations reduced this significantly, making the US more dependent on imports from countries with opposing foreign policy objectives. Congress effectively prohibited crude exports in 1975 through the Energy Policy and Conservation Act, though refined product exports were always permitted. By the mid-2000s, US net petroleum imports had reached approximately 12 million barrels per day, making it by far the world's largest oil importer (U.S. Energy Information Administration, 2024). The shale revolution, driven by innovations in hydraulic fracturing and horizontal drilling, fundamentally altered this.

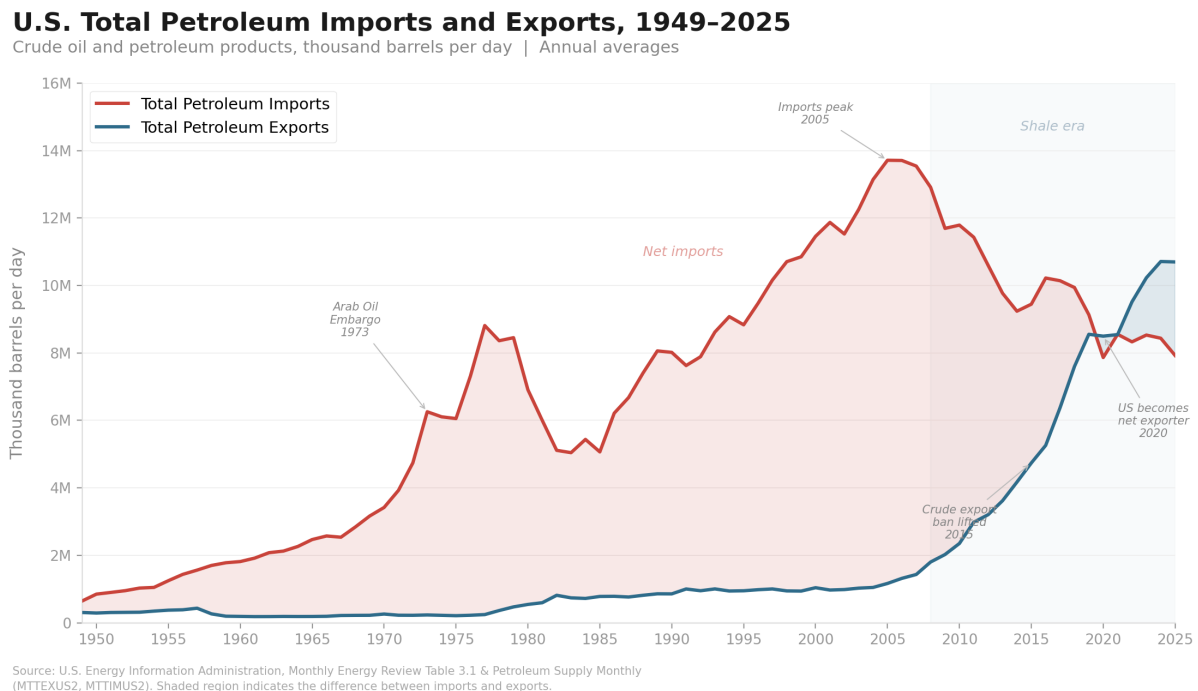


Figure 1: Changes in U.S. Petroleum Imports and Exports

Shale gas production began scaling meaningfully around 2005. By 2008 the same techniques were applied to oil-bearing formations, principally the Bakken in North Dakota and then the Permian Basin in West Texas. Both oil and gas production soared and after Congress lifted the crude export ban in December 2015, total petroleum exports exploded — from about 5.3 million b/d in 2016 to over 10.7 million b/d in 2024–2025. By 2018, the

United States had surpassed Saudi Arabia and Russia as the world’s top crude oil producer; by 2024, it had become a net energy exporter and the world’s leading exporter of liquefied natural gas (LNG), while also ranking among the largest exporters of petroleum products (U.S. Energy Information Administration, 2024; Yergin, 2020). The US still imports oil due to the legacies of existing infrastructure, such as the pipelines that transport heavy crude from the Alberta oil sands and the Gulf Coast refineries that were built to process heavy, sour crude, historically from Venezuela, Mexico, and the Middle East. However, the US no longer relies on large quantities of imported oil from distant regions.

China’s green energy dominance results from deliberate central planning going back at least two decades. Most importantly, China used industrial policies, such as “Made in China 2025,” that subsidized mining, refining, and R&D in order to achieve an edge in high-tech manufacturing (e.g. Allan, Lewis and Oatley, 2021). Figure 2 shows just how extensive China’s global market dominance in green energy has become. In 2025, China supplied about 80% of the global market in solar PV modules and controlled roughly 75% of electric vehicle (EV) battery cell production. China is the global leader in refining 19 out of 20 critical minerals for clean energy.¹ The scale of production combined with technological advances in manufacturing have given Chinese producers enormous cost advantages over competitors in key green energy technologies. The IEA estimates that manufacturing PV modules in the United States and India costs two to three times more than in China² and that China produces EV batteries at costs 20–30% lower than in European and North American markets.³ Since 2010, the costs of solar PV, wind, and batteries have fallen by 60–90%, largely thanks to Chinese scale and manufacturing advances.⁴

How does the emergence of two competing great powers with dominance in rival energy domains affect international cooperation and, more broadly, the international order? This is an especially pertinent question in the context of rising geopolitical conflict between China and the United States and the weakening of the U.S. led Liberal International Order (LIO). Energy has long been of considerable interest to international relations scholars and there has been research on aspects of this question. However, relatively little attention has been paid to how the dominance of the two great powers in different energy domains shapes international cooperation and conflict.

I examine four key ways in which energy production, imports, and exports potentially shape great power competition and cooperation, as well as their interests toward the LIO. I follow Lake, Martin, and Risse in defining an order as “patterned or structured relationships

¹<https://www.iea.org/reports/energy-technology-perspectives-2024>

²<https://www.iea.org/reports/energy-technology-perspectives-2024>

³<https://www.irena.org/Publications/2025/Jul/Renewable-Power-Generation-Costs-in-2024>

⁴<https://ember-energy.org/latest-insights/china-energy-transition-review-2025/>

China's Share of Global Clean Energy Manufacturing Capacity

Percentage of global manufacturing capacity by technology, 2024 estimates

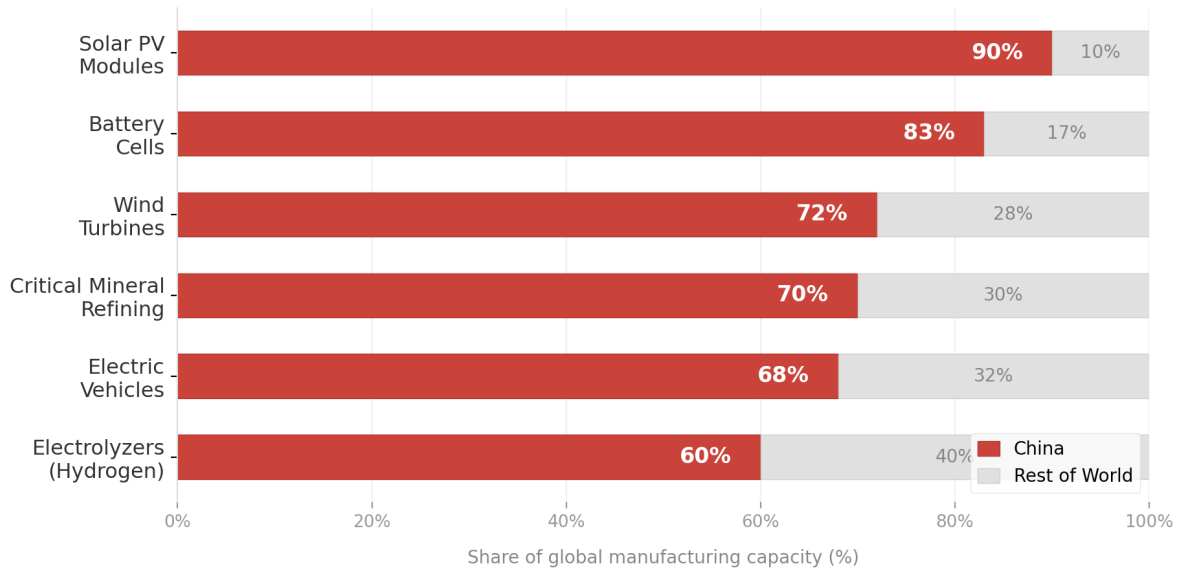


Figure 2: China's Dominance in Clean Energy Sectors

among units” (Lake, Martin and Risse, 2021). The LIO is the US led order characterized by ideas and institutions that privileges the rule of law, the free movement of goods and capital, and the multilateral provision of global public goods. The LIO is sustained both by multilateral institutions and U.S. power (Ikenberry, 2011). This order has become increasingly contested both from within and by challenges from illiberal states, most notably China (Voeten, 2021). Oil has long been a subsystem within that order, with its own rules, institutions, and logic (Colgan, 2021), but green energy is governed more squarely within the multilateral framework of the LIO. The core question in this paper, then, is how dramatic changes in global energy markets are reshaping these orders within the context of broader geopolitical and ideological contestation over the LIO?

First, the open economy politics tradition posits that the interests of domestic political and economic actors determines policies and strategies towards globalization (Lake, 2009; Rogowski, 1989). Big structural changes, like the China trade shock, can change these interests and thus affect an interest in international economic cooperation (Broz, Frieden and Weymouth, 2021). Energy shocks could have the same effects but have not been examined as much in this framework. Second, the literatures on complex interdependence (Keohane and Nye, 1977) and weaponized interdependence (Farrell and Newman, 2019) have studied how asymmetries in oil and gas interdependence and control over choke points in the energy

supply create opportunities for coercive bargaining. Third, the literature on conflict and cooperation suggest that oil exporters have reduced incentives for international cooperation (Ross and Voeten, 2016) and fewer constraints on aggressive foreign policies (Colgan, 2013). Finally, big structural changes could create incentives for realignments, as happened after the 1970s oil crises, which moved Egypt and the Gulf monarchies firmly into the US orbit (Gause III, 2009).

2.1 Domestic Political Economy

A first, and straightforward, argument is that energy matters because domestically producing energy increases economic growth while import dependence puts economic growth at the whims of global energy markets. Energy remains a key input for most economic activities. The coupling between energy and GDP was highest during industrialization and has loosened substantially in advanced economies, especially after the oil crises of the 1970s. However, the U.S. economy is about 40-50% more energy intensive than the EU (International Energy Agency, 2023) and electricity demand is increasing in developed countries for the first time in two decades, largely due to the rise in data centers. The IEA expects US electricity demand to grow at an average annual rate of 2% over the 2025–2027 period, which is equivalent to adding the total electricity demand of California over the next three years (International Energy Agency, 2025). The correlation between energy and economic output remains very tight in developing and middle-income countries.

The overall effect of the shale boom on the US economy has been modest. The U.S. is a large and diversified economy. The Dallas Federal Reserve estimated that the first ten years of the shale boom were responsible for about ten percent of U.S. GDP growth (Yucel and Plante, 2019). Yet, the economic benefits of the shale boom have been geographically uneven, with some parts of the country and some producers reaping huge gains (Feyrer, Mansur and Sacerdote, 2017). The geographic concentration of US shale production has generated pronounced feedback effects on domestic political alignment (Colgan and Van de Graaf, 2017; Gazmararian, 2025; Mahdavi, 2020). The regions that have benefited most from the unconventional oil and gas boom—Texas, North Dakota, Louisiana, Pennsylvania, and Ohio—have trended decisively toward the Republican Party, which has adopted an aggressively pro-fossil-fuel platform. Campaign finance data indicate that nearly 90 percent of oil and gas industry donations in the 2024 election cycle were directed to Republican candidates (Dahl, 2025).

There is a strong argument that the U.S. should use both green and brown energy sources to meet growing electricity demand. The time horizons on U.S. shale production and the

green energy transition mean that a rational central planner would see no inherent conflicts. We may already be at peak shale oil production while shale gas production could remain relatively flat until mid-century.⁵ Indeed, some oil producing states, especially Texas, lead the charge on both fossil fuel and renewables. Yet, the shale boom likely undermined the development of the green energy sector in the US. Before the shale boom, US leaders used oil import dependence as an explicit argument for expanding the need for green energy. President George W. Bush said in his 2006 State of the Union speech that: "America is addicted to oil, which is often imported from unstable parts of the world. The best way to break this addiction is through technology. Since 2001, we have spent nearly \$10 billion to develop cleaner, cheaper, and more reliable alternative energy sources – and we are on the threshold of incredible advances. So tonight, I announce the Advanced Energy Initiative – a 22-percent increase in clean-energy research – at the Department of Energy, to push for breakthroughs in two vital areas. To change how we power our homes and offices, we will invest more in zero-emission coal-fired plants, revolutionary solar and wind technologies, and clean, safe nuclear energy."⁶

Economists have found that the shale revolution undermined incentives to invest in R&D for green energy, resulting in a less competitive green energy sector (Acemoglu et al., 2023). Political scientists have found that the shale revolution contributed to polarization over green and fossil fuel policies (Gazmararian, 2025). This has resulted in large policy shifts across administrations, thus challenging the credibility of US energy policies (Brooks and Voeten, 2025). In 2026 a Republican Congress voted to dismantle the Biden Administration's signature green energy law: the 2022 Inflation Reduction Act, which included incentives for long term investments into green energy. It is unclear that new US green industrial policy would be credible given these large pendulum swings. Indeed, the second Trump Administration has become outright hostile towards renewable energy, especially wind energy. For example, the administration agreed to pay \$1 billion to TotalEnergies to walk away from two U.S. offshore wind leases, extracting a promise from the company to invest the money in U.S. LNG production.⁷ This is especially striking given overall rising electricity demands from data centers.

The shale boom may also have affected the international competitiveness of US manufacturing and agriculture. In the pre-export ban period, energy intensive manufacturing industries enjoyed large energy price advantages compared to their foreign competitors thanks to the increase in domestic supply, resulting in sizeable export gains (Arezki, Fetzner and Pisch,

⁵<https://pgjonline.com/news/2025/april/perman-oil-growth-slows-as-us-shale-hits-geological-limits>

⁶<https://georgewbush-whitehouse.archives.gov/stateoftheunion/2006/>

⁷<https://www.doi.gov/pressreleases/interior-and-totalenergies-agree-end-offshore-wind-projects-lowering-costs-american>

2017). These price advantages eroded after the crude oil ban was lifted, although some price advantages remain in natural gas, which faces more export barriers. Yet, after the export ban was lifted oil price shocks are now positively correlated with economic production in the United States, which was not the case before the export ban and it is not true in non-oil exporting countries (Bjørnland and Skretting, 2024). There is also evidence that incipient Dutch Disease dynamics may be operating in the U.S. context. Since the onset of the shale boom, oil prices and the U.S. dollar have exhibited increasing co-movement (Rees, 2025). A stronger dollar erodes the competitiveness of manufacturing and agriculture, providing stronger incentives for protectionist trade policies.

Finally, the US is caught in a dilemma faced by all major oil exporters: price increases benefit producers and may have favorable spillover effects into parts of the economy but they also hurt consumers. Many oil exporting states therefore adopt fossil fuel subsidies (Mahdavi, Ross and Simoni, 2025). In the US this contributes to inconsistent and volatile policies. For example, President Biden paused approval of new LNG export terminals driven in large part by fear of rising domestic energy prices.⁸ President Trump promised to expand US oil production *and* to deliver \$50 per barrel oil, which would be below break even level for many US oil producers.⁹ This points to a basic political economy tension, which is that policies that favor producers (campaign contributors) often hurt consumers (voters).

The effect of high tech manufacturing of especially batteries, solar panels, and wind turbines on the Chinese economy has been substantial. China’s continued rise as a great power depends heavily on its ability to sustain economic growth. More recently, China has faced significant challenges on this front, which also pose risks to the legitimacy of the regime. Clean-energy sectors contributed a record 15.4 trillion yuan (\$2.1 trillion) in 2025, some 11.4% of China’s GDP, and drove more than a third of overall economic growth, plus more than 90% of the net rise in investment.¹⁰ Exports have also surged, reaching about \$200 billion in 2025 across green energy technologies.¹¹ While these benefits were not equally distributed, they were the result of a centrally planned government strategy that pursues both economic and strategic goals, especially energy independence. Thus, the clean energy sector has become a significant component of China’s continuing rise as a geopolitical competitor of the United States.

As the world’s largest oil and gas importer, China’s economy remains vulnerable to large

⁸<https://www.csis.org/analysis/biden-administration-pauses-new-lng-approvals>

⁹<https://finance.yahoo.com/news/trump-wants-oil-prices-to-hit-50-a-barrel-the-math-doesnt-work-for-the-us-oil-industry-182639810.html>

¹⁰<https://www.carbonbrief.org/analysis-clean-energy-drove-more-than-a-third-of-chinas-gdp-growth-in-2025/>

¹¹<https://ember-energy.org/data/china-cleantech-exports-data-explorer/>

shocks in the price of oil and gas. Imports accounted for 74% of the country’s total oil supply and 42% of its gas supply in 2024.¹² However, crude oil is only a relatively modest part of China’s total energy supply, with coal remaining dominant and a rising share of green energy. This means that price shocks hit specific sectors hard, especially petrochemicals, steel, and aluminum, but China’s economy overall is less vulnerable than many other Asian countries, like Japan and South Korea. Nevertheless, general equilibrium analyses show that oil price volatility remains a considerable negative influence on China’s GDP (Liu, Chen, Wu, Ma and Yao, 2025).

One key difference between oil and green energy is how the market sets prices. While oil producers vary in the cost of extraction, oil is largely traded at global market prices. The natural gas market is differentiated by geography shaped by transport complications: pipelines or sea transport after liquefaction. Markets for solar and wind power are like other markets for manufactured products. Given China’s large cost advantages, this means that open markets create competitiveness concerns and pressures for protectionism. Thus, even the IRA, which wanted to expand green energy adoption in the US, did so while placing high tariffs on Chinese green energy products and excluding Chinese owned firms from benefiting from its tax credits. By contrast, countries rarely put tariffs on oil and gas imports. Thus, compared to the U.S., China relies more on the trade policies of other countries in order to realize the economic benefits of its sectoral energy dominance. I will return to this issue in later sections.

While both China and the US have benefited from their respective energy transformations, China’s continued economic success depends relatively more on its green energy products than the US economy depends on being a leading fossil fuel producer. Moreover, their dual successes have created conflicting interests. China’s economy loses from higher prices and volatility while the US economy is much less affected. Finally, the shale boom has had polarizing effects in the US leading to large policy swings. By contrast, there is much more of a consensus view underlying China’s green energy strategy.

2.2 Energy as a Coercive Tool: Asymmetric and Weaponized Interdependence

Great powers can use their role as energy suppliers to increase the dependence of their allies and (threaten to) cut off supplies to adversaries. The point that oil trade creates asymmetric interdependencies that can potentially be weaponized is well established (Keohane and

¹²<https://andamanpartners.com/2025/10/chinas-dependence-on-strategic-fuel-imports-and-opportunities-for-global-fuel-exporters/>

Nye, 2012). Asymmetric interdependence reflects that oil importers are often both sensitive and vulnerable to shocks in oil supply; meaning that shocks hit economies hard and there are limited policy options to remedy the damage. This potentially gives oil suppliers power over importers. Oil’s political relevance derives from two features (Hughes and Long, 2014). First, importers need a continuous flow to keep their economies productive and their citizens comfortable. States can build up strategic reserves to manage short-term interruptions but most importers are extremely limited in how they can brace themselves for disruptions. Second, suppliers are restricted by geological features, although the shale revolution shows that technological development matters. Nonetheless, the countries that are major oil suppliers are relatively fixed in the medium term. This creates large and persistent asymmetries in the highly integrated global markets for oil and gas. States with market dominance can exploit these asymmetries for political gain.

Weaponized interdependence captures that actors can use control over key nodes in a global network to extract concessions from states (Farrell and Newman, 2019). Oil and gas trade has numerous choke points, from shipping lanes, like the Strait of Hormuz, to pipelines, like the Nordstream pipelines that transmitted Russian gas to Europe. China’s near monopoly control over critical minerals, such as Rare Earth minerals, can also be exploited as a choke point in coercive bargaining. The weaponization of oil itself has been studied extensively since the 1970s (LaBelle, 2023). However, more recently, scholars have started studying the exploitation of other network vulnerabilities (Farrell and Newman, 2019). Most notably, the United States has increasingly exploited that many cross-border transactions rely on the dollar and the US has extensive strong jurisdictional control over such transactions. This gives the US opportunities to leverage unilateral sanctions to extract policy concessions, which is especially important in the oil and gas sector, which almost exclusively relied on dollar denominated transactions (until recently).

There is little doubt that the US used energy to create dependencies before the 1970s. For example, Hans Morgenthau argued that during the first decades of the Cold War both the USSR and the US used their oil exporter status to establish their dominance over allied states (Morgenthau, 1975). Before the 1970s, the US was a near-pure hegemon in oil (Colgan, 2021). The major international oil companies (the “Seven Sisters”) controlled price formation backed by US and British military support. The order was maintained by threats of force and occasionally direct intervention, as illustrated by the coup against Iranian Prime Minister Mossadegh in 1953 after his government had nationalized oil two years prior. Decolonization brought about change in the oil security subsystem, causing the US to lose its hegemony in the oil sector (Colgan, 2021). In the 1970s, Middle Eastern states even tried to use oil as a weapon against the US. This did not have its intended political effects (the US abandoning

support for Israel) but it did have a large negative effect on the global economy and led to large changes in global energy markets, including less reliance on oil and gas.

Recent literature questions the effectiveness of oil as a weapon since the 1970s (LaBelle, 2023). After the U.S. stopped controlling global oil production, the US role changed to providing security that allowed oil markets to operate as “one great pool” (Weiner, 1991). In the absence of high market concentration, even the OPEC cartel had limited ability to set prices (Colgan, 2014). This led to relatively sanguine assessments of the potential for oil to be used as a coercive tool in the first two decades of the post-Cold War period (Hughes and Long, 2014). The primary concern for the U.S. became that others would exploit their control over choke points, such as Russian control of the Nordstream pipelines (de Jong, 2022), rather than using control over energy markets as a tool of coercion itself.

The US secured integrated global oil markets through its naval superiority (Hughes and Long, 2014), oil for security deals with Middle Eastern powers (Colgan, 2021), and defending the order with force when needed, most notably after the Iraqi invasion of Kuwait. Some argue that this force projection created new possibilities for direct coercion. For example, Charles Glaser worried that the U.S. ability to cut off Chinese oil imports by controlling naval routes created a security dilemma that cannot easily be solved and has the potential to create military conflict (Glaser, 2013). The possibility of the US cutting off shipping routes is a long-standing concern in Chinese debates over energy security and an incentive to aim for energy independence (Downs, 2006). It also plays a role in China’s decision to diversify oil suppliers. Yet, it is also a very expensive tool for the US to employ, as it would adversely affect US allies, like Korea and Japan, and trigger strong responses.

The use of energy as a weapon has made a comeback (O’Sullivan and Bordoff, 2025). Energy and energy infrastructure have become a target in the Ukraine and Iran wars. The U.S. has also used energy coercion, for example in its conflicts with Venezuela and Cuba, essentially seeking to control Venezuela’s energy assets and depriving Cuba of oil in order to get political concessions. This is a major departure from recent policies that mostly aimed for stability and depoliticization of global oil markets. Importantly, the US has increasingly used the sanction instrument against oil producers even in the absence of multilateral support, exemplified by Trump’s sanctions on Iran in the first Administration after leaving the JCPOA. The effects of those sanctions on the US were strongly limited by the shale revolution (Bordoff and Losz, 2019; O’Sullivan, Overland and Sandalow, 2017a).

A less studied question is whether China’s green energy dominance also gives it increased leverage over other states (Erdoğan, Çelik and Haskell, 2025; Joffe, 2018; Kennedy, 2023; Meckling and Hughes, 2018; O’Sullivan, Overland and Sandalow, 2017b)? In terms of market share, China’s dominance of green energy trade is vastly greater than U.S. dominance in oil

and gas markets. Demand for green energy products is rising as countries seek to meet climate goals and growing energy needs. In many developing countries, importing Chinese solar and wind products is the fastest and cheapest way to meet rising energy demand. While electricity demand in developed countries has been largely flat over the past two decades, the expansion of data centers has led to sharply higher growth projections, which can in part be met by clean energy. Moreover, many oil-importing countries share China's desire to reduce their exposure to increasingly disruptive oil and gas markets.

Nevertheless, trade in green energy products does not create the same dependencies as oil and gas. To be sure, China has the ability to set prices and exploit supply chain choke points in certain mineral trades. Especially with regards to rare earth minerals, countries are both sensitive and vulnerable to supply disruptions. However, in the higher-value green technology sector, the picture is more complicated. Temporarily shutting down solar panel exports does not shut down an economy or leave citizens without heating in the way that cutting off natural gas or oil does. Most countries are neither very sensitive nor vulnerable to such supply shocks.

Moreover, oil differs from manufactured goods because geology largely determines the location of production. China's critical mineral dominance stems from its refining capacity rather than its geological richness. Potentially, other states could develop new refining capacity, provided they are willing to bear the environmental costs and the subsidies needed to compete with low-cost Chinese refining. New technologies could also reduce reliance on the specific minerals that China dominates. Similarly, while China has significant advantages in green energy manufacturing, including a technological edge in battery production and scale advantages that are hard to replicate, other countries could in principle expand their production capacities in a way that is not typically possible with oil and gas. This would come at an economic cost but the policy options are broader than with oil and gas.

That said, countries that build their electricity grids around Chinese inverters, battery storage systems, and EV charging infrastructure may face significant switching costs. Moreover, cost advantages and the sheer size of market dominance make it difficult to avoid Chinese imports for countries that wish to switch to cleaner energy for climate and/or strategic reasons. This form of technological lock-in operates through a different mechanism than oil dependence, but it could carry its own long-run strategic consequences. This may be especially important for developing countries that are oil and gas importers, like Pakistan, who are adversely affected by more unstable oil and gas markets.

In short, while the US exploited control over oil markets to create dependencies before the 1970s, since then it has played more of a stabilizing role; facilitating highly integrated global markets through security. This has changed only recently, most notably through targeted

sanctions and a blockade on Cuba. These coercive tools are not due to market dominance or control over choke points in oil supplies but due to the larger pillars that determine US power: its military might and the dollar. In this sense, these tools fit the logic of the next section: that US oil export surpluses have removed some of the constraints on coercive actions that previously existed.

China has used its dominance over certain critical minerals in coercive bargaining but ultimately its market dominance in green energy technologies is of limited use for coercion. However, especially dependent countries that want to escape the detrimental effects of unstable global oil and gas markets may become more structurally dependent on Chinese green energy products.

2.3 Energy Import Dependence and Incentives for Cooperation and Public Good Provision

While US oil dominance and China’s green energy dominance are probably not very useful as tools for direct coercion, they did shift incentives for cooperation and public good provision, especially for the United States. The literature on oil and foreign policy argues that oil-exporting states have reduced incentives for international cooperation (Ross and Voeten, 2016) and that oil exports remove constraints that might restrain potentially aggressive leaders (Colgan, 2013). Thus, oil export dominance offers reduced incentives for cooperation and it creates structural conditions that facilitate the increase in aggressive and coercive actions in Trump’s second Administration (Ross and Voeten, 2026).

The US incentives to provide the security underlying integrated global oil markets stemmed in large part from it being the world’s largest oil importer. By the mid-2000s, US net petroleum imports had reached approximately 12 million barrels per day (U.S. Energy Information Administration, 2024). This aligned American interests with those of other major consuming states, generating shared incentives for stable maritime trade routes, predictable commodity markets, and multilateral governance institutions (Colgan, 2021; Keohane, 1984). It also put considerable constraints on US foreign policy.

When President Trump first took office in 2017, he mentioned foreign policy freedom as one of the key motivations for his “Unleashing American Energy” announcement: “Our country is blessed with extraordinary energy abundance, which we didn’t know of, even five years ago and certainly ten years ago. [...] We have so much more than we ever thought possible. We are really in the driving seat. And you know what? We don’t want to let other countries take away our sovereignty and tell us what to do and how to do it. That’s not going to happen. With these incredible resources, my administration will seek not only

American energy independence that we’ve been looking for so long, but American energy dominance. And we’re going to be an exporter — exporter.”¹³

By the time Donald Trump took office again in 2025, the U.S. had become the world’s largest oil producer and a leading energy exporter. On his first day in office, the President released a new “Unleashing American Energy” executive order.¹⁴ Among other provisions, the order removes incentives for green energy and includes explicit language that the global effects of energy policy should take a backseat to domestic costs and benefits.¹⁵ Trump Administration officials have stated explicitly how energy dominance has facilitated foreign policy actions. Energy Secretary Chris Wright noted that U.S. output growth and the anticipated growth following US military action in Venezuela “gives President Trump more leverage in his geopolitical actions to not worry about a crazy spike in oil prices.”¹⁶ Interior Secretary Doug Burgum, explaining why the Trump administration was willing to strike Iran’s nuclear facilities in the summer of 2025, stated that: “[..] we don’t get any oil anymore out of the Strait of Hormuz. And so, then you’re in a position where now the military power, tied with the economic power of tariffs, tied with the courage to be able to actually use that, you’ve got the degrees of freedom” (Burgum, 2025). In a leaked Signal group chat, Vice President J.D. Vance argued against “bailing Europe out again” by countering Houthi threats to shipping in the Red Sea: “Three percent of U.S. trade runs through [the Suez Canal]; 40 percent of European trade does.”¹⁷

The changing U.S. export profile has also facilitated coercive bargaining over tariffs by undermining the core principle of reciprocity. States that import oil and gas typically do so because they lack domestic production. They therefore have no incentive to place tariffs on oil and gas, which are key inputs for domestic producers. This undermines the key principle of reciprocity: when the U.S. imposes tariffs on other countries, those countries cannot respond by placing tariffs on what have become among the most valuable US exports. This dynamic has been most apparent in interactions with European partners. Following Russia’s 2022 invasion of Ukraine, European states rapidly diversified away from Russian pipeline gas, with U.S. LNG filling much of the resulting supply gap. By 2024, approximately 45 percent of European LNG imports originated from the United States (U.S. Energy Information

¹³<https://trumpwhitehouse.archives.gov/briefings-statements/remarks-president-trump-unleashing-american-energy-event/>

¹⁴<https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/>

¹⁵“(g) to ensure that the global effects of a rule, regulation, or action shall, whenever evaluated, be reported separately from its domestic costs and benefits, in order to promote sound regulatory decision making and prioritize the interests of the American people;”

¹⁶<https://www.cnbc.com/2026/02/06/trump-iran-oil-prices.html>

¹⁷<https://www.theatlantic.com/politics/archive/2025/03/trump-administration-signal-group-chat-attack-houthis/682176/>

Administration, 2024). Oil and natural gas constitute almost a quarter of all EU imports from the US.¹⁸ This creates a new dependency that the Trump Administration has chosen to exploit.

While the Biden Administration did not use tariffs to extract concessions from allies, it showed little interest in resurrecting the multilateral trading regime. One explanation may be that oil and gas had become the most valuable US export products even during the Biden Administration, and that these products did not face obstacles in gaining foreign market access. Moreover, the U.S. has developed a large trade surplus in services trade, which only rarely invited trade disputes and is governed by a shallower agreement (GATS) than trade in goods. As such, there was relatively little pressure from US exporters to revive the WTO.

This qualitative evidence suggests that US energy dominance helped make possible, though did not determine, the increasingly coercive behavior of the second Trump Administration. This is consistent with the broader literature on "petro-aggression" (Colgan, 2013): oil exports are a structural condition that remove some of the structural constraints that prevent more aggressive foreign policy behavior but they do not compel it.

That said, the structural changes were already visible before Trump's return to office and were placing pressure on the existing order. For example, the relationship between Saudi Arabia and the United States has weakened following the US transition from major consumer to competitor in oil markets (Konrad and Thum, 2025). Saudi Arabia, and other oil-rich states, have started hedging their strategic alliances as they worry about the enduring credibility of US commitment in the absence of oil dependence (Quamar, 2022). For example, Saudi Arabia and Pakistan signed a mutual defense pact, which some analysts interpreted as a welcome reduction in the security burden for the US (Mir, 2025).

These changes may also be visible in broader US strategic and policy choices. For example, analysts and the Congressional Budget Office have found that the U.S. has underinvested in shipbuilding and the navy,¹⁹ capabilities that were essential to upholding the previous order (Hughes and Long, 2014). The U.S. has also sought to strategically disengage from the Middle East, even if it has repeatedly been pulled back into conflicts (Quero and Dessì, 2021).

The Chinese government views its dependence on imports of oil and gas as a major strategic vulnerability. China is now the world's largest crude oil importer, purchasing over 10 million barrels per day. China has long sought to diversify its oil and gas imports to reduce dependencies on choke points like the Strait of Hormuz (Li, Jin and Shi, 2018), and it has expanded its strategic reserves to manage geopolitical disruptions (Liu, Guo, Shi,

¹⁸<https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20250311-1>

¹⁹<https://gcaptain.com/cbo-warns-navys-ambitious-2025-shipbuilding-plan-faces-major-hurdles/>

Ding and Chen, 2025). China also has excess coal capacity that it could use to manage oil and gas shortages (Gong and Lewis, 2024). China installed approximately 1,300 GW of non-fossil capacity (45% of the world total) by 2024 and saw a small reduction in oil and gas imports for the first time in 2025. Official Chinese projections suggest that energy independence, or something close to it, is possible by 2060,²⁰ although other projections anticipate 90% domestic reliance already by 2045.²¹ Achieving these goals would remove considerable constraints from China’s foreign policy behavior, including with respect to Taiwan.

Full energy independence may not be necessary if China can source sufficient energy from Russia or other partners in the event of Western sanctions, although China also fears dependence on Russia.²² Nevertheless, building up renewables and energy storage is integral to China’s long-term foreign policy ambitions. This logic mirrors the argument developed in the previous section: just as the shale revolution has loosened structural constraints on US foreign policy, China’s green energy transition could, over time, do the same. Or, to put it differently, China’s reliance on oil and gas imports has likely made it a more cooperative actor in international affairs than it otherwise would have been.

That said, the politicization of the global integrated oil market also leads to new conflicts between China and the US. Crude oil subject to US and Western sanctions probably accounted for more than one-fifth of China’s oil imports in 2024 (Downs, 2025). For example, Malaysia emerged as China’s third largest oil supplier in 2024, which almost certainly reflects oil imports from Iran and Venezuela, which are rebranded as Malaysian to evade US sanctions.

Finally, China is not in a position to subsume the US security role. China does not have a similar global security posture. China has virtually no mutual defense alliances (aside from North Korea) and is a minor, though growing, arms exporter. Its naval capabilities have expanded but they are mostly deployed nearby. Moreover, China realizes that expanding its military posture in the Middle East would risk conflict with the United States and further disrupt oil supplies.

2.4 Asymmetries in Energy Dependencies and Geopolitical Alignments

Do asymmetries in the energy vulnerabilities and opportunities of great powers contribute to rising geopolitical contestation and the reshaping of geopolitical alignments? Some analysts

²⁰<https://www.chinadaily.com.cn/a/202412/17/WS6760d927a310f1265a1d34c6.html>

²¹<https://www.ceic.com/gjnyjtwWEn/xwzx/202509/95c2f8bf1cd64e4ca38123b4d4cfcf9e.shtml>

²²<https://www.rferl.org/a/china-russia-power-siberia-gas-pipeline-xi-putin/33525800.html>

posit that a new energy bipolarity is emerging: petrostates (the US, Saudi Arabia, Russia) are consolidating influence through fossil fuels, while electrostates (led by China, increasingly joined by Europe) are building dominance through electrification, renewables, and clean tech supply chains (Mitrova and Corbeau, 2025; Morgan, 2026; Rawlings, 2025). These divisions cut across existing security and political alignments, as illustrated in Table 1.

Table 1: State Types by Security Realm

	US Security Realm	Non-US Security Realm
Petro state	USA	Russia
Electro state	EU	China

The theoretical logic for expecting realignment along energy lines draws on the idea that states that occupy similar positions in the emerging energy economy should develop convergent preferences on key policy questions. China and the EU, for example, share interests in decarbonization, in reducing exposure to volatile fossil fuel markets, and in scaling clean energy deployment. By contrast, the US and Russia, as major hydrocarbon exporters, share an interest in sustained fossil fuel demand and face similar incentives to resist aggressive climate policy. If these shared material interests are sufficiently strong, they could pull states toward new patterns of cooperation that cut across established security alignments. The petro/electro framework thus predicts that energy domain position should increasingly structure diplomatic alignments, trade partnerships, and institutional coalitions.

So far, however, there is little evidence for such realignment. To be sure, clean energy advocates in the EU and elsewhere invoke the Ukraine war and US coercive pressure as arguments to accelerate the energy transition. Yet, as discussed in the previous section, the EU is pursuing this transition by adopting industrial policies that aim to limit Chinese market domination and stimulate domestic production rather than by deepening cooperation with Beijing. Several mechanisms help explain why the expected realignment has not materialized.

First, the continued need for oil and gas creates immediate, continuous dependencies that lock states into existing relationships. The July 2025 Turnberry trade deal illustrates this vividly: the EU pledged to purchase \$750 billion of US energy, primarily LNG, oil, and nuclear fuel, in exchange for a lower 15% tariff ceiling on EU exports. Meeting this commitment would require roughly tripling annual US energy imports from approximately \$80 billion. Whatever shared interests the EU and China may have in clean energy, European dependence on US fossil fuel supplies acts as a powerful anchor to the existing transatlantic relationship.

Second, as documented previously, competitiveness concerns pervade green energy trade.

Even states that share China’s interest in decarbonization are erecting trade barriers against Chinese products and are seeking to build their own industrial capacity rather than aligning with Beijing.

Third, security ties remain dominant: NATO membership, intelligence-sharing arrangements, and shared threat perceptions vis-à-vis Russia continue to bind the EU to the United States in ways that energy interests alone are unlikely to override.

A better characterization of the current moment, then, is that a U.S.-led fossil-fuel order coexists with a China-led clean-tech order and that both orders have become increasingly politically contested. The question is whether this coexistence is stable or whether, over time, the material incentives created by diverging energy positions will begin to erode existing alignments.

3 The Politicization of Energy Trade

Different pillars of the US-led LIO upheld globally integrated markets in oil and green energy trade. US security guarantees allowed especially oil, and to a lesser extent gas, trade to function as drawing from “one great pool.” Countries rarely impose heavy import restrictions on oil and gas and so the international trading regime had little influence on oil and gas trade. By contrast, green energy trade, like other trade in manufactured goods, was largely governed by the WTO and other trade institutions. These institutions increased trade most among geopolitical adversaries who needed binding institutions to overcome political hold up problems (Carnegie, 2014). Thus, the combination of US power and institutions allowed energy trade to largely follow market principles rather than a political logic.

The theoretical argument implies that this liberal energy order has dissipated. One observable implication is that geopolitical alignment increasingly shapes bilateral trade in fossil fuels and that one key driver of this trend is the reduced U.S. incentive to stabilize global oil and gas markets as it transitioned from the world’s largest importer to its largest producer and a major exporter. If this mechanism is correct, we should observe a specific pattern: the alignment effect on fossil fuel trade should be concentrated among importers *outside* the U.S. security umbrella. Countries that enjoy U.S. defense guarantees, whether through mutual defense pacts, the presence of U.S. military bases, or de facto security partnerships, have less need for “political insurance” in sourcing energy, because their supply security is underwritten by the alliance relationship itself. By contrast, countries outside this security realm face the full force of geopolitical uncertainty and should therefore be most responsive to alignment signals when contracting for oil and gas.

By contrast, the politicization by trade in green energy is largely driven by countries

that adopt trade restrictive policies, often in violation of WTO rules, that specifically seek to keep out Chinese exports. These policies are driven by both competitiveness concerns and a geopolitical logic. Countries are employing tariffs and industrial policies to stimulate their own domestic green industries (Allan, Lewis and Oatley, 2021; Meckling, 2025). These policies are framed around issues of competitiveness more than fears of coercion (Allan and Nahm, 2025; International Energy Agency, 2022; Overland, 2019). For example, USTR actions under Section 301 increased tariffs on inputs such as wafers and polysilicon, explicitly linking industrial resilience to clean-tech manufacturing competition (Office of the United States Trade Representative, 2024). In parallel, the EU’s Net-Zero Industry Act formalizes a regulatory strategy to scale domestic net-zero manufacturing capacity (European Union, 2024).

Nevertheless, these policies often also have a geopolitical logic. A rapidly emerging literature demonstrates that Chinese exports and FDI are increasingly shaped by geopolitical alignments (Gopinath et al., 2025). China’s geopolitical partners may be more amenable to continuing to import large quantities of goods from China or to inviting Chinese FDI that establishes domestic manufacturing using Chinese technologies. But especially liberal democracies committed to the liberal international order have adopted restrictions motivated by both geopolitical and competitiveness concerns. The US Inflation Reduction Act (IRA) defined Chinese companies as “Foreign Entities of Concern” and created provisions that excluded these firms from tax credits (Brooks and Voeten, 2025). While the second Trump Administration has sought to roll back much of the IRA, the Foreign Entity of Concern provisions have largely survived, reflecting bipartisan support for limiting Chinese participation in US clean energy supply chains. The newly proposed EU Industrial Accelerator Act eliminates new FDI into green manufacturing from firms owned by nationals of countries that hold more than 40% of global manufacturing capacity, drawing angry reactions from China.²³

This results in two observable implications. First, geopolitical adversaries of China and countries with competitiveness concerns increasingly adopt green trade restrictions specifically targeted at China. Second, the countries that adopt these trade restrictions start importing more from geopolitical friends, implying that they are willing to pay a premium for trade along political lines. The bottom line expectation is that the liberal energy order where trade follows an economic rather than a political logic has dissipated.

²³<https://english.news.cn/20260306/6fff0516eb364bcc8f9d448226fab506/c.html>

3.1 Data and Measurement

I use the 2012–2024 BACI bilateral trade panel (HS12 revision) combined with data on U.S. security relationships. Trade data are aggregated into three product groups: fossil fuels (crude oil, refined petroleum, LNG, and natural gas), green energy goods (solar PV, wind turbines, batteries, power transformers, grid cables, and heat pumps, following the Ember definition), and similar goods in the same HS4 headings as the green goods, which serve as a placebo group. Geopolitical alignment is measured by ideal point proximity from UN General Assembly voting (Bailey, Strezhnev and Voeten, 2017). This is a measure of the degree to which two countries agree with how global issues should be resolved rather than a measure of the bilateral relations between countries (Voeten, 2025). Thus: UN ideal point dissimilarity reflects disagreement over the global order rather than a specific dispute between countries.

Operationalizing whether a country is in the U.S. security realm is complex. A country is coded as being in the U.S. security realm in a given year if it has a mutual defense pact with the United States, hosts a U.S. military base, or is Israel or Saudi Arabia, which have de facto security guarantees despite the absence of a formal alliance. The analysis focuses on the *importer's* security status: approximately 59% of fossil fuel dyad-year observations and 67% of green energy dyad-year observations have importers outside the U.S. security realm. I check the robustness of the results to using just mutual defense pacts.

3.2 Method

I estimate PPML gravity models separately for fossil fuels and green energy goods, interacting alignment with importer security status and three time periods:

$$\text{trade}_{ijt} = \exp(\alpha_{it} + \alpha_{jt} + \alpha_{ij} + \beta \cdot \text{IPProx}_{ijt} \times \text{NotUSRealm}_j \times \text{Period}_t) \cdot \varepsilon_{ijt} \quad (1)$$

where α_{it} , α_{jt} , and α_{ij} are exporter $\times$ year, importer $\times$ year, and dyad fixed effects, and NotUSRealm_j indicates that the importer is outside the U.S. security realm. The dyad fixed effects absorb all time-invariant bilateral factors, and identification comes from how the alignment–trade relationship *evolves differently over time* for importers inside versus outside the U.S. security realm. The three periods are 2012–2015 (reference), 2016–2019, and 2020–2024. I complement the period model with event studies that trace year-by-year alignment coefficients separately for each importer group. Standard errors are clustered by dyad.

3.3 Results

Figure 3 presents event study estimates of the alignment effect on fossil fuel and green energy trade, stratified by whether the importer is inside or outside the U.S. security realm. The two panels reveal strikingly different patterns that are consistent with the theoretical mechanisms advanced above.

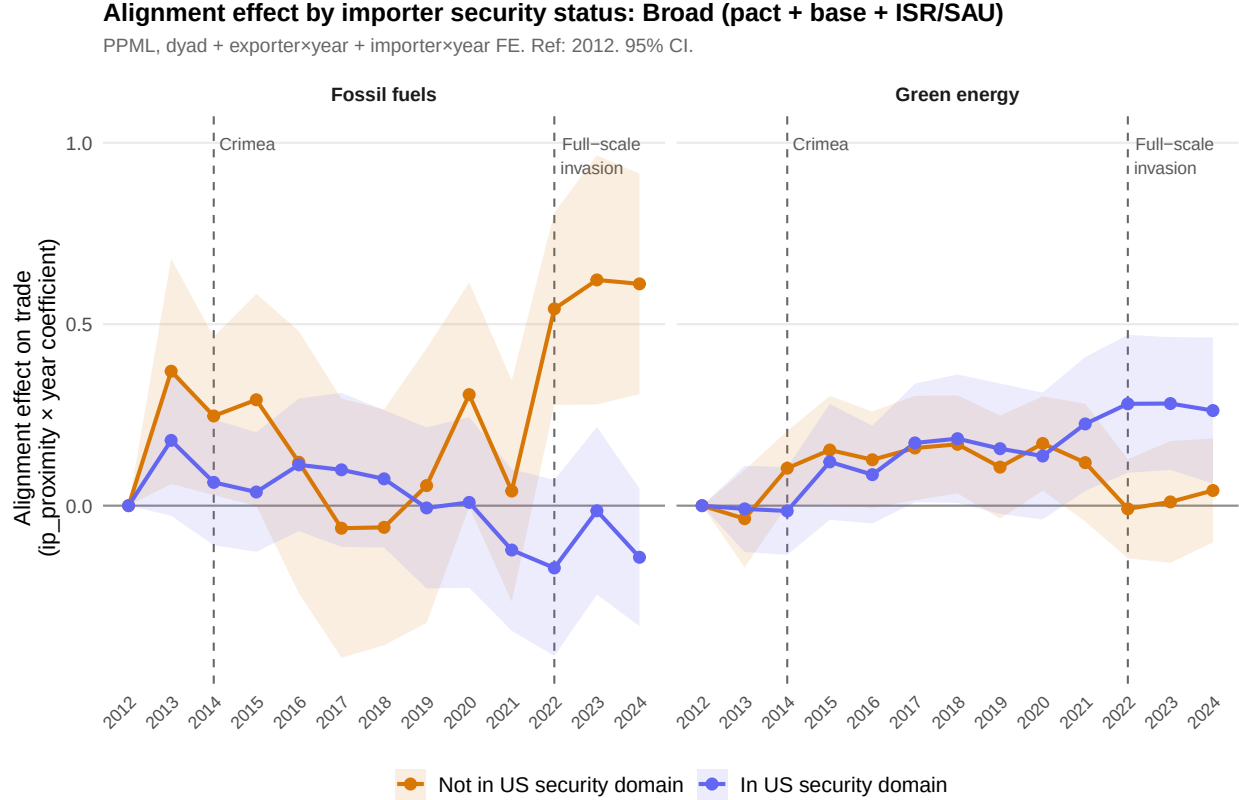


Figure 3: Alignment effect on fossil fuel and green energy trade by importer security realm status, 2012–2024. Lines show year-by-year PPML estimates of the effect of ideal point proximity on bilateral trade for importers inside vs. outside the U.S. security realm (broad definition), estimated separately for each group. Dyad, exporter × year, and importer × year fixed effects included. Shaded areas show 95% confidence intervals with standard errors clustered by dyad. Reference year: 2012.

For **fossil fuels**, the alignment effect grows substantially for importers outside the U.S. security realm. The baseline alignment effect in 2012–2015 is 0.29 ($p < 0.05$); by 2020–2024 it reaches 0.64 ($p < 0.01$), a more than twofold increase. For importers inside the U.S. security realm, the alignment effect moves in the opposite direction over the same period, declining toward 0.30 by 2020–2024. The three-way interaction between alignment, non-ally importer status, and the 2020–2024 period is -0.594 ($p < 0.001$), confirming that the post-2022 surge in alignment-based fossil fuel sourcing is concentrated among importers outside the

U.S. security umbrella. This result is robust to excluding all Russian exports: the analogous interaction is -0.563 ($p < 0.001$), indicating that the pattern reflects a broad shift in importer behavior rather than a mechanical consequence of Russia redirecting energy exports toward political allies. That said, the Russian invasion of Ukraine is clearly a triggering event.

For **green energy goods**, the pattern is reversed, pointing to a different underlying mechanism. Here, the growing alignment effect is concentrated among importers *inside* the U.S. security realm. By 2022–2024, the alignment effect for these importers rises to approximately 0.28, a significant increase from the near-zero baseline in 2012, while the alignment effect for importers outside the security realm fades toward zero over the same period. The three-way interaction term capturing the differential change in the alignment–green trade link in 2020–2024 for security-realm importers is positive and significant ($+0.195$, $p < 0.05$). As I argue in the next section, this pattern reflects deliberate policy choices by U.S.-aligned states to restrict Chinese green energy imports and redirect procurement toward geopolitically compatible suppliers.

Taken together, these findings reveal geoeconomic fragmentation in energy trade operating through two distinct channels: security-driven demand among non-aligned importers for fossil fuels, and policy-driven substitution among aligned importers for green energy goods. The results are consistent with a narrower definition of U.S. security realm. Moreover, the correlation between U.S. security realm and geopolitical alignment is modest (around .5). There are many states, like Saudi Arabia, that mostly vote with China in the UN but nonetheless rely on US security.

3.3.1 The Sanctions Channel

One mechanism that may partially explain why the alignment–fossil-fuel premium is concentrated among non-allied importers is the continued trade with US-sanctioned oil exporters. A growing share of global oil exports originates from countries subject to comprehensive US sanctions: Iran (sanctioned under CISADA/NDAA from 2012, with a partial reprieve during the JCPOA in 2016–2017, and under maximum pressure from 2018 onward), Venezuela (from January 2019, when OFAC designated PDVSA), and Russia (from March 2022, with the EU price cap following in December 2022). Importers within the US security realm face substantial risks to their continued relationship with the US. For example India, the world’s third largest oil importer and outside of the US security realm, has become a significant importer of Russian and Iranian oil.

Figure 4 provides descriptive support for this channel. Among importers outside the US security realm, the share of fossil fuel import value originating from sanctioned exporters rises from roughly 10% in 2012 to over 20% by 2023–2024, driven first by Iran, then Venezuela,

and most sharply by Russia after 2022. Among importers inside the US security realm, this share stays consistently below 5% throughout the sample.

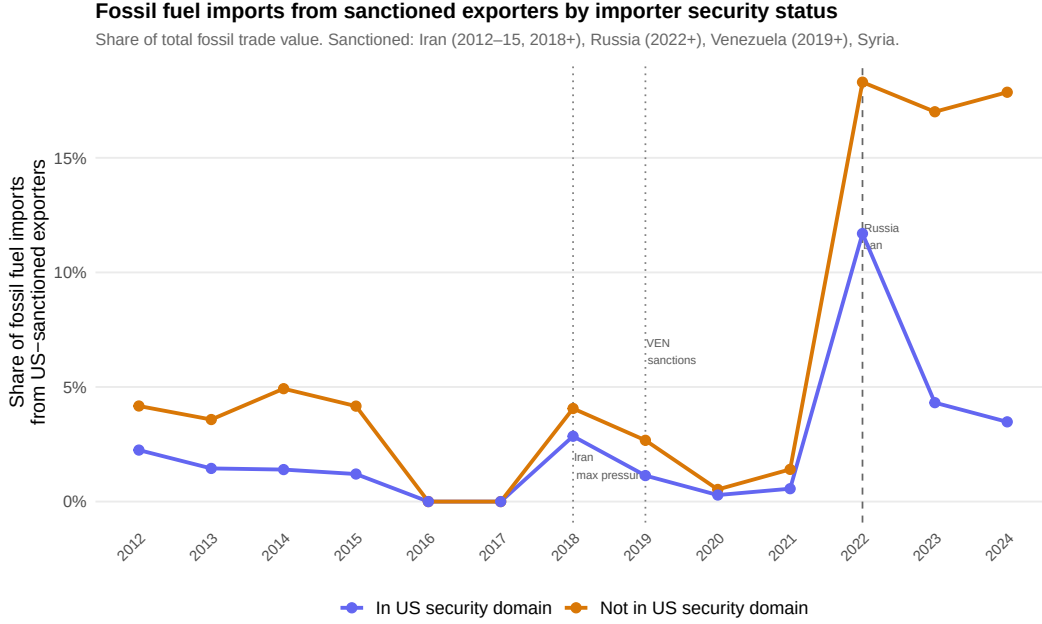


Figure 4: Share of fossil fuel import value from US-sanctioned exporters (Iran, Russia, Venezuela, Syria), by importer security realm status, 2012–2024. Vertical dotted lines mark the introduction of Iran maximum-pressure sanctions (2018) and OFAC’s designation of PDVSA (2019); the dashed line marks the US ban on Russian oil imports (2022).

To assess whether the differential alignment effect is driven by this channel, I re-estimate the importer-stratified event studies after excluding sanctioned exporters from the sample. Figure 5 presents two panels: the full-sample estimates from Figure 3 (left) and the estimates for non-sanctioned exporters only (right). The comparison is informative. When sanctioned exporters are excluded, the alignment effect for non-allied importers falls substantially and the gap between the two importer groups narrows considerably, especially after 2018. The post-2022 spike in the alignment coefficient for non-allied importers—the most visually prominent feature of the full-sample result—shrinks markedly once Russian exports are removed from the non-sanctioned-exporter sample (Russia transitions into the sanctioned category in 2022).

To decompose the alignment effect more precisely, I estimate a triple-interaction specification on the fossil-fuel panel:

$$\text{trade}_{ijt} = \exp(\alpha_{it} + \alpha_{jt} + \alpha_{ij} + \beta_1 \text{IPProx}_{ijt} + \beta_2 \text{IPProx}_{ijt} \times \text{Sanctioned}_{it} + \beta_3 \text{IPProx}_{ijt} \times \text{USRealm}_j + \beta_4 \text{IPProx}_{ijt} \times \text{Sanctioned}_{it} \times \text{USRealm}_j) \quad (2)$$

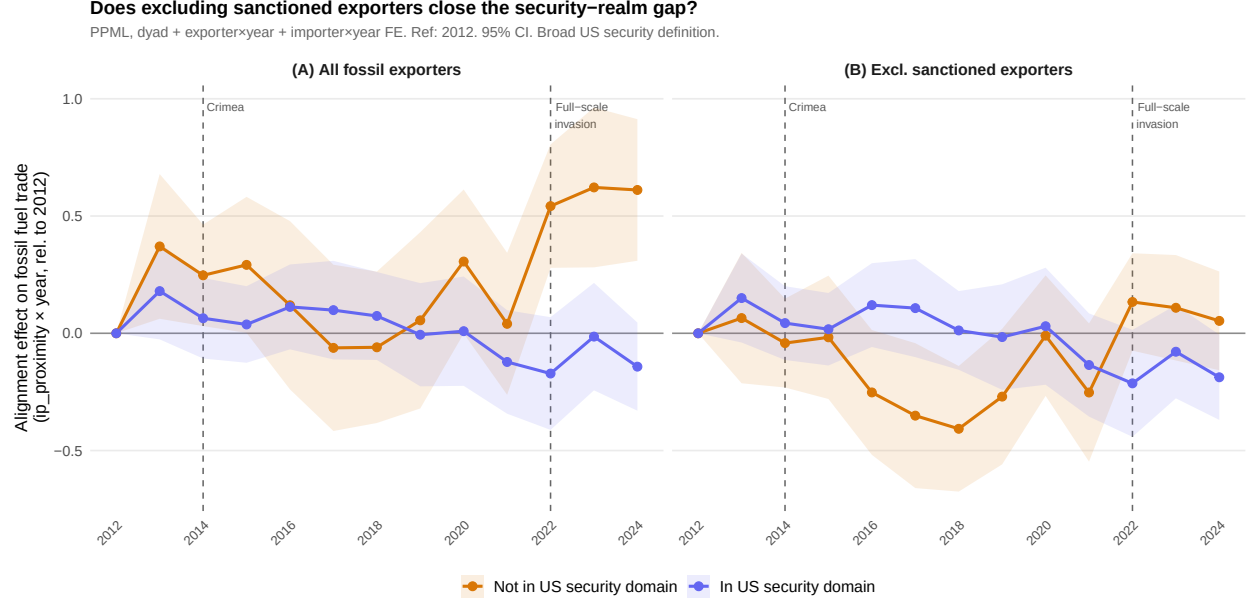


Figure 5: Alignment effect on fossil fuel trade by importer security realm status: full sample (left panel) vs. excluding sanctioned exporters (right panel). Sanctioned exporters: Iran (2012–2015 and 2018–2024), Russia (2022–2024), Venezuela (2019–2024), and Syria (2012–2024). PPML with dyad, exporter × year, and importer × year fixed effects. Reference year: 2012. 95% confidence intervals, standard errors clustered by dyad.

where Sanctioned_{it} is a time-varying binary indicator equal to one whenever exporter i is under comprehensive US oil sanctions in year t . The coefficient β_2 captures the additional alignment premium that non-allied importers earn from sanctioned exporters relative to non-sanctioned ones, and β_4 tests whether this premium is attenuated for importers inside the US security realm.

The results, reported in Table ??, are striking. The baseline alignment effect among non-allied importers trading with *non-sanctioned* exporters is $\hat{\beta}_1 = -0.035$ and statistically indistinguishable from zero. By contrast, the alignment premium from sanctioned-exporter flows is large and highly significant: $\hat{\beta}_2 = 1.456$ ($p < 0.001$). The combination implies a total alignment coefficient of approximately 1.42 for non-allied importers sourcing from sanctioned exporters—consistent with the interpretation that non-allied importers actively seek out geopolitically proximate sanctioned suppliers and are rewarded for political proximity in access and pricing. The triple interaction is $\hat{\beta}_4 = -1.057$ ($p < 0.01$), meaning that the alignment premium on sanctioned-exporter flows is strongly attenuated for importers inside the US security realm, consistent with secondary sanctions constraining allied importers from acting on the same alignment incentives. This may well understate the true effect as some states, like China and India, seek to hide their continued trade with sanctioned exporters.

These findings suggest that a substantial portion of the differential alignment effect across security realms documented in Figure 3 is attributable to the sanctions channel: the same political logic that drives non-allied importers toward geopolitically proximate suppliers operates *especially* through flows involving exporters whom the United States has sought to isolate. Among non-sanctioned exporters, the alignment signal is weak and insignificant for both allied and non-allied importers, implying that the broader market for oil and gas from non-isolated producers remains relatively insensitive to bilateral political alignment. The alignment effect thus reflects the politicization of the residual market that forms outside the sanctions perimeter rather than a general turn toward political sourcing across the whole fossil fuel market. The result is robust to treating the Iran JCPOA relief period (2016–2017) as sanctioned rather than unsanctioned.

3.4 Geopolitics and the Market for Green Energy Goods

3.4.1 Is Green Energy Trade more Politicized than Similar Trade?

Figure 6 presents year-by-year event study estimates of the alignment effect on green energy trade and a placebo group of similar goods. The specification is the same PPML gravity model with dyad, exporter $\times$ year, and importer $\times$ year fixed effects, and with the alignment coefficient allowed to vary by year (reference year: 2012). The “similar goods” placebo comprises products in the same HS4 headings as solar PV (8541), wind turbines (8502), and lithium-ion batteries (8507), but without green energy applications (Dai, Zhang and Zhang, 2021).

The left panel shows that the alignment effect on green energy trade rises from zero in 2012 to approximately 0.15–0.22 by 2018–2020, before declining slightly in the most recent years. The pattern suggests that geopolitical alignment began to shape green energy sourcing in the mid-2010s, coinciding with the escalation of trade restrictions on Chinese green exports. The modest decline after 2020 may reflect the proliferation of restrictions to a broader and more heterogeneous set of countries, diluting the average alignment signal, though pandemic-related trade disruptions could also play a role. The right panel confirms that the similar goods placebo shows no comparable trend: the alignment coefficient fluctuates around zero with no systematic pattern. This placebo test supports the interpretation that the green energy result reflects alignment-driven sourcing of these specific technologies rather than a general trend toward geopolitically motivated trade in the broader product categories.

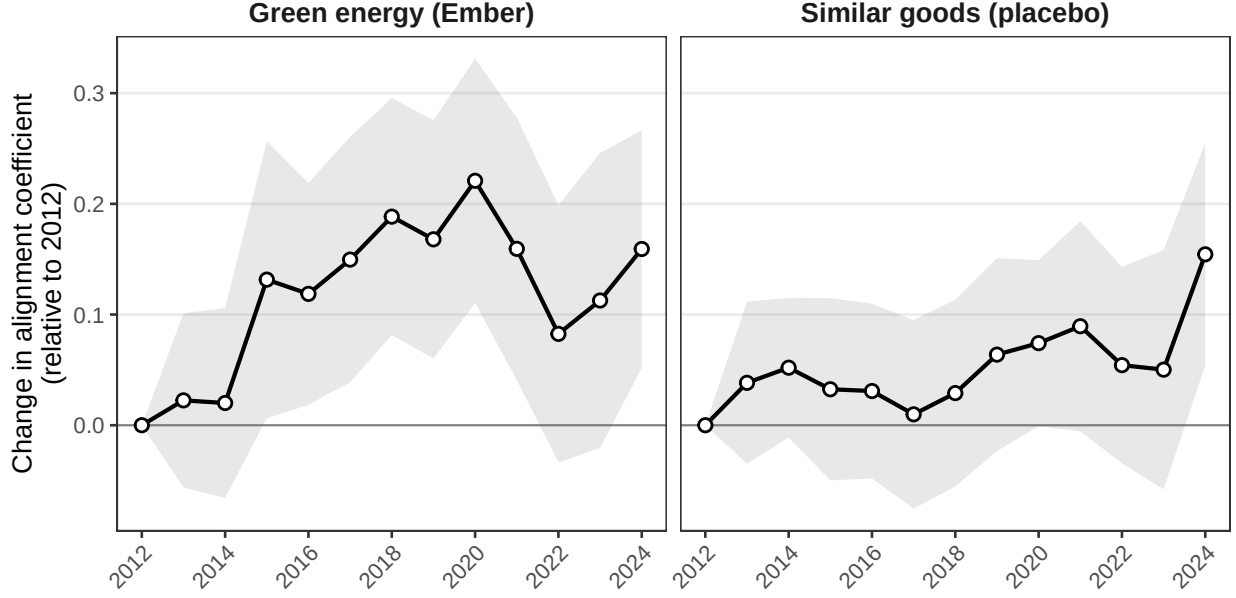


Figure 6: Alignment and green energy trade, 2012–2024. Year-by-year PPML estimates of the effect of ideal point proximity on bilateral trade, with dyad, exporter $\times$ year, and importer $\times$ year fixed effects. Left panel: green energy goods (Ember definition). Right panel: similar goods in the same HS4 headings (placebo). Reference year = 2012. 95% confidence intervals with standard errors clustered by dyad.

3.4.2 Are Restrictions on Chinese Green Goods Driven by Geopolitical Alignment?

Trade restrictions on Chinese green goods could be driven by geopolitical alignment, competitiveness concerns from domestic industries, or coordination within the U.S. security alliance. Trade intervention data come from the Global Trade Alert (GTA), which records government interventions affecting international trade. I focus on import-restricting measures targeting China, specifically tariffs, anti-dumping duties, countervailing duties, safeguards, and import bans on green energy goods, distinguishing these from domestic subsidies that do not directly impede imports. For each measure, I track whether it is *active* in a given year (accounting for measures that lapse), rather than counting cumulative adoptions. By 2024, 73 countries had active import restrictions on Chinese green energy goods, up from 7 in 2009, with two notable inflection points: the EU solar anti-dumping case in 2013 and the U.S. Section 301 tariffs in 2018.

To distinguish between these mechanisms, I construct a panel at the country $\times$ HS6 product $\times$ year level, covering all 11 green energy HS codes for 192 countries over 2012–2024 ($N = 27,412$). The dependent variable is binary: whether country j has an active import restriction on China in HS code k in year t . I measure three predictors. *Geopolitical distance*

is the absolute difference in UN ideal points between the implementing country and China (?). *Competitiveness* is a binary indicator equal to one if the country itself exports in that HS6 code in the same year, constructed from BACI trade data. *US security realm* is a binary indicator for countries with a mutual defense pact with the United States, hosting a U.S. military base, or Israel and Saudi Arabia. I estimate linear probability models with year fixed effects and cluster standard errors by country.

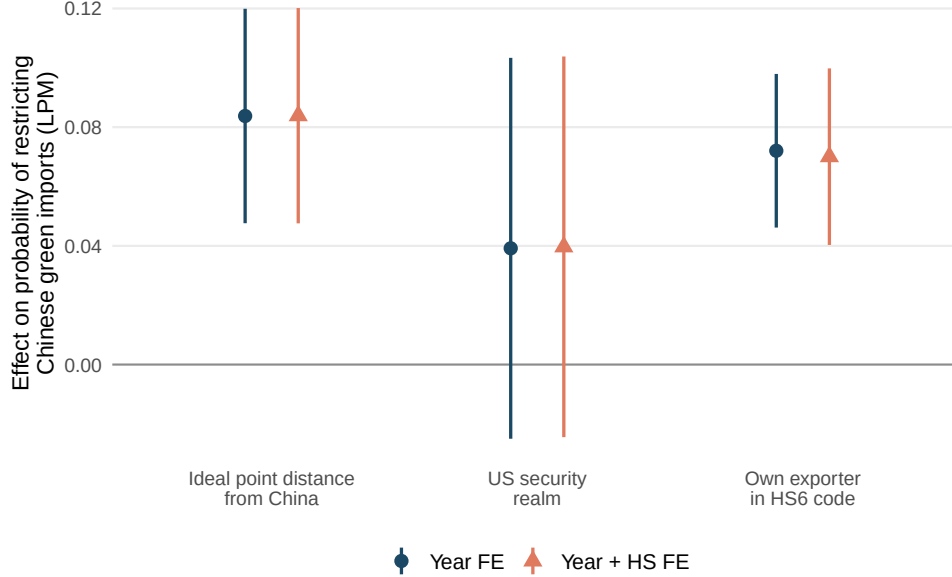


Figure 7: Linear Probability estimates of the effect of ideal point distance and competitiveness on import restrictions by HS6 code. 95% confidence intervals with standard errors clustered by country.

When entered separately, all three predictors are significant: geopolitical distance from China raises the probability of an active restriction by 9.8 percentage points per unit ($p < 0.001$); being in the U.S. security realm raises it by 9.4 percentage points ($p < 0.01$); and being an own-exporter in the HS6 code raises it by 9.5 percentage points ($p < 0.001$). However, when all three enter jointly, geopolitical distance and competitiveness remain highly significant (+8.4 pp, $p < 0.001$ and +7.2 pp, $p < 0.001$, respectively), while the U.S. security realm effect drops to 3.9 percentage points and loses significance ($p = 0.23$). Results are robust to adding HS6 fixed effects. It is worth noting that the competitiveness variable may itself be partially endogenous: countries that have adopted industrial policies to build green energy capacity are more likely both to export and to restrict Chinese imports, and the industrial policy decision may in some cases be jointly determined with geopolitical considerations.

The finding that U.S. security realm membership does not independently predict restric-

tions, conditional on alignment and competitiveness, is consistent with the heterogeneous composition of the U.S. alliance network. Countries such as the Gulf states, Israel, and several Southeast Asian allies are firmly within the U.S. security realm but are not ideologically distant from China in UN voting and have limited domestic green energy industries. These countries continue to import Chinese green products without restriction. The restrictions are concentrated among U.S. allies that happen to be both geopolitically distant from China *and* home to competing domestic producers, primarily the EU, the United States itself, and other advanced industrial democracies. In short, security alliance membership is a correlate of restriction adoption, but the operative mechanisms are geopolitical alignment and industrial competitiveness.

3.4.3 Do Restrictions Redirect Trade Toward Aligned Suppliers?

The final question is whether import restrictions on Chinese green goods redirect purchases toward politically aligned alternative suppliers. I estimate a PPML gravity model on the sample of non-Chinese exporters of green energy goods:

$$\text{trade}_{ijkt} = \exp(\alpha_{it} + \alpha_{jt} + \gamma \cdot \text{Restrict}_{jkt} + \beta \cdot \text{IPProximity}_{ijt} \times \text{Restrict}_{jkt} + \mathbf{X}'_{ij} \delta) \cdot \varepsilon_{ijkt} \quad (3)$$

where i is the exporter, j the importer, k the HS6 product code, and t the year. IPProximity_{ijt} is the negative of bilateral ideal point distance derived from UN General Assembly voting (?), where higher values indicate closer alignment. Restrict_{jkt} is a binary indicator equal to one if importer j has an active import restriction on China specifically for HS code k in year t (from Global Trade Alert). $\mathbf{X}_{ij}$ denotes standard gravity controls (log distance, contiguity, common official language, colonial tie, and preferential trade agreement). The coefficient γ captures whether a China-specific restriction on a product generates trade diversion toward all non-Chinese exporters; β captures the additional alignment premium, that is, whether aligned suppliers disproportionately benefit when their product faces a China restriction.

The key identifying variation is at the product level within importer $\times$ year: across green energy goods sold to the same importer in the same year, do products subject to a China-specific import restriction trade more with politically aligned suppliers? The more demanding specifications replace bilateral gravity controls with dyad fixed effects (α_{ij}), which absorb all time-invariant bilateral heterogeneity, and add exporter $\times$ year (α_{it}) and importer $\times$ year (α_{jt}) fixed effects to absorb all supply- and demand-side shocks.

Table 2 reports four specifications. Column (1) is the cross-sectional gravity specification: exporter $\times$ year and importer $\times$ year fixed effects with bilateral gravity controls, mirroring

the benchmark specification of the gravity analysis. The gravity controls have the expected signs. The HS restriction main effect is large and positive (1.157***): when China is blocked from an HS code, non-Chinese exporters experience substantially higher trade in that product, consistent with trade diversion benefiting all alternative suppliers. The IP proximity main effect is negative (-0.368^{***}), indicating that among non-Chinese green exporters, politically aligned countries trade *less* with each other in ordinary times. This likely reflects the composition of the non-Chinese exporter pool: the major alternative green energy exporters are advanced industrial democracies that are closely aligned with each other but also compete directly in the same product markets. The alignment premium is specific to restricted products: the interaction coefficient (0.817***) shows that trade in China-restricted goods flows disproportionately toward aligned suppliers.

Column (2) replaces gravity controls with dyad fixed effects and adds year fixed effects. The interaction coefficient remains large and highly significant (0.790***), while the restriction main effect is similarly positive (1.179***). Columns (3) and (4) further add exporter $\times$ year and importer $\times$ year fixed effects, absorbing all unilateral shocks. Column (3) retains the HS restriction main effect (1.272***) and yields an interaction of 1.043***; column (4) reports the most parsimonious specification with the interaction alone (0.400**). The coefficient in Column (4) is smaller because, without the restriction main effect, the interaction absorbs both the general trade diversion effect and the alignment-specific component, attenuating the estimate. Column (3), which separates these two channels, is the preferred specification.

The interaction is positive, significant, and consistent across all four specifications. Countries that restrict Chinese green imports do not simply import from whoever is cheapest: trade diversion is strongly concentrated among politically aligned suppliers.

4 Conclusion

This paper has argued that structural changes in global energy markets have politicized both fossil fuel and clean energy trade, albeit through distinct mechanisms. In oil and gas, the shale revolution reduced US incentives to underwrite the stability of global energy markets and increasingly undertake coercive actions, including targeted sanctions on oil exporters. This increasingly drives importers outside the US security umbrella to source fossil fuels increasingly from geopolitical adversaries of the US, contributing to geopolitical fragmentation in oil and gas markets. In green energy, a combination of competitiveness concerns and geopolitical misalignment from China has led states to erect trade barriers and redirect purchases toward aligned suppliers. Gravity model regressions confirm both

Table 2: Geopolitical Alignment and Substitution in Green Energy Trade

	(1)	(2)	(3)	(4)
IP Proximity	−0.368*** (0.074)	0.435* (0.199)		
HS Restriction	1.157*** (0.096)	1.179*** (0.098)	1.272*** (0.098)	
IP Proximity × HS Restriction	0.817*** (0.170)	0.790*** (0.104)	1.043*** (0.132)	0.400** (0.149)
Log Distance	−0.623*** (0.044)			
Contiguous	0.313*** (0.089)			
Common Language	0.385*** (0.082)			
Colonial Tie	0.089 (0.116)			
PTA	0.225** (0.080)			
Dyad FE		✓	✓	✓
Exporter × Year FE	✓		✓	✓
Importer × Year FE	✓		✓	✓
Year FE		✓		
Gravity Controls	✓			
Observations	375,300	494,254	494,254	494,254
Adjusted Pseudo R^2	0.581	0.638	0.662	0.646

Notes: PPML estimates. Dependent variable is bilateral trade value (BACI). Sample: non-Chinese exporters of green energy goods (Ember HS6 codes), 2012–2024. HS Restriction: binary indicator equal to one if importer j has an active import restriction on China for HS code k in year t (Global Trade Alert; import tariffs, anti-dumping, countervailing duties, safeguards, and import bans only). IP Proximity = $-|\text{idealpoint}_i - \text{idealpoint}_j|$ from UN General Assembly voting (?). Column (1) includes log bilateral distance, contiguity, common official language, colonial tie, and preferential trade agreement indicator. Smaller sample in column (1) due to missing gravity covariates for some territories. Standard errors clustered by dyad in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

patterns. Yet, there is no evidence that these new energy interdependencies are driving broader political realignment. The EU’s dependence on US fossil fuels, the pervasiveness of competitiveness concerns in green energy, and the enduring weight of security ties all work

against the emergence of new coalitions organized around energy domain position.

Both of these dynamics undermine the pre-existing rules-based trade order and contribute to geoeconomic fragmentation, but they do so in different ways. Global trade institutions primarily facilitated trade between geopolitical adversaries by reducing political hold-up problems (Carnegie, 2014). These institutions, however, had little effect on fossil fuel trade, where import restrictions were never the primary barrier to exchange. Instead, it was US security guarantees that allowed global oil and gas markets to operate as a single integrated pool. The erosion of those guarantees has fragmented fossil fuel trade along geopolitical lines in ways that trade institutions are ill-equipped to address. In green energy, by contrast, the rules-based order is being undermined more directly: states are imposing tariffs, anti-dumping duties, and industrial policies that violate the spirit, and sometimes the letter, of multilateral trade commitments. The result is a two-front erosion of the liberal trading order, one driven by the withdrawal of security provision and the other by the reassertion of industrial policy.

These findings carry implications for the trajectory of the global energy transition. The politicization of green energy trade is a mixed blessing. On the one hand, geopolitically motivated sourcing is inefficient: countries that forgo the cheapest clean energy products in favor of alternatives from political allies risk slowing the pace of decarbonization. On the other hand, the politicization of fossil fuel trade may itself accelerate the transition by making renewable energy more attractive to states seeking to reduce their exposure to increasingly volatile and geopolitically fraught hydrocarbon markets. Moreover, political incentives to invest in clean technology for competitiveness reasons may diversify global supply chains away from Chinese near-monopolies, which poses its own long-term risks. Whether the net effect accelerates or retards the energy transition remains an open and consequential question.

Finally, the absence of energy-driven political realignment should not be mistaken for permanence. The theoretical conditions for realignment, shared material interests across existing alliance lines, are present and growing. Should the United States continue to pursue aggressively anti-green policies while simultaneously leveraging fossil fuel dependence against allies, the structural incentives for European and other advanced democracies to deepen energy cooperation with China will intensify. For now, security ties, fossil fuel lock-in, and competitiveness concerns act as powerful anchors to existing alignments. Whether those anchors hold as the energy transition advances is among the most important questions for the future of international order.

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