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AN ANALYSIS OF BRSR REPORTS IN THE POWER SECTOR IN INDIA

[1]Anisha Mishra, [2]Chhotu Kumar

[1,2]Research Scholar

[1,2]Faculty of Commerce

Banaras Hindu University, Varanasi, India

Abstract: Global investors and governments are placing increasing emphasis on environmentally responsible finance. Investors are now considering factors beyond simple risk and return, while businesses strive to operate in a responsible and sustainable manner. Environmental, Social, and Governance (ESG) principles assess a company's overall responsibility for various environmental and social issues. This study delves into the concept of "Business Responsibility and Sustainability Reporting" (BRSR) within the ESG framework, focusing on its implementation in four selected Indian Power Sector companies. Considering the critical role of the power sector and its substantial environmental impact, an in-depth examination of the disclosures made by prominent energy companies in India was undertaken. This involved conducting a content analysis of the Business Responsibility and Sustainability Reports (BRSR) submitted by these companies. The study specifically examines principles 2 and 6 within the BRSR reports. Findings reveal that under principle 2, all companies present their reports in a favourable manner. Regarding principle 6, companies tend to be more transparent about areas where they have demonstrated improvement.

Keywords: ESG, Business Responsibility and Sustainability Reporting (BRSR), Power Sector, Sustainability, Environmental, Social, and Governance Reporting

1. Introduction:

In an era marked by increasing emphasis on corporate responsibility and sustainability, the power generation and distribution sector stands at the forefront of pivotal transformations. As global concerns over climate change escalate and societal expectations regarding environmental stewardship intensify, companies operating within this domain face mounting pressure to align their practices with principles of sustainable development. In India, where energy demands are burgeoning and environmental challenges loom large, the role of power sector entities in fostering sustainable growth has never been more crucial.Amidst this backdrop, the Business Responsibility and Sustainability Reporting (BRSR) framework emerges as a significant tool for assessing the sustainability performance of corporations operating in India. Envisioned as a comprehensive reporting mechanism, BRSR mandates companies to disclose their initiatives, strategies, and outcomes concerning environmental, social, and governance (ESG) parameters from FY 2022-23 for top 1000 companies according to market cap. This framework not only fosters transparency but also facilitates stakeholder engagement, enabling investors, consumers, and regulatory bodies to gauge a company's commitment to sustainable practices. The BRSR format was specified by SEBI which contains nine principles that cover a company's ESG (Environment, Social and Governance) performance. It is developed on the basis of National Guidelines on Responsible Business Conduct (NGRBC) principles and is aligned with United Nations SDGs, GRI and United Nations Guiding Principles. From investors' perspectives, the adoption of sustainability-centric reporting for companies in India would make India a more attractive destination for investments. Given the emerging trend of Socially Responsible Investing (SRI) and Impact Investing, Investors are increasingly recognizing the significance of non-financial reporting by companies in influencing their share market performances.

ESG Params

Environmental Concerns:

Issues such as the shifting climate, energy utilization, waste management, preservation of natural resources, and adherence to animal welfare regulations all fall under the umbrella of environmental concerns. The evaluation of a company's response to these issues through ESG criteria may occur before or after suggested changes are implemented, allowing for selective action based on the organization's discretion.

Social Aspects:

Socially Responsible Investing (SRI) places emphasis on the social facets of ESG, acknowledging the interests of both internal and external stakeholders. SRI actively supports financially those businesses that champion diversity, inclusion, social equity, and ethical conduct. The SRI community seeks partnerships with companies that demonstrate a commitment to non-discrimination based on sexual orientation or gender identity, while also valuing investors with expertise in addressing issues such as sexual harassment and abuse.

Governance Considerations:

Investors prioritize ethical conduct, impartial board appointments, and transparent financial reporting when evaluating companies. They expect firms to abstain from political contributions to avoid perceptions of seeking favours, while also emphasizing accountability to shareholders. Upholding these standards not only enhances ESG governance but also strengthens the company's reputation, making it more attractive to top-tier executives seeking responsible leadership environments.

ESG and Power Sector

India's energy transition mirrors its robust economic growth, propelled by an expanding middle class and rapid urbanization. As per data from S&P Global Commodity Insights, the nation stands as the third-largest energy consumer worldwide. From 2000 to 2020, its total primary energy demand more than doubled, soaring from 417 Mtoe (million tons of oil equivalent) to 937 Mtoe. The strategies India adopts to meet its escalating energy needs and reshape its primary energy mix in the next decade will significantly impact global energy markets and play a pivotal role in determining the attainment of global emissions targets and their timeline. In India, the power sector stands out as the primary contributor to greenhouse gas (GHG) emissions, predominantly due to coal, which accounts for over 70% of electricity generation. Swiftly reducing coal's dominance in the fuel mix proves challenging, despite support from wealthier nations through initiatives like the Just Energy Transition Partnership.

Following the introduction of the 2030 Sustainable Development Agenda, the power sector faces a distinctive array of challenges. Companies must navigate how to expand access to clean energy to meet the needs of a growing population while simultaneously reducing carbon emissions from energy production (Charles Rajesh Kumar & Majid, 2020). Enhancing access to clean energy is pivotal for advancing nearly every Sustainable Development Goal (SDG), including those related to agriculture, education, infrastructure, health, water systems, and reducing inequalities (McCollum et al., 2017).

The energy sector is subject to stringent emission regulations and must comply with local and national environmental protection laws. Leveraging technology-based models for energy generation and utilization enables companies to meet Environmental, Social, and Governance (ESG) targets (Globaldata, 2021).However, with 55 percent of India’s energy demands met by coal, certain actors within the energy sector overly rely on greenhouse gas-intensive fossil fuels (Ministry of Coal, GOI, 2020). Such practices hinder efforts to combat climate change and sustain healthy ecosystems and populations. In recent years, frameworks and standards have emerged to assess energy companies' alignment with the SDGs, aiding companies and investors in enhancing their sustainable performance (Sachs, 2018). In India, SEBI introduced the Business Responsibility and Sustainability Reporting (BRSR) framework in May 2021 to evaluate companies' Environmental, Social, and Governance (ESG) disclosures. BRSR offers a comprehensive, globally accepted, and quantifiable set of metrics, unlike its predecessor, the Business Responsibility Report (BRR) (Tarunya & Radhika, 2021). Against this backdrop, this study endeavours to examine the ESG endeavours of companies.

In this context, this research endeavours to evaluate Environmental Concerns detailed in the BRSR reports filed by four of India's foremost power generation companies: NTPC, Adani Power, Tata Power, and NHPC. The study focuses only on the Environmental Issues and selected NGRBC principles aligned in for same disclosed practices of 4 companies operating in India's energy sector, particularly in electricity generation. These entities, collectively representing a significant portion of India's power infrastructure, serve as focal points for understanding the sector's approach towards sustainability and corporate responsibility.

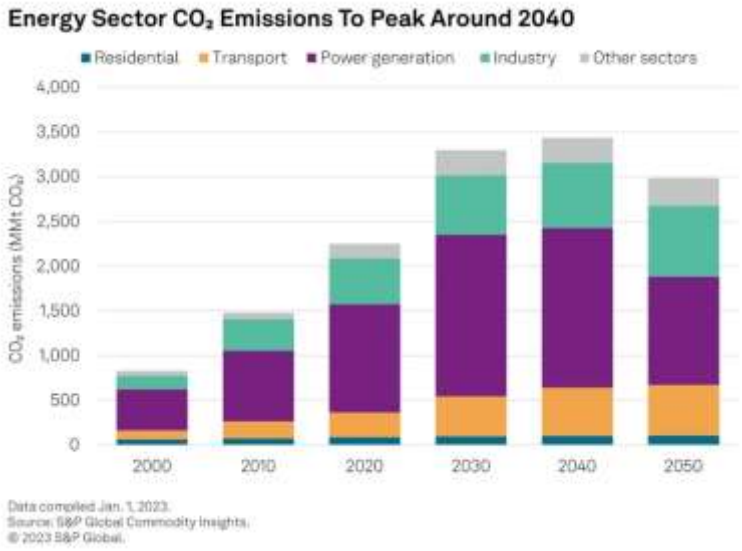

Figure 1

The objective of this paper is threefold:

1. To understand and comprehend BRSR Framework laid down by SEBI for compliance with ESG related information disclosure.
2. To analyse the comprehensiveness and quality of BRSR disclosures made by each company, with a focus on key sustainability metrics such as carbon emissions, energy efficiency, community engagement, and governance practices.
3. To identify commonalities and disparities among the BRSR reports related to Environment of the four companies, thereby elucidating overarching trends and best practices within the Indian power sector's sustainability landscape.

Relevance of the Study

The Power Generation and Distribution Sector in the India is one of the most influential and contributing sector in the country's economy. The power sector confronts a pressing challenge in curbing its emissions, primarily due to a significant portion of power generation still reliant on greenhouse gas (GHG)-intensive fossil fuels, leading to concerning CO^2 emissions levels. However, by implementing Environmental, Social, and Governance (ESG) strategies, power companies can substantially reduce their emissions, either through transitioning to renewable energy sources or by implementing emissions capture technologies in fossil fuel operations (Rissman et al., 2020).

Moreover, the expansion of renewable energy not only aids in emission reduction but also fosters job creation and contributes to the overall advancement of the energy industry. Consequently, investments in low-carbon energy production garner considerable acceptance from a socio-political standpoint (Ahuja Dilip et al., 2009). As power companies face increasingly stringent regulations regarding fossil fuel usage, the adoption of ESG policies enables them to uphold their commitments to emission reduction. However, the mere presence of an ESG policy is insufficient. To address stakeholders' information needs and establish their credibility, companies must transparently report their ESG practices. Therefore, this study holds significant relevance in discerning whether public sector or private sector entities are effectively disclosing ESG information. The research paper provides valuable insights for investors interested in the power distribution and generation sector in India. The motivations for this study arise from the substantial environmental footprint of power sector corporations and the shifts within the regulatory landscape regarding ESG reporting within the Indian context.

2. Literature Review:

As discussed above, Business Responsibility and Sustainability Reporting (BRSR) introduced by SEBI, is a vital reporting framework in India, that dictates companies to reveal their efforts towards sustainable and responsible business practices. BRSR aims to enhance transparency and accountability among corporations regarding environmental, social, and governance (ESG) factors. BRSR acts as a tool for investors, stakeholders, and consumers to evaluate a company's commitment to sustainability and ethical conduct. BRSR also inspires companies to align with the United Nations Sustainable Development Goals (SDGs), contributing to India's progress towards a sustainable future. Though this reporting has several benefits, there is no such previous literature highlighting its importance as well as its compliance by Indian firms. Kumar & Prakash, (2019) have conducted a study to examine the extent of sustainability reporting of Indian banks. Taking FY 2016 & 2017 as the study period and doing the content analysis of sustainability report, corporate social responsibility report, business responsibility report(BRR) and annual report, they concluded that the banks in India are much slower in adopting sustainability reporting practices. Sustainability issues on which banks are giving higher priority are financial inclusion, financial literacy, community development programs, training and education, healthcare programs, and energy efficient technology whereas they are not giving any attention to environmental and socio-environmental issues. Another similar study was done by Agnihotri et al., (2022) as they conducted a study to compare the business responsibility reports of 2 top banks one from the public sector(SBI) and another from the private sector(HDFC) and concluded that private sector banks are more compliant with BRR frameworks as compared to public sector bank in ESG perspective for FYs 2019-20 and 2020-21. A study to find the impact of sustainability indices on the performance of BSE and NSE was conducted by Kishan & Gayathri, (2022). They used the BRR reports for measuring the sustainability performance concluded that BSE is performing better in sustainability disclosure as compared to NSE. Another study by Devi Rama V. & Kumar Venkateswara K.S., (2015) was focused on examining the current state and landscape of sustainability reporting practices within India. Additionally, the study inquired into the factors contributing to the sluggish progress in this domain and discovered methods for enhancing the depth and scope of Indian companies' engagement with sustainability reporting. Goel & Misra, (2017) further advocated the sustainability reporting practices of 120 companies listed on the Bombay Stock Exchange (BSE) across eight diverse industries. Their analysis utilized a self-constructed sustainability reporting framework comprising seven sub-parameters to assess sector-specific reporting practices and their correlation with company-level financial performance indicators. They observed variations in reporting quality across sectors, with refineries and power companies demonstrating higher adherence to GRI norms. Further, Mishra & Vishwavidyalaya, (2023) investigated the corporate responsibility and sustainability reporting practices used by Indian financial sector companies in their annual reports. The authors discovered that the use of sustainable finance has increased across India's financial sector. Moreover, the study also identified important policy adjustments and reforms that must be implemented in this area to improve growing financial markets in the long term. An important study highlighting the significance of BRSR reporting as well as its many aspects is performed by Debnath & Kanoo Rishav, (2022). They claimed that the disclosure standards will become more mature and in line with global expectations with the switch from Business Responsibility Reports (BRR) to Business Responsibility and Sustainability Reports (BRSR). They discussed the BRSR scoring technique, which consists of four levels: Formative Stage, Emerging Stage, Established Stage, and Leading by Example. They also provided a detailed explanation of the BRSR framework, including its three sections and all of the principles

covered in section C. Menghnani et al., (2022) presented a thorough examination of the history and developments of BRSR, delving into the progression of sustainability reporting from Business Responsibility Reporting (BRR) to BRSR, along with the improvements introduced by BRSR. They conducted an exploratory investigation, offering a detailed account of BRSR in India and a critical assessment of the changes implemented from BRR to BRSR. Also, the information from reports of the Committee on Business Responsibility Reporting and Sustainability Reporting Standards Board was scrutinized in the study. Finally, Pareek & Subbarao Pasumarti, (2021) conducted a comparative study of the ESG, CSR, and BRR reporting procedures of the top 30 corporations in India, UK, and the USA. The research adds to the body of knowledge on the comparative analysis of corporate governance practices across borders and advances the knowledge of sustainability reporting standards in various nations, particularly in relation to large corporations. The authors found that corporate governance cannot function completely in terms of sustainability unless sustainability is

represented across the entire management process of the organization. From the above literature review, we can find that very few studies are there focusing on the BRSR guidelines and so this study aims to bridge this literature gap. Furthermore, the study is majorly focused on the Power sector firms as they are contributing a major role in India's power generation.

3. Research Methodology:

Sampling & Data Collection:

Four major electricity-producing companies were selected using convenience sampling, comprising two privately-operated companies and two government-owned companies.

1. **NTPC** has several power plants including both renewable and non-renewable sources which are listed below with total power generation capacity of around 59,135 Mw alone.

Table 1.

NTPC Owned	Plants	Capacity(Mw)	Owned By JVs/Subsidiaries	Plants	Capacity(Mw)
Coal	27	53,850	Coal	9	8,344
Gas/Liquid Fuel	7	4,017	Gas/Liquid Fuel	4	2,494
Hydro	1	800	Hydro	8	2,925
Small Hydro	1	8	Small Hydro	1	24
Solar	16	460	Solar	16	2,880
Total (NTPC Owned)	52	59,135	Wind	4	213
			Total (JVs/Subsidiaries)	42	16,880
			TOTAL (NTPC Group)	94	76,015

2. NHPC has installed capacity of 7144.2 Mw in which 50 Mw comes from Wind POWER and 123 Mw from Solar Power, Rest from Hydro Power Plants.

3. Adani Power Limited is the largest private Coal based thermal power producer in India with an installed capacity of 15,250 Mw.

4. Tata Power Company Limited has an installed generation capacity of 14294 Mw across the globe (13623Mw domestic, 487Mw International). The thermal power generation capacity stands at 8860 Mw Domestic + International, while generation through clean sources such as hydro, solar, and wind stand at 5434 Mw.

Tata Power commissioned a total of 4000 Mw at a single location, Mundra, in FY15. Some of its major projects include thermal power stations at Trombay, Jojobera, Haldia, Jamshedpur, Maithon and Mundra, hydro stations in Khopoli, Bhira and Bhivpuri in Maharashtra, wind farms across 7 states of including Maharashtra, Gujarat, Tamil Nadu, Karnataka and Rajasthan and solar power projects in Gujarat, Maharashtra, Rajasthan, Karnataka, Madhya Pradesh, Andhra Pradesh and Tamil Nadu.

Tata Power, together with its subsidiaries & joint entities, has a generation capacity of 14,690 Mw of which 39% comes from clean energy sources.

Table 2 Section A General Disclosure

Particulars	**NTPC**	**NHPC**	**APL**	**TATA POWER**
Name of the Listed Entity	NTPC Limited	NHPC Limited	Adani Power Limited	The Tata Power Company Limited
Year of incorporation	1975	1975	1996	1919
Name of the Stock Exchange(s) where shares are listed	NSE & BSE	NSE & BSE	NSE & BSE	NSE & BSE
Paid-up Capital	9696.67 crore	10,045.03 crores	3856.94 crore	319.56 crore
Major business activity	Power Generation	Power Generation	Power Generation	Power Generation and Transmission and Distribution
Products and services sold by the entity: i. Renewable ii. Non-renewable	**Renewable-** Hydro(3.11%), Solar(0.85%), Wind(0.08%) **Non- renewable-** Gas(5.30%), Coal(85.91%)	Power generation by hydropower, wind, solar, power trading business and consultancy Services (100%)	**Non-Renewable-** Coal (98%)	**Renewable-** Wind and Solar (13.95%) **Non-Renewable-** coal, gas and oil (26.67%)
% Differently abled Employees	Male-92.64% Female-7.36%	Male-96% Female-4%	Male-0% Female-0%	Male-86.67% Female-13.33%
% Differently abled workers	Male-86.05% Female-13.95%	Male-83% Female-17%	Male-0% Female- 0%	Male-0% Female-0%
Representation of women on Board	8.3%	10%	16.7%	20%
Representation of women on Key Managerial Personnel	0%	100%	0%	0%
CSR Details i) Whether CSR is applicable ii) Turnover iii) Net worth	i. Yes ii. 1,67,724.41 crore iii. 1,38,889.88 crore	i. Yes ii. 9,316.3 crore iii. 35,407.9 crore	i. Yes ii. 43,040.52 crore iii. 29,875.66 crore	i. Yes ii. 56,033 crore iii. 34,204 crore

4. Results and Discussions :

Businesses should provide goods and services in a manner that is sustainable and safe (Principle 2)

In this section we have analysed the 4 important questions included under the Essential Indicators and 5 questions under Leadership Indicators for Principle 2.

[1] Question 1 under Principle 2 deals with the Essential Indicators which asks the companies to report the Percentage of R&D and capital expenditure (capex) investments in specific technologies to improve the environmental and social impacts of product and processes to total R&D and capex investments made by the entity, respectively. As can be seen in table 2, only NTPC, and NHPC have mentioned the R&D in percentages. While NTPC, NHPC, and TATA POWER have mentioned the Capital Expenditure in percentages. Adani Power Limited have not provided any information regarding the Capital expenditure made towards the technological improvement and have mentioned R&D in absolute amount.

Table 3. Contribution towards R&D and Capex investments

Particulars/Companies	**NTPC FY2023**	**FY2022**	**NHPC FY2023**	**FY2022**	**APL FY2023**	**FY2022**	**TATA POWER FY2023**	**FY2022**
R&D	100%	100%	3.17%	0.00%	99.3 Cr	150 Cr	17.06 crore	13.72 crore
CAPEX	21%	24%	100%	100%	-	-	44%	63%

[2] As can be implied from table 3 that all firms have answered 'yes' to the second question under essential indicators for Principle 2 which asks them whether they have procedures in place for sustainable sourcing. However, only NTPC and Tata Power provided details on the percentage of inputs sourced sustainably. NHPC stated that all procurements are considered sustainably sourced due to established procedures. APL noted that the percentage of sustainably sourced inputs is not currently determined.

Table 4.

Particulars/Companies	**NTPC**	**NHPC**	**APL**	**TATA POWER**
(a)Procedures in place for sustainable sourcing?	YES	YES	YES	YES
(b)What percentage of inputs were sourced sustainably?	100%	All the procurements are considered as source sustainable.	Percentage not currently mapped	100%

[3] Question 3 focuses the processes in place to safely reclaim your products for reusing, recycling and disposing at the end of life, for (a) Plastics (including packaging) (b) E-waste (c) Hazardous waste and (d) other waste. Upon reviewing the companies, it was found that TATA POWER states that it has taken numerous steps to improve waste management practices and is working towards minimizing waste generation through the use of various resources, technologies and processes. Its major waste is the Fly Ash generated from thermal power stations. But by following the legal and government's regulations it is trying to reduce the wastes. The company focused on E-waste and fly ash. Talking about Adani Power they commit towards achieving Zero Waste to Landfill certification across their sites, aiming to minimize waste generation and prevent landfill disposal. They claim to handle hazardous wastes accurately, following the regulations and best practices, and ensuring environmentally sound disposal through authorized recycling vendors. Beyond hazardous waste, they acknowledge various non-hazardous waste types, expressing the intent to reduce waste generation

through reuse and recycling. This underscores the APL's dedication to responsible waste management, minimizing environmental harm, and fostering sustainable operations. NTPC stated that electricity and coal firms have no product packaging or e-waste. Furthermore, they have implemented a comprehensive ash management program for coal, aimed at recovering and recycling ash into new products. NHPC stated that this question doesn't apply to them as they generate electricity from renewable sources like water, solar, and wind, which don't involve consumptive use. However, waste from service use is disposed of according to existing norms. Upon reviewing the responses provided by the companies, it suggests that they have not fully addressed the question's intent. The companies have mentioned that they are following the legal norms but without specifying them. Legal obligations mandate companies for waste management according to environmental regulations, yet responses lack details on processes for product recycling, and safe disposal at the end of their life cycle.

[4] Question 4 of Principle 2 asks whether Extended Producer Responsibility (EPR) is applicable to the entity's activities. Owing to the nature of the Company's product/service offerings, EPR is not applicable to any of the companies taken in our study.

Leadership Indicators

The leadership indicators of principle 2 comprise 5 questions, of which NHPC and APL clearly mentioned not applicable to all the 5 questions whereas TATA POWER and NTPC have mentioned some information regarding this. First question deals with whether the entity has conducted Life Cycle Assessments (LCA) for any of its products or for its services. NTPC mentioned that it is in process of undertaking the LCA of its products. TATA POWER mentioned that it has done LCA for Cradle to Grave under the "Manufacturing of solar panels" as the product. Question 2 of leadership principles deals with "any significant social or environmental concerns and/or risks arising from production or disposal of entities products / services, as identified in the Life Cycle Perspective / Assessments (LCA). TATA POWER mentioned about Solar PV panels as a product and "Contamination due to landfilling of unrecyclable / unrecoverable material from end of life PV panels" as the risk. Question 3 asks about "Percentage of recycled or reused input material to total material (by value) used in production (for manufacturing industry) or providing services (for service industry)". NTPC mentioned Water as the input material with less than 1% as recycled or reused input material to total material. The Question 4 deals with "the products and packaging reclaimed at end of life of products, amount (in metric tonnes) reused, recycled, and safely disposed:" NTPC mentioned the details while TATA POWER mentioned not applicable. Last Question 5 asks "reclaimed products and their packaging materials (as percentage of products sold) for each product category". All the four firms mentioned not applicable for this question.

Respecting, Protecting and Restoring the Natural Environment (Principle 6)

We analysed several questions relevant to our study from the 12 questions within the Essential Indicators & 9 Questions within Leadership Indicator for Principle 6 stated in BRSR Report.

[1] Total Energy Consumption (In Joules or Multiples) And Energy Intensity

Table 5.

Total Energy Consumption (In Joules or Multiples) And Energy Intensity								
Companies / Parameters	NTPC		NHPC		ADANI POWER		TATAPOWER	
	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22
Total Energy Consumption (Gigajoules)	37,43,047.57	33,85,837.35	3,31,931.0	3,36,944.5	550,524,091.54	526,990,356.71	40,89,48,131	27,80,72,239
Energy Intensity (GJL/₹ in Cr.)	21.03	25.08	35.63	40.55	12790.83	16631.4	7298.34	6531.20

NTPC, Adani Power, and NHPC have provided insights into the proportion of energy derived from renewable and non-renewable sources within their operational facilities. Notably, Adani Power's disclosure indicates zero utilization of renewable sources, whereas Tata Power has omitted this aspect entirely, addressing only eight out of the provided questions under leadership indicators. There is a notable disparity in the energy usage per rupee of annual turnover among the companies. Privately-owned entities such as Adani Power and Tata Power exhibit significantly larger energy usage footprints compared to their publicly-owned counterparts. This contrast underscores the differing operational efficiencies and sustainability practices between private and public sector companies within the power industry.

[2] Total Water Consumption (In Litres or Multiples) And Water Intensity

Table 6.

Total Water Consumption (In Litres or Multiples) And Water Intensity								
Companies / Parameters	NTPC		NHPC		ADANI POWER		TATAPOWER	
	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22	FY 2022-23	FY 2021-22
Total Water Consumption (Kilolitres)	1,135,550,000	1,069,870,000	14,06,250.54	16,64,510.9	132,023,576	130,145,639	69,735,000	64,721,000
Water Intensity (KL/₹)	6000	8000	150.9	200.3	3,061.08	4,107.29	1244.53	1520.12

The water intensity metrics, measured as kilolitres (KL) of water consumed per ₹ (in Cr.) of annual turnover, reveal significant variations among the companies. NTPC and Adani Power show particularly high water intensity values of 6000 and 3061.08 KL/₹ cr., respectively, indicating substantial water consumption relative to their turnover. Tata Power's water intensity is lower, at 1244.53 KL/₹ cr., but still notable compared to NHPC's remarkably low figure of 150.9 KL/₹ cr.. NHPC's minimal water intensity aligns with its hydropower operations, which typically require less water consumption compared to the water-intensive processes of coal-based thermal power plants operated by NTPC, Adani Power, and Tata Power. These figures underscore the substantial environmental footprint of coal-based energy production in terms of water usage, emphasizing the need for improved water management practices in thermal power generation.There is significant decline in water usage intensity of each companies reflects their sustainability and operational efficiency.

[3] Designated Consumers (DCs) under the Performance, Achieve and Trade (PAT) Scheme of the Government of India

PAT scheme is a Bureau of Energy Efficiency(BEE, Ministry of Power, GoI) sponsored FY cycle based mechanism for improvements in energy efficiency of energy intensive industries.

Specific high energy intensive industries are identified as Designated Consumers (DCs) within certain key sectors, who are required to appoint an energy manager, file energy consumption returns every year and conduct mandatory energy audits regularly.

Table 7.

Companies / Parameters	NTPC	NHPC	ADANI POWER	TATAPOWER
Sites & Facilities designated as DCs	yes	no	yes	yes
If they met Notified Targets sets under PAT cycles or not	yes	N/A	yes	Yes, except for division Trombay(Gas)

[4] Zero Liquid Discharge by Companies and their coverage & Implementation

Table 8.

Companies (FY 2022-23)	NTPC	NHPC	ADANI	TATAPOWER
ZLD	Yes, But only to 19 stations, rest W.I.P	No	Yes, 100% reuse of treated water	Yes

In the fiscal year 2022-23, the adoption of Zero Liquid Discharge (ZLD) practices among the companies shows notable differences in their commitment to sustainable water management:

- NTPC has implemented ZLD at 19 of its stations, with efforts underway to extend this practice to the remaining facilities. This indicates a partial yet progressive approach towards minimizing water discharge and promoting water reuse.
- NHPC has not adopted ZLD practices. Given NHPC's focus on hydropower, their water management strategy may differ from those reliant on thermal power, potentially influencing their approach to ZLD implementation.
- Adani Power reports achieving 100% reuse of treated water, indicating a comprehensive and effective application of ZLD across its operations.
- Tata Power has implemented ZLD across its major plant facilities, demonstrating its dedication to sustainable water management and environmental conservation.
- Both TATA Power and Adani Power claim to ensure compliance with the applicable statutory conditions laid by Ministry of Environment, Forest & Climate Change / Central and State Pollution Control Board for locations, where zero discharge is mandated and in sea-water based power plants, mechanism in place to treat the sewage/effluent as per the statutory limits before discharging back.

[5] Green House Gases (GHG) Emissions and their intensity w.r.t per year turnover

Table 9.

Companies / Parameters	NTPC		NHPC		ADANI POWER		TATAPOWER	
	FY 23	FY22	FY 23	FY 22	FY 23	FY22	FY 23	FY22
Scope 1 Emissions (Metric Tonnes eq. CO_2)	335,720,000	303,340,000	N/A since negligible GHG emissions due to nature of work		49,032,768.27	47,528,068.41	28,312,000	27,330,000
Scope 2 Emissions (Metric Tonnes eq. CO_2)	70,000	10,000	N/A		46,004.71	15,288	475,000	285,000
Emission Intensity per ₹ of turnover (**tCO2e/ ₹**)	$20.020x10^{(-5)}$	$26.373x10(-5)$	N/A		$11.403x10^{(-5)}$	$15.005x10^{(-5)}$	$5.137x10^{(-5)}$	$6.486 \times 10^{(-5)}$
Scope 3 Emission Intensity per ₹ of Turnover (**tCO2e/ ₹**)	24.49x10 (-7)	$8.16x10^{(-7)}$	N/A		$3.37x10^{(-5)}$	$9.9741x10^{(-11)}$	$1.799 \times 10^{(-5)}$	$2.349 \times 10^{(-9)}$

The Scope 1 and Scope 2 GHG emission intensities among these companies demonstrate minimal variance, suggesting similarities in their direct and indirect greenhouse gas emissions from operational activities. However, the reporting inconsistencies and limited numerical disclosure obscure insights into their actual operational efficiencies.

Conversely, the Scope 3 emission intensities exhibit considerable variation among the companies. NHPC, leveraging hydropower, boasts negligible carbon emissions, aligning with exemplary sustainable practices for future energy sources. This underscores the environmental advantages of hydropower generation, wherein NHPC's minimal carbon footprint contrasts starkly with the emissions associated with coal-based operations of NTPC, Adani Power, and Tata Power. Such disparities underscore the diverse environmental impacts of different energy generation technologies and emphasize the imperative for transitioning towards cleaner and more sustainable energy sources.

[6] Waste Generation, Management Practices and Strategies to Reduce Hazardous Waste

Waste including Plastic waste, E-waste, Bio-medical waste, Construction and Demolition waste, Battery, Radioactive Waste & other hazardous and non-hazardous waste disposal through incineration, landfilling & other methods and their recycling and reusage followed by other recovery operations if applicable could not be judged in relation with their financial indicator like turnover but these companies at top of industry show to fulfil minimum recommendations set by environment concerning authorities.

[7] Independent Assessment/Evaluation/Assurance carried out by External Agency

Table 10.

Companies (FY2022-23)	NTPC	NHPC	ADANI POWER	TATAPOWER
Name of Agencies	KPMG	No External Agency	DNV Business Assurance India Private Limited	Deloitte Haskins & Sells LLP.

Except for NTPC, other 3 companies highlight the robustness of their Business Continuity/Crisis and Disaster Management Plans. Adani Power demonstrates its commitment to risk management by adhering to the ISO-31000:2018 Risk Management System standard, while Tata Power aligns with the ISO 22301:2012 standard

from the British Standards Institute (BSI). However, NTPC says their plan is currently in development All four companies have implemented specific initiatives during the fiscal year 2022-23 aimed at mitigating the impact of emissions and waste discharge, as well as enhancing resource efficiency. While these initiatives appear promising on paper, their effectiveness in achieving tangible sustainability outcomes warrants further investigation.

It is important to note the presence of several irregularities and inconsistencies in the measurement standards used in the reports. For instance, Adani Power employs ₹ in Crores for Water Consumption Intensity but inconsistently switches to ₹ per rupee for Energy Consumption Intensity. Similarly, NTPC omits the measurement unit (₹ Cr.) while displaying figures as ₹ per rupee. These inconsistencies highlight the need for standardized and uniform reporting metrics to ensure clarity and comparability.

[8] Commitments and Active Projects towards reducing GHG emissions:

- NTPC has adopted cleaner, more energy-efficient technologies by transitioning from sub-critical to supercritical and ultra-supercritical boilers, saving approximately 2% fuel per unit of power, reducing emission intensity by 8%, and increasing efficiency by 8%. Additionally, NTPC is increasing its renewable energy percentage and developing carbon sinks, having planted 38 million trees to date with an annual target of 1 million saplings.
- NHPC's business activity of generating electricity from non-consumptive use of renewable sources such as water (hydropower), solar and wind itself is a Green House Gas (GHG) reduction activity.
- Tata Power claims to have committed to climate action and aims to positively impact its communities and environment. As the first Indian power utility to pledge Net Zero emissions by 2045, Tata Power has aligned with the Science Based Targets initiative (SBTi) to develop integrated solutions for carbon neutrality. The company plans to phase out coal-based power plants, ramp up renewable and clean energy investments, and improve operational efficiency to reduce GHG emissions.
- Adani Power claims to reducing emissions in line with India's Climate Change (NDC) targets through various initiatives:
    - Upgrading to high energy-efficient equipment.
    - Installing solar rooftops and green energy projects.
    - Transitioning to electric vehicles.
    - Optimizing energy use in office buildings.
    - Utilizing digitization to improve monitoring and reduce losses.
    - Promoting energy conservation and GHG reduction awareness.
    - Switching to low GWP refrigerants.

Additionally, Adani Power is exploring the use of Green Hydrogen-derived ammonia in thermal power plants, aiming to decarbonize coal-fired assets. Supported by Kowa's global survey and IHI Corporation's ammonia co-firing technology, these efforts aim to decarbonize coal-fired assets, this initiative targets a 20% ammonia co-firing ratio, with potential for up to 100% mono-firing, significantly reducing GHG emissions.

5. Conclusion:

Previous research have shown that without regulatory control, companies tend to highlight only their positive achievements, neglecting to disclose negative impacts. Consequently, forcing Business Responsibility and Sustainability Reporting (BRSR) for large companies appears to be a positive move. Following this mandate, Indian businesses have increasingly engaged in sustainability initiatives to benefit society and secure long-term economic viability. Upon the Securities and Exchange Board of India's approval, companies began gathering data for BRSR, reflecting the board's commitment to social and environmental accountability. The latest disclosure framework helps in connecting a company's financial performance with its Environmental, Social, and Governance (ESG) metrics, offering a more comprehensive view of the company's growth and stability to regulators, investors, and other stakeholders. This study examines the BRSR reports of four power sector companies—two public (NTPC Limited and NHPC Limited) and two private companies (Adani Power Limited and The Tata Power Company Limited).

The study examined two specific principles (principle 2 and principle 6) within the BRSR report. Our findings indicate that under principle 2, all the companies presented their reports in a way that casts a positive light. Critical questions regarding the percentage of sustainably sourced inputs, the portion of R&D and Capex spent on environmental improvements, and the percentage of materials reused and recycled were either left unanswered or addressed vaguely. Responses were often limited to "Yes" or "No" without providing precise data. However, upon closer review, TATA Power and NTPC were found to be more transparent in their disclosures compared to the others. Regarding principle 6, companies tend to be more transparent about areas where they have shown improvement, such as reductions in energy and water intensity. However, their Scope 1, Scope 2, and Scope 3 emissions have increased, and also report higher levels of waste generated. Companies further provided exhaustive responses to qualitative questions about their efforts to reduce GHG emissions and improve resource efficiency. Moreover, TATA Power, NTPC, and Adani Power Limited (APL) also underwent independent assessments by external agencies. This transparency can help these organizations attract investors by clarifying their environmental stance.

6. Limitations:

The paper's focus on just four companies limits the generalizability of its findings. Here's a breakdown of the limitations:

- **Limited Sample Size:** Analysing only four companies limits the accuracy to draw conclusions about the entire Indian power sector. The performance of these four companies though dictates the industry.
- **No Longitudinal Analysis:** The study doesn't include data from past years, making it impossible to assess trends or improvements in ESG performance over time. This limit understanding of the companies' progress towards sustainability goals.
- **Limited Scope of BRSR Analysis:** Focusing only on two principles of the National Guidelines on Responsible Business Conduct (NGRBC) restricts the comprehensiveness of the ESG assessment. The BRSR framework covers a wider range of environmental, social, and governance factors that weren't considered.

7. Scope for Further Study:

Following are some of the major areas in which further studies can be extended.

- **Larger Sample Size:** Include a broader range of companies encompassing different ownership structures (public, private), generation sources (coal, renewable), and sizes to gain a more representative picture of the sector.
- **Longitudinal Analysis:** Collect data over a period (e.g., 5 years) to analyse trends, assess progress towards sustainability goals, and identify areas requiring improvement.
- **Comparative Analysis:** Compare the ESG performance of Indian power companies with those in other countries or regions to understand their relative standing and potential areas for learning.
- **Comprehensive BRSR Analysis:** Analyse all relevant principles within the NGRBC framework covered by the BRSR reports. This provides a more holistic view of the companies' ESG practices.
- **Financial Performance Integration:** Explore the potential relationship between a company's ESG performance and its financial results. This can incentivize companies to invest in sustainable practices.
- **Stakeholder Engagement:** Investigate how companies engage with stakeholders on ESG issues. This can include employee relations, community engagement, and supply chain management practices.
- **Policy and Regulation:** Analyse the effectiveness of existing policies and regulations in promoting ESG practices within the Indian power sector. Identify potential areas for improvement in the regulatory framework.

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