

PAPER • OPEN ACCESS

The International Energy Trade Pattern Reshaping, Competition and Energy Revolution

To cite this article: Xu Hua 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **632** 032022

View the [article online](#) for updates and enhancements.

You may also like

- [Thermal instability of cell nuclei](#)
Enrico Warnt, Tobias R Kießling, Roland Stange et al.
- [International energy trade impacts on water resource crises: an embodied water flows perspective](#)
J C Zhang, R Zhong, P Zhao et al.
- [NASA's Double Asteroid Redirection Test \(DART\): Mutual Orbital Period Change Due to Reshaping in the Near-Earth Binary Asteroid System \(65803\) Didymos](#)
Ryota Nakano, Masatoshi Hirabayashi, Harrison F. Agrusa et al.



ECS
The
Electrochemical
Society
Advancing solid state &
electrochemical science & technology

DISCOVER
how sustainability
intersects with
electrochemistry & solid
state science research

The International Energy Trade Pattern Reshaping, Competition and Energy Revolution

Xu Hua*

School of Economics and Management, Shanghai University of Political Science and Law (SHUPL), Shanghai, China

*Corresponding author e-mail: xuhua@shupl.edu.cn

Abstract. Under the global economic slowdown and shale oil and gas technology revolution, the current international energy trade is reshaping, forming a new one whose characteristics are totally different from the old. The energy price fluctuations, the international energy supply and demand structure have been shuffled, and the geopolitical landscape has changed. The energy trade bloc led by the United States realizes self-circulation and high stability. The differentiation of the supply and demand in East Asia-Southeast Asia trade bloc has expanded, the risks increasing. The U.S. geopolitical leadership becomes more and more strong. The energy giants such as Saudi Arabia and Russia competed in production and price are further strengthening this trend. At present, an energy revolution is imperative. It is necessary to focus on improving energy efficiency and energy use structure. There is also have an effect on the global production. The distributions of world's manufacturing industry will readjust due to the costs.

1. Questions raised

Energy trade is an important part of energy production and circulation. It is not only dominated by economic laws, but also an extension and expansion of a country's energy market in the international scope, which affects a country's economic development and operation. In recent years, in order to ensure the safety of energy supply, energy consuming countries continue to promote the diversification of energy import sources, while energy producing countries continue to promote the diversification of energy export in order to obtain financial stability, and the pattern of energy trade tends to be multipolar and complex.

In order to better promote the development of energy trade and energy cooperation, some scholars in the field of economics roughly discuss in two aspects. The first aspect is to analyze and understand the evolution, structural characteristics and influencing factors of international energy trade market as a whole. By using the trade network analysis method and topological structure, the scholars have analyzed the density and reciprocity in the energy trade, the evolution of trade groups in the world, the causes of change, such as urbanization level differences, population differences, language and culture, etc. The second aspect is to identify national characteristics, identify the stability of risk, and explore ways of energy cooperation. They made energy country identification and risk assessment and proposed different cooperation methods and approaches by analyzing the perspective of national



competition and cooperation, or by analyzing the industrial chain, the supply chain and the value chain, or by analyzing the stability and invulnerability of energy cooperation.

Because energy has unique political, financial and strategic attributes, which can affect the pattern of international power, energy trade is different from other trade. Energy trade is not only a pure trade, but also a part of national strategy, which is often interfered by the government to ensure the smooth realization of some national policy goals. In view of this, we cannot analyze the characteristics of energy trade and cooperation methods without the consideration of geopolitical discourse power and other broader levels. Nowadays, with the development of shale oil and gas technology, the world's energy field is undergoing tremendous changes. A game of oil trade dominance is going on without any sound. From this point of view, this paper aims to have a more comprehensive and profound understanding of the pattern and trend of energy trade.

2. Reconstruction and game of international energy pattern

Since the financial crisis in 2008, the global economic development has slowed down, and the demand for energy in the world has also decreased. The international energy trade price has declined since 2013 and 2014. At the same time, in 2009, the United States made significant progress in shale gas exploration technology, achieved a historic breakthrough in production, which realizing the "energy independence" of the United States. The America changed from a major energy demand country to a major energy supply country. Affected by these factors, the current international energy pattern is being reshaped, showing totally different characteristics from the old pattern.

2.1. The market price fluctuates and falls

In terms of demand, developed countries have reduced oil demand due to the impact of the financial crisis, the aging of the domestic population and the implementation of the low-carbon economy. Although developing countries are in the process of economic growth, their demand for energy has gradually increased, but in recent years, especially in Asia, the economic growth has also slowed down. In terms of supply, the increase of shale oil supply in the United States not only reduces the demand for energy, but also exports a large amount of unconventional oil, accelerating the increase of world oil production. By the end of 2018, the daily crude oil production of the United States has reached 11.7 million barrels, successfully surpassing Saudi Arabia, Russia and other countries, the United States became the largest oil producer in the world. In addition, in order to ensure their own economic development, some major oil producing countries not only did not reduce their production, but also implemented measures to increase production, resulting in the phenomenon of oversupply in international oil trade.

From 2014 to 2016, Brent crude oil price in London fell from \$110 to \$30 in 2016, dropped by more than 70%. After that, although it reversed and recovered to the peak in September 2018, the international oil price had dropped to \$32.15 per barrel in March 2020, and the U.S. West Texas crude oil futures even fell below \$30 per barrel.

2.2. Energy supply and demand structure have been shuffled, the stability of the United states bloc is strong, East Asia-Southeast Asia is fragile

At present, there are four trade blocs in the global energy trading network, namely, the trade blocs led by the United States (mainly including the United States, Canada, Mexico, Brazil, Venezuela, etc.), European-Russia countries, East Asia-Southeast Asia countries, and Australia- India- Africa countries. [1]

After the shale oil and gas revolution, the energy output of the United States has increased greatly. The oil import of the United States has shifted from the Middle East to Canada, some American and African countries, and it can also be exported in large quantities. The Inter American group has basically realized the oil trade cycle, with self-produced, self-sold and stable energy supply. In 2013, the volume of intra American bloc oil trade was 380 million tons, accounting for 58% of the total trade volume of the region; in 2015, the volume of Inter oil trade was 290 million tons, accounting for 70%

of the total. But there are still some deficiencies in the utilization of energy resources in Asia and Europe, especially in the Asia Pacific region. The Asia Pacific region is poor in energy resources and relatively fast in economic development, and has a large energy dependence on the Middle East, Russia and the former CIS region. In general, the trend of integration of energy supply and demand in the Americas is obvious, the trend of separation of energy supply and demand in the Asia Pacific region is intensified, and the dependence and vulnerability are large.

2.3. The world's energy geopolitics has been divided, and the leading power of the United States has been strengthened

Some countries who depended on energy are affected by the fluctuation of energy price, and their political economy is divided and restructured. Africa remains unchanged, and the export advantages of western developed countries such as Europe and the United States are reduced, leaving only the Middle East, Russia and CIS, Latin America. Among them, the CIS by vigorously improving export facilities such as pipelines and railways, and breaking through management barriers doubled export capacity in the Middle East and Central Asia. On the contrary, the Middle East region affected by the regional political situation is not as good as the CIS. In the Americas, as one of the five founding countries of OPEC, Venezuela's oil production plummeted due to lack of funds, political turmoil, etc., and its original market share was gradually replaced by neighboring oil producing countries such as Ecuador, Colombia and Brazil.

The most dazzling of all is the United States. The shale gas revolution and energy independence have freed the United States from its dependence on the Gulf countries, which stimulated and strengthened the confidence and ability of the United States to dominate global energy, even global affairs. The United States has freed up its hand to change the energy structure internally. In domestic, drives innovation and development in the field of clean energy, reduces emission reduction costs, and promotes the revival of American manufacturing industry. In overseas, withdraws from the Middle East and the Gulf region, returns to the Asia Pacific region, manages South America, strives for achieve "rebalancing". In addition, the United states also can use energy financial instruments to affect energy price, use military adjustment to affect the safety of energy navigation pipelines. All these measures constantly enhance the ability of the United states to manage and dominate global affairs, and adjust the energy pattern and geopolitics.

3. The game of international energy powers

Russia and the Middle East are traditional energy supply regions. Among them, Saudi Arabia is the country with the largest proved crude oil reserves in the world, while Russia is the second largest natural gas producer and the third largest oil producer in the world. They are equivalent in oil production. Saudi Arabia's oil reserves are 2.6 times that of Russia, but Russia's refining capacity is about 2.2 times that of Saudi Arabia. In addition, both revenues rely heavily on energy. Once the oil export market is eroded or narrowed, the future economic development of both countries will face great difficulties. For both countries, seeking a stable energy export market is a common goal. For a long time, the traditional energy trade pattern of the two countries has focused on the European market and the Asian market. Russia's main export direction is Europe, Asia and Belarus, Saudi Arabia's main export direction is Asia, America and Europe.

However, with the decline of oil prices and the shift of the United States from an oil importing country to an oil exporting country, the balance of international oil supply and demand has been broken. Russia and Saudi Arabia are facing unprecedented competition and challenges, but both countries can't change the situation by improving technology or innovation in a short time. They both focus on each other's traditional market. Saudi Arabia's industrial system is basically in the primary stage, but its domestic oil reserves are large. Saudi Arabia hopes to find various export channels, adjust regional prices, intervene in the European market, and obtain corresponding political dominance. Russia's modern industrial system is relatively perfect, but its technology is backward, its industrial structure is aging, and its downstream industries such as oil refining industry rely heavily on imports.

Russia hopes to change the single export channel which concentrated in the European market, put forward the Asia Pacific strategy, build oil pipelines, and strengthen cooperation with Asian countries.

In the face of depressed prices in the energy market, Russia and Saudi Arabia have not only failed to accept OPEC's proposal to reduce production and stabilize prices, but also increased oil production to occupy competitors' markets through low prices. At the same time, they can also exclude the United States, which has relatively high oil production costs, from the market. At present, Saudi Arabia has made some obvious progress in competing for the European market. Some large oil companies, such as Eni Corporation, Exxon Mobil and Royal Shell, bought a lot of crude oil from Saudi Arabia in the second half of 2015. Even in the traditional Russian dominated Eastern European market, Saudi Arabia has begun to supply oil to Poland.

4. The influence of big power game and starting up to the energy revolution

4.1. The influence of big power game

Under the game of energy giants, Russia is facing an awkward situation. It is possible for Russia to spend a lot of money to build an oil transportation pipeline to Europe, which may lead to nothing and heavy losses. Those energy suppliers with higher energy costs are bound to face great challenges, and the market will be reshuffled. In the process of the game between big energy countries, the energy risk in the Asia Pacific region is increasing, which may cause heavy losses. For example, the fixed energy price contract between China and Russia will make China bear huge losses under the trend of price decline.\

In this game, the European market will get rid of the single dependence on Russia, enjoys the lower price dividend, and get a larger buffer space for its economic development. The biggest beneficiary is the United States. Although the U.S. is unable to enter the European market due to its high cost, it makes the advantages of energy self-sufficiency, firmly controls the oil futures market and energy prices through energy financial instruments, shares with the winners by use the voice and initiative in Energy.

4.2. Stating up to the energy revolution

The balance of the international energy market has been broken, which has played a prelude to the energy revolution. An energy revolution is coming. It may affect the development of world energy and economy in three aspects. First, it will trigger the technological reform and innovation, improve the efficiency of existing energy utilization, adjust the industrial supply chain, and reduce the production costs of upstream and downstream links of energy; Second, it will adjust the energy structure. Many countries will get rid of the structure of excessive dependence on petrochemical energy and make full use of other energy resources, such as geothermal resources, develop clean energy, such as wind energy and solar energy; Third, the low oil prices is conducive to reducing the cost of manufacturing industry, which promoting the readjustment and development of manufacturing industry, and ultimately affecting the layout of the world economy.

Acknowledgments

This work was supported by Shanghai Plateau Discipline and Innovative Group Programme [Grant Number SHZF201501].

References

- [1] Ma Guifeng, Li Zaichi, Lei Zhongmin. Identification of major energy cooperation countries in the Belt and Road and investment environment evaluation [J]. Coal Economic Research, 2019(05).
- [2] He Ze, Yang Y, Liu Y. Characteristics of evolution of global energy trading network and relationships between major countries [J]. Progress in Geography, 2019(10).
- [3] Ma Yuan, Xu Lili. Network Structure and Influence Factors of Gas Trade About the Countries Along "the Belt and Road" [J]. The World Economy Research, 2017(03).
- [4] Wang Ya. Study on structure characteristics and evolution features of international oil trade based on complex network theory [D]. Jiangsu University, 2019.
- [5] Li Zaichi, Ma Guifeng, Lei Zhongmin. Study on the stability of the "Belt and Road" energy trade cooperation network [J]. Coal Economic Research, 2019(06).
- [6] Du Huizhong. International energy power transition and states, energy competition in the process of the energy situation reshaping [D]. East China Normal University, 2016.
- [7] Yu Hongyuan. The Discourse Right, Energy Competition and the Changing International System [J]. Frontiers, 2017(02).