

# Research on the Business Environment of the Real Economy Based on Electricity Costs in Different Regions of Guangdong Province, China

Li Zhang<sup>1,a</sup>, Ya Wu<sup>2,b,\*</sup>

<sup>a</sup>498552343@qq.com, \* Corresponding author: <sup>b</sup>jnwy2012@126.com

<sup>1</sup>Planning and Finance Department, Guangdong Power Grid Company, Guangzhou 510000, China.

<sup>2</sup>School of Economics, Jinan University, Guangzhou 510632, China

**Abstract:** Optimizing the business environment of the real economy is an important lever for promoting high-quality development. In order to further optimize the electricity business environment, improve and precisely reform policy mechanisms, this article adopts a questionnaire design, with the unique sales electricity price zoning in Guangdong as the background. Based on the perspective of electricity cost, it comprehensively targets relevant industrial and commercial users in 21 cities throughout the province. Using survey research methods, it statistically analyzes the perception of electricity price cost by various users and considerations of investment location selection factors. Expanded the perspective of obtaining electricity research and related reform decisions. Research has found that most companies believe that local electricity prices are relatively reasonable and tend to maintain the current price zone pattern unchanged; If the price zone reform is promoted in the future, it is more expected that the reform will be supported by government financial subsidies; For the selection of investment locations, the main considerations are local government tax incentives and labor costs, followed by factors such as land costs, with relatively low considerations for electricity costs. Based on the investigation, the article concludes with relevant suggestions.

**CCS CONCEPTS** • Social and professional topics • Computing / technology policy • Commerce policy

**Keywords:** Real economy; business environment Electricity cost; Electricity price reform; Survey and research

## 1 Introduction

Optimizing the business environment is an objective need to enhance the "soft power" of economic development, and also an inevitable requirement for deepening the reform of the system and mechanism in China. In order to thoroughly implement the decisions and arrangements of the CPC Central Committee and the State Council on deepening the reform of "delegating power, regulating power and providing services" and optimizing the business environment, fully implement the Regulations on Optimizing the Business Environment, continuously improve the business environment for electricity consumption and improve the convenience level of "getting electricity" for industrial and commercial enterprises, the National Development and Reform Commission and the National Energy Administration

issued the Opinions on Comprehensively Improving the Service Level of "Getting Electricity" and Continuously Optimizing the Business Environment for Electricity consumption and other policy documents. Guangdong Power Grid Corporation actively undertakes and implements the Three-year Action Plan on Comprehensively Improving the Service Level of "Getting Electricity" and Continuously Optimizing the Business Environment for Electricity consumption issued by Southern Power Grid Corporation, and helps Guangdong create a competitive business environment with practical actions.

Taking Guangdong as an example, it is of great significance to study the real economy business environment based on electricity cost. In addition, in the academic field, many literatures have studied the business environment from different perspectives, such as the effectiveness evaluation of the power system reform [1], the study of the business environment competition between county-level governments [2,3], and even the comparative evaluation of the business environment between countries [4,5].

Based on the current reform and research status[6-15], this paper, based on the special background of six electricity price zones in Guangdong Province, through questionnaire design, on-site visits and other investigation methods, statistically analyzes the responses and suggestions of industrial and commercial users in various price zones on electricity cost, electricity price reform and investment location selection, providing a micro perspective of real economy for optimizing the business environment and reforming the electricity price system mechanism. Although based on the social survey of the impact of electricity price reform in 2018 and 2019 in 2020, it is still of practical significance for further promoting the reform of electricity price system mechanism and improving relevant policy decisions under the background of the current trend of investigation and research and promoting high-quality development. Compared with existing research, the contributions of this paper are as follows: First, focusing on the impact of electricity price cost of real economy such as industrial and commercial users on optimizing the business environment, from the perspective of price cost perception of users in different electricity price zones and consideration of investment location selection factors, this paper enriches the perspective of obtaining power research and relevant reform decisions. Second, to make up for the method defects of the existing econometric empirical model based on historical data and ignoring actual investigation, with the help of investigation and research, while enriching the statistical methodology of the power industry, it deeply understands the provincial situation and economic reality, and helps solve relevant practical problems. Third, different from the existing county-level and international evaluation research on the acquisition of electricity and related business environment, the first-hand data at the provincial, regional and municipal level is used as the research data source, highlighting its importance to the decision-making level, which is conducive to the competent government departments to strengthen the monitoring of the operation of the real economy and the precise supply-side structural reform.

## **2 Basic information of the enterprise under investigation**

In order to understand the situation of electricity price, price area reform and investment location selection considerations of users in various price areas of electricity sales in Guangdong Province, 21 power supply units in the province were organized to investigate

users by interview, email, telephone and other means. A total of 2,342 questionnaires were issued, 2,169 were recovered, with a recovery rate of 92.6%, and 2,075 were effective questionnaires.

The questionnaire design included objective choice questions and open suggestion questions. The first part was the basic information of the enterprise, including the type of electricity, the industry to which it belongs, the annual operating income, the annual electricity consumption, and the proportion of electricity cost in the operating cost, etc., with 5 questions, all of which were single choice questions. The second part was the main part of the questionnaire, which evaluated the influencing factors of the electricity price related business environment faced by the enterprise, including the feelings of electricity price reform, the tendency of electricity price reform, the way of electricity price adjustment, and the consideration factors of investment location selection, with 9 questions. The classical Likert scale was used, and 1-6 points were assigned according to the options. The third part was an open question and answer, with 2 questions, to evaluate whether the electricity price increase caused by environmental factors can be borne, and to put forward suggestions on the electricity business environment for electricity price adjustment or price area reform.

## **2.1 Descriptive statistical characteristics**

The sample enterprises participating in the questionnaire survey have the following six statistical characteristics:

1. The participating enterprises cover 21 cities in 6 price zones, including Guangzhou, Foshan, Dongguan, Zhongshan, Zhuhai and other 5 cities in the Pearl River Delta; Shantou, Chaozhou, Jieyang, Shanwei, Zhanjiang, Maoming, Yangjiang, Zhaoqing and other 8 cities in the east and west wings of Guangdong; Heyuan, Meizhou, Shaoguan, Qingyuan, Yunfu and other 5 cities in the northern mountainous area; Shenzhen is an independent price zone according to the Hong Kong electricity price system, and Huizhou and Jiangmen are independent price zones.
2. The participating enterprises are divided into two categories of electricity consumption, among which there are 1,224 effective samples of large industrial users, accounting for 59%, and 851 effective samples of general industrial and commercial users, accounting for 41%.
3. The participating enterprises are mainly divided into 5 categories in terms of industry classification, among which the ordinary manufacturing industry is the most, with a total of 1,166 effective samples, accounting for 56.19%. The other categories are commercial service industry (21.35%), high energy consumption manufacturing industry (8.34%), other industries (9.16%), water and electricity and other public utilities (4.96%).
4. The participating enterprises cover large, medium, small, micro and other types of income scale. More than half of the enterprises with operating income less than 20 million yuan (accounting for 60%).
5. Among the enterprises participating in the survey, the annual power consumption of less than 1 million kWh accounts for about half (40.34%), 1 million - 4 million kWh accounts for 24.43%, 4 million - 15 million kWh accounts for 18.22%, 15 million - 50 million kWh accounts for 9.83%, and more than 50 million kWh accounts for 7.18%.
6. In different proportions of electricity costs, the proportion of electricity costs in the total operating costs of most enterprises is between 1-5%, with a total of 995 effective samples,

accounting for 47.95%.The second is the enterprises with electricity costs accounting for 1% or less.There are only 345 enterprises with electricity costs accounting for more than 10%, accounting for 16.63%.

## 2.2 Reliability test

In empirical research, the most commonly used method to measure the reliability of data is to calculate the Cronbach  $\alpha$  value. It is generally considered that the Cronbach  $\alpha$  value is greater than 0.7, indicating that the data reliability is high, that is, the reliability test is passed. This paper uses SPSS to analyze the reliability of data, evaluate the users' feelings on the electricity price reform in recent years, the tendency of the Guangdong sales electricity price area reform, the way of electricity price adjustment in the next price area reform, the consideration factors for the selection of enterprise investment place and the overall reliability of the scale. The relevant Cronbach  $\alpha$  coefficients are 0.821, 0.807, 0.824, 0.843 and 0.835, indicating that the data reliability of the questionnaire is relatively ideal.

## 2.3 Validity test

The structural validity test was conducted. Table 1 shows that the KMO value of the questionnaire is 0.819, which is greater than 0.7; and the P value corresponding to Bartlett's sphericity test is less than 0.01. Through the significance test, it indicates that the questionnaire is suitable for exploratory factor analysis to conduct structural validity investigation.

Table 1 KMO and Bartlett tests

KMO sampling fit quantum		.819
	Approximate chi-square	9164.561
Bartlett's test of sphericity	Degree of freedom	136
	Significance	.000

## 3 Investigation and statistical analysis

### 3.1 Companies' perceptions of electricity pricing in recent years

1. Compared with 2017, the vast majority of enterprises believed that the average electricity price level in 2018 decreased significantly, among which 52.24% of enterprises felt that the electricity price level decreased by less than 10%, and 37.93% of enterprises felt that the electricity price decreased by more than 10%.

2. Compared with 2018, the average electricity price level of enterprises in 2019, 47.71% of enterprises felt that the electricity price level decreased by less than 10%, and 42.07% of enterprises felt that the electricity price decreased by more than 10%.

3. From the perspective of the rationality of the electricity price level, 87.95% of the enterprises participating in the survey believed that the local electricity price was reasonable.8.24% of the enterprises thought that the electricity price was high, and nearly 60%

of the medium and high energy consumption users in these enterprises accounted for more than 5% of their total operating costs.

### **3.2 Proposal on the Reform of Electricity Price in Enterprise Consideration Area**

1. At present, there are 6 price zones in Guangdong Province, with different price levels. As for the direction of price zone reform, 68.43% of the enterprises think that the status quo should be maintained unchanged, 10.51% of the enterprises don't care about the direction of price zone reform, and 9.40% of the enterprises tend to narrow the price difference between the price zones.

2. As for the time of price zone reform, more than half (accounting for 51.13%) of the enterprises think that it should be carried out within five years, 18.99% of the enterprises don't care about the time of price zone reform, and 12.24% of the enterprises think that it should be carried out within two years.

3. If the provincial price reform is carried out, the vast majority (accounting for 77.98%) of the enterprises think that the funds required for the provincial price are from the government's financial subsidies, 10.55% of the enterprises think that the same price funds can come from the mutual adjustment among regional users, and a few enterprises think that the finance, users and power enterprises can bear a little.

4. As for the suggestions on the adjustment method of electricity price, 41.59% of the enterprises think that the average price of the province can be taken as the benchmark, and the price higher than the benchmark price can be reduced to the average price, and the price lower than the benchmark price can be increased to the average price. 21.49% of the enterprises think that other methods such as maintaining the status quo are suggested, and 15.18% of the enterprises tend to reduce the industrial electricity price in the province uniformly.

### **3.3 Other aspects**

1. From the main considerations of the choice of investment location, the two factors most enterprises consider are preferential policies of local governments such as tax (72.05%) and labor cost (62.51%), followed by land cost (19.61%) and industrial layout factors (15.86%). The consideration of electricity cost is relatively low in the seven options, only 11.95%.

2. In order to implement the requirements of the national pollution prevention and control battle and the blue sky battle, it is necessary to increase the consumption of gas and renewable energy electricity. 58.46% of the enterprises can accept the appropriate increase of electricity cost caused by the purchase of clean energy.

## **4 Subdivision dimension survey**

From different price zones, different electricity categories, different industries, different proportion of electricity costs and other subdivision dimensions, the user's perception and evaluation of the business environment such as electricity costs are investigated. Due to space limitations, the main statistics are as follows:

#### **4.1 Different regional conditions**

Most enterprise users in the Pearl River Delta region have recognized the current status of the price zone by reducing electricity prices within 10% in the past two years. In 2018 and 2019, Guangdong lowered the tariff of general industry and commerce by the same amount based on the tariff of general industry and commerce in the province. Because the tariff of the Pearl River Delta region is relatively high, the tariff reduction in the tariff adjustment is less than 10%, and the tariff of the eastern, western and northern Guangdong is higher than 10%. The survey also reflects the above situation: 89% of the enterprises in the Pearl River Delta region believe that the average electricity price in 2018 has dropped by less than 10%; 52.42% of the enterprises believe that the average electricity price in 2018 has dropped by less than 10%. 68.15% and 51.01% of the enterprises respectively regard preferential policies such as local government tax and labor cost as the primary factors for the selection of investment location, followed by industrial layout (22.58%) and land cost (20.56%), and only 13.10% consider the factor of electricity cost. 72.78% of the enterprises recognize the current status of the price zone; 46.57% of the enterprises prefer to maintain the current status of the price zone within 5 years. Nearly half of the enterprises in Shenzhen have reduced electricity prices within 10% in the past two years, and tend to adjust the electricity price in the province in the future, but preferential policies such as local government tax and labor cost are still the primary factors for the selection of investment location. 47.67% of users expect to narrow the price gap properly, but nearly a quarter of users recognize the status quo of the Electricity Price Bureau and hold an indifferent attitude; 67.44% and 60.47% of enterprises take preferential policies such as local government taxes and labor costs as the primary factors for investment decision-making, respectively; followed by land cost (22.09%) and industrial layout (18.60%); only 15.12% consider the cost of electricity.

#### **4.2 Different categories of electricity consumption**

68.70% of large industrial users think that the current price zone status should be maintained; 50.73% of the enterprises tend to the price zone reform time is best within 5 years; 77.61% of the enterprises think that the provincial capital source of the same price should be government subsidies; 40.76% of the enterprises think that the more reasonable way to adjust the price is to take the provincial average price as the benchmark, lower than the benchmark price to the average price, lower than the benchmark price to the average price. Large industrial users and general industrial and commercial users generally regard preferential policies such as local government taxes, labor costs, land costs and so on as the main considerations for the choice of investment sites, and the cost of electricity is relatively not very important. In large industry, 72.79% give priority to preferential policies such as local government taxes, and 61.19% choose labor costs as the main considerations for investment. The second is land cost (19.12%) and industrial layout (16.67%). General industrial and commercial considerations for the above factors are also basically the same, respectively 70.98%, 64.39%, 20.33% and 14.69%. The two types of users consider the cost of electricity factors only 13.48% and 9.75%, respectively.

#### **4.3 Different industries**

In the past two years, most users of high energy consumption manufacturing industry have a price reduction range of less than 10%, with strong demands for price reduction, but the cost

of electricity is not the key factor affecting the choice of investment location, and 58.96% of users can accept the appropriate increase in electricity costs brought by the purchase of clean energy; for the choice of investment location, 71.10% and 57.23% of users regard preferential policies such as local government taxes and labor costs as the two most important factors affecting the choice of investment location, followed by the factor of industrial layout (21.39%), and the cost of electricity is less than 20%, only 18.50%. On average, 18% of users tend to reform within 1-2 years, and 43.93% of users expect to implement reform within 5 years. For the adjustment method of electricity price, 34.68% of users hope to take the provincial average price as the benchmark, and reduce the price higher than the benchmark to the average price, and increase the price lower than the benchmark to the average price; another 29.48% of users hope to reduce the industrial electricity price uniformly in the province.

#### **4.4 Different proportion of electricity cost**

All kinds of users have basically the same expectations for the current electricity price level and future reform. According to the relative sensitivity of electricity price and electricity fee for enterprises, this paper roughly divides into three categories: 5% and below, 5-15%, and more than 15%. Among them, the vast majority of enterprise users whose electricity cost accounts for 5% and below (67.03% of the total effective samples) believe that the current electricity price level and the current situation of the electricity price bureau are reasonable. 58.88% of them prefer to reform within 5 years, and 23.94% of them suggest to take other ways such as maintaining the electricity price unchanged. Most of the enterprise users whose electricity cost accounts for more than 15% have strong demands for price reduction and reform expectations, but the electricity cost is not the key factor affecting the choice of investment location, and they are willing to bear the cost of clean energy. 42.27% of the users can accept the appropriate increase in electricity cost caused by the purchase of clean energy. For the choice of investment location, 65.46% and 53.09% of the users respectively regard preferential policies such as local government tax and labor cost as the two most important factors affecting the choice of investment location, and less than one third of the factor is electricity cost.

## **5 Conclusions**

According to the comprehensive survey and analysis, from the feedback of users, most enterprises think that the local electricity price is relatively reasonable, and tend to maintain the current price zone model unchanged. If the price zone reform is promoted in the future, the vast majority of users think that the reform is more appropriate to be implemented within 5 years, and they also expect the government to support the reform with financial subsidies. For the future electricity price adjustment method, most users tend to take the average price of the province as the benchmark, and the price higher than the benchmark is reduced to the average price, and the price lower than the benchmark is increased to the average price. For the choice of investment place, the main considerations are the preferential policies of local government tax and labor cost, followed by land cost and other factors, and the consideration of electricity cost is relatively low.

The open questions of the questionnaire received a total of 1965 enterprises' feedback, and put forward relevant suggestions for further optimizing the electricity environment: First, the government is expected to subsidize or reward enterprises for support. Enterprises generally reflect that while reducing the price of electricity within the scope of national policies, they hope to give enterprises preferential and support through government subsidies or energy saving awards in different forms, so as to further reduce the burden on enterprises. Second, participate in and share market-oriented dividends. Some small and medium-sized users have limited electricity consumption, and hope to reduce the market access threshold, through the contract market, by the supply and demand sides through market pricing, participate in and share market-oriented price reduction dividends. Third, it is expected to optimize the current peak and valley electricity prices. Many export-oriented enterprises reflect that, affected by the international trade situation, export output is reduced, and almost no electricity is used during the valley. It is hoped that the optimization of the peak and valley electricity price policy will promote enterprises to flexibly arrange production. Fourth, reduce or cancel government-managed funds and attachments. Most enterprises hope that the government will further reduce or cancel government-managed funds and attachments. At the same time, it is also hoped that the government will increase support for the development of clean energy industry through fiscal subsidies. Fifth, the price area reform takes into account regional development. For the province's electricity price area reform, it is hoped that the local economic development level will be combined to support the economic and social development of mountainous and less developed areas in northern Guangdong, and consider maintaining regional differences.

This survey provides relevant decision support for the competent government departments to optimize the business environment of electricity consumption; meanwhile, looking forward to the future, in the practical work, there is still room to further improve the scientificity, sustainability and accuracy of the survey and research, and help the high-quality development of the power industry and the economic society with high-quality survey and research.

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