ENVIRONMENTAL JUSTICE FORUM

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CITIZEN BRIEFING: VISAKHAPATNAM'S EMERGING DATA CENTRE CLUSTER

Environmental Footprint, Community Impacts & Demands for Accountability

1. Why This Matters to Citizens

Visakhapatnam is emerging as a major eastern hub for AI and hyperscale data centres. These 24×7 facilities demand enormous amounts of electricity, cooling water and land. Almost all electricity used ultimately becomes waste heat, which must be continuously dissipated, adding pressure on local water, land and coastal ecosystems.

The key questions are: Who benefits from these mega-infrastructure projects, and **who bears** the short-term and long-term ecological, water, and power costs? **From Virginia to California in the USA, data-centre clusters have driven up residential electricity costs and led to growing concerns over local water reserves—a precedent Visakhapatnam can't afford to ignore** as it plans its digital future. Development must not compromise drinking-water sources such as **Mudasarlova Reservoir, the Eastern Ghats, Kambalakonda Wildlife Sanctuary** and its **Eco-Sensitive Zone**, or the Bay of Bengal's sensitive coastal ecosystems and **Coastal Regulation Zones**. **Technology and investment are welcome—but not at the cost of Visakhapatnam's water and energy security, climate resilience or environmental justice. They must deliver shared benefits without overstretching public resources** or **compromising** the interests of local communities and wildlife.

2. How Large Is the Energy, Water, and Heat Footprint?

Metric	Current Operating / Initial Phases	Announced / Planned Projects	Long-Term / Cluster Potential
Identified Projects	Sify Rushikonda (Phase 1), Initial AdaniConneX Madhurawada (~100 MW)	AdaniConneX Madhurawada (200 MW), Google-Adani AI Hub (Tarluvada/ Adavivaram), Sify Paradesipalem (500 MW)	Reliance Bhogapuram (1.5 GW), Anakapalli/ Rambilli coastal data campuses (>2,500 MW cluster)
IT Power Capacity	~100 MW	~800 MW	>2,500 MW potential
Peak/Full-Capacity Electricity Demand (@assumed PUE 1.4)	~1,226 GWh / yr	~9,811 GWh / yr	>~30,660 GWh / yr
Illustrative Water Use (@ assumed WUE 1.0	~876 ML / yr	~7,008 ML / yr	>~21,900 ML / yr

L/kWh, IT basis)			
Continuous Heat Released into Neighbourhood (@ 1.4 PUE)	~140 MW	~1,120 MW	>~3,500 MW

Note 1: PUE: Power Usage Effectiveness; **WUE**: Water Usage Effectiveness; **MW**: Megawatt; **L:** Litre; **ML**: Million Litres; **MLD**: Million Litres per Day; **IT**: Information Technology; **GWh**: Gigawatt-hours; **CRZ:** Coastal Regulation Zone.

Note 2: A **100 MW facility** could use **about 2.4 ML/day** of water under the stated **WUE of 1.0 L/kWh**, assuming an **illustrative evaporative/wet-cooling, high-water-use scenario.** This is an **illustrative** estimate, **not actual** consumption. **Each facility** should **publicly disclose** and **independently verify** its ***actual* water** and **power** consumption/performance.

3. Key Environmental, Ecological, and Neighbourhood Risks

- **Direct Hydrological Threat to Mudasarlova Reservoir:** Siting mega-campuses adjacent to the reservoir disrupts natural drainage, accelerates soil erosion and siltation, and risks raw drinking water contamination from toxic cooling blowdown and hazardous runoff.
- **Kambalakonda Sanctuary & Hill Forests:** *Encroaching* upon the **Eco-Sensitive Zone** (ESZ) of the 70 sq. km Kambalakonda Wildlife Sanctuary fragments vital habitats and movement corridors for leopards, pangolins, spotted deer, barking deer, and over **100 bird species.** Flattening the adjoining **Simhachalam–Madhurawada hill ranges** strips native canopy and endemic flora, destabilising fragile slopes and worsening cyclone-induced erosion and landslide risks.
- **Coastal & Marine Impact (CRZ):** Subsea fibre-cable landings disturb inter-tidal (CRZ-I) and marine (CRZ-IV) ecosystems, while thermal and high-salinity brine discharges from cooling and desalination deplete dissolved oxygen, damaging local fisheries.
- **Wetland Drainage & Urban Flooding:** Paving over natural streams (*geddas*) discharging into the sea and **Meghadrigedda wetlands** impairs flood buffering, worsening urban flash flooding during monsoon downpours.
- **Regulatory Gaps & Cumulative Strain:** The **Category 8(a), B2** approach may assess projects in isolation, leaving the **cumulative burden on Visakhapatnam's water, power and fragile ecosystems**—from **Mudasarlova and Kambalakonda to forests, wetlands and the Bay of Bengal coast**—inadequately addressed.

4. Cooling Technologies: Demands for Lower Water, Energy, and Heat Footprint

Technology	Water Footprint	Energy Footprint	Assessment & Citizen Demand
Evaporative / Cooling Towers	High (~2.4 MLD per 100 MW)	Lower cooling energy	**Unacceptable:** Depletes municipal freshwater reservoirs and stresses drinking water grids; avoid completely.

Chilled Water / Air Cooling	Low–Moderate	Moderate–High	Standard industrial method; acceptable only where dedicated 100% off-grid renewable energy is utilized.
Free-Air / Sea-Breeze Economiser	Very Low	Low	Limited seasonal feasibility due to high coastal humidity and corrosive saline marine air.
Hybrid Dry + Adiabatic	Low–Moderate	Low–Moderate	Practical transitional system; uses limited water only during peak summer temperature spikes.
Direct-to-Chip Closed Loop	Near Zero	Low potential	**Preferred Standard:** Circulates dielectric fluid water through cold plates; prevents continuous evaporation.
Liquid Immersion Cooling	Negligible	Lowest cooling energy	**Mandatory for High-Density AI:** Submerges servers in dielectric liquid; highly efficient, zero water loss.

Protect Drinking Water: Drinking water, household needs, and local agriculture must take statutory priority over data centre cooling. Completely prohibit the extraction of groundwater and freshwater from **Mudasarlova, Meghadrigedda, or municipal pipelines**. Where water-based cooling is unavoidable, **facilities must mandate 100% tertiary-treated**, **recycled** municipal sewage (STP water).

- **Strict Ecological Buffer Zones:** Enforce a non-negotiable minimum 500-metre no-development buffer around the **Mudasarlova reservoir high-flood line and reserve forest boundaries**.
- **Public Green–Amber–Red Real-Time Dashboard:** Mandate continuous, publicly accessible monitoring of daily water draw and source, recycling percentages, grid electricity vs. renewable share, acoustic emissions, and effluent discharge compliance.
- **Assess Cumulative Cluster Impacts:** Environmental regulators must evaluate the **combined regional footprint** of all existing and planned data centres across Visakhapatnam before granting any single project clearance.

5. Employment Realities: Low Direct Jobs vs. Massive Resource Demand

Data centres are highly capital-intensive and automated, creating relatively **few permanent jobs** compared with the large land, power, water and public incentives they may receive.

Indicative Employment for a 100 MW Facility:

- **Temporary Construction Jobs:** ~800–1,200 short-term contract jobs during construction; these taper off sharply after commissioning.
- **Direct Permanent Jobs:** ~100–200 specialised on-site roles, mainly technical, network engineering and physical security, i.e.,~1-2 specialised jobs/MW IT capacity.
- **Indirect Support Jobs:** ~300–600 regional support roles across grid maintenance, fibre connectivity, and local vendors.

6. Key Takeaways

- **Disproportionate Resource Load:** A 1,000 MW cluster, operating continuously at an illustrative PUE of 1.4, could consume ~12,264 MU/year—about 3.2× Visakhapatnam region's domestic electricity demand (~3,820 MU).
- **Significant Water Footprint:** At an illustrative WUE of 1.0 L/kWh, evaporative cooling could require ~24 ML/day—equivalent to the domestic needs of 1.6 lakh people at 150 LPCD and ~6% of GVMC's ~400 MLD drinking-water supply.
- **Ecological & Local Pollution Risks:** Large data centres can add pressure through continuous heat rejection, air emissions, noise, wastewater and chemical discharges, while associated infrastructure can affect reservoirs, wetlands, forests, wildlife habitats and coastal/marine ecosystems.
- **Limited Permanent Employment:** Automated operations create relatively few permanent jobs; **actual local employment and skill-development benefits should be disclosed.**
- **Regulatory Gap:** Data centres have no dedicated category under the EIA Notification, 2006. Large facilities may be processed under Item 8(a), Category B2, limiting conventional public consultation and overlooking cumulative regional impacts**.**

7. Core Public Demands

1. **Mandatory Category 'A' EIA & Public Consultation:** Require comprehensive environmental assessment and statutory public consultation for data centres above 20 MW, including cumulative regional impacts.
2. **Water-Secure Development:** No groundwater or potable water for cooling; prioritise treated wastewater, closed-loop and low-/zero-water cooling.
3. **Protect Ecologically Sensitive Areas:** No approvals within critical Mudasarlova Reservoir catchment or Kambalakonda ESZ without independent carrying-capacity and ecological-impact assessment.
4. **Control Local Pollution:** Set enforceable limits and continuous monitoring for heat, air emissions, noise and wastewater/chemical discharges.
5. **Transparent Public Accountability:** Establish an independent Green–Amber–Red dashboard disclosing verified energy, water, emissions, wastewater and compliance data, backed by a time-bound grievance-redressal mechanism.
6. **Demonstrate Local Benefits:** Require disclosure of actual permanent local jobs, skill development and measurable community benefits.

8. Citizen Test — What Should We Ask?

Water & Power: Will 24×7 **water**-cooling and massive **electricity** loads **strain** Vizag's **water supply** and **push power costs** onto households? **Heat & Health:** Will hundreds of megawatts of **continuous thermal exhaust** intensify local **heat stress** during summer heatwaves? **Jobs vs. Cost:** Do **just 1–2 permanent jobs per MW** justify **massive allocations of** public land, grid infrastructure, and state subsidies?