

Comparison of the Strategic Factors of Enterprises in China and the United States in the Process of Green Transformation

Qianyao Shen*

Adam Smith Business School, University of Glasgow, United Kingdom

Abstract. The electricity industry is one of the largest contributors to greenhouse gases, which makes reducing carbon emissions critical to mitigating climate change. In response, renewable energy sources like wind, solar, and hydropower are replacing traditional sources such as oil and natural gas. Traditional energy companies are undertaking green transformations to invest in sustainable facilities that require significant capital and practice, making it an area for study and improvement. This essay examines the green transformation process in the power industries of China (China Three Gorges Corporation (CTG)) and the United States (NextEra Energy (NEE)), essential for reducing carbon emissions. Chinese companies experience political interference, which limits their flexibility in industrial layout and capital allocation. However, they have established an information system combining employee management and electronic human resources systems, enabling relatively ideal human efficiency. American companies have higher market flexibility, allowing them to negotiate agreements with the government and trade unions to ensure stable and efficient human-to-efficiency ratios during the transformation process. Future research should identify factors that influence the green transformation process and, develop strategies to overcome potential obstacles. Comparative studies of power industries in other countries could provide insights into improving the efficiency of green transformations.

1 Introduction

The power industry has always been one of the industries with the highest carbon dioxide emissions. In recent years, the United States has developed rapidly in the direction of power transformation, and all companies have outstanding and successful internal strategic transformations. Among them are several power companies. The green transformation strategy of the enterprise has stimulated the productivity of the enterprise to a certain extent and improved the overall human efficiency ratio of the enterprise. In recent years, China has also made every effort to transform. Due to the scarcity of China's natural gas, the transformation path will be different from that of the United States [1]. The power transformation in China and the United States will have a huge impact on the global new energy market in the future, so the two can compare their strategies and business performance after the implementation of the strategies from the advanced and successful companies in each country. From the resource performance, the enterprises of the two countries can learn from each other and upgrade and compare what specific factors will produce different strategic results. As far as all enterprises in the green transformation are concerned, ISO 14001 and EMAS have been the most used reference models for implementing environmental management systems (EMS) [2]. When assessing a company's sustainability performance, there are various internationally recognized evaluation methods. One such approach is the Global

Reporting Initiative (GRI), which was established to measure the economic, social, and environmental performance of companies. The GRI framework includes over 100 indicators that cover all three aspects of sustainability performance.

In the following sections of the paper, the different data of the two companies for analysis will be compared, and how the design of the company's green performance can better improve the transformation and further improve the human-efficiency ratio will also be thought about.

2 NextEra Energy

NEE is a prominent player in the power and energy infrastructure industry in North America and has a strong presence in renewable energy. It operates through two primary businesses - Florida Power & Light (FPL) and NextEra Energy Resources (NEER). FPL's primary focus is to invest in generation, transmission, and distribution facilities, while NEER is focused on the development, construction, and operation of clean energy assets with long-term contracts in the US and Canada, including renewable energy generation facilities, battery storage projects, and power transmission facilities. Despite their unique business models, FPL and NEER work together on a shared platform, aiming to reduce costs and enhance efficiencies across their operations. Then, NEE's strategy achieved continuous profitable growth in FPL and NEER. In the ESG evaluation data (A) framework used to assess an organization's business practices and performance on

* Corresponding author: 2613007S@student.gla.ac.uk

various sustainability and ethical issues.) provided by Morningstar Rating, it reached a value of 27.07, which is in the middle of the industry [3,4].

For its green vision for the future, it plans to achieve it simultaneously in four ways: Achieving 100% clean energy without increasing costs for customers, before 2045. Collaborating with peer companies to help decarbonize other sectors of the U.S. electricity sector. Partner with companies outside the electric power industry to help lead the decarbonization of other sectors of the U.S. economy. Especially in industries with high power consumption or high emissions. Continuing to build a leading and competitive power transmission business in the country to provide infrastructure for the expansion of the renewable energy market.

Diversity and balance in NEE's energy sector are valuable characteristics of the business, and each business contributes to NEE's financial strength in different ways.

From January 1, 2022, NEE will report its financials through its two divisions, namely FPL and NEER. NEECH is a fully-owned subsidiary of NEE, and it provides funding for NEE's operating subsidiaries, excluding FPL and its subsidiaries. NEP, a subsidiary of NextEra Energy Resources, is responsible for the acquisition, management, and ownership of clean energy projects with stable, long-term cash flows. Further information regarding the New Economic Policy can be found in the following section. The simplified ownership structure of NEE is illustrated in Figure 1.

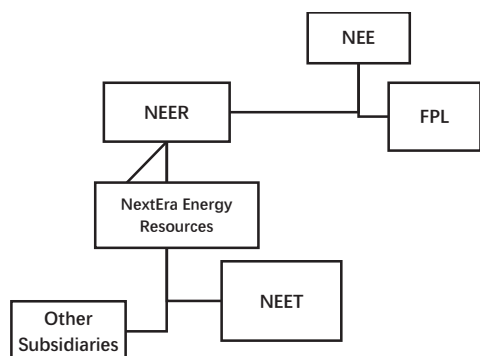


Fig. 1. Ownership structure of NEE. (Picture credit: Original)

The enterprise deployment with a clear division of labor has helped NEE form the ability to make the business layout more flexible, transfer its funds more flexibly to provide for more important projects, and lay a strong foundation for its future green development. And after the layout of the green energy market since 1990, in 2021, fossil fuels will account for less than half of NEE's own r generation mix. Nuclear power accounted for 21.2%, while renewable energy (i.e., solar and wind) accounted for 31.6% [5]. The distribution is shown in Figure 2:

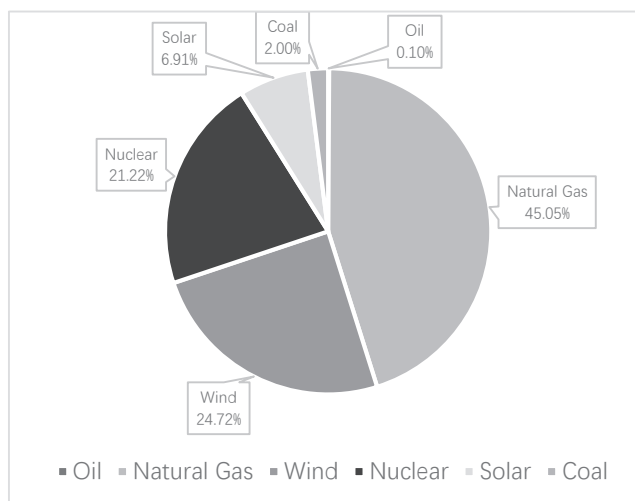


Fig. 2. Distribution of NextEra energy's net electricity generation in 2021 [6].

(<https://www.statista.com/statistics/1255328/nextera-energy-electricity-generation-share-source/>)

In the process of comprehensive remodeling in 2014, the company interrupted a large number of its coal power generation and stone power generation businesses. In the case of interrupting its core business, with a strong internal operating structure and its advanced transformation Retrofit technology has kept things going in Florida, eliminating nearly all coal and oil use, and providing most of NEE's net profit, reaching 90% in 2020 [7].

Starting in 2022, NEE will spend \$25 billion to develop its R&D programs for new wind, solar and storage assets. Due to its diverse corporate structure, NEE chose to reduce FPL's investment and transfer a large amount of investment to NextEra Energy's R&D projects.

3 China Three Gorges Project Corporation

China Three Gorges Project Corporation, established in 1997, is a group focused on the development and operation of large-scale hydropower as a means of promoting clean energy. Its primary operations involve construction, international investment, and contracting, as well as the development of renewable energy sources such as wind and solar power. Additionally, the company is engaged in the comprehensive development and utilization of water resources and the provision of related technical services. The company's business model prioritizes renewable clean energy, accounting for 97% of its overall structure, while its comprehensive hydropower capacity represents 16% of China's total installed hydropower capacity. Its business chain spans the globe, with large-scale hydropower operations constituting its core business [8]. Hydropower has the characteristics of renewable, pollution-free, mature technology, and strong peak-shaving capabilities. Its carbon dioxide "zero emission" feature will play an important role in my country's "carbon peak" and "carbon neutral" strategies [9]. The fundamental principle that underpins the company's core values is to "construct power stations that

promote local economic growth, improve the environment, and benefit resettled residents" while upholding the values of innovation, coordination, green development, openness, and sharing. As a central enterprise, China Three Gorges Corporation is dedicated to fulfilling its social responsibilities. Beyond the ecological advantages of cascade development, such as flood control, water resource preservation, energy conservation, and emission reduction, the Three Gorges Group also aims to generate social and economic benefits through engineering technical measures and scientific supervision. According to Morningstar Rating's ESG assessment, the company earned a score of 27.34, indicating that both NEE and CTG have favorable sustainability prospects [10].

To maximize the overall benefits of the company, China Three Gorges Project Corporation has been expanding its marketing ideas, innovating its marketing strategies, optimizing its marketing methods, and implementing refined and precise marketing that considers the consumption characteristics of power stations.

The market plan of the company is the company will actively respond to the market situation, further, deepen market concepts, strengthen forward-looking research, promote top-level design, and strictly control market risks. The report suggests maintaining efficiency as the central aspect, focusing on large hydropower consumption, and striving for a sustainable mechanism. It proposes prioritizing large hydropower in power generation plans, implementing multiple measures to ensure power consumption, and addressing related issues to achieve production and operational objectives. The study advocates exploring the market, developing potential customers, and improving market competitiveness in line with the company's strategic layout to support sustainable development.

4 Comparison and discussion

4.1 The operating performance

Operating performance can be used to measure a company's ability to operate in its primary business. Determining operating performance focuses on the extent to which assets are converted into revenue and the efficiency with which resources are used to generate revenue. A business with an excellent performance ratio can generate high levels of sales with relatively few resources and generate high levels of cash inflow. Next, will compare NEE and CTG by comparing the company's fixed asset turnover rate, asset turnover rate, and sales per employee, which are the advantages and the reasons behind their advantages.

1: Fixed Asset Turnover calculates how efficiently a company generates sales from its fixed assets. It can be calculated by [11]:

$$\text{fixed asset turnover} = \text{net income} / \text{PPE} \quad (1)$$

2: Asset turnover can often be used as an indicator of how efficiently a company deploys assets to generate

revenue. it can be calculated by [12]:

$$\text{asset turnover} = \text{income} / \text{average total assets} \quad (2)$$

3: Sales per employee allows investors to see the value management is getting from employees. This analysis can be done on a departmental, functional, or company-wide basis.

It can be calculated by [12]:

$$\text{Sales per Employee} = \text{Revenue} / \text{Number of Employees} \quad (3)$$

Table 1. The human resources performance between the two companies

		2017	2018	2019	2020	2021
Fixed Asset turnover (%)	NEE	4.81	5.23	4.13	2.58	2.85
	CTG	5.53	5.10	4.29	3.67	3.75
Asset Turnover (%)	NEE	23.82	31.27	16.32	15.29	13.37
	CTG	9.85	8.59	8.88	7.86	7.07
Sales Per Employees millions	NEE	0.86	1.17	1.30	1.86	1.84
	CTG	1.15	1.24	1.48	1.94	1.37

Through the comparison of the above data (Table 1), first of all, comparing the data of the turnover rate of fixed assets, a higher ratio is usually beneficial, which indicates the company's effective use of assets. However, from 2017 to 2021, NextEra Energy's utilization rate of the company's fixed assets is getting lower and lower, from 4.81% to 2.85%. The main reason is that NEE has started a more comprehensive green energy alternative strategy. It modernizes and replaces aging, inefficient oil, gas, and coal plants with advanced natural gas installations. Then, the oil consumption for power generation was greatly reduced, all coal-fired power plants were phased out, and new solar energy projects were immediately deployed vigorously. The original infrastructure cannot be used due to renovation, and new facilities still need time to be built, so the utilization rate of fixed assets is low, but research shows that the future benefits it can generate are astonishing, and it is estimated that in 2045 it will be more than 65% for now [13]. Compared with NextEra Energy, the ratio of China Three Gorges is relatively high. This is because the main facility of the CTG is hydropower, which is already a clean energy source, so there is no need to spend a lot of money on energy transformation but can spend more on creating new technologies. The funding for the new sustainable energy sector, both of which have declined significantly since 2019, is mainly due to the economic stagnation caused by the global epidemic. In the years before COVID-19, the capacity of clean energy generation and steady consumption growth [14]. Renewable energy jobs in the U.S. witnessed a surge in 2019, with solar energy jobs rising by 2.3% and wind jobs increasing by 3%. However, during the initial stages of the pandemic, most energy sectors, including clean energy, were affected as businesses shut down, traffic decreased,

and people stayed indoors. In the second quarter of 2020, the residential solar industry was particularly impacted, more so than any other segment of the solar industry [15]. For example, residential solar installations were down 23% from the first quarter. The cumulative loss for 2020 is more than double the growth in clean energy jobs over the past three years.

Asset turnover is often used as a metric to gauge a company's efficiency in deploying its assets to generate revenue. When it comes to the effectiveness of asset deployment, CTG and NEE exhibit stark differences. In 2017, NEE's asset turnover of 8.32% was significantly higher than CTG's 9.85%, but the latter witnessed a substantial decline in its value between 2017 and 2021. This can be attributed to a drop in operating income by 1.993 billion US dollars, largely caused by changes in energy prices leading to non-qualified commodities. Additionally, the impact of hedging resulted in a loss of approximately \$2.510 billion in 2021, as opposed to a loss of \$244 million in 2020. The severe and prolonged winter weather in Texas in February 2021 further reduced revenue from existing generation and storage assets by \$331 million. Moreover, the closure of the Duane Arnold nuclear power plant in August 2020 also contributed to a decline in nuclear power revenue [16]. However, due to its relatively comprehensive layout of new energy, since 1990, it has expanded its renewable energy portfolio and expanded to new markets and invested in new technologies. The company's strong financial position allows it to make strategic investments to grow the business. Therefore, it is also possible to maintain a stable balance of losses and profits. Reuters report reveals that NextEra Energy Partners LP will continue to acquire some solar and wind energy assets for US \$805 million, as it expands its renewable energy portfolio in the face of surging demand for clean energy. Compared with NEE and CTG industrial layout is relatively simple, and combined with its future development report, before 2045, it will still choose to focus on hydropower and further improve the energy efficiency ratio of hydropower. However, there is no more initiative in the innovation of new technologies and the expansion of new fields, and because of its special status as a national enterprise, it lacks flexibility in the transformation and improvement of its own green business [17]. As a result, it will be more difficult to face the global economic collapse or other external factors, thereby reducing the overall operating efficiency of the enterprise.

From the sales of employees, the NEE use 1.86 people can sell the same revenue as 1.94 people of CTG in 2020, the difference between them is very few. Moreover, it is obvious that CTG is a little higher than NEE, and the growth rate is also a little higher. Therefore, in terms of enterprise personnel, CTG can have more places to learn from. The following will analyze the green human efficiency ratio of enterprises through a more detailed data comparison.

4.2 Human resource analysis of the Company's green transformation

Yusliza argued that green human resource management practices are considered to be the most effective strategy for environmental performance programs [17]. These practices involve implementing environmentally friendly human resource activities that not only reduce costs and increase efficiency but also help in retaining employees and improving their engagement. Such practices can ultimately help in reducing the carbon footprint of employees. The human-efficiency ratio is a measure of the productivity of an enterprise's human capital. Different productivity concepts can be used, such as labor productivity, capital productivity, labor and capital productivity, and human capital productivity. The human capital of an enterprise comprises individuals who are closely aligned with the enterprise and its mission, capable of collaborating, possess a creative attitude, and have high-quality qualifications.

1: Economic benefit of human capital use (HCE) [18]. Borowski-Beszta defines HCE as the efficiency of human capital use, which is an important indicator of human capital in terms of creating added value for companies. Formula:

$$HCE=VA/HC \quad (4)$$

Where VA stands for value-added, which is calculated by adding wages to operating profit, and HC stands for wages and other expenses of company employees [19].

2: Efficiency in Human Resource Use (EHC) is an indicator of a company's productive use of human capital Formula [20]:

$$EHC=ICVA/HC \quad (5)$$

This metric can be obtained by adjusting EBIT. Intellectual capital value added (ICVA) represents the newly created value per currency unit invested in tangible intellectual capital [21]. This indicator also represents the return performance of intangible assets and goodwill. ICVA is calculated as [22]:

$$ICVA = EBITDA + Pe \quad (6)$$

EBITDA stands for earnings before interest and taxes, depreciation, and amortization. To ensure economic efficiency in the use of intangible assets and goodwill, which form part of the total intellectual capital (IC) recorded on the asset side of the balance sheet, it is essential to measure the efficiency of these assets. The performance indicator used for this purpose reveals the number of units of ICVA that can be generated for every 100 monetary units of intangible assets and goodwill employed. This indicator essentially measures the return on intangible assets and goodwill.

Table 2. Human resource analysis between two companies

	Nextera energy	China Three Gorges
HCE	17.62	64.83
ICVA	12.57	31.03
EHC (unit)	0.04	0.22
Sales Per Employees millions	1.84	1.37

Human Capital Utilization Efficiency shows how many ICVA monetary units are generated for each monetary unit of human capital. As shown in Table 2, between the two companies, in 2021, every dollar of human capital in NEE will generate an ICVA of USD 0.04, while CTG can generate an ICVA of USD 0.22. It can be seen that CTG has a better performance in terms of the efficiency of human capital use. In HCE, which represents the added value that each employee can create for the company, CTG is four times higher than NEE in terms of added value.

Investment in human capital can enable enterprises to gain a competitive advantage, and it is an input that enterprises transform into talents and technologies [23]. Ruchala pointed out that by investing in human capital, companies will improve the efficiency of products or services and quality, and differentiation [24]. In order to cultivate the company's green core competitiveness, both CTG and NEE have invested a lot of money to expand their core technologies, but the efficiency displayed by the two is completely different. The main reason is the difference in management models. Its huge multinational business structure and a large number of companies, in order to pursue more efficient human resource management, have adopted e-HR, that is, electronic human resource management, which is a new human resource management model based on advanced information and Internet technology [25]. The implementation of e-HR can lead to cost reduction, improved efficiency, and better employee service models. By introducing e-HR, the administrative burden on the human resources department can be reduced, the human resource management process can be streamlined, and the service quality of the human resource management department can be enhanced. Furthermore, e-HR can provide decision-making support and assist enterprises in transitioning towards a strategic human resource management approach. Othman proposed that the improvement of employees' green awareness can also improve their output efficiency to a certain extent, and the company's effective improvement of green awareness can also further increase customer trust, thereby indirectly improving the company's output [26]. CTG mentioned in its "ESG report" in 2022 that the company is making every effort to strengthen system construction and improve employees' social responsibility awareness and capabilities. At the strategic level, formulate the "Social Responsibility Index Management Manual", revise the accountability system and project management methods, and guide the company's social responsibility practice. By optimizing the project management process and system functions and implementing an online monthly report and progress monitoring system, CSR project information that

can be retrieved, collected, traced, and available is realized [27]. Therefore, with the help of information technology, it-based process management is improved, and the cultivation of green awareness among enterprise employees is more efficient and systematic. Taking advantage of China's developed Internet system to manage CTG's human resource management and green structure in an informative manner can make the entire enterprise operation more transparent and better supervised, but it is also accompanied by disadvantages, such as informatization management. It is necessary to quantify the green performance of employees such as behavioral awareness, but there are many things, such as the employee's green carbon footprint, personal green knowledge reserve, etc., which cannot be quantified, so it may also lead to some errors in the company's data, thus misleading corporate strategy.

While NEE doesn't use an information-based management approach, its methods for managing different professional talents are worth studying. As a new energy company deploying and developing solar energy, wind energy, and battery storage simultaneously, NEE operates under a unique political system in the United States, where trade unions can have a significant impact on its operation. To ensure stability, NEE guarantees that about 31% of its employees are represented by the International Brotherhood of Electrical Workers (IBEW), and most unions have collective bargaining agreements with terms of approximately three years, expiring in April 2022 and January 2025. In 2018, NEE launched an Employee Retirement Benefits Employee Pension Plan and Other Benefits Plans, which include a qualified non-contributory defined benefit pension plan for almost all employees of NEE and its subsidiaries. NEE also offers a Supplemental Executive Retirement Plan (SERP) that includes a non-qualified supplemental defined benefit pension component for a select group of management. Eligibility for SERPs requires retirees to contribute to post-retirement plans that provide other benefits. As of December 31, 2018, and December 31, 2017, the total accrued cost of equity for SERPs and post-retirement plans was around \$500 million. Improving employee benefits can enhance the stability of the company's overall operations, as well.

5 Conclusion

The power sectors in China and the United States are Playing key roles in the global effort to reduce carbon emissions and combat climate change. Both countries have set ambitious greenhouse gas reduction targets, and companies in these industries play an important role in achieving them. In China, the government has been promoting renewable energy sources such as wind and solar as part of efforts to reduce reliance on coal-fired power plants. Chinese power companies are investing heavily in renewable energy and have made significant progress in improving their green performance. China Three Gorges Corporation has achieved a relatively ideal human-efficiency ratio by combining powerful information systems, employee awareness training of the

company's green vision, and employee management systems with the e-HR system. In the U.S., electric utilities have also made significant strides in reducing carbon emissions. A shift to clean energy sources such as natural gas and renewables can help reduce the carbon intensity of the power sector. NextEra Energy, based on existing wind power and solar power, has again invested heavily in energy storage technology to achieve its strategic ambition to further lead the energy market. Utilities in both countries have made significant efforts to improve green performance and reduce carbon emissions. However, in China, the government is taking a more prominent role in setting targets and incentivizing companies to invest in renewable energy. Therefore, when CTG is intervened by the government, its industrial layout and capital allocation cannot be as flexible as NEE. Moreover, it can maintain more stable development. In contrast, the U.S. electricity sector is more market-driven, with businesses responding to consumer demand and the economics of the energy sector. Hence, NEE will sign agreements with the government and trade unions for the stable development of the company. Consequently, in order to better carry out green transformation, enterprises need to consider their own national policies and improve their industrial flexibility and the company's human efficiency ratio, so as to achieve faster industrial transformation.

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