

ORIGINAL RESEARCH ARTICLE

Developing a subsector-specific ESG materiality framework with standards alignment: Evidence from India's natural gas sector

Supplementary File

Table S1. Summary of critical ESG dimensions in the literature relevant to the Indian natural gas sector

| Reference | Primary ESG dimension | Specific variables/indicators analyzed | Relevance to the natural gas sector |
|------------------------------------|-----------------------|--|---|
| Baratta <i>et al.</i> ¹ | Environmental | Carbon intensity; decarbonization pathways | Supports the priority of GHG emissions found in upstream operations |
| Gupta ² | Environmental | Scope 1, 2, and 3 GHG emissions; NCGG guidelines | Validates the need for standardized emission reporting frameworks |
| Mohanty <i>et al.</i> ³ | Environmental | Quality of Environmental Impact Assessment processes | Confirms that while reporting volume is high, "impact" data remains low quality |
| Fogarty <i>et al.</i> ⁴ | Environmental | Marine ecosystem potential impacts biodiversity considerations | Benchmark the level of rigor required for meaningful biodiversity (SDG 14) reporting |
| Sarkar <i>et al.</i> ⁵ | Social/cross-cutting | Alignment with United Nations SDGs, particularly SDG 5 and 14 | Highlights the critical "Social" gap regarding gender equality and the "Environmental" gap in marine life |
| Arora and Sethi ⁶ | Governance | CEO characteristics and corporate disclosure transparency | Demonstrates that "Governance" is driven by internal leadership traits, affecting transparency |
| Kabra ⁷ | Governance | Board strategy; BRSR compliance | Argues for shifting "Governance" from compliance (checkboxes) to strategy (resilience) |
| Desikan and Devi ⁸ | General | Energy security vs. sustainability | Sets the macro-economic context for why "Social" (access to energy) is a material topic |
| Motwani and Gupta ⁹ | General | Voluntary vs. mandatory disclosure | Illustrates the regulatory transition period the industry is currently navigating |
| Bania and Biswas ¹⁰ | General | Metric standardization; greenwashing risks | Justifies the creation of a materiality matrix to prevent greenwashing through vague metrics |

Abbreviations: BRSR: Business Responsibility and Sustainability Reporting; CEO: Chief executive officer; GHG: Greenhouse gas; NCGG: National Centre for Good Governance; SDG: Sustainable Developmental Goal.

References

1. Baratta A, Cimino A, Longo F, Solina V, Verteramo S. The impact of ESG practices in industry with a focus on carbon emissions: insights and future perspectives. *Sustainability*. 2023;15(8):6685.
doi: 10.3390/su15086685
2. Gupta V. An analysis of environmental disclosure and emission reporting by Indian companies. NCGG; 2024. Available from: <http://www.ncgg.org.in/sites/default/files/lectures-document/Vinayak.pdf> [Last accessed on 2026 Jan 28].
3. Mohanty A, Priya VK, Paithe UN, Mohanty A. E of environmental, social, and governance (ESG) in India: reporting, review and future prospects. *Discov glob Soc*. 2025;3(1):136.
doi: 10.1007/s44282-025-00288-0
4. Fogarty MJ, Rosenberg AA, Cooper AB, *et al.* Fishery production potential of large marine ecosystems: a prototype analysis. *Environ*

Dev. 2016;17:211-219.

doi: 10.1016/j.envdev.2016.02.001

5. Sarkar S, Moolearambil Sukumaran Nair M, Datta A. Role of environmental, social, and governance in achieving the UN sustainable development goals: a special focus on India. *Environ Prog Sustain Energy*. 2023.
doi: 10.1002/ep.14204
6. Arora N, Sethi R. A bibliometric review of literature on ESG disclosure with specific focus on CEO traits. *IUP J Corp Gov*. 2025;24(3):24-50.
doi: 10.71329/IUPJCG/2025.24.3.24-50
7. Kabra A. Locating the future of ESG in India's present sustainability framework. *Asian J Bus Ethics*. 2024;13(1):137-173.
doi: 10.1007/s13520-024-00191-y
8. Desikan J, Devi AJ. Oil and gas industries in India - a case study. *Int J Case Stud Bus IT Educ*. 2022:110-125.
doi: 10.47992/IJCSBE.2581.6942.0154
9. Motwani A, Gupta R. ESG reporting: environmental dimension disclosures by large energy sector companies in India. *Eur J Theor Appl Sci*. 2023;1(2):108-118.
doi: 10.59324/ejtas.2023.1(2).11
10. Bania S, Biswas J. An analysis of key environmental, social and governance (ESG) metrics in several important manufacturing segments of India. *Indian J Corp Gov*. 2024;17(2):202-233.
doi: 10.1177/09746862241276938