

COSTING FOR SUSTAINABILITY AND ESG REPORTING

*Integrating the Holistic Environmental Costing Framework within
India's Cost Audit Architecture*

Abstract

Management accounting is undergoing an epistemological transformation driven by the sustainability mandate. This article examines the Holistic Environmental Costing (HEC) framework introduced by ICAI's Guidance Note (2025), situates it within India's Cost Accounting Standards architecture, and maps its requirements against the BRSR. Drawing on India's Vedic philosophical heritage, it argues that sustainable costing is a recovery of principles already embedded in Indian civilisational thought. It develops the True Total Cost equation, identifies the regulatory gap between the HEC Guidance Note and enforceable standards, and proposes a CAS-26 pathway for CMAs as the natural practitioners of impact accounting in India. Ultimately, this integration will transition corporate ESG disclosures from management assertions to verified, audit-backed realities.

The Epistemological Shift in Management Accounting

The discipline of management accounting is undergoing a transformation that is not merely technical — it is epistemological. Historically, cost statements ended at the factory gate; the consumption of unpriced natural capital and ecological degradation were externalities by definition. The BRSR, mandated by SEBI for the top 1,000 listed companies from FY 2022-23, is the regulatory system's first serious attempt to bring these invisible costs inside corporate disclosure. ICAI's Guidance Note on



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Environmental Costing (2025) responds with the HEC framework — but it sits in uneasy proximity to the Cost Accounting Standards, whose scope has not yet been extended to require environmental cost ascertainment. Closing this gap is the central task facing the profession. Crucially, the roots of sustainability in India do not begin with SEBI. They are Vedic. The Pancha Mahabhutas — earth, water, fire, air, and space — establish an ontology in which human economic activity is derivative of planetary stability. What accounting theory calls 'planetary boundaries,' the Rig Veda called Rta.

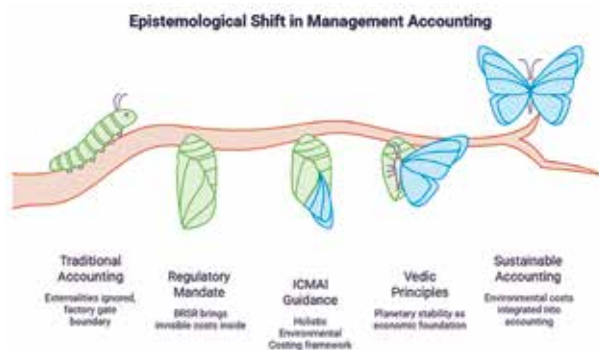
***"Dyauh Shanti, Antariksha Shanti,
Prithivi Shanti..."***

*"May the sky be peaceful, may the
atmosphere be peaceful, may the earth be
peaceful — may that peace pervade us."*

— Atharva Veda — Shanti Sukta

The Shanti Sukta's invocation of sky, atmosphere, and earth conceptually mirrors the spatial stratification of the GHG Protocol's Scope 1, 2, and 3 frameworks — both recognise that ecological harm respects no localized boundary. Sustainable

costing is not an imported concept but a recovery of principles native to Indian civilisational thought.



The Vedic Architecture of Environmental Accountability

Four Vedic and Upanishadic concepts constitute a coherent theory of environmental stewardship that underlies the HEC framework.

Rta — Cosmic Order as the Basis for Ecological Limits

The Rig Veda's Rta is the principle of cosmic and moral order — the idea that natural systems operate according to laws which human action can violate but cannot escape. When a manufacturing enterprise extracts groundwater beyond the aquifer's recharge rate, it violates Rta. A cost accounting system that records no liability for this overextraction is misrepresenting the firm's net position relative to the natural order.

Rina — The Doctrine of Ecological Debt

The Shatapatha Brahmana elaborates a fourth debt — Bhuta Rina — owed to living creatures and the natural world, expanding beyond the classical three debts to gods, sages, and ancestors. When an enterprise depletes a shared resource base to generate private revenue, it incurs Bhuta Rina, effectively borrowing from nature without recording a payable. The HEC framework's Tier IV costs (ecosystem capital depletion) serve as the mechanism to finally bring this unrecorded ecological debt onto the balance sheet.

Aparigraha — Non-Accumulation as the Circular Economy Principle

Aparigraha — the ethic of taking only what is

strictly necessary — translates directly into the modern industrial imperative of material efficiency, circularity, and minimizing throughput. Viewed through this lens, a cost audit that tracks financial expenditure but fails to measure waste ratios, energy intensity, and water consumption per unit of output is epistemologically deficient by the standards of its own tradition.

“Mata Bhumi Putroham Prithivyah”

“Earth is my mother; I am her son.”

— Atharva Veda — Prithvi Sukta 12.1.12

Isha Upanishad — The Trusteeship Doctrine and Inter-Generational Equity

“Isavasyam idam sarvam... tena tyaktena bhunjitha, ma gridhah kasya svid dhanam.”

“All this is pervaded by the Lord. Enjoy through renunciation; do not covet anyone's wealth.”

— Isha Upanishad — Verse 1

The phrase ‘tena tyaktena bhunjitha’ — find enjoyment through what you relinquish, not through accumulation — establishes the ultimate sustainability constraint: value extraction must never exceed ecological regeneration. The accounting system must therefore mathematically capture the cost of regeneration, expanding our definition of cost beyond what the factory gate records. Gandhi drew his entire economic philosophy of trusteeship from this single verse; for the modern CMA, the mathematical equivalent is the True Total Cost equation.

Vedic Principles for Environmental Accountability



Impact Accounting and the True Total Cost Equation

Impact Accounting assigns monetary values to environmental and social externalities, its foundational claim being that conventional reporting overstates enterprise value by treating unpriced natural capital as zero-cost. Drawing on ICAI's HEC Guidance Note (2025) as primary basis, and on the US EPA's Environmental Accounting guidelines (1995) and IFAC's Environmental Management Accounting guidelines (2005) as foundational antecedents, the author proposes the following True Total Cost formulation:

$$\text{TTC} = \text{CC} + \text{HC} + \text{EC} + \text{SC}$$

CC = Conventional Costs (CAS-compliant: direct material, labour, overheads)

HC = Hidden Costs (regulatory compliance, litigation, contingent liabilities)

EC = External Environmental Costs (carbon, water, land, biodiversity)

SC = Social Costs (health burden, community displacement, labour informality)

The ratio EC / TTC indicates the proportion of a firm's true economic costs externalised onto society. Applying IPCC AR6 shadow carbon pricing and

replacement-cost water valuation to sector-level data suggests externalised costs routinely comprise 18 to 35 percent of TTC across India's heavy manufacturing, mining, and petroleum sectors — indicative of scale, not audit-verified findings. Contingent environmental liabilities are absent from current cost audit reports by design: CAS-1's actuality principle excludes contingent items from the cost of production, and CAS-15 permits provisions only where statistically estimable from historical data. A proposed CAS-26 must therefore introduce a probabilistic recognition principle — a deliberate methodological departure from existing standards.

Consider a cement manufacturer where SCC\$ is ₹4,000/ton. If SHCS (contingent liabilities) is estimated at ₹200, SEC\$ (using a carbon shadow price of ₹6,000/tonne CO₂e for 0.6 tons of emissions) adds ₹3,600, and SSC\$ (community health burden) is ₹200, the STTC\$ becomes ₹8,000. In this scenario, conventional accounting captures only ₹4,200, systematically missing 47.5% of the true economic cost.

Note: The 18–35% range is illustrative, derived from IPCC AR6 shadow carbon pricing, replacement-cost water valuation, and avoided-cost ecosystem methodology applied to sector-level data. Enterprise-level verification would require standardised cost audit data under a future environmental cost standard.

True Total Cost Components

Cost Component	Conventional Costs (CC)	Hidden Costs (HC)	External Environmental Costs (EC)	Social Costs (SC)
Description	CAS-compliant: direct material, labour, overheads	regulatory compliance, litigation, contingent liabilities	carbon, water, land, biodiversity	health burden, community displacement, labour informality

The HEC Tier Structure

Table 1 maps each tier — with its definition, Vedic parallel, and CAS linkage — in a single reference structure.

Table 1: HEC Tier Structure — Vedic Parallels and CAS Linkages

Environmental Cost Type	Vedic Parallel	HEC Tier	Definition	CAS Linkage
Direct material, energy, waste treatment	Aparigraha — non-accumulation	Tier I	Conventional costs captured under existing CAS	CAS-6, CAS-8
Regulatory compliance; hidden environmental expenditure	Ahimsa — non-injury to nature	Tier II	Hidden and contingent costs: compliance expenditure, environmental overheads, and unrecorded contingent liabilities not yet separately disclosed	No current CAS — gap addressed by proposed CAS-26
Carbon, water, land externalities	Rina — ecological debt	Tier III	External environmental costs borne by society but unrecorded by the enterprise	CAS-14 (Pollution Control Cost), BRSR Core
Ecosystem services, biodiversity depletion	Rta — cosmic natural order	Tier IV	Ecosystem capital depletion: biodiversity loss, groundwater drawdown, destruction of ecosystem services	No current CAS — gap addressed by proposed CAS-26

Source: ICAI Guidance Note on Environmental Costing (2025); Author's compilation

Note: Tiers II and IV have no current CAS linkage. CAS-26 would address this gap.

Emerging Sectors: The Case for Prospective Environmental Costing

The more urgent case for HEC is not legacy industry but the sectors India is building now under PLI schemes, National Mission targets, and digital infrastructure policy. EVs, data centres, and green hydrogen are positioned as pillars of India's sustainable growth narrative, yet their environmental cost profiles are unexamined because no cost accounting standard requires their ascertainment. Table 2 maps the externality structure of each.

Table 2: Emerging Industry Environmental Externalities — Illustrative HEC Assessment

Industry	Key Tier III / IV Externalities	Externality Intensity (Est.)	Priority CAS Gap
EV Manufacturing & Battery Supply Chain	Lithium/cobalt extraction: Tier IV ecosystem depletion; gigafactory water use (Rajasthan, Gujarat); end-of-life battery recycling — unrecorded Tier II contingent liability; PLI/FAME disbursed without HEC baseline	25–38% of TTC	Tier IV extraction valuation; battery end-of-life contingent standard
Data Centres	PUE thermal waste (1.4–1.6x per compute unit); cooling water draw on stressed municipal supply (Chennai, Pune); Scope 2 coal-grid emissions absent from cost records; e-waste from server refresh	20–32% of TTC	Shadow carbon price for Scope 2; replacement-cost water; e-waste Tier II schedule

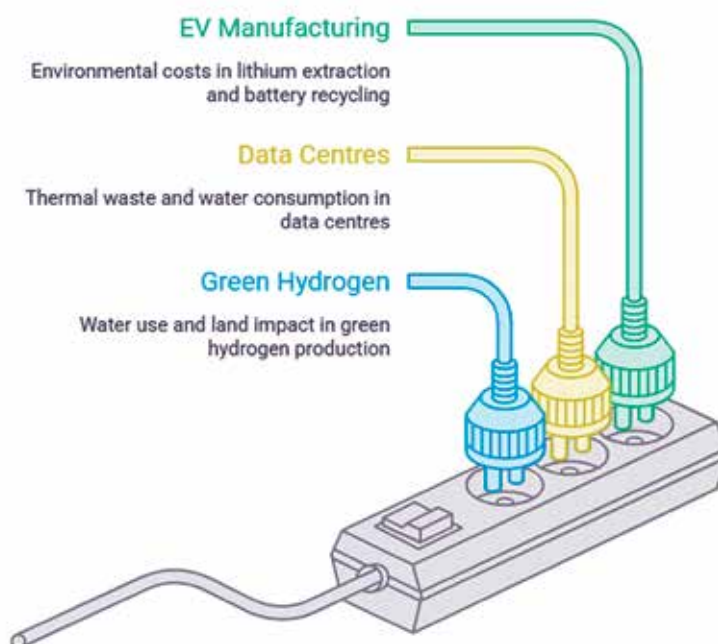
Green Hydrogen / Renewables	Electrolysis water use in water-scarce regions; biodiversity displacement from utility-scale solar; embodied carbon in electrolyser supply chain	18–28% of TTC	Water footprint valuation; land-use damage cost; embodied carbon allocation
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Source: IEA Global EV Outlook 2024; Uptime Institute PUE Data 2024; IRENA Green Hydrogen Cost Reduction 2023; IPCC AR6; Author's analysis

Note: Externality intensity estimates apply shadow carbon pricing (IPCC AR6 central estimate: USD 80–120/tonne CO₂e), replacement-cost water valuation, and avoided-cost ecosystem methodology to data from IEA (2024), Uptime Institute (2024), and IRENA (2023). Enterprise-level verification requires CAS-26 compliant cost audit data.

The EV sector presents a structural paradox: marketed as green, yet its environmental cost is front-loaded into an extraction and manufacturing supply chain structurally excluded from current cost audit mandates — with FAME and PLI incentives disbursed without a verified environmental cost baseline. Data centres compound this with diffuse externalities that cross jurisdictional boundaries in ways conventional cost allocation cannot handle. Green hydrogen's sustainability claim is only valid if water consumption, land use, and embodied carbon of the full production system are accounted for — precisely what HEC Tiers III and IV require.

Emerging Sector Environmental Costs



India's Cost Audit Architecture and the Regulatory Gap

1. The Structural Gap in the Existing Standards

India's cost audit regime — under Section 148 of the Companies Act 2013 and the Cost Records and Audit Rules 2014 — is among the most comprehensive in the world, with the CMA as the only professional authorised to conduct these audits. Yet not one of the twenty-five Cost Accounting Standards mandates environmental cost ascertainment at Tiers III or IV. CAS-6, CAS-8, and CAS-14 each address adjacent

territory — material consumption, energy costs, pollution control expenditure — but none extends to the monetisation of residual externalities. The result: a world-class cost audit framework that systematically excludes the largest externality costs of production.

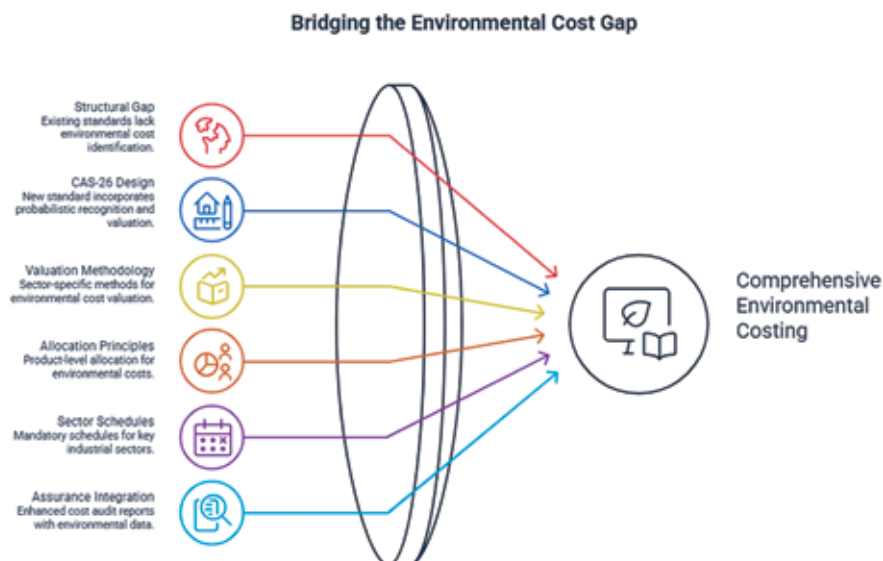
2. A Framework for the New Standard: CAS-26 on Environmental and Social Costs

Table 3: CAS-26 Design Elements — Framework for the New Environmental Cost Standard

CAS-26 Design Element	Description	Linkage
Scope Definition	Tiers I–IV classification mandatory; CAS-26 introduces probabilistic recognition principle — a deliberate departure from CAS-1’s actuality principle	HEC Guidance Note; EPA (1995); CAS-1
Valuation Methodology	Shadow pricing, avoided cost, damage cost, replacement cost — sector-specific schedules prescribed	IPCC AR6; Dasgupta Review 2021
Allocation Principles	Product-level vs. entity-level environmental cost attribution; allocation keys defined per sector	CAS-3 (Overheads) as template
Sector Schedules	Mandatory cost schedules for cement, steel, pharma, petroleum, sugar, textiles, power	Cost Records and Audit Rules 2014
Assurance Integration	Amendment to Form CRA-3 to include HEC supplementary statement	Section 148, Companies Act 2013
BRSR Reconciliation	Cross-reference linkage between CAS-26 data and BRSR Core KPI disclosures	SEBI BRSR Core Framework

Source: ICAI HEC Guidance Note; Companies Act 2013; Author’s framework

A CAS-26 designed on these elements would — if enacted — establish mandatory, auditable methodologies for Tier II and III costs, align cost audit reports with BRSR Core disclosures, and position CMAs as the natural assurers of ESG financial data. SEBI has prescribed reasonable assurance for BRSR Core KPIs from FY 2024-25; the quantitative environmental KPIs — energy intensity, water withdrawal, GHG emissions, waste generated — require exactly the cost allocation and variance analysis skills CMAs hold. This is a proposal, not a current standard; ICAI should actively seek SEBI recognition as the designated assurance body in anticipation of the broader standard that would follow.



Integrating HEC with BRSR: A Mapping Exercise

Six of BRSR's nine principles have direct environmental or social cost dimensions that the HEC framework can populate with verified cost audit data. Table 4 maps these linkages.

Table 4: BRSR Principles — HEC Tier Mapping

BRSR Principle	Key Disclosure	HEC Tier	Standard
P2 – Sustainable Products & Services	Product lifecycle environmental costs; value chain sustainability expenditure; supplier compliance costs	Tier II	CAS-4, CAS-21
P3 – Employee Wellbeing	Safety costs; occupational health compliance expenditure	Tier II	CAS-7
P5 – Human Rights	Supply chain due diligence; remediation for labour violations	Tier II	CAS-7, CAS-21
P6 – Environment	GHG Scope 1/2/3; water; waste; energy intensity	Tiers III & IV	HEC / BRSR Core
P8 – Inclusive Growth	CSR expenditure; social value in communities	Tiers II / III	CAS-21
P9 – Consumer Responsibility	Product lifecycle costs; e-waste liability	Tiers II / IV	HEC / GRI 301

Source: SEBI BRSR Framework (2021, as amended); ICAI HEC Guidance Note; Author's mapping

The integration matters beyond compliance. When BRSR Principle 6 disclosures are grounded in verified cost audit data rather than management assertion — the current weakness analysts widely acknowledge — ESG data quality improves materially. CAS-based environmental costing introduces the same rigour that cost audit already applies to production economics.

Practical Roadmap for CMA Practitioners

Table 5 sets out a phased sequence for CMAs advising companies subject to cost audit.

Table 5: Three-Phase HEC Implementation Roadmap for CMA Practitioners

Phase	Timeline	Key Actions	Outcome
Phase I — Baseline Mapping	Year 1	Map cost drivers across Pancha Mahabhutas; reconcile CAS data to HEC Tiers I–II; identify gaps for Tiers III–IV; align with BRSR schedules	Environmental cost baseline; gap register
Phase II — Quantification	Years 2–3	Apply shadow pricing for carbon, water, land; develop product-level HEC allocation keys; prepare supplementary HEC statements; engage BRSR assurance process; ICAI to develop capacity-building programmes in shadow pricing and damage-cost valuation	Verified HEC statements; trained CMA practitioners
Phase III — Standardisation	Years 3–5	Advocate for CAS-26 enactment; develop sector-specific HEC templates; seek SEBI recognition as BRSR Core assurance body; integrate HEC into capital budgeting	CAS-26 formally proposed; CMAs positioned as ESG assurers

Source: Author's framework; ICAI HEC Guidance Note

Conclusion: The Accountant as Ecological Trustee

The Isha Upanishad's trusteeship ethic — that humans are temporary stewards of resources they did not create — is also the most accurate description of the cost accountant's professional function in a sustainable economy: no cost unrecorded, no consumption unmeasured, no liability escaped. Applied to the natural world, this is ecological trusteeship. Three actions would accelerate institutionalisation: ICAI's Cost Accounting Standards Board should formally take up CAS-26 with the HEC Guidance Note (2025) as its foundation; MCA and SEBI should jointly mandate Tier II environmental cost disclosure in prescribed cost audit reports pending enactment; and ICAI should seek SEBI recognition as the designated BRSR Core assurance body. The cost accountant who integrates HEC today is not waiting for a standard — they are discharging the oldest obligation in accounting: a true and fair picture of the enterprise's position, including the ecological debts carried silently on the balance sheet of the natural world.

“Sahanavavatu, sahanau bhunaktu, saha viryam karavavahai...”

“Let us be protected together; let us be nurtured together; let us work together with great vigour.”

— **Taittiriya Upanishad — Shanti Patha**



The Shanti Patha's call for mutual protection and shared flourishing — between enterprise and ecosystem — is the ethic of sustainability in its oldest and simplest form. The profession's task is to give it a number. **MA**

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