

# The Rise of Renewable Index Funds: Comparative Performance Analysis and Strategic Necessity in India

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*Abstract— The global shift towards sustainable investing has significantly amplified the relevance of renewable index funds, particularly in the context of India's growing commitment to environmental sustainability. Renewable index funds, which allocate investments to companies involved in renewable energy sources such as wind, solar, and hydroelectric power, have emerged as a compelling alternative to traditional energy sector investments. This paper explores the necessity of renewable index funds within the Indian market, examining their historical performance and comparing them with traditional oil and gas funds. The analysis begins by contextualizing the concept of index funds, focusing on their ability to replicate the performance of specific market indices through passive investment strategies. Renewable index funds, a sector-specific variant, have gained prominence due to technological advancements, supportive government policies, and rising investor demand driven by environmental consciousness. Using performance data from the National Stock Exchange of India, the study highlights the impressive returns generated by the top 20 renewable energy stocks from 2019 to 2024, demonstrating the sector's robust growth potential. The study also includes a comparative analysis of global renewable indices such as the S&P Global Clean Energy Index, MSCI Global Alternative Energy Index, NASDAQ Clean Edge Green Energy Index, and FTSE Environmental Opportunities Index. These indices underscore the growing international interest in renewable energy investments and provide a benchmark for evaluating the performance of Indian renewable index funds. A key focus of this paper is the juxtaposition of renewable index funds with traditional oil and gas funds. Over the past five years, the renewable sector has outperformed the oil and gas sector in terms of returns, growth potential, and stability. This comparative analysis emphasizes the strategic necessity of incorporating renewable index funds into investment portfolios, particularly in light of the oil and gas sector's moderate returns and high volatility. The findings suggest that renewable index funds not only offer substantial financial returns but also align with global sustainability goals, making them a vital component of future investment strategies in India. The paper further discusses the methodology for designing renewable index funds, advocating for the use of market-capitalization weighting to ensure accurate representation of market value and to capture the performance of both large-cap and high-growth companies within the renewable energy sector. The study concludes that the rise of renewable index funds represents a critical evolution in the financial markets, offering investors a means to achieve both ethical and financial objectives in an era where sustainability is paramount.*

**Index Terms:** BSE, CAGR, India, Index, NSE, NASDAQ, Oil & Gas index, Renewable, Sustainability, Weighted Average.

## I. INTRODUCTION

The shift towards sustainable investment has led to a significant surge in interest in renewable index funds. These funds, which focus on investing in companies involved in renewable energy sources such as wind, solar, and hydroelectric power, have not only demonstrated substantial returns but also provided investors with a means to actively support environmental sustainability. In an era where the climate change and environmental concerns are at the forefront of global priorities, renewable index funds offer a compelling alternative to traditional investments in the energy sector. This paper delves into the necessity and growing importance of renewable index funds, their historical performance over recent years, and how they compare themselves with traditional energy sector investments, particularly those in the oil and gas industries,

which are increasingly seen as facing significant long-term challenges. By exploring these aspects, this paper highlights the role of renewable index funds in aligning financial goals with ethical and environmental considerations, making them an essential component of modern investment strategies.

### A. Understanding Indices

An index fund is a type of mutual fund or exchange-traded fund (ETF) designed to replicate the performance of a specific market index. This passive investment strategy aims to match, rather than outperform, the returns of the index it tracks, by holding all or a representative sample of the securities in the index. Index funds offer broad market exposure, low operating expenses, and low portfolio turnover, making them a popular choice for investors seeking diversification and cost efficiency. Indexes serve as benchmarks for evaluating the performance of various financial markets. They can be constructed in multiple ways,

such as market-capitalization weighting, price weighting, and equal weighting, each serving different investment strategies and objectives. Sector-specific indexes, in particular, provide targeted exposure to specific market segments, offering investors the opportunity to capitalize on industry-specific trends and growth potentials (Bogle, 1999).

## II. THE RISE OF RENEWABLE INDEX FUNDS

Renewable index funds have become increasingly popular due to several factors as mentioned below

- **Technological Advancements:** Continuous improvements in renewable energy technologies have reduced costs and increased efficiency.
- **Government Policies:** Favourable policies and incentives have accelerated the adoption of renewable

energy.

- **Investor Demand:** Growing awareness of environmental issues has driven investors towards sustainable investment options.

### B. The Case of INDIA

Table 1 presents the performance of the top 20 renewable energy stocks over the past five years. This table discusses the table provides a comprehensive overview in terms of Absolute Increase (In %), Year over Year (YOY) Returns (In %), Market Capitalization Growth and Comparison of Opening and Closing Prices of the performance of various renewable energy companies over a specified period, ranging from August 2, 2019, to August 1, 2024, with a few exceptions.

**Table 1:** Performance Data of Top 20 Renewable Energy Stocks (2019-2024)

Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	Closing Price	Absolute Increase (In %)	YOY Returns (In %)	Market Cap (In Crores)
Adani Green	02-08-2019	01-08-2024	46.85	7264.4	1905.5	3967	793	295461
JSW Enegy	02-08-2019	01-08-2024	67.2	11836.5	731.8	989	198	128898
Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	Closing Price	Absolute Increase (In %)	YOY Returns (In %)	Market Cap (In Crores)
Suzlon Energy	02-08-2019	01-08-2024	3.9	5290.5	68.35	1653	330	92719
Ireda	21-11-2023	01-08-2024	32	8562.7	259.2	710	1020	69358
SJVN Ltd	02-08-2019	01-08-2024	24.2	9511.3	146.49	505	101	57575
Waree Renewables	02-08-2019	01-08-2024	3.1	106.8	1589.1	51161	10227	54757
Inox Wind	02-08-2019	01-08-2024	13.06	1701.0	178.2	1264	253	23210
KPI Green Energy Ltd	29-04-2022	01-08-2024	88.19	1058.9	974	1004	444	11695
Borosil	02-08-2019	01-08-2024	139.9	1825.2	554.25	296	59	7231
Exicom Share Price	27-02-2024	01-08-2024	142	1702.4	450	217	507	5395
BF Utilities Ltd	02-08-2019	01-08-2024	163	618.0	801	391	78	3037
K.P. Energy Ltd	02-08-2019	01-08-2024	27.98	191.4	402.15	1337	267	2751
Websol	02-08-2019	01-08-2024	17.55	73.6	602.85	3335	667	2527
Orient Green Power Company Ltd	02-08-2019	01-08-2024	2.81	274.4	21.58	668	134	2107
Solex Energy Ltd	02-08-2019	01-08-2024	30.4	24.3	1530	4933	986	1224
Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	Closing Price	Absolute Increase (In %)	YOY Returns (In %)	Market Cap (In Crores)
Zodiac	02-08-2019	01-08-2024	37.1	54.1	750.05	1922	384	1094
Kotlyark Industries	25-10-2021	01-08-2024	51	52.4	916	1696	612	941
Felix Industries	02-08-2019	01-08-2024	15.44	17.8	344	2128	425	397
WAA Solar Ltd	02-08-2019	01-08-2024	15.5	20.5	169.1	991	198	224
Energy Development Company Ltd	02-08-2019	01-08-2024	4.95	23.5	29.47	495	99	140
KKV Agro Powers Limited	02-08-2019	01-08-2024	268.8	15.3	912	239	48	52

Reference: National Stock Exchange of India. (2024). Stock market data. Retrieved August 1, 2024, from <https://www.nseindia.com/>

### A. Pioneers of Renewable Index

The rise of environmental consciousness and sustainable investing has driven the development of specialized market indices focused on clean and alternative energy. Indices like the S&P Global Clean Energy Index, MSCI Global Alternative Energy Index, NASDAQ Clean Edge Green Energy Index, and FTSE Environmental Opportunities Index provide investors with benchmarks that track the performance of companies actively engaged in renewable energy and environmental technologies. These indices offer a diversified exposure to global and U.S.-based companies,

enabling investors to align their portfolios with sustainability goals.

- **S&P Global Clean Energy Index:** Tracks the performance of 30 companies globally involved in clean energy. (<https://www.spglobal.com>)
- **MSCI Global Alternative Energy Index:** Includes companies involved in alternative energy globally. (<https://www.msci.com>)
- **NASDAQ Clean Edge Green Energy Index:** Focuses on U.S.-based companies involved in clean energy. (<https://indexes.nasdaqomx.com>)
- **FTSE Environmental Opportunities Index:** Tracks

global companies with significant exposure to environmental technologies (<https://www.lseg.com>)

These indexes provide a broad spectrum of investment opportunities in the renewable energy sector.

**Table II:** Global Renewable Index Performance in last 5 Years.

Index Name	Number of Companies	Focus Region	The 5-Year Return, based on maximum Capital Appreciation) (in percentage)
S&P Global Clean Energy Index	30	Global	350
MSCI Global Alternative Energy	40	Global	330
NASDAQ Clean Edge Green Energy	50	U.S.	310
FTSE Environmental Opportunities	25	Global	300

Reference: <https://www.spglobal.com/spdji/en/indices/sustainability/sp-global-clean-energy-index/overview>,  
<https://www.msci.com/documents/10199/40bd4fec-eaf0-4a1b-bfc3-8ed5c154fe3c>,  
<https://indexes.nasdaqomx.com/Index/Overview/CELS> &  
<https://www.lseg.com/en/ftse-russell/indices/environmental-markets>

Table 3 provides a snapshot of key renewable energy companies, highlighting their market performance over five years. It includes metrics such as opening and closing prices, market capitalization, and year-over-year returns,

showcasing significant growth, particularly for companies like Adani Green and Suzlon Energy, indicating robust investment potential in the renewable sector.

**Table III:** TOP 10 Renewable Shares by Market Cap in Indian Capital markets (Data 2019-2024)

Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	YOY Returns	Closing Price	Market Cap (In Crores)
Adani Green	02-08-2019	01-08-2024	46.85	7264.42	793.00	1905.50	295461
JSW Enegy	02-08-2019	01-08-2024	67.20	11836.49	198.00	731.80	128898
Suzlon Energy	02-08-2019	01-08-2024	3.90	5290.48	330.00	68.35	92719
Ireda	21-11-2023	01-08-2024	32.00	8562.72	1020.00	259.20	69358
SJVN Ltd	02-08-2019	01-08-2024	24.20	9511.33	101.00	146.49	57575
Waree Renewables	02-08-2019	01-08-2024	3.10	106.82	10227.00	1589.10	54757
Inox Wind	02-08-2019	01-08-2024	13.06	1701.02	253.00	178.20	23210
KPI Green Energy Ltd	29-04-2022	01-08-2024	88.19	1058.91	444.00	974.00	11695
Borosil	02-08-2019	01-08-2024	139.90	1825.20	59.00	554.25	7231
Exicom Share Price	27-02-2024	01-08-2024	142.00	1702.42	507.00	450.00	5395
Market Capitalization (Rs.in Crore)				48859		746299	

Reference: National Stock Exchange of India. (2024). Stock market data. Retrieved August 1, 2024, from <https://www.nseindia.com/>

While renewable index funds have shown impressive growth, it is essential to compare them with traditional oil and gas funds to understand their relative performance and risk

profiles. Table compares the returns of renewable index funds with oil and gas funds over the past five years, as given in Table 4

**Table IV:** Comparative Analysis with Oil and Gas Funds

Index Name	Opening Date	Closing Date	Opening Price	Opening Market Cap (INR Crores)	Closing Price	Absolute Increase (In %)	YOY Returns (In %)	Closing Market Cap (INR Crores)
BSE Oil and Gas Index	02-08-2019	01-08-2024	13061.22	785071.9519	32755.02	151	30	1968809
Renewable TOP 10 (Table 3)	02-08-2019	01-08-2024	NA	48859.8	746299	1527.27%	305%	746299

Reference: Comparison of BSE Data, Bombay Stock Exchange of India. (2024) Retrieved August 1, 2024, from <https://www.bseindia.com/sensex/code/37> on BSE Oil and Gas index and Table 3(Renewable top 10)

Table 5 provides a comparative overview of key metrics between the oil and gas sector and the renewable energy sector, highlighting the stark contrasts in their investment characteristics. The renewable sector outperforms the traditional oil and gas sector in terms of return on investment and growth potential, offering high returns and substantial

future growth opportunities. Additionally, the renewable sector exhibits lower volatility, making it a more stable investment option. In contrast, the oil and gas sector presents moderate returns with higher volatility and limited growth potential, reflecting the challenges and uncertainties faced by fossil fuel industries in a transitioning global economy.

**Table V:** Comparative Metric showing Futuristic Approach on Oil and Gas sector vs Renewable

Metric	Oil and Gas Sector	Renewable Sector
Return on Investment	Moderate	High
Volatility	High	Low
Growth Potential	Limited	High

Reference: Derived by Research Scholar

### B. Environmental and Economic Impact

Investing in renewable energy not only offers substantial financial returns but also aligns with global sustainability goals. The transition to renewable energy helps reduce carbon emissions, combat climate change, and create a more sustainable future. Renewable index funds enable investors to support these initiatives while benefiting from high-growth investment opportunities.

### C. Method of Designing Renewable Indexes

Designing an index fund involves selecting and weighting the components of the index in a way that reflects the desired investment strategy. The three main methods for designing an index fund include market capitalization weighting, Price Weighting and Equal weighting as described below,

#### 1. Market-Capitalization Weighting:

- **Description:** In a market-capitalization-weighted index, each component's weight is proportional to its market capitalization. This means that larger companies have a greater influence on the index's performance.
- **Example:** The S&P 500 Index is a market-capitalization-weighted index, where the largest companies, like Apple and Microsoft, have a significant impact on the index.
- **Advantages:**
  - Reflects the actual market value of the components.
  - Often leads to lower turnover and transaction costs.
- **Disadvantages:**
  - Heavily influenced by large-cap stocks, which can skew the index.
  - May not capture the performance of smaller, high-growth companies.

#### 2. Price Weighting:

- **Description:** In a price-weighted index, each component's weight is based on its stock price, regardless of the company's market capitalization.

Higher-priced stocks have a greater influence on the index.

- **Example:** The Dow Jones Industrial Average (DJIA) is a price-weighted index, where stocks like Boeing or Goldman Sachs have more influence if their share prices are high.
- **Advantages:**
  - Simple to calculate and understand.
- **Disadvantages:**
  - Can be distorted by high-priced stocks, regardless of the company's overall size or importance.
  - May not represent the overall market as accurately as other methods.

#### 3. Equal Weighting:

- **Description:** In an equal-weighted index, each component is given the same weight, regardless of its market capitalization or stock price. This method ensures that all companies have an equal impact on the index's performance.
- **Example:** The S&P Equal Weight Index assigns equal weight to each of the 500 companies in the S&P 500, ensuring that smaller companies have as much influence as larger ones.
- **Advantages:**
  - Provides more exposure to smaller companies and can capture their growth potential.
  - Reduces concentration risk in larger companies.
- **Disadvantages:**
  - Requires more frequent rebalancing, leading to higher transaction costs.
  - May have higher volatility compared to market-cap-weighted indexes.

We will choose Method 1 i.e. Market-Capitalization Weighting for developing Index fund for an index in the Indian renewable stock market offers several advantages:

- The method reflects True Market Value: Market-cap weighting accurately reflects the actual market value of the companies within the index. In the Indian renewable sector, where there are dominant players like Adani Green and Suzlon Energy. This

method ensures that the index performance aligns with the overall market perception and investor sentiment.

- Lower Volatility: Large-cap companies, which are often more stable and established, dominate a market-cap weighted index. This can lead to lower overall volatility in the index, providing a more stable investment option for investors looking to tap into the renewable sector.
- Efficiency and Lower Costs: Market-cap weighted

indices generally require less frequent rebalancing compared to equal-weighted indices. This leads to lower transaction costs, making it a cost-effective choice for long-term investors.

- Alignment with Investment Goals: Many institutional investors and mutual funds prefer market-cap weighted indices because they align well with capitalization-weighted benchmarks, making it easier to measure performance and align portfolios with broader market trends.

**Table VI: Market Capitalization Weighting for Developing Index Fund**

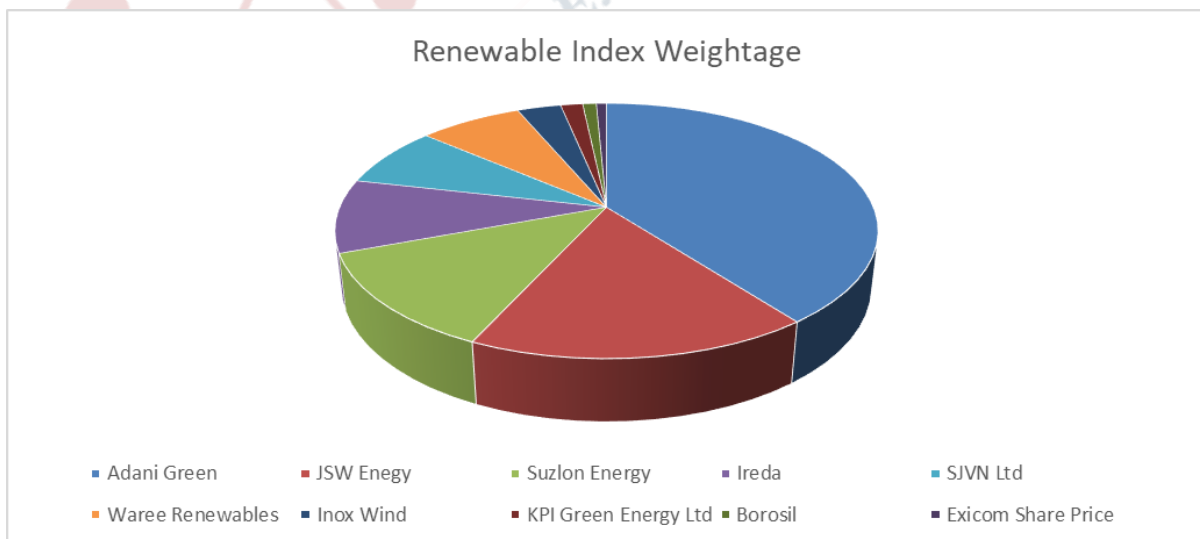
Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	Closing Price	Absolute Increase	YOY Returns	Market Cap (In Crores)	Index Weightage
Adani Green	02-08-2019	01-08-2024	46.85	7264.4	1905.5	3967	793	295461	3959
JSW Enegy	02-08-2019	01-08-2024	67.2	11836.5	731.8	989	198	128898	1727.2
Suzlon Energy	02-08-2019	01-08-2024	3.9	5290.5	68.35	1653	330	92719	1242.4
Share Name	Opening Date	Closing Date	Opening price	Opening Market Cap	Closing Price	Absolute Increase	YOY Returns	Market Cap (In Crores)	Index Weightage
Ireda	21-11-2023	01-08-2024	32	8562.7	259.2	710	1020	69358	929.36
SJVN Ltd	02-08-2019	01-08-2024	24.2	9511.3	146.49	505	101	57575	771.47
Waree Renewables	02-08-2019	01-08-2024	3.1	106.8	1589.1	51161	10227	54757	733.71
Inox Wind	02-08-2019	01-08-2024	13.06	1701.0	178.2	1264	253	23210	311
KPI Green Energy Ltd	29-04-2022	01-08-2024	88.19	1058.9	974	1004	444	11695	156.71
Borosil	02-08-2019	01-08-2024	139.9	1825.2	554.25	296	59	7231	96.891
Exicom Shar	27-02-2024	01-08-2024	142	1702.4	450	217	507	5395	72.29
Market Capitalization (Rs.in Crore)				48859.8				746299	10000

Reference: National Stock Exchange of India. (2024). Stock market data. Retrieved August 1, 2024, from <https://www.nseindia.com> and index weightages are derived by Research Scholar

**D. Renewable Index Weightage**

**Chart 1: Graphical Representation of Renewable Index Weightage** According to Chart I, Adani Green Holds Highest Proportion holding highest Market cap currently, this

proportion changes from time to time depending upon change in prices of underlying stock prices and this index is dynamic in size and shape



Source: Derived from Table 6

### III. CONCLUSION

This research paper focused on the rise of Renewable Index Funds provides a comprehensive analysis of the growing significance of renewable index funds within the Indian financial markets, especially in comparison to traditional energy sector investments. The conclusion of this study underscores the critical role these funds play in aligning investment strategies with global sustainability goals while delivering robust financial returns.

The analysis reveals that renewable index funds have emerged as a formidable force in the investment landscape, driven by technological advancements, favourable government policies, and a growing demand for sustainable investment options. As shown by the performance data of various renewable energy companies in India, these funds have not only outperformed traditional oil and gas investments in terms of returns but also demonstrated lower volatility, making them a more stable and attractive option for investors.

One of the key findings of this research is the comparative analysis among renewable index funds and traditional oil and gas funds. The results indicate that while the oil and gas sector has historically been a cornerstone of energy investments, it faces significant challenges in the current global environment, including high volatility and limited growth potential. In contrast, the renewable sector is characterized by high growth potential and substantial returns, positioning it as a more viable and forward-looking investment strategy.

The research highlights the strategic necessity of investing in renewable energy. As the world increasingly shifts towards sustainable development, the financial markets are likely to witness a continued rise in the importance of renewable index funds. These funds not only offer significant financial rewards but also contribute to the global efforts to combat climate change and reduce carbon emissions, thereby creating a more sustainable future.

However, an interesting observation arises from the fact that the Oil and Gas Index in the U.S. started approximately ten years prior to that of India, with similar trends seen in the introduction of the S&P Global Clean Energy Index and the NASDAQ Clean Edge Green Energy Index. These benchmarks were established much earlier in Western markets, allowing investors in those regions to capitalize on renewable energy trends. In contrast, India's relatively recent adoption of renewable index funds suggests a slower response in aligning with global sustainability trends.

This delay raises the question of whether India is moving too slowly in its decision-making concerning the development of such indexes. While India has made significant strides in recent years, the comparative lag behind global markets may have caused a slower mobilization of capital towards sustainable energy sectors. Accelerating the creation and promotion of renewable index funds is critical

for aligning India's financial markets with the rapid global shift towards sustainable investments. This would not only enhance market participation but also position India as a key player in the global renewable energy revolution.

In conclusion, the rise of renewable index funds in India is not just a response to growing environmental concerns but also a strategic investment decision that aligns with the evolving global economic landscape. The substantial returns and stability offered by these funds, coupled with their alignment with global sustainability goals, make them an essential component of modern investment strategies. As the renewable energy sector continues to expand, these funds are poised to play a crucial role in shaping the future of sustainable investing, offering both financial rewards and the opportunity to contribute to a more sustainable and equitable world. However, to fully capitalize on this potential, India must expedite its efforts to establish and promote renewable index funds on par with global markets.

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