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# The Strategies for the Hotel Industry's Green and Low-Carbon Transformation under the "Dual Carbon" Goals

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**Abstract: With the introduction of the "dual carbon" goals, low-carbon transformation and green development have become an inevitable trend for the hotel industry's transformation, upgrading, and high-quality development. This paper starts from the necessity of the hotel industry's green and low-carbon transformation, analyzes the practical challenges faced during this process, demonstrates the specific measures and achievements of exemplary hotels in low-carbon transformation through case studies, and then proposes feasible countermeasures to promote the green and low-carbon transformation of the hotel industry. It aims to provide insights for enterprises creating "low-carbon hotels" and to drive the hotel industry's transformation and upgrading towards low-carbon and environmental protection, achieving a dual improvement in economic and environmental benefits.**

**Keywords: "Dual Carbon" Goals; Hotel; Green and Low-Carbon Transformation**

## 1. Introduction

Amidst the intensifying global climate change, the goals of carbon peaking and carbon neutrality have become a common action program for the international community. As the world's second-largest economy, China accounts for approximately 28% to 30% of global carbon emissions. This implies that under the framework of global climate action, China's active participation and effective emission reduction play an indispensable role in achieving the targets in global temperature control [1]. As a strategic sector that promotes global cultural exchange and economic development, the tourism industry faces issues of resource consumption and greenhouse gas emissions. The hotel industry, one of the three major sectors of tourism, is a key link in China's efforts to achieve the "carbon peak and carbon neutrality" goals. Against this background, China aims to peak its carbon dioxide emissions before 2030 and strive to achieve carbon neutrality before 2060. China has long been committed to guiding the hotel industry toward a comprehensive green and low-carbon transformation through targeted policy measures. As early as 2006, the Ministry of Commerce, along with five other departments, issued the "Notice on Carrying out the Creation of Green Hotels", advocating the establishment for energy-efficient, eco-friendly, and health-conscious hotel operations while encouraging accommodation enterprises to adopt sustainable resource and environmental practices.

This commitment was further reinforced in 2017 with "13th Five-Year Comprehensive Work Plan for Energy Conservation and Emission Reduction" which emphasized the need to "the green hotel standard system and accelerate the development of green hotels". Subsequent policies, including the "Green Building Evaluation Standard" and the "Classification and Rating of Tourist Hotel Stars", explicitly required the industry to adopt energy-saving and emission-reduction technologies. Most recently, the "14th Five-Year Plan" introduced even more ambitious goals, calling for the "establishment of a carbon emission accounting system and for hotels and the promotion of near-zero carbon demonstration hotels". These progressive measures underscore China's clear policy direction: green and low-carbon transformation of the hotel industry is not only an inevitable trend but also a strategic priority for the sustainable development of the nation's tourism industry.

Research shows that energy consumption accounts for 93.5% to 94.1% of the hotel industry's carbon emissions [2]. Although the adoption of low-carbon technologies has reduced this proportion, energy use remains the

primary contributor. Growing consumer demand for sustainability coupled with regulatory pressures, is accelerating the industry's shift toward greener practices. This transformation not only reduces operational costs but also strengthens corporate social responsibility profiles while serving as a practical models for regional green economic development. Current research primarily examines the hotel industry's green and low-carbon transition through fragmented lenses, including low-carbon evaluation systems [2-3], policy frameworks [4-5], technological innovations [6-7], consumer behavior [8], and industry practitioners' perceptions [9]. However, these studies lack a holistic, systematic framework to guide the sector's transition effectively. This paper assesses the necessity of green and low-carbon transformation from economic, regulatory, and brand value perspectives. It also evaluates the current state of adoption, identifying key challenges such as high retrofit costs, technological barriers, skills shortages, organizational culture resistance, and limited public engagement in sustainable practices. It further innovatively proposes development strategies for the hotel industry's transformation towards low-carbon and high-efficient operations.

## 2. The Necessity of the Hotel Industry's Green and Low-Carbon Transformation

### 2.1 Reducing Operating Costs and Enhancing Economic Benefits

The hotel industry is a major consumer of urban energy and a significant source of pollution emissions. Its daily operations bring about noticeable environmental issues. For example, common coal and oil-fired boiler systems not only emit large amounts of dust, suffocating sulfur dioxide, and pungent nitrogen oxides during heating and hot water supply but also produce the greenhouse gas carbon dioxide due to the consumption of large amounts of fuel. This dual impact that both pollutes the air and exacerbates climate change/global warming makes the hotel industry a key target for urban environmental protection and governance. Driven by intensified industry competition and the dual need for low-carbon transformation, many hotels have begun to explore new paths for energy conservation and emission reduction, achieving cost reduction and efficiency improvement through technological innovation and service optimization. In specific practice, hotels can reduce carbon emissions at the source by introducing clean energy equipment such as photovoltaic power generation systems and air-source heat pumps. They can also adopt refined operational measures, such as streamlining the provision of disposable guest room items, installing water-saving sanitary fixtures, and optimizing the hot water circulation system. These measures can significantly reduce operating costs while ensuring service quality, ultimately achieving a dual improvement in economic and environmental benefits.

### 2.2 Aligning with Policy and Regulatory Trends

Globally, the regulation of carbon emissions is becoming increasingly stringent. Governments around the world are using mechanisms such as carbon taxes and carbon emission trading to promote corporate low-carbon transformation. In 2007, China issued the "National Standard for Green Hotels," which made qualitative provisions for the green management and operation of hotels. In recent years, China has issued policy documents such as the "Catalogue of Guiding Industries for Green and Low-Carbon Transformation" "Guiding Opinions on Further Strengthening Financial Support for the High-Quality Green and Low-Carbon Development of the Yangtze River Economic Belt", and "China's Energy Transition". These documents not only provide clear goals and paths for energy conservation and emission reduction in the hotel industry but also offer important guidance and policy support for its low-carbon transformation. Data from the Sustainable Hotel Industry Alliance shows that the hotel industry needs to reduce absolute carbon emissions by 66% by 2030 and by 90% by 2050 to decouple economic growth from carbon emissions and achieve sustainable development. Under China's goal of striving to achieve carbon peaking before 2030 and carbon neutrality before 2060, the hotel industry faces higher requirements for low-carbon development. This includes adopting more energy-efficient equipment, improving energy management systems, and implementing sustainable practices in building design and operations. While pursuing economic benefits,

the hotel industry should actively respond to national policies, formulate scientific and rational development strategies, lay a solid foundation for the industry's long-term development through green transformation, and contribute to the country's environmental protection and sustainable development goals.

### 2.3 Enhancing Brand Value and Market Competitiveness

In the context of fierce market competition, a company's social image is becoming increasingly important. Consumers are also becoming more sophisticated, paying more attention to whether the products they consume and use are green. According to Ctrip's "2024 Sustainable Travel Consumer Report," with the continuous enhancement of sustainable awareness, consumers' recognition of green travel is growing. Ninety-two percent of respondents worldwide indicated their willingness to consider sustainable travel, and Ctrip plans to launch more than 10,000 low-carbon travel products, aiming to encourage 100 million tourists to travel in a low-carbon manner. As global attention to carbon emissions increases, major international hotel management groups such as Marriott, Hilton, and Accor have initiated green and low-carbon transformations and have joined forces with hotel supply chain companies to address climate challenges, using green and low-carbon practices as key indicators of their high-end quality. This indicates that green and low-carbon hotels have become a market trend. Therefore, transforming into a green and low-carbon hotel is not only a necessary measure to cope with policy pressure but also a key to enhancing market competitiveness.

## 3. Challenges Faced in the Hotel Industry's Green and Low-Carbon Transformation

### 3.1 High Renovation Costs and Difficulties in Upgrading Old Facilities

In the hotel industry, energy consumption is one of the main operating costs, especially in air conditioning, electricity, and hot water. To achieve low-carbon operations, hotels first need to invest in green technologies and facilities. Specifically, hotels need to update energy-consuming equipment, adopt more efficient intelligent air conditioning systems, high-efficiency lighting, energy-saving electrical appliances, and low-carbon heating and cooling equipment, renovate buildings to meet green building standards, and implement water-saving and energy-saving facilities. However, the new generation of energy-saving technologies and equipment is relatively expensive. The purchase, installation, and maintenance of these devices and technologies require substantial financial investment, posing high demands on the hotel's capital liquidity. Although installing low-carbon and energy-saving equipment in hotels can help reduce energy consumption, lower long-term operating costs, and enhance brand value, the return on investment in the short term is not obvious. The additional costs incurred by hotels for purchasing high-tech environmental protection devices will take at least five years to pay off. This is acceptable for large hotel groups, but for small and medium-sized hotels, considering the investment return and the balance between short-term and long-term benefits, the implementation of low-carbon measures still faces certain difficulties. Moreover, although there are many advanced energy-saving devices and technologies available in the market, many hotels, especially traditional or old ones, still rely on traditional energy consumption patterns. Some old hotel building structures that do not meet low-carbon standards are not suitable for large-scale energy efficiency renovations, making it more difficult to improve energy efficiency.

### 3.2 Low Technical Synergy Efficiency and Insufficient Compatibility of Traditional Energy Systems

Modern hotel energy management involves a multitude of devices and systems, such as central air conditioning systems, lighting systems, hot water supply systems, elevator systems, and various kitchen and laundry equipment. These devices and systems are functionally independent but interrelated in terms of energy consumption and usage, forming a complex energy network. As the level of intelligence in hotels gradually increases, the integration and compatibility issues between devices have become more prominent. Devices from different manufacturers may have non-unified communication protocols, incompatible operating interfaces, and non-interconnected system platforms, posing certain technical barriers for hotels when implementing

intelligent control systems. For example, central air conditioning systems interact closely with the hotel's ventilation systems and the thermal insulation performance of doors and windows. Optimization or adjustment in any one link will affect the others. To achieve overall energy efficiency improvement, these devices and systems need to operate efficiently in synergy during operation, but most hotels currently have significant shortcomings in this regard. Upgrading traditional energy systems to improve their compatibility with new technologies not only requires a high investment cost, but also, due to the significant differences in technical architecture and operating modes between traditional energy equipment and new energy-saving devices and intelligent systems, often faces the complexity of technical implementation.

### 3.3 Insufficient Professional Talent and Lack of Systematic Training Systems

The green and low-carbon transformation of hotels requires a large number of professional talents with interdisciplinary knowledge and skills, who need to master hotel management, environmental engineering, and data analysis skills simultaneously. China needs around 550,000 to 1 million green transformation talents during the “14th Five-Year Plan” period, while the current practitioners are only about 100,000, leaving a significant gap [10]. According to the OECD’s statistics in 2023, the proportion of professional talents in environmental science and green technology in China is only 2.3% of the total labor population, far lower than the level of European and American countries. This shortage of professional talents is particularly evident in the hotel industry. The operation and management of green and low-carbon hotels require a team of professionals with specialized knowledge and skills. However, many hotel employees currently lack systematic knowledge and skills in green and low-carbon practices, failing to meet the demands of the hotel industry's green and low-carbon transformation. The hotel industry also lacks a sound talent training and education system for green and low-carbon practices. At present, most hotel employee training focuses mainly on traditional service skills and management knowledge, with less and less systematic training content on green and low-carbon aspects. This results in significant deficiencies in employees’ awareness of green and low-carbon practices, professional knowledge, and practical skills. They lack the habits and professional skills to actively promote low-carbon services and guide guests to consume in a low-carbon manner, making it difficult to meet the requirements of the hotel industry's green and low-carbon transformation.

### 3.4 Weak Environmental Awareness and Lack of Corporate Culture Construction

Energy efficiency improvement, as the core driving force for the hotel industry’s green and low-carbon transformation, relies not only on systematic technological innovation but also on the comprehensive collaboration of the organizational system. If hotel managers and employees lack awareness of the importance of low-carbon practices and environmental protection consciousness and execution capabilities, the effectiveness of energy efficiency improvement will be greatly reduced even with the introduction of advanced technologies and equipment. At present, many hotels have deficiencies in corporate culture construction and have not fully integrated the concept of green and low-carbon into the core of their corporate culture, resulting in a dual lack of “awareness” and “execution.” On the one hand, management has a cognitive bias regarding the connotation of low-carbon development, overemphasizing the initial investment cost while ignoring the benefits of the entire life cycle. They view environmental protection measures as an economic burden and oppose environmental responsibility to corporate benefits, failing to recognize the comprehensive value of green and low-carbon transformation for brand premium, energy cost, and policy dividends. On the other hand, hotels generally lack a dedicated department or organization for low-carbon and environmental protection work, making the promotion of low-carbon work lack systematicness and continuity. At the same time, in employee training and daily management, low-carbon and environmental protection are not emphasized as important content, resulting in employees lacking low-carbon awareness and failing to form good low-carbon behavior habits.

### 3.5 Low Consumer Recognition and Insufficient Willingness for Green Choices

In recent years, with the promotion and popularization of green, low-carbon, and environmental protection concepts by the state and society, the public's environmental awareness has been continuously enhanced, and consumers' attention to ecological and environmental pollution issues has also increased. Green and low-carbon hotels have gradually been included in consumers' choices. However, in actual consumption decisions, although most consumers claim to support green hotels, the proportion of consumers who actually choose green-certified hotels is relatively low, with most consumers still prioritizing price and location in their decision-making. Consumers acknowledge the environmental significance of eliminating single-use items, but in actual situations, they still resist due to the loss of convenience. This indicates a certain disconnection between consumers' attitudes and behaviors. This is because China's green hotel certification system is still imperfect, and consumers' familiarity and trust in green and low-carbon hotels are generally low, making it difficult to identify truly green and low-carbon hotels. Due to the lack of transparency in green service information, the scarcity of green information makes it difficult for consumers to understand green hotels. In addition, consumers' understanding of the low-carbon concept is significantly stratified, with most people only having a superficial understanding of "energy conservation and emission reduction" and lacking a correct understanding of green consumption behavior. These issues collectively lead to consumers' vague perception of the value of hotel green measures, making it difficult to establish an internal logic for behavior-driven actions and thus affecting the formation of green consumption behavior.

## 4. Case Study

### 4.1 Case Background

As a global large-scale hotel group, Jinjiang Hotels actively responds to the national "dual carbon" strategic goals. Under the initiative of "Lucid waters and lush mountains are invaluable assets," it focuses on the organic unity of environmental protection and enterprise development and actively practices the green and sustainable development route. In recent years, it has carried out innovative practices in various aspects, integrating green concepts into hotel design and operation, brand environmental communication, and activity development, providing strong support for the transformation of the low-carbon economy.

### 4.2 Implementation Strategies

Firstly, it actively promotes green building. Jinjiang Hotels takes "green and environmental protection" as the keyword for innovation and continuously promotes the research and development of "sustainable development theme model rooms." From the basic construction stage of the room, hard decoration, soft decoration to operational materials, it considers the recyclability of materials more comprehensively. For example, in home decoration materials, it uses walls made of wood ash and floors made of straw wood. In terms of indoor configuration, it replaces wood with fast-growing bamboo that does not need to be planted and uses corrugated paper processed from recycling to create modern furniture that is high-strength and lightweight, reducing material waste.

Secondly, it adopts green products. Jinjiang Hotels has included straw-based six-piece sets in the brand standards of its subsidiaries and gradually promoted the use of environmentally friendly six-piece sets in all stores. To reduce the use of plastic, each brand under Jinjiang Hotels has replaced small packaged and disposable soaps with large bottled bath products and used unbleached linen and biodegradable EP materials to make slippers without plastic packaging to further reduce waste and plastic garbage.

Thirdly, it promotes circular economy and resource recycling. Jinjiang Hotels launched an initiative for the resource utilization of waste textiles and established a 4R module of "recycling - regeneration - exchange - reporting." In 2023, Jinjiang Hotels' brands 7 Days Inn, Jinjiang Inn, and White Orchid participated in the textile recycling project, and the recycled textiles were used to produce regenerated polyester-cotton yarn and regenerated cellulose fibers.

Fourthly, it carries out environmental protection communication and activities. As a joint initiator of HSB and the first domestic enterprise to implement it on a large scale, Jinjiang Hotels integrates green and low-carbon into daily operations. Jinjiang Hotels' Internet

platform cooperates with Alipay to launch the "Green Check-in" action for hotel members and has also launched the micro movie "Where There Is Light" to raise public awareness of green and low-carbon practices.

### 4.3 Implementation Results

By implementing the relevant strategies, over 700 hotels under Jinjiang Hotels have passed the verification of the eight primary benchmarks in the "Hotel Sustainability Baseline" and have been awarded the HSB certification by the global authoritative certification body SGS. Its flagship brand, J Hotel Shanghai Tower, became the first hotel in the country to pass the verification of all 12 benchmarks in the "Hotel Sustainability Baseline" on December 18, 2023. Through the waste textile recycling project, approximately 3.13 tons of textiles were recycled, reducing greenhouse gas emissions by about 23,000 kg of $CO_2$ equivalent. Jinjiang Hotels continuously promotes the establishment of industry standards and drives the green transformation of the upstream and downstream industrial chains. By adopting the "policy response - technological innovation - ecological collaboration" model, it not only achieves its own low-carbon transformation but also becomes an important driver for sustainable development in the hotel industry, providing a replicable industry model for the "dual carbon" goals.

## 5. Optimized Countermeasures for Promoting Green and Low-Carbon Development in the Hotel Industry

### 5.1 Adopting Green Financing and Staged Investment to Alleviate Hotel Funding Pressure

For new hotel construction, higher building energy-saving design standards should be implemented, and low-carbon, environmentally friendly, or sustainable building materials should be used. For example, the energy-saving performance requirements for key components such as building doors and windows should be enhanced, and building insulation systems with high fire resistance and excellent thermal insulation should be promoted. The initial construction of ultra-low energy consumption buildings requires a significant amount of capital, which is mainly recovered through hotel operations later on. The time gap can be bridged with green finance, and currently available green financial products include green bonds, green credit, and carbon trading [4]. Hotel development companies should also strive for more incentive policies for low-carbon hotel construction to reduce financing costs.

For older hotels, energy-saving renovations of existing buildings need to be advanced. To alleviate funding pressure, hotels can divide their low-carbon renovation plans into several key areas and implement them gradually. In the first phase, priority should be given to replacing energy-saving lighting fixtures and efficient air conditioning equipment, choosing devices with environmental performance such as energy-saving lighting, air conditioning, and electrical appliances. In the second phase, focusing on the low-carbon economy, the intelligent upgrade of central air conditioning systems should be emphasized, with priority given to smart switches or remotely controllable devices to reduce electricity consumption. In the third phase, attention should be paid to the thermal insulation upgrade of the building's exterior walls and facades. The focus should be on improving the thermal performance of the building envelope to enhance insulation, and for buildings that meet the conditions, the installation of solar photovoltaic facilities should be promoted to fully utilize renewable energy [11]. By adopting a phased renovation approach, hotels can not only reduce initial funding pressure and balance the timeliness and flexibility of fund usage but also promptly assess the energy-saving effects and changes in operating costs after implementation, adjust subsequent investment plans, and thus maximize investment efficiency.

### 5.2 Deploying Intelligent Energy Management Systems to Enhance Carbon Monitoring Capabilities

Energy management is an essential path for hotels to implement low-carbon development. Intelligent energy management systems can connect to various energy-consuming devices, collect and analyze data in real-time, and provide the best energy usage solutions for hotels. Through intelligent device management, hotels can maximize energy-saving effects. For example, intelligent air conditioning systems and LED lighting systems can automatically adjust their operating power according to the

environment and demand, effectively avoiding unnecessary energy waste. In addition, intelligent systems can also conduct regular maintenance and fault warnings for devices, extending their service life, reducing the frequency of repairs and replacements, and further saving operating costs. At the same time, hotels should also develop carbon emission management systems to monitor the company's carbon emission data in real-time. Using big data, the Internet of Things, and other technologies, building carbon emissions should be evaluated from a comprehensive perspective, including infrastructure, renewable energy, and carbon sinks. The accuracy of related data and the stability of the system should be ensured to achieve traceable and manageable carbon emission data, providing decision-making basis for hotels to carry out carbon emission reduction and promoting the transformation of hotels towards green and low-carbon development.

### 5.3 Building Professional Teams to Solve Technical Operation Challenges

One of the core challenges of hotel low-carbon transformation is the shortage of professional talent. The current hotel industry generally faces the dual problems of insufficient technical adaptability and a lack of interdisciplinary talent, especially in the fields of energy management, intelligent system operation, and environmental engineering. There is an urgent need to build a professional talent system to support the implementation of green strategies. First, hotels can establish new positions such as "Energy Management Engineer" and "Carbon Neutrality Project Manager", clarify job responsibilities and performance targets, prioritize the recruitment of technical personnel with experience in intelligent building management system operations or backgrounds in environmental engineering, and offer salaries above the industry average. Attractiveness can be enhanced through green innovation bonuses and equity incentives. Second, since many new types of energy-saving devices and intelligent management systems are relatively complex to operate, to ensure that employees can proficiently master the use and maintenance of new technologies, hotels need to provide systematic training for their staff. Hotels can establish a tiered training system, develop personalized training programs, and provide targeted training for employees in different positions. Through systematic training, employees will not only be able to master the skills of using new devices but more importantly, understand the significance of the energy-saving effects of the devices, thereby actively promoting low-carbon actions in their daily work.

### 5.4 Enhancing Hotel Low-Carbon Management Levels to Promote Daily Environmental Protection

Corporate culture, serves as the internal driver of green management, requiring a shift beyond "slogan-style environmentalism". For hotels undergoing low-carbon transformation, employee engagement and cultural alignment with sustainability principles are critical to success. Hotels must also foster a deeply ingrained green culture by raising environmental awareness and encouraging organization-wide participation. Only then can low-carbon principles be truly embedded into daily operations, ensuring meaningful and lasting change. First, hotel management needs to integrate the concept of low-carbon environmental protection into corporate culture construction and strengthen employees' recognition of green culture through various means. A dedicated green environmental protection department can be established within the hotel to promote the implementation of low-carbon policies and the cultivation of employees' green consciousness. Regular environmental protection training and environmental protection-themed activities can also be organized to let employees feel the influence of low-carbon culture in their daily work and enhance their awareness of environmental protection behaviors. Second, hotels should establish green behavior norms, making low-carbon environmental protection a necessary requirement for employees' daily work, and provide energy usage management training to guide them on how to save energy in various tasks.

### 5.5 Strengthening Green Marketing to Advocate Low-Carbon Consumption

In today's business environment that emphasizes green development, integrating low-carbon practices into a hotel's brand image has significant strategic importance. On the one hand, hotels can leverage innovative marketing

strategies and diversified communication channels to actively promote and publicize their low-carbon initiatives and environmental protection practices. By sharing achievements in green and low-carbon practices and designing unique low-carbon activities or offers, hotels can effectively expand the influence of low-carbon marketing, attract more consumers with environmental awareness, and inspire their enthusiasm for participating in low-carbon consumption movements. On the other hand, consumer cooperation is crucial when hotels implement low-carbon concepts internally. If consumers lack low-carbon travel awareness or do not cooperate with the hotel's low-carbon management, it will severely hinder the effective implementation of the hotel's low-carbon practices. Therefore, hotels need to cultivate consumers' low-carbon consumption habits through educational and incentive measures. Specific measures include: First, hotels can design a tiered behavioral incentive mechanism. For example, hotels can introduce a "Green Points Program", where customers accumulate points for each low-carbon action they take, and these points can be redeemed for physical rewards or virtual privileges, with an attractive exchange ratio. Second, establish an "Environmental Ambassador" honor system, where customers in the top 10% of monthly points rankings are awarded the title of "Silver Environmental Ambassador," given an electronic badge, and publicly displayed on the hotel's official website. For long-term supporters, a "Green Travel Profile" can be customized to record their cumulative carbon reduction and regularly send achievement reports via email. Third, encourage customers to share their low-carbon experiences on social media, offering additional rewards for content with over 500 likes. A "Customer Environmental Stories" column can also be opened on the hotel's official website to regularly feature and display high-quality content, creating a demonstration effect.

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