

**Non-Peer Reviewed*

The Green Mirror: Reflecting on Sustainability Reporting Practices of Indian and Australian Real Estate Stakeholders

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Abstract

Historically, sustainability in real estate has centered on green buildings and environmentally friendly structures. However, these efforts have often been confined to individual buildings, overlooking the broader ecosystem. This research paper expands the focus, investigating how various stakeholders in the real estate sector, including developers, financiers, suppliers, and advisors, are addressing environmental challenges. Utilizing the Global Reporting Initiative (GRI) as a framework, the paper analyzes publicly available company disclosures. The results highlight a strong emphasis on emission and energy-related indicators, while other vital aspects such as biodiversity, supplier assessment, and materials are often neglected. The paper also explores regional variations and alignment with global standards, providing insights into the current state of sustainability reporting within the industry. By identifying areas for improvement and underscoring the importance of a multi-stakeholder approach, this study contributes valuable perspectives to the ongoing dialogue on environmental stewardship in real estate and offers actionable recommendations for enhancing transparency and sustainability practices.

Keywords: Australia; India; Environmental disclosure; Real Estate; Stakeholders; Transparency

Introduction

The size of the worldwide real estate market was assessed at USD 3.88 trillion in the year 2022 and is expected to rise to a projected USD 6.13 trillion by the year 2030. This growth is projected to occur at a compound annual growth rate (CAGR) of 5.2% during the anticipated timeframe of 2023 to 2030 (Research and Markets, 2023). Real estate, serving as the paramount reservoir of wealth, surpasses the combined value of worldwide equities and debt securities. Its valuation is nearly fourfold that of the global Gross Domestic Product (GDP) (Savills Impacts, 2021). As per International Energy Agency (IEA) estimations, the real estate sector is responsible for producing 40% of the CO₂ emissions of the world. This sector holds substantial significance in relation to the overarching endeavor to achieve the objectives set forth in the Paris Climate Agreement, particularly in terms of constraining the average temperature escalation significantly under 2°C from the pre-industrial levels. Out of these building operations produce 70% and remaining 30% gets generated from construction (Architecture 2030, 2023).

The real estate industry has come under significant scrutiny for its central role in environmental and social challenges, particularly in light of its contribution to carbon emissions. In 2021, the industry reached an all-time high, emitting approximately 10 gigatons of CO₂ equivalent (CO₂e), a trend that raises concerns regarding the fulfillment of climate goals set forth in the Paris Agreement. According to the UNFCCC, EU, and 193 countries (excluding Yemen, Iran, and Libya), their Nationally Determined Contributions (NDCs) have been submitted. Notably, the

report highlights that 80% of these countries have indirectly referenced buildings, and thus real estate, as an action point within their NDCs. Furthermore, while 40% of the 193 countries have implemented building energy codes, only 26% have made adherence to these codes mandatory. To align the real estate industry with global carbon reduction targets, stakeholders across the sector must take responsibility for understanding the environmental impact of their decisions. This includes considering material choices throughout the entire lifespan of buildings, as emphasized by the United Nations Environment Programme (UNEP) in 2022 (UNEP, 2022).

In CBRE's 2021 Global Investor Intentions Survey, a significant shift towards sustainability was observed, with 60% of respondents indicating that they had integrated Environmental, Social, and Governance (ESG) criteria into their investment strategies. This trend was especially prominent in the Americas, EMEA, and Asia-Pacific regions, reflecting a growing emphasis on ESG factors compared to earlier survey periods (Müller, 2022). As the real estate industry continues to evolve, it is anticipated to face an increase in regulatory measures and the implementation of innovative policies. These may encompass more rigorous construction standards, the establishment of carbon pricing mechanisms, and the introduction of additional reporting benchmarks, all aimed at aligning the sector with global sustainability goals (UNEP FI, 2023). Such developments underscore the industry's critical role in environmental stewardship and signal a broader shift towards responsible investment and development practices.

Stakeholders within the real estate sector possess a diverse spectrum of pathways to consider in their course of action. These encompass endeavors such as environmentally conscious development and construction, the revitalization of structures to enhance energy efficiency, enhancements to heating, cooling, and lighting systems, as well as the integration of technological solutions for demand and consumption management (Boland et al., 2022). As per the Global Alliance for Buildings and Construction, in order to reach the worldwide decarbonization goal, the predominant approach to new building construction in all economies by 2050 should involve net-zero energy and carbon-neutral buildings (Tan & Zheng, 2022). It is further stated that such steps also require a collaborative effort involving all stakeholders along the real estate industry value chain. This effort should focus on diminishing material demand, reducing embodied carbon, and embracing nature-based solutions that bolster building resilience (Tan & Zheng, 2022).

Historically, the discourse surrounding real estate and sustainability has been largely confined to the realms of green buildings, green building ratings, and reductions in embodied carbon. These initiatives, while valuable, have been limited to individual building levels. A more comprehensive approach is needed, one that engages the entire spectrum of stakeholders to collectively realize the sector's environmental, sustainability, and net-zero targets (Tien Doan et al., 2023). The challenge of decarbonization extends beyond mere technical obstacles. It requires stakeholders within the real estate industry to explore and comprehend various strategies for reducing carbon emissions across all parties involved. This includes understanding not only the financial implications but also the strategic benefits and costs associated with these choices (Boland et al., 2022). To align the real estate sector with the ambitious goal of achieving net-zero carbon emissions by 2050, a concerted effort is required. Stakeholders across the buildings' value chain must intensify their commitment to decarbonization, increasing their impact by a factor of five (Tan & Zheng, 2022).

This collective endeavor underscores the industry's pivotal role in global sustainability efforts and the necessity for a unified approach to meet the pressing challenges of our time.

Recognizing the critical interplay between stakeholders and mounting environmental challenges, this paper embarks on an in-depth exploration of how the entire real estate ecosystem is responding to issues related to climate change and emission reductions. While much of the existing literature has focused on specific subsets of stakeholders, such as real estate firms or REITs, there is a notable gap in research that encompasses the full spectrum of the stakeholder ecosystem. This includes developers, suppliers, financing partners, institutional investors, facility management companies, international property consultants, and REITs. This paper seeks to fill this void by delving into the specific issue of transparency within the real estate sector as it pertains to addressing climate change and other environmental concerns. The subsequent sections are methodically structured to provide a comprehensive analysis: the next section offers a review of existing literature, followed by a detailed explanation of the methods and data collection. The fourth section presents the results and discussions, the fifth explores policy implications, and the concluding section summarizes the findings and outlines directions for future research. By casting a wide net over the multifaceted landscape of real estate stakeholders, this paper contributes valuable insights to the ongoing dialogue on sustainability and responsible industry practices.

Literature review

In the real estate industry, terms such as green real estate, sustainability, eco, energy-efficient, and footprint have become emblematic of a growing commitment to environmental considerations by developers and investors. The concept of 'green buildings' has emerged as a specific reference to environmentally friendly structures, setting them apart from conventional constructions (Hebb et al., 2010). The advocacy for green buildings (GB) is recognized as a vital strategy to achieve environmental sustainability, despite the higher upfront costs, as the long-term environmental benefits are seen to justify these expenditures (Juan et al., 2017).

The research domain of green buildings has seen a proliferation of scoping reviews, encompassing diverse aspects such as green building materials, barriers to adoption, drivers, environmental performance, rating systems, assessment techniques, life cycle evaluation, post-occupancy evaluation, external stakeholders, life cycle assessment models, incentives, decision support tools, cost-benefit analysis, and evaluation standards (Wuni et al., 2019).

Recent studies have further enriched this field. For example, Lee et al. (2022) evaluated the impact of mandatory disclosure of building energy efficiency on the premium associated with environmentally conscious features in Australia, finding that green buildings consistently outperform non-green counterparts. Ofek & Portnov (2020) explored consumer familiarity with green building concepts, demonstrating that enhanced awareness leads to a willingness to pay higher premiums and suggesting the need for customized strategies to engage various stakeholders.

The broader context of environmental sustainability in construction has also been examined. Ali et al. (2020) provided a comprehensive analysis of concerns, repercussions, and strategies for CO2 emissions reduction and management, emphasizing the continued reliance on unsustainable fossil fuel energy in construction and operation phases. Research on the influence of GRESB ratings on

Real Estate Investment Trusts (REITs) across North America, Asia, and Europe from 2011 to 2014 revealed a positive correlation between commendable sustainability scores, operational efficiency, and reduced stock market risks (Ferrell et al., 2016).

In contrast, a study by Brounen et al. (2021) on European publicly traded real estate markets, using LEED and related certifications, disclosed an adverse impact on performance metrics such as return on assets (ROA), return on equity (ROE), and stock alphas, attributed to the additional expenses of renovations for BREEAM and LEED certification.

This present study contributes to the field by evaluating the environmental aspects through an examination of disclosure transparency within the real estate industry. Unlike prior studies that considered environmental, social, and governance collectively (Bissoondayal-Bheenick et al., 2023), this research disaggregates these components to assess specific disclosure reporting levels for climate change and other environmental aspects among various stakeholder groups. Recognizing a significant research gap in the comprehensive evaluation of real estate sector disclosure transparency, this research aims to illuminate the current state of disclosure transparency and identify stakeholder groups requiring further efforts to enhance green practices related to climate change and other environmental aspects.

Method and Data Collection

The Global Reporting Initiative (GRI) functions as an independent global standards entity, assisting various organizations in understanding and communicating their impacts on environmental, social, and governance (ESG) concerns. Established in 2000 by the Global Sustainability Standards Board, GRI standards are recognized as the prevailing global benchmarks for ESG reporting (GRI, 2023a). Unlike prior frameworks, GRI standards are organized modularly, allowing for convenient updates and adjustments. These standards promote standardization in content, format, and other reporting requirements, enhancing the quality and credibility of sustainability reports (Luo & Tang, 2022). They are the preferred method for ESG communication (KPMG, 2023). The GRI standards have become an essential tool for organizations within the real estate sector. To effectively communicate sustainability strategies and initiatives, companies often rely on sustainability reports or dedicated sections in annual reports, which are predominantly based on the international regulatory framework provided by the GRI. This widespread adoption underscores the relevance of the GRI standards in assessing disclosure transparency related to environmental, social, and governance (ESG) concerns. For this study, indicators focusing on climate change and other environmental aspects were selected. Table 1 lists all the indicators and sub-indicators considered.

Table 1 GRI Indicators and Sub-indicators List

Indicator Name	Sub-Indicator Name
GRI 301: Materials 2016	301-1 Materials used by weight or volume
	301-2 Recycled input materials used

		301-3 Reclaimed products and their packaging materials
GRI 302: Energy 2016		302-1 Energy consumption within the organization
		302-2 Energy consumption outside of the organization
		302-3 Energy intensity
		302-4 Reduction of energy consumption
		302-5 Reductions in energy requirements of products and services
GRI 303: Water and Effluents 2018		303-1 Interactions with water as a shared resource
		303-2 Management of water discharge-related impacts
		303-3 Water withdrawal
		303-4 Water discharge
		303-5 Water consumption
GRI Biodiversity 2016	304:	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
		304-2 Significant impacts of activities, products and services on biodiversity
		304-3 Habitats protected or restored
		304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations
GRI Emissions 2016	305:	305-1 Direct (Scope 1) GHG emissions
		305-2 Energy indirect (Scope 2) GHG emissions
		305-3 Other indirect (Scope 3) GHG emissions
		305-4 GHG emissions intensity
		305-5 Reduction of GHG emissions
		305-6 Emissions of ozone-depleting substances (ODS)
		305-7 Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions
GRI 306: Waste 2020		306-1 Waste generation and significant waste-related impacts
		306-2 Management of significant waste-related impacts

	306-3 Waste generated
	306-4 Waste diverted from disposal
	306-5 Waste directed to disposal
GRI 308: Supplier Environmental Assessment 2016	308-1 New suppliers that were screened using environmental criteria
	308-2 Negative environmental impacts in the supply chain and actions taken

Source: (GRI, 2023b)

Key stakeholder groups within the real estate sector were identified, including developers, raw material suppliers, REITs, facility management companies, international property consultants, and financial institutions such as banks, private equity players, and institutional investors.

The dataset comprises major publicly traded corporations from Australia and India exhibiting notable ESG facets within the real estate sector. A total of 38 companies from Australia and 34 from India were considered, with five companies selected for each stakeholder group, or fewer if less than five were available (e.g., three Indian REITs). Data were retrieved from company websites, sustainability reports, and annual reports. Table 2 lists the companies considered for all stakeholder groups.

Table 2 Companies considered for the study

Stakeholder Group	Australia	India
Developers	Goodman Group	DLF Limited
	Scentre Group	Godrej Properties Ltd
	Vicinity Centres	Sobha Ltd
	Stockland Corporation Ltd	Omaxe Ltd
	Mirvac Group	Mahindra Lifespace Developers Ltd
Raw Material Suppliers	James Hardie Industries plc	UltraTech Cement Ltd
	Boral Limited	Visa Steel Ltd
	Brickworks Limited	RDC Concrete (India) Pvt Ltd
	CSR Limited	Volve Construction Equipment
	Adbri Limited	Asahi India Glass Ltd
	Commonwealth bank of Australia	HDFC Bank Ltd

	Westpac Banking Corp	State Bank of India
	National Australia Bank Ltd	PNB Housing Finance Ltd
	Australia and New Zealand Banking Group Limited (ANZ)	LIC Housing Finance Ltd
	Bank of Queensland Ltd	ICICI Bank Ltd
	AMP Capital Investors	ICICI Venture Funds Management Company
	Macquarie Infrastructure and Real Asset	Kotak Private Equity Group
	Blackstone	Blackstone
Financial Institutions	KKR & Co. Inc.	KKR & Co. Inc.
	TPG Capital	Motilal Oswal Alternates
	Future Fund Australia	New York Life Insurance Company
	Bain Capital	The Canada Pension Plan Investment Board
	IFM Investors	Temasek's Mapletree
		Caisse de dépôt et placement du Québec
		Ontario Teachers' Pension Plan Board
	Goodman Group	Brookfield India Real Estate Trust REIT
REITs	Scentre Group	Mindspace Business Parks REIT
	Vicinity Centres	Embassy Office Parks REIT
	Stockland Corporation Ltd	
	Mirvac Group	
International property consultants	CBRE	Cushman & Wakefield
	Jones Lang Lasalle	CBRE
	Colliers	Jones Lang LaSalle

	Cushman & Wakefield	Colliers
	Knight Frank	Knight Frank
Facility management companies	CBRE	Cushman & Wakefield
	ISS Australia	
	Jones Lang LaSalle	

Source: Author’s compilation from various sources

A two-fold approach was employed to evaluate the disclosure transparency related to environmental aspects within the selected companies in the real estate sector. First, a scoring system was used for each sub-indicator within a GRI (as listed in Table 1), assigning 1 point for disclosed information and 0 points for no information. The study estimated the percentage of disclosures for each sub-indicator within a GRI. The combined use of scoring and percentage calculations offers a comprehensive view of the disclosure practices related to environmental aspects within the real estate sector. The data collection table, including both scores and percentages, is presented in Annexure – A. The analysis involved evaluating the outcomes based on country, indicator, sub-indicator, and stakeholder group, allowing for a nuanced understanding of the disclosure transparency across different dimensions.

Results and Discussions

Table 3 provides a summary of the overall results, offering insights into the disclosure practices related to various environmental aspects within the real estate sector.

Table 3 Overall transparency scores

GRI Indicator	Disclosure transparency score	
Emission	224,	(44.44%)
Waste Management	125,	(34.72%)
Energy	129,	(35.83%)
Supply Chain	33,	(22.92%)
Water and effluent	89,	(24.72%)
Biodiversity	53,	(18.40%)
Material	10,	(4.63%)

Source: Authors’ calculations

A notable observation from the data is the prominence of the Emissions category, which has received the highest number of disclosures at 44.44%, followed by Energy at 35.83%, and Waste

34.72%. This pattern suggests that the sector is placing a significant emphasis on emissions reductions, reflecting a broader industry trend towards mitigating climate impact.

Conversely, certain indicators appear to be receiving less attention (such as Water and Effluent at 24.72%, and Biodiversity at 18.4%), indicating that these areas are not among the top priorities for the sector. This could raise concerns about a potential imbalance in the focus on different environmental aspects, possibly overlooking critical sustainability factors.

These findings collectively paint a picture of a sector that is actively engaging with certain key environmental challenges, particularly emissions, but may be neglecting other equally vital areas. The results prompt a consideration of how a more balanced and holistic approach to environmental disclosure might be fostered within the real estate industry, ensuring that all aspects of environmental sustainability are adequately addressed.

Figure 1 presents country wise reporting disclosure scores for the indicators. For Australian companies Emissions and Waste indicators are highly disclosed indicators. Indian companies have highest disclosures for Emissions, followed by Energy indicator.

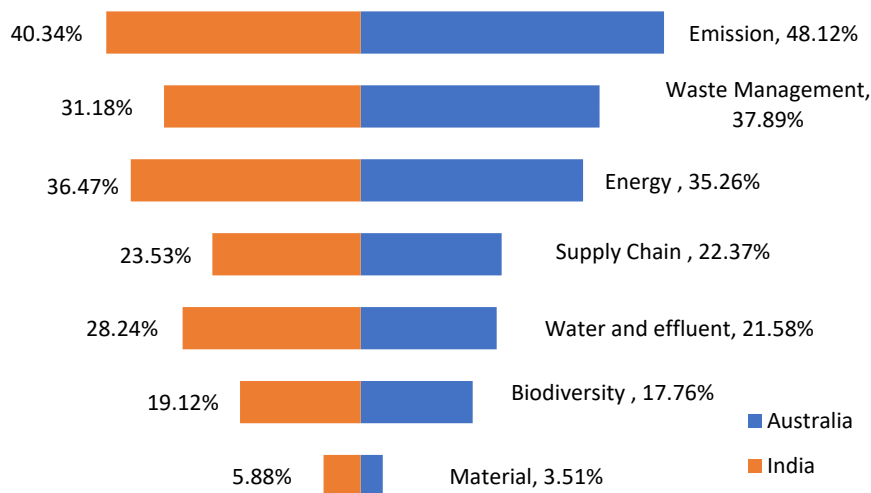


Figure 1 Country wise disclosure transparency scores

However, Supplier environmental assessment and Material are the least disclosed for both countries. For Australia Energy, Water and effluents and Biodiversity have lesser focus as compared to Emissions and Waste indicators. For India, Waste, Water and effluents and Biodiversity have lesser focus as compared to Emissions and Energy.

Table 4 shows stakeholder groups wise results for disclosure transparency scores. Most of the stakeholder groups are highly focused on disclosing emissions related sub-indicators. All the stakeholder groups are least focused on disclosing Materials related sub-indicators.

Table 4 Stakeholders wise indicators disclosure scores

Stakeholder Group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	6.67%	46.00%	50.00%	35.00%	58.57%	60.00%	35.00%
Suppliers	20.00%	42.00%	30.00%	32.50%	47.14%	34.00%	30.00%
REITs	0.00%	37.50%	32.50%	25.00%	42.86%	52.50%	25.00%
Facility Management	0.00%	40.00%	30.00%	12.50%	60.71%	45.00%	37.50%
Financial Institutions	2.22%	26.67%	10.67%	10.00%	34.76%	21.33%	11.67%
International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%

Source: Author's calculations

It is crucial to note that for developers, waste is the most disclosed indicator which is in alignment with the quantity of the waste this particular category has to deal with and so is for REITs. Suppliers' next target after Emissions is energy indicator which is again in alignment with their energy consumption levels and their reductions. As expected, financial institutions are having energy indicator next in line after emission. This aligns with their role as financial institutions and aligning their reporting with the global disclosures like Task Force on Climate-Related Financial Disclosures (TCFD).

Table 5 and 6 shows disclosure reporting scores for different stakeholder groups for Australia and India respectively.

Table 5 Australia disclosure reporting scores

Stakeholder group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	0.00%	36.00%	28.00%	30.00%	57.14%	64.00%	20.00%
Suppliers	26.67%	56.00%	44.00%	45.00%	62.86%	40.00%	30.00%
REITs	0.00%	36.00%	28.00%	30.00%	57.14%	64.00%	20.00%
Facility Management	0.00%	40.00%	20.00%	16.67%	57.14%	40.00%	33.33%
Financial Institutions	0.00%	24.00%	8.00%	3.33%	34.29%	21.33%	16.67%

International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%
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Source: Author's calculation

Table 6 India disclosure reporting scores

Stakeholder group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	13.33%	56.00%	72.00%	40.00%	60.00%	56.00%	50.00%
Suppliers	13.33%	28.00%	16.00%	20.00%	31.43%	28.00%	30.00%
REITs	0.00%	40.00%	40.00%	16.67%	19.05%	33.33%	33.33%
Facility Management	0.00%	40.00%	60.00%	0.00%	71.43%	60.00%	50.00%
Financial Institutions	4.44%	29.33%	13.33%	16.67%	35.24%	21.33%	6.67%
International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%

Source: Author's calculation

Results of table 5 shows that all the Australian stakeholder groups (other than developers and REITs) have maximum disclosure scores for Emission indicator. However, all of them have least focus on the materials indicator. For developers and REITs stakeholder groups waste related disclosures are of priority. Table 6 presents the similar results for Indian stakeholder groups. All the Indian stakeholder groups have least disclosure transparency scores for Materials indicator. Emission indicator has received the most attraction from all the stakeholders (except developers and REITs). Indian developers have greatest focus towards Water and Effluents. From the results, REITs have two top priorities Energy and Water and Effluents. Both of the them have received equal weightage from the REITs.

Sub indicator Transparency disclosure scores

Table 7 provides further in detail analysis of what sub-indicators have better disclosure transparencies and which ones are lacking. Table captures data for both the countries.

Table 7 Sub-indicator disclosure transparency scores

Indicator Name	Sub-Indicator Name	Australia	India
GRI 301: Materials 2016	301-1 Materials used by weight or volume	0.00%	5.88%
	301-2 Recycled input materials used	7.89%	8.82%
	301-3 Reclaimed products and their packaging materials	2.63%	2.94%

GRI 302: Energy 2016	302-1 Energy consumption within the organization	63.16%	50.00%
	302-2 Energy consumption outside of the organization	0.00%	5.88%
	302-3 Energy intensity	39.47%	50.00%
	302-4 Reduction of energy consumption	44.74%	41.18%
	302-5 Reductions in energy requirements of products and services	28.95%	35.29%
GRI 303: Water and Effluents 2018	303-1 Interactions with water as a shared resource	2.63%	14.71%
	303-2 Management of water discharge-related impacts	44.74%	50.00%
	303-3 Water withdrawal	10.53%	26.47%
	303-4 Water discharge	2.63%	5.88%
	303-5 Water consumption	47.37%	44.12%
GRI 304: Biodiversity 2016	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	18.42%	26.47%
	304-2 Significant impacts of activities, products and services on biodiversity	23.68%	26.47%
	304-3 Habitats protected or restored	23.68%	17.65%
	304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	5.26%	5.88%
GRI 305: Emissions 2016	305-1 Direct (Scope 1) GHG emissions	81.58%	58.82%
	305-2 Energy indirect (Scope 2) GHG emissions	81.58%	58.82%
	305-3 Other indirect (Scope 3) GHG emissions	71.05%	41.18%
	305-4 GHG emissions intensity	23.68%	44.12%
	305-5 Reduction of GHG emissions	71.05%	58.82%
	305-6 Emissions of ozone-depleting substances (ODS)	0.00%	0.00%
	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	7.89%	20.59%
GRI 306: Waste 2020	306-1 Waste generation and significant waste-related impacts	5.26%	2.94%
	306-2 Management of significant waste-related impacts	63.16%	52.94%
	306-3 Waste generated	36.84%	35.29%
	306-4 Waste diverted from disposal	42.11%	41.18%
	306-5 Waste directed to disposal	42.11%	23.53%
GRI 308: Supplier Environmental Assessment 2016	308-1 New suppliers that were screened using environmental criteria	44.74%	41.18%
	308-2 Negative environmental impacts in the supply chain and actions taken	0.00%	5.88%

Source: Author's calculations

Australian companies have highest sub-indicator disclosure transparency scores for scope 1 emission, scope 2 emissions (both have 81.58% score) followed by scope 3 emissions and reduction of GHG emissions (both 71.05% score). Indian companies also similar sub-indicator take precedence over others - scope 1 emission, scope 2 emissions and reduction of GHG emissions. All three have 58.82% score.

Now moving to least disclosed sub-indicators – for Australian companies - Materials used by weight or volume; Energy consumption outside of the organization, Emissions of ozone-depleting substances (ODS) and Negative environmental impacts in the supply chain and actions taken. All four of them have 0% score. In case of Indian companies least disclosed Emissions of ozone-depleting substances (ODS) (0%), Reclaimed products and their packaging materials and Waste generation (2.94%) and significant waste-related impacts (2.94%).

Discussions

The Materials indicator captures data regarding material usage in terms of weight or volume, integration of recycled input materials, and the utilization of reclaimed products along with their accompanying packaging materials. This approach reflects a collective endeavor to promote sustainable resource management across diverse industries. Nevertheless, as highlighted by certain companies during their reporting for this indicator, the company in question is actively engaged in the realm of real estate development, encompassing the entire lifecycle of real estate assets, from construction to operation and maintenance. The company's portfolio comprises the construction of residential properties as well as the establishment, operation, and upkeep of commercial office spaces, retail outlets (shopping malls), and hospitality establishments (hotels and clubs). As a result, the notion of utilizing reclaimed products and their associated packaging materials does not align with the scope of the company's activities. Similar disclosures have also been noted from other stakeholder groups as well.

Carbon emissions are assessed through scope 1, scope 2, and scope 3 greenhouse gas emissions. Presently, it has become customary to report these emissions due to the enhanced clarity in calculation methods and the availability of third-party validations. This convergence of factors renders carbon emissions a more convenient metric for measurement. Emissions have consistently held significance and have often been equated with the broader regime of environmental activities. This is evident in the disclosure scores, where the Emissions indicator attains the highest disclosure scores.

Numerous companies have emphasized the challenges associated with reporting sub-indicators concerning Energy and Water and effluents. The primary reason is the nature of the property arrangement; as many properties are rented rather than owned, installing proprietary measuring units to accurately record these indicators is often unfeasible. Nonetheless, these companies acknowledge their efforts to capture these indicators with the highest possible precision wherever circumstances allow. Consequently, this circumstance could contribute to the relatively lower priority placed on water-related matters or the potential inability to fully disclose information tied to this particular indicator.

Waste generation for developers is an issue – they can actually use some of the waste as raw material inputs – which is captured by Materials indicator (interlinkage of 2 different indicators) – In India, Godrej Properties Limited is using 94.44% of construction waste as “recycled input materials used”. DLF Ltd also uses Fly ash 2.22%; Ground Granulated Blast Furnace Slag used in RCC and PCC works 0.27% and Steel scrap 0.01%.

Supplier evaluation is an area that often receives limited emphasis. This can be attributed to the fact that suppliers are external entities. Amongst stakeholders, developers and providers of raw materials are the groups more likely to prioritize this aspect. Many of these companies implement supplier codes of conduct and policies to facilitate supplier screening. On the other hand, stakeholders like financial institutions, international property consultants, and facility management firms don't typically need to procure raw materials on such a significant scale. Hence, their focus on this indicator might not be as pronounced.

Policy Implications

The strong focus on emissions, while essential, may overshadow other vital environmental aspects. The assessment underscores that certain indicators have not yet received the requisite attention to fully satisfy the overarching criteria of climate change and other environmental aspects. A more balanced approach to disclosure that includes Materials, Waste, Water and Effluents, and Biodiversity could provide a more comprehensive view of the sector's environmental impact. The alignment of disclosure practices with global frameworks like TCFD emphasizes the importance of integrating international guidelines into national reporting practices. This alignment fosters consistency and comparability across markets. The data suggests that disclosure practices are influenced by the specific roles and responsibilities of different stakeholder groups. Tailoring sustainability strategies to these roles could enhance effectiveness and relevance. The differences between Australia and India highlight the importance of considering local environmental priorities, regulations, and cultural factors in shaping disclosure practices. The least disclosed sub-indicators point to areas where transparency could be enhanced. Addressing these gaps would contribute to a more transparent and accountable real estate sector.

The analysis of environmental disclosure practices within the real estate sector highlights key policy implications for developers, REITs, suppliers, and financial institutions. For developers and REITs, the focus on waste disclosures calls for strengthened waste management regulations, incentives for sustainable materials usage, and comprehensive environmental reporting guidelines. Suppliers could be guided by energy efficiency standards, transparency requirements in the supply chain, and collaboration with industry bodies to develop best practices. Financial institutions should align with global frameworks like TCFD, promote green financing initiatives, and implement guidelines for assessing climate-related financial risks.

Governments and regulatory bodies in Australia and India have a role in shaping these policies, with opportunities to develop harmonized environmental reporting standards, incentivize balanced disclosure, and establish monitoring and enforcement mechanisms. These policy directions are tailored to the unique roles and responsibilities of each stakeholder group, addressing the specific focus areas identified in the analysis. They provide a roadmap for enhancing transparency and

sustainability within the real estate sector, reflecting the complex interplay of emissions, materials, energy, and waste, and aligning with broader environmental goals and global standards.

Conclusions and future research

The real estate sector's role in environmental sustainability has led to this study's exploration of environmental disclosure practices among key stakeholders, including developers, REITs, suppliers, and financial institutions in Australia and India. Findings highlight a consistent focus on emissions but varying attention to other aspects like materials, waste, energy, and water. This complexity underscores the need for a nuanced approach to disclosure, reflecting the unique roles and contexts of different stakeholders.

In conclusion, this research provides valuable insights into the multifaceted nature of environmental disclosure within the real estate sector. The derived policy implications offer a pathway towards more transparent and sustainable practices, emphasizing the importance of balanced reporting. Future research should delve into the underlying drivers of disclosure practices, regulatory impacts, and emerging technologies, fostering collaboration across academia, industry, and policymakers.

This study lays the groundwork for further exploration, contributing to the ongoing dialogue on responsible development and global stewardship within the real estate landscape. It calls for concerted action towards a more sustainable and transparent future, aligning the real estate sector with broader environmental goals.

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Annexure – A

Australia

Australia Developers and Suppliers Disclosure Transparency Score Matrix

Sub-indicators	Developers					Suppliers				
	Goodman Group	Scentre Group	Vicinity Centres	Stockland Corporation Ltd	Mirvac Group	James Hardie Industries plc	Boral Limited	Brickworks Limited	CSR Limited	Adbri Limited
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	1	1	1	0	
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	1	
302-1 Energy consumption within the organization	0	0	1	1	1	1	1	1	1	
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	
302-3 Energy intensity	0	0	1	1	1	1	0	1	0	
302-4 Reduction of energy consumption	0	0	1	1	1	1	1	1	0	
302-5 Reductions in energy requirements of products and services	0	0	0	0	0	0	1	1	0	
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	
303-2 Management of water discharge-related impacts	0	1	0	1	1	1	1	1	1	
303-3 Water withdrawal	0	0	0	0	0	1	0	0	0	
303-4 Water discharge	0	0	0	0	0	1	0	0	0	
303-5 Water consumption	0	1	1	1	1	1	0	1	1	
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	0	1	0	0	1	0	0	
304-2 Significant impacts of activities, products and services on biodiversity	1	0	0	1	0	1	1	0	1	
304-3 Habitats protected or restored	0	0	0	1	0	1	1	1	1	
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	1	0	0	0	0	0	
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	1	1	1	
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	1	1	1	

305-3 Other indirect (Scope 3) GHG emissions	1	0	1	1	1	1	1	1	1	0
305-4 GHG emissions intensity	0	0	1	1	0	0	0	0	1	0
305-5 Reduction of GHG emissions	1	1	0	1	1	1	1	1	1	1
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	1	0	0
306-1 Waste generation and significant waste-related impacts	0	0	1	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	1	1	1	1	1	1	1
306-3 Waste generated	0	0	1	1	1	1	1	0	0	0
306-4 Waste diverted from disposal	0	1	1	1	1	1	1	0	0	0
306-5 Waste directed to disposal	0	0	1	1	1	1	1	0	0	1
308-1 New suppliers that were screened using environmental criteria	0	1	1	0	0	0	0	1	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0

Australia REITs, Facility Management and International Property Consultants Disclosure Transparency Score Matrix

Sub-indicators	REITs					Facility Management					International Property Consultants			
	Goodman Group	Scentre Group	Vicinity Centres	Stockland Corporation Ltd	Mirvac Group	CBRE	ISS Australia	Jones Lang LaSalle	CBRE	Jones Lang Lasalle	Colliers	Cushman & Wakefield	Knight Frank	
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0	0	0	0	
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0	0	0	0	
302-1 Energy consumption within the organization	0	0	1	1	1	1	0	1	1	1	1	1	0	
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	
302-3 Energy intensity	0	0	1	1	1	1	0	1	1	1	1	1	0	
302-4 Reduction of energy consumption	0	0	1	1	1	0	0	1	0	1	0	0	0	
302-5 Reductions in energy requirements of products and services	0	0	0	0	0	1	0	0	1	0	1	0	0	
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	1	0	

303-2 Management of water discharge-related impacts	0	1	0	1	1	0	0	1	0	1	1	1	0
303-3 Water withdrawal	0	0	0	0	0	1	0	0	1	0	0	1	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	0	1	1	1	1	0	0	1	0	1	0	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	0	1	0	0	0	1	0	1	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	0	0	1	0	0	0	1	0	1	0	0	0
304-3 Habitats protected or restored	0	0	0	1	0	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	1	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	1	1	1	1	1	1	0
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	1	1	1	1	1	1	0
305-3 Other indirect (Scope 3) GHG emissions	1	0	1	1	1	1	1	1	1	1	0	1	0
305-4 GHG emissions intensity	0	0	1	1	0	0	0	0	0	0	1	1	0
305-5 Reduction of GHG emissions	1	1	0	1	1	1	1	1	1	1	1	1	0
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	0	0	0	1	0	0
306-1 Waste generation and significant waste-related impacts	0	0	1	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	1	1	1	1	1	1	1	0	0	0
306-3 Waste generated	0	0	1	1	1	0	0	1	0	1	0	1	0
306-4 Waste diverted from disposal	0	1	1	1	1	0	0	1	0	1	0	1	0
306-5 Waste directed to disposal	0	0	1	1	1	0	0	1	0	1	0	1	0
308-1 New suppliers that were screened using environmental criteria	0	1	1	0	0	1	0	1	1	1	0	1	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0

Financial Institutions															
Sub-indicators	Common		National Australia Bank Ltd	Australia and New Zealand Banking Group Limited (ANZ)	Bank of Queensland Ltd	AMP	Macquarie Infrastructure and Real Asset	Blackstone	KK R & Co. Inc.	TPG Capital	Future Fund Australia	Bain Capital	IFM Investors	Common	Westpac Banking Corp
	wealth bank of Australia	Westpac Banking Corp		Group Limited (ANZ)		Capital Investors								wealth bank of Australia	
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	1	1	1	1	0	0	0	1	0	1	0	0	0	1
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
302-4 Reduction of energy consumption	0	0	1	1	1	0	0	1	0	0	0	1	0	0	0
302-5 Reductions in energy requirements of products and services	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-2 Management of water discharge-related impacts	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
303-3 Water withdrawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

304-2 Significant impacts of activities, products and services on biodiversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
304-3 Habitats protected or restored	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-3 Other indirect (Scope 3) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-4 GHG emissions intensity	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
305-5 Reduction of GHG emissions	0	1	1	1	1	1	0	0	0	0	0	1	1	0	
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
306-2 Management of significant waste-related impacts	1	0	0	1	0	0	0	1	0	0	0	1	0	1	
306-3 Waste generated	1	1	1	1	0	0	0	0	0	0	0	0	0	1	
306-4 Waste diverted from disposal	1	1	1	1	0	0	0	0	0	0	0	0	0	1	
306-5 Waste directed to disposal	1	1	1	1	0	0	0	0	0	0	0	0	0	1	

308-1 New suppliers that were screened using environmental criteria	1	1	0	1	1	0	1	0	0	0	0	0	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0

India

India Developers and Suppliers Disclosure Transparency Score Matrix

Sub-indicators	Developers						Suppliers			
	DLF Limited	Godrej Properties Ltd	Sobha Ltd	Omaxe Ltd	Mahindra Lifespace Developers Ltd	UltraTech Cement Ltd	Visa Steel Ltd	RDC Concrete (India) Pvt Ltd	Volve Construction Equipment	Asa Ind Gla Ltd
301-1 Materials used by weight or volume	0	0	0	0	0	0	1	0	0	0
301-2 Recycled input materials used	1	1	0	0	0	0	1	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	0	1	0	0	1	1	1	0	0	1
302-2 Energy consumption outside of the organization	0	1	0	1	0	0	0	0	0	0
302-3 Energy intensity	1	1	0	0	1	1	1	0	0	0
302-4 Reduction of energy consumption	1	1	1	0	1	1	1	0	0	1
302-5 Reductions in energy requirements of products and services	1	1	0	0	1	1	1	0	0	1
303-1 Interactions with water as a shared resource	1	1	0	0	1	1	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	1	1	1	1	1	0	0	0

303-3 Water withdrawal	1	1	0	1	1	1	0	0	0
303-4 Water discharge	0	0	0	1	1	0	0	0	0
303-5 Water consumption	1	1	0	1	1	1	0	0	1
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	1	0	1	1	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	1	0	0	0	1	0	0	1
304-3 Habitats protected or restored	0	0	0	0	1	1	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	1	0	0	1	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	0	1	1	1	0	0	1
305-2 Energy indirect (Scope 2) GHG emissions	1	1	0	1	1	1	0	0	1
305-3 Other indirect (Scope 3) GHG emissions	0	1	0	1	1	1	0	0	1
305-4 GHG emissions intensity	1	1	0	1	1	1	0	0	1
305-5 Reduction of GHG emissions	1	1	1	0	1	1	0	0	0
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	1	0	0	0	1	1	0	0	1
306-1 Waste generation and significant waste-related impacts	0	1	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	0	1	1	0	0	1
306-3 Waste generated	1	1	0	0	1	1	0	0	1
306-4 Waste diverted from disposal	1	1	0	0	1	1	0	0	1
306-5 Waste directed to disposal	1	1	0	0	1	0	0	0	1
308-1 New suppliers that were screened using environmental criteria	1	1	1	0	1	1	0	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	1	0	0	0	1

India REITs, Facility Management and International Property Consultants Disclosure Transparency Score Matrix

Sub-indicators	REITs	Facility Management	International Property Consultants
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	Brookfield India Real Estate Trust REIT	Mindspace Business Parks REIT	Embassy Office Parks REIT	Cushman & Wakefield - Commercial Real Estate Services	Cushman & Wakefield - Commercial Real Estate Services	CBR E	Jones Lang LaSalle	Colliers	Knight Frank
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	0	0	1	1	1	1	1	0
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	1	0	0	1	1	1	1	1	0
302-4 Reduction of energy consumption	1	1	0	0	0	0	1	0	0
302-5 Reductions in energy requirements of products and services	0	1	1	0	0	1	0	1	0
303-1 Interactions with water as a shared resource	0	0	0	1	1	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	1	1	1	0	1	1	0
303-3 Water withdrawal	0	0	1	1	1	1	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	0	0	0	0	1	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	0	0	0	0	0	1	0	0
304-2 Significant impacts of activities, products and services on biodiversity	0	0	0	0	0	0	1	0	0
304-3 Habitats protected or restored	1	0	1	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	0	0	1	1	1	1	1	0
305-2 Energy indirect (Scope 2) GHG emissions	1	0	0	1	1	1	1	1	0
305-3 Other indirect (Scope 3) GHG emissions	0	0	0	1	1	1	1	0	0
305-4 GHG emissions intensity	0	0	0	1	1	0	0	1	0
305-5 Reduction of GHG emissions	1	0	1	1	1	1	1	1	0

305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	0	0	1	0	0	1	1	0	1	1	0	0	0	0	0
306-3 Waste generated	1	0	0	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
306-4 Waste diverted from disposal	0	0	1	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
306-5 Waste directed to disposal	0	0	0	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
308-1 New suppliers that were screened using environmental criteria	0	1	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

India Financial Institutions Disclosure Transparency Score Matrix

Sub-indicators	Financial Institutions																
	HDF C Bank Ltd	State Bank of India	PNB Housing Finance Ltd	LIC Housing Finance Ltd	ICICI Bank Ltd	ICICI Venture Funds Management Company	Kotak Private Equity Group	Blackstone	KKR & Co. Inc.	Motilal Oswal Alternates	New York Life Insurance Company	The Canada Pension Plan Investment Board	Temasek's Mapletree	Caisse de dépôt et placement du Québec	Ontario Teachers' Pension Plan Board		
301-1 Materials used by weight or volume	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	1	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	1	1	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0
302-4 Reduction of energy consumption	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0

302-5 Reductions in energy requirements of products and services	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0
303-3 Water withdrawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	1	0	0	0	0	0	0	1	1	0	1	0	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
304-3 Habitats protected or restored	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0
305-3 Other indirect (Scope 3) GHG emissions	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0
305-4 GHG emissions intensity	1	1	1	0	1	0	0	0	0	0	0	0	1	1	1	0
305-5 Reduction of GHG emissions	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	1
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	0	1	1	0	0	0	1	0	1	1	0	1	0	0
306-3 Waste generated	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0
306-4 Waste diverted from disposal	1	1	0	0	0	0	0	0	0	1	1	0	1	0	0
306-5 Waste directed to disposal	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
308-1 New suppliers that were screened using environmental criteria	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0