Suggestions on Promoting China's Energy Sustainable Development in the New Era

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Abstract. China is a major energy producer and a big consumer in the world. However, with the constraints of traditional energy shortages and energy security factors and the enhancement of Chinese people ecological and environmental protection concepts, the sustainable development of energy and the use of sustainable energy are receiving more and more attention. This paper will systematically analyze the current status and existing problems of China's current energy development in the new era of socialism, and propose a series of targeted recommendations for sustainable energy development.

1. Introduction
Energy is an important material for national production and life. Clean, efficient and sustainable energy is an important prerequisite for improving people's happy life. With the rapid development of China's economy, China's requirements for energy quality and quantity have increased simultaneously, and the current inefficient and polluting energy sources cannot meet the needs of China's new development concepts and development models in the new era. Under such circumstances, it is particularly important to accelerate the development and utilization of sustainable energy and steadily promote the formation of a sustainable energy development pattern.

2. The necessity to develop sustainable energy
2.1. Traditional unsustainable energy self-sufficiency rate is decreasing year by year
Through the analysis of the world energy production and consumption situation published by BP World Energy Statistical Yearbook in 2000-2017, we make a figure (figure 1) and find that China's traditional unsustainable energy self-sufficiency rate has declined since 2010, and the self-sufficiency rate of oil has dropped from 72.52% to 31.48%. The self-sufficiency rate of natural gas decreased from 111.02% to 62.06%, the self-sufficiency rate of coal decreased from 103.45% to 92.31%, and the decline of oil and natural gas was close to half of the original self-sufficiency rate. In the same period, the self-sufficiency rate of the three traditional fossil energy sources in the United States was higher than China. The self-sufficiency rate of energy is often closely related to national energy security. Studies have shown that for every 1% increase in energy self-sufficiency, the energy supply security level drops by 6.34%. The decline in traditional unsustainable energy self-sufficiency has sounded the alarm for China's energy security, which requires China to adjust its energy consumption structure, reducing the proportion of unsustainable energy consumption in total energy consumption, and by increasing the proportion of sustainable energy consumption in total energy consumption, the overall energy self-sufficiency rate is improved, thus ensuring national energy security.
Traditional non-sustainable energy brings serious environmental problems

The development and utilization of various non-sustainable energy sources such as oil, natural gas and coal have adverse effects on China's atmosphere, water sources, land and biodiversity. The entire process of traditional non-sustainable energy from production to consumption completion has a negative impact on the environment. The contaminants produced by each process include, but are not limited to, those shown in Figures 2. Since these fossil energy sources are usually buried deep underground, mining and excavating these energy sources can easily damage the vegetation in the storage area and lead to soil erosion. At the same time, due to the improper preservation of energy, it is very easy to pollute the water source and land where the energy is located. The products of sustainable energy are usually water and carbon dioxide. The composition of the sustainable energy is relatively simple and hardly produces toxic gases. The impact on air, water and land is small or not.

At present, China's environmental problems caused by primary energy are more severe than those of developed countries. This is because with the revolutionary development of shale oil and gas exploration technology, countries such as the United States and Europe use natural gas as a "transitional energy source" for the transition from non-sustainable energy to sustainable energy.
China still stays in the era of using coal as its main fuel, and the problems of carbon emissions, serious environmental pollution and health hazards caused by coal use are increasingly prominent.

2.3. *The scale of sustainable energy development in China is huge*

According to the data released by the National Bureau of Statistics of the People's Republic of China, it can be calculated that the self-sufficiency rate of hydropower and wind power in China is 209%, and will continue to climb according to the development trend. China is a country with huge wind energy. The development of wind energy resources is huge and concentrated. It is distributed in China's northeast, north, northwest and coastal islands, which is conducive to the large-scale development and utilization of wind energy. There are many rivers with abundant water resources such as the Yangtze River, the Yellow River and the Pearl River. Although China's water energy reserves rank first in the world, some water resources have not yet been fully developed and utilized. At the same time, China still has a huge space for development in the exploitation and utilization of ocean energy, geothermal energy and solar energy.

3. Current problems in sustainable energy development

3.1. *Sustainable energy use accounts for less than the overall use of energy in China*

As of 2016, the proportion of traditional non-sustainable energy consumption in total energy consumption has shown a downward trend, but still accounts for 86.74% (more details on figure 3) of the total energy consumption. The corresponding sustainable energy sources such as wind power and hydropower account for about 10% of the total energy consumption. At the same time, through the fact that the production of wind power and hydropower exceeds more than twice its consumption, it is not difficult to see that China's use of the above new sustainable energy is not sufficient.

| Year  | Total energy consumption (10,000 tons of standard coal) | Total traditional energy consumption (10,000 tons of standard coal) | Proportion |
|-------|------------------------------------------------------|---------------------------------------------------------------|------------|
| 2008  | 320611                                               | 293679.68                                                    | 91.60%     |
| 2009  | 336126                                               | 307555.29                                                    | 91.50%     |
| 2010  | 360648                                               | 326747.09                                                    | 90.60%     |
| 2011  | 387043                                               | 354531.39                                                    | 91.60%     |
| 2012  | 402138                                               | 363130.61                                                    | 90.30%     |
| 2013  | 416913                                               | 374387.87                                                    | 89.80%     |
| 2014  | 425806                                               | 377689.92                                                    | 88.70%     |
| 2015  | 429905                                               | 377886.51                                                    | 87.90%     |
| 2016  | 435818.63                                            | 378012                                                       | 86.74%     |

*Figure 3.* Non-sustainable energy consumption as a percentage of total energy consumption

3.2. *China does not have a good grasp of the core technology of the hardware needed for sustainable energy development*

The exploitation and utilization of sustainable energy requires advanced science and technology as support. However, due to the current unreasonable training mode of talent education in China and insufficient funding for scientific research, the shortage of sustainable energy technology research and development talents and related technical equipment are prominent. The core technology possession required for the development of sustainable energy in China is not enough compared with countries such as Europe and the United States. It is also restricted by countries such as Europe and the United States in key areas and hardware facilities. Because China's sustainable energy research started late, the foundation is thin, the level is low, the innovation is weak, and the imbalance in the development
field leads to the development and utilization of some types of sustainable energy in China far behind the European and American countries, and because of the above problems, the new Energy cannot meet or can only meet the needs of low-level economic development.

3.3. The input-output imbalance of sustainable energy development is serious
Sustainable energy is known for its high efficiency, environmental protection and renewable capacity, but its high development cost and high price are also characteristics of sustainable energy. Due to the complexity of development technology, the investment cost of sustainable energy development is much higher than that of traditional energy. At the same time, due to the high price of equipment that can be used for sustainable energy, the cost of using new energy is high. Taking the input and output of solar photovoltaic power generation as an example, the cost of solar photovoltaic power generation is composed of factors such as battery module cost, operation and maintenance cost, and operation time. The current cost of thermal power generation is about 0.3 yuan / kWh, while the cost of solar photovoltaic power generation is about 1-1.5 yuan / kWh, although the cost of a small number of resource-rich regions has dropped to 0.5 yuan / kWh, but other regions the cost of photovoltaic power generation is much higher than the cost of thermal power generation. In addition, the average utilization rate of wind turbines in China is around 20%, while the international average is between 25% and 30%, which is significantly lower than the international average [2].

4. Suggestions for promoting sustainable energy development in China

4.1. Rationally deploy energy use scale and increase sustainable energy use
Energy is an essential factor in overall efforts to achieve sustainable development. In view of the current situation of small proportion of sustainable energy consumption, it is necessary to strengthen the government's macro-control function, and adjust the layout of China's energy use systematically and holistically on the basis of integrating the status quo of social economy and energy resources. Optimize the energy consumption structure to upgrade sustainable energy status. Diversify energy use, while reducing the use of traditional fossil energy, we continue to increase the use of sustainable energy. According to local conditions, develop appropriate energy policies at appropriate time to encourage and reward the development and utilization of sustainable energy, so that sustainable energy wind power, hydropower, tidal energy, solar energy, etc. become an effective alternative to traditional energy.

4.2. Strengthen research and development of energy exploitation and utilization technology, and accelerate the corresponding transformation of results
There are many institutions engaged in the research and utilization of various sustainable energy sources in China, but they are mostly distributed in various research institutes and universities, and the related intelligent achievements are not timely transformed. Therefore, in order to promote the development of sustainable energy, it is necessary to connect universities and research institutes and form a joint effort to promote sustainable energy development in China through academic exchanges and academic discussions. At the same time, it is necessary to increase investment in education and research funding. By improving the quality of education, we will provide talent reserves for the development of sustainable energy; through the increase of research funding, we will attract more high-quality talents at home and abroad to participate in sustainable energy development and construction. We’d better accelerate the transformation of sustainable energy-related intelligent technology achievements and shorten its transformation cycle so that cutting-edge technologies can be invested in sustainable energy development and utilization practices in a better and timelier manner.

4.3. The government must increase support and strengthen ecological accountability supervision
The current social benefits of developing sustainable energy are much higher than their economic benefits, but in the future, as the level of science and technology increases, its economic benefits will
also increase. Take the United States as an example, relevant information shows that the development of the sustainable energy industry has enhanced the competitiveness of the US economy and brought a lot of jobs [4]. For the sustainable development of Chinese society and the long-term happiness of the Chinese people, the government must shoulder economic responsibility. Promote sustainable energy development through three-pronged policies. The first is incentive policies, such as reducing tax rates and reducing administrative fees for companies that produce sustainable energy. Through the adjustment of policy leverage, attract more companies to participate in the development of sustainable energy. The second is the safeguard policy, which is to encourage the enterprises that have participated in the sustainable energy construction to achieve better and more development through means such as low-interest investment in the early stage of investment, reasonable market guarantee, and legal and regulatory guarantees. The third is to restrict policies, that is, to restrict the production and use of unsustainable energy through means such as market ban, limited production, and high consumption tax. At the same time, the government should strengthen legislative work and law enforcement in energy. Strict accountability for illegal exploitation and illegal use of polluting energy, taking on the government's ecological responsibility, and forcing enterprises to raise their awareness of ecological responsibility through strict ecological accountability, reducing the arbitrary development and use of traditional non-sustainable energy

5. Conclusion
China's socialism has entered a new era, and the development of sustainable energy is also facing new problems. Promoting sustainable energy development is a long-term and continuous process [5]. We still need hope for the future development of sustainable energy. China is a country with a large population, but it is a small country with per capita resources. The realization of China's development in the future must depend on the development of sustainable energy. China's sustainable energy development can only be fully motivated by continuously increasing the proportion of sustainable energy consumption, improving the development and utilization of sustainable energy technologies, and strengthening government support and ecological accountability supervision.

References
[1] Li pin 2018 Research on influencing factors of energy supply security in China (China: Journal of xi 'an university of science and technology) p403
[2] Zhang hongbo 2016 Problems existing in China's new energy development and countermeasures (China: second session of today's wealth BBS)
[3] VeraI and LangloisL 2007 Energy indicators for sustainable development (America: Energy) p 875
[4] Chen minwei 2018 Overview of US Energy Sustainable Development in 2018 (China: China Power Enterprise Management) p 95
[5] Yan luguang 2007 Development Strategy of China's Sustainable Energy System in the First Half of the 21st Century (China: Science & Technology Review) p 1-1.