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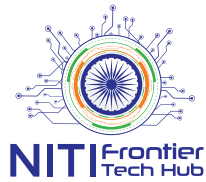
NITI Frontier
Tech Hub

Data Centre Evaluation Framework to Help States Plan for Sustainable Growth



Disclaimer

This framework has been prepared by NITI Frontier Tech Hub (FTH) in consultation with experts and stakeholders. The data used is from secondary sources. Any references to specific organisations, products, services or technologies does not constitute endorsement but are only for illustrative purposes.



Data Centre Evaluation Framework to Help States Plan for Sustainable Growth

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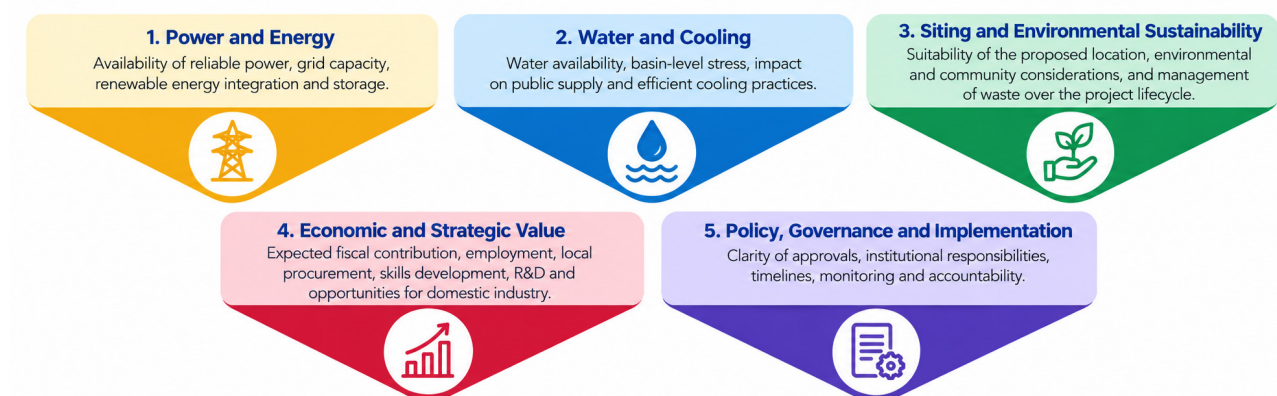
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Purpose

India's growing data-centre sector presents an opportunity to attract investment, strengthen the nation's growing AI economy and build domestic technological capabilities. However, data-centre projects also have significant requirements for electricity, water, land and supporting infrastructure. States need a structured approach to assess these requirements alongside the economic benefits of proposed investments.

The Data Centre Evaluation Framework to Help States Plan for Sustainable Growth, developed by the NITI-Frontier Tech Hub, provides States with a common set of parameters to evaluate data-centre proposals and make informed decisions that balance investment promotion, infrastructure readiness, economic value and long-term sustainability.

What does the Framework assess?



How can States use the Framework?

States can use the framework to ask the right questions for assessing the proposals at the planning and evaluation stage, identify infrastructure and resource constraints early, compare projects on a consistent basis, and determine the support and enabling measures required for implementation. It can also help States link incentives and other support to measurable outcomes, including domestic industry participation, skills, innovation and sustainable resource use.

The framework is intended to **support decision-making, not prescribe a uniform approach or create an additional layer of regulation**. States can apply the common assessment principles in line with their priorities, resource availability and development objectives.

The framework aims to help States move beyond competition for investment announcements towards competition based on investment readiness, infrastructure quality and sustainable economic value. It seeks to facilitate timely and predictable project implementation while ensuring that data-centre growth contributes to long-term economic development and public interest.

Why the Framework is Essential for Sustainable Data-Centre Growth

India needs a framework that converts rapid investment into sustainable capacity by aligning every project with infrastructure readiness, responsible siting and measurable public value

Definitions

State Role

Actions to be undertaken by State departments, utilities and authorities to coordinate infrastructure and approvals, support data centre operators, set conditions and monitor delivery

State Evaluation Framework

Criteria used by the State to assess a proposal across the five pillars and determine the conditions for approval

Recommended Minimum Approval Documents

Core records the State should obtain before approval to confirm resource readiness, safeguards, responsibilities and measurable commitments

Central Government Role

Provide National standards, model guidance and common templates that support consistent State evaluation and coordination across States and regulators

How the Framework Helps India

1. Plan Before Approval

Assess the full campus at node and corridor level. Treat large data centres as grid-interactive loads capable of demand response; phase grid, water, fibre and land capacity with augmentation and commissioning milestones

2. Protect Local Systems

Test basin stress, existing users, climate and community impacts, backup sources and lifecycle liabilities before construction

3. Secure Public Value

Compare fiscal and ecosystem benefits with total State support. Pay against controllable KPIs, with monitoring and suspension triggers

4. Enforce Delivery

Separate State and Central roles, assign each condition to the responsible entity, and track clearances, resource use, mitigation and disclosure

International Experience

Virginia, Dublin, Amsterdam, Johor and Bangkok show the risks when capacity outruns grid, water, land and community systems. Ireland links new projects to additional generation. Singapore and European frameworks use phased, climate-sensitive PUE and WUE assurance. Thailand and Malaysia have tightened incentive screening for resource efficiency and domestic value.

Implication

Establish the guideline framework before constraints emerge, and enable faster approvals only where resource readiness, local safeguards and public value are evidenced.



Pillar 1

Power and Energy

Assess grid readiness for the full campus, including augmentation and firm supply at each capacity milestone.

State Evaluation Framework

(1) Assess total electricity demand

- ◆ At site selection, require the developer, DISCOM and STU to jointly validate a Power Readiness and Ramp-up Plan covering total campus demand, built capacity, expected utilisation, sanctioned MW, year-wise energisation, substation and transmission augmentation, lead times and responsibility for each upgrade
- ◆ Obtain DISCOM and STU load-flow studies for total planned load, covering applicable 33 kV/11 kV feeder limits, voltage sag and power factor, and N-1/N-2 contingency, thermal headroom and transformer loading at relevant 132 kV/220 kV/400 kV substations
- ◆ Classify the proposed facility as conventional colocation, AI/HPC/GPU compute or hybrid, and assess its power, cooling and infrastructure requirements against the relevant facility type
- ◆ Record firm MW, connection point, sanction stage; align each capacity milestone with confirmed substation and transmission lead times
- ◆ Assess cumulative existing and committed load at the node and corridor, map long-term transmission constraints and augmentation lead times, and verify extra-high-tension resilience and independent upstream sources for dual feeds
- ◆ For facilities above 20 MW, require automated demand-response readiness and SLDC telemetry and control integration, subject to applicable grid-code requirements

(2) Specify augmentation, delivery milestones and cost allocation

- ◆ Identify substation, feeder, transmission and protection upgrades before each capacity addition.
- ◆ Use a network-reinforcement study to separate data-centre-driven upgrades from normal demand growth and allocate shared upstream costs by beneficiary, contracted load and utilisation; project-exclusive assets may be applicant-funded
- ◆ Approve load enhancement only after the assets are commissioned and agreed technical and payment milestones are met
- ◆ Publish the power-infrastructure roadmap and indicative energisation timelines for each data centre site or corridor to support developer capacity planning

(3) Calculate net grid draw

- ◆ Recognise renewable and storage-backed reductions only where hourly or applicable time-block matching, approvals, contracted quantum, commissioning, connectivity, metering and usable discharge capacity are confirmed; record net grid draw by milestone
- ◆ Recognize storage-backed reductions only for usable capacity over the discharge period, and record approved grid draw per milestone.

(4) Set and monitor efficiency and resilience requirements

- ◆ Require modelled design PUE, guaranteed operating PUE and the assumptions for climate, rack density, cooling, UPS, backup configuration

- ◆ Issue common load-flow and grid-augmentation templates;
- ◆ MoP and CERC should develop and publish model green-tariff, banking and open-access principles for round-the-clock renewable and storage-backed supply, for adoption by SERCs, to provide longer-term visibility on green-energy procurement mechanisms
- ◆ BEE, BIS and MeitY should standardise PUE, WUE and CUE measurement boundaries, reporting and verification. These should be aligned with applicable Indian Standards which BIS (or any other regulatory body) has published; BEE should assess a Designated Consumer pathway for eligible data centres



Pillar 1

Power and Energy

Assess grid readiness for the full campus, including augmentation and firm supply at each capacity milestone.

- ◆ Require a phased roadmap to reduce diesel reliance through BESS, green hydrogen or sustainable biofuels where technically feasible, while maintaining required redundancy
- ◆ For hyperscale or large compute facilities, require a waste-heat utilization assessment and record technically and commercially viable uses
- ◆ Report operating PUE and CUE and site-level GHG emissions from electricity use, backup generation, refrigerants and other material operational sources

(5) Access to Advanced Power Technologies

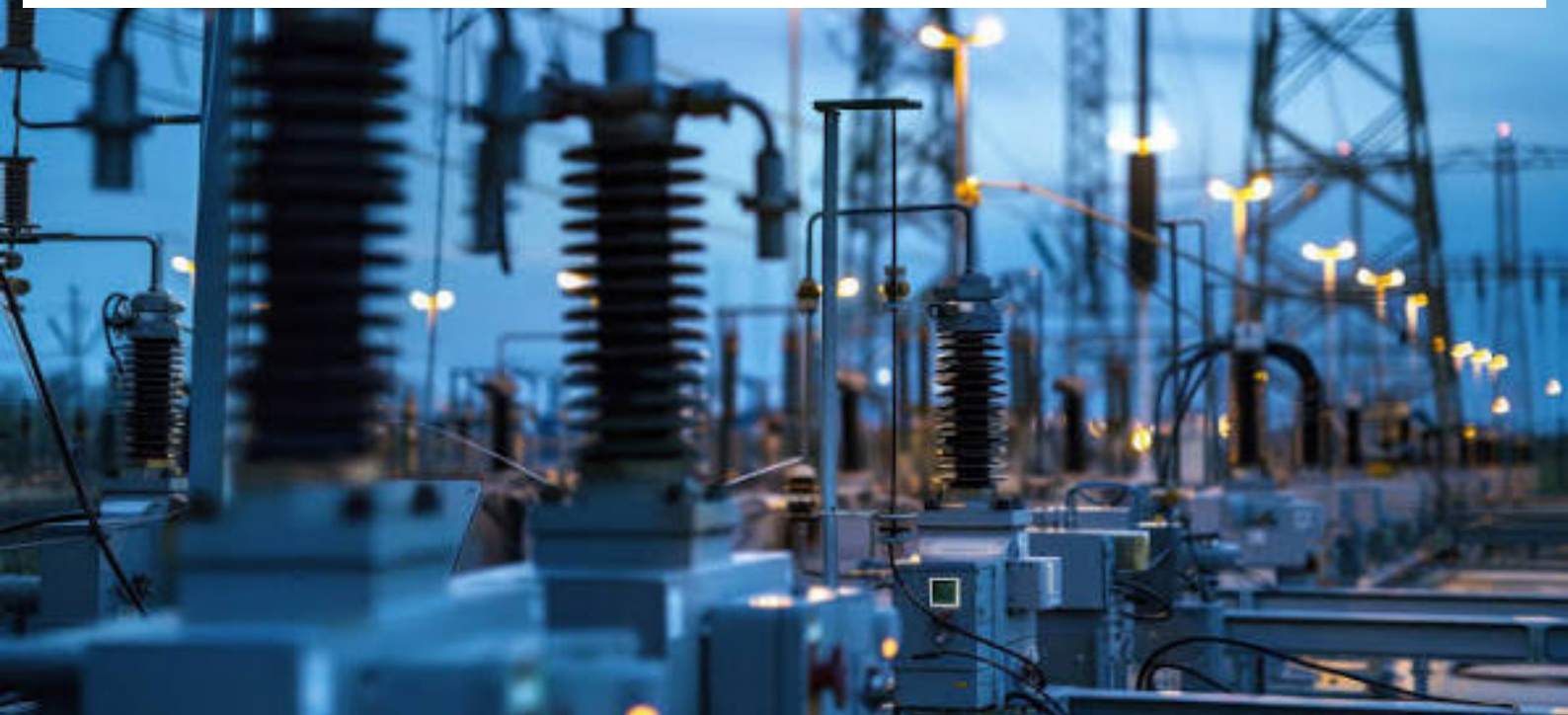
- ◆ Evaluate adoption of BESS, microgrids and alternative backup power technologies to improve resilience and reduce dependence on diesel generation

State Role

- ◆ State and Central resource-adequacy assessments should include approved and committed data-centre loads and treat firm captive, open-access and backup arrangements, counting only capacity available to the system
- ◆ Encourage firm captive or open-access renewable-plus-storage supply to reduce DISCOM draw; where applicable prescribe a minimum renewable-energy share and encourage hybrid models (solar + grid)

Recommended Minimum Approval Documents

- ◆ Jointly validated Power Readiness and Ramp-up Plan covering total campus demand, built capacity, expected utilisation, sanctioned MW, year-wise energisation, required augmentation, lead times, responsible entity, funding and cost-allocation basis
- ◆ Phase-wise total load and net grid draw, including the basis for each deduction
- ◆ Required grid augmentation, responsible entity, funding and cost-allocation basis, and delivery milestone
- ◆ Renewable and storage arrangements contracted or approved and deliverable by the relevant capacity milestone, with a metering and monitoring plan





Pillar 2

Water and Cooling

Assess fit-for-use demand against long-term surface-water, groundwater and treated-water availability, while protecting priority and existing users.

State Evaluation Framework

(6) Assess long-term water availability and allocation

- ◆ Apply applicable State allocation priorities and inter-State river rules across drinking water, irrigation, hydropower, ecology, agriculture/industry and navigation
- ◆ Before approval, require an MSP agreement among Water Resources (surface/groundwater), ULB/urban (treated wastewater), drinking-water, irrigation/agriculture and industry authorities, recording allocation, protected users, NOC validity, drought rules and infrastructure responsibility

(7) Define fit-for-use water and calculate net freshwater demand

- ◆ Specify fit-for-use water quality and quantity separately for facility-level and rack-level cooling, distinguishing air cooling, water cooling, rear-door heat exchangers, direct liquid cooling and immersion cooling where applicable; model peak-summer demand and WUE at local conditions, including approximately 40°C where applicable
- ◆ At each commissioning milestone, assess peak water demand, contracted supply, availability of grey water and other alternative or recycled sources, on-site storage, contingency arrangements and whether each source will be available when the relevant capacity is commissioned
- ◆ Report source type and distance, conveyance, treatment, storage and commissioning infrastructure; assess liquid and other low-water, low-energy cooling options against climate, rack density, PUE and WUE
- ◆ Deduct recycled, treated or other non-potable supply only when contracted, connected and available from commissioning

(8) Protect existing users and provide for shortages

- ◆ In high-stress locations, require independent source validation, certified meters and periodic reporting and also require rainwater harvesting, on-site treatment, and storage capacity
- ◆ Where basin stress precludes additional freshwater abstraction, require desalinated water where feasible; do not allow the project to further strain existing freshwater resources

(9) Access to cooling technologies

- ◆ Evaluate usage of innovative technologies (air-cooled, indirect evaporative, liquid, closed-loop, immersion) which can improve the efficiency and sustainability of data centre from water consumption and cooling technologies

State Role

- ◆ Prepare a 20-30 year seasonal catchment water balance covering surface water, groundwater, municipal supply, treated wastewater, competing demand, particularly agriculture
- ◆ Surface-water, groundwater or municipal-water allocation should not reduce dependable supply for existing users

Recommended minimum approval documents

- ◆ Basin-stress and public-supply impact assessment, with peak-condition WUE
- ◆ Phase-wise water-supply plan covering peak demand, contracted supply, grey water and other alternative or recycled sources, on-site storage, contingency arrangements and source availability at each commissioning milestone, together with metering and reporting arrangements

- ◆ Issue cooling guidance by climate, water source, cooling system, rack density and facility type, with source-wise WUE reporting
- ◆ Define common measurement boundaries for cooling water and source-wise WUE reporting



Pillar 3

Siting and Environmental Sustainability

Prepare sites before approval and assess climate and community impacts.

State Evaluation Framework

(10) Assess site and community risk before construction

- ◆ Assess forward-looking coastal, flood, cyclone, seismic, heat and ecological risk, not only current hazard maps
- ◆ Require a Community Impact Assessment covering water, traffic, roads, drainage, emissions, noise, waste, emergency access, land-use change and local jobs, with consultation and grievance processes
- ◆ For large campuses, States may consider a proportionate Community Benefit Plan covering local training, grievance redress and other local measures

(11) Provide for waste and decommissioning liabilities

- ◆ Require a lifecycle plan for e-waste, batteries, hazardous waste, diesel systems, IT-asset disposition, recycling, building decommissioning
- ◆ Introduce financial assurance only after a sector-specific assessment of decommissioning risks and costs

State Role

Designate and Prepare Data-Centre-Ready Zones

- ◆ Verify land title, permitted use, zoning, expansion headroom. Pre-assess grid, water, substation readiness and, among otherwise suitable sites, prioritise renewable-energy-rich zones with available connectivity where this limits long-distance transmission
- ◆ Assess access to multiple fibre providers, carrier-neutral interconnection and physically diverse routes; where relevant, assess cable-landing-station proximity, backhaul readiness and opportunities to extend high-capacity connectivity to underserved regions
- ◆ Publish corridor-level grid, transmission, renewable-access, water, fibre, right-of-way, land and clearance readiness, with nodal contacts
- ◆ Publish approval timelines and cost-sharing rules. Issue interim building, fire and electrical guidance until BIS standards apply
- ◆ Alongside data-centre-ready zones, mark-out the exclusion or high-risk zones (Red zone) where development should be restricted because of hazard exposure, water stress, land-use conflicts or inadequate supporting infrastructure

Recommended Minimum Approval Documents

- ◆ Site-readiness record covering 10-15 year expansion headroom for land use, grid, water, fiber, right-of-way and applicable clearance status
- ◆ Climate-risk assessment and, for large campuses where warranted, a proportionate Community Impact Assessment
- ◆ Identified readiness gaps, responsible entity and completion date, together with a lifecycle and decommissioning plan

- ◆ Issue model Data Centre Economic Zone and BIS standards, with lifecycle and decommissioning guidance



Pillar 4

Economic and Strategic Value

Assess value net of State support and pay only for measurable outcomes.

State Evaluation Framework

(12) Classify the business model and responsible entities

- ◆ Distinguish passive infrastructure models, including colocation, built-to-suit and powered shell, from active models such as cloud, Compute as a Service, GPU as a Service and managed hosting and compare across similar archetypes

(13) Measure net economic contribution

- ◆ Review net fiscal contribution over a defined period. Separately quantify land, infrastructure, electricity-duty, stamp-duty, utility and capital support being provided
- ◆ Assess local procurement, downstream demand in digital consumption, job skilling, local hiring – direct/indirect, training and capability development and R&D
- ◆ Assess domestic procurement percentage across both IT and non-IT infrastructure

State Role

Link incentives to measurable outcomes within the recipient's control

- ◆ Disburse against defined commissioning, renewable supply, PUE or WUE, employment, procurement and capability milestones. Specify the KPI, method, reporting frequency, suspension trigger
- ◆ For compute projects, recognise research, skilling and certification. For colocation, recognise anchor tenants, civil and MEP vendor development and local operations capability
- ◆ Encourage domestic procurement and indigenous technology development across servers, HPC/AI, software ecosystem, and support "Make in India" IT and non-IT infrastructure

Recommended Minimum Approval Documents

- ◆ Net contribution and quantified State support
- ◆ Data-centre model, incentive recipient and entity controlling each committed outcome
- ◆ KPI, incentive tranche, reporting frequency, suspension trigger

- ◆ Publish Net Economic Contribution and performance-linked incentive templates



State Evaluation Framework

(14) Assign each condition to the responsible entity

- ◆ Map the facility and IT owner, workload controller, customer counterparty, Data Fiduciary or Processor, regulated entity, compute controller and incentive recipient

(15) Assess cross-pillar innovative technologies and performance standards

- ◆ Assess and encourage adoption of innovative technologies across all pillars where proposals quantify improvements in power, water, connectivity, environmental, economic or governance outcomes; assign delivery and verification responsibility
- ◆ Assess design-stage PUE, WUE and CUE against applicable published BIS standards and require post-commissioning measurement and reporting using the same boundaries

State Role

Run a time-bound end-to-end digital single-window mechanism

- ◆ Publish a State-wise Data Centre Approval Matrix covering each applicable approval or NOC, issuing authority, applicability, indicative processing time, dependencies, required documents, applicable fees and escalation mechanism
- ◆ Link the Approval Matrix to one digital interface for coordinated submission, processing and tracking of clearances; identify each responsible department, processing time, dependency and escalation officer, including the authorities responsible for surface water, groundwater, municipal supply and treated wastewater
- ◆ For each incentive, cite the enabling notification, validity, responsible department and disbursement mechanism. Track status on the dashboard
- ◆ Each State may designate a single point approving authority/ agency/nodal agency (including MeitY) to coordinate the data centre establishment approvals in the State

Track approved conditions and publish non-sensitive information

- ◆ For government or regulated workloads, assess certifications, contracts, physical security, incident response and audit support
- ◆ Track approved load, water, safeguards, mitigation, incentive milestones and the grievance channel
- ◆ Publish non-sensitive approval data. Withhold customer, security, network, resilience and proprietary operating information
- ◆ Assess and track disaster-recovery and business-continuity arrangements, including seismic risk, power and network redundancy, recovery objectives and emergency operating procedures

Recommended Minimum Approval Document

- ◆ Designed PUE, WUE, CUE planned documents

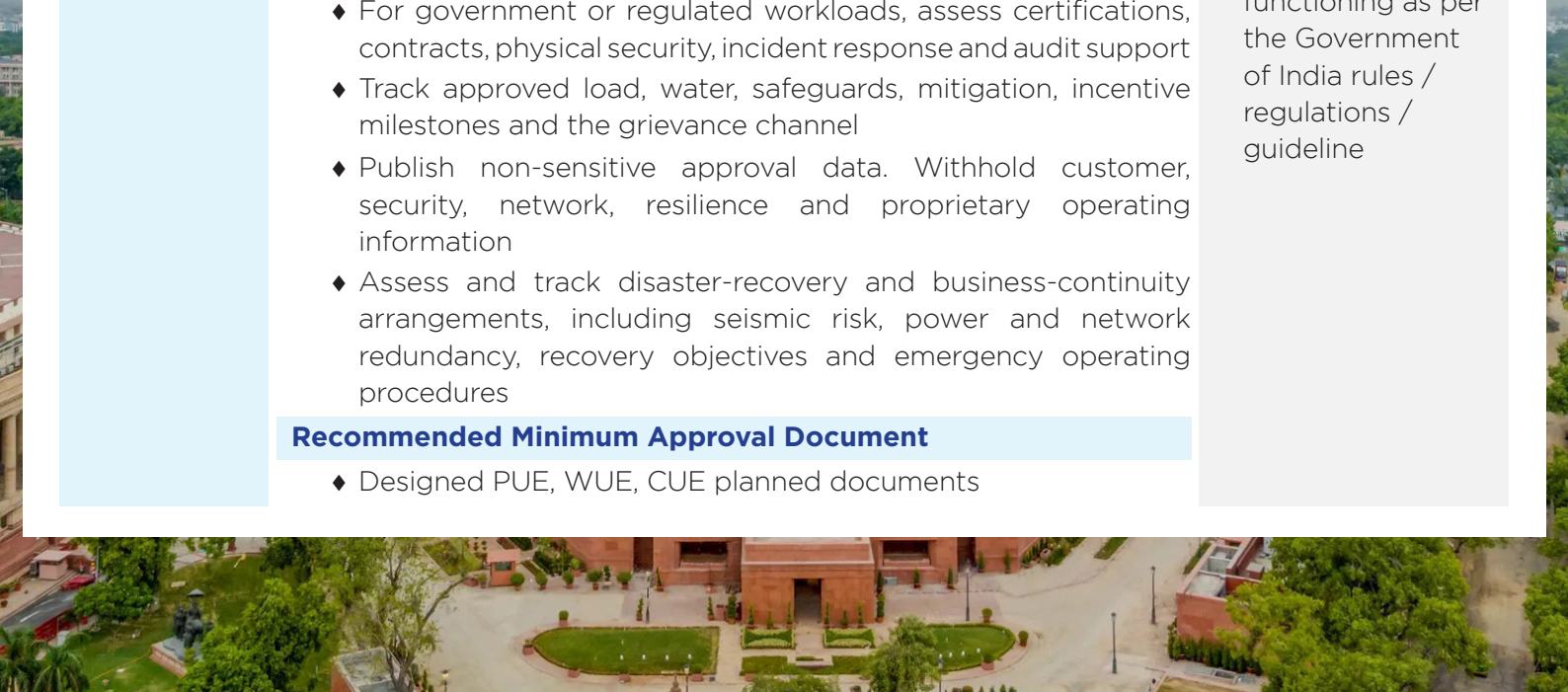
- ◆ Maintain the national legal-responsibility matrix and compliance templates
- ◆ Provide a model State notification or Central advisory for ESMA or equivalent continuity treatment. Cover 24x7 operations, priority utilities, emergency access
- ◆ Establish centralised Audit mechanism (with MeitY as the nodal ministry) to periodically audit / inspect the claims of the data centres establishments and to oversee if the data centre is functioning as per the Government of India rules / regulations / guideline



Pillar 5

Policy, Governance and Implementation

Assign conditions to responsible entities and track delivery.



Taken together, the five pillars provide States with a common basis to assess data-centre proposals from initial site selection through commissioning and ongoing operations. The framework links approvals to verified readiness of power, water, land and supporting infrastructure; safeguards existing users and local communities; assesses State support against measurable economic and strategic outcomes; and assigns each condition to the entity responsible for delivery. Common standards, templates and guidance from the Central Government can support consistent implementation across States, while milestone-based monitoring can link capacity additions, incentives and resource commitments to the fulfilment of agreed obligations. The framework therefore serves as a practical guide for enabling data-centre growth while protecting local systems, securing measurable public value and maintaining clear accountability throughout the project lifecycle.

NOTES



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