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Quantitative research of "dual carbon" policy text based on objective perspective

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Abstract: *Since China put forward the " double carbon " goal in 2020, the relevant policy texts have been continuously expanded and improved. This paper selects 47 key policy texts in the field of " double carbon " as the research object, constructs a two-dimensional analysis framework of " policy tool-target, " and uses MAXQDA2018 software to encode and classify the policy texts. It is analyzed from two dimensions of policy tools and policy objectives. The study found that the use of various policy tools is more reasonable, the use of demand-based policy tools needs to be improved, the policy goal orientation is in line with the current " double carbon " goal, the long-term planning needs to be strengthened, and the matching of policy tools and policy goals is prominent and clear. At present, China 's " double carbon " policy should optimize the allocation of policy tools, balance the layout of policy tools, pay attention to long-term goal planning, and strengthen personnel training, so as to provide inexhaustible impetus for winning the " double carbon " battle in the new era.*

Keywords: *Double carbon strategy, green development, policy tools, energy reform, MAXQDA*

1. Introduction

The problem of global climate change and environmental pollution is becoming increasingly serious. In the world, all countries are trying to take positive measures to control or reduce carbon emissions in order to promote sustainable development.

As one of the world's largest carbon emitting countries, the introduction of the "dual carbon" policy is of great significance. The proposal of "double carbon" marks a new stage of social development that China enters into with green transformation as an important driving force, which means that for a long time in the future, "double carbon" policy will penetrate into China's economic, social, cultural and ecological development as an important rigid guidance policy. The "dual carbon" transition is not only a historic opportunity for China, but also brings a series of challenges. The "dual-carbon" transition is not only the responsibility of a major country, but also an opportunity for economic and industrial development, and a feasible path to realize national security independence [1-2].

From July 17 to 18, 2023, the National Conference on Ecological and Environmental Protection was held in Beijing [3]. It marks that China is gradually establishing a "1+N" policy system based on the "dual carbon" goal, that is, the "Opinions of the CPC Central Committee and The State Council on Fully, Accurately and Comprehensively Implementing the New Development Concept to Achieve Carbon Peak and Carbon Neutrality" as the core, and the "Action Plan for Carbon Peak before 2030" as the main content. A series of policy documents covering specific industries such as energy, industry, transportation and urban and rural construction.

Through literature review, it is found that the current domestic research on "dual-carbon" mainly includes two aspects: application field and policy research. Among them, the research on "dual-carbon" application field mainly includes three directions: first, the strategic and international significance of "dual-carbon" policy [4]; Second, the practical impact of the "dual carbon" policy on all walks of life, such as metallurgical industry, automobile industry, energy industry, electric power industry, etc. [5]; Third, the research on the burden compensation of enterprises caused by the "dual-carbon" policy [6]. In the research on "dual-carbon" policy, Song Min and other scholars analyzed specific "dual-carbon" policy documents from the perspective of policy tools and put forward policy formulation suggestions [7]. Fu Lin et al. used the quantitative analysis method of policy content to analyze China's carbon emission reduction policies from the fields of energy, industry, construction and transportation, and proposed a new idea to optimize the "dual carbon" policy [8]. Ma Yingjie and other scholars sorted out

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and studied the low carbon policy promulgated by our country in accordance with the time context to promote energy saving, emission reduction and pollution control, and found the phased characteristics and inherent evolution law of low carbon policy of our country [9]. By constructing a three-dimensional analysis framework for provincial "dual carbon" policies, Jin Luyao and other scholars analyzed the policy contents in depth and put forward suggestions on policy coordination and other aspects [10]. Based on the above contents, scholars have achieved a wealth of research results and conclusions. In particular, the impact of the "dual carbon" policy on various industries provides an important reference for the production and development of enterprises. However, there are still some deficiencies in the existing researches, such as the specific and detailed research on a single industry, and insufficient in-depth discussion on the overall control and value of the "dual carbon" policy. With the continuous renewal and expansion of the "double carbon" policy library, the text research of "double carbon" policy should be carried out continuously and deeply. Based on the perspective of policy tools, this paper uses MAXQDA2018 software to make a quantitative analysis of the content of the "dual-carbon" policy texts issued by departments of The State Council and central ministries, discusses the use of different policies, and proposes an optimization path for policy tools to consolidate the achievements of the "dual-carbon" policy application, so as to promote the application of policy tools in the "dual-carbon" field.

2. Theoretical framework construction

This paper constructs an analytical framework of "dual-carbon" policy text from two dimensions of policy tools (X dimension) and policy objectives (Y dimension), and studies the content characteristics and the use of policy tools of "dual-carbon" policy in China under this framework.

2.1 Dimensions of Policy Tools (X dimension)

The purpose of policy tool research is to provide the "guide" for the government to choose the right tool, so that the government can better achieve the governance goal on the basis of balancing the interests of multiple parties. Of course, the choice and application of policy tools are affected by many factors, and the evaluation of their effects is difficult to maintain absolute neutrality and justice. Under the background of different socio-economic development levels and governance models, the research, selection and application of policy tools will also form different characteristics [11].

Domestic scholars hold different views and attitudes towards the classification of policy tools. The generally accepted classification method is the "three-way method" proposed by British scholar Roswell and Dutch scholar Segerfeld, that is, policy tools can be divided into three types: supply type, demand type and environment type. This paper makes reference to the above views. China's policy documents on "dual carbon" are divided into the above three types [12].

Supply-oriented policy tools refer to policies that directly promote policy objectives and can generally directly reflect the dominant position and main responsibility of the government, which generally include direct financial allocation, capital investment, technology support, talent introduction, equipment upgrading and other aspects [13]. Demand-oriented policy tools refer to the government's promotion of industrial development through service outsourcing, government-enterprise cooperation, social participation, and establishment of demonstration zones, which mainly reflect the policy role played by product market [14]. Environmental policy tool means that the government creates a favorable development environment for policy implementation through top-level design and institutional guarantee, and indirectly promotes the role of policy through environmental construction. By referring to previous studies on the classification and division of "dual-carbon" policy tools and combining the selected "dual-carbon" policy texts, this paper constructs the classification of "dual-carbon" policy tools. The specific contents and interpretation are shown in Table 1.

Table 1. Types, names and definitions of "dual carbon" policy instruments

Tool type	Tool name	Instrumental interpretation
supply-side	capital investment	Provide financial support for the development of "dual carbon", such as the establishment of special funds and financial allocations
	innovation drive	Vigorously develop low-carbon industries, emphasize scientific and technological research, and pay attention to new energy, new materials and new technologies
	Facility construction	For the construction of facilities in the field of "dual carbon", carbon neutral College has been established and listed as a research base
	cultivation of talent	Establish a "double carbon" personnel training mechanism and

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		strengthen the means of personnel training
	financial policy	Broadening financing channels for carbon-emitting enterprises through social financing, credit preferences and other means
	Incentive mechanism	Provide awards and support to enterprises and departments that actively implement the “dual carbon” policy.
	green bond	Establishment of bond instruments dedicated to financing or refinancing green projects
demand-based	Organizational leadership	Strengthening leadership at the central and local levels to build an integrated approach to the “double carbon” effort
	Government-Enterprise Cooperation	Transferring part of the “dual-carbon” activities to enterprises through public-private partnerships
	exchanges with foreigners	Integration of the international and domestic situations, based on the Belt and Road, and the establishment of a green trade system
	Pilot demonstrations	Prioritize “dual-carbon” pilot activities and establish a number of exemplary parks
	risk prevention	To achieve pollution reduction and energy security to ensure the normal life of the masses, safe carbon reduction
	industrial layout	Give full consideration to international, domestic and regional economic development trends and rationalize the layout of green industries.
	Site support	Provide land concessions and support for projects that develop a green economy and carry out low-carbon activities
environmental	target planning	“Dual-carbon” strategic objectives and specific planning, deepening the adjustment of industrial structure and focusing on the ecological environment
	legal construction	Establishment of regulatory, operational and oversight mechanisms and legal norms for effective linkage between policy and effectiveness
	Tax incentives	Ensure effective implementation of the “dual carbon” policy by adopting policies such as tax incentives for some enterprises
	deepen reform	Supervise reforms in key industries such as electric power and petrochemicals to accelerate the promotion of the system
	Publicity and promotion	Advocating green mobility, creating a low-carbon social atmosphere and accelerating the formation of a green lifestyle
	Technical promotion	Promoting green industry and reducing total carbon emissions through the development of science and technology
	Low-carbon products	Research and development of low-carbon products with energy-saving and emission reduction effects, focusing on the role of lifestyle in environmental protection.

2.2 Policy Objective Dimension (Y-dimension)

The Opinions of the Central Committee of the Communist Party of China and The State Council on the complete, accurate and comprehensive implementation of the new development concept to do a good job of carbon peak carbon neutral work clearly pointed out that the ultimate goal of the "dual carbon" work is divided into three steps: By 2025, the economic system of green low-carbon circular development is initially formed, and the energy utilization efficiency of key industries is greatly improved; By 2030, remarkable results should be achieved in the comprehensive green transformation of economic and social development, and the energy efficiency of key energy-consuming industries should reach the international advanced level. By 2060, an economic system of green, low-carbon and circular development and a clean, low-carbon, safe and efficient energy system will be fully established, energy utilization efficiency will reach the international advanced level, and the construction of ecological civilization will achieve fruitful results, creating a new realm of harmonious coexistence between man and nature [15].

Combining the three-step strategy of "double carbon" target with the current "double carbon" strategic focus of "focusing on the defense of blue sky, clear water and clean land" proposed by the Ministry of Environment, this paper divides the policy objectives into four dimensions, namely, strengthening environmental governance and protection, building a low-carbon economic system, transforming the development of a green society, and building a low-carbon society in an all-round way.

2.3 Tools - Target 2D analysis framework

According to Roswell and Segfeld's three-way method of policy instruments, combining the four

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dimensions of "two-carbon" policy objectives and the overall requirements of "two-carbon" policy, a two-dimensional analysis framework of policy objectives (X-dimension) - policy instruments (Y-dimension) is formed, as shown in Figure 1.

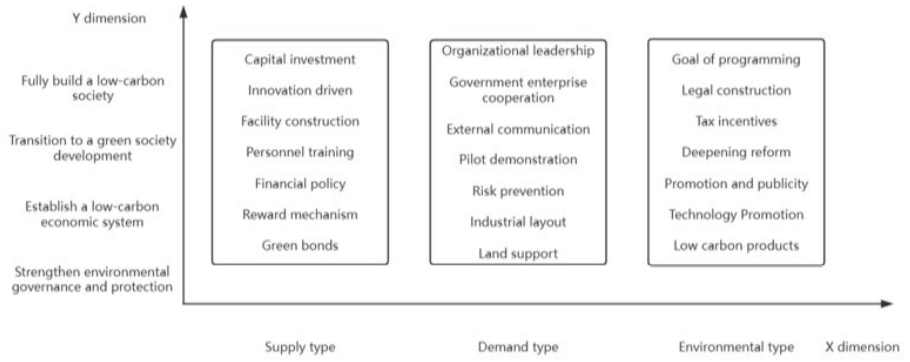

Figure 1. Policy tools for "two-carbon" policy -- two-dimensional analysis framework for goals

3. Data sources and research methods

3.1 Source of policy text

The source of the text policy is a national policy document. The search was carried out on the websites of the Central People's Government of the People's Republic of China, the websites of The State Council and its ministries and commissions with keywords such as "dual carbon", "carbon neutrality", "carbon peak", "carbon emission", "low carbon" and "green development" from September 2021 to now, and a total of 133 policy texts were obtained, as shown in Table 2.

Table 2 "Dual carbon" policy text database (part)

ID	Policy name	Publication time	Issuing authority
1	Opinions on the complete, accurate and comprehensive implementation of the new development concept to do a good job of carbon peak carbon neutral work	2021-09-22	CPC Central Committee and State Council
2	Action Plan for Carbon Peak by 2030	2021-10-24	The State Council
3	Guiding Opinions on Accelerating the construction of a national unified electricity market system	2022-01-18	National Development and Reform Commission National Energy Administration
4	"14th Five-Year Plan" new energy storage development implementation plan	2022-01-29	National Development and Reform Commission National Energy Administration
……	……		……
46	Green low-carbon advanced technology demonstration project implementation plan	2023-08-22	National Development and Reform Commission and other 10 departments
47	Implementation opinions of the General Administration of Market Supervision on coordinating the use of quality certification services to reach peak carbon neutrality	2023-10-12	General Administration of Market Regulation

3.2 Research Methods

In this paper, text content analysis is adopted, and MAXQDA2018 software is combined to analyze the content characteristics and the use of policy tools of "dual carbon" policy from two dimensions of policy tools and policy objectives. MAXQDA2018 software can import, organize and analyze interview

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records, policy texts, web page pictures, data tables, etc. In this paper, MAXQDA2018 software is used to analyze the policy text mainly in the following ways: Firstly, 47 data policy texts collected and sorted are imported to form a policy text database; Secondly, the content of the policy text is coded manually according to the policy-target two-dimensional analysis framework, and counts and frequencies are counted and analyzed. Finally, through the text content analysis, the characteristics of policy content and the use of policy tools are explored.

3.3 Policy text coding

The MAXQDA2018 software was used to encode the relevant content of 47 "dual carbon" policy texts in the way of "text number - chapter - clause". For example, code 2-3-6 corresponds to the sixth chapter of the "Carbon Peak Action Plan before 2030", and the code content is "circular economy helps to reduce carbon action, seize the source of resource utilization. Vigorously develop circular economy, comprehensively improve resource utilization efficiency, and give full play to the synergistic effect of reducing resource consumption and reducing carbon "[16], which belongs to the deepening reform project of environmental policy tools, and the policy goal is to establish a low-carbon economic system. It should be noted that because each document is not the same in terms of the number of words and the format of the terms, the above encoding method is modified based on different texts, but it is based on the three-level encoding rules. The total number of coded nodes is 1225, as shown in Table 3.

Table 3. Coding situation of "Dual carbon" policy sample (part)

Policy text sequence number	Node content	Code	Types of policy instruments	Policy objective anchoring
1	Vigorously develop energy-saving and low-carbon buildings. Continuously improve energy-saving standards for new buildings, and accelerate the development of ultra-low-energy, near-zero-energy and low-carbon buildings on a large scale...	1-7-2	innovation-driven	Build a low-carbon society
……	……	……	……	……
10	Promote the reduction and use of building materials products. Precise use of building materials, reducing the use of high-carbon building materials products. Improve the quality and application level of cement products...	10-2-6	Goal programming	Build a low-carbon economy
……	……	……	……	……
47	Carry out various forms of publicity and promotion activities to guide various regions and industries to actively use quality certification services to reach the peak of carbon neutrality.	47-3-3	Publicity and promotion	Transform the development of green society

4. Statistics and analysis of policy text content

4.1 Semantic network analysis of "dual carbon" policy

According to the word frequency statistics of ROST6.0 software, the key words that appear more than 400 times in the "double carbon" policy text include low-carbon, green, ecological, development, energy, technology, standards, emissions, resources, environment, industry, economy, efficiency, trade, etc. Key words appearing 200-400 times include industrial structure, electricity, transportation, market, reform, security, risk, energy saving, efficiency, development, climate, energy efficiency, etc. Keywords that appear 100-200 times include circular economy, resource utilization, petrochemicals, agriculture, technology, institutions, innovation, demonstration, evaluation, research, foundation, etc. Combined with the semantic network diagram, it can be seen that: First, advocating low-carbon development, ecological governance, green economy, rational use of natural resources, and reducing carbon emissions are important power points and decision-making priorities of China's "dual carbon" policy at present;

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Secondly, petrochemical industry, electric power industry, transportation and other industrial industries are the key objects of low-carbon development, cost reduction and efficiency improvement, and energy saving innovation. Whether they can effectively achieve low-carbon development, do a good job in the reform of the new era, and optimize the industrial structure is the main reference and important supervision object of whether the "two-carbon" policy can be realized. Third, give play to the role of the market, carry out extensive trade activities, strengthen the "Belt and Road" cooperation, through technical support, innovation guidance to achieve comprehensive green economic and social development is the method choice and important path for the real realization of the "two-carbon" policy.

4.2 X-dimensional analysis of "dual carbon" policy

According to the three types of policy tools divided above and the coded summary results of policy texts, it is statistically concluded that the current use of policy tools of China's "dual carbon" policy is shown in Figure 2 below.

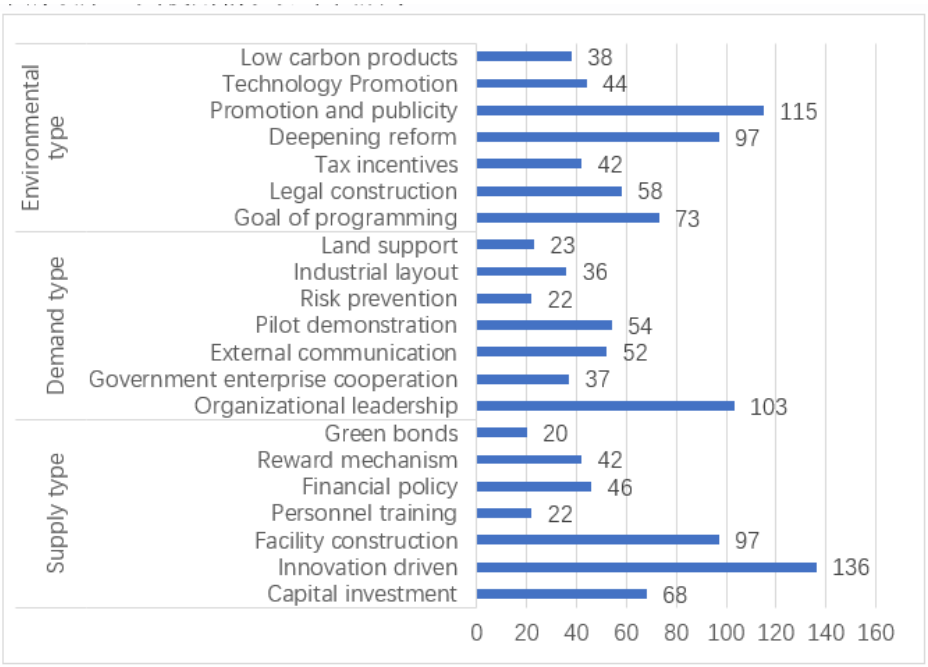

Figure 2 Specific distribution of the three types of policy instruments of the "two-carbon" policy

Environmental policy tools were used the most, with a total of 467, accounting for 38.12%, followed by supply policy tools, with a total of 431, accounting for 35.18%, and demand policy tools were used the least, with a total of 327, accounting for 26.69%. From the perspective of frequency distribution, the use frequency of supply-oriented policy tools and environment-oriented policy tools is similar to that of demand-oriented policy tools, and the ratio of the three is 7:5:7. It can be seen that the content of China's "dual carbon" policy comprehensively uses the three policy tools of supply, demand and environment, which provide a clear hierarchy and various forms of policy support for the achievement of the "dual carbon" goal. The use of the three policy tools also shows a certain gap, but on the whole, it is more balanced, taking into account the supply, guidance and cooperation. The emphasis of different types of policy instruments also varies markedly.

Supply-oriented policies focus on innovation. In terms of the use of supply-oriented policies, the highest proportion is innovation-driven (31.55%) and facility construction (22.51%), which indicates that the government pays more attention to the application of scientific and technological progress and dual-wheel drive in the field of carbon reduction when formulating "dual-carbon" policies. The ultimate realization of the "double carbon" goal can not only rely on temporary emissions ban, energy control and other means to achieve, the most important thing is to use scientific and technological innovation to promote industrial upgrading, with modern facilities to reduce emissions from the source, can make low-carbon become sustainable normal. However, it is difficult to effectively mobilize the market role only through the government's use of incentive innovation means to achieve the "dual carbon" goal, which is not conducive to giving play to the advantages of the market. In this case, the government stimulates the vitality of the market through capital investment, financial policy regulation, the issuance of green bonds

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and incentive mechanisms, and guides the rational allocation of resources with policy support, so as to effectively make up for the lack of government intervention. At the same time, the realization of the "double carbon" goal requires the extensive participation of talents in relevant fields, so it is also crucial for the training of professional talents, but at present, the use of talent policy tools is insufficient, accounting for only 5.10%.

Demand-oriented policies focus on organizational leadership. Organizational leadership accounted for 31.50% of the use of demand-oriented policies, and was the most important measure of demand-oriented policy tools. This shows that the state attaches great importance to the leading role played by government organizations at all levels in the process of "dual carbon" policy formulation, and can achieve national planning at the central level, top-level planning, and responsibility compaction at the local level, and give play to advantages, so as to achieve coordination and orderly promote the achievement of "dual carbon" goals. This phenomenon of the use of policy tools stems from the political advantages of the Party's overall leadership of all work and concentrated efforts to do big things. Through administrative coercive force to ensure the effective implementation of the "double carbon" policy, the proportion of industrial layout policy tools is 11.01%, which is also a strong evidence of the above conclusions. Government-enterprise cooperation is an effective means to stimulate domestic demand, but it is insufficient in the "double carbon" policy, which is mainly determined by the industry innovation of the "double carbon" policy and the internal requirements of people's life and production mode change. In addition, the proportion of foreign exchanges and pilot demonstrations is 15.90% and 16.51% respectively. Externally, strengthening foreign exchanges and continuously promoting the construction of green "One Belt and One Road" is the external value of the "two-carbon" policy in the context of global cooperation, and it is also the due action for China to actively respond to international climate negotiations and jointly assume environmental obligations. Internally, through the promotion of low-carbon technologies, the establishment of a number of pilot parks with demonstration significance, and the exploration of industrial demonstrations with promotion significance are the only way to accelerate the realization of the "dual carbon" policy. The application of risk prevention policy tools accounted for 6.37%. Compared with other demand-oriented policies, risk prevention played a role in ensuring stability, preventing the "dual carbon" reform from being too radical and damaging people's existing rights, and was a safety valve to ensure the transformation from the current social and economic model to comprehensive low-carbon social and economic development. The land support is conducive to the extensive implementation of the "dual carbon" policy is an important approach, at present, the use of these two policy tools should be further strengthened.

Environmental policy emphasizes publicity and deepening reform. The use of environmental policy instruments has a stronger incentive effect than the previous two policy instruments. Among them, publicity and promotion (24.63%) and deepening reform (20.77%) are the main aspects of environmental policy tools, which reflects that China pays more attention to encouraging people to independently develop green and low-carbon living and production modes through publicity and guidance in the formulation of "dual carbon" policy, and pays more attention to self-transformation through deepening reform. The internal environment conducive to the comprehensive transformation of a low-carbon society will be stimulated from the inside, and the low-carbon concept will be deeply cast into a social consensus through national education, publicity and demonstration, so as to accelerate the formation of a nationwide low-carbon healthy development pattern. In contrast, target planning (15.63%) and legal construction (12.42%) more reflect the importance of the Chinese government to comprehensively promote the "dual carbon" construction. Target planning is to use pre-design to give impetus to green development, while legal construction provides institutional protection for low-carbon development from the legal level. Tax incentives (8.99%) are price subsidies for enterprises with green development through tax means, which can promote the determination of enterprises to change and delimit the direction of low-carbon development of enterprises to a certain extent. Relevant policies also need to attract high attention from the government. Technology promotion (9.42%) and low-carbon products (8.14%) pay more attention to the spillover effect of the implementation of the "double carbon" policy, and directly promote energy conservation and emission reduction through scientific and technological means and green products, which is a powerful means to achieve the "double carbon" goal.

4.3 Y-dimension analysis of the "two-carbon" policy

According to the coding summary results of the three policy objectives and policy texts divided above, the current target focusing situation of China's "dual carbon" policy is statistically obtained, as shown in Figure 3.

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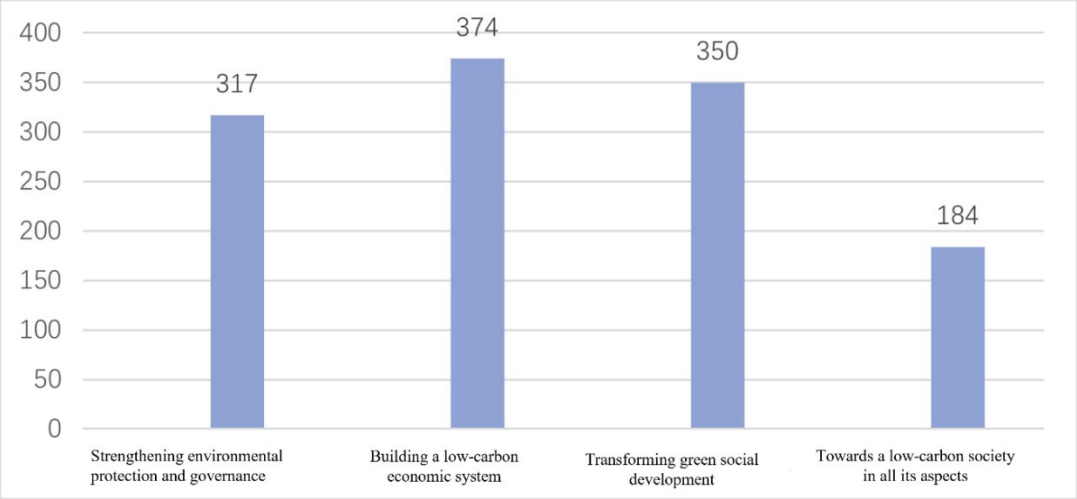

Figure 3 Degree of focus on "dual carbon" policy objectives

Among them, the focus on building a low-carbon economic system is the most, a total of 374, accounting for 30.53%, followed by the transformation of green social development, a total of 350, accounting for 28.57%, and the third is to strengthen environmental governance and protection, a total of 317, accounting for 25.88%, focusing on building a low-carbon society is the least, a total of 184, accounting for 15.02%. From the perspective of frequency distribution, the ratio of the four dimensions is 5:6:5:3. It can be seen that there are differences in the goals of China's "dual carbon" policy. Based on China's current economic and social development degree and the principle of systematic promotion, key breakthrough, steady and orderly, and safe carbon reduction, the focus and main goal of the "dual carbon" policy is to protect the environment, build a low-carbon economic system and transform the development of a green society, focusing on the green transformation of traditional energy. It is a practical and logical development law to strive to fully build a low-carbon society on the basis of adhering to and developing a low-carbon economy. With the effective implementation of specific measures such as "Ten actions to reach the peak of carbon", the goal of the "two-carbon" policy will gradually approach the direction of fully building a low-carbon society.

4.4 Tool of "two-carbon" policy - target two-dimensional cross-analysis

The cross-summary of the two-dimensional analysis framework of policy tools and objectives is shown in Table 4. In general, the "dual-carbon" policies issued by government departments cover a number of policy sub-tools, and the policy objectives are also considered at different levels. The contents of the policy texts are extensive and comprehensive, but there is also an imbalance in distribution.

First, among the supply-oriented policy tools, the capital investment mainly serves to strengthen the protection of environmental intelligence and build a low-carbon economic system, accounting for 67.65%, that is, the main capital destination and investment subject of the "two-carbon" policy are mainly low-carbon construction; Innovation-driven and facility construction mainly serve to build a low-carbon economic system and transform the development of a green society, accounting for 65.44% of the total, much higher than the comprehensive construction of a low-carbon society; Talent training mainly serves the whole process of the "double carbon" goal, and the distribution is uniform, which comes from the long-term characteristics of talent training to play the actual effectiveness, and generally pays attention to the full-cycle goal; The balance of financial policy is distributed in four kinds of policy objectives, accounting for about 25%. The incentive mechanism plays more role in strengthening environmental governance and protection, which shows that the incentive has a more obvious role in urging and guiding environmental governance; Green bonds focus on environmental governance, low-carbon economy and green development, which is in line with the financial attributes of bonds.

Second, among demand-oriented policy tools, organizational leadership mainly serves to strengthen environmental governance and protection and build a low-carbon economic system, accounting for 64.08%, which indicates that the organizational leadership of the government has a strong guiding role in the process of achieving the current "two-carbon" goal. Government-enterprise cooperation mainly serves to build a low-carbon economic system and transform the development of a green society, and the two pay the same attention, the ratio is close to 1:1; Foreign exchanges mainly serve the transformation of green society development, accounting for 40.38%, that is, the "two-carbon" policy pays more

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attention to exchanges and dialogues with foreign countries on green society development; The pilot demonstration serves the full cycle of the "double carbon" goal, which can be seen that the government hopes to guide low-carbon development by establishing demonstration zones and set up industry models; Risk prevention and land use support are evenly distributed in the four policy objectives, which proves that risk prevention and land demand are realistic needs throughout the whole process of "dual carbon" policy. The industrial layout mainly serves to strengthen environmental governance and protection and build a low-carbon economic system, which coincides with the main realistic goals of the "two-carbon" policy at this stage.

Table 4. Tool of "two-carbon" policy - Target two-dimensional cross-analysis table

Types of policy instruments	Name of policy instrument	Strengthening environmental governance and protection	Building a low-carbon economic system	Transforming green social development	Towards a low-carbon society in all its aspects	Proportion of policy instruments applied	
						Subtotal	total
Supply type	Capital investment	20	26	13	9	68	431
	innovation-driven	31	46	43	16	136	
	Facility construction	23	27	33	14	97	
	Personnel training	5	6	5	6	22	
	Financial policy	13	14	10	9	46	
	Incentive mechanism	18	12	7	5	42	
	Green bond	7	6	6	1	20	
demand-oriented	Organization and leadership	29	37	25	12	103	327
	Cooperation between government and enterprise	7	12	13	5	37	
	External communication	8	15	21	8	52	
	Pilot demonstration	15	14	15	10	54	
	Risk prevention	5	7	5	5	22	
	Industrial layout	12	10	8	6	36	
	Land support	6	8	5	4	23	
Environmental type	Goal programming	16	20	22	15	73	467
	Legal system construction	14	12	20	12	58	
	Tax incentives	10	12	13	7	42	
	Deepen reform	28	37	22	10	97	
	Publicity and promotion	26	30	38	21	115	
	Technology extension	15	12	12	5	44	
	Low-carbon product	9	11	14	4	38	
Degree of focus on policy objectives		317 25.88%	374 30.53%	350 28.57%	184 15.02%	1225 100%	

Third, among environmental policy tools, target planning mainly serves to build a low-carbon service system and transform the development of a green society, accounting for 57.53%. Compared with other sub-policy tools, fully building a low-carbon society accounts for a relatively high proportion in this project, which indicates that the "two-carbon" target planning is still long-term and forward-looking at this stage. Legal construction, tax incentives and low-carbon products mainly serve to strengthen environmental governance and protection, build a low-carbon economic system and transform the development of a green society, accounting for 81%, which ensures the realization of the "two-carbon" policy objectives at the current stage from three aspects: law, tax and lifestyle. Deepening reform mainly serves to build a low-carbon economy and society, accounting for 40.65%, which indicates that deepening reform should be carried out deeply and continuously in key areas such as energy and electricity, so as to inject strong impetus to win the "double carbon" battle; Publicity and technology promotion serve the full cycle of the "double carbon" goal, widely publicize low-carbon travel, energy saving and emission reduction, and comprehensively promote low-carbon technology, so that the low-carbon concept becomes a social consensus, and is the only way to truly realize the transformation of a green society.

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5. Research conclusions and future prospects

5.1 Research Conclusions

From the analysis of 47 policy texts and 1225 nodes in the framework of policy tool-target two-dimensional analysis, China's "two-carbon" policy presents the following characteristics:

(1) The use of different policy tools is more reasonable, and the use of demand-oriented policy tools needs to be improved.

Policy tools coordinate and interact with each other on a macro level. Only when different policy tools are used rationally can policies be effectively implemented and achieve expected results. Under the guidance of the ultimate goal of building a low-carbon society in an all-round way, the use of policy tools should be highlighted, but also balanced development, on the whole, the use of "two-carbon" policy tools is reasonable, but there is still room for improvement. From the analysis results, government departments pay particular attention to the dynamic power stimulated by deepening reform and publicity and promotion in environmental policy tools. At the same time, they also emphasize the direct positive benefits generated by innovation-driven, facility construction and capital investment in supply-oriented policy tools. Environmental construction and direct promotion jointly contribute to the realization of the "double carbon" goal. "Talent cultivation" and "low-carbon products", two sub-policy tools with global effects, are used less frequently and have not received sufficient attention. Compared with supply-oriented and environment-oriented policy tools, demand-oriented policy tools are slightly underused. On the one hand, the sub-policy tool of "organization and leadership" accounts for a relatively high proportion, which may lead to over-spill risks. On the other hand, there are few sub-policy tools for "land use support" and "risk prevention", which are related to the practical promotion and risk protection of "dual carbon" policy, and should be paid more attention to.

(2) The policy target orientation is in line with the current "dual carbon" goal, and long-term planning needs to be strengthened.

Combined with China's current industrial structure, development status, economic level, regional differences and other status quo, "double carbon" policy objectives must have its focus, strengthening environmental governance and protection, building a green economic system and transforming green social development are the main anchors of China's "double carbon" strategy in a short period of time, combined with the policy word frequency analysis, the transformation and upgrading of industrial industry, reducing costs and increasing efficiency. The green development and reasonable regulation of the energy industry, the equipment transformation and system construction of transportation are all urgent problems to be solved. The 85% target of "strengthening environmental governance and protection", "building a low-carbon economic system" and "transforming green social development" in the text analysis results also confirms the above argument. However, we should also deeply understand that with the continuous upgrading of industrial institutions and the in-depth construction of circular economy, the goal trend of China's policy will gradually turn to the comprehensive construction of a low-carbon society, which requires that the "dual carbon" policy formulation should keep pace with The Times and develop in sync with China's national conditions.

(3) The matching of policy tools and policy objectives is prominent and the direction is clear.

Focused and well-structured policy formulation is crucial to the realization of the "dual carbon" goal, and only reasonable planning can achieve efficiency and carbon reduction. As can be seen from the cross-distribution table, the number of policies of "deepening reform to strengthen environmental governance and protection", "innovation-driven to serve the construction of a low-carbon economic system", "organization and leadership to serve the construction of a low-carbon economic system", and "publicity and promotion focusing on the transformation of green social development" are all higher than average, and are evenly distributed among the three policy types. This shows that the use of China's policy tools has obvious directionality, that is, focusing on the practical role of deepening reform, innovation-driven, organizational leadership, publicity and promotion. These four policy sub-tools indeed play a more important role in the realization of the "dual carbon" policy objectives, which reflects the rational top-level design and clear motivation in the process of making China's "dual carbon" policy. The implementation path is clear.

5.2 Policy recommendations and future prospects

In order to better achieve the goal of China's "dual carbon" policy and promote the comprehensive

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construction of a low-carbon society, combined with the above research conclusions, this paper believes that the future "dual carbon" policy design can be improved from the following aspects:

(1) Optimize the allocation of policy tools and balance the layout of policy tools.

In order to achieve the "dual carbon" strategic goal more effectively, the government should balance the use of different policy tools, and policy formulation should not only focus on the current form of attention, but also take into account the practical results of policy landing, so as to achieve both the pertinence and timeliness of the "dual carbon" policy. In different implementation stages of the "two-carbon" policy, it is necessary to make top-level planning, according to the research results, strengthen the use of demand-oriented policy tools, pay attention to the role of the market in green carbon reduction, continue to strengthen government-enterprise cooperation, foreign exchanges, and pay attention to risk monitoring in the process of policy implementation. Enhancing land use support for enterprise reform is an effective policy approach to achieve the goal of "double carbon" at this stage.

(2) Focus on long-term goal planning and enhance scientific research and innovation capabilities.

It should be recognized that practicing the concept of green development, optimizing and adjusting the energy structure, vigorously developing renewable energy, and comprehensively building a low-carbon society are the strategic direction and development prospects of China for a long time in the future. Carbon peak and carbon neutrality are the key links of this grand vision and grand narrative, and it is of great significance to pay attention to the formulation of long-term goals. The realization of this concept is closely related to the improvement of scientific research and innovation ability. According to the research results, there is still room for strengthening the "dual carbon" policy in terms of personnel training and scientific and technological support. In terms of personnel training, at present, many universities and research institutes in China keep up with the theme of The Times, actively adapt to the development needs, set up carbon-neutral colleges, set up "double carbon" related majors, far-reaching impact, policy formulation should continue to strengthen science and technology investment, vigorously train professionals in the field of professional technology, and strengthen the reserve of high-quality talents.

(3) Stimulate the energy efficiency of the driving body and supervise the effectiveness of policy implementation.

The realization of the "double carbon" goal can not only rely on the government, enterprises and individuals are also participants in this battle. The government should do a good job in top-level design and system planning, actively promote the coordinated use of policy tools, formulate industry standards for low-carbon development in various fields, scientifically grasp the overall rhythm of the "double carbon" goal, regulate the responsibility of personal behavior of enterprises, ensure the implementation of the "double carbon" policy, and form a long-term supervision mechanism are the due responsibilities of the government. Enterprises should carry out production activities in accordance with government requirements and low-carbon norms, actively use policy tools to guide production and respond to demand, and at the same time pay attention to optimizing production methods, developing science and technology, and assume the social responsibility of reducing carbon emissions with a more positive attitude. Individuals should use low-carbon products, respond to policy propaganda, achieve low-carbon life, and deepen the concept of environmental protection and green development, so as to contribute their own strength to achieve the goal of "double carbon".

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