

# Transitioning to Green: the Role of Finance

Association for Evolutionary Economics

San Francisco, California

January 5th, 2025

# China's Global Energy Projects and Finance

Keywords: Chinese Energy Projects, Renewable and Non-renewable  
projects, Policy Banks, Institutional Investors, Global South

JEL Classification Codes. E0, F0, E22, F21, O50

**“China is set to spend almost USD 680 billion in 2024,  
supported by its large domestic market and rapid growth in  
the so-called “new three” industries: solar cells, lithium  
battery production and EV manufacturing”  
(IEA, 2024)**

IEA (2024), World Energy Investment 2024, IEA, Paris <https://www.iea.org/reports/world-energy-investment-2024> Licence:CC BY 4.0

# 1. Abstract

- China's energy transition represents one of the most significant transformations in the global energy landscape. This study analyzes China's dual role as the **world's largest greenhouse gas emitter** and its position as a global leader in renewable energy production. Drawing on Schumpeter's theory of "*creative destruction*" and Minsky's framework of "*Big Government*" and "*Big Bank*", the paper explores how state intervention, corporate governance, and institutional investment have driven structural changes in China's productive systems. While renewable energy projects—particularly solar, wind, and hydroelectric—have benefitted from substantial public and private investments, coal remains deeply embedded in China's energy strategy, accounting for **56.2%** of the country's consumption as of 2022.
- The research highlights the financial dynamics underpinning China's renewable energy dominance, including its **97% control of the global solar panel market** and cost competitiveness, which is **51% lower than in the United States**. Simultaneously, initiatives like the **Belt and Road Initiative (BRI)** serve as vehicles for global energy investments, with energy projects representing **36% of total BRI funding in 2023**. However, the study also underscores the persistent challenges of fossil fuel dependency, external debt in the Global South, and the need for large-scale financing—estimated at **US\$14–17 trillion** over four decades—to enable a comprehensive energy transition.
- This paper concludes that China's energy strategy offers valuable insights into the interplay of technological innovation, institutional finance, and state-driven policies in advancing a *Just Transition*. The findings align with international climate agreements such as the **Paris Agreement** and the **2030 Agenda for Sustainable Development**, while acknowledging the complexities of balancing economic growth with environmental sustainability.

## 2. Introduction

- **China's Dual Role:**
  - World's largest greenhouse gas emitter (27% of CO<sub>2</sub> emissions)
  - Global leader in renewable energy production
- **Energy Transition:**
  - Ambitious shift towards renewables and transportation infrastructure
  - Requires significant investment (US\$14–17 trillion over four decades)
- **Dominance in Clean Energy:**
  - Controls 97% of the global solar panel market
  - Cost competitiveness (51% lower than the US)

# 3. Key Drivers of China's Energy Transition

- **State Intervention:**
  - “Big Government” role in supporting renewable energy development
  - Financial support and policy incentives
- **Corporate Governance:**
  - Strong corporate governance fostering innovation and investment
  - Leading firms like LONGi Solar, JinkoSolar, Trina Solar
- **Institutional Investment:**
  - “Big Bank” role in financing renewable energy projects
  - Active participation of institutional investors

# 4: Belt and Road Initiative (BRI)

- **Vehicle for Global Energy Investments:**
  - Energy projects represent 36% of total BRI funding in 2023
  - Extends China's energy influence globally
- **Challenges:**
  - External debt in the Global South
  - Environmental and social impacts of BRI projects

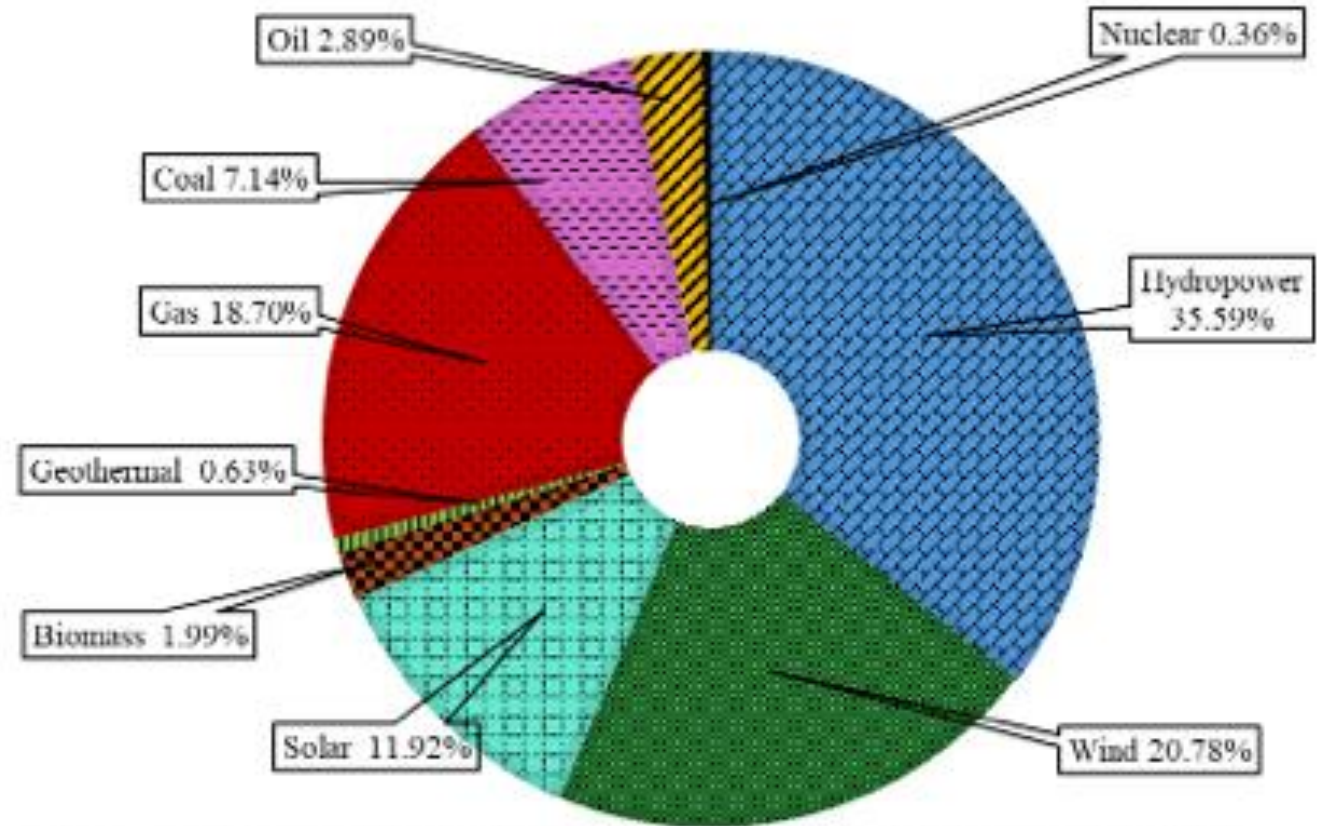
# 5: Global Map of Chinese Energy Plants

- **Total:** 1,107 plants and projects
- **Renewable Energy:** 785 projects (71%)
  - Hydroelectric: 394 (35.59%)
  - Wind: 230 (20.78%)
  - Solar: 132 (11.92%)
- **Non-Renewable Energy:** 322 projects (29.1%)
  - Gas: 207 (18.70%)
  - Coal: 79 (7.14%)



# GLOBAL MAP OF CHINESE ENERGY PLANTS

**Graph 1**  
**Worldwide Distribution of Chinese Energy Plants**



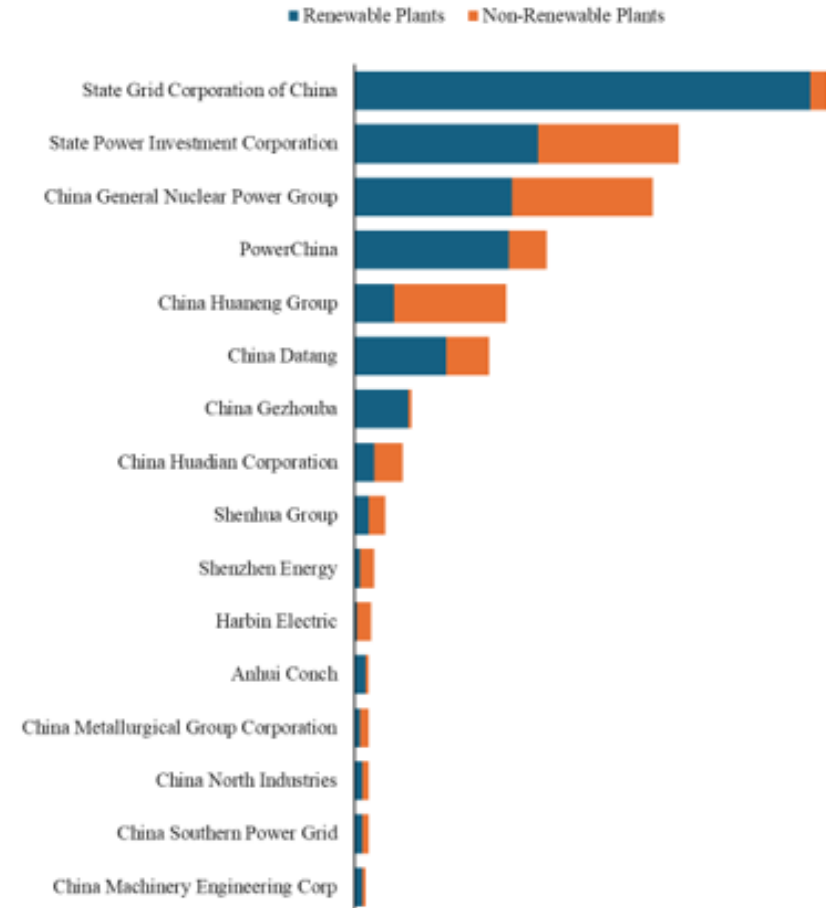
Source: own elaboration with data from Boston University Global Development Policy Center, 2023. China's Global Energy Finance Database. <http://www.bu.edu/cgef>.

# 6: Leading Chinese Energy Corporations

- **Renewable Energy:**
  - State Grid Corporation of China (159 projects)
  - State Power Investment Corporation (64 projects)
  - China General Nuclear Power Group (55 projects)
- **Non-Renewable Energy:**
  - State Power Investment Corporation (49 projects)
  - China General Nuclear Power Group (49 projects)
  - China Huaneng Group (39 projects)

# LEADING RENEWABLE AND NON-RENEWABLE ENERGY PLANTS OF CHINESE CORPORATIONS WORLDWIDE

**Graph 2**  
**Chinese Corporations' Investments in Renewable and Non-Renewable Power Plants Worldwide**



Source: own elaboration with data from Boston University Global Development Policy Center, 2023, China's Global Energy Finance Database. <http://www.bu.edu/cgef>.

# 7: Development Bank Financing

- **Renewable Energy:**
  - Total loans: \$35.963 billion (2000-2020)
  - Africa: \$17.806 billion (49.5%)
  - Asia: \$10.374 billion (28.8%)
- **Non-Renewable Energy:**
  - Total loans: \$189.14 billion (2000-2020)
  - Asia: \$67.291 billion (35%)
  - Europe: \$45.502 billion (24.06%)

## DEVELOPMENT BANK FINANCING

**Chart 1**  
**Chinese Loans for Renewable Energy Projects**  
Millions of dollars  
2000-2020\*

Region	Amount	Share (%)
Africa	17,806	49.51
Asia	10,374	28.85
Latin America and the Caribbean	7,526	20.93
Europe	186	0.52
Oceania	70	0.19
Total	35,963	

Note: the range of time is general because commissions or disbursements years to each project can be different for each country.

Source: own elaboration with data from Boston University Global Development Policy Center. 2023. China's Global Energy Finance Database. <http://www.bu.edu/cgef>.

# DEVELOPMENT BANK FINANCING

**Chart 2**  
**Chinese Loans for Non-Renewable Energy Projects**  
Millions of dollars  
2000-2020\*

Region	Amount	Share (%)
Asia	67,291	35.58
Europe	45,502	24.06
Latin America and the Caribbean	41,642	22.02
Africa	34,572	18.28
Oceania	133	0.07
Total	189,140	

Note: the range of time is general because commissions or disbursements years to each project can be different for each country.

Source: own elaboration with data from Boston University Global Development Policy Center. 2023. China's Global Energy Finance Database. <http://www.bu.edu/cgef>.

# 8: Institutional Investors in Renewable Energy

- **Top Investors:**
  - Shah Capital Management, Inc. (29.67% in Emeren Group)
  - GF Fund Management Co., Ltd. (25.14% across various companies)
  - Xingyin Growth Capital Management Co., Ltd. (18.40% in Trina Solar)
- **Investment Channels:**
  - Diversified portfolios across leading renewable energy companies
  - Focus on solar, wind, and hydroelectric projects

# RENEWABLE ENERGY

Chart 3					
Major Institutional Investors by Percentage of Shares Outstanding					
Chinese Renewable Corporations					
Shareholder	Corporation	Shares Held	% Shares Out	% of Assets	As of Date
Shah Capital Management, Inc.	Emeren Group Ltd. ADR (Renesola)	16,995,670	29.67%	100.00%	19/09/23
GF Fund Management Co., Ltd.	Trina Sola; JA Solar; Zhejiang Chint Electrics Co. Ltd. (Chint [Subs.]); Huadian Power International Corp. Ltd. (China Huadian Corporation [Subs.]); China Three Gorges Renewables (Group) Co. Ltd. (China Three Gorges Corporation [Subs.]); China Southern Power Grid Energy Efficiency & Clean Energy Co. Ltd. (China Southern Power Grid [Subs.]); Shenzhen Energy Group Co. Ltd.; Datang International Power Generation (China Datang [Subs.])	871,756,477	25.14%	5.12%	31/12/23, 31/12/22, 31/12/22
Xingyin Growth Capital Management Co., Ltd.	Trina Solar	242,458,460	18.40%	56.96%	29/05/23
China Merchants Fund Management Co., Ltd.	Zhejiang Chint Electrics Co. Ltd. (Chint [Subs.]); GD Power Development Co. Ltd. (Guodian Group [Subs.]); Huadian Power International Corp. Ltd. (China Huadian Corporation [Subs.])	546,265,487	12.17%	0.24%	31/12/22
First Seafront Fund Management Co., Ltd.	Risen Energy; China Three Gorges Renewables (Group) Co. Ltd. (China Three Gorges Corporation [Subs.]); GD Power Development Co. Ltd. (Guodian Group [Subs.])	243,491,986	7.53%	2.07%	31/12/22, 31/12/22
GIC Pte Ltd. (Investment Management)	Goldwind Science & Technology Co. Ltd. (Xinjiang Goldwind [Subs.])	46,153,800	5.97%	6.61%	20/09/22
Invesco Great Wall Fund Management Co. Ltd. (Invst Mgmt)	JA Solar; Power Construction Corp. of China Ltd. (PowerChina [Subs.]); Shenzhen Energy Group Co. Ltd.; Datang International Power Generation (China Datang [Subs.])	223,468,815	5.27%	0.53%	31/12/22, 31/12/22
Principal Global Investors LLC	Goldwind Science & Technology Co. Ltd. (Xinjiang Goldwind [Subs.])	39,073,400	5.05%	100.00%	22/08/22
Taiping Asset Management Co., Ltd.	Power Construction Corp. of China Ltd.-Power China	543,478,260	4.95%	100.00%	13/07/23
Schroder Investment Management (Hong Kong) Ltd.	Jinko Solar	2,303,648	4.58%	5.21%	31/03/23

Note: \*Chinese corporations or subsidiaries that have investments in renewable energy sector worldwide. The table is structured taking into account the 10 Institutional investors with the highest % of shares out in the different Chinese corporations that have stakes in the renewable energy sector.

Source: own elaboration with data from each company's profile in the 'Wall Street Journal Market Data' Portal. Accessed October 6th, 2024.



# 9: Institutional Investors in Non-Renewable Energy

- **Top Investors:**

- The Vanguard Group, Inc. (10.23% across various companies)
- HuaAn Fund Management Co., Ltd. (3.93% across various companies)
- China Southern Asset Management Co., Ltd. (3.50% across various companies)

- **Investment Channels:**

- Significant holdings in fossil fuel companies (Sinopec, CITIC, China Hongqiao)
- Exposure to coal, oil, and gas projects

# NON-RENEWABLE ENERGY

Chart 4 Major Institutional Investors by Percentage of Shares Outstanding Chinese Non-Renewable Corporations					
Shareholder	Corporation	Shares Held	% Shares Out	% of Assets	As of Date
The Vanguard Group, Inc.	China Petroleum and Chemical Corp. (Sinopec [Subs.]); China International Trust & Investment Corp - CITIC; China Hongqiao; Hengyi Petrochemical Ltd. (Zhejiang Hengyi Group [Subs.]); Inner Mongolia Eerduosi (Chinaerdos [Subs.]); Zhefu Holding Group Co. Ltd; SDIC Power Holdings Co Ltd; Shanghai Electric Power Co. Ltd.; Nanjing Iron and Steel Co. Ltd.	85,775,867	10.23%	0.00%	31/07/24
HuaAn Fund Management Co., Ltd.	SDIC Power Holdings Co Ltd; Shanghai Electric Power Co. Ltd. A; China Petroleum and Chemical Corp. (Sinopec [Subs.])	35,745,655	3.93%	0.15%	31/12/23
China Southern Asset Management Co., Ltd.	Shanghai Electric Power Co. Ltd. A; Shenzhen Nanshan Power Co; Nanjing Iron and Steel Co. Ltd. A; Shandong Ruyi Woolen Garment Group Co. Ltd. A. (Shandong Ruyi [Subs.]); China Hongqiao; Hengyi Petrochemical Ltd. (Zhejiang Hengyi Group [Subs.]); Zhefu Holding Group Co. Ltd.; SDIC Power Holdings Co Ltd	9,600	3.50%	0.00%	31/12/23
China Merchants Fund Management Co., Ltd.	Nanjing Iron and Steel Co. Ltd. A; Inner Mongolia Eerduosi (Chinaerdos [Subs.]); Shanghai Electric Power Co. Ltd. A.	5,827,480	2.17%	0.02%	31/12/23
Huatai-PineBridge Fund Management Co., Ltd.	China Petroleum and Chemical Corp. (Sinopec [Subs.]); Hengyi Petrochemical Ltd. (Zhejiang Hengyi Group [Subs.]); Inner Mongolia Eerduosi (Chinaerdos [Subs.]); SDIC Power Holdings Co Ltd	6,878,420	2.08%	0.04%	31/12/22
BlackRock Fund Advisors	China International Trust & Investment Corp - CITIC	131,032,862	1.99%	0.01%	31/07/24
Zhong Geng Fund Management Co., Ltd.	Inner Mongolia Eerduosi (Chinaerdos [Subs.]); China Hongqiao	105,935,000	1.94%	2.06%	31/12/22
Fullgoal Fund Management Co., Ltd.	China Petroleum and Chemical Corp. (Sinopec [Subs.]); China Hongqiao; Inner Mongolia Eerduosi (Chinaerdos [Subs.])	104,773,754	1.41%	0.08%	31/12/23
Invesco Great Wall Fund Management Co. Ltd. (Inv Mgmt) total	Inner Mongolia Eerduosi (Chinaerdos [Subs.]); Nanjing Iron and Steel Co. Ltd. A.	8,882,122	1.34%	0.03%	31/12/23
Orient Securities Asset Management Co. Ltd.	China Hongqiao; China National Chemical-ChemChina	87,952,000	1.21%	0.32%	31/12/22

Note: \*Chinese corporations or subsidiaries that have investments in Non-renewable energy sector worldwide. The table is structured taking into account the 10 Institutional investors with the highest % of shares out in the different Chinese corporations that have stakes in the Non-renewable energy sector.

Source: own elaboration with data from each company's profile in the 'Wall Street Journal Market Data' Portal. Accessed October 6th, 2024.

# 10: Creative Destruction and Just Transition

- **Schumpeter's Theory:**
  - China's energy transition as a form of "creative destruction"
  - Shifting from fossil fuels to cleaner alternatives
- **Minsky's Framework:**
  - Role of "Big Government" and "Big Bank" in driving the transition
- **Just Transition:**
  - Addressing the social and economic impacts of the energy transition
  - Supporting workers and communities in the shift to renewables

# 11: Challenges and Opportunities

- **Challenges:**
  - Persistent coal dependency (56.2% of energy consumption in 2022)
  - Climate finance needs in the Global South
- **Opportunities:**
  - Continued innovation in renewable energy technologies
  - Green finance and sustainable investment
  - Global leadership in clean energy

# 12: Conclusion

- **China's Energy Strategy:**
  - Offers valuable insights into the interplay of technology, finance, and policy
  - Aligns with international climate agreements (Paris Agreement, 2030 Agenda)
- **Key Takeaways:**
  - China's experience highlights the importance of coordinated governance and institutional collaboration
  - Provides a model for other nations seeking a sustainable energy future

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# 14: Methodology

- Investment Type: Differentiated between foreign direct investment (FDI) categories such as Greenfield investments, mergers, and acquisitions;
- Policy Bank Involvement: Whether projects were financed through China's development banks (CDB or CHEXIM);
- Energy Type: Identification of renewable versus non-renewable energy plants;
- Project Timeline: The year the project was signed or the power plant commenced operations.