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REGULATORY TRIGGERS AND THE CUMULATIVE ENVIRONMENTAL IMPACTS OF ARTIFICIAL INTELLIGENCE DATA CENTRES: A COMPARATIVE STUDY OF INDIA AND THE UNITED STATES

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Abstract

Artificial intelligence has made electrical load the variable that decides how heavily a data centre presses on the environment. This paper argues that Indian and American law share a structural defect: the event that brings a data centre before an environmental decision-maker bears no relation to that load. In India the event is a built-up area threshold in Item 8 of the Environmental Impact Assessment Notification, 2006. In the United States it is a major federal action under the National Environmental Policy Act, 1969, a concept the Supreme Court has recently read narrowly. A doctrinal and functional comparison shows that each federal system also places the power to review at the tier of government with the strongest reasons to promote the facility. The paper proposes a load-based trigger, a regional cumulative assessment and a public metering duty, each fitted to its own constitutional structure.

Keywords: Data centres, Artificial intelligence, Environmental impact assessment, Cumulative impacts, Federalism, India, United States.

Statement of Problem

Neither India nor the United States has a binding framework written for AI-driven data centres. Both apply general environmental statutes to a facility whose significance lies in continuous electrical load, cooling water and geographic clustering. The statutes ask about floor area,

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discharge or federal involvement, and the answers have little to do with the footprint. Where the government that promotes the facility is also the one meant to restrain it, the gap widens.

Research Questions

1. Whether the legal events that trigger environmental review in India and the United States correspond to the environmental significance of AI data centres?
2. Whether the allocation of regulatory power within each federation explains the mismatch?
3. Whether a load-based and region-wide design can close it in both systems?

Research Objectives

1. To test the Indian and American triggers against measured data-centre impacts.
2. To compare, by function, where each federal system places the power to review and to restrain.
3. To propose reforms that fit the constitutional structure of each country.

Research Methodology

The study is doctrinal and comparative. The doctrinal part reads statutes, notifications, executive orders, reported decisions and official reports from both countries. The comparative part is functional: it sets the two systems side by side by what each legal rule does, and not by the name or rank of the institution that applies it. The study involves no empirical fieldwork. As state practice in both countries is changing quickly, later measures may alter the picture at the margins.

Introduction

Data centres used about 415 terawatt-hours of electricity in 2024, and the International Energy Agency (IEA) expects the figure to reach around 945 terawatt-hours by 2030, with facilities built for AI growing fastest.[1] The previous decade told a gentler story. Global data-centre energy use rose by roughly six per cent between 2010 and 2018 even as computing instances grew more than five-fold.[2] That period of efficiency gains has ended. American data centres

[1]International Energy Agency, Energy and AI (IEA, Paris, 2025), *available at*: https://www.iea.org/reports/energy-and-ai (last visited on Nov. 08, 2026).

[2]Eric Masanet, Arman Shehabi, et.al., "Recalibrating Global Data Center Energy-Use Estimates" 367 Science 984

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took 4.4 per cent of national electricity in 2023, and the federal laboratory that counts them projects between 6.7 and 12 per cent by 2028.[3]

Law has not kept pace. A data centre appears in statute as a building, an electricity customer, a source of effluent or a recipient of public funds, and rarely as what it is, a continuous load that gathers in clusters. This paper asks which legal event puts such a facility before an environmental decision-maker in India and the United States, and whether that event measures anything that matters. Its answer is that in both countries the trigger has drifted away from the footprint. Its further claim, drawn from a functional comparison of the two federations, is that the power to restrain sits with the tier of government that has the strongest reasons to promote. The method is doctrinal, supported by official reports and reported decisions. Individual states serve as illustrations, and the paper does not describe every subnational regime.

The Footprint Is a Function of Load, Water and Place

Three variables fix the environmental weight of a facility. The first is continuous load. The IEA observes that an AI-focused data centre can draw as much power as an aluminium smelter,[4] and its later work records that training and inference produce rapid power swings, which make energy storage critical to reliable supply.[5] Emissions then depend on the grid that supplies the load.

The second variable is cooling water. Li and co-authors estimated that training one large language model in American facilities could directly evaporate several hundred thousand litres of fresh water, apart from the water embedded in the electricity used.[6] The third is place. Siddik, Shehabi and Marston found that the carbon and water footprints of American data centres fall unevenly across power grids and watersheds,[7] and almost half of American capacity sits in five regional clusters.[8]

(2020).

[3]Arman Shehabi, Alex Newkirk, et.al., 2024 United States Data Center Energy Usage Report (Lawrence Berkeley National Laboratory, Berkeley, 2024), *available at*: https://eta-publications.lbl.gov/publications/2024-lbnl-data-center-energy-usage-report (last visited on Nov. 08, 2026).

[4]*Supra* note 1.

[5]International Energy Agency, Key Questions on Energy and AI (IEA, Paris, 2026), *available at*: https://www.iea.org/reports/key-questions-on-energy-and-ai/executive-summary (last visited on Nov. 13, 2026).

[6]Pengfei Li, Jianyi Yang, et.al., "Making AI Less 'Thirsty': Uncovering and Addressing the Secret Water Footprint of AI Models" arXiv:2304.03271 (2023), *available at*: https://arxiv.org/abs/2304.03271 (last visited on Nov. 10, 2026).

[7]Md Abu Bakar S*Id*dik, Arman Shehabi, et.al., "The Environmental Footprint of Data Centers in the United States" 16 Environmental Research Letters 064017 (2021).

[8]*Supra* note 1.

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Place turns a facility question into a regional one. Virginia, the largest market, shows how. Its legislative audit commission found in 2024 that unconstrained electricity demand could double within about ten years, with data centres the main driver, and that only two data centres fell within the state's surface-water withdrawal programme.[9] The commission judged present water use sustainable, yet most of it stays outside withdrawal permitting. Load, litres and location are the facts that matter. As the next two sections show, neither country keys its entry point to any of them.

India: Built-Up Area as the Gate

The Environmental Impact Assessment Notification, 2006, issued under the Environment (Protection) Act, 1986, makes prior clearance depend on the project types and sizes listed in its Schedule.[10] Data centres are not named. Where one is cleared at all, it enters through Item 8, which covers building projects of 20,000 square metres of built-up area or more and townships of 50 hectares or 1,50,000 square metres. Both entries are Category B, so appraisal rests with the State Environment Impact Assessment Authority.[11]

The gate measures floor area, and floor area is a poor proxy for a data centre. At the rack densities now used for GPU clusters, a compact building can draw tens of megawatts, while a sprawling low-density hall of the same size draws a fraction of that. A facility below the threshold needs no clearance on environmental grounds however large its demand. This is an inference from engineering trends reported by the IEA and not a finding about Indian facilities, but it follows directly from the text of the Schedule.

Other statutes catch single effects. The Water (Prevention and Control of Pollution) Act, 1974 requires consent for discharges,[12] so it governs what leaves a plant and not how much a plant takes. Groundwater drawn for cooling falls to the Central Ground Water Authority, which the Central Government constituted under section 3(3) of the Environment (Protection) Act, 1986.[13] Backup diesel sets face emission norms revised in 2022 and in force from July 2023.[14]

[9]Joint Legislative Audit and Review Commission, Data Centers in Virginia, Report 598 (Virginia General Assembly, Richmond, December 9, 2024), *available at*: https://jlarc.virginia.gov/pdfs/reports/Rpt598.pdf (last visited on Nov. 11, 2026).

[10]Government of India, "Environmental Impact Assessment Notification, 2006" S.O. 1533(E) (Ministry of Environment and Forests, 2006).

[11]*Supra* note 10, sch., items 8(a), 8(b).

[12]The Water (Prevention and Control of Pollution) Act, 1974 (Act 6 of 1974), s. 25.

[13]The Environment (Protection) Act, 1986 (Act 29 of 1986), s. 3(3).

[14]Government of India, "Environment (Protection) Third Amendment Rules, 2022" G.S.R. 804(E) (Ministry of

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To the authors' knowledge no specific energy consumption norm has been notified for data centres under the Energy Conservation Act, 2001.[15] Each regime sees one pipe of the same facility. Several facilities drawing on one substation and one aquifer are seen by none.

Promotion runs the other way. The Ministry of Electronics and Information Technology's draft policy of 2020 proposed single-window approvals and incentives,[16] and states such as Tamil Nadu have adopted policies of their own.[17] The Supreme Court has said that disclosure in Form 1 is the foundation of appraisal and that an appraisal built on incomplete information is flawed.[18] A self-reporting system works only for projects that enter it, and the area threshold decides who enters.

The United States: The Federal Proposal as the Gate

The National Environmental Policy Act, 1969 requires an environmental impact statement for major federal actions that significantly affect the environment.[19] A data centre built on private land with private money and connected to the grid under a state commission's order involves no such action, and the statute does not reach it. The reach has also shortened. In Kleppe v. Sierra Club the Court held that NEPA does not require a regional statement where no regional proposal exists.[20] In Seven County Infrastructure Coalition v. Eagle County the Court, without dissent, directed reviewing courts to defer substantially to agencies and held that an agency need not assess the effects of separate projects merely because they are foreseeable.[21] In NEPA terms, the cumulative effect of many private facilities is somebody else's project. The Council on Environmental Quality had already removed its own implementing regulations in February 2025.[22]

Executive Order 14318 sharpens the mismatch. It defines a Data Center Project as a facility needing more than 100 megawatts of new load dedicated to AI, and it uses that load figure, or

Environment, Forest and Climate Change, Nov. 3, 2022).

[15]The Energy Conservation Act, 2001 (Act 52 of 2001).

[16]Ministry of Electronics and Information Technology, "Draft Data Centre Policy 2020" (Government of India, 2020).

[17]Government of Tamil Nadu, "Tamil Nadu Data Centre Policy 2021" (Department of Information Technology, 2021).

[18]Hanuman Laxman Aroskar v. Union of India, (2019) 15 SCC 401.

[19]The National Environmental Policy Act, 1969 (Pub. L. No. 91-190), s. 102(2)(C) [42 U.S.C. s. 4332(2)(C)].

[20]Kleppe v. Sierra Club, 427 U.S. 390 (1976).

[21]Seven County Infrastructure Coalition v. Eagle County, 605 U.S. 168 (2025).

[22]Council on Environmental Quality, "Removal of National Environmental Policy Act Implementing Regulations" 90 Fed. Reg. 10610 (Feb. 25, 2025).

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a capital threshold, to select projects for loans, federal land and fast-track permitting.[23] The same order presumes that federal financial assistance covering less than half of project cost lacks the control that makes it a major federal action.[24] The government therefore identifies the facility by its load when it supports it, and leaves in place a review trigger that is blind to load when the question is whether review is due.

Statutes on emissions and discharges reach only those pipes. Section 101(g) of the Clean Water Act expressly preserves state authority over the allocation of water, so consumption is a state question.[25] Wholesale electricity falls to the Federal Energy Regulatory Commission and retail service to the states.[26] Federal power over the grid is also bounded. West Virginia v. EPA applied the major questions doctrine to an attempt to restructure electricity generation under the Clean Air Act.[27] States fill the gap with siting, rate and water rules, unevenly, as the Virginia audit shows.

Why the Single-Project Model Cannot See a Cluster

Both systems assess one project at a time. An Indian appraisal committee examines a proposal, its Form 1 and its environmental report, and decides on that proponent's papers. An American agency examines a proposed federal action and, after Seven County, may draw a line around the effects it considers. A single data centre may pass either test comfortably. Ten of them within a few kilometres of one another may still exhaust the same substation, draw down the same aquifer and put the same strain on the same airshed during a grid emergency, when backup generators run together.

Aggregation is therefore the source of the harm, and aggregation is exactly what a project-by-project model leaves unmeasured. Kleppe recognised cumulative effects of pending proposals but refused to infer a duty to plan a region from the mere fact of regional development. Indian procedure has no counterpart to a regional plan against which a proposal could be tested. The first project in a district meets an empty file, and the tenth meets a file that nobody has added up. Order of arrival then decides who bears the strain, which is a poor basis for a decision about shared water and power.

[23]Executive Order 14318, "Accelerating Federal Permitting of Data Center Infrastructure" 90 Fed. Reg. 35385, s. 2 (July 28, 2025).

[24]*Id*., s. 5(c).

[25]The Federal Water Pollution Control Act, 1972 (Clean Water Act), s. 101(g) [33 U.S.C. s. 1251(g)].

[26]The Federal Power Act, 1935, s. 201 [16 U.S.C. s. 824].

[27]West Virginia v. EPA, 597 U.S. 697 (2022).

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Where the Power Sits: A Functional Comparison

A comparison by function asks three questions: who decides that review is due, who measures cumulative load and water, and who can restrain the project. Institutions with similar names answer them differently.

In India the Union writes the rule and the states apply it. The central environment statute rests on the decisions of the Stockholm Conference, and so on Parliament's treaty-implementing power,[28] yet Item 8 appraisals belong to a state authority. Water belongs to the states and electricity is concurrent,[29] and the Water Act itself reached the states by their own resolutions.[30] Centre and states are broadly aligned in promoting data centres. The tier that appraises is the tier that competes for the investment, and no tier has a reason to count the cumulative load.

In the United States the first function belongs to Washington by statute and has been narrowed by judicial and executive choice. The second and third functions have drifted to states and localities, which control siting, rate design and water. Federal promotion and state restraint therefore coexist. Revesz questioned the claim that interstate competition drives standards down,[31] and Engel examined whether a race occurs and in which direction.[32] Data centres add a feature that debate did not consider. Grid reinforcement and water are shared goods, so a state that lowers its barriers exports part of the cost to its neighbours and its own ratepayers.

The difference in structure matters for reform. Stepan, Linz and Yadav describe India as a state-nation federation whose centre holds considerable constitutional power.[33] A central notification can therefore change the Indian trigger. The American trigger cannot be repaired through NEPA without Congress, so reform there must work through state siting law, utility regulation and the conditions attached to federal support.

Courts as Partial Substitutes

Indian courts supply principle. Article 21 has been read to include a healthy environment, and the Supreme Court has treated the precautionary principle and the polluter-pays principle as

[28] *Supra* note 13, preamble; The Constitution of India, art. 253.

[29] The Constitution of India, sch. VII, List II, entry 17 and List III, entry 38.

[30] *Supra* note 12, s. 1(2); The Constitution of India, art. 252.

[31] Richard L. Revesz, "Rehabilitating Interstate Competition: Rethinking the 'Race-to-the-Bottom' Rationale for Federal Environmental Regulation" 67 New York University Law Review 1210 (1992).

[32] Kirsten H. Engel, "State Environmental Standard-Setting: Is There a 'Race' and Is It 'to the Bottom'?" 48 Hastings Law Journal 271 (1997).

[33] Alfred Stepan, Juan J. Linz, et.al., Crafting State-Nations: India and Other Multinational Democracies (Johns Hopkins University Press, Baltimore, 2011).

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part of national law,[34] while the public trust doctrine extends to water.[35] These tools allow a bench to ask about cumulative water draw even where the Schedule is silent. They need a case, and to the authors' knowledge no reported decision of the Supreme Court has yet addressed a data centre's environmental clearance. Indian courts hold principles that lack facts, while American courts now owe agencies a deference that leaves little room for principle. Neither can fill the gap that legislation has left.

The Limits of the Argument

Load is a gate and not a verdict. A facility of 100 megawatts on a low-carbon grid with closed-loop cooling differs sharply from one of the same size on a coal-heavy grid with evaporative towers. The IEA also places data centres at around one-tenth of global electricity demand growth to 2030, less than industrial motors, air conditioning or electric vehicles,[36] and the Virginia audit found present water use sustainable. The paper does not claim that AI infrastructure is the largest environmental pressure of its time. It claims something narrower. Where a pressure is concentrated, fast-growing and locally severe, the legal system should be able to see it before approval and not after the grid has been committed. A load-based gate does that, and leaves the merits of each project to the appraisal that follows.

Suggestions

First, India should add a distinct entry for data centres to the Schedule of the Notification, keyed to connected or contracted load in megawatts and to daily water withdrawal in kilolitres. The unit matters more than the figure, which a technical committee with the Central Electricity Authority should set. Projects above a higher load band should move to the central appraisal committee. The Central Government can do this by notification under its existing power.[37]

Second, both countries need a regional cumulative assessment. Where the combined load or water draw of a cluster passes a stated share of local substation capacity or aquifer recharge, a joint review by the environment agency and the grid or water authority should precede further approvals. In India the central committee can host it. In the United States, state utility commissions and environmental agencies are the natural venue.

[34] Vellore Citizens' Welfare Forum v. Union of India, (1996) 5 SCC 647.

[35] M.C. Mehta v. Kamal Nath, (1997) 1 SCC 388.

[36] *Supra* note 1.

[37] *Supra* note 13, s. 3(1).

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Third, a public metering duty should require annual reports of electricity, water withdrawn and consumed, backup-generator hours and the source of power. In India it can be built through designated-consumer norms under the Energy Conservation Act. In the United States it need not wait for Congress. The Executive Order already offers loans, grants and federal land to projects it defines by load,[38] and disclosure can be made a condition of that support.

The content of the meter matters as much as its existence. Emissions depend on where the power comes from, and the IEA expects renewables and natural gas to meet most of the added demand.[39] A report that gave only total consumption would hide the difference between the two. Reports should therefore state the supply source, the hours at which load peaked and the volume of water drawn from public sources as against recycled or reused water. Published in a common format, such data would let regulators compare clusters, and would give courts the factual record that, on the argument above, Indian principle now lacks.

Fourth, wherever one tier both promotes and appraises, an independent check is needed. Routing Indian Category B data-centre appraisals to the central committee and attaching reporting conditions to American incentives would serve the same purpose in the two systems. An objection deserves an answer. A stricter gate, it may be said, will slow the very investment both governments want. The reply is that a load-based trigger sorts facilities more accurately than an area-based one. Small and efficient facilities would leave the review track, and attention would go to the few that draw the most. The American order itself shows that a line at 100 megawatts can be drawn and administered. The question is whether the line is used only to grant support or also to ask for scrutiny.

Conclusion

India and United States have laws governing data centres that question the wrong thing at the door. India queries the size of the building. The U.S. asks if the federal government is involved. The facts that determine the environmental footprint are continuous electricity demand, water consumption and geographical concentration. Both governments are already aware of the need to consider electrical load when determining data centre projects that are eligible for policy support and investment. Environmental review must be based on the same understanding when determining which projects are subject to review. This comparison illustrates the problem is not just that there is no environmental law. The two countries have their own legislation on

[38] *Supra* note 23, s. 3.

[39] *Supra* note 1.

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environmental assessment, water, air pollution and electricity. The issue is that these laws are applied independently and do not consider the synergy of facilities located within the same geographic region. A project can meet the requirements for its own operations and at the same time have an impact on a broader scale on the electricity grid, water supply and local environment. Evaluating the individual facilities is thus a potentially incomplete approach because it fails to capture the compounding effects of the development of data centres. The division of regulatory power adds to the confusion. The central government in India has the power to modify the environmental clearance framework, and the state governments perform important appraisal work and bid to attract investment. Federal environmental review in the United States is constrained by the need for a "major federal action," with most of the siting, electricity control and water management decisions left to state and local governments. The two systems of the constitution are not the same, but both are indicative of the challenges involved in trying to keep the encouragement of data-centre development from being isolated from independent environmental review.

Judicial principles offer an important foundation for environmental protection, especially in India, but in a world without a regulatory system to define projects that need assessment and to generate credible information on their environmental impacts, courts cannot play this role. Regulation should start before the institution of infrastructure and resource commitments. This needs to be legally triggered based on the size of the facility, not its funding source, and on the actual size of the facility. A trigger based on load would be more suitable, as would public reporting of electricity and water consumption that is mandatory. These mechanisms should be used as screening and accountability tools, rather than as a presumption that all high-load facilities are bad for the environment. Additional factors affecting the environmental impacts of a data centre include the type of electricity it uses, its cooling system, as well as the availability of water and its geographical location. These are all factors which must be assessed in relation to each other when considering the regulatory assessment. The possible measures can be tailored to the constitutional structure of each country, and in India, notification-making powers reside with the central government, while in the United States they are more firmly on the shoulders of the States and conditions attached to the federal support.

To regulate AI-driven data centres, we need to move beyond the traditional approach of studying each centre as an independent building project to viewing it within the broader context of energy and resource use. Economic and technological development does not have to be divorced from protection of the environment. The establishment of a regulatory framework

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which would identify key loads, assess the cumulative impact of these loads and make resource use public and accountable would enable both countries to develop digital infrastructure more environmentally responsibly. The focus should not be on whether or not data centres should be built, but on the cost of building them, recognising it, assessing it, and regulating it, before it may be too late.

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