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FROM AMBITION TO ACTION: GROWTH STRATEGIES FOR BIOMASS ENERGY ENTERPRISES IN THE DUAL CARBON ERA

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ABSTRACT
In the wake of China's introduction of the "dual carbon goals" in 2020, the imperative of fostering green renewable energy has taken center stage in the pursuit of low-carbon development. Notably, biomass energy stands out as the singular zero-carbon energy source on a global scale. Accelerating the growth of the biomass energy sector emerges as a strategic pathway towards realizing the "dual carbon" objectives. Presently, biomass energy utilization constitutes less than 10% of China's renewable clean energy portfolio, signifying ample room for expansion for biomass energy enterprises.
Against the backdrop of the "dual carbon" goals, this paper identifies considerable opportunities for biomass energy enterprises. By addressing the developmental challenges faced by these enterprises, this research not only aids companies in gauging their progress but also facilitates governmental agencies in gaining insights into enterprise dynamics. Such insights can be instrumental in crafting efficacious policies that align with the overarching goal of sustainable biomass energy development.

Keywords: Dual Carbon Goals, Biomass Energy, Renewable Energy, Sustainable Development, Policy Formulation

Introduction

After China put forward the "dual carbon goals" in 2020, vigorously developing green renewable energy has become the main direction of low-carbon development. Biomass energy is recognized as the only zero-carbon energy source in the world. Accelerating the development of the biomass energy industry is an effective way to achieve the "dual carbon" goal. At present, biomass energy utilization accounts for less than 10% of China's renewable clean energy. Under the background of "dual carbon" goals, there is adequate development space for biomass energy enterprises. Research of the development problems of biomass enterprise can help enterprises better assess their development level. Additionally, it can also be useful for relevant government department understand the status of the enterprises, and provide corresponding reference for the formulation of efficient policies.

1. Literature Review

At present, scholars have carried out extensive research on the issue of enterprise growth. Penrose pointed out that the growth process of an enterprise was comprised of two parts: "quantitative change" and "qualitative change"[1]. Song Peng and Huang Qian regarded growth as an ability that could help enterprises become stronger, bringing considerable benefits and good development prospects to enterprises in the future[2]. Some scholars believed that the prototype source of business

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development came from innovation, which could help enterprise to gain sustainable competitive advantage[3-4]. Another scholars carried research on the relationship between corporate growth and executive characteristics, corporate culture and organizational management mode[5-6]. Song Weiwei found that there was an inverted U-shaped relationship between financial flexibility and enterprise growth[7]. These research articles explain the concept of enterprise growth from different views. Although the focus are different, they all believe that growth is an important ability of an enterprise. How to measure the growth of enterprises is another research hotspot. Aiming at the characteristics of venture enterprises, Fan Bonai established a hierarchical evaluation system for growth based on previous research[8]. Li Bingxiang constructed an enterprise growth measurement index system based on the perspectives of enterprise resources, capabilities and its own characteristics[9]. Kiani mainly evaluated the growth of enterprises from the dimensions of business strength, profit level and future development prospects[10]. Tarnóczi et al. incorporated the two indicators of endogenous growth rate and sustainable growth rate into the evaluation index system of enterprise growth[11]. Bagger closely linked the issue of corporate growth with vacant jobs and employee employment[12]. Qiao Han established a growth classification model based on machine learning algorithm[13]. In general, the existing literature mainly

First-level indicator	Second-level indicator	Symbol	Third-level indicator	Calculation methods
Financial indicator	Profitability	X1	Operating margin	Operating profit/operating income
		X 2	Return on equity	Net profit/average net assets
		X3	Cost and expense margins	Total profit/total cost expense
	Operating ability	X 4	Accounts receivable turnover	Operating income/average accounts receivable balance
		X5	Total asset turnover	Operating income/total average assets
	Debate solvency	X6	Liquidity ratio	Current assets/current liabilities
		X7	Quick ratio	Quick assets/current liabilities
		X8	Gearing ratio	Total liabilities/total assets
	Development ability	X9	Capital accumulation rate	Increase in owner's equity for the current year / owner's equity at the beginning of the year
		X 10	Total asset growth rate	Total asset growth for the year / total assets at the beginning of the year
		X11	Growth rate of operating income	Growth in operating income for the current year / total operating income in the previous year
Non-financial indicator	Innovation ability	X12	Number of patents applied	Official website of the State Intellectual Property Office

uses financial and non-financial indicators to comprehensively evaluate the growth of enterprises, and the evaluation methods mainly include mutation progression method, factor analysis method, entropy value method, fuzzy comprehensive evaluation, TOPSIS analysis and other methods.

However, at present, there are relatively few results in the growth analysis and research of biomass energy enterprises in combination with the "dual carbon" goals. In the process of helping China to achieve the "dual carbon" goals, biomass energy plays an important role. It is necessary to carry out research on the growth of biomass energy enterprises, to help enterprises correctly understand their own growth ability, which is also the problem that the thesis topic is trying to solve.

3. Growth Evaluation Index System and Method of Biomass Energy Enterprises

3.1 Construction of Growth Evaluation Index System for Biomass Energy Enterprises

Enterprise growth refers to the survival and development of enterprises, and is the leapfrog process in which enterprises continuously realize the combination of "quality" and "quantity" and change from quality to quantity. The growth of the enterprise and the improvement of the financial performance of the enterprise are mutually reinforcing. The better the growth of a company, the better its financial indicators. If the financial performance of the business is good, it will in turn promote the growth of the business. Therefore, when analyzing the growth of enterprises, financial indicators are mainly used, and other non-financial indicators are combined to comprehensively analyze and evaluate the growth stage and capacity of enterprises.

Table 1: Growth evaluation index system of biomass energy enterprises

In view of the fact that financial status is an important part of analyzing the growth of enterprises, this paper selects several financial indicators for the evaluation of the growth of biomass energy enterprises from four aspects: profitability, operating ability, debt solvency and development ability. Among them, profitability is used to evaluate the strength of the enterprise's ability of profit. Operating capacity is an important indicator for evaluating the ability of enterprise sales, turnover and other aspects, reflecting the ability of enterprises to efficiently manage and utilize the resources they have. The ability to repay debts mainly evaluates whether an enterprise has the capability to repay its debts due on time, which reflects the enterprise's ability to continue to operate and resist risks, which is the key to the continued survival and development of the enterprise. The development capability is used to evaluate 04

whether the enterprise has the potential ability to further expand the scale of production and operation in the future.

As a clean and renewable energy source, biomass energy requires a large number of new technologies as support in the process of conversion and utilization. The innovation ability can help enterprises gain competitive advantages and promote the sustainable development. Considering the availability of data, the number of patents filed by enterprises per year is used as a non-financial indicator for growth evaluation factors, which is used to reflect the innovation ability of enterprises. Based on the above considerations, a growth evaluation index system for biomass energy enterprises is constructed, including two first-level indicators of financial indicators and non-financial indicators, as well as five second-level indicators and twelve third-level indicators. The meaning of each indicator and the calculation method are shown in Table 1.

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3.2 Evaluation Method of Growth of Biomass Energy Enterprises

The entropy method determines the weight of each index by calculating the entropy value of each indicator to reflect the degree of fluctuation and discreteness of the index. The entropy value method can objectively reflect the importance of various indicators in the empowerment process, and effectively eliminate the interference of human subjective factors. This paper uses the entropy value method to empower the indicators in the growth evaluation index system of biomass energy enterprises to ensure the objectivity and scientificity of evaluation.

The entropy method first need distinguish the types of different indicators, that is, positive indicators or negative indicators. And calculates the weights according to the following steps after standardizing and translating the data. The specific evaluation process is as follows

Let $X_{ij}(i = 1,2, \cdots, n; j = 1,2, \cdots m)$ is the observation data for the jth indicator of the ith object to be evaluated.

First, calculate the ratio of the index Xij: $p_{ij} = \frac{X_{ij}}{\sum_{i=1}^{n} X_{ij}}$

Secondly, calculate the entropy value of the jth evaluation index: $e_j = -\frac{1}{\ln n}\sum_{i=1}^{n} p_{ij} \ln(p_{ij})$

Furthermore, calculate the variance coefficient of Xij : $g_j = 1 - e_j$ Then, calculate the weight of each indicator: $w_j = \frac{g_j}{\sum_{j=1}^{m} g_j}$

Finally, combined with the observation data of various indicators, the growth score of the enterprise is calculated: $Y_i = \sum^{m}_{j=1} w_j X_{ij}$.

4. Chant Group Case Analysis

4.1 Analysis of Chant Group Growth

4.1.1 The Source of Data

Table 2: The raw data of various indicators of the enterprise

Indicators	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
X_1	5.08%	4.99%	5.30%	7.45%	8.52%	6.50%	10.69%	16.33%	15.58%	-5.54%
X_2	5.42%	3.70%	4.60%	6.79%	9.06%	4.29%	7.81%	13.18%	13.65%	-6.06%
X_3	8.48%	6.22%	7.50%	10.62%	12.54%	6.97%	11.39%	19.36%	18.59%	-5.21%
X_4	767.60%	733.13%	810.67%	606.36%	591.27%	503.13%	636.28%	690.89%	380.78%	208.18%
X_5	58.83%	58.50%	57.45%	55.63%	61.91%	51.30%	43.96%	41.80%	37.15%	27.92%
X_6	123.66%	102.71%	140.41%	82.83%	88.06%	83.05%	66.77%	60.52%	125.90%	104.85%
X_7	83.34%	62.30%	113.20%	58.88%	63.29%	58.36%	48.90%	49.59%	106.01%	96.01%
X_8	41.52%	45.75%	41.70%	44.18%	39.21%	49.07%	57.77%	65.04%	70.49%	74.63%
X_9	-4.49%	-1.02%	55.33%	-2.46%	22.07%	6.10%	0.73%	14.78%	13.40%	-10.97%

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X_{10}	8.24%	6.69%	44.54 %	1.86%	12.10 %	26.63 %	21.48 %	38.67 %	34.32 %	3.58%
X_{11}	-11.92 %	6.82 %	23.96 %	15.53 %	19.12 %	-0.74%	6.05%	24.46 %	20.98 %	-12.28 %
X_{12}	2	16	47	9	7	17	25	53	5	0

Date source: CSMAR database and State Intellectual Property Office.

Guangdong Chant Group began to enter the field of waste incineration power generation in 2004, gradually focused its development on the environmental protection industry. The group built a number of biomass energy utilization projects with a cumulative investment of more than billions yuan. Biomass power generation is becoming the company's main business income source. According to the growth evaluation index system of biomass energy enterprises, the relevant data of Chant Group from 2012 to 2021 are selected to analyze their growth. The raw data are shown in Table 2.

4.1.2 Chant Group's Growth Evaluation Results and Analysis

The entropy method was used to calculate the weights of each index of growth evaluation, and the specific results are shown in Table 3.

Table 3: The weight of various indicators of biomass energy enterprise growth evaluation

Indicators	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
Weight (%)	4.54	4.32	4.48	4.88	5.44	8.51	13.9	7.12	11.4	12.2	8.61	14.4

Combined with the observation data of various evaluation indicators of Chant Group, the growth score of the enterprise from 2012 to 2021 is calculated, and its change trend is shown in Figure 1.

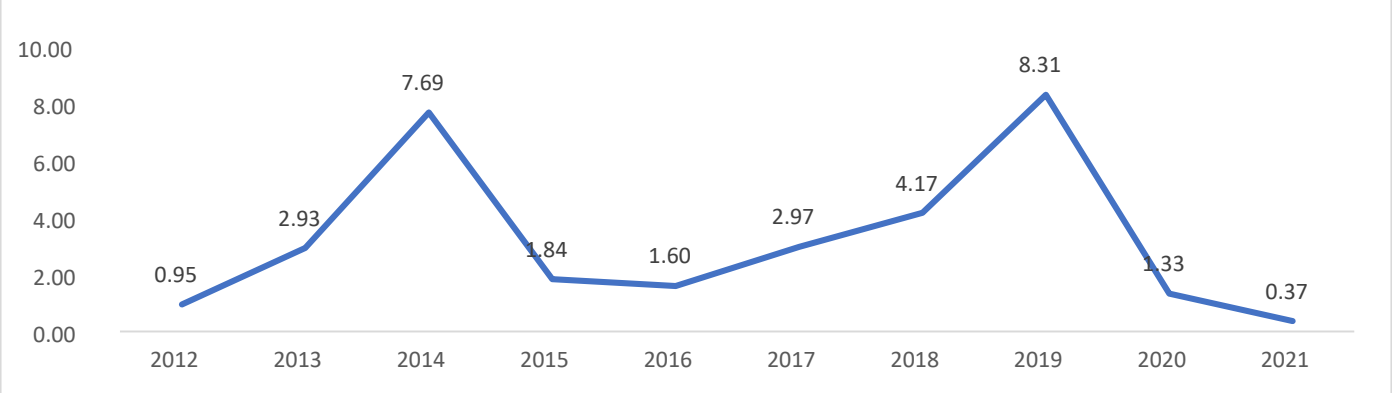

Figure 1: Chant Group's growth score and change trend from 2012 to 2021

As the data of Figure 1, 2014 and 2019 were the two years with the best growth of Chant Group, while 2015 and 2020 were the two turning points of the decline in corporate growth.

By reviewing the annual reports of Chant Group in 2014 and 2019, it is found that the operating profit of the company has increased significantly in these two years, especially in 2019, which increased by 193 million yuan, a year-on-year increase of 89.77%. In 2014, the total assets of the enterprise increased by nearly 880 million yuan, of which current assets were nearly 670 million yuan and non-current assets were about 210 million yuan, compared with the debt increase of only 290 million yuan, and current liabilities also decreased. In 2019, the total assets of the enterprise increased by about 2 billion yuan, mainly due to the increase in project investment and construction of the environmental protection industry. In this year, Chant Group obtained the new land use right

of the environmental protection industry, resulting in a significant increase in the company's intangible assets and projects under construction. Among them, the construction in progress increased by 41.14%, and the intangible assets increased by 119.49%. In addition, according to the weights of the indicators shown in Table 3, the indicator of the number of patents filed representing the ability to innovate has the highest weight, which is 14.4%. In 2014 and 2019, Chant Group's research and development capabilities were very outstanding, and the number of patents applied for was about 50, which is much higher than that of other years, significantly improving the growth level of the enterprise.

However, in 2015, while the current liabilities of Chant Group increased by nearly 160 million yuan, while its current assets decreased by nearly 370 million yuan. This was mainly due to the fact that the company gradually invested RMB530 million from the non-public offering of RMB ordinary A shares received on December 31, 2014 into the construction of the fundraising project, resulting in a significant reduction in the balance of monetary funds at the end of 2015, significantly reducing the company's solvency and generating liquidity risks. In addition, due to the increase in restricted stock amortization expenses and compensation, the company's management expenses increased by nearly 43 million yuan in 2015, a year-on-year increase of 35.28%, which once again lowered the growth level of the enterprise. From 2016 to 2019, the increase in liabilities of Chant Group slowed down, while assets and operating income increased, and the growth level of enterprises rebounded and reached a new high. However, the COVID-19 epidemic in 2020 had a serious impact on the company's business activities, and in the case of a year-on-year decline in the growth rate of operating income, the cost of expenses was still high, especially the financial expenses, which increased by 126.68% year-on-year due to interest expenses, reducing the profitability of the enterprise. In addition, in the past two years, the R&D investment of Chant Group had also decreased, and the number of patents applied by enterprises had dropped to single digits, which further affected the growth level of enterprises.

It should be pointed out that although the growth of Chant Group has shown a downward trend since 2020 due to the impact of the COVID-19, the trend has slowed down, falling by 83.99% in 2020. This is related to the gradual recovery of enterprise production activities with the control of the epidemic. Besides, it is also closely related to the active implementation of the "dual carbon" goals strategy. In September 2020, China put forward the "dual carbon" development goal. In July 2021, China opened the national carbon emission trading. By analyzing the annual report data of Chant Group in 2020 and 2021, it can be found that it have gradually begun to pay attention to the development of "dual carbon". In the 2020 annual report, there were only two references to "carbon", and in the 2021 annual report, the description of "carbon" increased significantly to 28 times, including 10 "carbon emissions", 4 "carbon emission reductions", and 3 "carbon trading", "carbon neutrality" and "carbon peaking". For the first time, Chant Group enjoyed the dividends of "carbon trading", and achieved carbon emission trading income of 8,254,716.95 yuan in 2021. Through trading the carbon emissions saved by biomass energy projects, Chant Group has obtained carbon emission reduction benefits, increased non-operating income, improved corporate profits, improved corporate profitability, and brought favorable impact to the growth level.

4.2 The Problems of the Growth of Chant Group

(1) The cost growth rate is fast and the efficiency of capital utilization is low. Expenses is an important factor affecting the profitability of a business. If the increase in expenses exceeds the growth rate of operating income, it will inevitably cause a decline in profitability and affect the growth of the enterprise. In 2015 and 2020, the operating income growth rate of Chant Group was 15.50% and 20.98% respectively, while the financial expenses increased by 25.73% and 126.68% respectively in the same period. This shows that Chant Group has great room for improvement in the control and utilization of expenses.

(2) The growth fluctuates greatly and the development is unstable. Figure 2 shows that the scores of Chant Group's best growth in 2014 and 2019 were as high as 7.69 and 8.31 respectively, exceeding the other years by several times, while the scores of 2012 and 2021, the worst growth were only 0.95 and 0.37. This shows that there is great volatility in the growth of Chant Group, and it is difficult to maintain long-term stable development.

(3) The investment in R&D is low and the innovation ability is seriously insufficient. The biomass energy industry is different from the traditional manufacturing industry. Its stable development needs a strong R&D and innovation capabilities to support. Chant Group's expenses in R&D is seriously insufficient, resulting in weak innovation ability and unable to support the long-term stable growth. Since 2017, the proportion of R&D expenses to operating income of Chant Group has never exceeded 1%, and even in 2019, the best growth year, the proportion was only 0.82%.

4.3 The Suggestions to Improve the Growth of Chant Group

First, reduce the cost and improve the efficiency of capital use. Enterprises should improve the efficiency of the use of assets and funds through effective management. In addition, the expenses of Chant Group, especially the financial part, has grown too fast. Chant Group need to strengthen management in terms of expenses and improve corporate profitability.

Second, make full use of policy support to enhance the development space. Under the background of "dual carbon" goals, the state has successively issued a number of policies to support and guide the development of biomass energy industry. Chant Group should make full use of industrial support policies, actively participate in the carbon trading market, expand the source of corporate income, and achieve better development in the future.

Third, increase the investment in research and development and enhance the innovation ability of enterprises. Technology is the primary productive force, especially for biomass energy enterprises. A large part of the reason for the large fluctuation of the enterprise growth comes from the fluctuation of innovation ability. In the future, Chant Group should continuously improve the level of enterprise research and development and create a scientific and technological competitive advantage.

5. Conclusion

Based on the characteristics of biomass energy industry, this paper establishes a growth evaluation index system for biomass energy enterprises. Taking Chant Group as an example, the paper objectively evaluates and analyzes its growth from 2012 to 2021, and especially explains the impact of the "dual carbon" goals on its growth. The research results have a certain role in promoting the sustainable development of biomass energy enterprises in the era of "dual carbon" goals in China. It should be pointed out that this paper only conducts a longitudinal analysis of the growth of Chant

Group in the past ten years, does not conduct a horizontal comparative analysis of the entire biomass energy industry, which will be what to be further studied in the future.

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