CHAPTER EIGHT

Disruptive Energies and the Tentative End of a System: An Epilogue

EARLY IN THIS BOOK, our focus period, October 2011 to March 2014, was described as one of "calm before the storm." Some aspects of the storm were swift, such as the April 2014 Russian military incursion in Ukrainian territory and the annexation of Crimea. Others had been years in the making but reached a critical point in 2014. All put under pressure fossil fuel value chains that had remained largely stable since 1991, value chains that had supported the maintenance of particular types of post-Soviet political systems. Already during the focus period, these value chains had started to come under pressure. By 2014, they were facing crucial changes. In this epilogue, we look at these chains' disruption, at the impact of this disruption on the countries crossed by these value chains, and across the ocean at the political crisis involving Donald Trump's presidency.

VALUE CHAINS UNDER PRESSURE

The energy value chains analyzed in this book were, first, affected by changes in global market conditions. Key factors included the entrance

into the global market of new energy sources and a global low price environment for fossil fuels.

A first factor concerned the explosively increasing role of energy types that had until then not played a significant role in the world market, including new production forms of fossil fuels (unconventionals), old fossil fuels seeing a resurgence due to price dynamics (coal), and renewables. Although—with the partial exception of Poland—shale gas did not make significant inroads in Central and Eastern Europe, unconventionals played a disruptive role due to the global changes set in motion by the fall in prices unleashed by the U.S. boom.[1]

A second type of disruptive energy (and, many would argue, the only truly disruptive one) concerned renewables. Their increased role in the European Union's market resulted from targets and regulations—including increasingly stringent motor fuel requirements—that synergized with national-level measures such as guaranteed prices for renewables-generated electricity.[2] In addition, as a result of economies of scale, the cost of producing renewable energy—in particular wind-generated electricity—went down significantly. The increase in the use of renewables was much more significant in the case of countries such as Germany (where it more than doubled, from 17 percent to 40 percent of electricity generation between 2010 and 2019[3]) than in the case of other countries crossed by this book's value chains. Especially in the German case, in addition to their direct impact on displacing fossil fuels, the growing role of renewables also synergized with increased public sentiment, not only against fossil fuels but also against large (natural-gas-based) electricity generating companies.[4] Thus the Nürnberg power plant at the end of the natural gas value chain discussed in chapter 4 was not only left waiting for a cloudy and windless day, but also faced an increasingly hostile public opinion, further disincentivizing investments in such infrastructure.

Let us now take a look at changes taking place at the level of each of the value chains.

The Natural Gas Value Chain

The natural gas chain deserves special consideration—as well as a somewhat lengthier discussion—due to its being exemplary of processes also going on in the oil and coal value chains, as well as to its importance for EU policies as a whole. In the case of natural gas, three key disruptive developments involved changes in Russian transit policy,

changing EU regulations, and the increased role of liquefied natural gas (LNG).

Russian transit policy. A key change affecting the course of the chains after 2014 was Russia's redirection of transportation routes aimed at moving away from reliance on transit states, and especially on Ukraine, replacing existing physical chains with new ones such as the Yamal pipeline and, later, projects through the Baltic (Nord Stream 1 and 2) or Black Sea (the never-realized South Stream, as well as the TurkStream project unveiled in 2014). Their impact was seen especially clearly on transit volumes through Ukraine, where changes already in motion since the 1990s gained speed in about 2011–14. By 2014, transit via Ukraine (62.2 billion cubic meters) had declined by more than 40 percent from its 2011 level;[5] despite temporary increases in the following three years, even the maximum post-2011 transit figure of 93.5 billion cubic meters (2017) was a full 20 to 30 percent lower than the volumes transported in the 1991–2006 period. In 2018, transit declined again, to 86.8 billion cubic meters. If both Nord Stream 2 and a further Gazprom project, the TurkStream pipeline to Turkey under the Black Sea, were to be completed and used at full capacity by Gazprom, this could mean a further substantial reduction in transit, and also in Ukraine's bargaining power.

The increasing role of LNG. Second, the growing role of LNG was slowly but surely affecting the natural gas value chain. Although LNG supplies did not involve the entrance of a new type of energy (LNG can come from both conventionally or unconventionally produced gas), transforming natural gas into a liquid substance made possible LNG's rise as a globally traded commodity. And though LNG had been used for decades to supply markets lacking pipeline access, its rise as a global commodity came only in the 2000s, having been made possible by price trends equalizing the higher costs required by the liquefaction process. LNG's share in global gas trade increased from less than 30 percent in 2003 to 46 percent in 2018,[6] with supply increasing by almost 10 percent in 2018 alone.[7] Even with Europe as the "market of last resort" for LNG exporters due to generally lower prices than in Asian markets with less access to alternative (pipeline) supplies, this growth helped kick-start supply chains different from the ones that had dominated European gas supplies since the early 1970s. These new chains involved increased supplies by tanker from various locations (mainly Qatar, Algeria, and Nigeria, and, slowly at first, the United States) to Northern European ports (as opposed to Southern European areas, where LNG supplies had a long tradition), regasification, and, now in gaseous form, transit along inland pipelines. This affected the constellation of actors coalescing around the chain, and it challenged the idea of natural gas markets as first and foremost regional, not global, markets.[8]

LNG reminds us of the ways in which technological change—through the way it affects midstream operations—can set into motion new technical-social chains and coalitions. Indeed, the very start of modern oil in the 1860s provides an example of how technical changes opening new transportation possibilities could set one group of actors against another. When the first rudimentary oil pipelines were developed, they upended the prevailing transportation technology, which until then consisted of oil being transported in barrels (whatever barrels could be found: "wine, whiskey, fish, nails, or salt pork barrels"), hauled by teamsters organized around the Brotherhood of Pennsylvania Oil Haulers, "a notoriously tight clique" whose members "earned five times the average wage of other union workers."[9] As the first pipelines were put into use, angry teamsters, seeing the danger of a pipeline that was making them superfluous, "vandalized one pipeline installation after another as the pipeline industry emerged."[10] Similarly, the rise of LNG in the 2010s could be seen as threatening established ways of doing business, which centered on pipeline-transported natural gas, first and foremost from Russia.

A number of factors limited the impact of LNG in Central and Eastern Europe, however. Its high (and largely fixed) liquefaction and regasification costs make LNG less competitive in a low-price than a high-price environment,[11] making it less competitive in the wake of the 2014 global slump in oil (and natural gas) prices; during the period 2010–17, average LNG prices in EU states were about 15 to 25 percent higher than prices for pipeline natural gas (see table 8.1).[12] This was especially the case for price competition from Russian pipeline gas, given Russia's lower production cost and transportation advantages;[13] the marginal cost of supply, including liquefaction costs, for U.S. LNG in Europe is about 25 percent higher than Gazprom's.[14] Although nearly half of LNG supplies to the EU were to old LNG markets lacking pipeline import infrastructure, such as Spain and Portugal, supplies to northwestern European ports gained increased momentum later in the decade.[15]

TABLE 8.1
Average Price of Germany's Pipeline Natural Gas Imports versus the EU Price for Liquefied Natural Gas, in Dollars per Million BTUs, 2010–17

Year	Average Price of Germany's Pipeline Gas Imports	Price for EU Member States of Liquefied Natural Gas
2010	6.04	6.9
2011	7.62	9.5
2012	8.58	10.3
2013	8.08	10.6
2014	6.90	8.8
2015	5.93	6.6
2016	4.51	4.8
2017	4.99	5.5

Sources: Germany's average pipeline imports: International Energy Agency, "Natural Gas Information 2018," table 2: selected natural gas import prices into Europe by pipeline, p. IV.4; liquefied natural gas price for EU member states: International Energy Agency, "Natural Gas Statistics," https://www.iea.org/statistics/naturalgas/.

Although the much-hyped idea that U.S. LNG supplies would change Europe's energy and political landscape did not materialize, LNG's impact could be seen in more indirect ways.[16] For instance, shortly after Lithuania's first regasification facility (a floating unit aptly named "Freedom," which was also the first in the region) was put into operation in 2014, even when its actual use remained limited given the high price of LNG supplies as compared with pipeline imports from Russia, it helped Lithuania negotiate a 23 percent price discount from Gazprom.[17] Similarly, though Central European hopes that regasified LNG from the Świnoujście terminal in Poland (opened in 2016) could be easily transported throughout the region and serve as a real diversification factor were probably overstated, the very existence of this option could bolster their bargaining power vis-à-vis Gazprom.[18] However, this will not necessarily mean more independence from Russian gas—Russian producers, first and foremost Novatek, were investing heavily in LNG facilities and seemed intent on conquering a significant share of the European (as well as global) LNG market in the 2020s. At the same time—akin to the situation in natural gas-fired electricity generation facilities, which had been kept on standby for a "cloudy and windless day"—LNG regasification facilities were often used at

partial capacity but were kept on standby, acting as a counterweight to Gazprom's market power. This raises a key issue: at which cost should this infrastructure be kept in operation if maintaining this capacity is considered key for national security—and who should pay for this?

Despite it not being fully competitive with pipeline gas supplies, U.S. LNG also became a disruptive factor through its discursive use, as U.S. administrations and energy companies argued that it could be crucial for breaking Russia's role as monopolist gas supplier. This was accompanied by strong lobbying efforts by well-connected U.S. suppliers, as would come to light in the course of the presidential impeachment investigations that started in 2019 (discussed below).

Changes in the EU's regulatory environment. Last but not least, changes in the EU's regulatory environment also made 2014 a key year for changes in the gas value chain. December 31, 2014, had been set by the European Council as the deadline for completing the preconditions for the EU's internal energy market integration.[19] Two sets of official EU regulations were especially important: competition-related regulations and infrastructure-related initiatives.

Related to long-term intellectual trends favoring the liberalization of network-related industries, competition-related policy regulations aimed to create a level playing field in support of more market integration.[20] Among these, the most significant were measures codified in the 2009 Gas Directive and Third Internal Energy Market Package (often referred to as the Third Package), which called for third-party access (TPA) to pipeline capacity, the breakup of national monopolies, and the unbundling of gas and electricity systems—that is, outlawing a single company from owning the production, transportation, and distribution of natural gas or electricity. Although the Third Package formally entered in force in 2009, its enforcement became more stringent starting in 2014.

Such competition-focused regulations also had a key impact on infrastructure issues. Although not mentioning Gazprom explicitly, these regulations limited the company's ability to own pipelines transiting its gas in the EU, as well as its ability to use 100 percent of a pipeline's capacity without providing TPA to other users. TPA came to the forefront of attention through issues related to the Nord Stream underwater pipeline connecting Russia and Germany while circumventing Ukraine. In particular, at issue was the question of the terms under which Gazprom would be able to use the OPAL pipeline connecting directly with Nord Stream's terminal in Lubmin (Germany)

and, traveling south, reaching consumers in Germany and the Czech Republic.[21] Gazprom's holding a legal monopoly on pipeline natural gas exports from Russia made it impossible for other companies at the point of origin to supply gas to the pipeline, meaning that it was not clear how the TPA requirement could be fulfilled. (The other alternative proposed by the EC, for Gazprom to implement a so-called gas release program "by selling at least 3 bcm [billion cubic meters] of natural gas at auctions to stimulate competition in the Czech Republic's gas market," was not considered seriously by Gazprom, because selling this gas at auctions would have helped depress prices for its gas.[22]) The specifics of the story on Gazprom's access to OPAL capacity are rather complex, with numerous changes between 2015 and 2020. A key point, however, is that up to the fall of 2019, Gazprom was able to use more of the pipeline's capacity (i.e., without capacity set aside for other potential shippers). This resulted from a 2009 agreement reached with Germany's energy regulator Bundesnetzagentur and with reference to a provision of the EU Gas Directive relaxing TPA rules for "energy infrastructure projects that enhance competition and security of supply, but, given their project risks, would not happen without the exemption."[23] The "project risks" noted by the EC as grounds for an exemption were directly related to natural gas's materiality characteristics, which in turn were related to its gaseous form, in particular the limited transportation options and high investment costs complicating the possibility of bringing additional gas supplies to a starting point (Lubmin), and the technical and financial burden of operating a pipeline at less than full capacity (see chapter 4). Such decisions also brought to the fore issues related to Gazprom's lobbying power vis-à-vis the EC, which was exemplified by the role played by high-level politicians, such as former German chancellor Gerhard Schröder, who, after leaving office, became chairman of Nord Stream's Shareholders' Committee Board.[24]

In September 2019, the European Court of Justice placed OPAL back under full EU jurisdiction and limited Gazprom's use of the pipeline to 50 percent of its capacity. This called into question how Gazprom would be able to fulfill its sale contracts to inland markets served by OPAL now that its ability to use its full transit volume would be limited. In addition, in December 2019 the United States imposed sanctions on companies participating in Nord Stream 2; and in May 2020 the German regulator ruled that it would not be exempted from EU unbundling regulations banning the same-company ownership of

both the pipeline and the gas being supplied. Though these developments do not prevent the pipeline from being completed, they complicate its operation; and, thus, they mean that—at least in the short term—Gazprom needs to maintain or even increase transit via Ukraine in order to be able to fulfill its contractual obligations.

This situation, together with delays in the completion of Nord Stream 2—which Gazprom had hoped would be ready before the December 31, 2019, expiration of its transit contract with Ukraine's Naftohaz—partially explains Gazprom's December signing of the contract—after a year of speculation that Gazprom would not enter into a new contract and that, as a result, Ukraine could be left with dangerously low transit volumes (see chapter 7). These zigzags around Nord Stream 2's regulation and the question of OPAL's use, however, should not turn our attention away from the reality that both the Nord Stream 2 and TurkStream pipelines are likely to be completed in the early 2020s, with the implication that Gazprom's need for transit through Ukraine is likely to decrease significantly.

The developments described above were taking place within the context of the EU's security-of-supply goals, which aimed at diversifying away from reliance on one dominant supplier. December 31, 2014, was also the deadline for putting in place measures that would guarantee that all EU states would have continued emergency supplies in the case of a disruption of external supply.[25] As became increasingly clear with Russia's 2014 intervention in Ukraine, and as the investigations of Gazprom's possible abuse of market power progressed, such issues could also have important "hard security" implications.

In addition to official regulations, no less important were what could be called quasi-regulatory developments, which mainly related to a number of EC legal proceedings against Gazprom. In 2015, the EC opened a case against Gazprom, arguing it had engaged in "abuse of dominant position" and hindering of competition in the supply of natural gas to Bulgaria, the Czech Republic, the Slovak Republic, Hungary, Estonia, Latvia, and Lithuania, for which Gazprom was the sole supplier, as well as in imposing unfair pricing and contractual conditions hindering gas supply diversification.[26] As of 2020, the case had not been fully concluded—the May 2018 EC decision suspending the antitrust case against Gazprom, but imposing a number of binding obligations on the company to change its business practices, was appealed by Poland, which imposed its own $7.6 billion fine on the company in October 2020.[27] In a separate but related development,

in May 2020 the Arbitration Institute of the Stockholm Chamber of Commerce, which is commonly known as the Stockholm Arbitration Court, ruled that Gazprom owed Poland's PGNiG $1.5 billion due to having overcharged it for natural gas between 2014 and 2020.

These developments were calling into question key elements of a natural gas contractual model that had been dominant for nearly four decades. Key elements of this system were destination clauses preventing importers from reselling gas volumes outside their borders, long-term contracts (with a typical duration of twenty to twenty-five years), oil-based price indexation, take-or-pay commitments holding importers financially responsible for purchasing a certain minimal amount (typically, 75 to 85 percent of the nominal quantities) of contracted volumes, and commercial secret regulations hindering transparent pricing.[28] From the EC's perspective, such clauses created obstacles to competition and to the free movement of goods within the EU. In calling into question this contractual system, the EC was also reducing Gazprom's indirect regulatory power and its headquarters' power as not only commercial but also de facto regulatory nodes.

These events took place in a context where typical natural gas contracts were also changing as a result of market developments.[29] As discussed above, the oversupply of natural gas experienced in the European market after 2010 led to more gas-on-gas competition, higher market liquidity, and an increase in spot market transactions.[30] These market developments affected contractual issues as increased supply options gave importers more power to counter Gazprom's conditions. For example, as a reaction to high oil-indexed prices that they saw as fully out of sync with a new, low-price environment,[31] a number of Gazprom customers in Europe started to successfully pressure the company to renegotiate long-term contracts to move a portion of their contracted volumes to spot prices; by 2015, we start to see a closer alignment between the Russian gas price charged to Germany and spot prices.[32]

The Oil Value Chain

Key pressures on the oil value chain had to do with Russian transit policy and EU regulations. Already since the 2000s, Russia had been pursuing a strategy of building new infrastructure (e.g., the new oil terminals Primorsk and Ost Luga and the BPS-1 and BPS-2 pipelines) as

a way to circumvent Ukraine and the Baltic states as oil export routes. Such views were also enshrined in official documents, such as Russia's Energy Strategy to 2020 (2003) and Russia's Energy Strategy to 2030 (2008); this strategy intensified after 2014. Thus, EU oil imports from Russia remained stable, but now increasingly taking place directly, without the participation of transit states. A key factor affecting our chain was changes in Russian tax rules favoring oil product exports. These changes contributed to making Russia the largest exporter of refined oil products to the EU, supplying nearly a third of its oil product imports throughout the 2010s.[33] Compounded with the problems besieging Ukrainian refining discussed in chapter 5, they meant that now more Russian exports to Ukraine would be in the form of refined products rather than crude oil, further weakening Ukraine's transit role.

Although, in the 2000s, oil as a "low-networkedness" type of energy had been less central to EU policy than natural gas, Russia's 2014 annexation of Crimea and the worsening of relations with Russia brought oil closer to the EU's attention concerning security of supply. With Russia's status as the largest source of refined oil products imports for the EU, the EC realized that the prior emphasis given to emergency reserves of crude oil would likely not be sufficient in the case of a crisis, and so it started to pay increased attention to oil product imports from Russia as well as Russian investments in EU refineries.[34] The shift in EC views on the importance of various segments of the oil value chain—that is, from a primary interest in the supply of *crude* oil to increased attention to its midstream refining component—is especially significant. This concerned not only the EU's stated need for diversification of oil import sources but also the transportation routes for oil and oil products, an area where an official Russian public relations campaign had long sought to unfairly cast Ukraine as an unreliable transit partner vis-à-vis the EU.

With regard to oil and oil products, most EU regulations came in the form of progressively more stringent environmental standards affecting automotive fuels (from EURO 1 fuel standards in 1992 to EURO 6 in 2014 and EURO 7 standards expected to be implemented in 2021[35]). These increasingly ambitious standards affected the oil value chain because, given the EU's growing demand for refined product imports, only refineries able to comply with these conditions had a chance to export to the EU market, limiting Ukraine's ability to export to these markets despite its physical proximity.

The Coal-Metallurgical Value Chain

Key changes in the coal value chain had to do with changes in the market role of coal, EU regulations, and the effects of Russian military intervention in Ukraine. A temporary but at the time very important trend was the growing role of coal in power generation in about 2014, aided by the boom in unconventionals (which drove down natural gas prices in the United States, increasing its market share and leading many U.S. coal users to substitute natural gas for it, creating a surplus of low-priced coal, much of which found a market in Europe). This lower-price surplus coal (whose import prices in Europe fell more than 50 percent between March 2008 and May 2014[36]) drove a temporary increase in coal use in the EU, at the same time as the EU's emissions trading system—seen by many as ineffectual due to the low price assigned to CO_2[37]—put few hurdles on the way for coal to gain a larger share, despite its worse CO_2 profile compared with those other fuels and a number of EU regulations affecting its use in power generation.[38]

However, the most important change to our coal-metallurgical value chain came from an unexpected direction: Russian military intervention and the military conflict in the Donbas. Despite the fact that Ukraine continued to purchase coal from Russia even after the 2014 military incursion and the fact that Metinvest's supply chains—including factories on both sides of the conflict line—continued to function until disrupted by separatists in 2017, the coal-metallurgical value chain analyzed in chapter 5 was profoundly affected by the military conflict in the Donbas and, in particular, by the establishment of entities in the area propped up by the Russians—the so-called Luhansk People's Republic (LNR) and Donetsk People's Republic (DNR). It was affected by coordination problems involving the connection between physical nodes located on both sides of the conflict line. In particular, it was affected by the changed balance of forces in the Azov and Black Sea areas after Russia's armed annexation of Crimea. Starting in 2018, Russia's intensive patrolling of the Azov Sea and forcible inspection—and intimidation—of ships coming in and out of Mariupol created a de facto naval blockade, threatening to bring to a halt Ukraine's metallurgical exports through the city, home to two of the country's most important metallurgical factories, the MMK Iron and Steel Works and Azovstal, as well as a major port. Table 8.2 provides

TABLE 8.2
Natural Gas, Oil, and Coal from Russia to Germany via Ukraine: Main Changes in About 2014

Commodity	Key Change	Analysis
Natural gas	Ukraine's official consumption and imports from Russia are drastically reduced; imports of Russian-origin gas continue, but on the basis of reverse flows from neighboring states.	Ukraine's fall in official consumption is due more to economic contraction and fall in GDP and the fact of not counting use in heavily industrialized DNR and LNR than to increases in efficiency. Chain is affected by significant increases in prices charged Ukraine, as Russia cancels previous discounts.
	Ukraine's transit role is drastically reduced.	EU levels of natural gas imports from Russia remain stable, but now increasingly taking place directly, without the participation of transit states.
	Gazprom's share in EU's natural gas imports did not change significantly, but continued its gradual increase, from 27% in 2011 to 35% in 2017.*	
Oil	Ukraine's transit role is drastically reduced. Russia's role in the supply of oil and oil products to the EU remains stable. As Ukraine's refining industry collapses, its dependence on imports of Russian crude oil is replaced by dependence on imports of refined oil products.	EU levels of oil imports from Russia remain stable, but now increasingly taking place directly, without the participation of transit states.
Coal	Ukraine continues to buy coal from Russia, using it for metallurgical exports. Metinvest's supply chains continued to function across the conflict line until disrupted by separatists in 2017.	Ukrainian segment of the coal-metal chain is affected by coordination problems involving feedstock and nodes located in uncontrolled territories. Ukraine's metallurgical exports decrease as a result of shipping problems in the Sea of Azov as result of Russian intimidation of Ukrainian and Ukraine-bound vessels.

Source: Author's notes and analysis based on the information presented in this book.

* From James Henderson and Jack Sharples, "Gazprom in Europe: Two '*Anni Mirabilia*,' but Can It Continue?," *Oxford Energy Insight* 29 (2018): 7 (based on Gazprom data), https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/03/Gazprom-in-Europe-%E2%80%93-two-Anni-Mirabiles-but-can-it-continue-Insight-29.pdf.

a summary of how each of our main three value chains changed in about 2014.

THE IMPACT OF THESE CHANGES ON THE VARIOUS COUNTRIES IN THE CHAINS

What was the impact of these changes on the key countries involved in our value chains? As is discussed below, this impact depended on each country's role in the value chain, as well as on its regulatory and governance environment.

The Impact on the Russian Segment

At first, it seemed that Gazprom's business would be significantly affected by changes in the EU market, but in the short term this was not the case, because it started to adapt to the new contractual environment by negotiating with importers and selectively offering more competitive price and contractual conditions.[39] The May 2018 EC decision suspending the antitrust case against Gazprom but imposing a number of binding obligations on the company also points in this direction. Russia also succeeded in launching its new projects aimed at diverting natural gas transit away from Ukraine, in particular the Nord Stream 2 project, which, despite ongoing disputes, started construction in 2018. Once operational, it would double Nord Stream's capacity to 55 billion cubic meters, further moving transit volumes away from Ukraine. A future EU energy balance based on renewables, however, would deeply affect future demand for Gazprom's exports. (EU demand for natural gas, originally predicted by the International Energy Agency to start flattening in 2022, went down already in the spring of 2020 as a result of the COVID-19 pandemic and related economic slump—which also led to a drastic 46 percent decline in transit through Ukraine in April 2020 alone.[40]) Similarly, the European Court of Justice's 2019 decision restricting Gazprom's OPAL use, together with the impact of EU and U.S. sanctions on specific links of Russia's energy value chains, made the outlook start to look less positive for Russia.

The Impact on the Ukrainian Segment

The impact of these changes on Ukraine was at times contradictory—but ultimately highly worrisome. The most important changes for Ukraine were the country's ability to contractually (but not physically) diversify away from Russian gas, and the further decline in both natural gas and oil transit via its territory. In the immediate aftermath of 1991, Ukraine was in a strong bargaining position due to its important transit role, leading to widespread references to a "bilateral monopoly" with Russia as (near) monopoly supplier and Ukraine as (near) transit monopolist;[41] over time, this bargaining power was significantly reduced as Ukraine's role as transit route starts to decline (on the various reasons for this decline, see chapters 4 and 5; concerning transit declines in the 2010s, however, it is important to note that in 2018, Gazprom was found to be in breach of contract for not transiting the contracted amounts for the previous years).

In about 2014, Ukraine's gas consumption as well as its gas and crude oil imports from Russia start to decrease drastically. Although Russia's military intervention strengthened the resolve of many in Ukraine to reduce dependence on energy purchases from Russia, these decreases were not necessarily the result of higher energy efficiency, higher renewables use, or use of domestic energy sources. And though crude oil imports from Russia decreased, dependency on imports of Russian refined products increased, as in the case of diesel (which increased from about 10 percent of consumption in 2010 to 25 percent in 2017) and liquefied petroleum gas (which is commonly known as LPG, and which reached 54 percent in 2016).[42] The decrease in natural gas use had to do with the sharp contraction of the economy after 2013, tensions with Russia (immediately after the April 2014 Crimea takeover, Gazprom announced an 81 percent increase in gas prices to Ukraine; after a dispute over payments, it ceased supplies for six months), and the fact that areas not under Kyiv's control (Crimea and the so-called DNR and LNR areas) were not included in the statistics. Imports of physically Russian gas continued, but through different contractual means—reverse supplies from the Slovak Republic, Poland, and Hungary. Indeed, one key impact of EU-level regulatory changes is that, by affecting these countries' contractual environment

by making clear that the EU did not support key elements of the traditional contractual system such as destination clauses, they made possible Ukraine's access to reverse gas supplies. Although, as discussed in chapter 4, this was by no means a smooth process, without the EU's challenge of the traditional natural gas contractual model, it would have been simply impossible.

Ukraine and a new conceptualization of European energy space. What was behind the contractual trends discussed above—including the challenge to destination clauses that was so crucial for Ukraine to be able to access reverse supplies—was a much broader reconceptualization of energy space. The model envisioned by the EC, in contrast to the world of long-term contracts and point-to-point deliveries, involved a vision of the gas market as a (physical or virtual) space where gas from different origins would meet, and could be bought and sold freely on the basis of spot prices; this gas would come from both regasified LNG as well as pipeline supplies, where, in a "common carrier" system, a neutral system administrator would allocate access to transportation capacities—as well as the fees for these—through a transparent process. Such space, and in particular natural gas space, was gradually being reconceptualized: from one based on *fixed contractual paths* and *fixed delivery points* (where, indeed, there was not much trading but simply delivery of already-contracted volumes) to a conceptualization based on *hubs* (where trading and gas-to-gas competition would take place) and *zones*, within which distance would be contractually inconsequential and a gas/methane molecule would be freely replaceable by another—and thus, all points in the zone could be considered equivalent.

These developments presented both new opportunities and new challenges for Ukraine. Although Ukraine supported the new gas market rules proposed by the EC, paradoxically, due to Ukraine's transit role being so intrinsically tied to Gazprom's export value chain and associated contractual path, in the transition period before a move to a fully open and liquid gas market, its transit role had much to lose with this new conceptualization of energy transit space. By moving away from a long-term contract, start- to end-point-based transportation fees and movement along a fixed contractual path as the key natural gas transportation concept, and toward treating equally all gas flows leading to a trading hub, already the EU's Second Gas Directive of 2003 "phased-out transit as a concept."[43] So while Russia was busy phasing

out the reality of transit states and promoting direct supply routes such as Nord Stream, the EU was set on phasing out (traditional) transit as a concept. Although concern about the threat to Ukrainian transit represented by Nord Stream 2 is only natural, overfocusing our attention on this issue may also take attention away from an even more crucial question for Ukraine: what is its role in a new energy world, a world characterized not only by a new conceptualization of energy space but also by moving away from the fossil fuels that dominated the Soviet and post-Soviet value chains in which Ukraine was so central?

Ukrainian oligarchs and changing value chains. How did these changes affect the economic and political role of traditionally dominant Ukrainian energy actors, which in the previous system often had a vested interest in maintaining Ukraine's dependency on Russian energy?[44] If the experience of 2005's political changes (the Orange Revolution) tells us anything, it is that the power of entrenched actors has been highly resilient. The difference between the experience of 2005 and that of 2014, however, is that despite significant political changes in 2005, many of the value chains remained unchanged at that time. The 2014 political changes (the Euromaidan Revolution), in contrast, coincided in time with significant changes in the energy value chains that had created rents whose circulation in the political system had supported a certain type of politics.[45]

One change was related to the significant increase in natural gas prices and the significant decrease in direct purchases from Russia, which made largely impossible the continuation of rent-seeking through arbitrage rents related to the coexistence of multiple prices for natural gas. Similarly, some of the rent-seeking related to transit lost currency and oligarchs' role in gas transit diminished.[46] At the same time, despite the Euromaidan protesters' commitment to de-oligarchization, the power of Ukrainian energy oligarchs continued unabated. The same key players from the 2011–14 period continued to play key roles in 2020, with some changes in their portfolios.

The natural gas magnate Dmytro Firtash continued to control key sectors of the Ukrainian energy sector, with an especially important role in the chemical and titanium industries, both of which, being very energy intensive, can benefit from access to low-price natural gas such as that enjoyed by Firtash in his many years as the main intermediary for murky transactions involving Russian natural gas in Ukraine (see chapter 4). He led these businesses from Vienna, where he was

arrested in 2014 on a warrant from the U.S. Federal Bureau of Investigation; freed on a $172 million bail, he is facing potential extradition to the United States on charges of bribery involving titanium supplies. (The United States' extradition request was approved by a Austrian judge in 2019, but has been blocked due to technical reasons.) In the course of the U.S. impeachment inquiry in late 2019, it emerged that President Trump's attorney, Rudy Giuliani, had sought to pressure Firtash to provide information on the son of Trump's contender, former vice president Joseph Biden, in exchange for help in avoiding that extradition.[47]

After a noisy confrontation with the state in 2015 regarding his informal control of Ukrnafta (see chapter 5), Ihor Kolomoyskyi's Privat company managed to remain one of the largest players in the automotive fuel retail sector. He also gained significant influence in the government of President Volodymyr Zelensky, the surprise winner of the 2019 presidential elections; Kolomoyskyi associates were named to key cabinet positions. He has used this influence, as well as that in the Verkhovna Rada, to push for policies aligned with his interests, as well as to gain advantages vis-à-vis rival oligarchs. In particular, his group was behind a proposed law that would impose high taxes on iron ore mining, a key part of Akhmetov's coal-metallurgical value chain, though not affecting manganese ore, a related sector controlled by Kolomoyskyi.[48] At the same time, his position came under increased scrutiny as he was seen as using his new influence to have the 2016 nationalization of Privatbank reversed, a move that created a stir in the international financial community as a large International Monetary Fund loan to Ukraine was seen as being contingent on prosecuting those responsible for money misappropriated at the bank, amounts that were bailed out by the state. In May 2020, the Parliament of Ukraine passed a law banning the return of nationalized banks to former owners, showing the limits of Kolomoyskyi's new influence. Kolomoyskyi was also targeted by Giuliani as part of his efforts to unearth negative information on Biden's son.[49]

After a period of confrontation with President Petro Poroshenko in 2014–15, Rinat Akhmetov seemed to have found a modus vivendi with the new power, and—despite significant problems with industrial assets in separatist territories—remained Ukraine's strongest energy actor, with assets in several energy branches and controlling 85 percent of coal production, 23.8 percent of electricity generation, and 30.5 percent of renewable energy.[50] Although his apparent power declined in 2019 as rival oligarch Kolomoyskyi sought to use his political connections with President Volodymyr Zelensky to undermine Akhmetov's positions, his influence never disappeared. Although the party he supported—the Opposition Bloc—did not formally win any parliamentary seats in the 2019 elections, his continued power could be seen through his influence over individual deputies as well as control of a key economic sector.

The Impact on the EU and German Segment

The impact of these changes in the EU segment of the value chains had to do first and foremost with EU regulations (discussed above). These EU regulatory developments, together with the market liberalization and opening promoted by the EU, fostered the emergence of large utility companies active in several countries and benefiting from larger market areas (e.g., Vattenfall, Engie, and Enel), leading to mergers and the dissolution of traditional, single-country-based companies.[51] All this, compounded by the growing competition from renewables in power generation, exacerbated the decline of established national gas suppliers such as E.ON Ruhrgas, which had been key as Gazprom's traditional downstream partners.

Going beyond declarations, what real changes could be seen in the European markets after 2014? Three data points are central: the degree to which the market integration and liquidity envisioned by the EC were becoming a reality, the prevalence of the contractual forms favored by the EC, and the degree of dependency on Russian fossil fuels. The liquidity of major European gas hubs, as evidenced by raising "churn rates" (i.e., the frequency with which each gas molecule is traded) continued to increase, but "in different ways and at differing speeds across the continent,"[52] with Northern Europe much closer to the ideal than the rest of the continent; a fully liquid and open market encompassing the EU as a whole had not yet been achieved. (In practical terms, the closest the EU had gotten to a hub-based system by 2019 was through the system of entry/exit zones, a gas network access model allowing "users to book capacity rights independently at entry and exit points, . . . creating gas transport through zones instead of along contractual paths" as in the point-to-point contract model;[53] as of 2019, however, a single EU entry/exit space was still

on the horizon, with most single states' gas markets still organized, as in 2014, as single "entry/exit zones."[54])

Concerning contractual forms, the trend toward transparent gas-on-gas competition pricing (e.g., hub-based, spot market pricing), in contrast to oil-indexed longer-term contracts, which had increased rapidly from 2009 on, started to stabilize in 2014 at about 61 percent of total volumes, with smaller gains in the following years.[55] Although some long-term contracts continued to be signed after 2010 (e.g., those between Gazprom and Bulgaria and Hungary), these were of shorter duration (four to ten years) than those that were the norm until 2010 (between twenty and twenty-five years).[56]

Given these changes, what happened to dependency on Russia? Despite the rise in renewables, EU natural gas consumption (as well as imports from Russia), which had reached a low point in 2014, started to increase again in 2015.[57] Gazprom's share in EU natural gas imports grew significantly (from about 23 percent in 2014 to 35 percent in 2016, 2017, and 2018[58]), while the share of Russian supplies in oil, oil products, and coal imports remained largely stable. A significant decline in the demand for Russian energy would also imply a significant decline in Russia's ability to use energy for leverage; contractual changes could also reduce Gazprom's ability to use its market power.

EURASIAN VALUE CHAINS AND THE CRISIS OF THE TRUMP PRESIDENCY

That the value chains analyzed in this book would reach well beyond the EU and across the Atlantic was made clear in the fall of 2019, when revelations concerning U.S. president Donald Trump's pressure on Ukraine to gain advantage against a domestic political opponent, former vice president Joseph Biden, unleashed a tumultuous impeachment process, which would be only the third in U.S. history. As the story continued to unfold in the fall of 2019, the clearer it became that Ukraine's role as the target of such pressure had everything to do with the chains analyzed in this book, with the key element connecting these and the broader story being the issue of sanctions imposed on Russia in the wake of its 2014 military intervention in Ukraine. Ukraine is key to all the chains affected by sanctions due to the simple

fact that the sanctions are largely about Russia's invasion of Ukraine. For example, Ukraine is key for the Nord Stream natural gas value chain not because it is physically on its path (it is not) but because the negative effect that the full use of Nord Stream would have on Ukraine has prompted sanctions against companies participating in the project. Similarly, Ukraine is key for the potentially booming Arctic oil value chain not because it is physically on its path (it is not) but because EU and U.S. sanctions against Russia specifically targeting Arctic oil projects are about Russian aggression toward Ukraine. So, for Russian actors to be able to unlock these value chains, a solution to the sanctions issue needs to be found, and also a solution to Ukraine's concerns about Russian aggression in Eastern Ukraine. In fact, the desire to unlock these chains is one of the two key reasons (besides the desire to maintain a lever of influence on Ukrainian politics) for Russia's support of a plan (the "Steinmeier Formula") to return the LNR and DNR territories to limited Kyiv control, but in an arrangement that would give them a distinct, self-governing status.

In what ways does the crisis of the Trump presidency—in its full arch, involving both suspicions of Russian interference in the 2016 elections and the alleged 2019 quid pro quo and parallel policy vis-à-vis Ukraine—intersect with the natural gas, oil, and coal chains analyzed in this book? To understand these connections, we need to understand that the so-called Ukraine scandal was never just about Ukraine, but also very much about Russia and about how sanctions were affecting the entire value chains extending from Siberia to the EU and beyond.

In the case of natural gas, one important element of the Ukraine story concerns the 2019 efforts of two shady businessmen associated with President Trump's private lawyer to—through what amounted to a parallel foreign policy outside regular channels—reshape the leadership of Ukraine's state energy company, NAK Naftohaz, in order to get it to purchase large amounts of U.S. LNG originating from companies related to these individuals. In order to do so, they exerted pressure on the Ukrainian government to replace the reform-minded chief executive of Naftohaz, Andriy Kobolyev, with another Naftohaz senior executive, U.S. citizen Andrew Favorov, who was seen as amenable to their proposals. According to press reports, U.S. energy secretary Rick Perry was also closely involved in these attempts. In addition, natural gas was directly related to the quid pro quo at the center of the investigation, as Burisma, the company on whose board

Joseph Biden's son had served and that president Trump wanted investigated, had competed for natural gas production licenses—an area where long-standing corruption issues had made it harder for Ukraine to increase production and thus become more self-sufficient.

The oil value chain also figures in the impeachment inquiry, but from a different perspective, going back to the key Russian interest in influencing the U.S. administration: the lifting of sanctions imposed on Russia as response to its 2014 intervention in Ukraine. Some of the most damaging sectoral sanctions imposed on Russia targeted Russia's deepwater, Arctic offshore, and fracking-related oil projects and, thus, its ability to develop some of the few areas where—given the rapid increase in increasingly unprofitable mature brownfields discussed in chapter 5—growth and profits could still be expected.

Concerning the coal-metallurgical chain, the key link with the Trump-Ukraine scandal had to do with the way sanctions had affected a key player in a subbranch of this chain, the Russian Aluminum conglomerate Rusal—which produces 7 percent of the entire world's supply of aluminum—and its owner, Oleg Deripaska. Rusal and Deripaska are the best-known targets of sanctions directed at seven Russian oligarchs, twelve companies, and seventeen senior Russian officials accused of supporting malicious Russian state activity around the globe. Imposed on April 2018, the sanctions originally intended to shut Rusal entirely from international markets—the first time the United States and the EU imposed full blocking sanctions on a top-twenty Russian firm, with ripple effects all along the global aluminum value chain.[59] Deripaska emerged as one of the key behind-the-scenes players seeking to influence the U.S. administration to lift these sanctions, which were watered down in May and lifted in late 2018 in exchange for Deripaska reducing his ownership stake in Rusal's parent company. Deripaska also seems to have been the key person behind Paul Manafort's attempt to influence both U.S. policy and the Republican Party's official position on Ukraine already at the 2016 Republican National Convention.[60] The coal value chain also figures directly in the story, as related to Paul Manafort's work on behalf of Rinat Akhmetov, the key player in the coal-metallurgical chain analyzed in chapter 6. In fact, Akhmetov used some of the money made through this chain to support then–president Yanukovich, including by helping to fund a parallel, underground budget for Yanukovich's Party of Regions, which paid for Manafort's public relations services.

INTERPRETING THESE CHANGES FROM AN ENERGY-MATERIALITY PERSPECTIVE

The changes taking place in about 2014 can be understood within the context of our general view of energy materiality: it may create constraints to actors' choices, but it does not itself dictate these choices. For example, in the case of LNG, the high energy expenditures needed to transform a gaseous substance into a liquid one created new hurdles for its marketability; in the case of renewables and renewables-produced electricity, issues of storage were key. Materiality issues also synergized with these developments in two additional ways: first, changes such as the increased use of LNG took a familiar energy good and gave it new materiality characteristics, in the process also altering our views of the size and connectiveness of natural gas markets.[61] Second, the impact of external impulses was mediated by the materiality characteristics of the various goods. For example, new rules on the need for third-party access to pipeline capacity were both co-constituted by concerns about the network significance of natural gas *and* had a particular effect on natural gas markets exactly because of natural gas's high degree of networkness.

Earlier in this book, chapter 3 discussed some of the ways in which different value chains bring to the fore different types of risk. All energy value chains present challenges concerning issues of coordination and the sharing of risk between participants (e.g., buyers and sellers), but these challenges differ depending on the type of energy being considered, and are more acute in the case of those types of energy with relatively higher sunk cost investments involved in their typical production and delivery processes, such as natural gas. Seen from a value chain perspective, the EU's unbundling legislation sought to replace vertical integration with a market relationship as a means of managing risk; in the EC-favored contractual and pricing model, there is an attempt to move risk-sharing from contractual long-term commitment and into the ongoing costs of supplies; a perfectly liquid market would (at least in theory) ameliorate some of the typical risks associated with natural gas, such as the risks of sunk costs and stranded assets.[62]

The idea behind these EU initiatives is that these risks are assessed by players in economically rational terms, but here the EU may have been too naive. Even when there were always two sides in EU

policy—acknowledgment of the need for some degree of public intervention without which policies such as the move to renewables would be impossible was always present, alongside and often in tension with the push for competitive markets[63]—the EU was not always properly equipped to deal with issues requiring clear intervention and investment above and beyond that by private actors, which, for example, may not see a business rationale for investments in import diversification infrastructure to reduce dependency on Russia. Thus, not being able to tackle geographic diversification directly, the EU ended up tackling the issue through what could be called contractual and contractual diversification means—that is, the management of the risks of dependency on a single supplier through the use of a variety of contract types and duration frames and the support of new contractual models.

This also meant that the EU was ill prepared to deal with the political challenges coming from Russia's more centralized energy system, or to recognize the full impact of situations where infrastructure may be built for primarily noneconomic reasons but, once built, changes the way the value chains work. One example may be projects such as Nord Stream, which some have seen as not economically justified. This applies in particular to the Nord Stream 2 project, which—especially after a 2019 EU decision subjecting its flows to EU regulation—saw its profitability take a sharp turn downward. Although it appears that Nord Stream 2 is not the most economically efficient way of bringing Russian natural gas to Germany, it seems to be, indeed, highly profitable for close-to-the-Kremlin construction companies and pipe suppliers.[64] In this case, the interests of a subgroup of the Russian elite seem to have coincided with a particular foreign policy vision by the Russian leadership to push for a project which, though having a debatable economic basis, can play an important political role. This brings us back to the point made at the beginning of this book: energy policy has multiple uses above and beyond producing electricity, heat, and transportation fuel; no less important are the various material and social goods produced by energy systems as processes, ranging from systems of social provisioning for the many to rents for the few.

APPENDIX A

Glossary of Key Technical Terms in the Natural Gas, Oil, and Coal-Metallurgical Chains

General Terms

benchmark prices: the most important and widely used price quotations for a particular commodity, widely used as reference points. Especially used for oil and coal. For oil, some key benchmark pricing brands are West Texas Intermediate, Dubai/Oman, and Brent, with nearly two-thirds of world contracts using Brent prices as benchmark reference. While coal qualities and prices vary much more than those of oil, the prices of Central Appalachian (United States), Newcastle (Australia), South African export, and Colombian stem coal are commonly used as benchmarks, but in a less rigid manner than in the case of oil, where some prices (e.g., the Russian Urals discussed in this book) are explicitly understood in terms of a particular discount from a benchmark price, most often Brent.

brownfields: aging oil and natural gas fields with declining and increasingly inefficient production rates, close to reaching maturity.

bulk dry cargo: cargo that is dry (i.e., cannot be transported by pipeline) and has low value per unit of volume (e.g., most types of coal).