

# ***Environmental Sustainability Practices of Chinese Logistics Service Providers: A Perspective on Corporate Social Responsibility***

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**Abstract:** Guided by the strategic objectives of "carbon neutrality" and "peak carbon" in China, low-carbon development in the logistics industry has become a core driver of industry transformation and upgrading. At the micro-level, companies are gradually accelerating their environmental strategic planning and actively promoting environmental sustainability practices. This paper focuses on logistics service providers (LSPs) and selects representative integrated logistics service companies for multidimensional analysis of corporate social responsibility report information. The paper analyzes the characteristics of environmental sustainability practices in companies from the perspectives of transportation strategies, green packaging, green buildings, and circular economy. Policy recommendations for the low-carbon and green development of Chinese logistics service providers are provided.

**Keywords:** logistics service providers, corporate social responsibility, environmental sustainability practices

## **1. Introduction**

Environmental sustainability is a common theme in today's global society. As China advances its strategic goals of "peak carbon" and "carbon neutrality," profound and extensive changes will be witnessed in economic and social development. The key to addressing ecological and environmental challenges lies in establishing a sound green, low-carbon, and circular development economic system, promoting comprehensive green transformation of economic and social development. China's economy has transitioned from a phase of high-speed growth to one of high-quality development. This transition necessitates structural reforms in various sectors, including production, consumption, distribution, and services. Among these sectors, the logistics industry plays a pivotal role in driving high-quality economic development, as it heavily relies on fossil fuels [1]. Hence, low-carbon logistics activities and environmental sustainability are subjects of great concern to corporate managers, policymakers, and industry researchers.

Logistics service providers act as intermediaries between manufacturers and retailers, connecting the production and consumption processes [2]. The environmental sustainability of logistics activities can facilitate the coordinated participation of upstream and downstream companies, holding a crucial position in supply chain sustainability [3]. However, discussions about the environmental sustainability of the logistics industry from a micro-level perspective are relatively limited, and

regional explorations and comparisons are lacking [4]. Therefore, this study focuses on Chinese logistics service providers. Given the specific characteristics of the Chinese consumer market, we select representative comprehensive logistics service providers, namely express delivery service companies, as our research subjects. This study conducts a multidimensional comparative analysis of these companies' environmental sustainability practices, aiming to elucidate the industry-specific characteristics, challenges, and underlying reasons at the micro-level, thereby accelerating the achievement of low-carbon development goals in the logistics industry.

## **2. Environmental and Social Responsibility Disclosure of Logistics Service Providers (LSPs)**

Corporate environmental information is a part of public social responsibility. By regularly publishing social responsibility reports, companies convey information to external stakeholders about their corporate governance, social concerns, and efforts and achievements in environmental protection. This, in turn, communicates the company's potential for development and brand value [5].

Regarding corporate environmental information disclosure standards, various international NGOs, governments, and financial regulatory authorities worldwide have published nearly a hundred sustainability reporting guidelines and directives. This study summarizes and reviews mainstream disclosure standards. Although the direction of environmental information disclosure adhered to by these standards is generally uniform, there are differences in their applicability to specific industries and methodologies [6]. Chinese companies predominantly follow the Global Reporting Initiative (GRI) as a primary reference for information disclosure. However, in terms of applicability, the paradigms and methods for disclosure are not developed according to specific industry classifications.

In the context of environmental sustainability information disclosure in the logistics industry, a typical reference is the United States Environmental Protection Agency's (EPA) "SmartWay" Transportation Partnership Green Freight Program introduced in 2004 [7]. SmartWay aims to improve fuel efficiency in transportation and reduce the environmental impact of cargo transport. SmartWay's carbon emission assessment and monitoring tools primarily provide information on carbon dioxide, nitrogen oxides, and particulate matter emissions. These tools cover all modes of cargo transportation and assist companies in calculating environmental emissions. The program simplifies freight data through collaborative efforts between government and participating companies to reduce freight emissions globally. SmartWay effectively integrates environmental sustainability data along the logistics supply chain and continually promotes the transparency and standardization of environmental sustainability data in the logistics and freight industry. Additionally, SmartWay actively collaborates with large global corporate social responsibility reporting agreements to integrate pollution emission data into social responsibility reporting guidelines and standards, providing consistent and comparable metrics for supply chains and corporate environmental sustainability [8].

However, social responsibility information disclosure by Chinese companies is primarily policy-driven, often lacking quantitative data. Furthermore, there is a lack of uniformity in data collection scope and key issues among enterprises. In terms of environmental data disclosure, domestic companies still exhibit significant disparities when compared to listed companies in regions such as the European Union and the United States.

Table 1 summarizes the environmental and green development-related sections of CSR reports from representative comprehensive logistics service providers in China for the years 2016-2020 [9-12]. Four companies that primarily provide express delivery services are selected. Based on an examination of the disclosure of corporate social responsibility information, the four companies began participating in social responsibility disclosure from 2016. SF Express and YTO Express were the earliest to disclose in 2016 but did not provide specific information about energy consumption

and carbon emissions. By 2018, all four companies voluntarily disclosed their environmental responsibility information according to a specific social responsibility guideline.

Table 1: CSR Disclosure Status

Year	Reporting Status	SF express	YTO express	ZTO express	Uda express
2016	Released CSR Report	●	●		
	Disclosure According to Guideline Standard		●		
	Environmental Annual Goals and Performance Indicators				
	Specific Carbon Emission Calculations				
2017	Released CSR Report	●	●	●	
	Disclosure According to Guideline Standard		●	●	
	Environmental Annual Goals and Performance Indicators				
	Specific Carbon Emission Calculations				
2018	Released CSR Report	●	●	●	●
	Disclosure According to Guideline Standard	●	●	●	●
	Environmental Annual Goals and Performance Indicators			●	
	Specific Carbon Emission Calculations				
2019	Released CSR Report	●	●	●	●
	Disclosure According to Guideline Standard	●	●	●	●
	Environmental Annual Goals and Performance Indicators			●	
	Specific Carbon Emission Calculations				
2020	Released CSR Report	●	●	●	●
	Disclosure According to Guideline Standard	●	●	●	●
	Environmental Annual Goals and Performance Indicators	●		●	
	Specific Carbon Emission Calculations	●		●	

Based on the latest social responsibility reports, SF and ZTO have publicly disclosed annual energy consumption and total carbon emissions (primarily Scopes 1 and 2). SF has calculated its energy consumption and carbon emissions by business type. These CSR reports indicate that comprehensive logistics service providers, represented by express delivery companies, have started taking practical carbon reduction actions, and the standardization of energy consumption and carbon emissions data is an ongoing process.

### 3. Environmental Practices of Logistics Service Providers

This chapter categorizes and summarizes the environmental practices of logistics service providers based on the textual content of their social responsibility reports. Through an analysis of the content in the social responsibility reports of major comprehensive logistics service providers, it is evident that domestic enterprises have gradually begun taking carbon reduction actions, and the measurement of energy consumption and emissions is progressively becoming standardized. Starting from the year 2020, practices related to environmental sustainability, energy consumption and emissions measurement, carbon reduction, and the establishment of environmental sustainability development goals have been gradually improving, making the practices, data, and goals increasingly clear.

Table 2: Environmental Sustainability Practices of Logistics Service Providers

Category	Environmental Practices
Transport Strategy	Use of low-pollution energy sources
	Utilization of new technologies and equipment (e.g., GPS) to enhance efficiency
	Driver behavior
	Optimization of vehicle routes
	Use of new energy vehicles
Green Packaging	Use and promotion of biodegradable packaging materials
	Design and use of recyclable packaging
	Regulation of packaging behavior (e.g., secondary packaging)
	Recycling and reuse of packaging materials
Green Buildings and Offices	Retrofitting traditional energy-consuming equipment
	Energy-efficient and environmentally friendly lighting systems
	Optimization of water supply systems to conserve water
	Green office practices
Environmental Management	Certification under quality management systems like ISO 14001 and ISO 9000
	Environmental awareness and incentives
	Employee training on environmental protection

Table 2: Continued

Supplier Management	Evaluation of supplier environmental qualifications
	Supplier training and environmental awareness
Environmental Compliance	Laws and regulations related to environmental protection and pollution control
	Government regulatory agencies issuing relevant environmental standards and specifications
	Corporate plans and management specifications related to energy and the environment

As shown in Table 2, the social responsibility information disclosure by major comprehensive logistics service providers primarily covers information related to environmental responsibility in several areas, including transport strategy, green packaging, green buildings, and the circular economy.

(1) Transport Strategy: One approach is to enhance vehicle efficiency. This can be achieved through modernizing vehicles within the fleet, replacing older vehicles with more efficient models, or exploring and adopting a range of advanced technologies that facilitate operational innovations. In terms of improving transport efficiency, SF Express has proposed the use of logical algorithms, combining factors such as delivery product timeliness and distance to optimize transportation routes for reduced energy consumption. They use geospatial big data to advise drivers on optimizing driving habits and employ predictive navigation and fuel-saving algorithms to decrease energy consumption. ZTO actively introduces intelligent devices such as drones, autonomous logistics vehicles, and autonomous delivery vehicles to provide services like on-demand pickups, shipments, and temporary storage for users, thereby reducing delivery pressure.

(2) Adoption of Clean Energy Vehicles: This mainly involves replacing traditional fossil fuel vehicles with more environmentally friendly ones, utilizing various sustainable materials and technologies. It encompasses promoting a variety of eco-friendly vehicles, including fully electric, hybrid electric, hydraulic hybrid, ethanol, compressed natural gas (CNG), liquefied natural gas (LNG), renewable natural gas (RNG), biodiesel, and propane vehicles.

ZTO employs electric cargo trucks, which produce no tailpipe emissions or atmospheric pollution. In their long-haul transport segment, they have experimented with using new energy vehicles powered by liquefied natural gas. Compared to traditional fuel vehicles, these new energy vehicles have reduced carbon dioxide emissions by about 20%, carbon monoxide by about 97%, and nitrogen oxide by about 90%. YTO employs new energy vehicles for urban shuttle distribution, with electricity costs compared to fuel costs being approximately 1:3. This effectively reduces vehicle usage and management costs and cuts carbon dioxide emissions. In 2020, SF Express introduced 17,053 new energy vehicles, a 50% increase from 2019. Through green transportation, they reduced greenhouse gas emissions by about 78,000 tons. SF uses new energy vehicles for all scenarios involving daily travel distances of up to 180 kilometers, including branch lines, heavy cargo collection and delivery, and regular collection and delivery. For long-haul transportation and transportation in cold northern regions, SF is piloting the introduction of hydrogen fuel and LNG natural gas vehicles.

(3) Green Packaging: Green packaging is a focal point in the carbon emission reduction efforts of Chinese express delivery service companies, as reflected in the social responsibility reports of various enterprises. ZTO introduced electronic waybills in 2019, with an electronic waybill utilization rate of 99.93% by the end of 2020. Similarly, Uda has practiced green packaging through electronic waybills, eco-friendly printing, reusable transit bags, packaging recycling, and customer guidance. YTO has

deployed over 7.2 million reusable transit bags and, considering factors such as wear and tear, currently has a total of approximately 6.9 million in actual use, with 65.28 million instances of reuse.

(4) Green Buildings and Offices: Companies primarily focus on the energy supply of facilities like transfer centers, collection and delivery points, and office buildings. Uda has established a Green Express Building Office, set up a Green Environmental Protection Committee, and created a mechanism for top-down communication, network-wide execution, and partner-driven standard working methods. YTO has gradually implemented electronic labor contracts in the Human Resources and Administration Center, developing an HR system contract signing module that saves an average of one million pieces of paper annually. SF actively promotes a culture of green offices and energy conservation. Through a range of resource-saving measures, they collectively saved CNY 3 million in water and electricity costs for operational locations in 2020.

(5) Development of the Circular Economy: ZTO has continued to advance its "Return Box Program" by deploying approximately 21,000 recycling devices across its network, covering 20,943 agent locations, which has promoted packaging sorting and recycling. YTO has deployed over 5,000 parcel recycling box locations nationwide. SF has established three research and development channels for the recycling, reduction, and reuse of packaging products. They have used these initiatives to promote the development of the circular economy and the creation of zero-waste cities. By the end of 2020, SF had deployed a total of 27.6 million recycled products for public use, with a total of 93.5 million cycles of reuse.

Based on the analysis of environmental practices in representative Chinese companies as described above, the environmental sustainability practices of Chinese logistics service providers have several distinct characteristics:

1. Low-Carbon Emission Strategies Related to Transport: One notable feature is the wide adoption of low-carbon emission strategies related to transportation. The high adoption rate of transport strategies is primarily due to the close correlation between low-carbon emissions in transportation activities and the overall operational efficiency of logistics services. This approach can help companies reduce costs, increase efficiency, and enhance their overall competitiveness. Furthermore, strong support from national policies and the rapid development of the new energy industry have played a significant role in promoting the application of new energy vehicles in the logistics sector.

2. Green Packaging Focus: Current Chinese express delivery service companies place significant emphasis on green packaging practices, as reflected in their social responsibility reports. This emphasis is concentrated on the use and promotion of biodegradable packaging materials, the use of recyclable packaging, regulating packaging behavior (such as secondary packaging), and the recycling and reuse of packaging materials.

3. High Implementation of Environmental Sustainability Practices in Green Buildings and Offices: Companies show a relatively high level of implementation in the area of environmental sustainability practices related to green buildings and offices. The most emphasized aspects include water resource conservation and optimization in office and production processes, followed by energy-efficient and environmentally friendly lighting. Similar to international logistics companies, the widespread acceptance of environmental sustainability practices related to green offices and buildings is closely linked to energy savings and cost reduction, which serve as inherent motivators for companies to make improvements.

4. Limited Mention of Green Supplier Management: Social responsibility reports from these companies do not explicitly reflect their efforts in green supplier and customer management. Green supplier and customer management require companies to consider the environmental sustainability impact of their business collaborations with both upstream and downstream partners, such as using environmental management certification as an evaluation factor when selecting suppliers. However, this aspect is not prominently featured in these companies' external stakeholder considerations. While

the environmental sustainability reports do include analysis of important topics for stakeholders, environmental responsibility is not among the primary factors considered when engaging with stakeholders.

5. **Emphasis on Environmental Management:** The environmental management system certifications such as ISO 14001 and ISO 9001, environmental awareness campaigns, and employee training are all reflected in the companies' social responsibility reports. Internal environmental management reflects the level of commitment to environmental sustainability from senior and mid-level management within the company. However, the internal environmental management initiatives of Chinese logistics companies are relatively limited and require further improvement.

In summary, environmental sustainability does not appear to be a primary focus of corporate social responsibility in the collaborative efforts between logistics companies and their stakeholders. While certain aspects of environmental management and practices are evident, there is room for enhancement, particularly in the areas of supplier and customer management, as well as more comprehensive and diversified internal environmental management initiatives.

#### 4. Conclusion

This paper, from the micro perspective of green development within enterprises, focuses on the environmental practices of representative Chinese logistics service providers. Through textual analysis of corporate social responsibility reports, it offers a comprehensive and structured examination of the current state of environmental social responsibility information disclosure and environmental practices in these companies. Based on the research findings, it is evident that environmental sustainability practices within Chinese comprehensive logistics service providers are relatively well-established in the domains of transport strategy and environmental compliance. However, the adoption level in internal environmental management and environmental practices concerning stakeholders is comparatively lower and requires further enhancement.

Based on the analysis results of this study, there are several insights for domestic logistics service providers aiming for low-carbon and green development: 1. **Incorporate Carbon Emission Reduction into the Overall Decision-Making System:** Green development should be integrated into all levels of enterprise decision-making, from environmental management strategies to production operations, cascading from the top down. 2. **Establish a Clear and Scientific Carbon Emission Calculation System:** Companies should select appropriate emission calculation standards and methods based on a comprehensive understanding of various carbon emission calculation guidelines and standards, considering the specific characteristics of their business processes. Comprehensive assessment of the carbon emissions from key activities is crucial, requiring the establishment of a robust emission data tracking and monitoring mechanism to ensure data quality stability and sustainability. 3. **Enhance Environmental Information Disclosure:** Information disclosure in express delivery service companies requires improvement in terms of regulatory completeness. Building on the foundation of the carbon emission calculation system, companies should enhance the disclosure of environmental information, including carbon emissions, energy consumption, waste, and other related data. Information disclosure should leverage digital tools and technologies, making extensive use of the Internet of Things, information platforms, and other digital technologies for data collection and tracking in production operations, minimizing manual intervention, and enhancing data reliability and accuracy. 4. **Accelerate the Formulation of Long-Term Carbon Emission Reduction Goals and Pathways:** Specific goals and pathways for achieving carbon neutrality by 2030 and peaking carbon emissions by 2060 should be developed at an accelerated pace. A combined bottom-up and top-down analysis approach is one of the most efficient methods for helping companies make critical decisions. 5. **Strengthen Collaboration with Stakeholders:** Supplier and franchisee management presents challenges and difficulties for logistics service providers in advancing low-carbon emission initiatives.



Therefore, companies should establish comprehensive supplier and subcontractor management systems and offer support tailored to subcontractors' needs. Companies should also consider the environmental performance of suppliers in their selection criteria. Leveraging government regulations and the influence of relevant NGOs, active communication with key stakeholders should be maintained to continuously promote the positive role of supply chain partners in achieving carbon neutrality goals.

In essence, the transition towards low-carbon and green development in the logistics sector requires a multi-faceted approach, involving both internal and external stakeholders, a commitment to environmental sustainability, and the integration of sustainable practices into the core operations of logistics companies.

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