

JULY 2020

# RACE *TO THE* TOP

The Case for a New  
U.S. International Energy Policy

**AUTHORS**

Sarah Ladislaw  
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A REPORT OF THE ENERGY SECURITY AND CLIMATE CHANGE PROGRAM

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# THE CASE FOR A NEW U.S. INTERNATIONAL ENERGY POLICY

## OLD STRATEGIES WILL NOT WORK—TOO MUCH HAS CHANGED

New energy sources are supplementing fossil fuels.

The United States is now a major hydrocarbon producer.

Nationalism, authoritarianism, and dirigisme are thriving.

Economic competition is growing among big economies.

## THE UNITED STATES SHOULD...

### REINVEST IN DOMESTIC ENERGY COMPETITIVENESS

- 1 Define technologies and markets to compete in.
- 2 Spend more on R&D and channel that spending to specific bets.
- 3 Focus equally on deployment—R&D is not enough.
- 4 Pair deployment strategies with a focus on manufacturing.

### ENCOURAGE AN INTERNATIONAL RACE TO THE TOP

- 1 Infuse climate into multilateralism and every institution out there.
- 2 Focus on diffusion over institutional consolidation.
- 3 Make multilateralism work, even if great powers do not get along.
- 4 Think about great power rivalry—but do not get consumed by it.

# EXECUTIVE SUMMARY

U.S. foreign policy has always thought about energy and, more recently, climate. The interaction between energy and foreign policy has followed the path of globalization. In early days, trade in energy formed the basis of bilateral relationships that helped to grow U.S. connections to the rest of the world. In the 1970s, energy was a source of instability to be managed among a group of countries and a vulnerability from which the United States tried to insulate itself. In the 1990s, climate change emerged as a global problem in need of coordinated and collective action. In dealing with countries where energy is a major export, the United States has had to think about energy either because it featured high on the agenda or because it lurked in the background, defining the space for action. More recently, countries have seen climate change as a central challenge, and for the United States to interact productively with those countries, it has needed to articulate a coherent strategy to bring about an energy transition.

In the last decade, however, the energy landscape has changed dramatically, as has the role of the United States in it. And these changes in energy are occurring within broader geopolitical shifts, which redefine the context for U.S. foreign energy and climate policy. The Obama and Trump administrations, the two administrations coinciding with these shifts, have in different ways tried to reframe how the United States should think about energy and climate—the former by emphasizing climate, the latter by emphasizing energy. Neither brought as many results as their architects envisioned.

In January 2021, a new administration, and maybe a new president, will be sworn in and the continued search for an international energy and climate strategy will go through another iteration. To prepare for that moment, we spent much of that last year thinking about what that strategy should be. This document summarizes our results. In general, there is an enormous opportunity for the next administration to advance a domestic and international energy strategy that provides tangible economic, security, and environmental benefits for the United States while encouraging and supporting a framework of constructive international competition based on shared interests. Such a strategy should be based on three key principles:

1. **Old strategies will not work—too much has changed.**
2. **Reinvesting in domestic energy competitiveness is an essential first step.**
3. **Encourage an international race to the top.**

**The energy world has changed in four profound ways, and those changes make it impossible to go back to any of the old strategies that previous administrations have pursued.**

First among those changes is the rise of the United States as a major hydrocarbon producer. For several decades, the United States set up a comprehensive set of energy policies and institutions that all reflected its status as the world's largest energy consumer and importer. Today, the country is neither.

Second, fossil fuels, while still the largest portion of the energy system, are being supplemented and may one day be supplanted (and significantly altered) by new energy technologies. So far, there has been tremendous progress in wind, solar, and battery technology, especially as applied to electric vehicles. A strategy that worked for a world dominated by coal, oil, and gas cannot work for a world dominated by new fuels. The energy transition underway requires all forms of energy to be more competitive in a low-carbon energy system—a strategy that swims against this tide risks the United States falling behind.

Third, there is no longer an assumption, as there was after the Cold War, that the liberal, democratic, and capitalist model championed by the United States is the ultimate endpoint toward which all countries would eventually move. Nationalism, authoritarianism, dirigisme—these alternative organizing principles are not only alive, they are thriving. Traditional, and regressive, understandings of state power and geopolitics—raw military force, territory, firm alliances, and spheres of influence—have re-emerged in the international system. Since the early-1990s, the United States could formulate its foreign energy policy assuming a commonality of interests and sense of direction that no longer exists. While the United States does need to adapt to fit these trends, and should naturally oppose some of them, its strategy should be able to respond to their existence.

Finally, economic competition has emerged as a serious corollary to geopolitical competition. Of course, countries have always competed with each other, and today is no different. What is different is that the United States can feel less secure that it is winning, however one might define winning. Its domestic economic challenges seem deep and profound, and there is no national consensus on how to solve those challenges. Meanwhile, the chief economic rivals of the United States are no longer Western Europe or allies in Asia but China, a country whose size, resources, and geopolitical aspirations present a fundamentally different challenge for the United States. The United States must grapple with the fact that the world's open economic system it has long championed, and on which the country has built its prosperity, is also enabling the rise of an economic and geopolitical rival. Here, too, there is no recent historical analog for how the United States should think about such challenge.

The starting point for an international energy and climate policy, therefore, is different. Rather than think as a consumer and importer of oil and gas, the United States must think, at least in part, as a producer. Rather than focus on fossil fuels, it must think about wind, solar,

and batteries as well as other technologies that are barely commercial yet—such as advanced nuclear, among others—in order to address a threat that is visible but whose magnitude is yet to be fully understood. Rather than shepherd countries toward a broadly agreed upon end goal, the United States must conduct foreign policy while major powers are nudging countries in different directions and are willing to defend their own interests with money and force. Rather than feel secure about its economic preeminence, the United States must think anew about how to compete. A new international energy and climate strategy must navigate these four new realities.

**No foreign policy can compensate for waning economic and technological preeminence, so the starting point for any strategy must be to ensure that the United States remains as innovative and competitive as possible.** This is hardly controversial, of course, but operationalizing this idea can be controversial. There is often a tendency to equate competitiveness with some cursory spending on research and development (R&D), assuming that the market will do the rest, and trying to avoid as much as possible any accusation that the federal government might be “picking winners.” That sentiment is oftentimes right, but there is a difference between the government not making all decisions and not making any. There is no sense pretending that all market outcomes are the same or that market outcomes are not determined, in one way or another, by political choices.

To ensure competitiveness, the United States should do four things. First, it needs to define the areas where it wants to compete. Wanting to be number one irrespective of the area makes no sense. The United States continuously defines sectors that are strategic, for example, in screening foreign investment, in channeling innovation resources, in supporting exports, in setting standards, in providing subsidies, and so on. In practice, the United States has a list of priorities that are relatively shared by both political parties, but it is scared to say out loud that such a list exists or to argue that once the list is made, it should dedicate some resources to that list. That is no way to nurture a healthy and competitive economy.

Second, the amount of money that the country spends on R&D is paltry relative to the size of the energy market (even ignoring the costs associated with pollution or climate change), and it is too dispersed. Different sources give different figures, but R&D spending on energy is probably around 0.25 percent of total spending for energy goods and services. In health care, the relative ratio is closer to 1 percent, and in national defense, it is near 8.5 percent (see Chapter 3 for more). More importantly, this budget is distributed across numerous different agencies and in pursuit of numerous different breakthroughs. The United States needs not only more resources but more targeted areas where it hopes for major innovations. The country can afford to make some big bets in the future of energy, even when and if those bets do not always pan out.

Third, R&D is not enough. The United States needs to think about the markets in which these innovations will be deployed. There is a lot of emphasis on making sure that technologies developed in a lab make it to the market, and those efforts are important. But the biggest obstacle to energy innovation is that markets favor incumbent technologies. The United States spends money to make discoveries but then prevents these discoveries from spreading due to policies that privilege existing energy resources and technologies over new ones. Of course, the United States has tools to rectify such disparities, such as tax incentives, mandates and regulations, and direct support of state institutions—depending on how much change it wants to engender. But the United States hesitates to use these well-established tools, thus undermining whatever successes it has in the lab.

Finally, the United States needs to focus on manufacturing. This is not because of an anachronistic or romantic obsession with making things. It is based, first and foremost, on the recognition that manufacturing jobs are good jobs, with backward linkages that provide a foundation for economic prosperity. There is security dimension, too, as the country has learned painfully during Covid-19. This is not an argument about protectionism or autarky, but the idea that it does not matter at all where a good is produced is silly. Supply chains will continue to be global, but one can still think about whether those supply chains expose the country to vulnerabilities and whether those supply chains provide as much economic opportunity as they could. A simpler emphasis on manufacturing would ensure that as the world transitions to newer energy sources, many of the widgets of the future are made in the United States and that the country retains the capability to produce resources on which it depends.

**A renewed emphasis on economic competitiveness and innovation should have an international corollary, where the United States leads an international race to the top.** Here, too, the assumption is not that the world can merely revert to a multilateralism for which enthusiasm has waned in recent years, not least of which in the United States. Nor can one argue for multilateralism for its own sake. But there are global problems that require global solutions, and if there is one global problem that towers over all others, it is climate change. In one way or another, climate change is becoming a primary political preoccupation.

Some places such as the European Union even define their entire strategy around climate change. Others may be less consumed by the problem but are keen to find workable and realistic solutions to it. Even for those who are skeptical that the world can ultimately achieve extremely ambitious energy transition targets related to climate change, just having a commonly agreed-upon objective can serve as the foundation for a new era of global competition that the United States has played a major role in shaping and can continue to shape. Given the current state of geopolitical churn, the world's major powers are likely to continue to struggle with each other in many different arenas. Having a potential positive

outlet for constructive competition has its benefits. The world is thirsty for leadership on this issue, and there is no reason for the United States not to lead.

Our recommended approach to multilateralism has two components. First, it is about diffusion rather than consolidation. This is not about creating a World Climate Organization and forcing all countries around yet another negotiating table, although both might be valuable under different circumstances. It is about recognizing that climate change will affect and possibly reshape every aspect of human life on this planet, and so every international institution must think clearly about climate change. From central banks and international financial institutions, to health and trade, to security and science, to cultural heritage and food, the United States should use climate to breathe life into a system that often appears to lack purpose and direction. Do not adapt climate policy to multilateralism—adapt multilateralism to grapple with the shared challenges posed by climate change.

Second, multilateralism must be made to function when major governments do not get along. The United States and China, for example, are quite likely to find themselves on different sides of many issues in the coming years, and if that disagreement leads to paralysis, or leads to one or the other wanting to act contrary to shared interests or leave the group and set up a new one, then real problems are unlikely to be solved. A multilateralism needs to be conceptualized that forms several Venn diagrams, allowing governments to move as fast as they can, and that makes space for the private sector, civil society, and non-profits to have a seat at the table. It means encouraging progress and shifting resources to initiatives and structures that can deliver results, wherever those might exist.

Great power rivalry can be an important lens through which to look at the world, but it cannot be the only or even the dominant one. A large part of our work in this project was to analyze geopolitical competition among three major powers, the United States, China, and Russia, and the role that energy plays in the struggle for influence in various regions around the world. Our research led us to conclude that the greatest risk that the United States faces in developing an international energy and climate strategy is that great power competition risks becoming an all-consuming obsession. There is good reason to spend time understanding what China and Russia are up to and what actions of theirs might undermine U.S. national interests. But a healthy skepticism can easily devolve into a zero-sum obsession, where the United States goes to great length to stop or to counteract whatever China or Russia are doing, however small, meaningless, or useless that might be to U.S. interests in the long term.

This approach requires, first and foremost, a shift in mindset. The words of Hans Morgenthau, written in 1967 in a totally different setting, ring true today: “In truth, the choice before us is not between the status quo and revolution or even between communist and non-communist revolution, but between a revolution hostile to the interests of the United States and a revolution which is not hostile to these interests.”<sup>1</sup> The context is different but the underlying

reality is the same: the United States should not instinctively judge as good or bad what Russia or China do merely because it is Russia or China that is doing it; the United States should ask clearly and carefully, is that thing hostile to the interests of the United States or not.

Even this small change in understanding would produce different results. Rather than trying to stop China's Belt and Road Initiative (BRI), the United States could be asking how the BRI might be coopted and leveraged to solve acute infrastructure needs but without some of the more damaging effects seen in some places. Rather than merely opposing any Russian pipeline or Russian project overseas, it would ask, how could this project contribute to energy security rather than undermine it. It would mean welcoming the good while trying to stop the bad rather than losing the good in fear of the bad. This strategy would have the added benefit of not putting allies in the position of having to pick either the United States or some other country—there is usually no need to present allies with such stark choices. This shift in strategy, along with a focus on constructive technological competition and a diffusion of efforts, should mean that there are avenues for energy- and climate-related progress at all times and that when the United States does choose to stand up to China or Russia about their behavior, those grievances will be discrete rather than taken in the context of a general pattern of ill will.

Together, these elements suffice to point in a new direction that begins, first of all, from the recognition that the world has changed and that something new is needed, not the dusting off of some old game plan. The strategy begins, as it must, at home, grounded in the understanding that unless the U.S. economy and energy system remain the most innovative in the world, there is only so much that foreign policy and diplomacy can do. It argues for a mindful multilateralism—smart, nimble, diverse, and, above all, driven by purpose—to address one of the most pressing global challenges of this century. The strategy tries to think hard about the interplay between energy and geopolitics, not to be distracted by every deal and every pipeline, but to find ways to keep what is good and mitigate what is bad, even when the good originates in countries that are otherwise rivals.

## CHAPTER 1

# THE TRUMP ADMINISTRATION'S ENERGY POLICY AS LEVERAGE OVER OTHER COUNTRIES: JOUS, OF COURSE, AND MEANS DIFFERENT. BUT IN OTHER WORDS, ENERGY DOMINANCE AS AN INTERNATIONAL STRATEGY

## SECTION 1: THE BACKDROP

The Trump administration's energy policy has come to be encapsulated by a single catchphrase: "energy dominance." The term is ambiguous, of course, and means different things to different people. It is also contentious in some countries—nobody really likes being dominated—and the economic shock of Covid-19 has further called the idea into question. The break between the Trump administration and earlier ones is easy to overstate, however, at least when it comes to foreign energy policy. In many ways, energy dominance is the logical extension of a much older and enduring concept in U.S. energy politics: energy independence. Rather than simply free oneself from energy induced dependencies, energy dominance takes it a theoretical step further and affords leverage over other countries and situations.

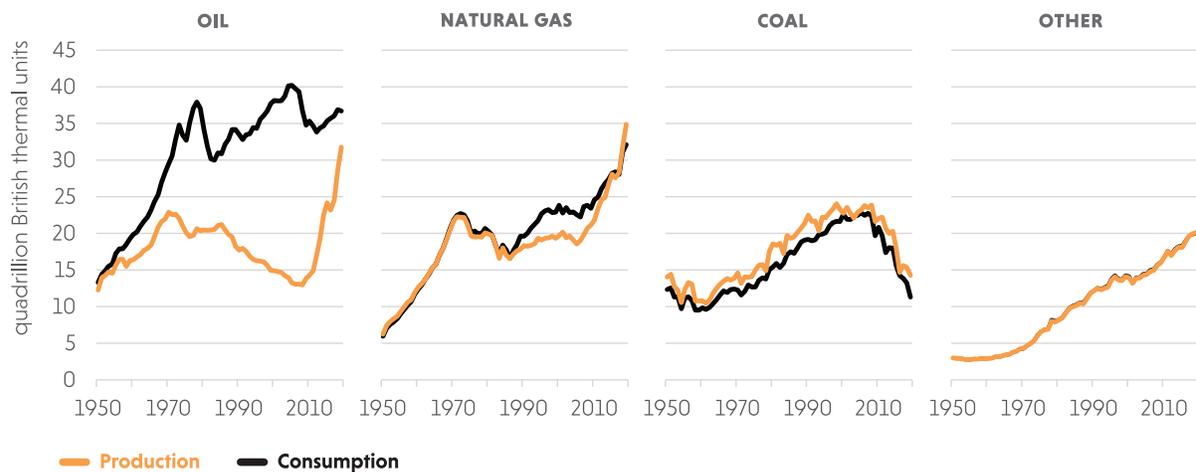
In practice, energy dominance has sometimes afforded the opportunity to do and say things hitherto unthinkable such as levying strong sanctions on oil producing nations or geopolitically contentious energy projects. But in other cases, the Trump administration has pursued policies that earlier administrations would have found familiar, even if they would have pursued those policies in a different tone or through different means. The latter includes goals such as seeking to provide greater energy security or energy poverty alleviation in developing countries and strategically important regions. Yet, the world has also changed. It is impossible to properly evaluate the utility of energy dominance as an international energy strategy without thinking about the four fundamental transformations that have reshaped the world of energy and geopolitics and to which, in part, energy dominance is a response.

## The Boom in U.S. Oil and Gas Production

The first has been the emergence of the United States as a major hydrocarbon producer and exporter. Since 1953, the United States has been a net importer of energy, chiefly of crude oil but also of natural gas (it has always been a net exporter of coal).<sup>2</sup> When the 1973 crisis hit, the United States was a declining hydrocarbon producer: gas production had peaked in 1971, and crude oil peaked in 1972. For almost 50 years, U.S. foreign energy policy reflected the anxieties and preoccupations of a net importer, although being the world's largest consumer of energy also provided some advantages in hindsight. Policy, both foreign and domestic, was geared to ensure reliable and affordable supplies.

All this changed in the late-2000s. The onset of rapid economic growth in China caused a global race for energy resource development, which caused prices to climb and oil and gas companies to experiment with new types of production on previously untapped resources. U.S. natural gas production reached a low point in 2005, and crude oil followed in 2009.<sup>3</sup> By 2019, gas production had jumped almost 90 percent versus that 2005 low point. The spike in crude oil production was even greater, more than doubling (up 140 percent). Natural gas liquids, which complement crude oil production, almost tripled from trough to peak in 2019. In just over a decade, this unprecedented production surge made the United States the largest hydrocarbon producer in the world. Although the United States remains one of the world's largest oil and gas consumers, net imports soon enough began to decline. By 2017, the United States became a net gas exporter, and in 2019, the country finally became a net energy importer, the surplus in coal and gas offsetting the modest dependence on imported oil.

**GRAPH 1: The Changing Patterns in U.S. Energy Production and Consumption**



Source: U.S. Energy Information Administration, Tables 1.2 and 1.3, Monthly Energy Review, May 26, 2020.

Big producers and exporters tend to see the world differently. An importer wants access to supplies, an exporter wants access to markets. An importer prefers lower energy prices, a producer and exporter earns more when prices are high. The delineation is not absolute, of course, and the United States, which relies on oil to meet 37 percent of its overall energy consumption, continues to show a preference for lower oil prices even as it has also, at times, favored higher oil prices.<sup>4</sup> But even in the United States, many state and local economies depend heavily on oil and gas production, and thus they exhibit the kind of cyclical dynamics typically seen in hydrocarbon exporters.<sup>5</sup> Evidence suggests that low oil prices have a net negative impact on the U.S. economy as a result of the direct and indirect impact of growing oil production and the industries and firms that benefit from it. The traditional single-mindedness toward managing scarce resources has given way to a new and more nuanced disposition in favor of capitalizing on newfound abundance.

In foreign policy, the growth in U.S. oil and gas production has manifested in different ways. For one, it has contributed to an overall dampening of hydrocarbon prices, which has made it easier to pursue foreign policy objectives related to oil and gas producing countries without fear of a price spike. It has given the United States a seat at the table of hydrocarbon producers, most recently exemplified by negotiating with the Organization of Petroleum Exporting Countries (OPEC) and other major producers on the basis of a co-equal or formidable rival. The United States has also seen its interests diverge from some of its major allies who are still reliant on imported energy. The differences between the United States and Germany over the Nord Stream 2 pipeline are a prime example. At the same time, the United States has offered its partners the opportunity to purchase U.S. oil and gas in order to enhance their energy security and to alleviate any trade imbalances they might have with the United States. These conversations would have been unthinkable a decade ago.

## Climate Change and the Energy Transition

The second transformation has been the rise of new energy technologies and the deployment of those technologies to lower greenhouse gas emissions at a time when climate change has risen near the top of the global agenda as an urgent topic to address. The energy transition is multilayered and looks different in different parts of the world, in speed as well as in form. Simply put, the energy transition is dominated by three parallel shifts.

The first is the rapid decline in coal-fired generation, at least outside of Asia.<sup>6</sup> In the United States, coal-fired generation was halved between 2007 and 2019,<sup>7</sup> and in Germany, which is often criticized for how slowly it is phasing out coal, it fell by almost 40 percent from 2012 to 2019.<sup>8</sup> In some markets, coal-fired generation has basically disappeared: in 2019, coal accounted for a mere 3 percent of net generation in the United Kingdom and

about 4 percent in Spain.<sup>9</sup> The decline in coal is attributable to several factors, including regulations that limit air pollutants or put a price on carbon dioxide and economic forces such as cheaper natural gas or renewable energy.

The decline in the cost of wind and solar energy is the second major change in the energy transition. The levelized cost of electricity for solar photovoltaic (PV) energy declined by 82 percent from 2010 to 2019. In wind, the declines were smaller but still significant: 38 percent for onshore wind and 29 percent for offshore. These declines have been made possible by reductions in costs as well as improvements in efficiency: the capacity factor for onshore wind has jumped 8.5 percentage points in that period and 4 percentage points for solar PV. Together with lower installation costs, these gains translated into lower generation costs for both wind and solar.<sup>10</sup>

As wind and solar have become more competitive, their presence has grown around the world.<sup>11</sup> From 2009 to 2019, installed capacity in wind has quadrupled, and 36 countries had at least 1 gigawatt (GW) of installed wind capacity in 2019. Ten countries had over 10 GW. A similar dispersion is visible in solar energy, where capacity has risen by a factor of 25 over the past decade: 37 countries had at least 1 GW in 2019, and 11 countries had over 10 GW. Combined with a supportive policy environment, discussed below, the growth in renewable energy generation has been so dramatic that almost three-fourths of the new power capacity in the world in 2019 came from renewables.<sup>12</sup>

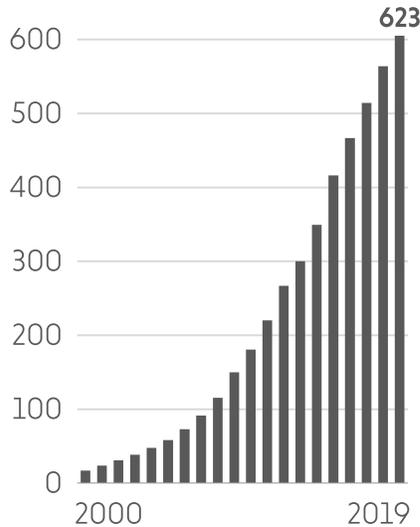
The third major force driving the energy transition has been the decline in the cost of batteries, which has contributed to a sharp rise in electric vehicle (EV) sales around the world. The cost of batteries has fallen by 87 percent between 2010 and 2019,<sup>13</sup> and EVs can compete more directly with internal combustion engines, although there are significant variations based on fuel prices, fuel consumption, and battery costs.<sup>14</sup> In 2018 and 2019, there were over 2 million EVs registered annually, and by 2019, there were almost 8 million EVs on the road.<sup>15</sup> Those numbers keep growing, although EVs still represent a small proportion of a global vehicle fleet at roughly 2.6 percent.<sup>16</sup>

These shifts have been accelerated by policy and changes in behavior. Places that account for around 20 percent of global greenhouse gas emissions have implemented or plan to implement measures to limit carbon emissions, either through a trading scheme or a tax.<sup>17</sup> Countries support renewable energy through feed-in tariffs, auctions, tax credits, or mandates.<sup>18</sup> Countries and cities have announced bans on the future sale of internal combustion engines.<sup>19</sup> Companies are committing to purchase electricity generated by renewable energy.<sup>20</sup> Oil and gas companies are venturing into wind, solar, batteries, and other technologies.<sup>21</sup> Investors are adding a climate lens to their portfolios, just as non-governmental organizations increasingly demand bold action to curb emissions.<sup>22</sup>

## GRAPH 2: Exponential Growth in Emerging Energy Technologies

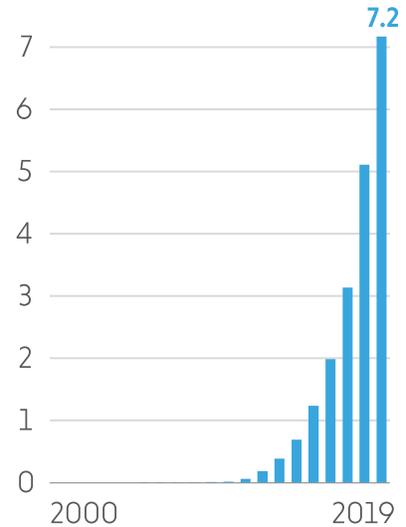
### WIND / SOLAR

gigawatts installed capacity



### ELECTRIC VEHICLES

million vehicles deployed



Source: Data for wind and solar from International Renewable Energy Agency, *Renewable Capacity Statistics 2020* (Abu Dhabi: March 2020). Data for electric vehicles from International Energy Agency, *Global EV Outlook 2020* (Paris: July 2020).

Yet despite these changes, greenhouse gas emissions continue to grow, even if their growth is not constant, and there are, occasionally, years of either no growth or decline (even before the more dramatic effects due to Covid-19).<sup>23</sup> Meanwhile, the policy discourse has been shaped by a growing recognition that the world needs to limit warming to 1.5°C above pre-industrial levels to avoid the most damaging effects of changing climate, a conclusion reinforced by the Intergovernmental Panel on Climate Change in a 2018 report.<sup>24</sup> The gap between calls for action and rising emissions, combined with increasingly evident signs of a changing climate, has provoked exponential growth in the number of protests related to climate change globally.<sup>25</sup> The energy system is changing both dramatically and not quickly enough.

### The End of Unipolarity

The geopolitical landscape has changed as well. The unrivaled primacy of the United States following the end of the Cold War, what Charles Krauthammer termed the “unipolar moment,” has given way to a multipolar world.<sup>26</sup> In part, this transition has been marked by the shift of economic gravity to Asia: in 1990, the United States accounted for over 21 percent of global gross domestic product (GDP), and its economy was more than twice as big as Japan’s, the next biggest economy (in purchasing power parity terms, or PPP).<sup>27</sup> By 2014, however,

China's GDP had surpassed the United States in PPP terms, and the United States was just 15 percent of global GDP in 2019. When companies think about which consumers they want to reach, they think about Asia and its rising middle class. Supply chains often start in Asia, and exports from Asia account for over a third of the world's total, up from a quarter in 2000.<sup>28</sup> Whether this geo-economic shift will produce a similar geopolitical shift is one of the great unknowns of our era, but few people envision a reversion back to a moment where the United States can dominate global affairs as it once did.

Nor is it clear that the United States has the appetite for such role. Two long wars in Afghanistan and Iraq, where the country at one point deployed almost 200,000 troops, have sapped the country's appetite for overseas military action.<sup>29</sup> Most Americans, including most veterans, thought in 2019 that neither war was "worth fighting."<sup>30</sup> And while the United States remains engaged diplomatically around the world, both Barack Obama and Donald Trump have proven averse to engagements that might lead to "boots on the ground," an unwillingness that has created a void that other powers have exploited.<sup>31</sup>

Even the multilateral organizations—both those born out of the post-World War II era, established and promoted by the United States, Europe, and Japan, and those of a more recent vintage such as the G20—have struggled to build consensus and uphold global norms in the face of this dramatic shift. The rise of nationalism in bedrock countries of the global order have led to a hollowing out of these institutions at a time when many of the world's global problems most require international coordination, as the recent Covid-19 pandemic has laid bare. Despite the efforts of traditional U.S. allies such as the European Union, Canada, and Japan to bolster these institutions, the centrality of such institutions in global affairs appears to be waning.

No power has taken advantage of that vacuum more clearly than Russia. Over the past decade or so, Russia has intervened militarily in Georgia, Ukraine, and Syria and sent advisers or contractors to areas as diverse as Venezuela, Libya, and Yemen.<sup>32</sup> It has interfered in elections around the world, including the United States, and has spread misinformation to amplify social divisions in the United States and Europe.<sup>33</sup> It has expanded its military exports, tried to become a diplomatic arbiter in the Middle East, and aspired to play a growing role in Africa.<sup>34</sup> It has tried to use oil, gas, and nuclear power as a foundation to deepen political ties with countries the world over (more on that later). Not all of these efforts have succeeded, and Russia works hard to appear stronger than it is. But it is hard to miss that Russia feels emboldened and willing to venture out in the world, seeing its role as defending a world from falling too much under a U.S. orbit.

China's rise has brought its own political and geopolitical challenges. First and foremost, China has not liberalized politically, and it has not conformed to a world where the rules were

written without it. Under Xi Jinping, China has changed domestically and internationally; as one analyst put it succinctly, “Xi has harshly suppressed internal dissent, executed a sweeping anticorruption campaign, and adopted a bold, expansive foreign policy that has directly challenged the United States.”<sup>35</sup> Whatever expectation there was, when China joined the World Trade Organization, that deeper integration with the global economy would produce political change has been dashed.<sup>36</sup>

Instead, China has developed parallel institutions to bypass U.S. dominance.<sup>37</sup> It has invested heavily in its military, more than doubling spending over the past decade.<sup>38</sup> It has expanded its physical presence in the South China Sea and challenged regional players as well as the United States.<sup>39</sup> Through the Belt and Road Initiative, it has articulated and begun to execute a vision that puts China front and center of a global rewiring.<sup>40</sup> As with Russia, not all of these initiatives should be taken at face value and deemed “successful” just because they exist. But they underscore a role for China that will increasingly challenge U.S. dominance in the Asia Pacific and possibly beyond.

## The Resurgence of Economic Competition

Geopolitical rivalry has extended into economics in a profound way. At times during the Cold War, there was a worry that the United States was falling behind the Soviet Union in space or defense. But the United States hardly saw the Soviet Union as an economic rival; it was a geopolitical rival that offered a competing vision for how to organize an economy. The most vibrant economies—Japan, West Germany, the Asian tigers, the rest of Europe—were solid American allies, firmly ensconced under the U.S. security umbrella. When economic rivalry heated up—for example, with Japanese cars coming to the United States or with recurrent trade surpluses in West Germany—the West was able to evolve and diffuse tensions. From time to time the equilibrium might be disturbed, as in the oil shocks of the 1970s, but the broader order in the world was never seriously questioned.

That world is long gone, shattered in part by the financial crisis and its aftermath, which reinforced or brought into focus several dynamics in the U.S. economy: stagnant median household income over the past two decades, exacerbated by higher costs for health care and higher education<sup>41</sup>; declining labor force participation, especially among white males, which has worsened a health crisis in populations that have dropped out of the labor force<sup>42</sup>; widening disparities in income between people and places<sup>43</sup>; a continuous decline in manufacturing employment, in part driven by Chinese imports<sup>44</sup>; an economy driven by finance and overly defined by short-term horizons<sup>45</sup>; lagging investment in infrastructure<sup>46</sup>; less innovation, driven partly by less competition and greater concentration within industries<sup>47</sup>; and a growing sense that upward mobility is not something younger generations can aspire to anymore.<sup>48</sup>

By contrast, China's economic rise has continued. None of the assumptions made by the skeptics about the Chinese economy turned out to be true (so far, at least): that the inefficient allocation of capital would sap growth; that overcapacity and loose lending would trigger a debt crisis; that rising wages would undermine China's competitiveness; that China could rely on increasing inputs but could not deliver productivity gains; or that its educational system could not produce graduates that excelled at innovation. Nor was there evidence that the usual complaints against China—over forced joint ventures to access the Chinese market, lax enforcement of intellectual property laws, industrial espionage, subsidies to state-owned enterprises—went away as China's economy grew and became more complex.<sup>49</sup> Instead, China started to export more sophisticated goods, directly competing with the United States in certain areas.<sup>50</sup> And through *Made in China 2025*, it unveiled a blueprint to turn China into the world's leading economic powerhouse by midcentury. Now, nearly every country on earth, including the United States, recognizes China as a formidable economic competitor.

Just as the collective global focus turns to China as an economic center of gravity, other major economic shifts lay just over the horizon. India, Southeast Asia, and Africa represent the future frontiers of growth and development. Economic competition from outside countries to invest and engage in these regions is intensifying, as is the domestic impulse in these places to push back on or shape some of this outside influence to set the terms of this growth. This is the new strategic horizon for the global economy, in which energy will play a major role.

## SECTION 2: ENERGY DOMINANCE IN PRACTICE

### Energy and Grand Strategy

When the Trump administration came into office, it confronted a changed world in both energy and geopolitics. Even so, and perhaps contrary to popular opinion, its international energy policy has sometimes been a continuation of the Obama years. Both administrations saw that the boom in U.S. oil and gas production strengthened the country's foreign policy position by removing a vulnerability that past presidents have always taken seriously. It shifted bargaining power from producers to consumers, just as the United States was becoming a big producer. The United States could be aggressive against other oil and gas producers without fearing a price spike. Muted prices, ranging from \$30 to \$80 per barrel, before Covid-19, enabled U.S. foreign policy sufficient room to maneuver without worrying too much about oil prices.

From this starting point, however, the Trump administration fused energy into a broader policy agenda and, in doing so, departed significantly from past administrations. In some ways, the shift signaled a natural progression from a Democrat to a Republican administration. The Trump administration reversed course on regulating the coal, oil and gas, electricity, and auto sectors.<sup>51</sup> The administration championed fossil fuels and announced its intension to

withdraw from the Paris Climate Agreement. In doing so, it reversed the Obama era's careful and sometimes criticized balance between both tacitly supporting oil and gas production and focusing its policy efforts on climate change and the development and deployment of low-carbon energy technologies.

Energy soon became a tool to achieve the various objectives of the Trump administration's nationalistic economic strategy and America First foreign policy, including reducing trade imbalances, competing with China, and forcing allies and adversaries to recalibrate their relationships with the United States in ways that better served the administration's view of U.S. interests. Energy was interwoven into political discussions more broadly. When discussing trade, or even defense spending in Europe, U.S. energy exports and energy-related grievances routinely entered the conversation in ways that they rarely did under previous administrations. When President Trump went from NATO to defense spending to the Nord Stream 2 pipeline in the span of a few sentences, he was articulating an interconnectedness hitherto rare in U.S. foreign energy policy, at least vis-à-vis allied countries. This shift was manifest in several policy strands that have defined the Trump administration.

## Energy Exports, Geo-economics, and Competition

Under the Trump administration, energy exports quickly became a vehicle to reduce trade imbalances, which have been a major preoccupation of the president. From the very early days of the administration, foreign countries and companies came to understand that purchasing U.S. energy would help them score political points with the White House. U.S. energy was also a booming sector, one that could help support the president's vision for robust economic growth and reshoring of industry either directly linked to oil and gas or indirectly enabled by affordable energy.

The focus on energy exports has appeared throughout the Trump presidency. In Europe, officials made one trip after another advertising U.S. LNG and calling on European customers to prefer U.S. gas over Russia. In selling U.S. LNG overseas, officials resorted to various metaphors. Former Energy Secretary Rick Perry once said that U.S. gas was high-quality, akin to a consumer opting for a Mercedes-Benz or a BMW, rather than buying the cheapest option.<sup>52</sup> Under Secretary of Energy Mark W. Menezes referred to a new LNG project as "critical to spreading freedom gas throughout the world."<sup>53</sup> With Korea, a pledge to purchase more U.S. energy was critical to retaining a free-trade agreement with the United States (even though there was no formal agreement to that effect).<sup>54</sup>

When it came to China, energy was front and center in the bilateral trade dispute. One of the goals that the United States had was to lower the bilateral trade deficit with China, and energy was seen as an area where the Chinese could make sizable purchases. At the same time, when the trade war escalated and each country imposed tariffs on imported goods,

China chose to target energy purchases from the United States, leading to an abrupt decline in exports of crude oil and petroleum products, of LNG, and even of coal (in 2017, around 5 percent of U.S. metallurgical coal exports went to China).<sup>55</sup> When the two parties came to an agreement, the so-called “Phase One” deal, increased energy exports accounted for a quarter of the commitments, in dollar terms, that China pledged to make.<sup>56</sup>

Energy exports, however, soon transcended their macroeconomic turf and emerged as a major driver of the country’s geo-economic strategy. As a candidate, President Trump was critical of the Export Import Bank of the United States (EXIM)<sup>57</sup>; as president, he oversaw the longest reauthorization in the bank’s history, a seven-year extension that came with added firepower and a clear mandate to compete head-on with China.<sup>58</sup> One of the first loans authorized by the newly empowered EXIM was for an LNG project, albeit one located in Mozambique, a sure sign that energy retains a key role in U.S. foreign policy. In approving the loan, Kimberly Reed, EXIM’s president, noted that “We have been told that China and Russia were slated to finance this deal before our EXIM board quorum was restored by the U.S. Senate.”<sup>59</sup> Great power competition has been the name of the game, and energy has been front and center.

But EXIM was just one part of the Trump administration’s geo-economic strategy. The United States Congress passed the Better Utilization of Investments Leading to Development Act (BUILD Act), which the president signed in October 2018.<sup>60</sup> The BUILD Act repurposed the Overseas Private Investment Corporation by giving it new powers and tools while also doubling its ability to lend, from \$29 billion to \$60 billion. The resulting organization, the International Development Finance Corporation (DFC), came into being in January 2020, and among its first loans was a \$241 million debt-financing for energy and power projects in Mexico.<sup>61</sup> Once again, the country’s international financing institutions were leading with energy.

Alongside these two formal institutions came a series of programs and initiatives in which energy was a main component. The Asia Enhancing Development and Growth through Energy (Asia EDGE) program was designed with various objectives in mind: “Strengthening the energy security of allies and partners,” “Creating open, efficient, rule-based, and transparent energy markets,” “Improving free, fair, and reciprocal energy trading relationships,” and “Expanding access to affordable, reliable energy.”<sup>62</sup> In a November 2019 review of the administration’s “Free and Open Indo Pacific Strategy,” the State Department identified several success stories in Indonesia, Bangladesh, Vietnam, and the Mekong region more broadly, largely in power generation, evidence that slowly but steadily the United States is looking to boost its geo-economic footprint in the region.<sup>63</sup>

In February 2020, Secretary Pompeo announced that the United States would provide, through the DFC and with the support of Congress, \$1 billion in financing to countries in Central and Eastern Europe under the Three Seas initiative. In his words, “Our aim is quite

simple: It is to galvanize private sector investment in the energy sector to protect freedom and democracy around the world.”<sup>64</sup> In doing so, he was promising to support with substantial resources some of the core aims of U.S. foreign policy in the region, namely helping countries develop diverse energy sources and lessen their reliance on Russian energy.

The Blue Dot Network, which the United States announced alongside Japan and Australia in November 2019, is designed to boost quality infrastructure in general, rather than energy infrastructure in particular.<sup>65</sup> But the initiative is largely a response to the perceived weakness of the BRI, and energy projects are among the most common and high-profile projects in that initiative. Alongside these high-profile initiatives came smaller regional programs that did not target energy directly, where energy was a subset of the universe of trade relationships that the United States sought to encourage (for example, Prosper Africa).<sup>66</sup>

## Sanctions Against Energy Producers

The Trump administration inherited an expansive sanctions regime that targeted several oil and gas producers, including Iran, Russia, and Venezuela, three countries that supplied around a sixth of the world’s oil in 2018 (before sanctions and other problems reduced production in Iran and Venezuela).<sup>67</sup> Against all three countries, the United States expanded sanctions in recent years, and it has also expanded the aims for which sanctions are deployed, at least in the case of Iran and Venezuela.

The United States has imposed sanctions on Iran since the mid-1980s, targeting the country’s oil sector and restricting trade and investment between the two countries.<sup>68</sup> That pressure, alongside other factors, is one reason why Iran’s oil production has never quite recovered to its 1970s levels. In recent years, Iran has been showcased as one of the clearest examples of the geopolitical benefits that increased U.S. oil production brought to U.S. foreign policy. The boom in U.S. oil production, and its impact on prices, made it easier for the Obama administration to implement the sanctions regime that acted as a pressure point to bring Iran to the table in a negotiation that ultimately produced the Joint Comprehensive Plan of Action (JCPOA) in 2015.

The Trump administration abandoned the JCPOA and reintroduced sanctions in order to achieve a more expansive set of objectives—objectives that Secretary of State Mike Pompeo summarized in 12 points covering Iran’s nuclear and ballistic programs, its regional foreign policy activities, and its treatment of citizens of the United States and allied countries who have been “detained on spurious charges.”<sup>69</sup> Importantly, this offensive was done largely without the support of the other major players that had come together for the JCPOA; it was not unilateral exactly, but it was not multilateral either, relying on raw U.S. power rather than a joint effort in order to produce results. It was also a push that was made possible by a compliant oil market, which absorbed the progressive losses in Iranian crude oil exports with only modest and temporary price increases, in part because U.S. oil production kept rising just as the screws on Iran

tightened. Here, too, was an example of a foreign policy strategy enabled by the growth in U.S. oil production and its effects on global oil markets.

In Venezuela, the United States has imposed sanctions since the mid-2000s, largely based on human rights abuses and the regime's support for terrorism. But after 2017, sanctions have targeted the oil sector more explicitly, with three main focus areas: "(1) access to short-term debt finance and cash distributions; (2) petroleum trade between the United States and Venezuela; and (3) Venezuela oil sales to non-U.S. buyers."<sup>70</sup> These sanctions have coincided with and likely worsened an overall collapse in Venezuela's oil sector, where output has declined by more than two-thirds over the last decade.<sup>71</sup>

Unlike Iran, sanctions on Venezuela supported a broad, multilateral effort to bring about regime change by supporting Juan Guaidó, the president of Venezuela's National Assembly and who has, since early 2019, tried to form a transition government to hold elections, an objective shared by the United States, its main allies, and many countries around the world. Unlike Iran, however, whose oil sector has little connection to the United States, the Venezuelan petroleum sector has been long integrated into the U.S. market, with substantial crude oil exports from Venezuela, a sizable presence by PDVSA (Venezuela's national oil company) in the U.S. refining sector, and continued foreign investment by U.S. firms in the Venezuelan upstream and services sectors. In that regard, the sanctions regime rested not only on the macro benefits that increased U.S. oil production had on global markets but also on the ability of the U.S. market to specifically cope without significant volumes of Venezuelan crude.<sup>72</sup>

In Russia, the United States has imposed a series of sanctions targeting Russia's oil sector and its ability to access finance as well as goods and services to develop its frontier areas (deepwater, the offshore Arctic, and shale). These sanctions were largely imposed after Russia invaded Ukraine, although some have been tightened in recent years following the enactment of the Countering Russian Influence in Europe and Eurasia Act of 2017.<sup>73</sup> The most recent round of sanctions, implemented in December 2019, targeted the construction of the Nord Stream 2 pipeline with a hope to stop, or at least delay, its construction. Earlier sanctions have generally operated alongside initiatives by European allies, but the sanctions on Nord Stream 2 were imposed against the will of major European partners such as Germany, although they were supported by others, such as Poland and Ukraine.

## SECTION 3: GRADING ENERGY DOMINANCE

### The Domestic Angle

Has energy dominance succeeded? In the domestic arena, there are clear successes and clear failures. The U.S. oil and gas sector continued to grow, although its growth will be handicapped by the Covid-19 crisis, and the growth seems largely a continuation of the trajectory of the

Obama years, as opposed to some breakthrough made possible by the supportive policies put in place by the Trump administration. Power generation from coal, which the administration sought to support, has continued its steady decline, with output falling year after year, a clear area where there has been no ability to “turn around” a sector whose economic viability has been challenged in recent years.

At the same time, the emphasis on hydrocarbons has come at the expense of the country’s climate goals and perhaps its long-term competitiveness in new energy technologies. After years of reducing CO2 emissions, the record over the last few years has been disappointing, with emissions in 2019 being barely lower than in 2016.<sup>74</sup> The weakening of other regulations, such as on methane, might offer short-lived benefits, by virtue of reducing costs, but at the expense of the industry’s long-term license to operate. In renewable energy, deployment continued, although some of the weakening support for new investment could undermine growth as tax incentives continue to be subjected to short-term extensions and phase out. The pace of renewable energy growth might also be hampered by the regulatory uncertainty introduced by the Federal Energy Regulatory Commission, which is challenging the ability of states to incentivize specific renewable energy sources in their jurisdictions.

**NO FOREIGN POLICY CAN COMPENSATE FOR WANING ECONOMIC AND TECHNOLOGICAL PREEMINENCE, SO THE STARTING POINT FOR ANY STRATEGY MUST BE TO ENSURE THAT THE UNITED STATES REMAINS AS INNOVATIVE AND COMPETITIVE AS POSSIBLE.**

In transportation, there have been, again, some mixed results. The sales of electric vehicles continued to grow, even though there has not been a major breakthrough in providing additional federal support to the sector. The gains in overall fuel economy

have also slowed down in recent years as lower oil prices led consumers back to big sports utility vehicles (SUVs), whose market share continued to grow. More importantly, the relaxation of fuel economy standards is likely to undermine the long-term competitiveness of the U.S. auto sector, compounding a problem that the industry has struggled with since the 1970s.

Even in hydrocarbons, the Trump administration has argued that the boom in oil and gas production has strengthened the United States and insulated it from the vagaries of the international oil market, delivering on the project of “energy independence” first announced by President Richard Nixon. The reality has been more mixed, however. As a country that continues to export and import significant amounts of crude oil, the United States remains deeply embedded in the global market and thus exposed to all the risks and turbulences of that market. Moreover, as a big producer, the United States sees real economic effects from

lower oil prices, chiefly through the impact they have on spending and investment. In fact, U.S. states that rely on hydrocarbons for more of their economic activity have under-performed the U.S. average.<sup>75</sup> The vulnerability of the U.S. oil sector has been made especially clear during the Covid-19 crisis, which led President Trump to vocally argue for higher oil prices in order to save U.S. jobs.

## The Foreign Policy Angle

In foreign policy, there are some areas where it is too soon to render a verdict on energy dominance as a strategy. The United States, for instance, has deployed an impressive array of new tools and instruments to elevate its position in geo-economics, supporting exports and private investment in emerging economies. But today it is hard to assess how well these initiatives will work and whether they will lead to a fundamental shift in where countries seek capital from. It is possible that they might trigger a rush to attract foreign investment from the United States; but it is also possible that the immense firepower deployed by China's BRI proves too much for the more modest resources that the United States is deploying, especially since those resources tend to come with more strings and requirements attached.

Energy has not given the United States an upper hand in the ongoing struggle with China for economic competitiveness in any real way. China remains the largest market for energy consumption and continues to grow. It has set out and invested heavily in a range of energy technologies and resources. Despite the central role energy played in the ongoing trade tensions between the United States and China, it has not played a decisive role in convincing China to alter any of the domestic economic- and trade-related concerns at the core of U.S. concerns.

When it comes to sanctions, it is hard to see what results they have delivered, especially in the case of Iran and Russia, whose behavior has barely changed in the ways that the United States might have wanted. If anything, both countries have become more ambitious and more confrontational in their foreign policies. Venezuela is a separate category; sanctions are arguably an essential element of increasing pressure on the regime of Nicolás Maduro, even if sanctions, on their own, are unlikely to trigger regime collapse, at least not soon (as they have not). But in both Iran and Russia, there has been a steady escalation without a clear way out. In Iran, it is possible that a new administration would revert back to the JCPOA in a way that sidestepped Iran's regional transgressions. And in Russia, it is possible, though unlikely, to see a broader "reset" in relations. In both cases, sanctions relief will be a carrot offered, although sanctions pressure may not have produced any results in the interim.

Critics of the administration would also point out that this strategy all but ignores the strategic implications of an energy sector transitioning toward lower-carbon energy resources for the purposes of combatting climate change. This is a fair criticism insofar as the priorities

of the administration regarding regulation and policy emphasis are not at all aligned with a low-carbon future. The administration has taken steps, however, to promote various low-carbon energy sources such as nuclear energy and carbon capture and sequestration. But these efforts pale in comparison to what is ultimately required for a low-carbon future, and the administration has almost totally disengaged from, if not obstructed, ongoing international conversations where climate change serves as the top priority.

Perhaps the most damaging side of U.S. energy sanctions has been the impact on U.S. allies. In Iran, sanctions have been entirely divorced from the multilateral effort that produced the JCPOA. Allies and adversaries both complied with the sanctions, albeit begrudgingly, and it is not clear that the United States paid a short-term price for alienating its allies. Similarly, in Russia, the sanctions on Nord Stream 2 weakened a relationship with Germany that has come under particular strain during the Trump presidency. In both cases, the short-term reactions have been modest. But together they have weakened the idea that U.S. sanctions are often deployed to achieve goals shared by the West. And increased frequency of use will accelerate an ever-evolving conversation of how to build institutions that allow countries to bypass the enduring dominance of the U.S. dollar in international transactions.

## CHAPTER 2

# WITH RUSSIA AND CHINA, WHICH TI RUSSIA AND CHINA ARE DOING OVERSE ING AND THE WAYS THAT THOSE CH OUT THE NEW GEOPOLITICS OF ENERG KE MOST OF THOSE CLASHES HAVE TO TEREST IN ENERGY PER SE, THERE IS A

The simplest way to think about the new geopolitics of energy is to separate influence exerted over specific regions and influence sought over specific markets or technologies. In the regional sphere, the United States has various interests across the world, and in pursuit of those interests, it often clashes with other countries. These days, it seems like most of those clashes have to do with Russia and China, which the Trump administration has explicitly labeled as geostrategic competitors. When it comes to what Russia and China are doing overseas and which behaviors alarm Washington, energy is often included. It is obviously not the only area that raises concerns, but energy is either a component of Russian and Chinese strategy toward certain places or at least a useful analytical lens for thinking about what these countries are trying to accomplish. Even if someone had no interest in energy per se, there is a need to understand the energy motivations and dimensions of Russian and Chinese foreign policy.

Competition takes a different form in the market and technological sphere. The United States, like other countries, is always aspiring to be more productive and more innovative, especially in strategic areas where innovation can reverberate across the economy as a whole or, in a defensive sense, in areas where prominence might lead to dominance and an ability to exert political influence over others. In energy, there is a need to keep energy costs low to enable the rest of the economy to function, but there is a need to ensure that wherever that energy comes from it does not expose the country to geopolitical vulnerabilities. These concerns have traditionally centered on the role of OPEC in oil markets or of Russia in European gas, and other elements of competitions have been more muted because they have occurred under the umbrella of a Western alliance (primary in nuclear technologies, for example).

Yet grappling with market and technological competition increasingly means thinking about Russia and China—Russia because it is a major force in oil, gas, and nuclear energy and China because it is the largest energy consumer in the world (and hence an actor able to define the rules of the game) and also an aspiring technological leader in new energy technologies. These two players are also central when it comes to dealing with climate change: China because of its size and centrality to solving this problem, and also because it sees the opportunities that the energy transition creates for it, and Russia because it has, in the past, seen a warming climate as possibly a good thing for Russia and hence has hesitated to embrace greater global action on climate (it was one of the last countries to ratify the Paris Climate Agreement). This is not to suggest any global approach can be reduced to these two actors, only that these two players tend to be seen in Washington as presenting the greatest challenges for U.S. foreign policy.

Given this reality, we investigated how different players were seeking to use energy to exert influence in various geographies, selecting, as a sample, the Middle East, emerging Asia, Africa, the Arctic, and Venezuela. We also investigated the role of major players in select energy markets or technologies including crude oil, natural gas, nuclear energy, and new energy technologies (with a focus on batteries, electric vehicles, wind, and solar). In the regional investigations, our core research questions were to assess what different players were doing (Russia and China in particular), how those players use energy to build ties, and to what extent those efforts should be seen as menacing by the United States. In the energy market and technological investigations, we examined how these markets were changing and the ways that those changes might grow or diminish the influence that specific actors might have enjoyed in the past. The following sections summarize what we found.

## SECTION 1: WHAT DOES RUSSIA WANT?<sup>76</sup>

To think systematically about Russia's foreign energy policy, it is helpful to start from the broad aims of the Russian state and Russian foreign policy. There is remarkable consensus among experts about the basic parameters that define Russia's foreign policy, though different scholars might emphasize different aspects of Russia's behavior. It boils down to three interrelated goals: (1) the recognition of Russia as a great power, as co-equal to the United States, and as always needing to be present when big decisions are made; (2) the ability to exert significant influence in its near abroad, in order to protect its own interests and to better defend its own territory; and (3) the ability to withstand external pressures that might challenge its territorial integrity, the regime's stability, or the wealth of its elite.

Prestige is an overriding concern of the Russian state, and it emerges from several, mutually reinforcing dynamics: an age-old nationalism and a desire for Russia to be great; a chronic sense of insecurity that Russia is never as strong or as vibrant as the West, or never able to

reconcile its ambitions as a great power with the reality of its capabilities; a nostalgia for the Soviet times where Russia, if nothing else, was taken seriously on the international stage, feared, and occasionally admired by others; and a desire to recover from the humiliation of the 1990s, where, in Russia's view, the West celebrates a triumph that was never quite justified and that relegated Russia to a second-tier power.

Prestige, however, is both a means and an end. It is an end because Russia's desires to be elevated in status and seen by the world's leading powers as a peer. Any slight, such as being thrown out of the G8 or being referred to by former President Barack Obama as a "regional power" whose significance is waning, hurts in its own right, for its symbolism as much as for its import for foreign policy. But prestige is also an end in itself insofar as Russia has a worldview that it tries to articulate, including a sense of how the world should be ordered and what is permitted and what is not in international affairs. Recognizing Russia as a great power cannot satisfy Russia if the world is moving in a way that undermines Russia's core national interests, at least the way that Russia defines those interests.

The first of those core interests is an ability to exert influence in its "near abroad," which in turn stems from several overlapping objectives. It is, on one hand, a defensive exercise. As Angela Stent writes, "[Russia] has only one natural border, the Arctic Sea to the north. Otherwise it has constantly had to redefine its borders . . . Invaders have come from the east, south, and west and have eventually been pushed back."<sup>77</sup> This is not to suggest that Russia's incursions are justified, only that they are seen by Russian leaders as such, as the means to secure the country's borders from invasion, hostile neighbors, or insurgents, especially from Muslim minorities, which have often clashed with the center over the years.

But it is also an offensive exercise, reflecting a worldview according to which great powers have a right to interfere in the affairs of smaller, less powerful neighbors, especially when those neighbors may have historical, cultural, linguistic, or religious links to Russia. From that perspective, the ability to project power needs not be justified by any particular threat or overriding objective; it stems naturally from Russia's position in the world and its relationship with other countries.

Finally, Russian leaders are motivated, as most leaders are, by a need to stay in power, which in Russia's case has meant several things over the past two decades. One is hostility to regime change, especially the kind fueled by popular uprising and supported by external forces. Russia has consistently opposed any international legitimation of such revolutions, and it has been especially adamant when those revolutions have taken place close to home (as in Ukraine, Georgia, and Kyrgyzstan). Moscow fears the contagiousness of foreign ideas and revolutions, and these shocks reinforce a long-held Russian suspicion, whether founded or not, that the West wants to undermine Russia's territorial integrity and promote liberal, democratic reforms that will challenge the regime's stability. Alongside this need to stay in power

is a more provincial desire for enrichment—one that goes all the way to the top, and one that makes it impossible to separate economics and politics among the goals that Russia's leadership aims for, whether in domestic politics or foreign policy.

Over time, these policies and preoccupations have morphed into a worldview that guides Russia's grand strategy. As Stent, again, notes:

Putin's eighteen years in power have created a new Russian Idea that resembles the old Russian Idea: Russia is a unique civilization, in many ways superior to that of the West, and is both European and Eurasian. Western concepts of individualism, competition, and untrammelled free expression are alien to the more holistic, organic and communal Russian values. Russia has a right to a sphere of influence in the lands that were part of both the Russian Empire and the USSR, and Moscow has a duty to defend the interests of compatriot Russians living outside the motherland. The West represents a threat to both Russian values and interest. And its agents inside Russia are poised to do its bidding.<sup>78</sup>

## SECTION 2: RUSSIA'S FOREIGN ENERGY POLICY

Energy is Russia's most lucrative, strategic, and visible export (alongside arms). Furthermore, for a country that prizes recognition as a major power, energy is also one of the areas where it can claim to be a real global leader. Russia benefits from a world that attaches significance to the world's largest energy producers. Over the years, Russia has sought to exploit its rich endowment to grow its economy (and hence its power), to forge links with countries all over the world, and to reward friends and punish adversaries. But over the past few years, Russia has also shifted its strategy in several regards.

In oil, Russia's most notable departure has been its engagement with the Organization of Petroleum Exporting Countries (OPEC). In practice, this relationship has, at times, turned into a G2 for oil markets where Moscow and Riyadh come to an agreement and then bring the rest of OPEC, plus a number of other countries that have agreed to manage output, in line with that topline target. At other times, it seems like Russia has been the mediator in chief, helping Saudi Arabia navigate the complex politics of OPEC, especially its growing antagonism with Iran; Russia is seen as an arbiter that both sides can talk to. In practical terms, Russia's commitment to OPEC has been more optics than substance: it has barely curtailed production, and when it has done so, it was usually off an inflated and unsustainable base.

But Russia has gained something for its participation. It has joined a long-established forum with a history of standing up to the West, and it did so as a leading force. Participation in OPEC helped cement Russia's presence in the Middle East, coupled with its intervention in Syria, turning Russia into a major diplomatic interlocutor and acting as a springboard for

closer energy investment ties and weapons sales. It helped prevent, until early 2020, a complete meltdown in oil prices, thus avoiding the economic pain Russia experienced after the 2014 collapse in prices. Some of the things that Russia wanted, however, it did not get. It was not able to thread that fine line of supporting oil prices without fueling the growth in U.S. shale (at least not until Covid-19 hit shale hard). It was also unable to solicit much foreign investment in its energy sector to compensate for Western sanctions. But it was able to accomplish these things without much sacrifice, despite the occasional grumblings from the oil companies, chiefly Rosneft, about the negative effects on Russia of curtailing production. And despite sanctions and limited foreign investment, the country's long-term production outlook has remained robust.<sup>79</sup>

In gas, Russia's strategy has shifted, too, partly because the gas market has changed in the past decade. Russia has pursued growth and diversification—of pipeline routes, export modes (from pipeline to LNG), target markets (from Europe to Asia), marketing strategies (from inflexible to flexible), and geographic footprint (adding businesses outside Russia). Some of these changes have been foisted on Russia by the marketplace—the move away from oil indexation in Europe, for instance, and the gradual liberalization of that market rendered Gazprom's old marketing model obsolete. Other changes have been as much about opportunism as strategy. The rise of NOVATEK has enabled the country to finally claim some leadership in LNG, a market long neglected by Gazprom, and this was as much the Kremlin recognizing and enabling success as it was the Kremlin driving it. Still the changes have been in response to external conditions, such as the shift to China and the reliance on Chinese financing for the Yamal LNG project after sanctions closed off Western finance as an option for the company.

In narrow terms, one can argue that Russia has been weakened in gas markets, the result of European diversification and the growth in U.S. shale. That is too simple a reading. Russia's leverage has never been as high as the critics have claimed—the ability to inflict damages on other countries never really translated into an ability to truly affect politics. Even in Ukraine, Russia was never able to use gas to sway the country's orientation; at best, it was able to make Ukraine pay a price for shifting away from Russia or to reward pro-Russia politicians with favorable deals. In essence, Russia has lost power in natural gas that it never truly possessed except in the minds of pundits. Today, Russian is bigger, more diverse, more variable, and more robust, but it operates in a far more competitive market, with lower prices overall, more options, and fewer certainties.

Nuclear power is the one area where Russia can claim genuine global leadership, accounting for a growing share of the market for new reactors.<sup>80</sup> Russia's success can be attributed to several factors. First, its chief competitors, in the West, have suffered from years of crisis and, often, shrinking local markets, which have undermined their competitiveness and their ability to put together a compelling package for newbuilds. Second, the market itself has shifted

to countries further down the bankability scale, and Russia has been far more willing to go after those deals. Finally, Russia has been able to bring together the entire resources of the state—from state support to Rosatom to financing for new projects—to offer a “one-stop-shop” package that newcomers to the industry find particularly attractive.

Geographically, Russia’s reach in energy markets has been propelled by Rosneft, which has acquired assets or taken positions around the world.<sup>81</sup> Even so, it is easy to overstate Rosneft’s footprint and its significance. Outside Venezuela, Rosneft mostly produces gas, and those gas volumes are not even 10 percent of the company’s total gas production in 2019, mostly from a small stake it bought in the Zohr field in Egypt.<sup>82</sup> Rosneft holds exploration positions in several countries, and some of these might eventually become significant but are not yet. It has entered into various trading or supply relationships whose significance is easy to exaggerate since they tend to be at arm’s-length and low margin.

Gazprom has been even less successful in building an international upstream business—the numbers are somewhat opaque, but less than 1 percent of its 2018 production came from overseas fields.<sup>83</sup> Interestingly, it is Lukoil that has the biggest overseas footprint—around 15 percent of its 2018 production came from outside Russia, chiefly in Uzbekistan and Kazakhstan—but Lukoil is rarely mentioned among strategists who worry about Russia’s overseas presence.<sup>84</sup>

The most significant foothold that Russia has been able to acquire has been in Venezuela, where Rosneft is a major producer and also the chief handler of Venezuelan crude since U.S. sanctions limited the options available to Venezuela to export its crude oil (in late April 2020, Rosneft divested its positions in Venezuela to a state-owned entity that would be better insulated from sanctions).<sup>85</sup> From Venezuela’s perspective, Russian help has been critical in enabling the country to continue earning hard currency despite U.S. sanctions.

From Russia’s view, however, the picture is more mixed. On the one hand, Russia has secured a seat at the table when Venezuela’s future is to be discussed; it has also supported a regime that is antagonistic to the United States and has defended a leader from regime change. The cost to achieve these goals is harder to discern, however. Rosneft had extended a number of loans to Venezuela over the years, and its operations in the country have been partly engineered to help the company recoup its debts. Russia also seems to have a track record of losing access to a country once its preferred patron has been toppled. As a result, Russia becomes further wedded into the Maduro regime because experience shows that if a fundamentally new leadership emerges in Venezuela, Russia’s position will weaken sharply.

Looking at Russia’s foreign energy policy more generally, a few themes stand out. First, Russia’s strategy is highly responsive to market dynamics: in oil, it has found an accommodation with OPEC when OPEC has had an opportunity to play a balancing role, but it has taken

only modest steps itself to cut output. Its participation has been crucial in securing whatever success OPEC+ has been able to accomplish in recent years, but it has been unable to help the most fundamental conundrum that OPEC+ has faced: that sustained prices at high levels merely incentivize more production in the United States. In gas, Russia's strategy has also responded largely to market dynamics, and its course of action could be considered as maximizing opportunities given the constraints created by the market. Even in nuclear energy, where Russia has a market-setting role, its success is in part due to the failure of the incumbent players. As in geopolitics, Russia has simply exploited a vacuum where it has found one.

This opportunism is the second clear theme that emerges from Russia's foreign energy policy. It is easy to assume, as some analysts do, that there is a detailed masterplan hatched in the Kremlin that the state bureaucracy and state-owned companies are then called to execute. The reality is far more nuanced and decentralized. Russian companies have gone places where they have found openings, even if some of those openings might not be optimal from an energy perspective. But after years of trying to grow international businesses, the Russian companies have little to show for it. Russia's energy power remains dependent on the hydrocarbons that exist under Russian territory, no matter how ominous the tentacles of Russia might appear to outsiders.

Third, the state spends considerable resources helping the energy sector. Rent extraction is still the name of the game, but the process of generating rents is finely tuned. Russia continues to tweak its tax system in order to ensure the profitability of its oil sector, and the developments in the Arctic depend critically on a favorable tax regime and state support for infrastructure and shipping. The nuclear sector similarly depends on transfers to Rosatom and generous financing packages. In some ways, this is just the usual story: Russia does not make money the way other countries make money, and profits are as important as spending. But there is another dimension: the rents generated by the energy sector are increasingly pumped back into the energy sector to sustain its viability, raising questions about the long-term sustainability of this recycling regime.

Finally, it is hard to see clearly how these energy relationships translate into political relationships. One can see examples where there is a clear political dimension to the energy relationship, such as in Venezuela. In other places, in the Middle East and Africa, energy is a good foundation that allows Russia to have deeper conversations with a wider variety of political leaders from different countries, even if those conversations do not yield something material in energy or foreign policy terms immediately. But these foundations can be critical when they meet opportunity, especially when the absence of the United States creates a vacuum that Russia can exploit. More than anything else, this is the way to think about Russia's foreign energy relations.

### SECTION 3: WHAT DOES CHINA WANT?<sup>86</sup>

Where Russia is eager and opportunistic, China is patient and strategic, sensing that time is on its side. Russia is eager to get involved in hotspots around the world, while China often resists entanglement. Russia's economy is stagnant and undiversified, China's is dynamic and broad-based. Russia extracts while China manufactures. Both are authoritarian and illiberal, offering an alternative to Western values such as democracy, human rights, and the rule of law. Neither sees a meaningful distinction between geopolitics and economics. Both will harass neighbors, defend their sovereignty against enemies, real or imagined, and deploy tools of statecraft, often crudely, to defend their interests. But the two present starkly different problems for American diplomacy in general and for energy in particular.

As China grows economically, it will not merely seek to integrate into a world built by others. China will instead try to change that world, although it is unclear by how much, how fast, and in what direction. China's foreign policy over the past few years gives some clear signals in terms of what the United States should expect. For one, China is unapologetic about its domestic political system and its refusal to either abide by or recognize the universality of values it sees as Western. It aspires to create new institutions, both global and regional, while at the same time looking to grow its footprint and influence in existing ones. During the Trump presidency, China has even turned into a self-proclaimed defender of the international order. Everywhere, it leads with economics—trade and investment—but these are always seen through a political lens, and China will quickly apply economic pressure when a partner country pursues policies that displease China (usually related to Taiwan but not exclusively). Yet, China's approach will also differ from the West; as Henry Kissinger put it:

Traditionally, China sought to dominate psychologically by its achievements and its conduct—interspersed with occasional military excursions to teach recalcitrant barbarians a 'lesson' and to induce respect . . . Still, China was not a missionary society in the Western sense of the term. It sought to induce respect, not conversion; that subtle line could never be crossed. Its mission was its performance, which foreign societies were expected to recognize and acknowledge.<sup>87</sup>

### SECTION 4: CHINA'S FOREIGN ENERGY POLICY

For many years, China's foreign energy policy was framed around how Chinese companies were securing access to energy resources overseas. The constant fear was that China was "locking up" oil resources and weakening global energy security in doing so (even though, in practice, a lot of this oil never went back to China, and even if it did, it would merely displace oil that China would purchase from other places). China of course remains an active participant in oil and gas markets: it continues to invest in new projects, to buy companies overseas,

to lend money to projects and governments, and to sign long-term contracts to import oil and gas. But the market and strategists have grown somewhat accustomed to these activities. Occasionally, a deal or two might rise to some threshold that merits special attention, perhaps involving Russia or Iran or some other big, strategic country. Other times, a deal might be scrutinized because there is some corruption involved, abuses, or because it might aid a country whose record is poor. But in simple terms, one of the primary preoccupations of Western energy strategists for the better part of a decade has withered, and it has been superseded by other concerns.

Instead, the oil and gas concerns vis-à-vis China have moved to the governance side of the equation and the extent to which China is integrating into these two markets versus trying to change them. In both cases, China has aspired to create domestic hubs that will price oil based on Chinese market fundamentals, thus challenging the dominance of either Western or generally foreign pricing markers (unsuccessfully so far). In oil, China's purchases for its strategic petroleum reserve remain opaque, adding non-transparency to a market that has become considerably more transparent, in part aided by satellite images. In gas, China has mostly followed the rules of the market, although it has also acquired considerable buying power, and it is possible that it might try to reshape the rules to suit its interests more directly.

But these days, the concerns around energy and China have shifted to two domains: (1) China's ambition to become a global leader in new energy technologies, and (2) the energy dimensions of the BRI. In 2019, China ranked first in the number of electric vehicles (EVs) deployed and in installed capacity for solar and wind energy.<sup>88</sup> Not only does China lead in deployment, it also leads in manufacturing. It is dominant in the midstream and downstream segments of the EV chain: its market share in refining or battery-grade chemical production was 80 percent in 2019, 66 percent in cathode and anode production, and 73 percent in lithium ion battery cell production.<sup>89</sup> China had a smaller share, just 23 percent, in upstream production (mining), which usually gets more focus as a concern, especially regarding its environmental, social, and governance dimensions.<sup>90</sup> China is just as dominant in solar, accounting for 70 percent of the world's manufacturing capacity for solar PV modules.<sup>91</sup> China faces greater competition in wind from U.S. and European suppliers, but in 2018, "eight out of the top 15 wind turbine manufacturers [were] based in China," accounting for over a third of the global market.<sup>92</sup> In nuclear energy, China is still a relative newcomer in the international stage, although it aspires to grab a bigger share of this market.<sup>93</sup>

This leadership position has been cultivated over many years and is the product of both strategic determination and considerable resource allocation, with "technology push" complemented by "market pull" and many loans, subsidies, and incentives geared to growing these markets and ensuring that production is located in China.<sup>94</sup> China's approach is thus not easy to replicate or replace, and any efforts that try to do that are likely to fail. But there is also

**TABLE 1: Comparing China and the United States Across Key Energy Metrics**

<i>data for 2019 unless otherwise noted</i>	<b>China</b>	<b>United States</b>	<b>Ratio</b>
<b>Energy Production</b>			
Oil and Condensate (thousands barrels per day)	3,836	17,045	0.2
Natural Gas (billion cubic meters)	178	921	0.2
Coal (million tons of oil equivalent)	1,906	342	5.6
Nuclear (terawatt hours)	349	852	0.4
Hydropower (terawatt hours)	1,270	271	4.7
Renewable Electricity (terawatt hours)	732	490	1.5
<b>Deployment of Select New Technologies</b>			
Wind (megawatts installed capacity)	204,548	103,555	2.0
o/w Offshore	5,930	29	204.5
Solar PV (megawatts installed capacity)	205,493	62,298	3.3
Electric Vehicles (thousand vehicles on the road)	3,349	1,450	2.3
<b>Market Share in Select Value Chains</b>			
Wind (wind turbine suppliers in 2018)	37%	10%	3.7
Solar PV (cell/module production)	70%	1%	72.2
Electric Vehicles			
Upstream (mining)	21%	0%	103.0
Midstream chemical refining	77%	1%	77.0
Midstream cathode and anodes	72%	0%	n/a
Downstream lithium ion battery cells	73%	10%	7.3

*Source: Energy production data from BP, Statistical Review of World Energy, June 2020. Wind and solar installed capacity from International Renewable Energy Agency, Renewable Capacity Statistics 2020 (Abu Dhabi: March 2020). Electric vehicle data from International Energy Agency, Global EV Outlook 2020 (Paris: July 2020). Wind manufacturing from "GWEC: 1 in 5 wind turbines installed by Vestas in 2018, according to new market intelligence report," Global Wind Energy Council, Press Release, April 21, 2019. Solar manufacturing from Arnulf Jäger-Waldau, "Snapshot of Photovoltaics—February 2020," Energies 2020, 13, 930. Electric vehicle manufacturing from Benchmark Mineral Intelligence, private communication with the authors (unweighted average of nickel, cobalt, graphite, lithium, and manganese for upstream and refining).*

no doubt that China's rise as a manufacturing locus for the energy transition presents major challenges for the United States and its allies, some of which will require confrontation over China's more abusive practices and others that will depend on the United States itself enhancing manufacturing prowess (more on that in the next section). It is important to note that before the Trump administration, the United States largely encouraged China's development as a new energy technology power. Part of the strategy to get China to engage productively on

the issue of global climate change was to encourage co-benefits to greenhouse gas emissions reduction such as improved local air pollution and enhanced economic competitiveness, both major priorities in China.

On the international stage, the China discourse has come to be defined by the Belt and Road Initiative (BRI), a visionary program that is clear in the abstract but nearly impossible to pin down in its details. In broad terms, the BRI serves several functions: it is a diplomatic offensive to create favorable relations with countries all over the world and improve China's image; it is a trade project meant to rewire the trading system and tie it to China; it is an export project meant to find new customers for surplus manufacturing capacity at home; it is a lending project looking to offload excess cash that China has accumulated over the years; and it is an investment project meant to secure Chinese participation in the massive infrastructure build up underway across Eurasia.

There is a big and growing literature that assesses the BRI, its motivations, and its impacts. There is broad consensus that while the BRI represents a semi-coherent vision of the world, it is not a centrally managed initiative but rather an umbrella that encompasses all sorts of projects, many of which predate the BRI. In fact, one is hard pressed to find a complete list of BRI projects, much less pinpoint a central architect or authority in charge. Instead, the BRI is a general thrust that various Chinese actors—companies, financiers, diplomats—use to wrap their projects into something grander and more coherent. It is also clear that whatever theatrics might accompany BRI summits, there is far less that actually happens under the banner of the BRI than meets the untrained eye. There are myriad agreements, deals, memorandums, frameworks, and so on that are signed between China and countries all over the world, many of which, in the end, lead to nothing.

Insofar as the BRI has become a shorthand for Chinese overseas investment, it has come to be associated with certain ills: non-transparent procurement and corruption; lax environmental, social, and governance standards, especially when it comes to engaging local stakeholders; substandard construction; terms that are highly favorable to Chinese parties, often foisted on countries that cannot afford them but must accept them due to a lack of alternatives; a bias toward Chinese labor and equipment, even if it is not cutting edge; and a preference for old technologies, especially coal, which undermines the global effort to transition away from fossil fuels.

These critiques, however, should be put into context. When it comes to debt sustainability, for instance, countries are usually far more indebted to Western creditors than they are to China.<sup>95</sup> Chinese companies are often accused of engaging in corruption, but the evidence is mixed on whether China invests in countries with poorer governance records than do Western partners.<sup>96</sup> In energy, China has been widely criticized for its willingness to fund coal projects overseas, even though the coal boom in Southeast Asia started far before China got involved.

Other financiers, chiefly Japan and Korea, also remain important external funders, and China's participation in coal projects is important but not dominant.<sup>97</sup> China often responds to what countries ask of it—it builds the projects that national governments have planned for but not secured funding or partners.<sup>98</sup>

In the end, however, the most important thing to know about the BRI is that it is unlikely to translate easily into geopolitical gain. China will make bad calls like other countries do and will be mired in disputes over unpaid or unpayable debts. It will become the target of politicians who see an electoral advantage in “standing up” to China. It will miscalculate, thinking that a slight nudge might sway a country in China's direction. Its projects, when they fail, will tarnish a reputation it is working so hard to improve. It will be caught in fights it has no wish to participate in—coups, revolutions, and civil wars that will force it to take sides to defend its interests and to possibly alienate the losers. Like great powers throughout history, China will discover that the pathway from economic relationship to political influence is convoluted and uncertain, and those failures, when they come, will present opportunities for the United States.

## CHAPTER 3

# ASK **WHAT** INTERNATIONAL ENERGY PROVIDE **THE** CONTEXT FOR U.S. IN A OR THE **UNITED STATES** IS THAT THESE **SHOULD** CREATE A STRAID MANY WHO **DO** MIGHT TRADE RELI

## **SECTION 1: OLD STRATEGIES WILL NOT WORK—TOO MUCH HAS CHANGED**

The opening chapter explained the four changes that provide the context for U.S. international energy policy: (1) the rise in U.S. oil and gas production, (2) an accelerating energy transition, (3) growing strategic rivalry, and (4) greater economic competition. U.S. international energy policy must be informed by these realities but also respond to them. The main challenge for the United States is that these megatrends present different opportunities and challenges, and it will be hard to find a balance between them.

### **Why Is a New Strategy Necessary?**

To strike the right balance, it is important to ask what international energy strategy is for and how it relates to domestic energy priorities. Most governments, including the United States, rely on other countries to meet their domestic energy goals because the modern energy system is international. Countries trade raw materials, finished energy products, energy equipment, finance and investment, and even innovation. Very few countries in the world can claim true energy independence and many who do might trade reliance on basic biomass-derived energy for something cleaner and more efficient, quite likely enabled through a connection with a foreign country or company. While this trade opens up new shared risks, it by and large provides savings and security. This interconnectedness also binds countries with one another in the shared responsibility for greenhouse gas emissions.

In general, countries seek to advance their domestic energy priorities through the creation of an international energy strategy, which can be either an explicit policy or general trend in behavior derived from broader economic or foreign policy priorities. Domestic U.S. energy policy stewards resource development, regulates environmental impacts, governs trade, and encourages energy innovation, all within the parameters of the fundamental though vague goals of providing affordable, reliable, and secure resources within some basic guidelines for reducing environmental impact.

**THE ENERGY WORLD HAS CHANGED  
IN FOUR PROFOUND WAYS, AND  
THOSE CHANGES MAKE IT IMPOSSIBLE  
TO GO BACK TO ANY OF THE OLD  
STRATEGIES THAT PREVIOUS  
ADMINISTRATIONS HAVE PURSUED.**

As discussed in Chapter 1, while both political parties in the United States agree on these main objectives, they differ on the relative importance of each and the lengths to which the country needs to go to address them. For example, the energy dominance strategy of the Trump administration prioritizes affordability and security, seeing cheap energy as a boost to

the U.S. economy and a source of national strength. It does not completely neglect all aspects of the energy transition or environmental impacts, but it does not advance them either. The Obama administration largely prioritized climate change and affordability, seeing efforts to drive down the cost of new energy technologies as a pathway to a clean energy economy. Similarly, the administration did not neglect resource security or geopolitical leverage, but it also was not the dominant frame for the administration's domestic or international energy policy.

Over time, the norms and institutions created to advance shared energy interests formed a loose system of global energy governance. In the 1970s, institutions such as the International Energy Agency came into existence to safeguard energy security and serve as a counterpoint to the Organization of Petroleum Exporting Countries (OPEC), which looked out for the interests of oil-producing countries. In the early-1990s, the United Nations started to organize around ideas of energy and sustainability, with a focus on the challenge of global climate change. As much as these organizations exist to advance a specific agenda, such as energy security or a strategy to deal with climate change, these organizations derive their authority from the countries that form their membership.

Shared interests among those countries and within this system are crucially important because no multilateral institution has any real authority or power to reward or punish countries in any material way. Take, for example, the Kyoto Protocol under the United Nations Framework Convention on Climate Change. Rather than punish non-compliant countries when they failed to meet greenhouse gas emissions reduction targets and timelines, the organization quickly created new mechanisms to accommodate a more realistic consensus-based

agreement to address growing greenhouse gas emissions. Even in OPEC, non-compliance with production quotas is the historical norm given the inability to enforce limits in individual countries. Despite these shortcomings, international energy institutions at the very least serve as a mechanism for coordination and discussion of shared interests.

When countries' interests start to diverge, or when new countries not previously included in the power structure of existing arrangements start to advance their own interests independently, the relevance and authority of such organizations weaken and their ability to advance shared interests becomes more diffuse. Such is the case right now, where greater economic competition, strategic rivalry, an accelerated energy transition, and the changing nature of U.S. oil and gas production are altering domestic and international energy priorities for the United States and countries around the globe. By doing so, they are challenging the international energy institutions designed to uphold or advance shared interests.

The choice before the United States right now, therefore, is not simply tactical but rather an opportunity to reset the rules and architecture of global energy governance in ways that advance U.S. interests. It is highly unlikely that the United States could achieve its interests in anything approximating a unilateral approach. Despite the enormous resource wealth of the United States, its energy sector is deeply connected with other countries, and any major U.S. policy priorities—security, economic prosperity, environmental sustainability—suffer as a whole without connections to other countries and global supply chains. As stated earlier, the norms and institutions are formed on consensus and shared interest, and while the United States may be able to get its way on an incidental basis, continuously forcing other countries to go against their own interests will come at a cost.

What combination of U.S. domestic energy strategy, international energy strategy, and global energy governance system might provide the best options for the United States? To answer this question, policymakers must collectively define U.S. energy interests in this new world and decide how best to achieve them.

## **U.S. Options and Trade-offs**

Any U.S. strategy to address the four megatrends will necessarily require trade-offs. A strategy to accelerate an energy transition and reduce greenhouse gas emissions, for instance, will look different than a strategy to maximize the leverage that the United States has through its abundant hydrocarbon resources. Not only would these strategies look different, but they are also, at some level, incompatible with one other. A climate-first strategy will upend the world on which energy dominance rests and from which its power emanates. It is hard to revolutionize and effectively dismantle the world's energy system while also reaping its benefits—not impossible, but hard.

How to integrate energy, climate, and geopolitics is also far from a simple task. For one, there is a tendency among policymakers and pundits to mix ends and means when thinking about the geopolitics of energy. Sometimes, it feels like energy dominance, for example, is an end in itself—not a tool that is being used in pursuit of a grander strategy, but a weapon deployed without a clear goal. The escalation of sanctions against Iran, to give one example, is mostly a demonstration of U.S. energy power but without any effort to match means and ends and affect a specific political outcome. They represent the flexing of muscles in a body-building competition, not the flexing of muscles to move an obstacle out of the way.

This is not to suggest that energy and climate must always be means that serve political ends. Fighting climate change is an end on its own. But having a goal says nothing about means. One could imagine a climate strategy that is antagonistic toward China, amplifying rivalry and competition. It would be a strategy based on erecting trade barriers to undermine whatever competitive advantage China enjoys from its carbon-intensive energy system and one geared to confer advantages to U.S. industry and to U.S. companies at the expense of China. But one could also imagine a strategy that puts climate first and sees opportunities to collaborate with China in that common challenge, framing the two powers of the world as partners facing a singular threat.

These two strategies would start from the same objective—reducing emissions—but pursue that goal in different ways, and these worlds could not look more different. The antagonistic world would be full of barriers and localized supply chains; the collaborative world would be more seamless and integrated (in theory). Each offers benefits and costs. More engagement with China could accelerate decarbonization but at the cost of empowering a strategic rival and maybe missing out on creating opportunities at home as China takes (or keeps) a greater share of the economic benefits that new industries bring. Less U.S. engagement with China could help the United States maintain some relative edge against China but at the risk of a slower energy transition, with all the challenges that come from a higher concentration of greenhouse gases in the atmosphere. It is not obvious, a priori, which path makes more sense.

The calculus becomes even more complex once additional elements are introduced. A singular focus on great power competition, for example, might lead the United States to try to create a growing wedge between China and Russia. If that were the overarching objective—to maintain primacy in a more multilateral or nonpolar world—energy could be deployed in different ways. It could mean an ever-shifting posture that one day favors Russia and another day favors China. It could mean engagement with China to weaken its ties to Russia. Or it could mean engagement with Russia to reduce the isolation that has made it seek China's friendship further. Closer ties with Russia could mean downplaying U.S. energy dominance or compromising on a more aggressive agenda to reduce emissions. Such a strategy might not make energy sense, but it might make geopolitical sense.

How the United States deals with the European Union and other allies is particularly important in that respect. In recent years, the transatlantic alliance has seen long-standing disagreements boil over, driven in part by President Trump's own skepticism of the European project. Maybe this moment will pass, and the United States and Europe will again find themselves on the same side on most issues. But energy has been a particularly divisive topic, driven by U.S. sanctions on Nord Stream 2 and by a growing fear in Washington that the European Green Deal might threaten U.S. hydrocarbon exports. Here, too, the heavy-handed pursuit of energy dominance, alongside other policies, chiefly on trade, has created a wedge in the most important alliance that the United States needs to confront its true strategic rivals. A point for energy dominance has meant a point subtracted on the grand chessboard of great power competition.

In other geographies, these tradeoffs are even more apparent. In the Middle East, an energy-first strategy would dictate disengagement and a willingness to pull back from the region. But such a strategy might cede strategic space to rivals, and those rivals might pursue policies that undermine U.S. goals. For instance, prolonged wars in Syria and Libya amplified refugee movements into Europe and helped weaken the European Union, chipping away at European unity, a long-standing goal of the post-World War II world. In Asia, there might be greater synergy between promoting energy exports to the region and undercutting China's influence there, but the manner in which U.S. exports are pursued could put countries in the uncomfortable position of having to pick between the United States and China. Finding balance could require greater restraint in promoting U.S. interests at some points or more ambition in others.

The United States, of course, is a big country with diverse interests, and it is unlikely that any one strategy or goal will suffice to cover all the possible choices that a policymaker may be confronted with. There are common interests, however, and right now a strong motivating force for nearly all aspects of U.S. society is economic competition. Different from geopolitical rivalry, economic competition is about the performance of the U.S. economy relative to other countries. U.S. preoccupation with economic competition covers much more than energy, and political leaders suggest very different approaches to pursuing a more competitive U.S. economy. But it is the kind of principle on which the United States can anchor a strategy with bipartisan support. As stated above, there are good and bad ways to pursue an energy strategy grounded in economic competition. The United States should create a strategy that connects its goals with international norms and institutions to advance positive competition among nations based on shared interests. A quick survey of countries, institutions, and governments shows that advancing the energy transition is now the most obvious and prevalent shared interest.

The point here is not to pick one priority and assume away or ignore trade-offs but to elucidate them and quantify them. The objective is to understand that one goal, or one strategy that stems from a specific way of looking at the world, could lead to policies that undermine other, equally important strategic objectives. As such, the crafting of U.S. international energy policy

still must balance between these competing priorities and objectives and, ideally, forge a path that achieves as many objectives as possible with as few obvious downsides as is realistic. Such a strategy begins, first and foremost, at home.

## SECTION 2: REINVEST IN U.S. ENERGY COMPETITIVENESS

What the United States can achieve in international energy policy depends on what happens at home, and there is no substitute for a strong, vibrant, and innovative U.S. economy—foreign policy can only compensate so much for weak fundamentals at home. Economic competition is embedded in the way that the United States thinks about the world, a vibrant private sector being a primary pillar of its geopolitical power. The challenge has been converting a broad consensus on the need for the United States to remain the most competitive economy in the world into a series of policies that support this objective. In energy and climate, revitalizing America's edge would rest on three propositions: pick an arena to compete; make big bets; and focus on deployment and manufacturing.

### Pick Arenas to Compete

When Congress reauthorized the U.S. Export-Import Bank (EXIM) in 2019, it gave the bank a mandate to compete in certain key sectors, especially vis-à-vis China: renewable energy; wireless communications (5G); artificial intelligence, high-performance and quantum computing; water treatment and sanitation; emerging financial technologies; space technology; biotechnology and biomedical sciences; and semiconductors.<sup>99</sup> Interestingly, this list has no domestic corollary: the United States wants to compete in these sector, and it has authorized EXIM to make an extra effort to support exporters in these areas, but this short-list means nothing at home. Having a sector included into this short list means very little except for export-oriented companies. One could imagine this list meaning much more.

There is a hesitation in the United States, healthy in many respects, to not overdo government direction in the economy. But there is a fine line between not wanting to choose a lane too soon, to “pick winners,” and just wandering aimlessly around the road with no sense of direction. Sometimes the obsession with U.S. competitiveness in the abstract sounds like an athlete wanting to win a gold medal in the Olympics but not wanting to pick a sport, lest they miss out on opportunities further down. Sometimes, to compete you have to first choose an arena.

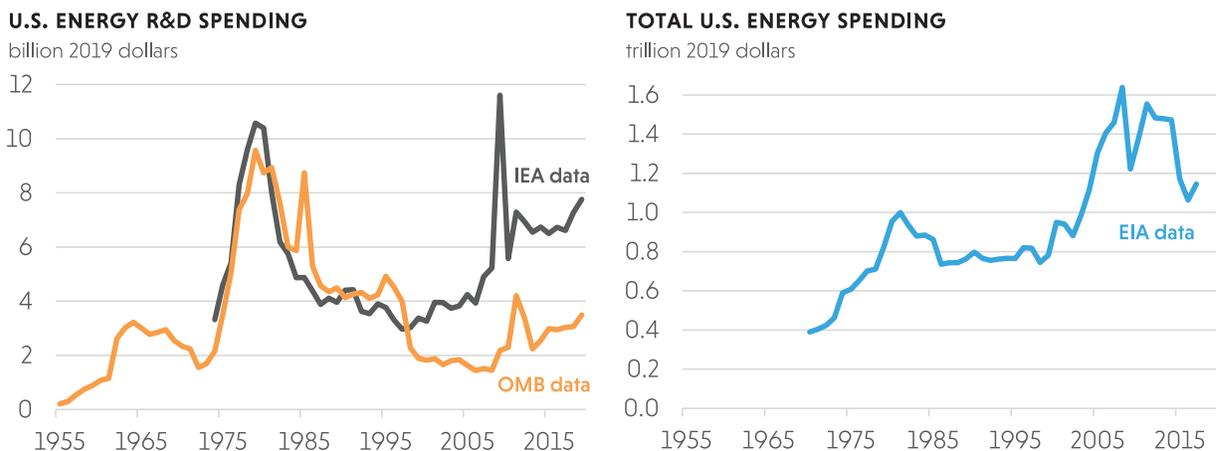
The questions, therefore, are (1) how does one produce a list like the one given to the U.S. EXIM on a regular basis, and (2) how does one create a domestic backbone for that list, a set of policies and institutions and resources that somehow become available once a sector or industry has been included in that list. The United States has several existing structures that serve that role, from the President's Council of Economic Advisers to the Council on Competitiveness to various institutions across the U.S. federal bureaucracy that occupy themselves with specific sectors.

There is no illusion that such a list could be created without controversy or that such a list could unlock tremendous benefits—and that this may not be desirable either, lest the list becomes another battleground for special interests to compete. But one could imagine a “competitiveness scorecard” of sorts, similar to many scorecards on innovation or infrastructure, which helps keep score of how the country is progressing in these specific areas. That scorecard might look at specific output metrics, but it would also elucidate inputs—what tax support are these industries getting, which regulatory reforms might make their deployment easier, how much innovation resources are they receiving, how much might federal agencies that are in charge of spending money be allocating to those ends, and so on. It would bring a certain cohesion to at least match aspiration with reality. If these are the areas to compete in, how is the country doing and where is it falling behind and could do more?

### Do Not Shy Away from Big Bets

Competitiveness begins with innovation, and there is no doubt that the United States remains one of the most innovative economies in the world, even if deployment of those innovations might sometimes lag (more on that below). Higher spending on research and development (R&D) has broad bipartisan support, even though the country devotes fewer federal dollars to R&D in general than it did in the 1950s and 1960s (as a share of GDP).<sup>100</sup> Spending on energy-related R&D is harder to ascertain because different sources provide different sums.<sup>101</sup> The IEA puts 2019 R&D spending close to \$8 billion (including deployment). The Congressional Research Service (for fiscal year 2017) and the Office of Management and Budget (OMB) (for fiscal year 2019) show figures in the \$3 to \$4 billion range, although it is possible that the IEA includes sums shown elsewhere in the other sources.

**GRAPH 3: U.S. Spending on Energy Research and Development, and Energy Overall**



Source: Office of Management and Budget (OMB), *Historical Tables, Table 9.8—Composition of Outlays for the Conduct of Research and Development: 1949–2021* (rebased to 2019 dollars based on the GDP deflator; data based on fiscal years). International Energy Agency (IEA), *Energy Technology RD&D Budget Database* (updated May 5, 2020). Energy spending from U.S. Energy Information Administration, *Table 1.7, Primary energy consumption, energy expenditures, and carbon dioxide emissions indicators, Monthly Energy Review, May 26, 2020*.

No matter the figure, these numbers are paltry and geared more toward avoiding losses rather than engineering success; they are more about avoiding a Solyndra rather than finding the next Tesla. The United States has spent upward of \$1.2 trillion each year on energy-related expenditures over the past decade, which means that energy R&D is not even 1 percent of energy spending and is probably closer to 0.25 percent if the 2017 OMB number is used (2017 is the last year for which economy-wide energy expenditures are known).<sup>102</sup> By contrast, health-related R&D was over \$35 billion in 2018 versus overall expenses of \$3.7 trillion (including R&D), or roughly 1 percent of expenditures.<sup>103</sup> Bringing energy R&D in line with health R&D would mean a quadrupling of the energy R&D budget. (If national defense was the benchmark, there is a \$56 billion R&D budget against overall spending of just under \$686 billion in 2019, which comes out to a share of 8.5 percent.<sup>104</sup>)

The next question is how to spend the money. Any innovation system tries to balance breadth and depth—how to spend large resources on big problems whose resolution would have a big impact—but while encouraging incubation of other ideas whose importance might be obvious only in retrospect. U.S. spending in energy innovation has straddled these two worlds: in the 1970s and 1980s, the system was heavily geared toward innovation in nuclear energy (and other ideas such as coal-based synthetic fuels), whereas the system post the 1990s has been much more dispersed.<sup>105</sup>

A diversified R&D portfolio makes sense to a certain extent, especially since the concentrated approach arguably produced few tangible results (the nuclear industry is still struggling). But the passivity implied by the diversified approach might be inappropriate for an era when the United States has a clear sense of which problems it is trying to solve and knows which technologies might be available to solve those problems. Energy storage is probably the highest on the list, although storage can be achieved through various technologies (e.g., batteries, hydrogen, smart systems). There is merit, however, in the galvanizing effect of a concentrated effort, the so-called moonshot, in areas where the problem and the likely means that will solve the problem are both clear. Several other countries, as well as the European Union, have decided to put hydrogen on that very short list of truly strategic future energy technologies. Picking two or three big ideas that will get an extra nudge could produce serious benefits down the road. And even if the big bets fail, the United States is a big enough country to be able to afford failure.

### **Emphasize Deployment and Manufacturing<sup>106</sup>**

Innovation, on its own, can only do so much. There is plenty of evidence that the United States remains highly innovative, even in renewable energy technologies, despite the appearance that it is ceding the technological high ground to China. Looking at patents, for example, the United States still performs very well,<sup>107</sup> and there is no shortage of historical examples where energy

innovations that spread around the world began in the United States, as solar PV did.<sup>108</sup> What is usually framed as a challenge of pushing innovations from the lab to the market is actually more accurately a challenge of creating a market in which innovations can thrive.

Consider, for the sake of comparison, some of the areas where the U.S. innovation ecosystem excels. These systems look different than energy. In defense and health care, for example, there are massive purchasing incentives at the end of the innovation system, such as Pentagon contracts or favorable intellectual property laws and a health care market that is willing to pay (often excessively) for new drugs. The starting point might still be public R&D, but the market can easily pull technologies out of the lab, especially when there is limited capital investment involved, which is the case often with technology start-ups.

By contrast, energy innovation is largely about displacing existing systems with a long shelf life, often counted in decades for some machines or facilities. The turnover, in other words, is very slow. There is a system that prizes low cost above all else and which, by not pricing externalities such as air pollution or climate change, offers a very difficult commercialization path to new technologies. It was not, after all, innovative research at the federal level which unlocked shale resources, although that R&D was necessary. It was expensive gas and then expensive oil which triggered the market pull for these technologies to be scaled. Similarly, it was feed-in tariffs and other policy support that enabled solar PV to jump quickly over the past decade or so.

The toolkit for energy deployment at scale is well known, with a clear delineation between a slow and passive system, an intermediate but somewhat faster system, and a system focused on rapid deployment. At one end of the spectrum are tax breaks and tax incentives, loan programs, and the like, offering customers the nudge they often need to shift their purchasing decision from one technology to another. Next is a series of policies that include firmer commitments—renewable portfolio or renewable fuel standards, cap-and-trade systems, and so on—which place a boundary around customer choice and push the system in one direction. Finally, there are large-scale interventions where the government creates or scales markets (e.g., the National Highway System, Fannie Mae and Freddie Mac for housing, the Tennessee Valley Authority, or student loan programs for higher education).

There is, in other words, a well-established rulebook for how to deploy new technologies. There are plenty of examples, even in recent history, of how to ensure a level playing field for all technologies and ensure that what gets developed in the formidable lab system can find a market, or at least a market in which innovation has a chance to compete with existing technologies with incumbent benefits. Otherwise, the system risks getting stuck: the federal government pours money into innovation, but then the market is so unwelcoming to the innovation that ideas either languish or look for deployment overseas, often taking with them the jobs and security that innovation is meant to provide.

Deployment strategies should also be explicitly paired with manufacturing. The United States should not be satisfied with merely installing what someone else has conceived, designed, manufactured, and delivered. How to re-attract manufacturing jobs is a big topic, and success will hinge on workforce development, on high-quality infrastructure, and on local factors that create clusters of innovation. But from an energy perspective, the United States has seen both the federal government and state and local governments step up to find ways to attract manufacturing jobs. For instance, the Advanced Technology Vehicles Manufacturing (ATVM) loan program was an innovative approach to help the industry improve its fuel economy (it was under the ATVM that Tesla was able to open its Fremont facility).<sup>109</sup> So far, the federal government has been more focused on facilitating deployment through tax credits than manufacturing through dedicated programs. Programs such as ATVM could be deployed across certain energy technologies to facilitate greater investment in manufacturing processes in the United States.

At the same time, it is also not necessary for the United States to manufacture all of its new technologies at home. Some degree of collaboration with other countries in both innovation and manufacturing will be necessary, and this is one area where a balance must be struck. The government can again provide a useful role in determining at a federal level some minimum standard for domestic production and supply chain self-sufficiency on the grounds of national security. This is already happening in areas such as the nuclear fuel supply chain or critical minerals, but the strategic review is not backed by adequate planning and investment to support the development of domestic capabilities.

### **SECTION 3: ENCOURAGE AN INTERNATIONAL RACE TO THE TOP**

A strong domestic position is vital for projecting power overseas, but a more competitive and innovative energy system at home will not automatically produce results that serve U.S. interests globally. For that, the country will have to come up with a renewed foreign policy. That foreign policy must be guided by and grounded in several principles.

First, it must be grounded in the recognition that the multilateral system that has been built over the past 80 years has frayed. It has frayed for many reasons, only one of which has been the Trump administration's distaste for multilateralism. Even before that, the United States showed a diminishing desire to support by force the multilateral world it helped build, leading to a sense that the United States is unwilling to punish actors who stray from behavior previously considered unacceptable. The absence of that policing force has cultivated a belief that anything goes, and no force is more disruptive to order than that.

The multilateral architecture has also frayed because the rise of China and reemergence of Russia have shattered the idea, however short-lived, that there exists a liberal international order and that any country that wishes to play in that world must abide by certain rules.

Moreover, the system itself has been very slow to adapt to the new geopolitical reality that decisions cannot be made in Washington and Brussels alone and that any table that does not include Beijing or New Delhi lacks legitimacy in the eyes of much of the world. So an international energy policy that is part strategy and part nostalgia for a world long gone is not going to produce results. There is no return to the status quo ante.

Second, there is a new set of international challenges, and it is not clear that the institutions the United States has cultivated can respond to these challenges. In some cases, of course, institutions are only as strong as the members wish them to be, and it is no use berating the institution for the lack of political will in the capitals of the member states. Even so, it is not hard to see that, for example, the World Trade Organization is not really geared to making sure that trade happens in a way that is politically acceptable in major economies. Similarly, there is a big mismatch between the demand for capital and infrastructure spending across the world and the supply of funds to meet that demand, and the myriad financial institutions that set up to close that gap are just struggling to catch up. A sensible international energy policy would start from the challenges that need to be confronted, not from what institutions already exist.

Third and finally, state-based multilateralism increasingly needs to be complemented by non-state actors and government authorities below the national level, in energy and climate more so than in other areas. Cities, states, regions, businesses, and non-governmental organizations play a key role in setting the agenda, disseminating that agenda, and securing buy-in from those on the front lines that have to implement policy on a day-to-day basis. Any talk about innovation, capital turnover, and mobilizing funds must be grounded in an ongoing dialogue between the state and the private and the non-profit sectors if it is to be enduring and transformational.

Energy and climate offer a ripe space for this renewed and refocused internationalism for several reasons. First, climate change is the most global problem that our world faces, and one most in need of sustained, coordinated action. Second, 2 of the 17 sustainable development goals deal directly with energy and climate (#7 and #13), while several others have a strong link to energy and climate (including #6 clean water and sanitation; #8 decent work and economic growth; #9 industry, innovation, and infrastructure; #11 sustainable cities and communities; #12 responsible consumption and production; and #15 life on land.) And third, many of the problems in the future depend on energy and climate action today. This includes avoiding the strain put on countries by climate change, building resilient communities (especially in areas that currently rely on fossil fuel production and processing), ensuring the sustainable extraction of the minerals and resources that the energy system will rely on, and so on. In other words, any agenda that tries to grapple with some of the most profound challenges that our world faces will ultimately require a strategy on energy and climate.

**A RENEWED EMPHASIS ON ECONOMIC COMPETITIVENESS AND INNOVATION SHOULD HAVE AN INTERNATIONAL COROLLARY, WHERE THE UNITED STATES LEADS AN INTERNATIONAL RACE TO THE TOP.**

First and foremost, this means ensuring that each international institution has an energy and climate dimension to its work. Some do this already. The International Maritime Organization (IMO) has been at the forefront of the conversation on how to transition the shipping industry to more sustainable fuels. The International Labor Organization (ILO) is spearhead-

ing the conversation on a “just transition,” especially when it comes to ensuring that workers who are employed in energy industries that might be rendered obsolete earn a decent livelihood. The Food and Agriculture Organization (FAO) grapples with the food security effects of climate change. And, of course, the world’s leading financial institutions have, to varying degrees, climate-related goals and policies.

But there are large swaths of the multilateral system where climate is mostly an afterthought. The International Monetary Fund (IMF) has ventured into this conversation by tallying up the fiscal support provided to fossil fuels around the world, and it has more recently tried to emerge as a central voice in calling for a green recovery post Covid-19. But these are mostly auxiliary to its core function, which is providing money to countries faced with a credit crunch. One could easily imagine the IMF taking a more systematic approach to energy and climate. For instance, the IMF often conducts analyses on debt sustainability, assessing whether a country can repay its debts. For many countries, climate risk will pose a serious fiscal challenge going forward, and the IMF would be ideally suited to lead the discussion on how to measure these risks and how to build resilience against them.

There are other institutions that could benefit from such a focus. The Bank of International Settlements (BIS) is the clearinghouse for central bankers, who are increasingly grappling with the energy transition and with climate change. Their focus is usually on either stranded asset risk, as energy assets lose their value during the transition, or on the damages that could ensue from climate-related catastrophes that could put a country’s financial system under great pressure. But such forays are adjacent to the organization’s core function. They need not be. Getting central banks to more systematically think about energy and climate risk, gathering information and requiring disclosures, and thinking about what financial buffers might be required are all essential elements of a successful central bank strategy for the twenty-first century.

The World Trade Organization (WTO) is another prime candidate for a climate-related disruption. The WTO faces many challenges, not least of which is the weakening commitment by the United States for a multilateral trading system. The agenda for reforming the WTO is

long and is mostly unrelated to energy. But there are two tasks where the WTO could find a renewed purpose: allowing countries to make tariff decisions based on the carbon intensity of goods and enabling countries to more clearly support the industries that are essential for the energy transition. In both of these cases, of course, there will need to be a balance—any rule can be easily manipulated to promote a narrow-minded protectionism. But unless the WTO takes on these two tasks, it risks becoming irrelevant for the energy transition. The world needs to come up with rules to trade in new energy goods and services and in energy-intensive goods, and the WTO is the place to have these conversations.

These are just some examples and they are not exhaustive. One could imagine the World Health Organization (WHO) looking more clearly at the interplay between climate change and health and ensuring that energy and climate policies incorporate insights on protecting population health. Or one could imagine the United Nations Educational, Scientific and Cultural Organization (UNESCO) mapping how changing climate conditions will affect our shared cultural heritage, a task at which work has already begun.<sup>110</sup> The point is to look around the multilateral system and ensure that energy and climate become core elements of what these organizations do.

Within the energy world, several institutions and initiatives provide the right groupings and focus to help foster “race to the top”-type geostrategic competition in energy. Mission Innovation, created in 2015 and meant to accelerate the clean energy transition, is a forum that could help strike a balance between cooperative innovation and healthy competition. The Clean Energy Ministerial process, created in 2009, is another useful complement to a renewed U.S. focus on new clean energy technology deployment. The International Energy Agency has also recast itself to focus on the global energy transitions with space for all the world’s major economies. These organizations, among others, can be useful venues to advance U.S. energy policy objectives in the context of positive competition.

Finally, as noted earlier, multilateralism might continue to experience headwinds, and collaboration on shared interests through these venues could be difficult, no matter how productive a role they could play. It will be important for the United States to involve the private sector, investors, and civil society in these organizations to help provide continuity and momentum where governments are failing. This might take the form of revitalized sector-based initiatives where collaboration across industry groups seeking to foster common aims can thrive.

A key challenge for multilateralism, however, will be dealing with other great powers. In the post-World War II era, the United States has often blurred the line between grand strategy and needless obsession, between finding a useful organizing principle for thinking about what the United States wants to accomplish in the world and seeing the whole world through that single lens. First, it was anti-communism and the need to label every organization as either pro- or anti-communist; more recently, it was terrorism and the need to find terrorists, how-

ever loosely defined, and eliminate them. Great power rivalry risks becoming the new thing that U.S. foreign policy organizes around. In moderation, this could be a healthy way to look at the world. But it can easily turn into an obsession.

Competition can be healthy, and there is no need to pretend that the United States does not compete with countries such as China and Russia—as it does with allies, at least in the realm of economics. But it is equally futile to pretend that everything that Russia or China does overseas gives them some great advantage and that the United States, therefore, must stand in opposition to it. Energy has often fallen prey to this problem. In European energy, for instance, anything that Russia does is painted in very broad strokes and understood to be unequivocally bad. As a result, the United States confuses an automatic opposition to all things Russia with promoting European energy security and, by extension, U.S. national security. This view leaves little space for nuance and sophistication and for policy responses that might be targeted and nimble. As such, the United States is caught fighting battles that need not be fought and neglects smart engagement that could serve U.S. and European interests.

A similar risk can be seen with the Belt and Road Initiative (BRI). In Washington, the BRI is rapidly becoming shorthand for “bad things that China does overseas,” and so the United States is now trying to find a way to “counter” China, even though most policymakers acknowledge that the United States cannot outspend China, and would not want to either, and that most countries in the region refuse to be caught in between the two great powers. In the meantime, countries invite Chinese investment because that is often the only investment on offer, the United States protests against that investment but offers no alternatives, and the country which desperately needs investment is caught between annoying the United States or turning down a much-needed capital injection into its economy.

A smarter foreign policy would keep tabs on what Russia and China are doing but would not let the mere fact that they do things define an instinctive response in opposition. If China wants to invest its capital overseas, the United States is often better served ensuring that the money is well spent, that there are adequate provisions for dispute resolution, that investment is done with proper transparency, that health and safety and environmental standards are high, and so on. It is far better to coopt Chinese capital than to mindlessly oppose it.

The same is true for Russia. Any time a Gazprom or Rosneft or Russian government official travels overseas and signs a meaningless memorandum of understanding, Washington has a tendency to overreact. Most times, these announcements lead to nothing and the best response is to carry on as before. And just as the United States has learned through its own experience, entanglements might bring leverage, but they also bring pain and costs. It is foolish to think, as U.S. strategists have often done, that whenever the United States goes overseas looking for resources, it is rendered weak by that pursuit, but when Russia or China do it, they become stronger in the process.

In the end, this means a foreign policy that has a clear-eyed view of the national interest, is willing to ask tough questions about what matters and what does not, is selective enough in which battles to fight and what ground to cede when necessary, and is willing to articulate a clear view of the world that, necessarily, makes space for other big countries to compete. Also, this strategy will be essential to operationalize in multilateral forums. It is impossible to revert back to a world where the United States and China, for instance, get along on all or even many issues. But that should not mean institutional paralysis. It means finding those pockets where things can get done with the two countries in the same room. It means encouraging industry and civil society to find solutions when governments cannot. It means retaining flexibility so that smaller groups can move faster than others. Above all, it requires confidence to let things play out and not be obsessed with anything that might benefit China or Russia.

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# ENDNOTES

- 1 Hans J. Morgenthau, “To Intervene or Not to Intervene,” *Foreign Affairs*, April 1967, <https://www.foreignaffairs.com/articles/1967-04-01/intervene-or-not-intervene>.
- 2 Energy Information Administration (EIA), “Table 1.4c Primary energy net imports by source,” U.S. Department of Energy, *Monthly Energy Review*, March 26, 2020, <https://www.eia.gov/totalenergy/data/monthly/>.
- 3 EIA, “Table 1.2 Primary energy production by source,” U.S. Department of Energy, *Monthly Energy Review*, March 26, 2020, <https://www.eia.gov/totalenergy/data/monthly/>.
- 4 On March 20, 2020, President Trump likened a big decline in oil prices to a tax cut: “Frankly that’s like a big tax cut, not a little tax cut for the consumer . . . So there’s something about that that I like.” Justin Sink and Josh Wingrove, “Trump Likens Cheap Gasoline Brought on By Oil Crash to a Tax Cut,” *Bloomberg*, March 12, 2020, <https://www.bloomberg.com/news/articles/2020-03-12/trump-likens-cheap-gasoline-brought-on-by-oil-crash-to-a-tax-cut>; and Rachel Frazin, “GOP senators ask Saudis to stabilize oil market,” *The Hill*, March 17, 2020, <https://thehill.com/policy/energy-environment/487990-gop-senators-ask-saudis-to-stabilize-oil-market>.
- 5 See Christiane Baumeister and Lutz Kilian, “Lower oil prices and the U.S. economy: Is this time different?,” Brookings Institute, Fall 2016, <https://www.brookings.edu/bpea-articles/lower-oil-prices-and-the-u-s-economy-is-this-time-different/>; Daniel Raimi, Ronald Minsk, Jake Higdon, and Alan Krupnick, *Economic Volatility in Oil Producing Regions: Impacts and Federal Policy Options* (New York: Columbia Center for Global Energy Policy, October 2019), <https://energypolicy.columbia.edu/research/report/economic-volatility-oil-producing-regions-impacts-and-federal-policy-options>; Nikos Tsafos, “Which U.S. States Are Most Exposed to Low Oil Prices?,” CSIS, blog post, March 12, 2020, <https://www.csis.org/blogs/energy-headlines-versus-trendlines/which-us-states-are-most-exposed-low-oil-prices>.
- 6 In Asia, coal consumption keeps rising in almost all markets. See Nikos Tsafos, “The Center of Coal Demand Keeps Shifting,” CSIS, *Commentary*, October 15, 2018, <https://www.csis.org/analysis/center-coal-demand-keeps-shifting>.
- 7 EIA, “Table 7.2a Electricity generation: Total (all sectors),” U.S. Department of Energy, *Monthly Energy Review*, March 26, 2020, <https://www.eia.gov/totalenergy/data/monthly/>.
- 8 “Electricity generation by energy source 1990 - 2019 (as of December 2019),” *Arbeitsgemeinschaft Energiebilanzen*, <https://ag-energiebilanzen.de/4-1-Home.html>.
- 9 Department for Business, Energy & Industrial Strategy, “Electricity production and availability from the public supply system (ET 5.4 - monthly),” from “Energy Trends: UK electricity,” *Gov.uk*, March 26, 2020, <https://www.gov.uk/government/statistics/electricity-section-5-energy-trends>; and Red Eléctrica de España, *The Spanish Electricity System. Preliminary report 2019* (Madrid: January 2020), <https://www.ree.es/en/datos/publicaciones/annual-system-report/the-spanish-electricity-system-preliminary-report-2019>.
- 10 International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2019* (Abu Dhabi: June 2020), <https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>.
- 11 IRENA, *Renewable Capacity Statistics 2020* (Abu Dhabi: March 2020), <https://www.irena.org/publications/2020/Mar/Renewable-Capacity-Statistics-2020>.

- 12 “Renewables Account for Almost Three Quarters of New Capacity in 2019,” IRENA, Press release, April 6, 2020, <https://www.irena.org/newsroom/pressreleases/2020/Apr/Renewables-Account-for-Almost-Three-Quarters-of-New-Capacity-in-2019>.
- 13 “Battery Pack Prices Fall As Market Ramps Up With Market Average At \$156/kWh In 2019,” BloombergNEF, press release, December 3, 2019, <https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/>.
- 14 See International Energy Agency, *Global EV Outlook 2019* (Paris: May 2019), <https://www.iea.org/reports/global-ev-outlook-2019>; and MIT, *Insights into Future Mobility* (Cambridge, MA: 2019), <http://energy.mit.edu/research/mobilityofthefuture/>.
- 15 “Data Service Renewable Energies,” ZSW, accessed April 13, 2020, <https://www.zsw-bw.de/en/media-center/data-service.html>.
- 16 International Energy Agency, *Global EV Outlook 2020* (Paris: July 2020), <https://www.iea.org/reports/global-ev-outlook-2020>.
- 17 World Bank Group, *State and Trends of Carbon Pricing 2019* (Washington, DC: World Bank, 2019), <https://openknowledge.worldbank.org/handle/10986/31755>.
- 18 For example, the IEA noted that, “Over 95% of power sector investment [in 2018] was made by companies operating under fully regulated revenues or long-term contractual mechanisms to manage the revenue risk associated with variable wholesale market pricing.” IEA, *World Energy Investment 2019* (Paris: 2019), 136, <https://www.iea.org/reports/world-energy-investment-2019>.
- 19 Isabella Burch and Jock Gilchrist, *Survey of Global Activity to Phase Out Internal Combustion Engine Vehicles* (Santa Rosa, CA: Center for Climate Protection Report, September 2018), <https://theclimatecenter.org/wp-content/uploads/2018/09/Survey-on-Global-Activities-to-Phase-Out-ICE-Vehicles-FINAL.pdf>.
- 20 IRENA, *Corporate Sourcing of Renewable Energy: Market and Industry Trends* (Abu Dhabi: May 2018), <https://www.irena.org/publications/2018/May/Corporate-Sourcing-of-Renewable-Energy>.
- 21 See Sarah Ladislav and Stephen Naimoli, *Oil and Gas Industry Engagement on Climate Change* (Washington, DC: CSIS, October 2019), <https://www.csis.org/analysis/oil-and-gas-industry-engagement-climate-change>.
- 22 Task Force on Climate-related Financial Disclosures, Status Report (June 2019), <https://www.fsb-tcfd.org/publications/tcfd-2019-status-report/>.
- 23 “Defying expectations of a rise, global carbon dioxide emissions flatlined in 2019,” IEA, Press release, February 11, 2020, <https://www.iea.org/news/defying-expectations-of-a-rise-global-carbon-dioxide-emissions-flatlined-in-2019>.
- 24 Intergovernmental Panel on Climate Change, *Global Warming of 1.5 °C* (Geneva: October 2018), <https://www.ipcc.ch/sr15/>.
- 25 Samuel Brannen and Christian Stirling Haig, *The Age of Mass Protests: Understanding an Escalating Global Trend* (Washington, DC: CSIS, March 2020), <https://www.csis.org/analysis/age-mass-protests-understanding-escalating-global-trend>.
- 26 Charles Krauthammer, “The Unipolar Moment,” *Foreign Affairs* 70, no. 1, <https://www.foreignaffairs.com/articles/1990-01-01/unipolar-moment>.

- 27 “World Economic Outlook Database,” International Monetary Fund, April 2020, <https://www.imf.org/external/pubs/ft/weo/2020/01/weodata/index.aspx>.
- 28 “Merchandise exports by product group and destination – annual,” World Trade Organization, <https://timeseries.wto.org/>.
- 29 Amy Belasco, *Troop Levels in the Afghan and Iraq Wars, FY2001-FY2012: Cost and Other Potential Issues*, CRS Report No. R40682 (Washington, DC: Congressional Research Service, July 2009), <https://fas.org/sgp/crs/natsec/R40682.pdf>; and Christopher T. Mann, “U.S. War Costs, Casualties, and Personnel Levels Since 9/11,” Congressional Research Service, In Focus, April 18, 2019, <https://crsreports.congress.gov/product/pdf/IF/IF11182>.
- 30 Ruth Igielnik and Kim Parker, “Majorities of U.S. veterans, public say the wars in Iraq and Afghanistan were not worth fighting,” Pew Research Center, July 10, 2019, <https://www.pewresearch.org/fact-tank/2019/07/10/majorities-of-u-s-veterans-public-say-the-wars-in-iraq-and-afghanistan-were-not-worth-fighting/>.
- 31 See, for instance, Jeffrey Goldberg, “The Obama Doctrine,” *The Atlantic*, April 2016, <https://www.theatlantic.com/magazine/archive/2016/04/the-obama-doctrine/471525/>.
- 32 See Samuel Charap, Elina Treyger, and Edward Geist, *Understanding Russia’s Intervention in Syria* (Santa Monica, CA: RAND, 2019), [https://www.rand.org/pubs/research\\_reports/RR3180.html](https://www.rand.org/pubs/research_reports/RR3180.html).
- 33 Heather Conley et al., *The Kremlin Playbook: Understanding Russian Influence in Central and Eastern Europe* (Washington, DC: CSIS, October 2016), <https://www.csis.org/analysis/kremlin-playbook>; Heather Conley et al., *The Kremlin Playbook 2* (Washington, DC: CSIS, March 2019), <https://www.csis.org/features/kremlin-playbook-2>; Michael Schwartz, “Top Secret Russian Unit Seeks to Destabilize Europe, Security Officials Say,” *New York Times*, October 8, 2019, <https://nyti.ms/2LYVP6R>; and Michael Schwartz and Gaele Borgia, “How Russia Meddles Abroad for Profit: Cash, Trolls and a Cult Leader,” *New York Times*, November 11, 2019, <https://nyti.ms/36SNIRK>.
- 34 “SIPRI Military Expenditure Database,” SIPRI, <https://www.sipri.org/databases/milex>; Judd Devermont, “Russian Theater: How to Respond to Moscow’s Return to the African Stage,” *Lawfare*, October 18, 2019, <https://www.lawfareblog.com/russian-theater-how-respond-moscows-return-african-stage>; Paul Stronski, *Late to the Party: Russia’s Return to Africa* (Washington, DC: Carnegie Endowment for International Peace, October 2019), <https://carnegieendowment.org/2019/10/16/late-to-party-russia-s-return-to-africa-pub-80056>; and Dmitri Trenin, *What Is Russia Up To in the Middle East?* (Cambridge, UK: Polity, December 2017).
- 35 Richard McGregor, “Party Man: Xi Jinping’s Quest to Dominate China,” *Foreign Affairs* 98, no. 5 (September/October 2019), <https://www.foreignaffairs.com/articles/china/2019-08-14/party-man>.
- 36 Ronald O’Rourke, *Renewed Great Power Competition: Implications for Defense—Issues for Congress* CRS Report No. R43838 (Washington, DC: Congressional Research Service, April 2020), <https://crsreports.congress.gov/product/pdf/R/R43838/56>.
- 37 Jonathan Hillman, “A ‘China Model?’ Beijing’s Promotion of Alternative Norms and Standards,” Statement Before the U.S. - China Economic and Security Review Commission, March 13, 2020, <https://www.uscc.gov/hearings/china-model-beijings-promotion-alternative-global-norms-and-standards>.
- 38 Ronald O’Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, CRS Report No. RL33153 (Washington, DC: Congressional Research Service, April 2020), <https://crsreports.congress.gov/product/pdf/RL/RL33153>; and “SIPRI Military Expenditure Database,” SIPRI.

- 39 Ronald O'Rourke, *U.S.-China Strategic Competition in South and East China Seas: Background and Issues for Congress*, CRS Report No. R42784 (Washington, DC: Congressional Research Service, April 2020), <https://crsreports.congress.gov/product/pdf/R/R42784>.
- 40 Nadège Rolland, *China's Eurasian Century?* (Seattle, Washington: National Bureau of Asian Research, May 2017), <https://www.nbr.org/publication/chinas-eurasian-century-political-and-strategic-implications-of-the-belt-and-road-initiative/>.
- 41 "Real Median Household Income in the United States [MEHOINUSA672N]," FRED, Federal Reserve Bank of St. Louis, May 15, 2020, <https://fred.stlouisfed.org/series/MEHOINUSA672N>; National Center for Education Statistics, "Digest of Education Statistics: 2018," U.S. Department of Education, Table 330.10, [https://nces.ed.gov/programs/digest/d18/ch\\_3.asp](https://nces.ed.gov/programs/digest/d18/ch_3.asp); and "National Health Expenditures by type of service and source of funds, CY 1960-2018," U.S. Centers for Medicare & Medicaid Services, <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical>.
- 42 "Labor Force Participation Rate - 20 Yrs. & Over, White Men [LNS11300028]," FRED, Federal Reserve Bank of St. Louis, June 4, 2020, <https://fred.stlouisfed.org/series/LNS11300028>; and Anne Case and Angus Deaton, "Mortality and Morbidity in the 21st Century," Brookings Institute, *Papers on Economic Activity*, Spring 2017, <https://www.brookings.edu/wp-content/uploads/2017/08/casetextsp17bpea.pdf>.
- 43 Enrico Moretti, *The New Geography of Jobs* (Boston: Mariner Books, 2013); Bruce Katz and Jennifer Bradley, *The Metropolitan Revolution: How Cities and Metros Are Fixing Our Broken Politics and Fragile Economy* (Washington, DC: Brookings Institute, 2014); and Benjamin Austin, Edward Glaeser, and Lawrence Summers, "Jobs for the Heartland: Place-Based Policies in 21st-Century America," Brookings Institute, *Papers on Economic Activity*, Spring 2018, <https://www.brookings.edu/bpea-articles/saving-the-heartland-place-based-policies-in-21st-century-america/>.
- 44 "All Employees, Manufacturing [MANEMP]," FRED, Federal Reserve Bank of St. Louis, June 4, 2020, <https://fred.stlouisfed.org/series/MANEMP>; and David H. Autor, David Dorn, and Gordon H. Hanson, "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade," *Annual Review of Economics* 8, no. 1 (2016), <https://www.nber.org/papers/w21906>.
- 45 John Kay, "What Finance Is For And How It Veered Off Course," *Foreign Affairs*, January 7, 2016, <https://www.foreignaffairs.com/articles/2016-01-07/what-finance>.
- 46 Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure, 1956 to 2017* (Washington, DC: October 2018), <https://www.cbo.gov/publication/54539>.
- 47 David Wessel, "Is Lack of Competition Strangling the U.S. Economy?," *Harvard Business Review*, March-April 2018, <https://hbr.org/2018/03/is-lack-of-competition-strangling-the-u-s-economy>.
- 48 "Opportunity Atlas," U.S. Census Bureau and Opportunity Insights, <https://www.opportunityatlas.org/>.
- 49 Wayne M. Morrison, *China-U.S. Trade Issues*, CRS Report No. RL33536 (Washington, DC: Congressional Research Service, July 2018), <https://crsreports.congress.gov/product/pdf/RL/RL33536>.
- 50 Senate Committee on Small Business and Entrepreneurship, *Made in China 2025 and the Future of American Industry* (Washington, DC: February 2019), <https://www.rubio.senate.gov/public/index.cfm/2019/2/rubio-releases-report-outlining-china-s-plan-for-global-dominance-and-why-america-must-respond>.
- 51 Nadja Popovich, Livia Albeck-Ripka, and Kendra Pierre-Louis, "The Trump Administration Is Reversing Nearly 100 Environmental Rules. Here's the Full List," *New York Times*, May 6, 2020, <https://www.nytimes.com/inter->

- active/2020/climate/trump-environment-rollbacks.html.
- 52 “Rick Perry says US gas more reliable for Europe than Russia’s,” France24, May 5, 2019, <https://www.france24.com/en/20190502-rick-perry-says-us-gas-more-reliable-europe-russias>.
- 53 “Department of Energy Authorizes Additional LNG Exports from Freeport LNG,” Department of Energy, Press Release, May 28, 2019, <https://www.energy.gov/articles/department-energy-authorizes-additional-lng-exports-freeport-lng>.
- 54 See Jane Chung and Florence Tan, “South Korea’s big buys on U.S. oil, gas to keep bilateral ties strong,” Reuters, January 29, 2019, <https://www.reuters.com/article/us-southkorea-usa-energy-analysis/south-koreas-big-buys-on-us-oil-gas-to-keep-bilateral-ties-strong-idUSKCN1PN339>. The fact sheet on the renegotiated Korea-U.S. Free Trade Agreement makes no mention of energy purchases. See: “Fact Sheet on U.S.-Korea Free Trade Agreement Outcomes,” Office of the U.S. Trade Representative, September 2018, <https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2018/september/fact-sheet-us-korea-free-trade>.
- 55 “Exports by Destination: China,” EIA, data updated April 30, 2020, [https://www.eia.gov/dnav/pet/pet\\_move\\_expc\\_dc\\_NUS-NCH\\_mbbldpd\\_m.htm](https://www.eia.gov/dnav/pet/pet_move_expc_dc_NUS-NCH_mbbldpd_m.htm); “U.S. Natural Gas Exports and Re-Exports by Country,” EIA, data updated April 30, 2020, [https://www.eia.gov/dnav/ng/ng\\_move\\_expc\\_s1\\_m.htm](https://www.eia.gov/dnav/ng/ng_move_expc_s1_m.htm); and “Exports by country of destination,” EIA, data released April 1, 2020, <https://www.eia.gov/coal/data.php>.
- 56 Office of the U.S. Trade Representative, *Economic And Trade Agreement Between The Government Of The United States Of America And The Government Of The People’s Republic Of China Text* (Washington, DC: January 2020), <https://ustr.gov/countries-regions/china-mongolia-taiwan/peoples-republic-china/phase-one-trade-agreement/text>.
- 57 Richard Rubin and Sahil Kapur, “Donald Trump Likes Volcker—and His Rule,” Bloomberg, August 4, 2015, <https://www.bloomberg.com/news/articles/2015-08-04/trump-the-developer-loves-low-interest-rates-trump-the-candidate-sees-a-bubble-?sref=Tj5BOUj2>.
- 58 “Overview: Program On China And Transformational Exports,” EXIM, May 2020, <https://www.exim.gov/who-we-serve/external-engagement/china-and-transformational-exports-program/fact-sheet>.
- 59 “EXIM Approves \$5 Billion to Finance U.S. Exports to Mozambique LNG Project,” EXIM, Press Release, September 26, 2019, <https://www.exim.gov/news/exim-approves-5-billion-finance-exports-mozambique-lng-project>.
- 60 Shayerah Ilias Akhtar and Marian L. Lawson, *BUILD Act: Frequently Asked Questions About the New U.S. International Development Finance Corporation*, CRS Report No. R45461 (Washington, DC: Congressional Research Service, January 2019), <https://crsreports.congress.gov/product/pdf/R/R45461>.
- 61 “DFC Approves Nearly \$900 Million for Global Development Projects,” U.S. International Development Finance Corporation, Press Release, March 12, 2020, <https://www.dfc.gov/media/press-releases/dfc-approves-nearly-900-million-global-development-projects>.
- 62 “Asia EDGE – Enhancing Growth and Development through Energy,” Department of State, <https://www.state.gov/asia-edge/>.
- 63 Bureau of East Asian and Pacific Affairs, *A Free and Open Indo-Pacific: Advancing a Shared Vision* (Washington, DC: Department of State, November 2019), <https://www.state.gov/a-free-and-open-indo-pacific-advancing-a-shared-vision/>.
- 64 Tal Axelrod, “Pompeo pledges \$1 billion in US support for European energy initiative,” The Hill, February 15,

- 2020, <https://thehill.com/homenews/administration/483227-pompeo-pledges-1-billion-in-us-support-for-european-energy>.
- 65 Matthew P. Goodman, Daniel F. Runde, and Jonathan E. Hillman, “Connecting the Blue Dots,” CSIS, Commentary, February 26, 2020, <https://www.csis.org/analysis/connecting-blue-dots>.
- 66 Nicolas Cook and Brock R. Williams, “The Trump Administration’s Prosper Africa Initiative,” Congressional Research Service, In Focus, December 12, 2019, <https://crsreports.congress.gov/product/pdf/IF/IF11384>.
- 67 Data from IEA, *Oil Market Report* (Paris: March 2020), <https://webstore.iea.org/oil-market-report-march-2020>.
- 68 See Kenneth Katzman, *Iran Sanctions*, CRS Report No. RS20871 (Washington, DC: Congressional Research Service, Updated April 2020), <https://crsreports.congress.gov/product/pdf/RS/RS20871>.
- 69 Mike Pompeo, “After the Deal: A New Iran Strategy,” (speech, Heritage Foundation, May 21, 2018), <https://www.heritage.org/defense/event/after-the-deal-new-iran-strategy>.
- 70 Clare Ribando Seelke, Rebecca M. Nelson, Phillip Brown, and Rhoda Margesson, *Venezuela: Background and U.S. Relations*, CRS Report No. R44841 (Washington, DC: Congressional Research Service, Updated March 2020), <https://crsreports.congress.gov/product/pdf/R/R44841>.
- 71 In 2019, Venezuela’s crude oil production was 0.87 million barrels a day, according to IEA, *Oil Market Report* (Paris: April 2020), <https://webstore.iea.org/oil-market-report-april-2020>. A decade earlier, in 2009, its production was 2.85 million barrels a day according to “Oil data: upstream,” Organization of Petroleum Exporting Countries, Annual Statistical Bulletin, <https://asb.opec.org/index.php/interactive-charts/oil-data-upstream>.
- 72 From 1973 to 2018, Venezuela accounted for anywhere from 5.9 percent (2018) to 18.1 percent of total U.S. crude oil and product imports. “U.S. Imports by Country of Origin,” EIA, Updated April 30, 2020, [https://www.eia.gov/dnav/pet/pet\\_move\\_impcus\\_a2\\_nus\\_ep00\\_im0\\_mbbldpd\\_a.htm](https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbldpd_a.htm).
- 73 Phillip Brown, *Oil Market Effects from U.S. Economic Sanctions: Iran, Russia, Venezuela*, CRS Report No. R46213 (Washington, DC: Congressional Research Service, February 2020), <https://crsreports.congress.gov/product/pdf/R/R46213>; and Cory Welt, Kristin Archick, Rebecca M. Nelson, and Dianne E. Rennack, *U.S. Sanctions on Russia*, CRS Report No. R4515 (Washington, DC: Congressional Research Service, January 2020), <https://crsreports.congress.gov/product/pdf/R/R45415>.
- 74 Nikos Tsafos, “United States No Longer Reducing Energy-Related Carbon Emissions,” CSIS, Blog post, April 3, 2020, <https://www.csis.org/blogs/energy-headlines-versus-trendlines/united-states-no-longer-reducing-energy-related-carbon>.
- 75 See Nikos Tsafos, “Focus More on Oil Country, Less on the Oil Industry,” CSIS, *Commentary*, May 6, 2020, <https://www.csis.org/analysis/focus-more-oil-country-less-oil-industry>.
- 76 This is a (partial) list of the resources that the authors relied on for this section. Mark Galeotti, *We Need to Talk About Putin: How the West Gets him Wrong* (London: Ebury Press, 2019); Dmitri V. Trenin, *Getting Russia Right* (Washington, DC: Carnegie Endowment for International Peace, 2007); Dmitri Trenin, *What Is Russia Up To in the Middle East?* (Cambridge, UK: Polity, 2017); Dmitri Trenin, *Should We Fear Russia?* (Cambridge, UK: Polity, 2016); Masha Gessen, *The Man Without a Face: The Unlikely Rise of Vladimir Putin* (New York: Riverhead Books, 2013); Angela Stent, *Putin’s World: Russia Against the West and with the Rest* (New York: Twelve, 2019); Fiona Hill and Clifford G. Gaddy, *Mr. Putin: Operative in the Kremlin* (Washington, DC: Brookings Institution Press, 2015); Lionel Barber, Henry Foy in Moscow, and Alex Barker, “Vladimir Putin says liberalism has ‘become obsolete,’” *Financial Times*, June 2019, <https://www.ft.com/content/670039ec-98f3-11e9-9573-ee5cbb98ed36>; Julia Ioffe,

- “What Putin Really Wants,” *The Atlantic*, January/February 2018, <https://www.theatlantic.com/magazine/archive/2018/01/putins-game/546548/>; Susan B. Glasser, “Putin the Great: Russia’s Imperial Impostor,” *Foreign Affairs*, September/October 2019, <https://www.foreignaffairs.com/articles/russian-federation/2019-08-12/putin-great>; Gregory Feifer, “Putin’s Past Explains Russia’s Future: What to Expect After the Election,” *Foreign Affairs*, March 16, 2018, <https://www.foreignaffairs.com/articles/russian-federation/2018-03-16/putins-past-explains-russias-future>; Stephen Kotkin, “Russia’s Perpetual Geopolitics: Putin Returns to the Historical Pattern,” *Foreign Affairs*, May/June 2016, <https://www.foreignaffairs.com/articles/ukraine/2016-04-18/russias-perpetual-geopolitics>; Thomas Graham, “Let Russia Be Russia: The Case for a More Pragmatic Approach to Moscow,” *Foreign Affairs*, November/December 2019, <https://www.foreignaffairs.com/articles/russia-fsu/2019-10-15/let-russia-be-russia>; Michael McFaul, “Russia as It Is: A Grand Strategy for Confronting Putin,” *Foreign Affairs*, July/August 2018, <https://www.foreignaffairs.com/articles/russia-fsu/2018-06-14/russia-it>; and Graham Allison, “The New Spheres of Influence: Sharing the Globe With Other Great Powers,” *Foreign Affairs*, March/April 2020, <https://www.foreignaffairs.com/articles/united-states/2020-02-10/new-spheres-influence>.
- 77 Stent, *Putin’s World*, 20.
- 78 *Ibid.*, 37.
- 79 See Tatiana Mitrova, Ekaterina Grushevenko, and Artyom Malov, *The Future Of Oil Production In Russia: Life Under Sanctions* (Moscow: Skolkovo, March 2018), <https://energy.skolkovo.ru/downloads/documents/SEneC/research04-en.pdf>.
- 80 See Jane Nakano, *The Changing Geopolitics of Nuclear Energy: A Look at the United States, Russia, and China* (Washington, DC: CSIS, March 2020), <https://www.csis.org/analysis/changing-geopolitics-nuclear-energy-look-united-states-russia-and-china>.
- 81 Edward C. Chow and Andrew J. Stanley, “Russia’s National Oil Champion Goes Global,” CSIS, *CSIS Briefs*, February 22, 2018, <https://www.csis.org/analysis/russias-national-oil-champion-goes-global>.
- 82 Rosneft, *Annual Report 2019* (Moscow: 2019), 77, [https://www.rosneft.com/Investors/Reports\\_and\\_presentations/Annual\\_reports/](https://www.rosneft.com/Investors/Reports_and_presentations/Annual_reports/).
- 83 The company reports production separately for five assets: the Incahuasi field in Bolivia, the Moc Tinh and Hai Thach fields in Vietnam, Naftna Industrija Srbije (NIS) in Serbia, and two joint ventures with Wintershall, one in the North Sea and the other in Libya. For Bolivia and Vietnam, the company only reports gross figures, not its attributable share (which depends not only on its equity stake but also on the contractual system under which the extraction takes place). For NIS and the Wintershall ventures, the company does not specify whether production is reported in gross or equity terms. Even adding all the (gross) volumes together amounts to 6.3 billion cubic meters (bcm) versus 498.7 bcm that the company reports as production in Russia. Gazprom, *Annual Report 2018* (Moscow: 2018), <https://www.gazprom.com/investors/>.
- 84 LUKOIL, *Annual Report 2018* (Moscow: 2018), 15, <https://www.lukoil.com/InvestorAndShareholderCenter/ReportsAndPresentations/AnnualReports>.
- 85 Dina Khrennikova and Olga Tanas, “Rosneft Sells Venezuelan Assets as Fight With U.S. Grows,” Bloomberg, March 28, 2020, <https://www.bloomberg.com/news/articles/2020-03-28/rosneft-exits-all-venezuela-projects-sells-assets?sref=Tj5BOuJ2>.
- 86 This section draws on several works, including Evan Osnos, *Age of Ambition: Chasing Fortune, Truth, and Faith in the New China* (New York: Farrar, Straus and Giroux, 2014); Nadège Rolland, *China’s Eurasian Century? Political and Strategic Implications of the Belt and Road Initiative* (Seattle, WA: National Bureau of Asian Re-

- search, May 2017), <https://www.nbr.org/publication/chinas-eurasian-century-political-and-strategic-implications-of-the-belt-and-road-initiative/>; Statements by Jonathan Hillman, Nadège Rolland, and Elizabeth Economy before the U.S. - China Economic and Security Review Commission, March 13, 2020, <https://www.uscc.gov/hearings/china-model-beijings-promotion-alternative-global-norms-and-standards>; Fareed Zakaria, “The New China Scare,” *Foreign Affairs*, January/February 2020, <https://www.foreignaffairs.com/articles/china/2019-12-06/new-china-scare>; and Henry Kissinger, *World Order* (London: Penguin Press, 2014).
- 87 Kissinger, *World Order*, 215.
- 88 Data on wind and solar from IRENA, *Renewable Capacity Statistics 2020* (Abu Dhabi: March 2020), <https://www.irena.org/publications/2020/Mar/Renewable-Capacity-Statistics-2020>. Data on electric vehicles from “Data Service Renewable Energies,” DSW, accessed April 13, 2020, <https://www.zsw-bw.de/en/media-center/data-service.html>.
- 89 “China Controls Sway Of Electric Vehicle Power Through Battery Chemicals, Cathode And Anode Production,” Benchmark Mineral Intelligence, n.d., <https://www.benchmarkminerals.com/membership/china-controls-sway-of-electric-vehicle-power-through-battery-chemicals-cathode-and-anode-production/>.
- 90 Ibid.
- 91 IEA, *Renewable Energy Market Update: Outlook for 2020 and 2021* (Paris: May 2020), <https://www.iea.org/reports/renewable-energy-market-update/2020-and-2021-forecast-overview>.
- 92 “GWEC: 1 in 5 wind turbines installed by Vestas in 2018, according to new market intelligence report,” Global Wind Energy Council, Press Release, April 21, 2019, <https://gwec.net/gwec-1-in-5-wind-turbines-are-installed-by-vestas,-according-to-new-market-intelligence-report/>.
- 93 See Nakano, *The Changing Geopolitics of Nuclear Energy*.
- 94 Jonas Nahm, “Renewable futures and industrial legacies: Wind and solar sectors in China, Germany, and the United States,” *Business and Politics* 19, no. 1 (2017): 68–106, doi:10.1017/bap.2016.5; Scott Kennedy, *China’s Risky Drive into New-Energy Vehicles* (Washington, DC: CSIS, November 2018), <https://www.csis.org/analysis/chinas-risky-drive-new-energy-vehicles>; Senate Committee on Small Business and Entrepreneurship, *Made in China 2025 and the Future of American Industry*.
- 95 Deborah Brautigam, “Is China the World’s Loan Shark?,” *New York Times*, April 26, 2019, <https://www.nytimes.com/2019/04/26/opinion/china-belt-road-initiative.html>.
- 96 David G. Landry, “Comparing The Determinants Of Western And Chinese Commercial Ties With Africa,” Johns Hopkins SAIS China-Africa Research Initiative, Working Paper 29, 2019, <http://www.sais-cari.org/publications-working-papers>.
- 97 See Nikos Tsafos, “The Center of Coal Demand Keeps Shifting,” CSIS, *Commentary*, October 15, 2018, <https://www.csis.org/analysis/center-coal-demand-keeps-shifting>; also IEA, “Chinese Companies Energy Activities in Emerging Asia,” April 2019, <https://webstore.iea.org/chinese-companies-energy-activities-in-emerging-asia>.
- 98 Erica Downs, “China-Pakistan Economic Corridor Power Projects: Insights into Environmental and Debt Sustainability,” Columbia SIPA Center on Global Energy Policy, October 2019, <https://energypolicy.columbia.edu/research/report/china-pakistan-economic-corridor-power-projects-insights-environmental-and-debt-sustainability>.
- 99 “Overview: Program On China And Transformational Exports,” EXIM, May 2020, <https://www.exim.gov/who->

- we-serve/external-engagement/china-and-transformational-exports-program/fact-sheet.
- 100 “National Patterns of R&D Resources: 2017–18 Data Update,” National Science Foundation, NSF 20-307, January 8, 2020, <https://nces.nsf.gov/pubs/nsf20307/>.
- 101 See, for example, Corrie E. Clark, *Renewable Energy R&D Funding History: A Comparison with Funding for Nuclear Energy, Fossil Energy, Energy Efficiency, and Electric Systems R&D*, CRS Report No. RS22858 (Washington, DC: Congressional Research Service, June 2018), <https://crsreports.congress.gov/product/pdf/RS/RS22858>; IEA, *Energy Technology RD&D Budgets 2020: Tracking trends in spending on research, development and demonstration* (Paris: April 2020), <https://www.iea.org/reports/energy-technology-rdd-budgets-2020#data-service-and-documentation>; and Office of Management and Budget (OMB), “Table 9.8 - Composition Of Outlays For The Conduct Of Research And Development: 1949 – 2021,” Historical Tables, <https://www.whitehouse.gov/omb/historical-tables/>.
- 102 The figure for energy spending comes from the U.S. EIA, “Table 1.7 Primary energy consumption, energy expenditures, and carbon dioxide emissions indicators,” Monthly Energy Review, May 26, 2020, <https://www.eia.gov/totalenergy/data/monthly/>. The latest year for which the data is available is 2017.
- 103 Overall spending from U.S. Centers for Medicare & Medicaid Services, “National Health Expenditures by type of service and source of funds, CY 1960-2018,” Overall spending from U.S. Centers for Medicare & Medicaid Services, <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/National-HealthExpendData/NationalHealthAccountsHistorical>. Federal R&D spending from OMB, op. cit.
- 104 Data from Office of Management and Budget, “Table 3.1—Outlays by Superfunction and Function: 1940–2025” and “Table 9.8 - Composition Of Outlays For The Conduct Of Research And Development: 1949 – 2021,” Historical Tables, <https://www.whitehouse.gov/omb/historical-tables/>.
- 105 This is based on data from the IEA, *Energy Technology RD&D Budgets 2020*. See also Clark, *Renewable Energy R&D Funding History*.
- 106 This section draws from Fred Block and Matthew Keller, eds., *State of Innovation: The U.S. Government’s Role in Technology Development* (London: Routledge, 2015), doi:10.4324/9781315631905; Fred Block “Swimming Against the Current: The Rise of a Hidden Developmental State in the United States,” *Politics & Society* 36, no. 2 (June 2008): 169-206 doi:10.1177/0032329208318731; Jonas Nahm, “Renewable futures and industrial legacies: Wind and solar sectors in China, Germany, and the United States,” *Business and Politics* 19, no. 1 (2017): 68–106, doi:10.1017/bap.2016.5; Mariana Mazzucato, *The Entrepreneurial State: Debunking Public vs. Private Sector Myths* (New York: Anthem 2013); Dani Rodrik, “Industrial Policy for the Twenty-First Century,” Harvard University, 2004, <https://j.mp/2nRcNXi>; Jacob Hacker and Paul Pierson, *American Amnesia: How the War on Government Led Us to Forget What Made America Prosper* (New York: Simon & Schuster, 2017); Steven Johnson, *Where Good Ideas Come From: The Natural History of Innovation* (New York: Riverhead Books, 2011); Annie Jacobsen, *The Pentagon’s Brain: An Uncensored History of DARPA, America’s Top-Secret Military Research Agency* (New York: Back Bay Books, 2016); and Vaclav Smil, *Made in the USA: The Rise and Retreat of American Manufacturing* (Cambridge, MA: The MIT Press, 2015).
- 107 John Helveston and Jonas Nahm, “China’s key role in scaling low-carbon energy technologies,” *Science* 366, no. 6467 (November 2019): 794-796, doi:10.1126/science.aaz1014; James Nurton, “Patenting trends in renewable energy,” WIPO Magazine, March 2020, [https://www.wipo.int/wipo\\_magazine/en/2020/01/article\\_0008.html](https://www.wipo.int/wipo_magazine/en/2020/01/article_0008.html); and National Science Board, “Global Trends in Sustainable Energy Research and Technologies,” in *Science and Engineering Indicators 2018* (Alexandria, VA: National Science Board, 2018), <https://www.nsf.gov/statistics/2018/nsb20181/report/sections/industry-technology-and-the-global-marketplace/global-trends-in-sustainable-energy-research-and-technologies>.

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- 108 Chris Knight, "Failure to Deploy: Solar Photovoltaic Policy in the United States," Chapter 9 in *State of Innovation: The U.S. Government's Role in Technology Development*, Fred Block and Matthew Keller, eds., (London: Routledge, 2015), doi:10.4324/9781315631905.
- 109 Bill Canis and Brent D. Yacobucci, *The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program*, CRS Report No. R42064 (Washington, DC: Congressional Research Service, January 2015), <https://crsreports.congress.gov/product/pdf/R/R42064>.
- 110 See "Climate Change and World Heritage," UNESCO, <https://whc.unesco.org/en/climatechange/>.

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