From Passive Compliance to Active Value Creation - How Can ESG Become a Core Element of Corporate Competitiveness

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Abstract. In the context of global sustainable development, the concept of environmental, ESG is undergoing a strategic transformation from passive compliance to active value creation. This study takes Longi Green Energy, a leading Chinese photovoltaic enterprise, as a case study. By analyzing its "Solar for Solar" strategy and ESG-driven innovative practices, it reveals how ESG has transformed from a regulatory burden into the core engine of corporate competitiveness. The study found that through its forward-looking ESG strategy, LONGi Green Energy has achieved triple value creation: breaking through low-carbon technology bottlenecks, building a risk-resilient supply chain based on hydropower resources in Yunnan Province, and securing financial benefits such as EU carbon premium pricing. A comparative analysis with GCL System Integration shows that enterprises that take ESG as the core of their strategy are significantly superior to passive compliance providers. This study reveals how ESG unlocks commercial value via technological innovation, risk management, and market premiums, offering a model for traditional manufacturing's transition in the carbon-neutral era. Longi's practice shows that when ESG is deeply integrated into the corporate strategy, the commitment to sustainability will be transformed into a long-term competitive advantage that is difficult to imitate.

1 Introduction

Driven by the global wave of sustainable development, the concept of environmental, social and corporate governance (ESG) is undergoing a strategic transformation from passive compliance to active value creation. At the policy level, the evolution of policy frameworks such as the EU's Sustainable Finance Disclosure Regulation and China's "dual carbon" goals is reshaping the ESG practice paradigms of enterprises. At the market level, capital allocation and consumer preferences are increasingly tilting towards enterprises with outstanding ESG performance. From a technical perspective, green technological innovations represented by photovoltaic and energy storage are constantly reducing the cost of ESG practices. At the social level, talent competition and public supervision have further strengthened the strategic value of ESG. Industry leading enterprises represented by Longi Green Energy and Goldwind Science & Technology have successfully transformed ESG

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from compliance costs into competitive advantages through technological innovation, supply chain optimization and the application of ESG data.

Existing research indicates that the promoting effect of ESG on enterprise development is mainly reflected in three dimensions: Firstly, as an innovation catalyst, ESG can stimulate the technological innovation vitality of enterprises. Acemoglu et al.'s research indicates that environmental regulations have significantly increased enterprises' investment in green technological innovation through a "reverse push mechanism" [1,2]. Take Longi Green Energy as an example. Through continuous research and development of low-carbon photovoltaic technology, it not only meets environmental protection requirements but also establishes a technological barrier in the industry. Secondly, ESG builds enterprise resilience and enhances risk resistance capabilities. Li et al. found that enterprises with excellent ESG performance demonstrated stronger resilience when facing systemic risks [3]. Goldwind Technology has effectively responded to the impact brought by international trade frictions by optimizing its supply chain layout through ESG management. Thirdly, ESG brings about significant profit effects. The empirical research by Khan et al. confirmed that there is a positive correlation between ESG scores and the financial performance of enterprises [4]. Longi Green Energy has been granted an exemption from anti-dumping duties by the European Union due to its ESG advantages, directly enhancing its international market competitiveness.

This study systematically examines the transformation mechanism of ESG from compliance requirements to value creation through the analysis of typical cases. Take Longi Green Energy as an example. It was the first to propose the sustainable development concept of "Solar for Solar" at the 24th United Nations Climate Change Conference. In 2020, it became the only Chinese enterprise to join the four international climate initiatives of RE100, EP100, EV100 and SBTi simultaneously. These practices vividly illustrate the core argument of this article: ESG is internalizing from external compliance requirements into the core driving force for corporate strategic innovation. Through technological breakthroughs (such as Hi-MO modules), supply chain reconstruction (the Yunnan hydropower base), and standard leadership (four international initiatives), Longi has successfully transformed its identity from a "passive compliance provider" to a "value creator", not only building a differentiated competitive advantage but also reshaping the sustainable development paradigm of the photovoltaic industry. This case profoundly reveals the intrinsic mechanism of the ESG competitiveness leap - when enterprises deeply integrate the ESG concept into technological innovation, operation management and strategic planning, they can achieve a virtuous cycle of social value and commercial value, and ultimately complete the qualitative change from a cost center to a value engine.

2 The evolution of ESG practices in Chinese photovoltaic enterprises

2.1 The initial stage of ESG practices in Chinese photovoltaic enterprises

In the early stage of development around 2010, the ESG practices of Chinese photovoltaic enterprises showed a distinct feature of passive response. As an industry representative, Longi Green Energy's early ESG activities mainly focused on meeting basic compliance requirements, including installing environmental protection facilities, establishing labor protection mechanisms, and minimum information disclosure [5]. This passive posture was closely related to the overall development status of China's photovoltaic industry at that time. At that time, the industry was undergoing the impact of the EU's "anti-dumping and countervailing duties" investigation and the high tariffs of the United States. Enterprises regarded ESG as an entry threshold for international trade rather than a strategic asset. Data shows that in 2015, the ESG report disclosure rate of Chinese photovoltaic enterprises was less than 30%, and the report content was generally just a formality, reflecting the industry's limited understanding of the strategic value of ESG [5]. In Longi's 2016 financial report, the description of environmental management still focused on basic matters such as "meeting pollutant discharge standards". The company's behavior at this stage fully demonstrated the characteristics of traditional compliance-oriented ESG practices [5].

2.2 Key nodes of Longi green energy's strategic transformation

2018 became a strategic turning point for Longi Green Energy's ESG practice. At the 24th United Nations Climate Change Conference held that year, the company's chairman, Zhong Baoshen, innovatively proposed the "Solar for Solar" development concept, marking a shift in the company's ESG strategy from passive response to active leadership. The breakthrough of this concept lies in the fact that it is entirely based on the enterprise's independent strategic choice, rather than being pressured by external policies or market conditions. Longi subsequently implemented a series of major strategic measures, including investing 4.5 billion yuan to build a hydropower production base in Yunnan, incorporating carbon footprint optimization into core technical indicators, and joining international initiatives such as RE100 [6,7]. These actions not only far exceeded the industry compliance requirements at that time, but also demonstrated the strategic intention of enterprises to internalize ESG as their core competitiveness. This transformation process vividly interprets the sustainable development value creation theory proposed by Hart and Milstein, that is, enterprises can gain a differentiated advantage in market competition through forward-looking ESG strategies [8].

2.3 ESG-driven value creation mechanism

The practical process of the "Solar for Solar" concept systematically demonstrates how ESG has transformed from a cost center into a value creation engine. The innovative operation model of Longi's Yunnan production base combines local hydropower resources with low-carbon production technologies, achieving remarkable results such as a 30% reduction in unit energy consumption and a 40% reduction in carbon footprint for monocrystalline silicon products [6]. This environmental performance is directly translated into commercial value: During the pilot phase of the EU's Carbon Border Adjustment Mechanism (CBAM), Longi became the only Chinese photovoltaic enterprise to receive preferential tariffs on carbon emissions [7]. More strategically significant is that the company has successfully replicated this model at its production base in Malaysia, where the components produced for hydropower have achieved a premium of 0.02 euros per watt in the European market [4]. The practice at this stage has verified the core viewpoint of Barney's resource-based theory, which is that enterprises can gain a sustainable competitive advantage by building scarce and hard-to-imitate ESG capabilities [9]. Longi, by proactively laying out a clean energy production system, essentially participated in the formulation of new industry standards, thus occupying a strategic high ground in subsequent market competition.

The comprehensive energy consumption data of Longi Green Energy from 2022 to 2024 further confirm the technical implementation effectiveness of its ESG strategy. As shown in Figure 1, the company has achieved a continuous decline in unit energy consumption intensity (tons of standard coal per 10,000 yuan of output value) through measures such as the replacement of clean energy in the hydropower base and the upgrading of RCZ single crystal growth technology [6,10]. This trend echoes the increase in its gross profit margin, low-carbon production not only avoids the risk of the EU carbon tariff but also reduces operating costs through process innovation. Data shows that Longi's ESG practices have formed a positive cycle of "technological consumption reduction - cost savings - market premium", which is precisely its core advantage over competitors like GCL.

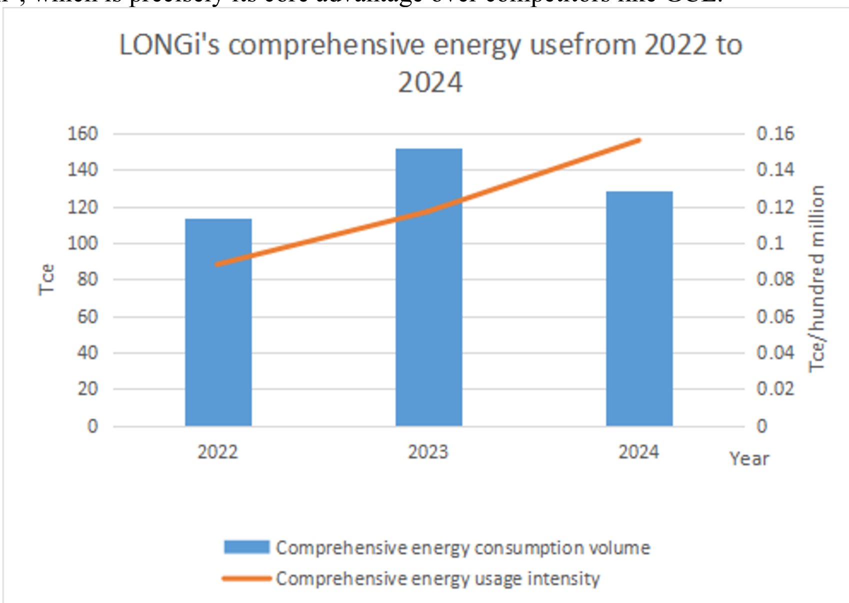

Fig. 1. LONGi's Comprehensive Energy Use Trends (2022-2024): Consumption Volume and Usage Intensity

3 Discussion

Through a comparative analysis of Longi Green Energy and GCL System Integration, based on the Resource-based view (RBV) and dynamic capability theory, it can be observed that ESG strategic choices have a profound impact on the development of enterprises [7,11]. Research has found that the differences in ESG practices between the two enterprises have directly led to completely different development trajectories. This phenomenon deserves in-depth analysis by combining institutional theory and shared value theory [12,13].

From the perspective of strategic positioning, the fundamental differences in ESG understanding between Longi and GCL determine their completely different development paths. According to the resource-based perspective, Longi has deeply integrated ESG into its core strategic framework, transforming it into VRIN resources that are difficult to imitate (valuable, scarce, unimitable, and irreplaceable), while GCL has long regarded it as a compliance burden. This difference gradually became decisive after 2018 [5,7]. Longi has achieved a strategic upgrade from merely technological leadership to a systematic reconstruction of "zero-carbon manufacturing" by proposing the forward-looking concept of "Solar for Solar", embodying the core logic of "perception - capture - transformation" in the dynamic capability theory [11]. Before this, although Longi had established an advantage in the field of monocrystalline silicon technology, its market position had not yet formed a significant gap with traditional polysilicon enterprises such as GCL. The proposal of the "Solar for Solar" concept has completely reshaped the competitive landscape of the industry. Longi is no longer confined to manufacturing clean energy products but has innovatively committed to using clean energy to produce clean energy. This strategic breakthrough validates the core viewpoint of the shared value theory, enabling it to achieve leapfrog development after 2018 [13]. By transforming the requirements of sustainable development into the driving force of technological innovation, Longi has successfully restructured the entire enterprise value chain [1]. From the perspective of institutional theory, GCL has always remained at the level of passively responding to regulation, adhering to the traditional model of high-carbon locking, and ultimately missed the critical window period for strategic transformation [12]. This difference in strategic choices directly led to a rapid gap in the market performance of the two enterprises. Longi achieved a comprehensive overtaking, while GCL fell into a development predicament.

The key difference lies in that Longi has transformed ESG from a slogan into a quantifiable competitive advantage. After its hydropower base in Yunnan was put into operation in 2019, the carbon footprint of its photovoltaic products dropped by 40%. This figure directly translated into the premium capacity in the EU market, verifying Hart's theory of "sustainable development competitive advantage". At that time, GCL was still expanding its production capacity in regions dependent on thermal power. Ultimately, under the "dual control of energy consumption" policy in 2021, it encountered large-scale production restrictions [4,6,8]. The comparison of gross profit margins between Longi Green Energy and GCL System Integration can directly reflect the long-term impact of ESG strategies on financial performance. At the same time, ESG is also influenced by multiple factors. From 2016 to 2021, Longi's gross profit margin rose from the industry average to the leading position through ESG measures such as the construction of hydropower bases and the research and development of low-carbon technologies. In 2021, it reached 16 billion yuan, far exceeding GCL's 9 billion yuan. This gap validates how ESG-driven value chain restructuring translates into business advantages, as Longi's low-carbon products enjoy a premium in the EU market, while GCL, relying on traditional energy production, faces cost pressure under the carbon tariff policy [4,10]. According to the stakeholder theory, Longi's success lies in balancing the demands of investors, customers, employees and other parties, while GCL overly focuses on the short-term interests of shareholders [14]. Data shows that ESG investment is not merely a cost but has achieved a leap in profitability through technical barriers (such as Longi's Hi-MO modules) and market bargaining power (such as the premium of hydropower modules) [15,16].

The more profound impact is reflected in technological iteration. For instance, Longi's low-carbon strategy has forced its R&D team to break through the RCZ single crystal growth technology, reducing unit energy consumption by another 15%. This process perfectly interprets the "technology-market" reconstruction logic in Christensen's [17] disruptive innovation theory, while GCL, due to the lack of carbon constraint pressure, Slow in the transformation of polysilicon, it gradually lost its technological say [9]. This contrast clearly reveals that Longi's overtaking is not the result of natural technological evolution, but rather the outcome of an active choice in ESG strategy. Through the "Solar for Solar" concept, Longi has reshaped its entire value chain. From the geographical advantage of the hydropower base in Yunnan to the industrial closed loop of "photovoltaic hydrogen production", and then to the completion of the industry's first "zero-carbon factory" in 2022, each step has strengthened its moat in the low-carbon era [6]. In contrast, GCL was not forced to release its carbon neutrality roadmap until 2020 under regulatory pressure. However, its compliance-driven response failed to generate innovation dividends, eventually turning its polysilicon business into a victim of a price war. Combining the dynamic capability theory with the resource-based perspective, Longi's case demonstrates that when ESG transforms from a cost center to a strategic engine, it can simultaneously drive technological innovation, cost reduction and efficiency improvement, as well as market premium. This is the fundamental reason why it has taken the lead since 2018 [1,4,7,11,15].

The case of Longi Green Energy profoundly reveals the value creation potential of ESG evolving from a compliance requirement to a strategic concept. The practical process of the "Solar for Solar" concept has systematically restructured the logic of enterprise value creation. It has transformed the ability to obtain clean energy into supply chain resilience (for example, the hydropower base in Yunnan has reduced energy costs by 15%), and the ability to manage carbon footprints into product premium advantages (a premium of 0.02 euros per watt in the EU market). Longi has transformed its commitment to sustainable development into a talent attraction, achieving a qualitative change from a "cost center" to a "value engine" [4,6,9]. This transformation path fully embodies Hart's "game-changer" theory [8]. Between 2018 and 2020, the leapfrog growth in the proportion of its renewable energy electricity (as shown in Figure 2) not only brought about an environmental benefit of a 40% reduction in carbon footprint, but also locked in a cost advantage through long-term hydropower agreements and contributed to its inclusion in the Dow Jones Sustainability Index (2021) [6].

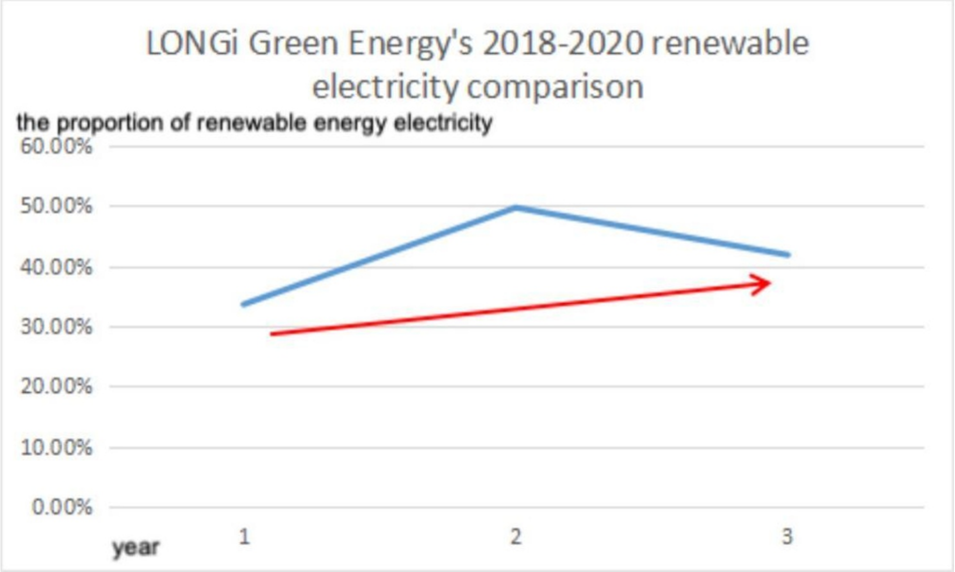

Fig. 2. LONGi Green Energy's Renewable Electricity Usage Proportion (2018-2020)

This transformation is essentially a reconfiguration of the strategic paradigm - enterprises no longer obsess over "how much to invest in ESG", but rather explore "how to create more value through ESG". While competitors are still imitating single measures (such as low-carbon factories), Longi has built an ESG-driven innovation ecosystem, forming a competitive advantage that is difficult to replicate [7,18]. From the dual perspectives of the resource-based view and the dynamic capability theory, Longji, through the systematic practice of "Solar for Solar", has not only achieved a virtuous cycle of commercial value and social value, but also promoted China's photovoltaic industry into a new stage with ESG as the core competitiveness It provides a benchmark model for the transformation of traditional manufacturing industries [7,11,13,19].

4 Conclusion

This study takes Longi Green Energy as a typical case to systematically reveal how ESG has transformed from a passive compliance requirement to a core driving force for active value creation and has become a key element of corporate competitiveness. Through the strategic practice of the "Solar for Solar" concept, Longi Green Energy has deeply integrated the requirements of sustainable development into its enterprise innovation system, successfully achieving a qualitative change from "cost burden" to "value engine". Research has found that ESG not only forces enterprises to break through low-carbon technology bottlenecks (such as the research and development of Hi-MO modules and RCZ single crystal growth processes), but also reconfigures supply chain resilience through clean energy layouts like the Yunnan hydropower base, enabling them to demonstrate significant risk-resistance capabilities under international trade frictions and carbon tariff policies. These strategic measures eventually translate into tangible commercial value: the carbon premium in the EU market (0.02 euros per watt), long-term cost advantages, and the control of industry technology discourse power, all of which jointly drive Longi to achieve comprehensive leadership in the photovoltaic industry. This case profoundly demonstrates that when enterprises transcend compliance thinking and take ESG as the core dimension of strategic innovation, they can not only effectively cope with regulatory pressure but also form an imitable competitive advantage through the construction of technological barriers, the acquisition of market premiums, and the optimization of supply chains. Longi's practice provides significant inspiration for the transformation and upgrading of China's manufacturing industry: In the carbon-neutral era, ESG is no longer merely about fulfilling social responsibilities, but a strategic fulcrum that determines a company's long-term competitiveness. Its potential for value creation is being systematically released through multiple paths such as technological innovation, risk management, and financial performance.

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