



The Impact of the Russian-Ukrainian War on Oil Markets in European Countries and Possible Solutions

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Abstract. The war between Russia and Ukraine broke out even before the world epidemic was over. Since the end of the Cold War, Ukraine has become a key focus of attention for Russia and other European countries, hence the war between Russia and Ukraine has never really stopped, from the trial in political preference to the dispute in market trade. Since February 24th, 2022, as the formal declaration of war against Ukraine from Russia, the war has been in full swing. With the rapidly changing situation between Russia and Ukraine, the international energy market has also made corresponding changes. This article analyzes the reasons for the trend in international oil and gas prices by comparing the changes in the past five years, and dissects how European countries will react to this situation by learning from historical experience. The paper demonstrates the definite relation between the process of wars and the surges and slumps of energy prices and the potential patterns in it. Through the observation and analysis of the energy market and the assessment of the measures applied by the developed countries in Europe, this paper aims to propose solutions such as phasing out coal-based energy and applying new energy to handle energy disputes so that other countries will be capable of minimizing their losses.

Keywords: Russia-Ukraine War · Energy · Markets · European Countries

1 Introduction

Russia has the richest natural gas resources in the world with the greatest production and consumption, as well as having the world's longest gas pipeline and the largest export volume. After the Russia-Ukraine war broke out, the international oil prices continued to rise, reaching a peak of \$139 per barrel. European countries are the most dependent on Russia for natural gas, importing not only 1/4 of their oil but also about 45% of their natural gas. Due to this extreme dependence in the past, the Russian-Ukrainian war has caused panic in Europe. In March 2022, the Russian President made a decision

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that natural gas will be supplied to European countries using rubles for settlement. If customers do not accept settling in rubles, they will face the risk of supply disruptions, which will further exacerbate the energy crisis in Europe, and this is the essential reason for the considerable increase in the price of natural gas.

Sina studied whether the demand for European natural gas imports can change, by the method of energy transformation. The study found that changes in natural gas prices affect investment in the European energy sector, which is about short-term natural gas consumption and long-term investment. Therefore, the author developed a model, which is called the hybrid complementarity model with conjecture change [1]. Borozan et al. Studied the business model of the European energy industry, which is due to the great changes in the European energy industry in the past two decades. The study found that the efficiency of many companies in Europe is very ordinary and can make great progress if they use new business models [2].

Siddi studied the current situation of the natural gas relationship between the EU and Russia and predicted the future trend of Russia and the EU, as well as the relationship between natural gas. Through research, the author found that Russia and the EU will remain partners for at least the next decade because of the interests of both sides. Moreover, the EU has done a good job in renewable energy production and improving energy efficiency [3]. Siddi analyzed the diversification of EU energy suppliers since the tense relations between Ukraine and Russia. The analysis found that the EU seems to have no clear strategy on energy. Besides, this situation slows down the development of renewable energy. Paying more attention to renewable energy and investing in energy efficiency may be a good way to reduce external dependencies [4].

Sauvageot analyzed a new energy policy given by the EU between 2014 and 2015 and considered the interdependence between Russia and the EU. The goods replacing LNG are limited because of the production and consumption patterns in Europe and other world markets. Although the strong reason for the EU's remarks is the commitment to liquefied natural gas, it has not found a second alternative to this relationship. Finally, the author believes that the EU's decision on energy recognizes the bad aspects of LNG, but the EU's attitude towards Russia has not changed [5]. Johannesson and Clowes make use of the resource dependency theory and the conceptual framework outlined by Jeffrey D. Colgan (2013) to explain the reasons for the Russia-Ukraine war since 2014. The research came to the final conclusion that Russia is heavily dependent on the revenue from exporting gas to Ukraine and the European Union and the energy resources and pipeline system in Ukraine also can be a competitive threat to Russia, which are the root reasons leading the war between Russia and Ukraine [6].

Andreas and Tim discussed three major policy proposals as an illustration to explain the broader impact of the confrontation between Russia and Ukraine. The research reveals the fact that although the energy market is in need of more globalization and connections, there are considerate politicians and diplomatic policymakers stuck in a Cold War paradigm. This impact could have provided precious opportunities for research on energy policies [7]. Johannesson uses a contingency theory approach to report the investigation of the reason why Russia has not defeated Ukraine easily. Based on the contingency theoretical perspective, it came to the conclusion that Russia is unlikely to win the war because there are plenty of negative factors affecting Russia including the

substantial devaluation of the Russian ruble and the isolation of diplomacy and politics, which is less affected by Ukraine [8].

By making a comparison of gas wars between Russia and Ukraine, Stulberg explicates the complicated situation in gas relations and introduces how the forms of power and diplomatic policies matter in between. The research also presents practical guidelines to resolve the current dilemma and stabilize the commercial relations of energy between Russia and Europe or the U.S. [9]. Wu discusses the potential reasons why the war between Ukraine and Russia has been in a complex situation. The loss of Georgia, Russia's southern strategic rearguard in the south, is not only a great loss for Russia in the war but would also deprive Russia of its access to Caspian oil. The gas dispute between Russia and Ukraine is also an important part of Russia's energy diplomacy, as Russia wants to use energy to achieve its CIS and European strategy and to control the CIS countries [10]. For Europe, being overly dependent on pipelines of Russian natural gas is the problem. The EU meets about 10% of its demand for natural gas domestically, and all the rest is imported, which makes it the largest importer of natural gas in the world, according to the Directorate-General for Energy for the EU. Natural gas imported into the EU comes mainly from Russia (41%), Norway (24%), and Algeria (11%) [11].

As part of its efforts to halve its energy-related carbon emissions by 2030, Germany intends to phase out coal-based power. To reach a broad social consensus on the coal phase-out plan, the federal government established the Commission on Growth, Structural Change, and Employment (also known as the Coal Commission) in June 2018. The Commission presented its report in January 2019, recommending to completely phase out coal power by 2038 at the latest. The deadline could be brought forward to 2035 if conditions permit. This option will be assessed in 2032. As sub-targets, the Commission recommended decommissioning at least 12.5 gigawatts (GW) of coal-fired power plants by 2022 and 25.6 GW by 2030 [12].

This paper makes an in-depth discussion on the energy problems between Europe and Russia caused by the Russian Ukrainian war. This paper summarizes the war background, the impact of war on energy, and the solutions in Europe. Firstly, through a lot of reading and exploring the views and statements expressed by relevant people about the war, it is used to analyze the current situation of the Russian Ukrainian war, improve the war background, and the impact of the war on the global oil economy. Then, through the fluctuation of energy prices over the years, this paper focuses on the impact of the war on European energy. Finally, take Germany as an example to analyze its response to the impact of the war. In order to summarize the full text and express views.

2 Historical Background

2.1 Russia-Ukraine Wars

After the Cold War, Ukraine was transformed from the second-largest republic of the former Soviet Union after Russia into a very important independent state, and it also became a buffer state between Russia and NATO territories. Ukraine, as the birthplace of the Russian nation, is a significant pivot point for Russia to become a truly European country, and will moreover contain the process of Russia's revival. The United States, in turn, treats Ukraine as a geopolitical pivot state to contain Russia in order to achieve

its goal of controlling Eurasia. Therefore, Russia and the United States pay constant attention to the political choices of Ukraine. As a gesture of goodwill to Ukraine, Russia has sold energy to Ukraine at prices well below the market. However, relations between the two countries deteriorated rapidly after Ukraine made EU and NATO membership its primary diplomatic goals in 2004, and also divided the CIS. In response, Russia tried to cut off gas supplies to Ukraine in 2006 by sharply rising gas prices. But Ukraine did not give in and instead signed a strategic partnership agreement with the United States in 2008 to strengthen cooperation between the two countries in a number of areas, especially energy. The political conflicts between Russia and Ukraine are the main reason why it is difficult to carry out energy cooperation smoothly.

As a major oil and gas exporter, 60% of Russia's economic revenue stream is from hydrocarbon, which is not only an important pillar of Russia's economic revival but also a powerful tool for implementing its geopolitical policies. In recent years, international energy prices have raised sharply and Russia has significantly boosted its economic power. Since 2005, Russia has been gradually reducing the gap between its energy prices and international energy prices and has been improving its position in the international market, reflecting its growing desire to control energy prices. As a result of the 2008 financial crisis, oil prices plummeted and Russia's economic revenues shrank significantly, so it hoped to maintain its economic growth by recovering energy debts from countries such as Ukraine. Ukraine, which has also suffered a severe economic downturn due to the economic crisis, was still unwilling to pay its debts and buy Russian gas at higher prices, further leading to a stalemate in energy negotiations between the two sides.

On Feb 24th, 2022, the war between Russia and Ukraine broke out. The war is the result of NATO's continued expansion to the east, occupying the space of Russia the threatening its room for survival. The diplomatic strategy adopted by Ukraine is also an important reason for the outbreak of the war. In the Russia-Ukraine war, Russia's demand is to use war to promote peace talks and force Ukraine to give up the intention to join NATO. The Russian-Ukraine war will make it even worse for global inflation and accelerate the process of tightening monetary policies in Europe and the U.S.

2.2 Petroleum Disputes

Before 2020, when the United States had no policy on sanctions against Russia, the export volume of Russian petroleum in 2019 was as high as USD121.44 billion, and the average price of Brent crude futures in 2019 was USD64 per barrel. Then the United States began to sanction Russia, making the export volume of Russian petroleum in 2020 only USD72.366 billion. After the war between Russia and Ukraine began, the United States and its allies imposed sanctions on Russia, including on petroleum prices.

On February 24, 2022, the price of Brent crude futures was \$100 per barrel, the highest since September 2014. On March 7, 2022, the petroleum market rose sharply, and Brent crude once rose \$20 to \$138.02 per barrel, a new high since 2008.

On March 8, 2022, the White House announced that President Biden confirmed the executive order that is about not buying petroleum products, natural gas, and coal from Russia, and prohibited the United States from investing in Russia's energy. The European Union also said on the same day that it was trying to reduce Russian natural

gas imports by two-thirds within one year. Britain also announced that it would stop importing Russian petroleum and petroleum products step by step before the end of this year.

Because the cost of transporting petroleum rose rapidly, the international petroleum price rose again. On March 8, the US crude 04 contracts closed at US \$123.7/barrel and the Brent crude 05 contracts closed at US \$127.98/barrel, closing at a new high since 2008. This means that the price of Brent crude rose by \$41 in five trading days, with a maximum increase of nearly 42%. This is the first time that petroleum prices have risen particularly fiercely, like this. Therefore, Russia’s petroleum exports must be greatly affected.

3 The Impact of the Russian-Ukrainian War on European Energy

3.1 Price Impact of Energy Commodities

As shown in Fig. 1, Russia is one of the world’s largest producers of crude oil. In 2020, Russia will produce 12.6% of the world’s crude oil and export 11.4% of global production. Meanwhile, Russia also ranks among the world’s top producers of natural gas, with more than 40% of the EU’s gas imports coming from Russia in 2020.

With the escalation of the conflict between Russia and Ukraine, market concern about the supply of commodities intensified, and the prices of energy-based bulk products, gold, agricultural products, and others soared. Among them, Brent crude oil exceeded \$100, hitting a new high for nearly eight years (as shown in Fig. 2). European gas futures prices have raised significantly in 2022 in comparison with the past few years (as shown in Fig. 3).

Pay close attention to the price changes of crude oil in March, there are several important sections. By March 17th, global oil prices rose sharply as many Western countries continue to impose sanctions on Russia, and markets once again focused on potential supply risks. By March 18th, global oil prices continued to rise as the Russia-Ukraine negotiation remained an unclear outcome, and the International Energy Agency alerted the market about supply risks. By March 21st, EU countries push some new sanctions against Russia as supply risks intensified, extending a sharp rise in global oil

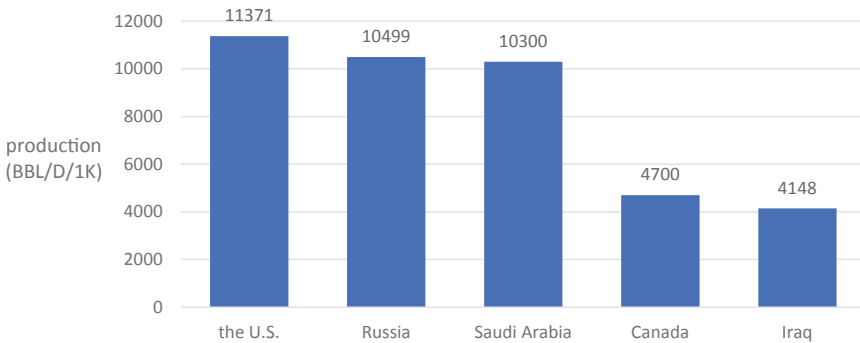


Fig. 1. Global crude oil production rank in 2020



Fig. 2. The price changes of Brent crude oil from 2019 to 2022



Fig. 3. The price changes of European gas from 2019 to 2022

prices. By March 22nd, EU countries were divided over a ban on imports of Russia's crude oil and Ukraine said it is ready to discuss its commitment not to join NATO. Global oil prices close slightly lower after a sharp surge. The EU and NATO countries discussed further sanctions against Russia and the storm led to a suspension of loading at Black Sea crude oil export terminals. Global oil prices experienced another sharp rise (as shown in Fig. 4).

3.2 European Energy Relations

Next, focus on the export of European energy. From 1990 to 2019, petroleum has always been in the position with the highest proportion of energy supply. Secondly, the growth rate of gas energy supply ratio is the fastest between 1990 and 2010, and its overall trend is rising from 1990 to 2019. However, the proportion of coal energy supply decreased year by year from 1990 to 2019, and the proportion of coal energy supply decreased by almost 40%. The energy supply proportion of nuclear energy, biofuels, wind energy, solar energy, and other energy sources is on the rise, but the energy supply proportion is still low. The energy supply proportion of hydropower has hardly changed from 1990 to 2019, and the energy supply proportion has always been in a very low position.

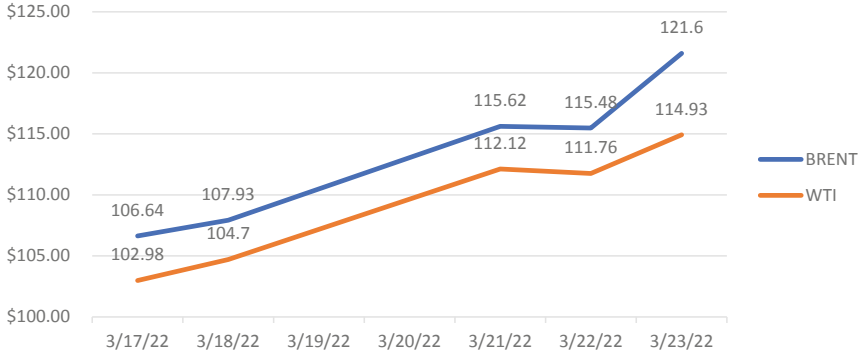


Fig. 4. The price changes of global oil in March

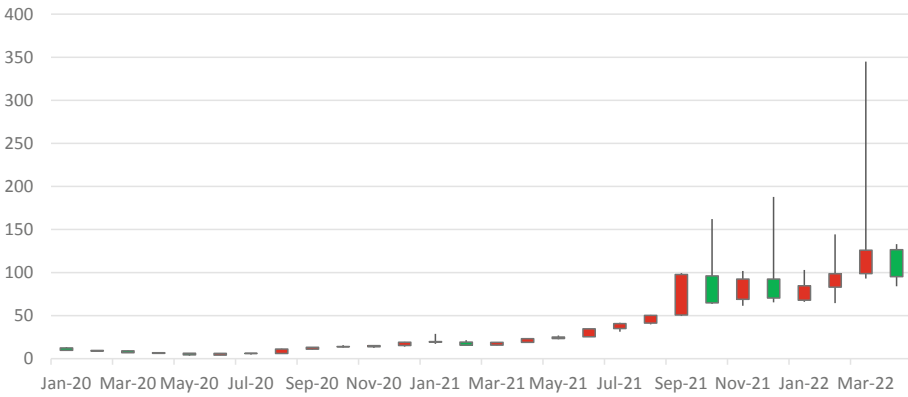


Fig. 5. ICE Dutch TTF Natural Gas Futures Historical Data

Focus on the natural gas export of the Netherlands. In September 2021, the natural gas export of the Netherlands increased sharply (Fig. 5).

Russia provides the main natural gas needed by Europe. Of Europe’s total natural gas imports, 40% are imported from Russia. Moreover, since the tense relations between Russia and Ukraine, the natural gas transportation pipeline from Russia to Europe, which passes through Ukraine, has not decreased but increased. Gazprom is a Russian gas industry company. According to his data, the average production of their company in the first half of this month was 1.54 billion cubic meters per day, the highest level since 2014 and 1.1% higher than that in December last year.

Generally speaking, we believe that the United States provoked to war by intensifying the contradiction between Ukraine and Russia. The effect of sanctions against Russia in this way is not obvious. Although the dispute between Ukraine and Russia led to soaring energy prices, Russia’s energy exports such as natural gas and oil increased slightly. The Ukrainian Russian war also failed to achieve the ultimate goal of US sanctions against Russia. Russia is still the main energy supplier of the EU.

4 European Countries' Approaches to Cope with Escalating Energy Prices

Taking Germany as an instance, it is one of the world's major energy consumers. Nowadays, some countries are extremely dependent on traditional fossil fuels. However, Germany is already making visible development in new energy. In order to reduce carbon emissions, Germany planned to phase out coal-based energy and in January 2019, the European Commission proposed phasing it out altogether. Furthermore, the government intended to phase out the commercial use of nuclear power for power generation. Expanding the use of renewable energy could reduce dependence on fossil fuels. In July 2019, renewable energy was providing more electricity than coal and nuclear power combined in Germany. Solar and wind have low marginal costs, and when demand and prices are low, other sources of production with higher fuel costs become less competitive. In March 2022, the German government has proposed an "Easter package" to boost renewable energy production, and wean itself off energy imports from hostile countries such as Russia.

To rid of their dependence on imported energy, for their part, other European countries are developing their own energy sources. As an example, France is the second-largest exporter of renewable energy in Europe, only after Germany. It relies on its abundant forest resources, with biomass accounting for 43% of France's renewable resources, water accounting for 25%, biofuels for 10%, and heat pumps for 7%. At the end of 2013, France had achieved an energy consumption that relied mainly on forest resources and hydroelectric energy, accounting for 14.2% of the total energy consumption. By 2017, two French demonstration farms had commissioned 11 hydroelectric engines. French legislation provides for 32% of total energy consumption to be renewable in 2030, which is already well ahead of the EU's 27% reservation target.

5 Conclusion

Through the historical analysis of the war, it is concluded that the energy of Europe has been affected by the war between Russia and Ukraine. Through the comparison of curves and tables, it can be clearly found that the war between the two countries has fundamentally and directly affected the changes in the European oil economy and natural gas economy, making the oil and natural gas sector fluctuate greatly. Although Germany has formulated rectification measures for the rise in energy prices, this method takes a long time and cannot quickly solve the current problem. Therefore, Russia still has important chips in the world energy economic war. The global energy market affects the whole body. It is wrong for the United States to try to lead western countries to coerce the EU to sanction Russia from beginning to end. Not only did the petrodollar system not come into being, but also increased the Asia Pacific market's oil import and export trade with Russia. More and more emerging countries are also making an independent voice, and now they are gradually realizing the diversification of Global trade.

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