The Rise of AI Data Centers in India: Strategic Growth Driven by Adani–Ambani Investments and National Digital Ambitions

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***Abstract*—India is entering a decisive phase in its digital transformation, marked by rapid growth in Artificial Intelligence (AI) data centers that underpin cloud computing, big data analytics, and large-scale AI model training. Large industrial groups such as the Adani Group and Reliance Industries (Ambani) are emerging as central players by committing multi-billion-dollar investments, forming global technology partnerships, and aligning closely with national programs like Digital India, the National AI Mission, and data localization policies. This paper examines the evolution of AI data centers in India, the economic and technological drivers behind their expansion, the role of Adani and Ambani in building critical infrastructure, and the environmental risks associated with high water and energy use. It proposes policy recommendations to balance India's ambition to become an AI compute hub with the need to protect water security, ensure environmental sustainability, and uphold socio-economic equity.**

I. INTRODUCTION

On 24 January 2025, Mukesh Ambani announced plans to transform Jamnagar into one of the world's largest AI-ready data center hubs, with a planned capacity of around 3 gigawatts integrated with a large green-energy ecosystem. Around the same time, Gautam Adani indicated that the Adani Group could invest up to 10 billion USD in data center infrastructure across states such as Andhra Pradesh, Gujarat, and Tamil Nadu, positioning India as a major node in global AI and cloud networks. These announcements signal a strategic shift: national competitiveness in AI now depends heavily on access to massive computing capacity and data-center-driven digital infrastructure.

However, the growth of AI data centers has a significant environmental footprint, especially in terms of freshwater use for cooling and high electricity demand from power-intensive GPU clusters. A typical 100 MW data center can consume around 2 million litres of water per day for cooling, and planned hyperscale facilities in India may reach up to 3,000 MW, magnifying pressure on already stressed water systems. Many proposed locations—including Navi Mumbai, Delhi NCR, Chennai, Hyderabad, Kolkata, and Bengaluru—already face chronic water deficits, while 163 million people in India still lack access to safe drinking water. This paper therefore examines why India needs large-scale AI data centers, what is driving the current investment wave, what lessons can be drawn from the United States, and how India can mitigate environmental and water risks while pursuing digital leadership.

II. BACKGROUND AND DRIVERS OF GROWTH

2.1 AI Data Centers: Definition and Capabilities

AI data centers are specialized facilities designed to host high-performance computing (HPC) infrastructure, including GPU and TPU clusters, high-throughput storage, low-latency networking, and advanced cooling systems. These centers support tasks such as training large language models, running generative AI workloads, processing big data analytics, and delivering cloud and edge services at scale. Compared with traditional data centers, AI-focused facilities typically have higher power density per rack and more demanding cooling requirements, making their design and operation both capital- and resource-intensive.

2.2 India's Market Potential

India's data center capacity has expanded rapidly in recent years, driven by rising internet penetration,

e-commerce, fintech, and enterprise cloud adoption. Industry estimates suggest the India data center market reached approximately 5.03 billion USD in 2024 and could grow to around 12.85 billion USD by 2033, reflecting strong growth in digital infrastructure investment. Major data center clusters have emerged in Mumbai, Chennai, Hyderabad, and the Delhi–NCR region, with additional capacity planned in cities such as Pune and Bengaluru. Government policies around data localization and digital public infrastructure further reinforce the need for domestic compute and storage capacity.

2.3 Policy and Strategic Drivers

Government initiatives such as Digital India, the National AI Mission, and the Digital Personal Data Protection Act (DPDPA 2023) provide strong policy support for expanding domestic compute and storage infrastructure. Emerging national and state-level data center policies offer incentives including land support, fiscal benefits, and favourable power tariffs to attract investment. Data localization requirements also encourage global platforms and domestic firms to host data and workloads within India's borders. At the same time, strategic concerns around digital sovereignty and cyber security are motivating countries to build "sovereign cloud" capabilities that keep critical data and AI training within national jurisdictions.

III. ROLE OF ADANI AND AMBANI IN BUILDING AI INFRASTRUCTURE

3.1 Adani Group's Data Center Strategy

The Adani Group is expanding its presence in the data center sector through AdaniConneX, a joint venture with EdgeConneX (a US-based hyperscale provider), with a vision of building a gigawatt-scale pan-India platform. The company is developing multiple large campuses, emphasizing renewable-energy-powered facilities and high availability. Adani's strategy integrates data center development with its strengths in renewable energy, transmission infrastructure, and large-scale industrial land development, positioning the group as a key enabler of AI compute capacity in India. The firm has committed to building approximately 25 data centers across the country, with focus on sustainability and operational excellence.

3.2 Reliance (Ambani) Initiatives

Reliance Jio is investing heavily in cloud infrastructure, edge computing, and AI platforms, supported by high-capacity fiber networks and 5G connectivity. Reliance has announced a partnership with NVIDIA to build advanced AI infrastructure in India and plans to establish a massive AI-ready data center complex in Jamnagar powered largely by renewable energy from nearby solar, wind, and green hydrogen projects. This integrated approach aims to support both domestic AI applications and global cloud workloads, leveraging Reliance's telecommunications and digital services ecosystem. The Jamnagar project is expected to serve as a nucleus for India's AI compute leadership in the Asia-Pacific region.

3.3 Ecosystem Effects and Competitive Dynamics

Although Adani and Ambani are not directly collaborating in a single project, their parallel investments create a competitive ecosystem that accelerates infrastructure build-out and attracts global cloud and AI players. Expanded domestic capacity helps reduce India's reliance on foreign data processing, improves data sovereignty, and supports the growth of domestic AI startups and enterprises. The combined effect strengthens India's position as a trusted alternative to other Asia-Pacific data center hubs, creating a virtuous cycle of investment and innovation.

IV. ECONOMIC AND SOCIAL IMPACT

4.1 Employment and Innovation Ecosystem

AI data center investments create direct employment in roles such as data center operations, network engineering, cybersecurity, and AI infrastructure design, as well as indirect jobs in construction, real estate, and renewable energy. The sector also stimulates skill development, though India faces a shortfall of tens of thousands of trained professionals in cloud computing, AI operations, and data management. Expanded local AI compute capacity lowers latency and costs for startups and small enterprises building AI-driven products, enabling Indian companies to train models domestically and foster innovation without relying entirely on overseas infrastructure. Over time, this can create a more vibrant and competitive ecosystem for frontier AI technologies.

4.2 Digital Infrastructure and Global Positioning

Expanded data center capacity improves overall digital resilience by supporting faster content delivery,

better redundancy, and more robust cloud services across the country. As operational capacity in India scales into the multi-gigawatt range by 2030, the country can position itself as a key regional hub, complementing or competing with existing centers in Singapore and other APAC markets. This enhances India's strategic leverage in global technology and supply chains, particularly as AI infrastructure becomes an essential layer of national competitiveness.

V. ENVIRONMENTAL CHALLENGES AND RISK MITIGATION

5.1 Water Usage and Scarcity

India's AI data center build-out is occurring in a country that has 18 percent of the world's population but only about 4 percent of global freshwater resources. Water-intensive cooling systems in hyperscale facilities risk competing directly with domestic and agricultural water needs in regions that already face severe scarcity, such as parts of Maharashtra, Tamil Nadu, and Karnataka. A single 3,000 MW facility could consume up to 6 crore (60 million) litres of water per day, comparable to the needs of entire districts. If freshwater-dependent cooling continues unchecked, possible outcomes include rising water tariffs, forced rationing, and increased rural–urban conflicts over water access.

5.2 Energy Consumption and Emissions

AI data centers consume 5–10 times more power per unit than traditional enterprise facilities due to dense GPU racks and continuous operation. India's data center energy demand is projected to rise from 13 TWh annually in 2024 to 57–60 TWh by 2030, representing five-fold growth. As coal still provides a significant share of India's electricity generation, rapid expansion without aggressive renewable deployment can drive measurable increases in emissions and grid stress. Both Adani and Ambani have committed to renewable-powered facilities, but delivering on these commitments requires investments in storage, grid integration, and innovative power purchasing structures.

5.3 Lessons from the United States

Experience from U.S. states such as Arizona, Oregon, and California shows that unregulated data center expansion can contribute to groundwater depletion, rising electricity prices, and community opposition. In some localities, water use by data centers has reached hundreds of millions to over a billion litres annually, leading to concerns over long-term aquifer health. These cases underscore the need for strong environmental impact assessments, transparent reporting of water and energy use, and clear sustainability benchmarks for operators.

VI. POLICY RECOMMENDATIONS AND PATHWAYS FORWARD

6.1 Water and Energy Governance

India should restrict the use of potable water for data center cooling and instead prioritize treated wastewater, industrial effluents, or non-potable sources where feasible. Regulations can mandate zero-liquid-discharge systems, high rates of water recycling, and adoption of less water-intensive cooling technologies such as liquid immersion or advanced air cooling. Policy frameworks should require a rising share of renewable energy—such as 50–70 percent—for large AI data centers by target years, combined with incentives for on-site solar, storage, and participation in green open-access schemes. Metrics such as Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) should be monitored and publicly disclosed.

6.2 Urban Planning and Community Engagement

Dedicated "green data center zones" can be identified in locations with relatively lower water stress, adequate power infrastructure, and suitable climate conditions. Mandatory, sector-specific environmental impact assessments should examine cumulative effects on water, energy, and local ecosystems before approving large clusters. Regulators should require annual public reporting of data center water use, energy consumption, renewable energy share, and emissions intensity. Public consultations and community engagement processes can help identify local concerns and ensure that projects contribute to local development through employment and infrastructure co-investment.

6.3 Sustainability Standards and Long-Term Vision

Over time, India can move toward water-neutral and carbon-neutral certification standards for hyperscale AI data centers, linking compliance to regulatory and financial benefits. Integration of data center planning with broader renewable energy buildout—such as Adani's solar projects and Ambani's green hydrogen

initiatives—can create symbiotic infrastructure ecosystems. These coordinated policies can position India as a global leader in sustainable AI infrastructure, differentiating the country in the competitive APAC data center market.

VII. CONCLUSION

India's AI data center expansion, led by conglomerates such as Adani and Ambani and supported by strong policy and market demand, has the potential to make the country a major global hub for AI compute and digital services. The Indian data center market is projected to reach 12.85 billion USD by 2033, and the country's digital economy is expected to grow toward 1 trillion USD by 2030. At the same time, the intensive use of water, energy, and land poses significant environmental and social risks, particularly in already stressed urban regions. The central policy challenge is not whether to build AI data centers, but how to design and regulate them so that digital ambition is aligned with ecological limits and social equity. With proactive regulation, transparent governance, and a strong focus on renewable energy and water stewardship, India can pursue AI-driven growth without undermining long-term environmental security. The next decade will be critical in determining whether India emerges as a leader in sustainable AI infrastructure or faces a crisis of environmental mismanagement. Strategic collaboration among government, industry, and civil society is essential to navigate this crucial phase.

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