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Analysis of Aviation Enterprise Management Mechanism under Carbon Neutralization Mechanism

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Abstract: As China's airlines maintain a high growth rate, the impact of the neutralization mechanism on China's aviation carbon emission reduction cost is becoming more and more significant, and the constraints on the development of China's aviation will be greater and greater, which will directly affect the market competitiveness of China's aviation logistics to a certain extent, and is also unfavorable to the low-carbon development of China's aviation logistics. This paper analyzes the forced mechanism and path analysis of carbon neutralization on China's aviation low-carbon development, and puts forward countermeasures and suggestions to promote China's aviation logistics low-carbon development from three aspects: neutralization reduction market mechanism, internal cost digestion and cost transfer, which has certain practical reference and theoretical significance for the research on aviation carbon emission reduction under the background of carbon neutralization market mechanism.

1. Introduction

Carbon neutralization strategy is an important driver of social and ecological transformation, and the company is the main participant in carbon emission reduction[1~3].

With the intensification of global climate change and greenhouse effect, the greenhouse gas emissions generated by air transport fuel consumption will also be included in the key emission reduction consideration. The emission reduction work in the field of air transport has the corresponding international and domestic policy background and is advocated by the relevant green emission reduction policies. In the Paris agreement adopted by the global climate change conference, the temperature control increase target is required to be no higher than 2 degrees Celsius, and countries need to submit independent contribution targets (INDC) for emission reduction and carry out emission reduction work[4]. According to the independent contribution goal submitted by China, the State Council issued the work plan for controlling greenhouse gas emissions in the 13th five year plan on October 27, 2016, which proposed that by 2020, the carbon dioxide emission per unit of GDP will be reduced by 18% compared with that in 2015, and the total carbon emission will be effectively controlled[5].

2. Current Situation of Energy Consumption of Airlines

2.1 Current Situation of Aviation Energy Consumption

China's aviation energy consumption mainly includes the comprehensive energy use of air transportation, ground transportation and ground nodes, namely airport cargo terminals, logistics centers and distribution centers[6]. The energy consumption of air logistics transportation in China is absolutely dominant, including the energy consumption of air transportation and ground transportation. Air transportation mainly focuses on the aviation fuel consumption of civil aviation transportation aircraft. Ground transportation mainly focuses on the diesel and gasoline consumption in the process of trunk and branch transportation and distribution of freight vehicles. The main body of ground nodes is the consumption of power, heat, fuel or gas such as operation equipment and site HVAC lighting. China's aviation transportation fuel consumption has increased from 1.6655 million tons since 2001 to 6.5178 million tons in 2016, of which the average annual growth rate in recent five years has reached 7.1%. The fuel efficiency and fuel efficiency level of China's air transportation decreased steadily. In 2016, the fuel consumption per unit turnover was 0.293kg, a decrease of 13.82% compared with 2005 (the benchmark year of the industry's energy conservation and emission reduction target). During the "12th Five Year Plan" period, the five-year average fuel consumption per unit turnover was 0.293 kg, down 4.2% from the "11th Five Year Plan", which is currently at the leading level in the world.

According to the overall goal of the 13th five year plan for energy conservation and emission reduction of civil aviation, the energy consumption per unit transportation turnover of the industry will be reduced by more than 4% in five years on average compared with the 12th Five Year Plan. By 2020, it is expected that the five-year average ton kilometer fuel consumption index will be reduced to 0.281kg. In the process of cargo and mail transportation on international routes, the longer voyage and low fuel consumption models make the fuel economy higher and the unit fuel consumption less than that of domestic routes. The fuel consumption per ton kilometer of all cargo aircraft and belly cargo is also different. In 2015, the average fuel efficiency of all cargo aircraft on international routes was 0.123kg, the average fuel efficiency of all cargo aircraft on domestic routes was 0.506kg, and the average fuel efficiency of belly cargo was 0.294kg, subject to the industrial fuel efficiency data[6].

2.2 Current Situation of Aviation Carbon Emission

According to the characteristics of China's aviation energy consumption, China's aviation carbon emission is also mainly caused by the energy consumption of transportation links and aviation node equipment[7]. Among them, the carbon emissions from transportation occupy an absolutely dominant position, including the carbon emissions from aviation kerosene consumed by air transportation commercial aircraft for freight services, and the carbon emissions from diesel and gasoline consumption of commercial vehicles during dry and branch transportation of ground transportation trucks, that is, the process of distribution to the destination. The carbon emission of air cargo and mail transportation in China's air logistics was 6.395 million tons in 2001 and 20.5766 million tons in 2016. Among them, the carbon emission per ton kilometer was gradually reduced to 0.925kg per ton kilometer in 2016, with an average annual decrease of 1.6%.

3. Key Factors Affecting Carbon Neutralization in Aviation Enterprises

In order to cope with the carbon neutralization work in the aviation industry, the emission reduction market mechanism is the entry point of carbon emission reduction in the aviation

industry[8]. Under the specific standards of the emission reduction market mechanism, aviation enterprises can obtain the mandatory emission reduction target corresponding to their own carbon emission level and the method of realizing the emission reduction target based on market means. The emission reduction market mechanism constitutes one of the main external factors affecting the carbon emission reduction mechanism of the aviation industry from the level of policy mechanism. Carbon emission right gap and carbon emission right price are the direct influencing factors of carbon emission reduction cost. Among them, carbon emission right price is related to domestic and international carbon market. Under the specific standards of aviation emission reduction market mechanism, carbon emission right price, as a market means element, constitutes one of the main external influencing factors of aviation logistics carbon emission reduction mechanism. The carbon emission right gap is directly related to the carbon emission level of the aviation industry, and is affected by the mandatory emission reduction target set under the emission reduction market mechanism. The carbon emission of aviation industry is the core of the impact mechanism of carbon emission reduction. The energy consumption and carbon emission coefficient of aviation industry are the key elements of the formation of carbon emission of aviation industry. Among them, aviation energy consumption is the key internal influencing factor of carbon emission in the impact mechanism of carbon emission reduction, and the carbon emission coefficient plays the role of external influence[9].

4. Management Mechanism to Deal with Carbon Neutralization

4.1 Carbon Neutralization Market Mechanism Means

(1) Actively participate in carbon emission trading

From the perspective of economic factors, firstly, strengthen the collection and analysis of their own business volume, energy consumption and carbon emission level data, and predict the possible energy consumption and carbon emission in the future according to the future development plan and development potential of the enterprise.

Secondly, strengthen the analysis and Research on domestic carbon market transactions and international aviation carbon offset mechanism, strengthen the communication with peers or relevant carbon market mechanism consulting institutions on emission reduction market mechanism, and actively discuss the preparation and response work.

(2) Joint strategic cooperative enterprises to participate in the development of carbon neutralization projects

Take aviation enterprises as the main body, and cooperate with other operation entities in all links of the aviation logistics chain, including ground transportation, warehousing, transit and distribution service providers to jointly explore the operation strategic cooperation of the whole chain low-carbon goal and tap the low-carbon emission reduction potential of each link. The entities in all links of aviation logistics can obtain corresponding legal certified emission reductions by tapping their own low-carbon emission reduction potential and developing voluntary emission reduction projects or clean development mechanism projects according to the filing methodology of the national competent department. Certified emission reductions can be used as carbon emission rights to offset the carbon emissions generated by energy consumption in air transportation, realizing the reduction of carbon emissions in the overall aviation logistics chain.

4.2 Explore the Internal Digestion Path of Carbon Neutralization

4.2.1 Strengthen Connection and Reduce Energy Consumption in Ineffective Links

From the perspective of the internal digestion path of carbon emission reduction cost of low-carbon development of China's aviation industry, the cost of carbon emission reduction forces aviation enterprises to continuously optimize their service operation process, so as to reduce ineffective energy consumption and promote the improvement of energy utilization.

(1) Strengthen the connection within the aviation link; The link optimization mainly includes the internal process optimization and efficiency improvement of air logistics, air transportation, ground transportation, airport cargo terminal and logistics center.

(2) Optimize the connection between aviation logistics links; The connection optimization between links is mainly the connection of air logistics air to ground transportation services. It is the application of air to ground transportation mode in multimodal transportation. The transportation subjects include air transportation enterprises, ground transportation enterprises and air logistics service transit service node units.

4.2.2 Optimize the Energy Consumption Structure and Make Rational Use of Biofuels

According to the 13th five year plan for renewable energy development, in accelerating the development of biomass energy, it is clearly proposed to promote the industrialization of biological liquid fuel, and promote the industrialization and demonstration application of biomass conversion to high-grade fuel and biological aviation fuel. For aviation enterprises, according to the package plan of energy conservation and emission reduction in the aviation field, biofuels, as renewable alternative fuels, are of great significance to reduce fossil energy consumption and reduce carbon emissions. The large-scale commercial use of biofuels in the future is an important measure to solve the low-carbon development in the field of air transportation.

4.3 External Transfer of Carbon Neutralization Costs

The external transfer path of carbon emission reduction cost affects the demand for aviation services and the level of aviation activities, which forces the low-carbon development of aviation logistics in China. The level of aviation logistics activities will be reduced with the external transfer of carbon emission reduction costs, and the service and operation level of enterprises will be affected. Aviation logistics enterprises need to improve the quality of aviation logistics activities through structural upgrading to ensure the ability of sustainable development in the future. The improvement of the level and quality of aviation logistics activities will promote the industry to obtain higher operating economic benefits with lower energy consumption and carbon emission, improve the fine operation level, and enhance the ability of aviation logistics enterprises to deal with the cost of carbon emission reduction and promote low-carbon development.

5. Conclusion

In order to cope with the orderly progress of aviation carbon neutralization, the implementation of emission reduction market mechanism is imperative. China's aviation, including international routes and domestic routes, will be subject to the constraints of international carbon offset mechanism and domestic carbon emission trading respectively. As China's airlines maintain a high growth rate, the impact of the neutralization mechanism on China's aviation carbon emission reduction cost is becoming more and more significant, and the constraints on the development of

China's aviation will be greater and greater, which will directly affect the market competitiveness of China's aviation logistics to a certain extent, and is also unfavorable to the low-carbon development of China's aviation logistics. This paper analyzes the forced mechanism and path analysis of carbon neutralization on China's aviation low-carbon development, and puts forward countermeasures and suggestions to promote China's aviation logistics low-carbon development from three aspects: neutralization reduction market mechanism, internal cost digestion and cost transfer, which has certain practical reference and theoretical significance for the research on aviation carbon emission reduction under the background of carbon neutralization market mechanism.

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