



Energy Security: From Energy Independence to Energy Interdependence

Energy independence, enormously attractive and appealing, is the dream pursued by many countries. Inspired by the successful development of shale gas and tight oil, energy independence has once again become a hot topic in the United States and other countries in recent years. Under the influence of planned economy and self-reliance for many years, China has shown considerable anxiety for being a large energy importing country with the constant rising ratio of oil importing. To a large extent America is often admired as a country of energy independence. However, the essence of the current American energy independence refers only to the decline in import ratio, with energy independence difficult to achieve in the near term.

With the deepening of globalization and energy interdependence, energy security has become more and more globalized. International energy security cooperation has also gradually expanded from some countries or groups to the whole world. Energy independence is contrary to international trend, and traditional concept of energy security and safety guarantee system aiming at energy independence is becoming increasingly unrealistic. In response to numerous common risks and challenges, the most important task for international community is to reinforce the interdependence of different countries, strengthen dialog and cooperation on global energy security, and strive to promote global energy governance and the establishment of a global energy security system.

Oil, as a weapon, attracted wide attention of the international community mainly because of the first oil crisis. So far, many countries, especially consuming countries, feel shocked to look back at the oil embargo. Since then, oil and other energy resources have influenced people's life more or less as a weapon. However, with the deepening of the energy marketization and integration, the commodity attribute of energy has become increasingly prominent, the role of energy as a political weapon being greatly weakened. In general, the energy problem has a trend of "de-securitization" so energy cooperation and global energy governance will gradually become the mainstream of energy security issues.



THE ORIGIN AND EVOLUTION OF THE CONCEPT OF ENERGY INDEPENDENCE

Generally speaking, the concept of energy independence was first put forward by Americans, and Nixon was the first American president who proposed energy independence. After the first oil crisis in 1973, Nixon proposed that the United States should meet its own energy demand without relying on any foreign resources. On November 7, 1973, Nixon delivered a speech to the whole nation on the radio, calling for energy independence. “Let us set as our national goal, in the spirit of Apollo, with the determination of the Manhattan Project, that by the end of this decade we will have developed the potential to meet our own energy needs without depending on any foreign energy sources.” [1] In 1974, Nixon further expressed that the goal would be achieved in 6 years. In 1975, President Ford proposed that America would realize its energy independence within 10 years. Since then, several presidents such as Carter and Bush proposed the goal of energy independence. But in fact, oil imports in the United States are rising, and crude oil imports rose from 1.32 million barrels in 1970 to nearly 9 million barrels in the 1990s.

Since the beginning of the 21st century, with the increase of international energy demand and rising oil prices, especially after the September 11 attacks, the link between oil and terrorism has been exaggerated, and the domestic concern over energy independence has rapidly risen in the United States. The coverage of the term “energy independence” in the Factiva news database soared from 449 in 2000 to 1118 in 2001 and 8069 in 2006 [2]. In 2012, there were 156 million searches for the term “US Energy Independent” at Google [3]. In addition to government officials and parliamentarians, some organizations like green peace organization also actively advocated energy independence. One organization named Apollo Alliance (representing labor unions, environmentalists, and other leftists) claims that one of its goals is to achieve sustainable US energy independence within 10 years. *Winning Our Energy Independence: An Energy Insider Shows How*, written by David Freeman, and *Free from Oil: How the Next President Can End the United States' Oil Addiction*, written by David Sandalow, became popular hits.

During George W. Bush's administration, he repeatedly warned American people to abstain from “oil addiction” and take positive measures to reduce the dependence of American oil on foreign countries. In

January 2006, the Bush administration proposed in *State of the Union Address* and *National Security Report* that American first priority was to reduce dependence on foreign energy, especially oil dependence on the Middle East and set targets for a 75% reduction in oil dependence on Middle East by 2025. In 2007, Bush signed the *Energy Independence and Security Act*, highlighting the fundamental change in the way of utilizing energy and making plans to raise renewable energy production to 36 billion gallons by 2022.

In the United States, energy independence is of a strong political correctness. After the September 11 Attacks, energy independence became a synonym for getting free from the dictatorship of the Middle East, “rogue states” and for fighting against terrorism. Although the purchase or import of oil does not mean financing terrorism, and the reduction of oil consumption cannot avoid or reduce the occurrence of terrorist activities, the association between oil and terrorism inevitably promotes the American complex of energy independence. In 2009, President Obama, who took office under the shadow of the financial crisis, linked the development of new and renewable energy and the reduction of dependence on foreign energy with the recovery of American economy, the growth of domestic employment, the prospect of future industrial competition, and the first chance of commanding heights in future industrial competition. As a result, it made energy independence more attractive to Americans who were eager to shake off the economic crisis.

In the US presidential and parliamentary elections, energy independence plays an important role in winning over voters, since energy independence is very appealing to American people. Since the first oil crisis, almost every presidential candidate took energy independence as one of the keys in the campaign. Energy independence is also an important issue which is easier to reach an agreement for Democratic Party and Public Party in the United States. Both liberals and conservatives are fond of asserting that as long as enough oil and gas and other energy products can be produced in the United States or in Mexico and Canada, they can say goodbye to the turbulent Middle East.

The Democrats and Republicans may have some differences in energy policy, but they have shown considerable consistency on the issue of energy independence. There is a difference between the two parties in how to energy independence or how to reduce the reliance on foreign energy. Republicans strongly advocated the lift of ban on developing offshore oil and gas and the growth of domestic oil production, while

Democratic Party represented by Obama stressed on developing new and renewable energy sources, improving energy efficiency and energy conservation. Mr. Trump has also referred to energy independence many times after taking office, but his focus has returned to the republican position, advocating reducing energy imports by developing rapidly traditional energy industries.



THE ESSENCE OF AMERICAN ENERGY INDEPENDENCE

On energy security, unlike many countries in the world which focus on the reliability and continuity of energy supply, the United States pays more attention to the influence and restriction of energy issue on national security and diplomatic strategy. American goal to get rid of the oil dependence on foreign countries started more generally from avoiding or reducing the blackmail and threat of some resource-rich but hostile countries. Many Americans believe that energy independence contributes to the independence and growth of American economy, strengthening the national security and enhancing the flexibility of the United States to cope with the turmoil in the Middle East.

In essence, what were behind the United States' heated discussions about energy independence was the obvious increase in domestic energy production and the decline in import ratios. Because of technological breakthroughs and high prices, shale gas had a substantial increase in production and can be exported. The increase in output and consumption of biofuel and tight oil have made the United States become a net exporter of refined oil products for the first time, and the US energy import ratio has dropped.

Shale gas development started in the United States, and then it became large scale and commercialized in the late 1970s. From the beginning of this century, technological breakthroughs have led to a sharp increase in shale gas production in the United States from 11 billion cubic meters in 2000 to 137.9 billion cubic meters in 2010, accounting for 23% in the natural gas production [4]. In 2009, the United States surpassed Russia to become the world's largest producer and resource country of natural gas. The US imports of LNG fell by a quarter in 2010 compared

with those in 2006. At the same time, technological breakthroughs have also led to a rapid growth in the production of dense oil in the United States. From 2011 to 2016, US oil production increased sharply from 7.822 million barrels to 12.354 million barrels per day [5].

Following the trend, American energy dependence is expected to keep its decline. Shale gas production is expected to grow nearly fourfold from 2009 to 2035, according to *Energy Outlook 2011*, published by Energy Information Agency [6]. By 2035, America's dependence on imported energy will continuously decline. With a full exploitation and utilization of unconventional natural gas, the consumption import ratio of American gas is predicted to decline to only 6% in 2030. Otherwise, it will reach to 65% [9]. Applying the mining technology of shale gas, the United States also exploited oil, the tight oil, in shale. A report from the National Petroleum Council pointed that the US oil production could reach 2–3 million barrels per day by 2035 if provided with both technology and environment. It can be seen that the development of tight oil in the United States has greatly exceeded people's expectations.

But in reality, the energy independence that Americans advocate is essentially a decline in energy import ratio, rather than energy independence in the real sense. And the notion that America will achieve energy independence is largely an illusion. In addition, the recent increase of energy self-sufficiency rate in the United States is mainly due to the decline in consumption demand caused by economic recession, besides the increase in domestic oil and gas production and the improvement of energy efficiency.

From 2006 to 2009, the US crude oil production increased by 43 million barrels from 6.841 million barrels to 7.271 million barrels per day, while the demand for the same period dropped from 20.687 million barrels to 18.771 million barrels, reaching a decrease of 1.916 million barrels. The oil equivalent of primary energy consumption dropped from 2331.6 to 2205.1 megaton, with a decrease of 126.5 megaton [9]. The financial crisis in 2008 is the major force for the significant drop in American energy demand, especially in oil demand, in addition to other causes like the upgrade of American economy structure, the improvement of fuel efficiency, and increase in the use of biofuel. The economic downturn and rising oil prices have led to a significant drop in overall driving mileage across the country, with a significant reduction in oil and energy consumption per capita. From 2008 to 2009, the US primary energy

consumption decreased by 116.1 megaton of oil equivalent, while oil consumption reduced by 727,000 barrels per day. But with the recovery of economy, the US oil consumption also shows signs of recovery. The US oil consumption rose from 18.49 million barrels to 19.631million barrels per day from 2012 to 2016 [9].

The close tie between the United States and the world's energy market is decided by the economy and the law, which cannot be cut off in a short time. On the one hand, considering the comparative advantage, cost, different quality, and standards, almost none of the countries in the world totally export or import oil. When the United States imports large quantities of crude oil and oil products, it also exports some oil or even crude oil products. For example, refineries in the US Gulf coast of Mexico export some gasoline to Mexico instead of the eastern coast for economic considerations because cheaper European gasoline can be available in the east areas. In addition, about 15.2 million barrels of American crude oil are exported to Canada every year [7]. Even if the United States becomes a net exporter of energy or oil a few years later, it does not mean that America will not import energy from the international market at all, so energy independence in the real sense cannot exist.

On the other hand, there is only one oil market in the world, and the United States cannot be independent from the global oil market. The global oil market is an organic whole, and no country can be immune from the volatility of oil prices and demand. Even with fast-growing tight oil, the United States could eventually become a net exporter of oil, but it does not mean it can achieve complete energy independence. As long as the United States continues to import oil or oil products from other countries, it certainly will be affected by fluctuations of global market, even supply disruptions from Canada or elsewhere in the world. International geopolitical events will still have influence on oil prices, while ordinary consumers in the United States still have to pay for oil price fluctuations caused by such events. Carlos Pascual, the US special envoy for international energy affairs, states that the oil "prices are driven by a global marketplace" and people could not isolate themselves from the global market. Increasing domestic oil and gas production was very important for the sustainable development of the US energy resources. However, "a growing demand from other countries still is going to impact international prices" [8].



ENERGY INDEPENDENCE AS A BEAUTIFUL BUT UNREALISTIC DREAM

With the deepening of economic globalization and global energy integration, the interdependence of economy and energy among countries in the world is also being strengthened day by day, and the energy independence is increasingly inconsistent with the historical trend. Energy independence and self-sufficiency are just quixotic pursuits. Energy independence is unrealistic and impossible to achieve, but it is meaningful, particularly in politics and diplomacy. It can win popular support for increasing domestic energy production and getting out of dependence on the Middle East and the so-called “rogue states.” A deep-rooted concept is that oil dependence, particularly on “rogue states,” is a great challenge to implement security strategy and democratic values of the United States. The oil-exporting countries and importing countries are interdependent, and the true energy security can be achieved as long as every participant understands the significance of such interdependence [9].

Economic development and resource constraints have made many consuming countries increasingly dependent on external energy, and there is no measure to provide economically viable alternatives to imported oil in the short or medium term, while energy-exporting countries cannot get rid of their economic dependence on energy exports for quite some time. John Nett, senior vice president of Business Development and M & A at Norwegian Equinor (originally named Statoil) said that there was no energy independence now, and people must start discussing the interdependence of energy sources. Rex Tillerson, former president of Exxon Mobil Corporation, said that American energy independence was a mistake and zero oil import was infeasible. This goal is worth pursuing but not realistic, according to Fareed Zakaria, the chief editor of *News Week*. Daniel Yergin also expressed that the United States must face the fact that the goal of energy independence had become a curse since its first appearance during the Nixon oil embargo in 1973. It was becoming increasingly unrealistic [10].

No country in the world can truly achieve energy independence, and no country can have all types of energy. According to Chevron's statistics, there are 193 countries and regions around the world, but none of them can achieve energy independence. All countries need foreign exports,

technology, and capital to maintain the development of their own industries. Even the major energy exporters such as Saudi Arabia and Iran cannot achieve energy independence. Iran is a net importer of natural gas and gasoline, with import volume accounting for 40% of the country's total demand. In 2005, Saudi Arabia imported 83,000 barrels of gasoline and other refined oils every day. Both Kuwait and the United Arab Emirates are short of natural gas resources. There are few coal, biofuels, nuclear, and hydroelectric power in the Middle East, while net oil importers such as China and India have abundant coal, hydroelectric and biological energy potential [9].

Energy-exporting countries also cannot achieve energy independence, and "demand security" may be more important to exporters than "supply security" to importing countries. Saudi Arabia's demand for the US import is much greater than that of the United States for Saudi Arabia import. For the United States the energy industry import only accounts for 15% of total imports and 2% of GDP. For Saudi Arabia, the energy industry accounts for 90% of its exports and 45% of GDP. In an emergency, the United States could use natural gas, coal, and nuclear energy as energy. But without oil, Saudi Arabia would have no way of making a living. If America cuts its energy demand by a few percentages, it might not need to import oil from Saudi Arabia. During the oil crisis, American GDP rose by 9% per capita. But in Saudi Arabia, capacity cuts and low prices led to a 42% drop in GDP per capita [11].

Energy independence itself does not guarantee energy security or any other type of security. Energy security is a global problem. The energy security of all countries depends on the stability of the global market. No country can guarantee its own security without the energy security of other countries and regions. No space is left for building any protection wall on this ever smaller planet, because this world is an interdependent organic unity. Considering the issues involved in energy, global carbon dioxide emissions, banking, exchange, free circulation of commodities, human beings, or ideas, if we want to achieve prosperity, we must accept the reality that the world is interdependent [12]. In October 2006, a report of US Foreign Relations Commission noted that the voice advocating energy independence was doing a disservice, because it encouraged to make a series of policies with a low efficiency and side effects. Jack Rubin, director of public relations at the American Natural Gas Association, asserted that energy independence sounded tempting, but the isolationist approach would have a lot of negative impact on energy

prices, consumers, and the US economy. In order to maintain energy security, we should develop clean and low-cost energy in our country while maintaining a fruitful and close trade partnership with global partners [13].

Energy independence cannot help to achieve the goals advocated by politicians that energy independence would make gasoline supply stable and cheap and create a safer world. American oil companies will continue to make its energy trade in the international market. If domestic oil prices are lower than world oil prices, oil companies will export their products. After the development of the North Sea oilfield, the United Kingdom basically achieved energy independence. However, with the deduction of tax, gas price in the United Kingdom is almost the same as that in the United States. In addition, its oil price fluctuates with the fluctuation of world oil price. For the Middle East oil producers, energy independence may help the United States free from giving dollars to them, but emerging countries, such as China and India with a rapid growth of energy consumptions would pay more for oil. It turns out that Americans would no longer purchase oils in the Middle East, but they would pay for non-energy import products from China and India. Then China and India would transfer dollars to the Middle East to buy oils.

Energy is the foundation of modern national infrastructure and economy. Any violations of commercial law for building the national energy system will cause great damage to the national competitiveness [14]. Over the past century, America's energy consumption has grown with economic growth. From 1913 to 2005, when American oil imports increased 300 times, its economic output also increased 300 times [15]. Weakening the world's energy links may reduce the constraints on the US diplomacy but it also means that the United States has weakened its link with the world economy, becoming less interdependent on the world economy. Perhaps this could enhance the security of US energy supplies to some extent, but the risks and threats to American economy and national security are also on the rise.

To some extent, energy independence has become synonymous with the assertion of isolationist foreign policy, which provides political cover for protectionist policies. Using panic as a political tool, along with a continuous crackdown on terrorism, has become one of favorite means of the United States for striving energy independence [16]. In May 2006, Robert Redford, a spokesman for the US Progress Center, said that the United States should totally give up importing oil from Middle East in

order to get rid of the “dictators and tyrants.” In the “new direction” agenda released by the Democratic Party after the November 2006 election, Democrats proposed that energy independence should be achieved within 10 years and they should give energy capital to the central and western regions instead of the Middle East [17]. President Obama has repeatedly asserted that America must reseize the US fate from the hands of dictators and tyrants by ending the long-term dependence on foreign oil [18].

Meanwhile, facing the US dependence on petroleum in the Middle East and the escalating energy independence, more and more analysts are worried that the American strategic retreat from the Middle East and Central Asia would leave troubles to China. In fact, American interest in Middle East energy does not entirely lie in the interest they can obtain from oil imports and energy investments in the Middle East, but in the Gulf region's importance to the world economy. The United States relies less on oil from the Persian Gulf than Europe, Japan, and China, but the supply disruptions of the Gulf region would have negative effects on the global economy, even on the United States, which continuously make the United States committed to implementing reforms in the Middle East just in order to ensure the stability of the energy market supply [19]. More important than the domestic oil industry in the United States is the world's economic health, which is largely related to the Saudi Arabia's capacity of sustainable large-scale oil production. If the flow of oil in Saudi Arabia is stagnated because a military coup aims to expel the royal family, the world's economy will fall into chaos [20]. We need to continue our diplomatic cooperation with key producers such as Saudi Arabia, because they will continue to affect the international market even as our domestic supplies grow. In fact, the situation in the Middle East affects not only the stability of the international energy market and the economic interests of the United States but also the diplomatic and security interests of the United States. Even if America does not import oil from the Middle East, it cannot sever its contacts with the countries in the Middle East and ignore turmoil and sit by.

For China, we can learn some experience and gain some inspiration from dropping of the US energy import rate. We should accelerate the development of clean energy and make full use of unconventional oil and gas resources like shale gas. However, it should be seen that Chinese economic demand is still on the rise, different from the American situation that the US economy has reduced its dependence on energy and the

demand growth has slowed down or declined after entering the postindustrial society. Therefore, following market and economic regulation, balancing cost and benefit, and protecting environment, China can fully explore the potential of various domestic energy resources. But it is not appropriate to aim at unrealistic energy independence or decline of import ratio. In line with the trend, China should strengthen its energy and economy interdependence with the countries concerned and enhance multilateral and international energy dialog and cooperation in search for common security.



THE DEEPENING OF INTERNATIONAL ENERGY INTERDEPENDENCE

With the development of economic globalization and global energy integration, the interdependence of economy and energy among countries in the world is being intensified gradually, making it increasingly unlikely to achieve energy independence. At the same time, the energy interdependence of all countries and the increase of common energy interests make it feasible for the international community to popularize the concept of energy security and establish a global energy security system through global energy security dialogs and cooperation.

Compared with the two oil crises, the current international energy supply has improved greatly. It is less likely for exporting countries to implement oil embargo and initiatively cut off supply, and the impact of high oil prices on the world economy has also diminished significantly. However, regional imbalance of energy supply and demand has been further aggravated, energy environmental problems become increasingly exacerbated, and the geopolitical conflicts and frictions have increased. All these problems make energy security more complicated and tough, causing an urgency to strengthen the dialog and cooperation on global energy security.

The driving force of energy interdependence is the development of global energy (especially oil) market integration. Since the mid and late 1980s, the world oil market has gradually become diversified. Not only has the number of producing countries increased by a large margin, from over 20 in the 1950s and 1960s of the 20th century to more than 50 at present but also the number of oil and gas importing countries is

increasing. In addition, the number of participating enterprises has also increased dramatically. At present, in the field of exploration and development, there are many independent small- and medium-sized oil enterprises besides international oil companies and oil-producing state-owned oil companies. If oil trading companies and oil refining companies are also taken into account, oil-market participants could be countless. With the diversification of the participating structure, the world oil market has gradually changed from monopoly to competitive. At the same time, the oil spot market, the quasi-spot market, and the futures market have developed rapidly. The trade pattern between oil supply and demand has gradually become market-oriented. With the worldwide development of supply–demand balance and value comparison on quantity and price of oil trade, the steps of the integration of global oil market has greatly quickened. Moreover, the mutual penetration and interdependence between producing and consuming countries have so greatly intensified, and the factors affecting the market and oil prices have so significantly diversified that neither party could unilaterally control the market and oil prices for a long time.

The gradual globalization of state-owned energy companies has further promoted the interdependence of producers and consumers. In recent years, the traditional state-owned oil companies have also followed an international trend in their operations, and quite a number of them are shifting towards multinational oil companies. In addition to Statoil ASA (Norway's national oil company), Petrobras (Brazil's oil company), Saudi Aramco (Saudi Arabia's national oil company), and Petronas (Malaysia's national oil company), state-owned oil companies in China, Russia, and Algeria are also developing towards internationalization. The internationalization of state-owned oil companies not only changes the relationship between multinational oil companies and state-owned oil companies but also deepens the interdependence of oil producers and consumers. John Knight, senior Vice President of business development and M & A at Statoil ASA, said there was no energy independence now, and we must start discussing the energy interdependence [21].

In history, the contradiction between consumers and resource countries was the principal contradiction in the field of international energy security. However, since the mid-late 1980s, as the resource countries have been gradually opening up to the outside world, the contradictions between the two sides have been greatly weakened, but interdependent

relationships strengthened. In the meantime, as the commodity attribute of oil becomes more and more prominent, the intervention of political factors to international markets has also weakened and the possibility of the use of petroleum weapons in Arab countries has greatly reduced. Since the 1990s, many countries like Iraq and Iran have proposed using “oil weapons” to fight against their “enemy,” but in vain. The US Embargo on Libya, Iran, and other countries made oil companies in France, Italy, and Spain grasp the opportunity. In peacetime, the contention between consumers and suppliers, in fact, is a scramble for oil profits and oil markets. The aim is to get higher profits by selling more products, rather than restricting the oil consumption of other countries. When the competition is more and more fierce, investment will be made more global and the international market supply will become more adequate.

The development of economic globalization and energy market integration has made different countries become a community with a common future. For example, in Northeast Asia, when energy crises occurred, it was difficult for any country to be immune from it. Although Japan, with more than 160 days of oil reserves, can guarantee domestic energy supply, its economy would inevitably suffer from economic fluctuation or economic dislocation of other Northeast Asian countries troubled by the lack of energy supply. The United States and China, the two largest energy consumers in the world, have many common interests, and both of them desire a stable and reliable energy supply. These two countries are deepening their interdependence in many fields such as trade and investment. If China’s energy shortage led to an economic recession, it would also cast a shadow over the growth of the United States and the global economy.

Economic development and resource constraints have led to the increase of dependence on foreign energy in many consuming countries, and currently there is no measure to provide economic and practical alternatives to replace imported oil in the short term or medium term. Although the energy-exporting countries are vigorously developing non-petroleum economy, their national economy cannot get rid of their dependence on energy export for quite some time. At the same time, the links between energy and economy between different consumer countries as well as different exporting countries are increasingly tightened. All energy consuming and exporting countries are inevitably mutually constrained and interdependent in the energy market.



GLOBALIZATION OF ENERGY SECURITY

Before the first oil crisis, the issue of energy security was not prominent. It only appeared in a few countries and in wartime. The explosion of oil crisis expanded the scope of energy security problem but was mainly confined to western developed countries. In recent years, with the expansion of energy consumption groups and supply groups and the increasing internationalization of the world energy industry, energy security has obviously become more globalized issue. Meanwhile, energy security has gradually shifted from country security and group cooperation to global dialog and cooperation on energy security.

Generally speaking, the problem of energy security can be traced back to the period of World War I. In order to guarantee oil supply in wartime, Churchill, who was the minister of the Navy, established the Royal Petroleum Supply Commission with the support of the British Government. During the war, the Britain-led Allies imposed trade embargoes including oil embargo on the Central Powers, and the German navy continued to attack oil tankers bound for the Allies. In the early stage of the war, the United States supplied oil to both sides. After the United States entered the war in 1917, massive oil supply was provided to the Allies, playing an important role in the final victory of the Allies. During the Second World War, oil supplies played a more important role in the progress of the war. Both warring parties treated it as a part of their supreme strategy that they should maintain and expand their own sources of oil supply, and restrict, cut off, destroy, or occupy the source of oil supply of the enemy side at the same time. During the war, many of the major battles launched by the two sides, such as Japan's seizure of Indonesia, the German attack on Volgograd in July 1942 (Stalingrad at present), and the allied massive aerial bombardment on Ploiesti of Romania, are all oil-related [22].

During the war, the United States, the Soviet Union, Britain, France, and other allied countries had overwhelming advantages over the Axis like Germany, Italy, and Japan in controlling oil resources, transportation, and the access to the world's oil resources, which, to a great extent, accelerated the failure of Axis countries. In the two world wars, energy security was more implicitly embodied in military security. The issue of energy security, which was aimed to ensure economic development and centered on a steady supply of energy, came after the first oil crisis. After

World War II, the rapid recovery and development of the global economy greatly increased the dependence of western countries on oil, especially on Middle East oil. In October 1973, the fourth Arab–Israeli war broke out. In order to strike Israel, the Arab oil-producing countries imposed a petroleum embargo on the pro-Israel western countries, so that the international oil prices increased more than two times, triggering a real energy and economic crises in the western countries. The first oil crisis has inflicted a lot on the western countries and has made western countries pay unprecedented attentions to energy security. All countries started to reinforce their domestic energy demand management, to promote energy conservation and energy efficiency, as well as to reduce energy consumption. Meanwhile, they also strengthened coordination among countries and adopted political and diplomatic measures to construct energy security system. The core achievement of all countries is the establishment of energy security cooperation mechanism centering on International Energy Agency (IEA).

In November 1974, under the initiative of the United States, 16 industrialized western countries signed an international energy plan to coordinate energy policy and established the IEA. The main task of the IEA is to address the disruption of oil supply through collective coordination among developed countries, whose core is to build and jointly use strategic oil reserves. The IEA has asked member states to build strategic oil reserves that can be effectively controlled by their governments in order to share oil reserves in “emergency situations” so that all countries are able to obtain minimum oil supply. For decades, this emergency coordination mechanism has been implemented three times. The first was on January 17, 1991, when the Gulf War broke out. All 21 IEA member countries, together with Iceland and Finland, decided to invest 2 million barrels of strategic oil reserves on the market every day and at the same time imposed consumption restrictions to cut off 0.5 million barrels per day. As a result, oil prices dropped from \$32 per barrel to \$21 per barrel in 2 days. The second time was in August 2005. Hurricane Katrina disrupted the oil production in Gulf of Mexico, so that the international oil price sharply soared. The IEA immediately launched the emergency mechanism to release strategic oil reserves, reducing the international oil prices. The third time was in 2011. Because Libya and other countries cut off their oil supplies, the productions of crude oil continuously declined, which was a threat to global economy recovery. The IEA made a release of 60 million barrels of oil reserves on June.

As far as effect is concerned, the emergency response mechanism of the IEA was very successful, which provided a more favorable guarantee of energy security for western developed countries. However, it has two historical limitations. The first one is the small scope. The scope of security cooperation is basically limited to the developed countries. Second one is its exclusiveness, as this emergency response mechanism called on member countries to join together against OPEC. Moreover, as a result, the source diversification strategy adopted by the western countries to reduce their dependence on oil-producing countries in the Middle East has reduced the risk of energy security in western countries, but to some extent it ignored the demand security of the oil-exporting countries and restrained the improvement of oil production capacity. As a consequence, although the international energy market witnessed a sharp increase in demand at the beginning of the 21st century, the surplus capacity dropped sharply. With the structural unbalance of supply and demand and large increase in oil price, the problem of energy security in western countries was highlighted again.

Considering energy-exporting countries, energy security cooperation has been carried out based on OPEC for a long time. Its core task is to strengthen the solidarity of exporting countries to safeguard their oil interests. Since 1960, OPEC has repeatedly adjusted its policies and unified actions, successfully grasped the initiative of international market and oil price after the first oil crisis. But the energy cooperation based on OPEC also has its limitations and exclusivity. It is such an exclusive and antagonistic energy policy that brings not only a series of success to OPEC but also a series of lagging chain reactions. After two oil crises, western countries cut energy consumption and launched market diversification strategy, making OPEC's control over the market fell greatly with the change of international market structure and the falling oil price in the 1980s.

In the mid and late 1980s, with the globalization of economy and the development of international energy market integration, the contradiction between consuming countries and exporting countries had weakened greatly, and interdependence had been deepened gradually. In addition, the participants of the international energy market are increasingly diversified, and the connotation and denotation of energy security were also constantly expanding. Therefore, the issue of energy security covered a wider range, and cooperation in energy security was also promoted. In

particular, in order to maintain the stability of the international market, the cooperation between the consumer countries represented by the Organization for Economic Cooperation and Development and the exporting countries represented by OPEC was enhanced significantly. In 1991, France and Venezuela invited the energy producers and consumers concerned to hold the first International Energy Conference in Paris to promote dialog and cooperation between them. The International Energy Conference was renamed International Energy Forum in 2000.

Since the 1990s, OPEC has voluntarily established a “mutual security mechanism” with the IEA. In *Declaration of Caracas* issued at the 40th Anniversary of OPEC in September 2000, OPEC illustrates the significance of seeking for dialog and cooperation with other oil-producing and consuming countries to ensure that crude oil was put to world markets with fair and reasonable oil prices. Meanwhile, the energy dialog and cooperation between OPEC and non-OPEC countries, between different energy consuming countries, consuming countries, and exporting countries as well as transit countries have also been strengthened. *European Energy Charter* has gradually evolved into the World Energy Charter Organization, expanding the partners of cooperation and dialog. Since the first summit in 1975, energy has been treated as an important issue in the relations of the participating countries of by the Group of Seven. International organizations, like the United Nations, have also increasingly focused on energy dialog, and they put energy issues on the agenda from time to time.

In recent years, the growth of energy demand and the deterioration of the global environment have made energy security cooperation further beyond the boundaries of consuming countries and exporting countries, but extended to the whole world, putting global energy security and cooperation on the agenda. Bilateral or multilateral energy security dialogs and cooperation between China, America, Japan, Russia, India, OPEC, and other energy consuming and exporting countries and organizations have also achieved a mixed progress. Energy has also become an important topic discussed by the G20 leaders. As a policy platform that brings together the core countries in the global energy field, the G20 is expected to become the most influential and promising global energy governance leadership mechanism in the future. Over time, the global energy security dialog and cooperation will cover a wider range and become strengthened than before.



THE ARTIFICIAL CONTROL OVER PRICES TO BE DEFEATED BY MARKET FORCE

All the time, the belief that oil is too important to be allowed to be regulated by market has long been widespread in all countries and all walks of life, which largely determines or affects the energy decisions of many countries. However, the law of supply and demand still plays a role in the oil market. Especially since the 1990s, with the deepening of the marketization of international oil, the role of the law of supply and demand may have become more effective than ever. The market appeared to be slow and inefficient, when oil information transferred slowly, and government allocated supply, decided demand, and attempted to price oil, but the law still worked. For example, from 1973 to 1974, when Arabic countries implemented oil embargo, the market behaviors were still very rational. The United States had taken measures to control oil price and allocated supplies. As a result, oil prices were lower than market levels, which stimulated demand and at the same time the quotation system restrained supply, making oil become unavailable to common consumers at market price. This was caused by Washington rather than OPEC [23].

It turns out that the power of market overcame the artificial control of oil prices. Oil price panic caused by oil embargo reduced demand for oil products in the United States from 1974 to 1975, but in the next 3 years, demand was rising annually and ended at a 9% above its level in the same period of 1973. The reason is that, through government regulation, the prices of domestic crude oil and several special products remained at a relatively low level, which was precisely what was predicted by the law of supply and demand, running counter to the goal that the US policy required. The United States once chose to implement an import quotation system, but this policy, originally implemented by the Eisenhower administration, caused American consumers to pay more than \$5 billion to buy oil [24].

Bob Tipi questioned why politicians, journalists, and even representatives of the oil industry claimed that the economy was not constrained by the economy and why the regulation of market force was capricious in the past on the most important commodity? Why does the supply and demand and price of oil seem to run the opposite directions from time to time? The answer comes in part from the size and complexity of the global oil market and others from international political manipulation,

which often plays a role in oil-making decisions, such as reserves and OPEC meetings. For nonprofessional market watchers, all this seems to be quite different from rational market behaviors but for observers who are familiar with the intrigue of ignorant politicians, the futures market looks like to be illegally manipulated. He stressed that the lesson we could learn from during the 1970s and 1980s was that any assumption that the oil market would not obey the law of supply and demand would eventually be proven wrong. Because the data cannot be synchronized with the market, because politicians' performance draws people's attention away from the market mechanism, or because the government has set up camouflages as price control or consumer restrictions, sometimes oil does get out of the economic law [25].

In general, OPEC has played an important role in the international oil market by virtue of its member countries' huge advantage in oil reserves and price, and the adjustment of OPEC policy is still an important factor to affect the price trend. However, with the major adjustment of the international market structure, OPEC's status is not the same as its heyday. The market participation structure is increasingly diversified, and the futures market is improving day by day. What's more, the oil price decision mechanism is more and more related to the expectation of financial market. Similarly, the role of "natural gas OPEC" will further enhance with the increasing importance of natural gas and the integration of the global natural gas market in the period ahead, but it is difficult for the OPEC to reach its high level of in the past due to changes in historical and market conditions. In other areas, such as food and minerals, it is more difficult to establish international organizations like OPEC. Although it is not sure whether some countries could come up with a similar propose on a certain area in the future, the model of OPEC cannot be replicated. In other words, even if a monopolistic organization has a significant political and economic impact in a short period of time, it would follow OPEC and ultimately give way to market forces.



THE LOSS OF OIL WEAPONS FOR OIL-PRODUCING COUNTRIES

The oil embargo in 1973 shocked the world, but it resulted from special international and historical environment and contingency. In

addition to such factors as the hegemony between the United States and the Soviet Union, the solidarity of Arab world, the support from Saudi Arabia as the largest oil producer, and so on, the substantial growth of the US oil demand and the deepening dependence on oil imports from the Middle East also played an important role in oil embargo. However, after the oil crisis these factors were changed to various extents.

Most importantly, the function oil as weapons for oil-producing countries is becoming more and more limited with the increasing integration of oil market and deepening of energy interdependence among countries. Since the 1980s, the international petroleum market has been optimized, increasingly globalized. As the growing integration of oil market and the financial market, both producers and consumers are eager to see a stable and well-functioning international oil market. Ahaji, an energy economist, pointed out that the current global energy market was a unity. It is impossible for any oil-banning campaign in the future to achieve its political goals. Any attempt to repeat the oil embargo in 1973 would backfire [26].

America and other energy consuming countries have greatly enhanced their ability to resist risks. Since the oil embargo in 1973, all countries have made various preparations for the oil shortage. Many countries such as the United States have set up strategic petroleum reserves (SPR) and improved the emergency response mechanism. The IEA has asked 28 member countries to store a sufficient quantity of oil in the forms of shares of multinational oil companies or strategic oil reserves to withstand 90 days of oil import disruptions. Currently, the IEA has a total of about 1.6 billion barrels of oil reserves, with only the United States nearly 700 million barrels. The United States strongly supports the economic development of the gulf countries like Saudi Arabia, which has boosted the return of oil dollars, increased exports to the Middle East, and reduced the economic dependence of Middle Eastern countries like Saudi Arabia on the economy of the United States. After more than 40 years of hard work, OPEC member countries have become increasingly mature and they have realized that oil weapons cannot solve their conflicts with Israel at all. Ultimately, to solve this problem, they may depend more on political means and the joint efforts of the international community. The international context is quite different from that in 1973. Apart from individual countries, OPEC has been cautious over the phrase "oil weapons." After the oil crisis, Saudi Arabia has gradually shouldered the responsibility of maintaining the stability of the international oil market.

Since the 1990s, Iraq, Iran, and other countries have proposed using “oil weapons” against their “enemy” but in vain.

Chen Weidong once wrote that the oil embargo did severely hit the economy of western countries at the outset, but the economy of the oil-exporting countries were affected fatally soon. Because exporting countries’ economy is excessively dependent on oil exports, the countries that were sanctioned are their primary buyers. For the vast majority of oil exporters, without oil exports, there is no financial revenue and national development. On the one hand, the oil embargo increased the production and living costs of oil-consuming countries. On the other hand, the high oil price stimulated oil investment and increased the controllable oil reserves and output. It is the oil embargo that contributed to the development of the offshore oil industry. Offshore oil industry, which was insignificant in the past, has produced 40% oil in the world.

As for the international community’s considerable concern that Iran could blockade gulf oil transport corridors, David Pomfrey, the US former Energy Secretary Assistant, comments that the blockade of the offshore oil pipe line is an action that Iran may take, but if Iran really took this action, it meant the oil battle were to take place at the last moment. Iran’s navy is not forceful enough to fight against the combined forces deployed by the United States and other countries in the Gulf region. Therefore, Iran would not blockade the oil pipelines if there is any room for negotiation. He also stresses that if oil and military power are not combined, the role of its political tools would be extremely limited, so he does not think geopolitics would be defined by oil in the current world, as control over oil is not the fundamental rule in the world [27].

In the past, oil-exporting countries could not fundamentally solve their problems by using oil weapons, and now it becomes harder to achieve their goals. As the commodity attribute of petroleum becomes increasingly prominent, intervention of political factors in international market has been weakened, which greatly reduces the possibility and effect of using oil weapons. Considering the differences of economic structure, development level, and overall strength, for a considerable period of time in the future, it is less likely that the energy-exporting countries will impose embargoes or use energy weapons to fight against the entire importing countries. However, in some areas, and between countries with great strength disparity, such as between large energy exporters and small importers, this could happen occasionally.

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