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Cultivation of New Energy Industry Clusters in China and Guangxi under the Perspective of World Markets

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Abstract: Based on a brief overview of the background and prospects for the development of new energy industries in China and Guangxi in the context of the world market, this paper outlines the methods used in the existing literature to measure the efficiency of new energy industries and the level of agglomeration of new energy industry clusters. Studies have shown that China and ASEAN have a large and unsaturated clean energy market, and the development of new energy industry has great potential; existing literature on China's new energy industry mainly focuses on the description of regional heterogeneity, that is, the level of agglomeration in the eastern part and agglomeration efficiency is higher than that in the central and western parts , based on which this paper broadens the perspective of the ASEAN as the representative of the Asian market, and looks at the development prospects and advantages of new energy clusters in the central and western areas of China.
Keywords: New Energy Clusters; ASEAN; Regional Heterogeneity

1. Introduction

Since the development of mankind, the world has experienced three energy revolutions, namely, the first energy revolution marked by the replacement of natural fire with artificial fire; the second energy revolution marked by the large-scale use of steam engines and coal; and the third energy revolution marked by the replacement of coal with oil, and the replacement of steam power with internal combustion power and electricity. Now a new round of energy revolution is taking place, called Energy 4.0. However, China's energy intensity is still 1.5 times of the world's average, which is obviously unsustainable.Energy transformation is imperative.

It is clearly pointed out in the "14th Five-Year Plan for the Development of Strategic Emerging Industries in Guangxi" that the accelerated emergence of new economy, new industries and new modes globally... have put forward a higher requirement for the development of Guangxi's industrial transformation, and have also provided an opportunity for the development of New energy, intelligent and new energy vehicles... It can be seen that due to the existence of large-scale and not yet saturated clean energy market, new energy industry in China contains huge potential for the development of new energy industry. Guangxi has a unique ASEAN-oriented location and coastal geographic advantages. However, the development of new energy industry in Guangxi still has many problems. Guangxi's low degree of new energy development, irrational internal structure of new energy, unbalanced industrial development, weak market development capacity and industrial system, insufficient market safeguards, and insufficient policies and incentives are restricting its development. How Guangxi draws on domestic and international practical experience, relies on its own development potential, and evaluates the effect of cultivation of new energy industry clusters under Energy 4.0, as well as the empowerment research of cultivation mechanism are all issues of great concern.

Domestic and international literatures show that the existing literature on the cultivation effect of new energy industry clusters has room for further exploration. First, the existing literature on the cultivation effect of new energy industry clusters is mostly in the stage of qualitative analysis. Second, the objects of China's research on the efficiency of the new energy

industry are limited to the listed new energy enterprises and the energy data at the Chinese provincial level. enterprises and energy data at the provincial level in China, Data acquisition and analysis of the cultivation effect and efficiency of new energy industry clusters is one of the difficulties in the existing research. Third, domestic and foreign literature focuses on the analysis of the common law of industrial cluster cultivation, but does not explore the cultivation mechanism of new energy industry clusters and how the relevant mechanism can empower the development of new energy industry enterprises. Fourth, the existing research on the emergence of transnational clusters in China's new energy industry is rarely mentioned, although there is the emergence of domestic cross-provincial clusters, but the cultural, political and institutional integration has always been the basis of simplified cooperation.

2. Literature review

The literature related to the cultivation of new energy industry is mainly reflected in the following two major aspects:

2.1 Literature on new energy industry

Research on the new energy industry can be summarised and analysed from three main perspectives: consumer, firm and government.

The literatures of the new energy industry from a consumer perspective focus on both public perceptions and user energy choices. From a public perception perspective, new energy technologies tend to stimulate public response, while public support can, in turn, influence the adoption and deployment of new technologies.Boudet, HS (2019) review of public response covers both large-scale energy infrastructure projects such as utility-scale wind and solar, fossil fuel extraction, and marine renewable energy, as well as small-scale "consumer-facing" technologies such as electric vehicles, rooftop solar and smart meters. From the perspective of user energy choices, Schot, J et al. (2016) situate energy citizenship within the overall socio-technical system driven by endogenous interactions between new technologies, user preferences and institutional frameworks. Rather than being passive consumers of a given energy source, users are able to optimise their energy allocation and utilisation efficiencies by raising their awareness of their current energy needs and the various major energy options available to meet them, which can change their energy needs. Existing data available to study the new energy industry from a consumer perspective is mainly qualitative, such as different types of interviews.

The literatures of the new energy industry from the perspective of firms mainly cuts through analysing the energy use efficiency and regional heterogeneity of listed new energy firms and Chinese provinces. It is found that the overall investment efficiency of China's new energy industry is relatively low, with the highest energy efficiency in the eastern part of China and rapidly improving technology in the central and western parts of the country. In addition to this, the existing literature has identified significant change points in new energy efficiency through analyses of energy data and samples of listed new energy companies in various provinces in recent years. For example, the increase in energy efficiency during 2006-2011, but a slight downward trend in average energy efficiency from 2011-2016; the energy efficiency of Chinese enterprises before 2015 is generally higher than that after 2015 (Zeng, SH, 2018).Yu, JQ et al. (2019) attribute the decline in energy efficiency to the "new normal", China has been focusing on energy conservation, energy structure optimisation, energy system innovation and new energy use. As a result, a significant amount of energy has been saved, but the ensuing short-term decline in efficiency is unavoidable.

The literatures of new energy industry from the government's perspective are mainly carried out by analysing the impact of taxes and subsidies on new energy industry. The existing literature is divided into two schools of thought, one part of which argues that both policy tools, tax incentives and fiscal subsidies, have a significant positive impact on the development of the new energy industry; one part of which argues that both state intervention and market openness have a negative impact on energy efficiency, and that value-added tax (VAT) refunds for the new energy industry reduce the return on equity (ROE) for enterprises, which is mainly due to the fact that tax incentives can cause industrial chain distortion, overcapacity and insufficient innovation incentives. Meanwhile, one of the key issues for the next step in the development of

China's new energy industry is how to implement supporting infrastructure on a large scale, including "charging piles into thousands of households" and "allowing the completed PV and wind power to generate electricity in full".

2.2 Literature on the basic theory of new energy industry cluster

With regard to the research on the cultivation mechanism of new energy industry cluster. As the main form of industrial organisation for the development of new energy industry in the future, the development of industrial clusters still needs to have certain conditions, which include the divisibility of production and the transportability of products or services. At the same time, the factors affecting the development of new energy industry prospects are mainly demand-driven, technological innovation, reasonable premium compensation, the drive of scale economy and economic growth, regional knowledge carrying capacity, spatial layout, industrial foundation, etc. Comprehensively, the current status of domestic and international research, the new energy industry cluster influencing factors can be summarised into six aspects: industrial foundation, technological innovation level, market demand, government policy, institutional environment and financial support.

In terms of empirical research on the measurement of the cultivation effect of new energy industry clusters, the existing literature on the assessment of the cultivation effect of new energy industry clusters has been summarised into two main categories: the assessment of energy efficiency and the assessment of the level of industrial agglomeration. Existing literature adopts multiple regression model, semi-parametric four-stage DEA, combination of meta-boundary and super SBM, factor analysis weighting and other methods to analyse energy efficiency. Four groups of indicators, namely, industrial market concentration, location Gini coefficient, Herfindahl and N indices, and location entropy, are usually adopted to comparatively analyse the level of agglomeration of new energy industries in each province of China using panel data.

Using the above indicators for measuring the degree of agglomeration of the new energy industry to measure the degree of agglomeration of the new energy industry in China's provinces, a recognised result is obtained, there is a phenomenon of agglomeration of China's new energy industry, and the level of new energy agglomeration in eastern regions such as in the Yangtze River Delta Economic Circle, the Pearl River Delta Economic Circle, the Bohai Bay Economic Circle, such as Jiangsu, Guangdong, Shandong, Zhejiang, Anhui, Shanghai, and Liaoning, is higher than that in central and western regions, and in Tibet, Xinjiang, and Gansu, Hunan and other central and western regions, the level of new energy agglomeration has a certain magnitude of attenuation. On this basis, Wang Huanfang (2018) pointed out the existence of spatial autocorrelation in China's new energy industry caused by geographic spillover effects, further indicating that the spatial differences in the level of China's new energy industry clusters are not randomly generated, but rather depend on the level of economic development, spatial correlation, industrial foundation, and resource advantages.

The existing literature only divides the energy market within China, dividing the new energy industry clusters within China by provincial level.Although there are cross-provincial clusters, cultural, political and institutional integration always simplifies the basis of cooperation. If the vision is broadened to the Asian energy market, China's new energy industry to expand to the transnational level of co-operation, such as docking the ASEAN ten new energy industry co-operation, the central and western regions.For example, the use of Guangxi's location advantage will not be limited to the Matthew effect of the constraints of the development prospects and development of the market can be expected in the future.

3. Conclusion

This paper broadly sorted out the background and prospect of the development of new energy industry in China and Guangxi under the perspective of the world market, and analysed the space for the development of new energy industry in China and even in the world market by comparing the energy demand and energy consumption under the world market. On this basis, this paper takes the cultivation of new energy industry clusters in Guangxi as an entry point, and briefly outlines the existing literature on the measurement of new energy industry efficiency and the measurement of new energy industry cluster level.

In summary, existing research on the new energy revolution under the new energy industry cluster cultivation and

infrastructure reconstruction of the common law has a certain degree of research, can be for the in-depth development of this paper to provide a wealth of theoretical nutrition. However, the shortcomings of the research are: the research object is mostly limited to the high-tech manufacturing industry in the whole country or the more developed regions, and there are few researches on the emerging industry service industry and the emerging industries in the late-developed regions, especially the lack of the research on the cultivation of the emerging industry characteristics cluster in the late-developed regions in the Free Trade Zone; the research method mostly focuses on the qualitative analysis and the discussion of the individual cases, and there are few scientific quantitative analyses and prospective guidance for the cultivation of the industrial clusters; The research perspectives mostly focus on the analysis of the common law of industrial cluster cultivation, and do not explore the cultivation mode of new energy industry cluster, the development of new energy industry enabling other manufacturing industries, and the countermeasures for the reconstruction of industrial infrastructures.

Relevant research prospects are as follows: first, quantitative comparative research on the cultivation mode of new energy industry clusters; second, heterogeneity research on the cultivation effect of new energy industry clusters. Thirdly, research on the cultivation effect and mechanism of transnational new energy industry clusters.

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