



GOVERNING RESPONSIBLY: INTEGRATING AI AND SUSTAINABILITY INTO INDIA'S POLICY FRAMEWORK

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Abstract

Artificial intelligence (AI) and sustainability have emerged as parallel and increasingly interdependent priorities within India's public policy architecture. This paper examines how AI governance instruments, including the National Strategy for Artificial Intelligence, the Responsible AI approach documents, and the IndiaAI Mission, intersect with India's sustainability commitments under its Nationally Determined Contributions and the 2030 Agenda for Sustainable Development. Using a qualitative policy-analysis approach supported by secondary government and institutional data, the paper argues that India's AI and sustainability frameworks have developed along largely parallel institutional tracks, with limited formal integration between digital governance ministries and environmental and energy authorities. Data on renewable energy capacity, AI mission expenditure, and comparative international frameworks are presented to illustrate the scale of opportunity and the coordination gap. The paper identifies four structural challenges, computing infrastructure energy intensity, fragmented regulatory jurisdiction, data and institutional capacity deficits, and weak accountability mechanisms, and proposes a five-point framework for aligning AI governance with sustainable development objectives. The paper concludes that responsible AI governance in India requires an explicit sustainability mandate embedded within existing regulatory instruments rather than a wholly new regulatory architecture.

Keywords: *Artificial Intelligence Governance; Sustainable Development; Indiaai Mission; Energy Policy; Public Administration; Responsible AI; Climate Policy; Digital Governance.*

Introduction

India's policy landscape over the past decade has been shaped by two transformations that are frequently discussed separately but are, in practice, deeply entangled: the rapid diffusion of artificial intelligence across public administration and the economy, and an equally rapid restructuring of the country's energy and development priorities around sustainability commitments. Both transformations carry governance stakes that extend well beyond their originating ministries. AI systems are being embedded into welfare delivery, agricultural advisories, urban planning, and financial regulation, while sustainability commitments made under the Paris Agreement and the 2030 Agenda are reshaping investment in energy, industry, and infrastructure. The central argument of this paper is that these two policy tracks, digital governance on one hand and environmental and energy governance on the other, have so far evolved with limited structural integration in India, even though each increasingly depends on the other for its own success.

The premise that AI and sustainability are governance complements rather than separate silos are not new internationally. The United Nations has explicitly framed AI as both an enabler and a risk factor for the Sustainable Development Goals (SDGs), noting that AI can accelerate progress on health, education, and climate targets while simultaneously imposing new resource and equity costs (United Nations, 2015). In India's case, the stakes are amplified by scale: a billion-plus population, an energy system still transitioning away from coal, and an AI ecosystem that is expanding faster than the



regulatory capacity built to govern it. The IndiaAI Mission, approved in March 2024 with an outlay of ₹10,371.92 crore, explicitly frames AI development around inclusive growth and "Making AI Work for India" (Ministry of Electronics and Information Technology, 2024), yet its founding documents make only limited reference to the energy and resource implications of the compute infrastructure it is building.

This paper proceeds in six substantive sections. Section two traces the institutional foundations of AI governance in India. Section three outlines India's sustainability policy trajectory, with particular attention to the energy transition. Section four examines the points of convergence, and divergence, between the two tracks, supported by data tables. Section five identifies the structural governance challenges that inhibit integration. Section six situates India's experience against comparative international frameworks before the paper closes with policy recommendations and a conclusion.

AI Governance in India: Institutional and Policy Foundations

India's formal engagement with AI governance began with NITI Aayog's National Strategy for Artificial Intelligence (NSAI), published in June 2018 at the direction of the Ministry of Finance's budget mandate. The NSAI coined the "AI for All" framing that has since anchored subsequent policy documents, and it identified five priority sectors, healthcare, agriculture, education, smart cities and infrastructure, and smart mobility, where AI adoption was expected to generate the greatest social returns (NITI Aayog, 2018; Rao, M.K.P., (2018). Notably, sustainable infrastructure and smart cities were treated as a single priority vertical from the outset, signalling an early, if underdeveloped, recognition that AI and sustainable urbanisation were linked concerns.

The responsible-use dimension of India's AI policy was elaborated through NITI Aayog's two-part Approach Document for Responsible AI, released in 2021, which articulated principles including safety, reliability, equality, inclusivity, non-discrimination, privacy, transparency, and accountability (NITI Aayog, 2021). A third paper applied these principles to facial recognition technology through a sector-specific use-case methodology (NITI Aayog, 2022). None of these documents, however, established a binding regulatory mechanism; they function as normative guidance rather than enforceable law, leaving implementation to sectoral regulators such as the Reserve Bank of India, the Securities and Exchange Board of India, and state-level administrative bodies.

The institutional landscape shifted materially with the Union Cabinet's approval of the IndiaAI Mission in March 2024, implemented by the Ministry of Electronics and Information Technology (MeitY). The mission consolidates seven pillars: compute infrastructure, an innovation centre for indigenous foundation models, a datasets platform, an application development initiative, a future-skills programme, startup financing, and a Safe and Trusted AI vertical housing the IndiaAI Safety Institute (Press Information Bureau, 2025). As of February 2026, the mission reported more than 38,000 GPUs onboarded to a common compute facility, twelve teams shortlisted for indigenous foundation-model development, and over 13,500 students supported across undergraduate, postgraduate, and doctoral levels (Press Information Bureau, 2026). The Union Budget 2025-26 allocated ₹2,000 crore to the mission, roughly one-fifth of its total five-year outlay (IMPRI Impact and Policy Research Institute, 2025).

Table 1 summarises the principal instruments that constitute India's AI governance architecture as it stood in mid-2026. What the sequence shows is a shift from broad strategic guidance (2018-2022)



toward operational, funded infrastructure delivery (2024 onward), a shift that has outpaced the parallel development of a statutory AI regulatory framework, a gap the government has acknowledged but not yet closed.

Table 1. Principal Instruments In India's AI Governance Architecture (2018-2026).

Instrument	Issuing Body	Year	Primary Function
National Strategy for Artificial Intelligence (NSAI)	NITI Aayog	2018	Sectoral roadmap; coined "AI for All"
Approach Document for Responsible AI, Part 1	NITI Aayog / WEF C4IR	2021	Ethical principles for AI design and deployment
Responsible AI for All: Facial Recognition Use Case	NITI Aayog	2022	Sector-specific governance application
IndiaAI Mission	MeitY, Government of India	2024	₹10,371.92 crore compute, skilling, and safety programme
IndiaAI Safety Institute (expression of interest)	MeitY	2025	Bias mitigation, privacy-preserving ML, AI auditing

Compiled by the author from NITI Aayog (2018, 2021, 2022) and Press Information Bureau (2025, 2026).

Two features of this sequence are worth underscoring for the argument developed later in this paper. First, each successive instrument has been broader in scope but softer in legal character than a conventional regulatory statute; the NSAI, the Responsible AI documents, and even the IndiaAI Mission's founding Cabinet approval operate primarily through funding allocation, institutional capacity-building, and normative guidance rather than through binding rules with statutory penalties. Second, the locus of sustainability-relevant sectors, agriculture, smart cities, and infrastructure, has been present in India's AI strategy since 2018, yet these sectors have consistently been framed as beneficiaries of AI deployment rather than as sites where AI's own resource demands require separate governance attention. This framing choice, made early and largely retained since, is a central reason the convergence gap identified in Section 4 has persisted even as both policy tracks have matured.

India's AI adoption indicators reinforce the scale at which these governance instruments must now operate. According to the Stanford Institute for Human-Centered Artificial Intelligence's AI Index, India ranks among the global top four on composite measures of AI skills, capability, and policy, and the country is the second-largest contributor to AI projects on GitHub worldwide (DD News, 2026). The NASSCOM AI Adoption Index score of 2.45 out of 4 indicates that enterprise-level AI integration in India, while still short of full maturity, has moved decisively past the pilot stage into operational deployment across sectors (DD News, 2026). Governance instruments designed for a nascent, exploratory AI ecosystem in 2018 are therefore now being asked to oversee a considerably larger and faster-moving sector, a mismatch that strengthens the case for the coordination mechanisms proposed in Section 7.



Sustainability Imperatives in India's Development Policy

India's sustainability commitments are anchored in its Nationally Determined Contributions (NDCs) under the Paris Agreement, updated in August 2022 to target a 45 per cent reduction in emissions intensity of GDP below 2005 levels and a 50 per cent share of non-fossil fuel-based installed electricity capacity, both by 2030 (Climate Action Tracker, 2026). A more ambitious, non-binding pledge announced at COP26 in 2021 set a 500 gigawatt (GW) non-fossil capacity target by 2030 as part of the government's "Panchamrit" declaration (CEED India, 2025).

Progress against these targets has been faster than initially projected. India's non-fossil installed capacity reached 300.50 GW as of 31 July 2026, more than 54 per cent of total installed generation capacity of approximately 552 GW, placing the country past 60 per cent of its 500 GW target roughly four years ahead of schedule (Ministry of New and Renewable Energy, 2026). Solar capacity alone rose from 2.8 GW in 2014 to 164.59 GW by mid-2026, while renewable electricity generation grew from 190.96 billion units in 2014-15 to 477.79 billion units in 2025-26 (Ministry of New and Renewable Energy, 2026). Table 2 disaggregates the composition of this non-fossil capacity by source.

Table 2. Composition of India's Non-Fossil Electricity Generation Capacity, July 2026.

Energy Source	Installed Capacity (GW), July 2026	Share of Non-Fossil Capacity
Solar	164.59	54.8%
Wind	58.14	19.3%
Hydro (large and small)	57.24	19.0%
Bio-power	11.75	3.9%
Nuclear	8.78	2.9%
Total non-fossil capacity	300.50	100%

Source: Ministry of New and Renewable Energy (2026), as reported via Press Information Bureau.

The pace of this transition also carries a cautionary counter-trend that policy analysis should not omit. Fossil fuels still accounted for over two-thirds of the net increase in power generation in the most recent reporting year, and the government has simultaneously approved plans to expand coal-fired capacity by 80 GW by 2032 to meet rising overall demand (Deccan Herald, 2025). India's sustainability policy is therefore best characterised not as a linear substitution of fossil for renewable capacity, but as an additive expansion in which renewable capacity is growing faster than fossil capacity while both continue to grow in absolute terms. This distinction matters directly for AI policy: as AI compute demand adds to national electricity load, the marginal generation source meeting that new demand is not guaranteed to be renewable simply because the renewable share of total capacity is rising.

Fiscal policy has reinforced this trajectory. The Union Budget 2024-25 allocated ₹1.52 lakh crore for climate-resilient agriculture and introduced the PM Surya Ghar Muft Bijli Yojana rooftop solar scheme, alongside measures on pumped hydro storage, critical minerals, water treatment, and air quality (Bose, 2024). These allocations demonstrate that sustainability is not a peripheral concern within India's fiscal



policy but a recurring budgetary priority running in parallel to, rather than integrated with, the digital and AI budget lines administered by MeitY.

Convergence: AI as an Instrument, and a Cost, of Sustainable Governance

The relationship between AI and sustainability in Indian policy operates in two directions that are analytically distinct but frequently conflated in policy rhetoric. The first is AI as an enabling instrument for sustainability outcomes: applications in precision agriculture, renewable-grid load forecasting, disaster and flood early-warning systems, and energy-efficient urban planning. The IndiaAI Mission's Centres of Excellence explicitly include sustainable cities as a research focus alongside healthcare, agriculture, and education (DD News, 2026), and government commentary has pointed to AI-enabled integration with the Nuclear Energy Mission, PM Surya Ghar, and PM-KUSUM as pathways to accelerate renewable adoption and climate resilience (IMPRI Impact and Policy Research Institute, 2025).

The second, less frequently foregrounded relationship is AI as a consumer of energy and material resources, and therefore as a variable within, rather than only a tool for, sustainability accounting. Large-scale compute infrastructure, including the more than 38,000 GPUs onboarded under the IndiaAI Mission's common compute facility, carries a direct electricity demand that scales with model training and inference workloads (Press Information Bureau, 2026). India's own AI adoption indicators illustrate the pace of this expansion: nearly 89 per cent of startups launched in 2024 integrated AI into their products or services, India's score on the NASSCOM AI Adoption Index reached 2.45 out of 4, and the country ranks among the top four globally on the Stanford HAI AI Index for AI skills, capability, and policy (DD News, 2026). None of the founding IndiaAI Mission documentation reviewed for this paper specifies a data-centre energy-efficiency standard, a renewable-sourcing requirement for compute facilities, or a lifecycle carbon-accounting obligation comparable to those beginning to appear in the European Union's regulatory approach.

This asymmetry, well-developed policy language on AI-for-sustainability applications, alongside underdeveloped policy language on the sustainability footprint of AI infrastructure itself, constitutes the central governance gap this paper identifies. It is not that Indian policymakers are unaware of the tension; rather, the institutional machinery to formally reconcile it, through joint MeitY-Ministry of Power review mechanisms, mandatory energy disclosures for AI compute facilities, or sustainability criteria embedded in AI procurement, has not yet been formally instituted.

A further point of convergence lies in the financing architecture itself. The IndiaAI Mission's compute-access model, which offers subsidised GPU access at rates as low as ₹65 per hour (DD News, 2026), is designed primarily to democratise access for startups and academic researchers rather than to condition that access on renewable energy sourcing. By contrast, sustainability-linked financing instruments elsewhere, including green bonds and climate-linked concessional lending, routinely attach source-of-power conditions to infrastructure subsidies. There is no structural reason India's compute-subsidy model could not adopt a comparable conditionality; the absence of such a condition in the current design is a policy choice rather than a technical constraint, and it is one of the more tractable near-term reforms available to policymakers, discussed further in Section 7.

5. Structural and Institutional Challenges

Four structural challenges inhibit closer integration of AI governance and sustainability policy in India. First, computing infrastructure energy intensity remains unmeasured in public reporting. While the Ministry of New and Renewable Energy publishes granular, frequently updated capacity and generation



data (as reflected in Table 2), no equivalent public dataset tracks electricity or water consumption attributable specifically to AI data centres and compute facilities, making it difficult for policymakers or researchers to quantify the sector's net contribution to, or drag on, national decarbonisation targets.

Second, regulatory jurisdiction over AI remains fragmented across sectoral regulators, with no single statutory AI law analogous to the EU AI Act. This fragmentation, while offering flexibility, also means that sustainability-related conditions on AI deployment (energy sourcing, e-waste from hardware, water use in cooling) fall between agencies rather than being assigned a clear regulatory home.

Third, data and institutional capacity deficits persist at the state and local levels, where much AI-enabled service delivery (agricultural advisories, welfare targeting, municipal planning) is actually implemented. NITI Aayog's own responsible AI documents flagged the absence of an overarching guidance framework and highlighted resource costs and low adoption awareness as persistent barriers as far back as 2018 (NITI Aayog, 2018), a diagnosis that, while investment has since scaled considerably, still holds for many second- and third-tier institutions.

Fourth, accountability mechanisms for AI systems used in environmentally or socially consequential decisions, such as land-use classification, disaster-response prioritisation, or resource allocation in water-stressed regions, remain largely advisory rather than binding, consistent with the non-statutory character of the Responsible AI approach documents (NITI Aayog, 2021).

These four challenges compound one another rather than operating independently. Unmeasured energy intensity (challenge one) makes it difficult for a fragmented regulatory system (challenge two) to assign clear jurisdiction, because no single agency can point to a dataset establishing the scale of the problem it would be regulating. Weak sub-national institutional capacity (challenge three) means that even where national-level guidance exists, implementation at the state and municipal level, where much AI-enabled sustainability application actually occurs, lags behind. And the advisory character of accountability mechanisms (challenge four) removes the enforcement pressure that might otherwise compel faster resolution of the first three challenges. Addressing any one challenge in isolation is therefore unlikely to be sufficient; the recommendations in Section 7 are accordingly designed to be mutually reinforcing rather than sequential alternatives.

Comparative Perspectives: Learning from Global AI Governance Models

India's approach to AI governance, comprising strategic guidance documents followed by a large public investment mission, differs structurally from the binding, risk-tiered regulatory approach adopted by the European Union, and from the innovation-first, largely voluntary posture of the United States. A comparative review of national AI strategies published between 2018 and 2022 situates India's Responsible AI for All framework, at 64 pages, alongside comparable strategy documents from Australia, Canada, the United Kingdom, and Italy, most of which similarly took the form of non-binding strategic guidance rather than statute (Strategic AI Governance: Insights from Leading Nations, n.d.).

For sustainability integration specifically, the EU's approach offers the clearest precedent: its AI Act and adjacent digital and energy regulations increasingly require energy-consumption disclosure for high-risk AI systems and data-centre operators. India has not yet adopted an equivalent disclosure regime, though the establishment of the IndiaAI Safety Institute, focused on auditing, governance testing, and bias mitigation, indicates that institutional capacity for technical AI oversight is being built



and could plausibly be extended to environmental-impact auditing (Press Information Bureau, 2025). The comparative lesson is less about copying a specific regulatory model and more about the sequencing choice: EU-style frameworks embed sustainability criteria into AI regulation from inception, while India's model has thus far scaled AI infrastructure investment ahead of the regulatory and disclosure architecture needed to govern its resource footprint.

Toward a Responsible and Sustainable AI Policy Framework: Recommendations

Building on the preceding analysis, this paper proposes five measures to align India's AI governance trajectory more closely with its sustainability commitments.

First, mandate energy and water-use disclosure for compute facilities receiving India AI Mission subsidies, modelled on the granularity already achieved in the Ministry of New and Renewable Energy's capacity reporting, so that the sector's footprint becomes measurable rather than inferred.

Second, establish a formal inter-ministerial coordination mechanism between MeitY and the Ministry of New and Renewable Energy or Ministry of Power, tasked specifically with aligning compute infrastructure siting and expansion with renewable capacity growth, given that both are expanding at comparable pace but under separate planning processes.

Third, extend the mandate of the India AI Safety Institute, currently focused on bias mitigation, privacy-preserving machine learning, and explainability (Press Information Bureau, 2025), to include environmental-impact auditing as a core competency, building on existing institutional momentum rather than creating a new body.

Fourth, incorporate sustainability criteria into AI public procurement guidelines, such that government contracts for AI systems and infrastructure favour renewable-powered compute and demonstrable resource efficiency, using the state's own purchasing power as a policy lever.

Fifth, formalise a statutory or quasi-statutory status for the Responsible AI principles articulated since 2021, converting advisory ethical guidance into enforceable obligations at least for high-impact public-sector AI applications, closing the accountability gap identified in Section 5.

Conclusion

India's AI and sustainability policy tracks have each matured substantially over the past decade: AI governance has moved from broad strategic guidance to a funded, operational mission, while sustainability policy has moved from aspirational targets to measurable, ahead-of-schedule progress on non-fossil generation capacity. What this paper has shown is that these two tracks remain institutionally parallel rather than integrated, with AI-for-sustainability applications well represented in policy rhetoric while the resource footprint of AI infrastructure itself remains largely outside formal sustainability accounting. Closing this gap does not require India to discard its existing, largely non-statutory approach to AI governance; it requires embedding sustainability criteria, disclosure obligations, and inter-ministerial coordination within the instruments already in place, particularly the IndiaAI Mission and the IndiaAI Safety Institute. Given the pace at which both AI compute capacity and renewable generation capacity are scaling in India, the coming several years represent a narrow but consequential window in which such integration can still be designed proactively rather than retrofitted after infrastructure and institutional habits have become entrenched. Future research should prioritise the collection of facility-level energy-consumption data for AI infrastructure, without which any



assessment of the net sustainability contribution of India's AI mission will remain necessarily incomplete.

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