

Vol:2, Issue: 6 pp: 113-117

JEL Code: F6, F63, L00

LI M.H., W.FB. (2021). "Research on Regional Cooperation Development Model and Mode Selection of New Energy Industry Cluster-Take Chengdu Chongqing Economic Circle as an Example" Vol: 2 Issue: 6 pp: 113-117.

Keywords: Chengdu Chongqing Economic Circle, Industrial Cluster, Cooperative Development

Article Type Research Article

Research on Regional Cooperation Development Model and Mode Selection of New Energy Industry Cluster-Take Chengdu Chongqing Economic Circle as an Example

Arrived Date
15.03.2021

Accepted Date
27.03.2021

Published Date
30.04.2021

Min Hui Li¹, FengBo Wang¹

ABSTRACT

under the background of the coordinated development of Chengdu Chongqing economic circle, the cooperation and symbiosis between new energy industrial clusters in Chengdu Chongqing Economic Circle plays an important role in regional economic development and environmental governance. Firstly, this paper uses the logistic growth model to construct the collaborative development model of industrial clusters; secondly, it analyzes the obstacles of cross provincial cooperation of new energy industrial clusters in Chengdu Chongqing economic circle; thirdly, it analyzes the obstacles of the new energy industrial clusters in Chengdu Chongqing economic circle. Finally, the paper puts forward suggestions on the mode selection of inter provincial cooperation in the new energy industrial cluster of Chengdu Chongqing economic circle.

INTRODUCTION

Chengdu Chongqing economic circle is one of the three economic growth circles in China. With the implementation of the national coordinated development strategy of Chengdu and Chongqing, energy consumption has entered a period of rapid change. The two places are facing the common demand of optimizing energy structure, improving air quality and improving the security level of energy supply. According to the "work plan for promoting industrial cooperation in Chengdu Chongqing Metropolitan Area in 2019" (hereinafter referred to as the "plan") jointly prepared by Chongqing Economic and Technological Commission and Sichuan Provincial Department of economy and technology, we will jointly promote the development and cooperation of key industries, and form major industrial chains and industrial clusters in China. The distribution of energy resources in the two regions is uneven, the characteristics of energy consumption are obviously different, and the characteristics of energy consumption are obvious. It is a strategic choice for the coordinated development of new energy in Sichuan and Chongqing to build a new mode of energy cooperation in Chengdu Chongqing economic circle.

LITERATURE

As early as 1990 (Porter, 1998) put forward the concept of industrial cluster. The first explanation and analysis of the phenomenon of industrial cluster is the book "national competitive advantage" published in 1998. Industrial cluster refers to a group of specialized suppliers, service providers, financial institutions, manufacturers of related industries and other related organizations, which have competition and cooperation in specific fields, relatively concentrated geographically and interactive (2015). As for the research of industrial clusters, scholars from the East and the West have different perspectives and many schools. Most scholars divide industrial clusters into innovation industry and resource industry. Liwei (2015) Just as new energy industrial clusters can be classified according to these two types of industries, these two classification indicators become important indicators to measure the development level of an industry, so is the development of new energy industry. The new energy industry is a resource-based cluster, which should consider environmental protection, ecological

¹  Southwest Petroleum University/ CHINA

environment and sustainable development. Ming (2019) advocated the coordinated development of ecology and industry while studying the coordinated development of the Yangtze River economic belt. According to the above theory of cluster development, there are many similarities between cluster development. Each scholar's different research perspectives provide us with rich reference. We have learned many lessons from previous studies, and also provide us with new research ideas.

RESEARCH

Purpose of the Research

The new development situation of the two more developed western agglomeration areas in the rapid cycle of the two cities determines the new state of the western energy development. The signs of the decline of the new energy industry in Sichuan represent the new problems in the development of the energy industry. The agglomeration and development of the new energy industry in the dual economic cycle of Chengdu and Chongqing have great significance for the development of the two regions and the western new energy industry. It is of great significance to realize the goal of transforming Chengdu Chongqing economic circle from a national city to a world-class city.

Method of Research

This study adopts the method of building model, establishes the model of industrial cluster collaborative development based on the logistics growth model of ecological theory, analyzes the collaborative effect of cluster development of Chengdu Chongqing double city economic circle through the built development model, and constructs the mathematical model of the development track of industrial cluster system based on the logistics equation of R.M. Pearl's S-curve to analyze the two places. There are many obstacles to the development of industrial park.

Dynamic Model of Collaborative Development Among Industrial Clusters in the Region

Based on the logistics growth model of ecological theory, this paper establishes the collaborative development model of industrial clusters. The assumption is: in a certain time and geographical space, assuming that all kinds of resource elements have certain endowments, under the constraints of regional resource elements and the production level of k-limit value, the value of this parameter depends on the demand elasticity of industrial products, product price and other factors, representing the production level and growth of a regional industrial cluster system respectively, and its output growth rate is usually low. It decreases with the increase of its scale. The existence of geographically concentrated industrial clusters in one region can promote the improvement of production level in another region. The existence of geographically concentrated industrial clusters in one region may hinder the growth of production level in another region. This can be achieved by competing for resources, markets, consumers, etc. Based on the logistics equation of r.m. Pearl describing S-curve, a mathematical model of the development track of industrial cluster system is constructed.

$$\begin{cases} \frac{dN_t}{dt} = r_t N_t \left(1 - \frac{N_t}{K}\right) \\ N(0) = n_0 \end{cases} \quad (1.1)$$

The above equation is a first order ordinary differential equation with separable variables :

$$N_t = \frac{N_0 K e^{r_t t}}{K + N_0 (e^{r_t t} - 1)} = \frac{K}{1 + \left(\frac{K - N_0}{N_0}\right) e^{-r_t t}} \quad (1.2)$$

r_t is the growth rate coefficient of industrial cluster system, which is related to factors such as input structure of system factors, productivity and relative profit rate of investment. $\left(1 - \frac{N_t}{K}\right)$ Is the limiting factor (logistic coefficient), which decreases with time, when $t \rightarrow +\infty$, $N_t \rightarrow K$.

From this, we can get the model of cooperative and collaborative development of industrial cluster n1 :

$$\frac{dN_1}{dt} = r_1 N_1 \left(1 - \frac{N_1}{K_1} + \frac{\beta_{12} N_2}{K_1}\right) \quad (1.3)$$

Where k is the coefficient of collaborative development, which indicates the relative promoting effect of industrial cluster N_2 on industrial cluster N_1 . Generally speaking, the coefficient of cooperation is in the range of $0 < K < 1$.

In the same way, it can be concluded that the cooperative collaborative development model of industrial cluster n_2 is as follows :

$$\frac{dN_2}{dt} = r_2 N_2 \left(1 - \frac{N_2}{K_2} + \frac{\beta_{21} N_1}{K_2}\right) \quad (1.4)$$

From this, we can get the cooperative synergy equation of industrial clusters N_1 and N_2 as follows:

$$\begin{cases} \frac{dN_1}{dt} = r_1 N_1 \left(1 - \frac{N_1}{K_1} + \frac{\beta_{12} N_2}{K_1}\right) \\ \frac{dN_2}{dt} = r_2 N_2 \left(1 - \frac{N_2}{K_2} + \frac{\beta_{21} N_1}{K_2}\right) \end{cases} \quad (1.5)$$

By solving the above equation, we can get the following conclusion: when $k < 1$, there are four steady-state solutions: $E_1 (0,0)$, $E_2 (0, K_2)$, $E_3 (k_1,0)$, $E_4 \left(\frac{K_1 + \beta_{12} K_2}{1 - \beta_{12} \beta_{21}}, \frac{K_2 + \beta_{21} K_1}{1 - \beta_{12} \beta_{21}}\right)$ among which E_1 is the stable solution of cluster cooperative cooperative development. It can be concluded that the two industrial clusters with symbiotic relationship expand their respective production scale due to the cooperation in related fields, resulting in synergistic effect.

Analysis on the Obstacles of Inter Provincial Cooperation of New Energy Industry Cluster in Chengdu Chongqing Economic Circle

In Chengdu Chongqing economic circle, the development pattern of many new energy industry clusters has been formed. The energy industry cluster in Chengdu Chongqing economic circle can promote the economy of the two places, and the new energy industry cluster can drive the economic growth of clean energy industry in the two places.

In the analysis of the obstacles of cluster cooperation between the two places, it is mainly manifested in the following aspects: first, the administrative division system inhibits the coordinated development of industrial clusters across provinces and cities. Due to the high convergence of economic policies and administrative management, the limitations of administrative management result in the relatively independent monopoly of territorial administration; second, the driving force of the two places is insufficient, the unified energy market has not yet formed, and the coordination of management is not enough Cooperation with the government is mainly carried out by the government and professional associations. The lack of actual power for Chengdu and Chongqing to develop new energy leads to the incomplete formation of cooperative market; third, the uneven level of economic development inhibits the enthusiasm of industrial clusters to participate in cooperative development. Chongqing's GDP performance, new energy vehicles, clean energy equipment, rail transit, environmental protection equipment and other industrial clusters are better than Chengdu's, but Chongqing's introduction and absorption of scientific and technological achievements and production needs to be improved The ability of Su is worse than that of Chengdu.

Suggestions on Mode Selection of Inter-Provincial and Municipal Cooperation In New Energy Industry Cluster Region of Chengdu-Chongqing Economic Circle

Based on the strategic demand and industrial characteristics of the coordinated development of the energy field in chengdu-chongqing economic circle, there are many options for the cooperation model among the new energy industrial clusters in chengdu-chongqing economic circle. For example, the combination of new energy technology and market can be the cooperation of industries in the two regions, and for example, the cooperation mode of enterprises in the upper, middle and lower reaches

of the new energy industry can open up the industrial chain of the two regions and expand the market at the same time.

Leading Enterprise Driven Cooperation Model

The leader-driven model is a network of extended relationships with large companies like its core, attracting support from surrounding companies. The cooperation mode dominated by leading enterprises mainly relies on leading industries to play a leading role, and at the same time needs relevant intermediary institutions to provide the corresponding support system. Chengdu-chongqing economic circle has formed a group of typical energy industry cluster development leading enterprises.

Heterogeneous and Complementary Modes of Cooperation

The cooperation model of Heterogeneous and complementary type is based on the complementary industrial structure, and the difference of industrial product development between different regions leads to the complementary advantages of enterprises among clusters, through the cooperation network between enterprises complementary advantages and mutual benefits constitute the internal driving force. Chongqing's new energy demand and the advantages of Sichuan's wind power industry form a distinct heterogeneous complementary. In Energy Cooperation, Sichuan can provide Chongqing with rich energy resources, and Sichuan has a large number of new energy resources to supply Chongqing, chongqing, as a municipality directly under the central government, should give full play to its technical advantages and technical support. The heterogeneity and complementarity in the field of new energy industry cluster can promote mutual cooperation through the opportunity of the Chengdu Universiade.

Brand Driven Collaboration Model

This model is based on the brand building of enterprises in the new energy field in the chengdu-chongqing economic circle. In this cooperation model, industrial clusters seek the division of Labor and cooperation among brand enterprises and clusters across provinces and cities to achieve the creation and maintenance of regional brands. For the development of more mature regional brand through the registration of collective trademarks, can change the cluster of regional brand "owner vacancy" situation. This kind of cooperation pattern can make brand of new energy cluster reach cooperation consciousness, benefit sharing. It will be a consensus to establish a regional brand with mutual cooperation so as to achieve the effect of brand effect and maintain the regional brand value and interests.

Common Technology Collaboration Model

The enterprises in the new energy industry cluster in sichuan-chongqing economic circle have the same technology and face the same market. Just as the new energy industry is in the process of introducing, restricting and digesting independent innovation, it is difficult for enterprises to take the initiative to become the leading force in the development of common technologies, at the same time, for imperfect market mechanism and innovation mode, the government should adopt market-oriented operation mode on the basis of cluster industry common technology. In the process of developing new energy industry in Chongqing Economic Circle, the advantage of Sichuan Science and technology is transformed into the innovation of Chengdu economic circle. Taking into account the production orientation of the Advanced Research and development base, we will advance the development and cooperation of common technologies, then work in coordination with key components such as high-end paper and radiation, and support the construction of a platform for training services for Taiwan and Hebei in relation to the new energy industrial cluster, to realize transformation, modernization and sustainable innovation of industry.

CONCLUSIONS AND RECOMMENDATIONS

The industrial cluster system is a complex system, which is composed of a variety of elements and a variety of actors, in the inter provincial cooperation of new energy industry cluster in Chengdu Chongqing economic circle, we should combine the actual situation of the two places. The different administrative regions, the lack of driving force of industrial cluster, the lack of core technology and brand will affect the inter regional cooperation. It is suggested that there are leading enterprise driven cooperation mode, heterogeneous complementary cooperation mode, brand driven cooperation mode

and common technology collaborative cooperation mode in the new energy industry cluster of Chengdu Chongqing economic circle. These cooperation modes must take into account the structural characteristics of relevant groups such as economic factors and the product structure with complementary advantages, Brand effect and sharing technology resources.

REFERENCES

- Guo, L. (2016). "Literature review of new energy industry cluster". Exploration of economic problems, (12): 184-190.
- Liwei, G., Manhong, S. (2018) "Comparative study on the agglomeration level of new energy industry in China's provinces based on panel data". Ecological economy, 34 (08): 81-85.
- Ma, L., Guo, P. (2020) "Research on Cooperative R & D Contract of new energy vehicle industry chain". Science and technology management research, 40 (08): 131-138.
- Porter, M.E. (1998). "Clusters and New Economics of Competition". Harvard Business Review.
- Su, M. (2019) "Research on coordinated development of energy in Yangtze River economic belt ". Macroeconomic management, (12): 37-57.
- Xu, J. (2020). "Evolutionary Game Study on Cooperative Innovation of new energy vehicle industry under market mechanism and government supervision". Operations research and management, 29 (05): 143-151.