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# Economic Forecast of Further Development for Oil Suppliers to World Markets Against the Background of the Development of Renewable Energy Sources

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**Abstract**. The energy problem in the conditions of modern economic development has acquired a particularly large scale: this is due to the elevated level of environmental pollution from conventional energy sources and their limited amount in the Earth's interior. This has forced countries to develop new, renewable energy sources. However, it is relevant to consider the prospects for the development of energy exporting countries, namely oil supplier states. Thus, the purpose of this study is to forecast the development trends of these countries, considering the current pace of introduction of renewable energy sources in the world. Main methods for authoring the paper were modelling and forecasting, considering the model of the future development of the oil market designed in this paper. The authors conclude that the demand for oil, at least in the short and medium term, will increase. This is due to a considerable projected increase in global energy demand, which cannot be met only through the development of renewable energy sources. In this case, most oil-exporting countries may experience an increase in cash receipts over the future. However, authors believes that it is better for these countries, especially the OPEC member states and Azerbaijan, to start pursuing a policy of export diversification to become less dependent in their economic well-being on trends in the energy market and have more sources of income in case of problems in this market. The paper allows taking a fresh look at current changes in the oil market and the role of renewable energy sources in its development

**Keywords**: international economy, green energy, sustainable development, world trade, oil exporting countries, diversification



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## INTRODUCTION

Energy carriers play an essential part in the development of any country: for exporters, they are the main source of income, and for importers – the key factor for the functioning of the economy (Taghizadeh-Hesary *et al.*, 2019). Therefore, it is not surprising that scientists are constantly conducting new research on the price of oil, natural gas, coal, and other resources, as well as the impact of these resources on the economy (Kaufmann & Connelly, 2020). Usually, members of OPEC (The Organisation of the Petroleum Exporting Countries) are primarily associated with oil exporting countries, although they are not the only major players in the market (Ologunde *et al.*, 2020). The specific feature of OPEC is that it is a cartel (albeit with its specific features), i.e., its member states regulate the amount of oil produced and put on sale, thus regulating its price (Parnes, 2019). Notably, scientists have indeed proved that OPEC affects the price of oil on the world market: in 2020, restrictions on the sale of oil increased its price by 4 US dollars per barrel (Quint & Venditti, 2020), which is one of the reasons for the introduction of renewable energy sources among oil importing countries.

Since the end of the 20th century, there has been a rapid trend towards sustainable development in the world, which has become a new paradigm for the development of the world's countries based on overcoming hunger, poverty, problems with education, and, most importantly, environmental issues (Mensah & Casadevall, 2019). Since one of the key components of this paradigm is the use of renewable energy sources, this brings a certain danger to energy exporting countries. Therefore, it is still relevant to consider the possible danger for such countries from the later increasing implementation of green energy in the economic structure of the world's countries.

Many researchers have investigated the issue of renewable energy sources and the oil market. Thus, it is worth highlighting M. Jefferson (2020), who studied the trends in the development of the oil market during the COVID-19 crisis, proved changes in supply and demand for this resource, as well as its prices. Important at the time of writing were the studies of researchers engaged in forecasting the future demand and price of oil. Among them, it is worth highlighting M. Bradshaw, T.V.D. Graaf, and R. Connolly (2019), as well as S. Dale and B. Fattouh (2018). An essential role was played by studies that investigated the impact of the future development of renewable energy sources on individual energy exporting countries. Thus, it is worth highlighting A. O. Adeola *et al.* (2022), who investigated the features of the functioning of African countries and their dependence on the oil market. The researchers found that oil revenue in Africa should be used to create sustainable investments for long-term benefits, while addressing current challenges. In turn, B. Fattouh and A. Sen (2020) evaluated the exports of Arab countries. In the study, they argue that the broader characteristics of the current energy transition matter more for economic diversification than when oil demand will peak. K. Mohaddes and M. Raissi (2019) studied the features of the United States as a player in the oil market. The researchers showed that oil price uncertainty shocks dampen real stock prices, with the effect found to be more persistent for countries with greater reliance on oil in their exports. E. Akhmedov (2019) assessed Azerbaijan's readiness for potential future changes in the world oil market. The results of his research show that oil price is a significant contribution of non-oil GDP as the oil price coefficient is positive and significant for Azerbaijan.

The role of Azerbaijan in the export of oil around the world is small. In 2021, only about 26 million tons of oil were exported (Bashir *et al.*, 2022). It is unlikely that this volume will increase in the future. But Azerbaijan is one of the countries with a high potential for the use of renewable energy sources. The potential of economically practical and technically suitable renewable energy sources in Azerbaijan is 27,000 MW, including 3,000 MW of wind energy, 23,000 MW of solar energy, 380 MW of bioenergy potential, 520 MW of mountain river potential (Akinsola & Odhiambo, 2020).

Thus, *the main purpose of this paper* was to forecast the development of the oil market, considering current trends in the spread of renewable energy sources, and draw conclusions on the impact of these changes on oil exporting countries. The main object of this study was the oil market as such, as well as current trends in its development. The originality of this study lies in the authors prediction of the development of the oil market and its statistical justification.

## MATERIALS AND METHODS

To author this article, the authors used a sufficient statistical database. The main source was the TradeMap (2022) statistical internet source, data from which primarily concerned information on oil exports and imports in various countries of the world. However, other internet sources also played an important part, namely the official website of the World Bank (2022), the Our World in Data statistical source (OurWorldInData Energy Production, 2022; OurWorldInData Renewable Energy, 2022), a versatile site with statistical (and not only) information about investments and everything related to them, Investing (2022), etc. Furthermore, a considerable number of scientific papers and reports were used for this study, including on sustainable development and the implementation of its principles in countries.

The study employed some statistical methods for analysing the obtained data. Finding the root mean square is widely used. It can be found using the following formula (1):

$$\sigma = \sqrt{\frac{\sum(x_n - x_{avg})^2}{n}} \quad (1)$$

where $\sigma x$ is the average square deviation of the feature $x$; $x_n$ is the value of the attribute $x$ under the number $n$; $x_{avg}$ is the arithmetic mean of the sum of all values of the feature $x$; n is the number of values in the feature $x$.

Furthermore, a correlation model was used to find the interdependence between several variables. To find the correlation between two variables ($x$ and $y$), the formula (2) was used:

$$r = \frac{(xy)_{avg} - x_{avg} * y_{avg}}{\sigma_x * \sigma_y} \quad (2)$$

where $r$ is the correlation index, $x_{avg}$; $y_{avg}$ are the average values of variable features (factor and effective); $(xy)_{avg}$ is the average values of multiplied factor and effective features; $\sigma_x$, $\sigma_y$ are the standard deviations of the effective and factor features.

Some forecasting methods were also used in this study. Trend lines were constructed using Excel, which allowed observing probable variants of the future course of events on the chart and the amount of possible future energy output from renewable sources. Other statistical research methods were used, namely graphical method, for a better visual representation of the selected information. Abstract-logical research methods were also widely used in this study, namely analysis (to process considerable amounts of data used in the study), abstraction (to assess the influence of only one or more variable factors on the performance trait), the above-mentioned forecasting method, etc. In turn, the historical method allowed analysing the development of the oil market in dynamics, to see the causes and consequences of changes in oil demand and prices.

All the study can be divided into several stages. Thus, the first stage presents a detailed analysis of the main oil exporting countries, the level of their dependence on the export of this resource and considers the oil market. The second stage provides a model that allows calculating the future volume of demand for energy resources and drawing conclusions about the development trends of oil supplier states. The third and final stage of this study discusses the validity of the results obtained and the opinions of other researchers on the future role of oil in the global economy and proves the economic development of oil-exporting countries.

## RESULTS AND DISCUSSION

Before considering the impact of the proliferation of renewable energy sources, it is worth considering the dynamics and structure of oil trade among the main exporting countries (they account for about 90% of all exports, thereby making their examination sufficient to observe the entire picture). Figure 1 shows the amount of exported oil in billions of dollars among the world's largest countries.

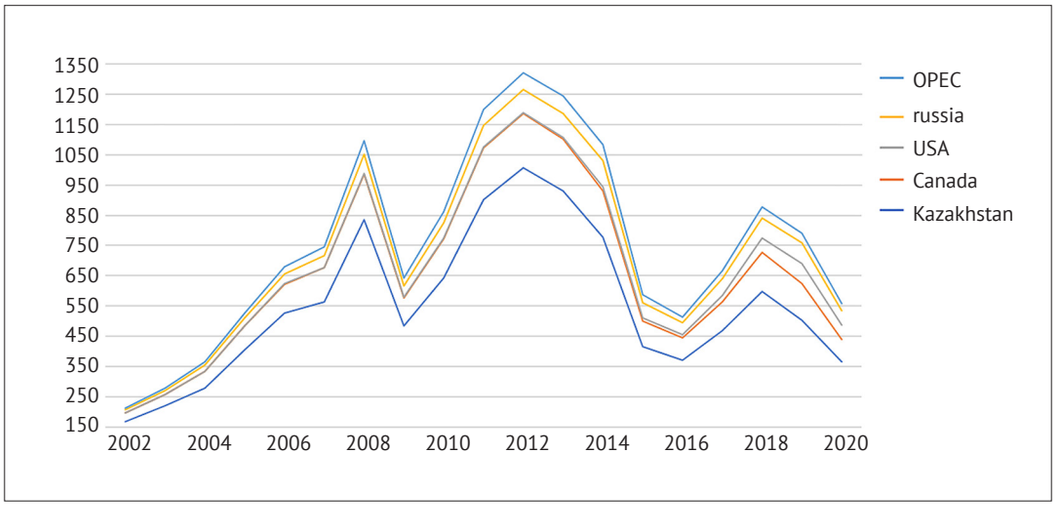


***Figure 1**. The amount of exported oil with the countries of the world from 2002 to 2020, billion dollars*
***Source:** compiled by the authors based on TradeMap (2022) and OecWorld (2022) data*

Figure 1 shows the dynamics of the amount of oil exported over the selected period. Oddly enough, its amount does not increase gradually, but changes in waves. Counting in 2002 prices, i.e., considering the dollar inflation, these waves have even lower values and become sharper in their movements (WorldBank, 2022). For greater clarity, one can estimate which of the countries occupies what share in total oil exports. For this, the data presented below in Figure 2 should be considered.

The data in Figure 2 on OPEC relate to the left scale of the chart, and other countries – to the right. Figure 2 shows that the share of most countries in total exports is stable, which can be proved based on the standard deviation. The calculated standard deviation data is presented in Table 1 below.

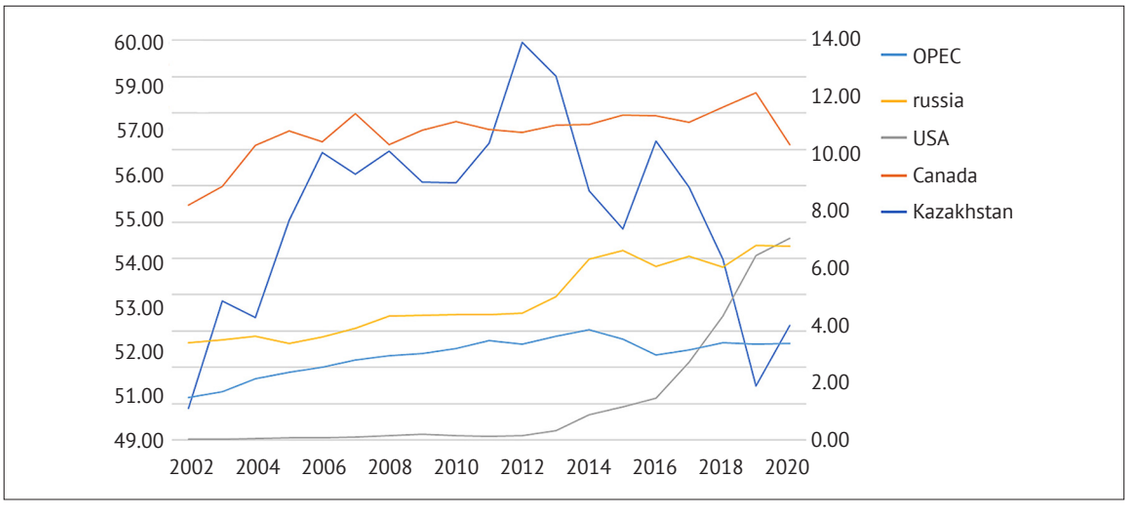


***Figure 2**. Share of countries in total oil exports in 2002-2020, %*
***Source:** compiled by the author based on TradeMap (2022) and OecWorld (2022) data*

***Table 1**. Some characteristics of the standard deviation of the share of exports of oil exporting countries*

| Country | Average share of oil exports from 2002 to 2020 | Standard deviation of the share in the export structure, % | Ratio of the standard deviation to the average share in the export structure, % |
|---|---|---|---|
| OPEC | 55.22 | 2.69 | 4.87 |
| russia | 10.75 | 0.91 | 8.50 |
| USA | 1.35 | 2.21 | 163.69 |
| Canada | 4.93 | 1.28 | 25.97 |
| Kazakhstan | 2.97 | 0.65 | 21.95 |

***Source:** compiled by the author based on TradeMap (2022) and OecWorld (2022) data*

Table 1 proves that the highest level of standard deviation is observed in the United States (2.21%), which is associated with a considerable increase in the country's share in exports, as well as in Canada (0.25%) add Kazakhstan (0.22%). The standard deviation of OPEC member states is also significant (2.69%), but it is also worth considering the ratio of the standard deviation to the average share of the country in the total structure of oil exports over these years. It is also the most stable for this group of countries, which suggests that the share of OPEC member states is the most stable among all other countries.

It is essential to estimate the volume of oil sold not only in monetary terms, but also in physical terms. This information was calculated based on the average oil price in the corresponding years. It is presented in Figure 3 as a filled-in area.

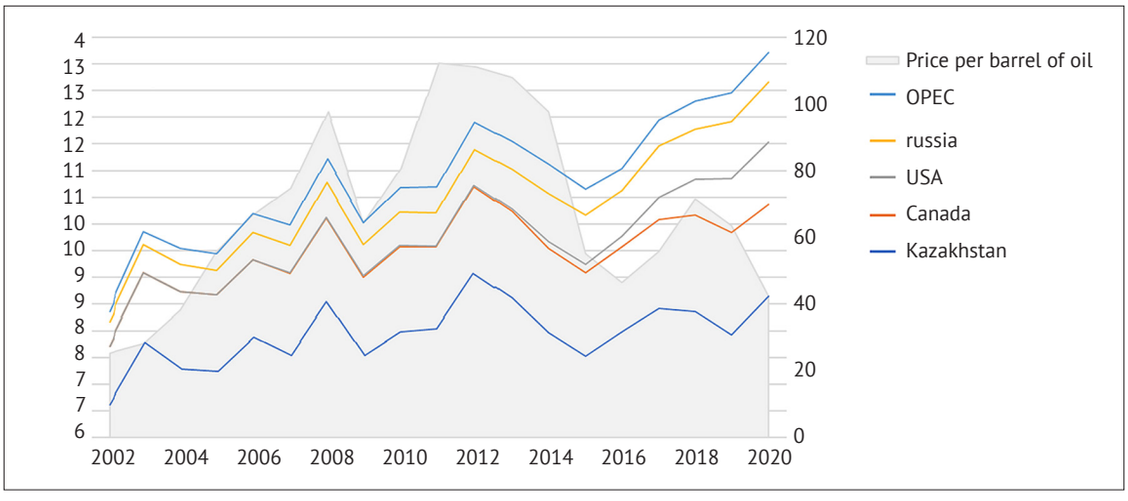


***Figure 3**. The amount of exported oil with the countries of the world from 2002 to 2020, billion barrels*
***Source:** compiled by the author based on data from TradeMap (2022), OecWorld (2022), and Investing (2022)*

As Figure 3 shows, the number of barrels of oil exported stays at a relatively stable level. However, it is gradually increasing, which is due to an increase in the number of US oil exports. This is also shown by the correlation between the average price per barrel and the number of sales: the higher the price, the more barrels are sold on the market. Thus, the correlation of world exports and the average price level is about 0.4, and OPEC exports and prices – about 0.6. These data clearly show the specific features of the functioning of this association as a cartel.

Thus, the most influential countries in the market are OPEC member states (which can be considered as the only subject of international trade in this market), as well as Russia, the United States, Canada, and Kazakhstan. However, this does not mean that their economies are dependent on oil exports: for this, it is worth considering the export structures of these countries in more detail. Table 2 below shows exactly the share of oil exports in the countries under study in some years.

***Table 2**. Share of oil exports in the total export structure in the largest oil exporting countries in some years, %*

| Year | 2004 | 2007 | 2010 | 2013 | 2016 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| **OPEC*** | 88.75 | 82.19 | 88.88 | 73.23 | 57.10 | 59.79 | 64.80 | 74.17 |
| **russia** | 54.85 | 61.46 | 66.16 | 70.56 | 47.18 | 52.24 | 42.10 | 43.15 |
| **USA** | 2.34 | 3.61 | 6.39 | 9.44 | 6.48 | 12.15 | 10.61 | 13.67 |
| **Canada** | 16.67 | 20.78 | 23.83 | 26.39 | 15.97 | 22.04 | 17.67 | 23.86 |
| **Kazakhstan** | 64.26 | 66.01 | 71.68 | 76.30 | 60.73 | 67.07 | 58.21 | 48.11 |

***Note:** * – in this case, the average value among all OPEC countries is calculated for OPEC countries; in Table 3, this share is calculated in more detail for each member state*
***Source:** compiled by the author based on TradeMap (2022) and OecWorld (2022) data*

Table 2 demonstrates that OPEC member states are the most dependent on oil exports. Russia and Kazakhstan are significant, which have obviously diversified their exports and reduced the share of oil exports in the total exports of the countries since the 2000s. However, in all the countries mentioned above, the share of oil exports to total exports is gradually decreasing. Interestingly, the countries of North America, namely the United States and Canada, only continue to increase the amount of oil sold on the market. It is worth considering the share of oil exports of OPEC member states in more detail. This share is presented in Table 3 below.

***Table 3**. Share of oil in total OPEC member exports from 2016 to 2021, %*

| Years | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| **Iraq** | 94.46 | 96.58 | 98.17 | 96.39 | 86.90 | 98.22 |
| **Libya** | 89.05 | 89.05 | 95.40 | 94.48 | 76.71 | 96.02 |
| **Angola** | 92.70 | 94.94 | 92.40 | 95.24 | 93.11 | 94.13 |
| **Kuwait** | 89.64 | 90.18 | 90.90 | 91.02 | 89.29 | 91.83 |
| **Equatorial Guinea** | 87.72 | 86.28 | 87.13 | 89.06 | 89.89 | 91.45 |
| **Nigeria** | 96.48 | 96.03 | 94.11 | 87.04 | 88.70 | 89.15 |
| **Algeria** | 95.31 | 96.11 | 94.10 | 93.07 | 89.78 | 88.42 |
| **Saudi Arabia** | 75.46 | 77.36 | 78.63 | 59.57 | 74.78 | 77.02 |
| **Gabon** | 75.39 | 65.05 | 65.32 | 67.60 | 58.54 | 63.83 |
| **United Arab Emirates** | 16.12 | 22.07 | 28.83 | 29.74 | 51.70 | 55.70 |
| **Iran** | 65.57 | 66.62 | 68.69 | 47.03 | 40.61 | 6.12 |
| **Democratic Republic of the Congo** | 4.17 | 2.65 | 0.72 | 1.12 | 0.49 | 5.14 |
| **Venezuela** | 83.07 | 88.29 | 86.63 | 87.14 | 67.65 | 2.49 |

***Source:** compiled by the author based on TradeMap (2022) and OecWorld (2022) data*

Table 3 shows that most OPEC member states have a large share of oil in their exports. Only three countries are exceptional: Iran, the Democratic Republic of the Congo and Venezuela, which account for less than 10% of their oil exports. For these countries, this is due to the sanctions imposed on them, which prohibit the import of their oil to most countries of the world. For Iran, this situation is related to the country's nuclear programme. To counter this,

some countries, including the United States, the United Kingdom, Germany, and China, have imposed sanctions to limit economic relations with Iran until it reduces its nuclear activities (Kokabisaghi *et al.*, 2019). Admittedly, the sanctions were effective, which led to a 96.5% decline in the country's oil exports since 2002 (TradeMap, 2022). For Venezuela, the reason was the policy of the Maduro government, which was aimed at leaving its ability to illegally extract gold, oil, and conduct some other operations that could contribute to the criminal activities of the regime; evidently, this policy was effective and led to a considerable decrease in exports in absolute units (by 99.5% compared to 2002) and a deterioration in the standard of living of the country's citizens (Weisbrot & Sachs, 2019). The Congo was also sanctioned in 2003 for acts of violence that were systematically committed against civilians, including violations of international humanitarian law and human rights (U.S. Department of the Treasury, 2022). Next, knowing the approximate dependence of each country on oil exports, one can estimate the losses that they may suffer in the future from the development of renewable energy sources. For this, some initial data should be entered. First, scientists (Chi & Hongmei, 2018), considering the constant development of the global economy and the increase in the number of people, believe that an increase in demand for electricity in the world by 1.3% should be expected by 2040. It is probable that this demand will be met only through renewable energy and without the need for conventional sources. By calculating the projected amount of energy produced from renewable sources, one can calculate the amount that will remain on conventional sources. This way, one can only find an approximate increase in oil demand, since changes can also occur within conventional energy sources, i.e., oil may begin to occupy a smaller or larger share in this structure compared to years.

To assess this, it is worth considering the existing data on the spread of green energy in the world. Figure 4 below shows the amount of energy produced from renewable sources from 1965 to 2020.

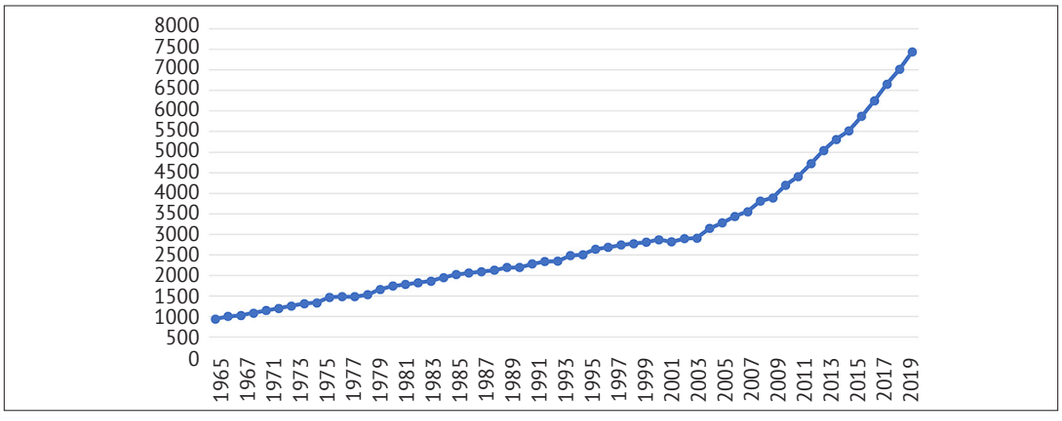


***Figure 4.*** *Growth rate of energy output from renewable sources in 1965-2019 in TWh (terawatt hours)*
***Source:*** *compiled by the author based on OurWorldInData data (OurWorldInData Energy Production, 2022)*

Data in Figure 4 allows calculating the average growth rate of renewable energy production: thus, it is about 3.83% per year. However, this is not the only way to calculate future renewable energy output values. One can also use trend lines. Thus, the authors obtained three scenarios for the future growth of the amount of energy produced from renewable sources and presented them in Figure 5 below.

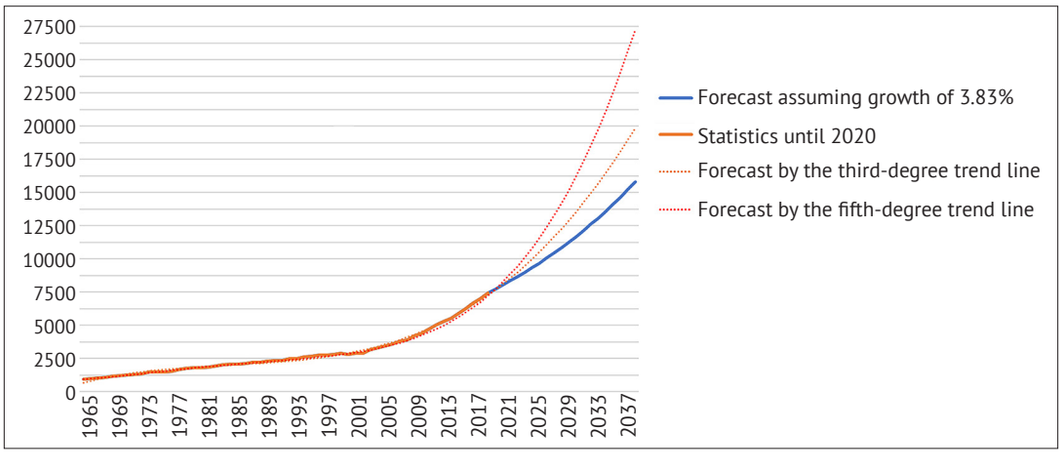


***Figure 5.*** *Some potential scenarios with the growing amount of renewable energy produced in the world, TWh*
***Source:*** *compiled by the authors based on OurWorldInData data (OurWorldInData Energy Production, 2022)*

Within the framework of this study, the three possible scenarios from Figure 5 were distinguished as follows: pessimistic (blue line; forecast with growth of 3.83% per year), normal (orange dashes; forecast with construction of a polynomial trend line of the third degree), and optimistic (red dashes; forecast with construction of a polynomial trend line of the fifth degree). Below are the formulas suggested by Excel that display trend line data to confirm later calculations. Thus, the third-degree trend line formula looks as follows (3):

$$y=0.0956x^3-5.9247x^2+152.22x+535.17 \quad (3)$$

It is also important that the value $R^2=0.994$ for this line. Next, the formula for the fourth-degree trend line is drawn as follows (4):

$$y=0.0023x^0-0.1702x^3+3.8748x^2+25.493x+925.03 \quad (4)$$

Value $R^2=0.9985$ for this line.

According to the Our World in Data statistical website (2022), the amount of energy consumed in 2019 amounted to 173,340 TWh, and in 2020 it decreased by 5% (Statista, 2022). Thus, considering the data on the growth of electricity demand and the estimated growth rate of the amount of renewable energy produced, one can calculate the amount of energy that will be produced from all other energy sources in the following years until 2040. This data is presented in Figure 6.

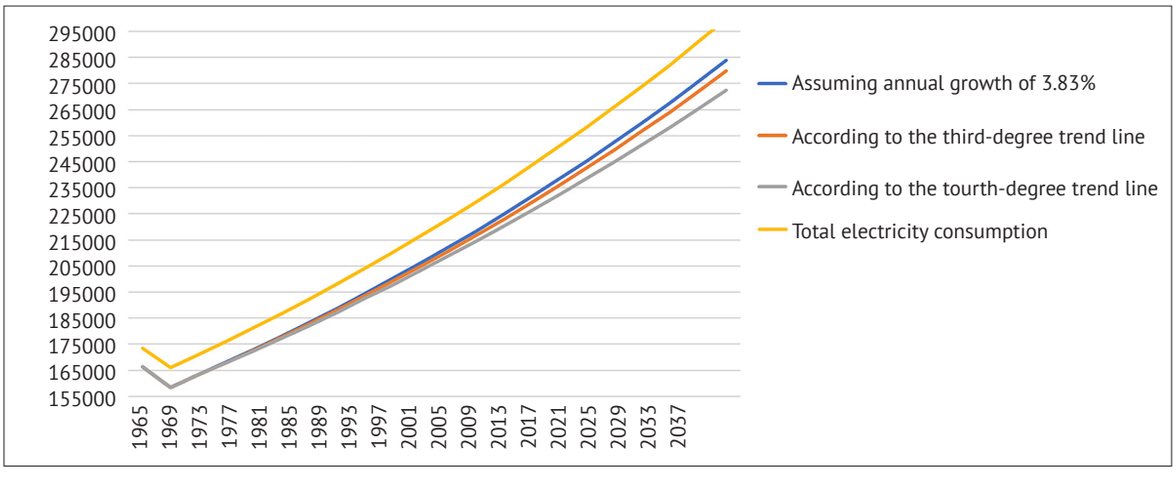


***Figure 6.*** *Forecast of the amount of energy produced by conventional sources from 2019 to 2040, TWh*
***Source:*** *compiled by the authors based on OurWorldInData data (OurWorldInData Energy Production, 2022; OurWorldinData Renewable Energy, 2022)*

As Figure 6 shows, the amount of energy produced from conventional sources for all models exceeds it in 2019 and 2020. This suggests that the current and recent pace of adoption of renewable energy sources in the world is still statistically insufficient to completely replace conventional sources in the near future. Next, the authors of this paper assumed that the demand for oil would grow at the same rate as for all conventional energy sources. Thus, under the pessimistic scenario, oil demand will grow by 70.69% compared to 2019; under the usual scenario – by 68.24%; under the optimistic scenario – by 63.79%. It is quite logical to assume that the profits of countries engaged in the export of this resource will increase by the same amount.

Thus, added theses to this study can be made as follows. First, according to the model developed by the authors, with the current growth rate of the amount of energy produced from renewable sources, the demand for conventional sources (including oil) will still grow. Secondly, there is still the possibility that the development of renewable technology production will follow a different scenario and oil demand will not develop as it was provided for in the models within the framework of this study; therefore, for oil exporting countries with a considerable share of exports of this resource in foreign trade, export diversification and the economy as a whole remains relevant. The authors of this paper offer several ways to strengthen diversification. These include general economic methods (i.e., the establishment and increase of customs duties on certain products to increase opportunities for the development of domestic producers) and administrative methods (the creation of national programmes to support certain types of businesses).

After the study, it is important to discuss some of the controversial issues that its authors have encountered during their study, and their solutions. The most complicated issue was figuring out the amount of future oil demand for calculations. Researchers have defined it differently in their studies. Thus, the International Energy Agency (2021), upon developing sustainable development scenarios, predicted a decrease in oil demand by 25 MB (million barrels) the day before the beginning of 2040. In turn, in its 2018 studies, British Petroleum (2018) predicted an increase in oil demand until 2030, but with a gradual decline after that. Some researchers have similar opinions on the future dynamics of oil demand. Thus, M. Bradshaw, T.V.D. Graaf and R. Connolly (2019), upon analysing the development of Saudi Arabia and Russia in the context of current trends in oil

prices, and S. Dale and B. Fattouh (2018), who investigated long-term trends in oil demand, also discussed the upcoming decline in the price of the resource and explained its occurrence with the increase in the cost of the conventional method of oil production and the future drop in oil demand due to climate change mitigation lays the foundations for a new oil order.

Currently, the hypothesis of "peak demand for oil" is popular, which suggests that eventually the demand for this resource will reach its maximum value. It was highlighted in the study of H. Abdel-Latif & M. El-Gamal (2020), which examined the possible dangers to the oil market associated with a probable future decline in oil demand, and in the study of M. Jefferson (2020), which analysed changes in demand, supply, and oil prices in the context of the COVID-19 crisis, as well as the impact of these changes on the main oil exporting countries. It is impossible to confidently state whether the world has already observed "peak oil demand" (mostly singling out 2005 as a peak, although the price of oil was not the maximum then), or whether this is still to be expected (scientists suggest that this may happen in the 2030s or 2040s (Bradshaw *et al.*, 2019)). Subsequently, a substantial decrease in demand for this resource and its price should be expected.

There are several reasons why this hypothesis can be considered true. First, as E. Ansari & R.K. Kaufmann (2019) assure when analysing the study of the industrial development of India and China, the increase in oil demand has recently been strongly influenced by the development of China and India, which carried out large-scale industrialisation. Thus, after the beginning of the transition of these countries to more sustainable methods of development, oil demand should have fallen considerably. Notably, this concept has one significant drawback, which follows from the concept of moving industrial capacities. It can be seen especially vividly behind the waves of the so-called "Asian Tigers" (Feng *et al.*, 2020): thus, industrial capacities from highly developed countries moved to countries with low wages and easy business opportunities, due to which companies received super-profits, and states – rapid economic development due to industrialisation. However, this process is cyclical: that is why scientists distinguish several waves of "tigers", which are accompanied by the movement of production facilities and the change of the main centres of world production. Thus, according to the authors of this study, in the future, the demand for oil will still increase due to the need for this resource from an increasing number of countries.

Secondly, T. Ahmad and D. Zhang (2020), in their study on the global history of changes in electricity supply and demand, note that oil demand should decrease due to the rapid recent spread of technologies that increase energy efficiency, i.e., energy-saving technologies. This trend leads to a decrease in demand for all energy resources, and first, countries will abandon conventional energy sources, including oil. However, one cannot be sure that the future growth rates of electricity demand will be lower than the trends in the spread of energy-saving technologies. That is why in this paper the author adhered to the idea of increasing oil demand, albeit at a slight pace, which was described in the work of J. Chi and Y. Hongmei (2018), who concluded on the average annual growth in electricity demand by 1.3% until 2040.

Next, this study analysed the impact of future trends in oil demand on the main oil exporting countries. Thus, B. Fattouh and A. Sen (2020), who analysed the export structure of Arab countries, concluded that in any case, international oil trade will remain one of the key components of their exports. If export diversification occurs, at least such a transition will not be abrupt, since a rapid transition to renewable energy sources that could replace oil is unlikely. The export diversification strategy of such countries is likely to be implemented for decades, depending on changes in oil demand and other factors: their main purpose is to ensure a smooth transition for their economies to the future realities of the functioning of the energy sector in a globalised world.

I.A. Ologunde *et al* (2020), together with Adeola *et al*. (2022), considered the future components of African development in terms of the social, economic, and environmental impact of changes in oil prices and demand. They note the significant dependence of the African countries mentioned in the paper on oil exports. However, the specific feature of implementing reforms that could ensure economic diversification for them is the low standard of living of the population and the instability of their incomes. Thus, according to the authors of this paper, the authorities of these countries should first focus on providing the population with basic needs, including high-quality education and healthcare, as well as start developing some strategically important industries for the countries, e.g., agriculture. The initial increase in people's living standards will lead to an increase in demand among the population, which will facilitate the subsequent diversification of the economy and the transition of countries to new paradigms of functioning.

The study of the further impact of changes in oil market characteristics on North American countries showed that the US entry into the global oil market strongly affected its conjuncture, as demonstrated in Figure 3. This is also stated by K. Mohaddes and M. Raissi (2019) in their study investigating the impact of the "American oil revolution" on the economies of countries around the world, wherein they note that the increase in oil supply due to the entry of the United States market has led to an increase in business activity in most countries of the world. As for the development prospects of North American countries, according to the authors of this paper, the future possible decline in oil demand will not cause considerable harm to them. This is due to the small share of oil in their total exports in these countries. It will be more difficult for Canada to survive this, due to its general orientation on the export of resources, but it should not bring significant losses to the countries. However, such diversification of these countries makes it impossible to obtain super-profits in case of the development of the oil market according to the scenario described in this paper in Figure 6.

## CONCLUSIONS

In this paper, current trends in the development of the oil market were analysed. It was noted that the market behaves very cyclically, has clearly defined waves of growth and decline in oil sold and prices for it. Furthermore, there was an interdependence between the size of oil demand and its price, which once again proves the high influence of the cartel on the formation of the market price.

Upon analysing individual countries in terms of oil exports, the authors proved that the OPEC member states hold the largest share (which should be considered as one subject, since they pursue a single policy in the market), russia, the United States, Canada, and Kazakhstan. All these countries, except the United States and Canada, have a considerable share of oil in their exports and issues with export diversification and the economy, i.e., they are highly dependent on changes in the price and demand for oil. Upon analysing practical options for the development of the oil market, considering the impact of the development of renewable energy sources, the authors of this study concluded that the demand for conventional energy resources will still increase due to significant projected growth rates of electricity demand in the world and insufficient rates of introduction of renewable sources. Thus, exporting countries are likely to still be able to make super-profits from the sale of petroleum products in the near future, which may increase by 60%-70% in 20 years. However, given the predictions of other scientists about the inevitable decline in oil demand, they still could suffer losses. According to the authors, low export diversification is a dangerous component of the development of these countries in the long term. Countries such as the Democratic Republic of the Congo, Venezuela, and Iran are also exceptional, but similar trends for these states are related to sanctions imposed on the import of their resources. Future research should cover the development of practical recommendations on the diversification of the economies of oil-exporting countries in connection with potential future dangers to their economies.

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## Економічний прогноз подальшого розвитку країн-постачальників нафти на світові ринки на тлі розвитку відновлюваних джерел енергії

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**Анотація**. Енергетична проблема в умовах сучасного економічного розвитку набула особливо великих масштабів: це пов'язано з підвищеним рівнем забруднення навколишнього середовища традиційними джерелами енергії та їх обмеженою кількістю в надрах Землі. Це змушує країни розвивати нові, відновлювальні джерела енергії. Водночас, актуальним є розгляд перспектив розвитку країн-експортерів енергоресурсів, а саме держав-постачальників нафти. Отже, метою цього дослідження є прогнозування тенденцій розвитку цих країн, з огляду на сучасні темпи впровадження відновлюваних джерел енергії у світі. Основними методами при написанні статті були моделювання та прогнозування з урахуванням розробленої в роботі моделі майбутнього розвитку ринку нафти. Автори дійшли висновку, що попит на нафту, принаймні в коротко- та середньостроковій перспективі, буде зростати. Це пов'язано зі значним прогнозованим зростанням світового попиту на енергоносії, який не може бути задоволений лише за рахунок розвитку відновлюваних джерел енергії. У цьому випадку більшість країн-експортерів нафти можуть відчути збільшення грошових надходжень у майбутньому. Однак, на думку авторів, цим країнам, особливо країнам-членам ОПЕК та Азербайджану, краще почати проводити політику диверсифікації експорту, щоб стати менш залежними у своєму економічному добробуті від тенденцій на ринку енергоносіїв і мати більше джерел доходу у разі виникнення проблем на цьому ринку. Стаття дозволяє по-новому поглянути на сучасні зміни на ринку нафти та роль відновлюваних джерел енергії в його розвитку

**Ключові слова**: міжнародна економіка, зелена енергетика, сталий розвиток, світова торгівля, країни-експортери нафти, диверсифікація