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■研究ノート

The New Energy Strategy of China: Comparison between World Energy China Outlook 2013-2014 and 2014-2015

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Abstract: World Energy China Outlook is an independent annual result, done and released independently, what issues in the report is calculated, analyzed, and included based on the best understanding and availability of sources. This kind of research report reflects an insight, findings and methodology along with the database and a unique preview of world energy trends through comparing China with the rest of the world. This paper is aiming at comparing the Chinese energy strategies in the documents of World Energy China Outlook (2013-2014) and World Energy China Outlook (2014-2015), we focus on the “new”, the difference, of the energy strategy to illustrate the change of Chinese energy strategy, especially after the proposing of the Belt and Road Initiative, and economic integration of Eurasia. With the comparison of two documents, the optimization of energy structure in 2020 and the meaning and challenges to China's economic and social sustainable development will impact on development and transformation of China's energy policy. The transformation from energy supply to energy services means that not only to pay attention to the demands of economic development, but also the functions of energy service, at which makes fundamental transitions on energy system, management concept and energy management in the future.

Key words: Resource Policy, Energy Strategy, China

Ⅰ. Introduction

The Belt and Road Initiative was first proposed by Chinese President Xi Jinping, which contains the international cooperation at energy and transportation. The implementation of the Silk Road is among the most large-scale international projects and has the potential to become an inexhaustible resource for economic development and political stability for many countries. The energy cooperation in the Belt and Road Initiative is the most important project. China imports 66% crude oil and 86% natural gas from the countries of the Belt and Road Initiative.[1)] With the report of Rethink Institute Washington DC, the Belt and Road Initiative is creating a regional energy market and improving trade and transport routes.[2)] It is necessary to generate and attract new initiatives and ideas in order to obtain proactive positions in a competitive environment of a complete use of capabilities and potential of the Silk Road. It is essential to avoid confrontation with other participants of the project and, on the contrary, to enrich the common idea with new components.

This paper is aiming at comparing the Chinese energy strategies in the documents of World Energy China Outlook (2013-2014) and World Energy China Outlook (2014-2015), we focus on the “new”,

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the difference, of the energy strategy to illustrate the changes of Chinese energy strategy, especially after the proposing of the Belt and Road Initiative, and economic integration of Eurasia. With the comparison of two documents, the optimization of energy structure in 2020 and the meaning and challenges to China's sustainable development at economy and society will impact on development and transformation of China's energy policy. In accordance with the latter, energy policy on energy supply and demand and market influence by 2020, China's energy development was described more comprehensive and clearer. With the proposing of the policy, new normal, it will push forward the new industrialization and urbanization, even the national plan of the 13th five-year. The concept of "new ecological energy strategy" emphasized the expectations and tendencies of China's energy development before 2030 and the new understanding on the concept of energy development. Energy supplies and services should be benefit to all walks of people and all of the areas. The transformation from energy supply to energy services means that not only to pay attention to the demands of economic development, but also the functions of energy service, at which makes fundamental transitions on energy system, management concept and energy management in the future.

Ⅱ. The Energy Situation of China

China is now the second largest energy user in the world. It depends on the Malacca Strait for 85% of its imports, including 80% of its energy imports.[3)] Beijing has primarily provided financial assistance to the littoral countries. Being on the alert for any minimization of its regional influence and power, China was disposed to involve greater India and Japan in security and went as far as to Japan's suggestions of making security patrols. The Middle East, as the largest oil-producing region in the world, supplies the demand for oil all over the world, and now the proportion is more than 40%.[4)] Meanwhile, the storage capacity of natural gas in the Middle East is 5,682 million cubic meters, and with the development of the world's industry, more and more countries are realizing that natural gas is a cleaner form of energy. For China, it is the same as the rest of the world, with the importing of oil and natural at 66% and 86%.[5)]

In accordance with the situation of China's energy, some researchers have focused on elaborating countermeasures to solve the energy security problem. [6)] However, if researchers only identify the questions without searching for the reasons, it will lead us to fall. Many people have said that the best method to solve the energy security problem is to deepen energy innovation, heighten energy use efficiency, attend to the international energy stock, and build up a steady international oil supply. These are the necessary conditions for safeguarding energy security, according to researchers. Every country should develop ways of transporting oil, strengthening the ability to control energy transportation, and meanwhile, quickening the oil reserve construction; these are some of the important methods that can be used to ensure oil security. Cooperation among countries by means of conferences, built to enhance military defense and to protect countries' overseas interests, is also a necessary measure to ensure the nation's energy safety, in which multiply energy structures will be the ultimate solution to energy safety. Finally, multilateral security cooperation is necessary for

the East Asian countries. [7)]

However, the consequences of such a production-intensive and coal-reliant economy are dramatic and stark. Pollutants from coal-fired plants, whether sulfur dioxide (SO2) or PM 2.5, are choking the urban China. Repeated occurrences of "airpocalypse" have become emblematic of the considerable downsides of a coal- based economy.[8)] More than a decade into China's industrialization, the environmental and potential public health costs are no longer an abstraction but a grim reality, and these problems are becoming a social problem.

In the past decade, China has increased its energy production and has expanded its production of renewable and nuclear energy. The National Bureau of Statistics reported that the use of hydro, wind, solar, and nuclear power increased to 9.5 percent of total energy use in 2008. Meanwhile, some reports indicate that plans are underway to increase the share of renewable energy to 15 percent by 2020. [9)] Hydropower increased from one percent of China's total energy consumption in 1949 to 7.4 percent in 2008; in that year, China's hydropower capacity had reached 170 million kw, making China the largest hydropower-consuming country in the world. China's wind-energy production has doubled every year in the past three years; its current capacity of 12.21 million kw ranks the fourth in the world. [10)] In 2008, the solar energy sector produced about 6,000 tons of polycrystalline silicon and 2 million kw of solar photovoltaic cells, while the nuclear power sector's installed capacity was 8.85 million kw. [11)]

Even China had taken some measures to multiply its oil sources and to decrease its dependence on oil imports from the Middle East; no one can deny that the Middle East is the energy center of the world and still produces large proportions of the energy share. This situation will lasts for a long time, not for only China but for other countries in the world. Oil is an important energy for industry and even for people's daily lives. During this period, Middle East will continue to play an important role in the global community.

The central aim of Chinese foreign policy continues to be the maintenance of a stable international system. China may be competing for energy resources with other countries, but this competition is unlikely to lead to direct confrontation. Similarly, energy security concerns have not led China to drastically increase its defense expenditure. Economic factors triggered by China's capitalist transition will continue to deepen the country's energy import dependence, thereby increasing the prominence of energy security in Chinese policy-making. The successful protection of energy security will, in turn, depend, in large part, on whether China can manage its geopolitical environment and avoid confrontation over energy resources. It will also hinge on whether China's energy production and distribution system can be reformed to avoid ecological degradation and disaster.

Ⅲ. The Outline of World Energy China Outlook (WECO)

World Energy Outlook is a report by the form of book is published by Xiaojie Xu, who led energy team of Institute of World Economics and Politics (IWEP) at Chinese Academy of Social Sciences (CASS) and it is an independent annual result, done and released independently. The issues in the

report is calculated, analyzed, and included based on the best understanding and availability of sources. This kind of research report reflects an insight, findings and methodology along with the database and a unique preview of world energy trends through comparing China with the rest of the world. [12] Not necessarily completed the findings, recommendations and data are rather than official ones.

In this part, we take two documents of World Energy China Outlook to compare and analyze. We are trying to get the differences between these documents, and find out the reasons of the changes.

Ⅲ.1 World Energy China Outlook (2013-2014)

World Energy China Outlook (2013-2014) is a style of research that emphasizes policy and its role in energy developments, especially, population, economics, market competition and technology innovation. Although China's current energy strategy, policies and regulations are seemingly completed, therefore, the existing policy as a whole covers all aspects of the energy sector and its externalities in general and prioritizes security of supply, production at home and abroad, energy savings, structural change, green and low carbon growth, and technological and systematic innovation, however, such policies fail to satisfy ecological and human expectations because of a fact that they are designed to serve the state interests, economic output and domestic priorities.

This report can be divided into two parts (eight chapters) roughly, energy development in China and repercussions on the world and special study on energy security. In the part of energy development in China and repercussions on the world, the chapter one introduce the global energy trends and the impacts from China and the U.S to the world, especially the 'Energy Dependency' of China and the 'Energy Independency' of the U.S. [13] China had realized the problem of energy dependency, such as, the economic development heavily dependent on the growth on energy supply and energy consumption, the energy development dependent on the consumption of coal, and the gap between domestic energy supply and consumption. [14] It is obvious that the shift of supply is not limited to one as a matter of fact. New energy sources of supply had reshaped the landscape of energy production in the past years, multiple sources from multiple supplying centers gain polycentric momentums of developments in the energy world.

Neo-energy revolution is resulted from the review of changes in energy mix starting from the Industrial Revolution in 1870s, which is near to the daily life. [15] China is to restructure its current energy strategy, policy and management system under its new leadership, launching a new round of industrialization, urbanization, informationization and agricultural modernization with wider and deeper implications and in keeping with global trends and realities. Natural gas in China will step into its Golden Age in the years after 2020, especially in the period of 2025 through 2035 featured by rapid increase in output, sound policy in place and public interests secured. [16] Renewable energy is taking a bigger in the energy mix in developed world. In China, state policy took over market orientation to propel new renewable energy, especially solar panel and wind farms, to grow. Solar energy, currently under restructuring, was over invested and expanded being short of domestic consumption backup.

With the higher energy consumption, China will be in a higher position leading the world energy growth, both in demand and supply at large. Eco-friendly Energy Strategy (EES) is envisaged to optimize energy mix by reducing coal consumption, stabilize oil demand, accelerate developments of natural gas and renewable energy sources and stimulate energy saving and efficiency sector to serve public interests. [17] The EES is envisaged to conduct readjustment, reform and enhancement in policy innovation campaign in order to reduce high CO2 emission, mitigate environmental concerns and social costs, and coordinate with the rest of the world. A greater impact on the world energy industry, world economy, and geopolitics will be widely felt onward in the course of its new four drives. It is a fact that different types of energy mix lead to different impacts of carbon emission on the eco-system and global warming. Energy demand is subject to demographic evolution and economic growth in the past but will be curbed through energy saving and energy efficiency partially today, plus new economic pattern and innovative management system being effective.

According the outlook, China's foreign energy dependency will increase to 11 percent in 2015 and 26 percent in 2020 from current 9 percent, but become stabilized thereafter and possibly decline to 15 percent in 2035. Foreign oil dependency will increase to 60 percent in 2015, 65 percent in 2030 and 68 percent in 2035 from the 55 percent in 2011 while foreign natural gas dependency will be 35 percent in 2015, 40 percent in 2020 before declining to 24 percent in 2035. [18] However, these dependencies resulted from looming bigger gaps between demand and supply will push the country to enlarge its oil and gas imports globally. Neighboring oil and gas imports will be emphasized as its cross border trunk lines and related facilities were built when pursuing its diversification of energy sources from abroad. Energy trade and investments will be globally expanded, both bilaterally and multilaterally.

In this report, it predicts that non-fossil fuel energy demand in China will increase up to 15 percent in 2020 and 24.5 percent (higher than that of oil) in 2035. Hydro-energy will be stable while nuclear energy will resume its fast track under stricter regulations and safety circumstances. Notably, new renewables (solar, wind and bio-energy combined) will gain their fastest growth momentum above 100 percent, as their current capacity at home remains small in its entirety. Evidently, energy policies for these sources have to be soundly designed and balanced to deal with market force and the state hands. Eventually, home consumption and market competition have to be fostered to lead these energy developments under the guidance of a sound policy. Consequently, market potential and growth can be tapped and stimulated.

Ⅲ.2 World Energy China Outlook (2014-2015)

WECO 2014-2015, Focus on energy transition and policy options require for eco-civilization construction including tackling climate change, and prioritize energy trends and challenges around 2020 and impacts on well-off society as planned and the entire world. [19] Energy development serves but not limited to economic growth. Energy development means not only sizable spending and supplies, enhanced employment and profit and tax resulted, but energy services featured by diverse and flexible and efficiency utilization of all types of energy sources for the mankind. Energy

development is not only the business of the industry, but also interests of the state and the public, not only a matter of a country, but the entire world. Therefore, multilateral and trans-regional and cross border cooperation is required. Energy demand continues to grow upward into 2020 and will level off thereafter. [20] Energy demand and supply will continue to grow at 3.79 percent driven by economic growth. However, both slow down to 1-2 percent thereafter. Energy demand could be 3373 million tons while energy supply could reach 2855 million tons by 2020. Meanwhile, energy mix will be reshaped obviously that is critical to the country in the next 5 years to come, the 13th Five-Year Plan. [21]

Coal demand witness near-zero growth in 2014 and will be upward steadily until 2020 when reaching peak plateau (below 2000 million tons). The peak plateau could be lower if new policy could fully implemented and expanded. Coal demand share will reduce from 65% in 2014 down below 50% in 2030, remaining the King of energy mix in China. [22] With the policy were taken in 2014, near-zero emission is possible. Because the higher coal consumption, clean coal is the future of choice. Clean coal is very important for China in the process of energy optimization and the Strategy, diminishing burning coal and inefficient coal turbines, also emphasize sustainable development through innovations. Nuclear electricity generation will be 867 TWh based on 112 GW installed capacity, accordingly, both shares in energy mix will be 8% and 4.35% in 2030.[23] Lower than some expected because of conservative view of nuclear sector and its constraints in industrial chains, HR and public acceptance. Acceptable size and growth rate are critical to nuclear policymaking moving forward. China is a lower nuclear power user with big potential to expanded. The next decade will be seen a rapid growth of nuclear electricity generation averaged at 12.8% from 2013 to 2030. [24] Modern renewables will be witnessing rapid growth while hydro power increases steadily. Non-fossil fuels including nuclear, geo-thermal and bio-fuels will surpass oil in energy mix (16%) in 2020. However, renewables encountered uncertainties. Besides higher costs utilization hours, not to mention management of wind and solar PV are distinguished from thermal powers. CSP and bio-energy are less developed. There exist wastes in wind, solar PV, even hydro sources being subject to policy innovation and marketization.

The document of 2014-2015 emphasizes systematic, holistic and synergetic approaches, and new policy scenario in the outlook period (2011-2030) like the IEA does in its WEO. However, new policy scenario is our current case, not central. This report does not follow IEA like current policy case and 450 case, instead, developing eco-energy strategy scenario based on the best understanding of eco-civilization drive after the 18th CPC, which featured by environmental counter-pressures. Climate commitments are included. A series of new and intensive policies, planning, regulations and plans for actions combined were released in the second half 2013 and throughout 2014, in a larger number than ever. Most of these new policies are subject to unavoidable and growing environmental concerns. It requires that shift to cleaner energy mix by reducing dependency on coal, enhance savings and efficiency and reducing emission through recycling, high-tech, policy incentives while developing new sources and re-focus energy products as commodities through reform attempts and enhance public interests.

Ⅳ. The Differences between these two documents

We had introduced the two documents of World Energy China Outlook briefly. Even though both of documents are trying to describe the Chinese energy to the world, China's energy development trend and the influence, of which is the basic nature and purpose of this project. However, because of the difference of year, there are still many differences between them.

First of all, World Energy China Outlook (2014-2015) was more focused on the optimization of energy structure in 2020 and the meaning and challenges to China's economic and social sustainable development, such as, the impacts on the thirteenth five-year national economic and social development plan. Especially, the optimization of energy structure around 2020 will impact on development and transformation of China's energy policy, and the challenges in the energy issues and policy deficits with the construction of a well-off society.

In accordance with the domestic and international environment for energy development, energy policy on energy supply and demand and market influence by 2020, China's energy development were described more comprehensive and clearer. With the proposing of the policy, new normal, it will push forward the new industrialization and urbanization, even the national plan of the 13th five-year.

Finally, “new ecological energy strategy” emphasized the expectations and tendencies of China's energy development before 2030 and the new understanding on the concept of energy development in the World Energy China Outlook (2014-2015). The core significance of “New energy ecological strategy” focus on the transformation of energy industry in China, which also can be explained as the future of China's energy development targets are the transformation from energy supply to energy services (the stability, flexibility, interconnection, and a series of universal service in energy supply). Energy supplies and services should be benefit to all walks of people and all of the areas. The transformation from energy supply to energy services means that not only to pay attention to the demands of economic development, but also the functions of energy service, at which makes fundamental transitions on energy system, management concept and energy management in the future.

Ⅴ. The Significance of These Changes for Chinese Energy Strategy

Ⅴ.1 Energy conditions

From global perspective, coal and oil will account for 50 percent of the energy structure in the world, the remaining 50 percent includes natural gas, nuclear power, and other clean energy. IEA made this prediction, which basically reveals the future of China’s energy development to 2030. Based on the “four modernizations” trend in the future of China energy development, evaluation, and analysis, China’s future growth trend made slightly different predictions, highlighting the characteristics of the country before 2030, when energy supply and demand structure was to be optimized.

With the growth of energy demand from 2011 to 2030, China’s trend and the IEA forecasts are

generally consistent. By 2020, China's energy demand would have steady growth. However, after enter a period of slow growth, we believe that China's energy demand growth rate will be slightly lower than what predicted by the IEA. The structure of energy supply and demand has a greatly changed. Coal in China's energy demand account will be lower than the IEA's forecast, and natural gas will be higher than the IEA forecasts. Some other new energy, such as nuclear energy, will have significant growth. According to forecast, by 2030 coal demand will account for 50 percent of China's total energy demand (in 2014 it was 65 percent); oil, natural gas, nuclear energy, hydropower, biomass, and other renewable energy occupy the other half.

Ⅴ.2 Energy Adjustment

With the forecast of World Energy China Outline, there will be a great energy structure optimization all over the world, meanwhile, China's energy demand will be a quarter of the world's. Because of the acceleration in the transformation of China's energy structure, China energy consumption decreased, improvement in energy efficiency and technological progress by about 2020 makes the facts will come faster than the IEA's forecast. Thus, China's energy optimization will be a great benefit for the world's climate change, obviously. With the energy optimization of China, it will make climate change and carbon emission better. In the last year, in the document of "Sino-US joint statement on climate change", China announced a goal to make carbon emissions peak in 2030. In World Energy China Outline, we find that in 2015 China's fossil energy total carbon dioxide emissions is about 80 tons, but in 2020, it will reach 92 tons, and then with the slowdown in growth in energy demand, especially the demand for coal, by 2025 carbon emissions can be controlled within 95 million tons. Accordingly, China's carbon dioxide emissions per unit of GDP in 2019 will fall about 45% of that in 2005, and in 2020 it will be 48 percent, which can help China achieve the commitments in emissions reduction.

Natural gas, nuclear energy, and renewable energy probably will be the growth-driver for the Chinese energy. Compared with solar energy and wind energy, hydropower will have relatively stable growth until 2020, especially with the concentrated development of the southwest area, such as the Jinsha River, Nujiang River, and the Yalong River, all types of hydropower stations will be built as fast as possible, and more and more environmental protection will be needed. However, wind and solar power, bio energy, solar thermal power generation, and other modern renewable energies' developments also are optimistic in general. Although there are a lot of uncertainties in the policy, technological innovations, and business models, the modern renewable energy has taken little part in China's energy demands. Thus, it is possible for China's energy development, and will be active and rapid. In the past two years, solar power generation capacity has grown by more than 100 percent.

Therefore, in the future, non-fossil fuel energy growth will depend on the energy structure of the overall collaborative planning that can be achieved, although the general trend of energy structure optimization and transformation is in the process of "going to carbon and hydrogen". But it is not as simple as non-fossil energy, because it involves the optimization of all energy sources, including

clean coal, ultimately towards a cleaner and green direction.

Ⅴ.3 Energy security in World Energy China Outline

Energy security is a special focus under closer scrutiny in this paper. An evolving concept of energy security was discussed, covering security demand, supply, and cooperation at regional or global levels. In World Energy China Outline 2013-2014, we found that the history of Sino-Russian cooperation in energy and identified the multifaceted nature of the bilateral cooperation based on common interests for long-term development. [25)] In addition to their commonly identified interests, however, there also have existing interest differentials and conflicts of preferences between the two powers. Consequently, strategic methods exercises were executed for their own best benefits on sensitive issues including gas pricing. The cooperation will continue under the strategic partnership as long as their commitments. However, the transformation may appear around 2020.

Multilateral cooperation is a combination of bilateral cooperation regionally and globally. China is actively participating in such cooperative activities, including its contribution to re-building up the Energy Club under the framework of Shanghai Cooperation Organization in 2012 and its involvements in the G20 activities in 2013. In 2014, China played a bigger role in the APEC meeting on the outskirts of Beijing, where the country will be well examined in terms of its cooperation with other countries in the EES strategic framework.

Crude price in China is tied with the world market, while oil product prices remain subject to adjustment by its national planner NDRC from time to time at present. Gas prices inside the country is far below the level of its import pricing. The gas market is immature, although some regional gas markets are developed, where infrastructure, trading activities, and competition are being expanded and witnessed both in the form of liquefied natural gas and in the form of pipeline natural gas. Gas-to-gas competition and free access by the third parties have been recognized but not developed until 2014-2015 in favour of market-based pricing. Given multiple gas supplies on-stream as observed for the years in 2018-2020, what also means that gas prices across China could be justified and set at some benchmark level similar to those in Europe by then. There are still some uncertainties remaining, however, some factors instituted by Energy Database remain to be identified such as energy demand growth into 2035, carbon emission factors, nuclear energy, solar, wind and nuclear utilization. Carbon taxes remain uncertain whether they are executed in 2020.

Ⅵ. Conclusion

The main contents in World Energy China Outlook focus on the aspects as energy strategy and policy serves economic interests or GDP growth merely; energy policies are not systematically matched. Some focus on energy production while others on energy use, or serving single sector. Energy Law remains sleep, not to mention policies; Policy constraints on energy utilization and efficiency are weak; Energy polices are short of effective supervision and enforcement; Some energy policies are equivocal; Some local policies are in disaccords with those issued from central

government because of regional interests overtaking central government's goals; Some government policies are "kidnapped" by the energy industry groups. No public policy is valued/positioned to take care of public interests and expectations; Transparency, accountabilities and supervision are questioned.

"New ecological energy strategy" will effect China can complete the construction of a well-off society till 2020. With the target of at the party's eighteenth conference drawn by 2020, China will achieve double the GDP and per capita income of urban and rural residents at the level of 2010, which aims at the comprehensive construction of well-off society. At present, it depends on a series of challenges in the field of energy, such as, energy policies can be implemented more effective coordination, clean and efficient development of various environmental priority of energy policy measures. It also impacts China to accelerate the energy policy transformation, enhance the adjustment in energy policy, and promote the energy structure optimization, what is benefit for the sustainable development of mode of energy - economy – society and ecological construction.

China has to make its energy policies ready to deal with its interactions with relevant countries and parties involved on energy security, energy governance, and the global warming. Active engagements and open dialogues with all stakeholders are required in order to be a responsible party. A set of logistic settings including required institutions, staffing, rules, education, and information sharing are necessary and should be in place beforehand to enhance China's cooperation capabilities.

[Notes]

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中国の新しいエネルギー戦略
―『世界エネルギーの中国展望』の変化－

鐘　鈺，宮脇　昇

【要旨】『世界エネルギー中国展望』は、最も良質な情報源にもとづき作成された独立した年次報告書である。この研究報告は、中国を世界の残りの諸国と比較して、データベースを掲載するのみならず、世界の資源動向についての洞察、発見と方法を示している。本稿は、『世界エネルギー中国展望（2013-2014）』と同（2014-2015）にかけて、中国のエネルギー戦略の変容を明らかにすることをめざす。私達は、一帯一路構想のうち、ユーラシア・ベルトと道路構想、および経済統合を提案した後、何が新たになったかを中国のエネルギー戦略の変化を通じて説明する。二つの文書の比較によって、中国の経済・社会的持続可能開発への 2020 年にむけた課題の中で、エネルギー構造の最適化が重要とされつつあり、中国のエネルギー政策の発展がみられた。エネルギー供給からエネルギー需要に政策の重点がシフトしている。経済発展の要求に注意を払うのみならず、エネルギーシステムでの根本的変化が進行していることに注目する必要がある。本稿の分析を通じて、中国のエネルギー部門の機能や経営理念および未来のエネルギー管理を指導する本報告書の変化に通底する資源政策の大転換を浮き彫りにする。

【キーワード】中国，エネルギー戦略，資源政策