REPORT

GRI INDIA DATA CENTER FORUM 2024

KEY INSIGHTS FROM A SERIES OF DISCUSSIONS WITH THE BIGGEST DECISION MAKERS IN THE INDUSTRY

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INTRODUCTION

For more than 25 years, GRI Club's exclusive networking events have been providing unique opportunities for the industry's decision makers to exchange valuable insights and experiences, igniting deal flow and potential using the real estate market.

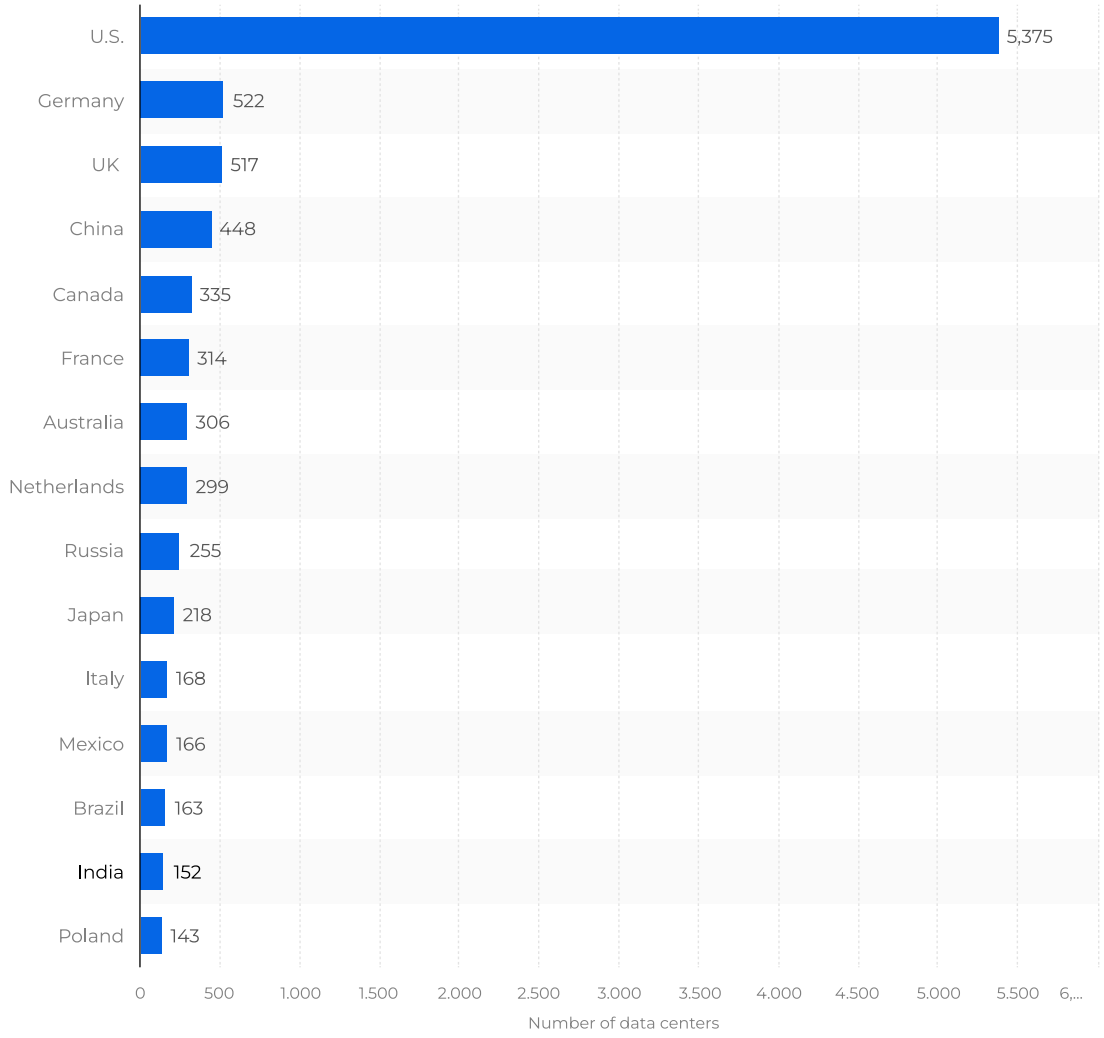
GRI Club reports provide the key takeaways from these events, including the most valuable insights, the most ardent discussions, and the most intriguing strategies.

This report was compiled following the conversations that took place at the **GRI Data Center Forum 2024** in **India**, where industry experts explored the critical aspects such as the evolving market landscape, design and infrastructure challenges, and the industry's future trajectory with AI and other emerging technologies.

INDIA'S DIGITAL DESTINY

India's economic growth is driving a surge in the demand for data centres, fueled by factors like data localization and cost efficiency. Positioned as a prime destination for this asset class, India leverages its abundant manpower and sustainable power sources.

Number of data centers worldwide in 2023, by country



Source: Statista Market Insights

Over the past decade, India has shown remarkable IT adoption, surpassing even the United States, particularly in sectors like banking. Participants reveal a growing demand, with around 1 gigawatt operational and an additional 1.5 gigawatts under construction.

Despite this positive trend, a notable observation emerges – data centre developers seem overly focused on global giants such as Amazon, Google, and Microsoft, potentially neglecting the vast potential within India's domestic enterprise market.

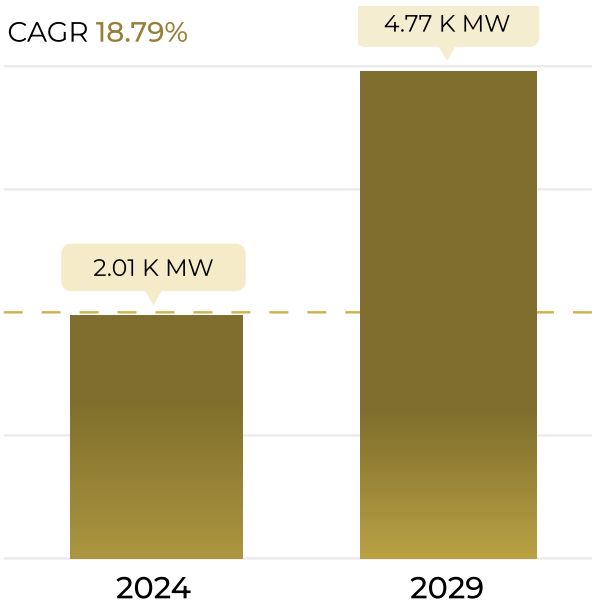
However, amidst this oversight, there is a shared acknowledgment of a promising future. Parallels were drawn with the continued growth of data centres in China and the US, creating a positive outlook for India's opportunity to follow suit over the next two decades. Forecasts go beyond mere expansion, predicting a transformation marked by new technologies and a surge in data centre construction.

Despite the optimistic phase, a crucial question looms: Is India prepared for the next generation of AI? The industry has shifted from constructing 20 to 30-megawatt facilities to colossal 100 to 300-megawatt data centres. The pace of development is set to increase drastically, posing a challenge for the entire Indian market to adapt and play a significant role in the global AI economy.

The vision extends beyond mere participation; it's about India taking the lead in a 20-year trajectory where AI becomes as indispensable as the internet is today. By 2040, AI is anticipated to permeate every facet of life, with India positioned at the forefront of this transformative wave. Addressing this challenge must be a collective effort, involving all stakeholders in the industry.

India Data Center Market

Market Size in Thousand MW



Study Period	2017 - 2029
Market Volume (2024)	2.01 Thousand MW
Market Volume (2029)	4.77 Thousand MW
Largest Share by Tier Type	Tier 3
CAGR (2024 - 2029)	18.79%
Fastest Growing by Tier Type	Tier 4

Major Players

EQUINIX, NTT, nxtra data, sify, STTelemedia

*Disclaimer: Major Players sorted in alphabetical order.

Source: Mordor Intelligence

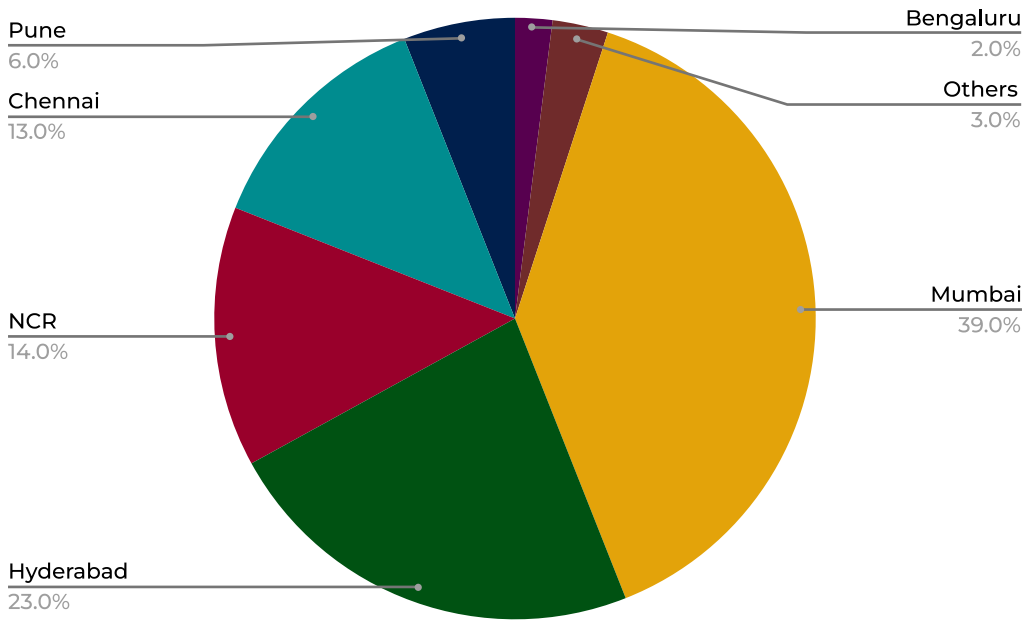
REAL ESTATE INVESTMENT INSIGHTS

The discussion began with a fundamental question: are data centres primarily a real estate or a technology business? According to the presented perspective, the answer lies in the seamless fusion of both, emphasising the construction of top-notch data centres that marry real estate excellence with cutting-edge technology.

The current landscape is likened to a gold rush, with a surge in data centre construction as hyperscalers flock to India. However, a cautionary note emerges - customization is paramount. The evolving technology, especially with the improvements in liquid cooling and the increase up to 30 kilowatts per rack due to new AI applications, necessitates specialised buildings.

This paradigm shift prompts a strong appeal to operators, urging developers and investors to embrace innovation and adeptly integrate new technologies to maintain a competitive edge in the industry.

Region-wise Distribution of Data Centres



Source: India Brand Equity Foundation (IBEF)

Taking a leap of faith is crucial. Entering the market two years ago, there were doubts about being late to the game. However, developers and investors must seize the imminent opportunities that the next decade holds.

Emphatically, experts encourage the proactive establishment of data centre campuses in every city, stressing that the infrastructure should not merely address current needs, but also anticipate and cater to the escalating demand, much like the strategic development of Special Economic Zones (SEZs) and IT parks.

While a methodical approach is better than an impulsive rush, the resounding message was clear—procure additional land, expedite construction processes, and promptly cater to the pressing needs of an eager customer base.

Investors and developers must embrace change, undertake calculated risks, and strategically allocate funds. The dynamic data centre sector offers enticing prospects, with the advantage of unique long-term contracts spanning 10 to 20 years, promising both short-term gains and enduring returns.

Success now depends on strategically positioning products to cater to entities with substantial financial backing. Developers need to move beyond traditional approaches and embrace the new era of building larger, more advanced infrastructure.

(Photos: GRI Club)

DECODING DATA CENTER DYNAMICS

Navigating the investment and development landscape for data centres requires a keen understanding of historical trends, global market developments, and the impact of evolving technologies.

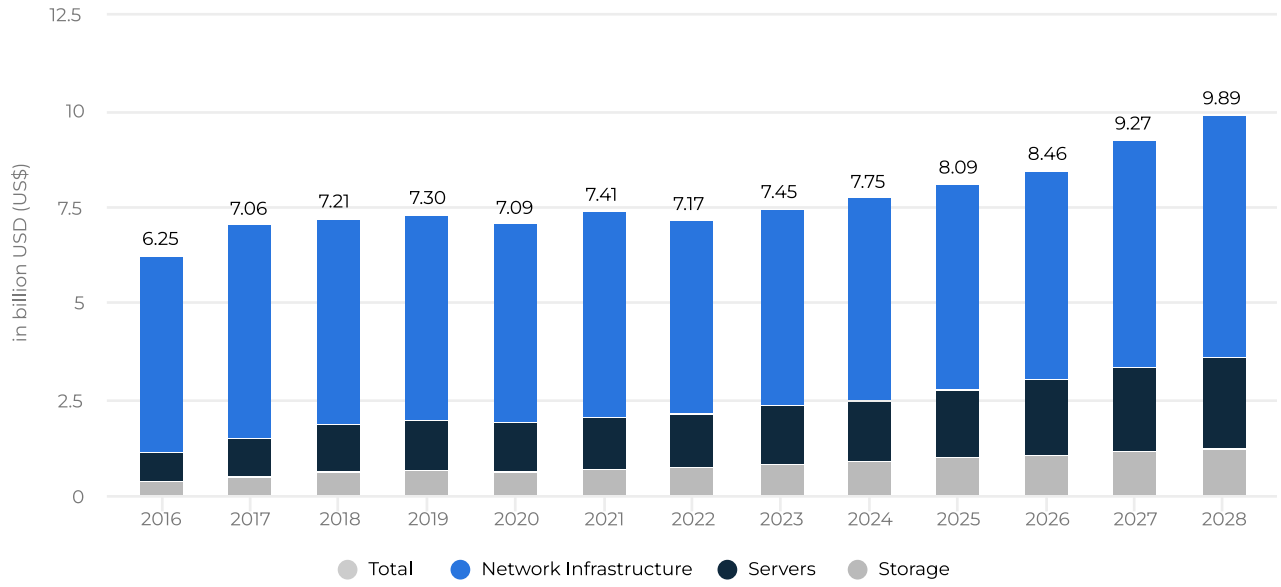
Exploring the evolution of computing technologies, from mainframes to the era of desktop computing, participants highlighted the role of the semiconductor industry in facilitating the shift towards distributed computing.

Acknowledging the challenges posed by data scattered across individual PCs, experts welcomed the advent of the internet and evolving standards, ushering in a transformative journey. This shift culminated in the prevalent server-client model, relegating servers to the background as data centres took the main stage, with mobile devices assuming the role of clients.

Although the industry has witnessed many significant transformations over the past 25 years, the emergence of hyperscalers in 2014 marked a pivotal shift, challenging traditional data centre models accustomed to serving enterprises, startups, and SMEs.

The present operational design capacity of industrial-level data centres stands at 1 GW, but a substantial surge is anticipated in the next two years, with overall capacity reaching 2.5 GW, highlighting a visible expansion.

Revenue by Segment



Notes: Data shown is using current exchange rates and reflects market impacts of the Russia-Ukraine war
Most recent update: Sep 2023
Source: Statista Market Insights

The heightened demand finds its roots in the changing landscape of technological interactions across sectors like banking, retail, automotive, and power. This surge is a direct result of the ongoing digital transformation, fostering increased data generation through automation and technological advancements.

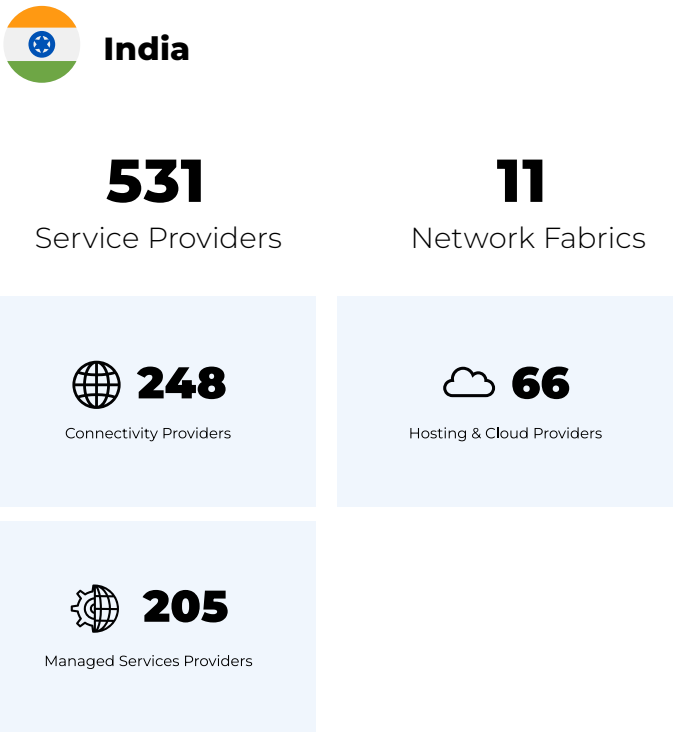
While domestic factors are the primary drivers of this growth, the expansion of India's economy and the global digital transformation - with worldwide spending expected to reach almost USD 4 trillion in 2027 - are expected to fuel considerable international demand.

The evolution of the industry, from small-scale ventures in the past to the current capacity additions, indicates a trajectory towards a more substantial data centre presence in India, albeit with unique challenges and considerations.

A critical blind spot identified during the discussion was the need for skilled manpower, robust MEP (Mechanical, Electrical, Plumbing) infrastructure, and an efficient contractor ecosystem. The conversation emphasised the necessity for concerted efforts to develop a skilled workforce and a supportive ecosystem to effectively address these identified gaps.

Addressing the need for adaptability and risk mitigation, the approach advocated involves designing on a macroscale and executing on a micro level. This entails building for maximum capacity while maintaining modularity, allowing for flexibility in catering to diverse clientele.

This proactive approach lays the foundation for modular solutions tailored to the unique demands of end customers, whether for hyperscalers, SaaS providers, banking and financial institutions, enterprises, or Colocation Centres (Colo).



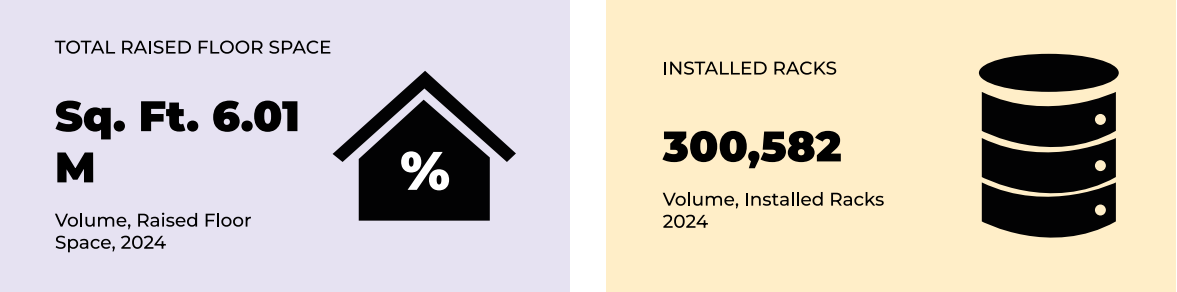
Source: Cloudscene 2024

DESIGNING THE FUTURE

Highlighting the shift from the traditional linear capacity model, the conversation emphasised the necessity for the development of new data centres to focus on operational efficiency, speed, and accommodation of Digital, AI, and Machine Learning (ML) requirements.

Specific details underscored the need for advancements in construction techniques, sustainability, and enhanced network connectivity to meet the demands of emerging technologies.

Choosing data centre locations extends beyond construction, with key considerations including height and weight specifications, the need for special-purpose buildings, the importance of network availability, airport access, and efficient utilisation of India's ample power resources.



Source: Mordor Intelligence

Participants also addressed the critical role of enhanced connectivity infrastructure, driven by issues linked to outdated submarine cables and technical aspects distinguishing data centre networks from traditional telecom networks. A stark reality was noted—current submarine cables are becoming obsolete, with an anticipated 20-25% remaining relevant.

Expected to come online in 2025 and with a bandwidth projected to exceed the entire network's data flow, an ambitious project to deploy the most powerful cable to operate in India is currently underway. This, however, might be just the beginning, as India is predicted to require multiple such projects.

At this point, collaboration with telecom operators and governmental policies becomes essential to facilitate the development of robust optical fibre infrastructure. The implementation of more streamlined policies was identified as a key issue when it comes to significantly easing infrastructure development.

Design considerations also took the spotlight, emphasising the significance of flexible and modular approaches. Operators grappled with creating adaptable facilities for diverse clientele needs, incorporating scalable solutions like flexible power distribution systems, cooling techniques, and infrastructure layouts to optimise resource utilisation.

Addressing power issues and cooling technologies, especially with the growing presence of hyperscalers, the suggested approach involved a macro design strategy for overall capacity planning, complemented by micro execution strategies tailored to specific areas or workloads.

Solutions on advanced cooling technologies for data centres involved outlining three key approaches:

Rear Door Heat Exchanges (RDHx):

The cooling device, which resembles an automobile radiator, is placed in the airflow outlet of a server rack. During operation, hot server-rack airflow is forced through the RDHx device by the server fans. Heat is exchanged from the hot air to circulating water from a chiller or cooling tower.

This system contributes to energy efficiency in a data centre facility in several ways. Firstly, once installed, the device operates without direct reliance on infrastructure electrical energy. Secondly, RDHx devices can enhance efficiency by using less chiller energy, performing well at higher chilled water set-points.

Thirdly, depending on climate and piping arrangements, RDHx devices can eliminate the need for chiller energy by utilising treated water from a plate-and-frame heat exchanger connected to a cooling tower. These inherent features help minimise energy consumption and reduce maintenance costs.

Direct liquid cooling (DLC):

This approach, also called direct to chip liquid cooling, involves establishing a cooling loop. Cold liquid is directed to cold plates, mounted on the hottest components, absorbing heat sent to a Coolant Distribution Unit (CDU) and a heat exchanger for dissipation. Typically located in the rack or shared by rows, the cooled liquid returns to the cold plates, completing the loop.

This method, capable of extracting up to 80 kW per rack (60-70% of the heat), enhances data centre efficiency and reduces energy costs by up to 45%. The remaining heat is usually dissipated through other methods, commonly using a fan wall at the rear of the rack.

Concerns arise regarding potential complications during operation, given the increased complexity of managing water pipes alongside network and power cables within each rack. The decision to adopt DLC involves assessing associated risks, related to water pressure balance and potential leakage, especially when dealing with high-value IT equipment.

Immersion cooling:

The newer and most experimental approach is another form of liquid cooling. It involves submerging servers directly into a non-conductive liquid bath. This method efficiently transmits thermal energy from the server's components to the surrounding fluid without the need for additional active cooling systems like heat sinks, heat pipes, or fans.

There are two types of immersion cooling. In single-phase, the coolant remains in a liquid state, pumped by the cooling distribution unit and cooled by the heat exchanger. In two-phase, the liquid is boiled to vapour and then condensed back into a liquid through condenser coils.

Additionally, immersion cooling presents the potential for energy reuse, enabling data centres to reduce their carbon emissions by up to 45% compared to traditional cooling methods.

As the industry prepares for the surge in demand driven by digital transformation, the collaborative effort of telecom operators, policymakers, and industry leaders is crucial.

Flexibility and adaptability also remain key principles in designing and executing data centre strategies, ensuring they align with the dynamic requirements of the ever-evolving technology market.

THE GREEN DILEMMA

A notable observation surfaced during the sessions—markets traditionally influenced by a handful of major customers, suggesting substantial pricing power, are now grappling with the environmental consequences of escalating power consumption.

The central issue revolves around the rapid increase in power consumption by data centres globally, raising concerns amongst governments and the public about environmental sustainability and the challenges posed by global warming.

The persistent influx of data worldwide poses a multifaceted challenge for the industry, seeding doubts about the feasibility of reducing power consumption. A pressing need for a significant transition to renewable power sources is mentioned, suggesting an imminent shift towards more sustainable practices in the industry.

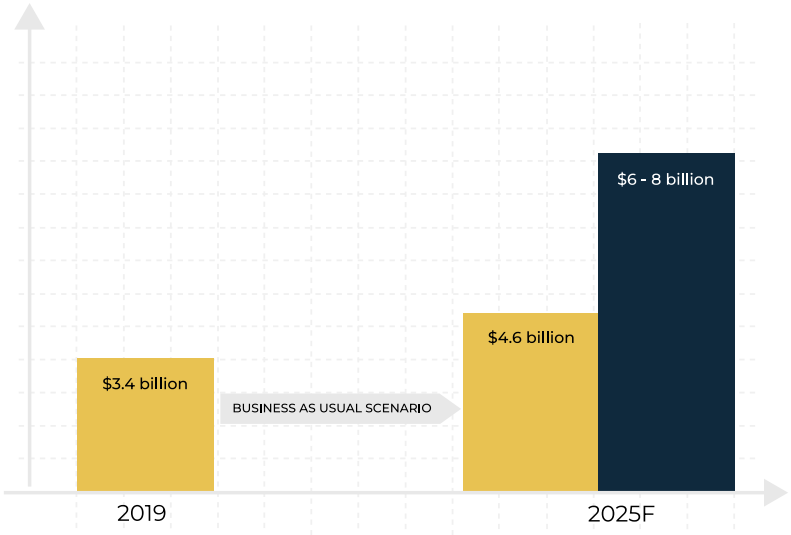
Experts advocated for India's leadership in sustainable development, proposing innovative initiatives such as establishing a substantial fund and collaborating with renowned universities on efforts to reduce power consumption.

The cost of power is another significant aspect, with sustainable power in India being reportedly less expensive than the grid, unlike the U.S. This cost dynamic positions India favourably, potentially securing more capacity as the global industry evolves.

Building on these discussions, the session highlighted the vital role data centres play in energy conservation. When a workload transitions from an on-premise server to the cloud, there's a significant reduction in energy consumption.

This underlines the potential for positive environmental impact through strategic shifts in data management practices.

India Datacentre Market Investment



Source: Arizton and NASSCOM

(Photos: GRI Club)

GRI Club
REAL ESTATE

Founded in 1998 in London, GRI Club currently brings together more than 15,000 senior executives spread across 100+ countries, operating in both real estate and infrastructure markets.

GRI Club's innovative discussion model allows free participation of all executives, encouraging the exchange of experiences and knowledge, networking, and business generation.

GRI Club Members also have access to our exclusive online platform to learn more about other members and their companies, correspond, schedule meetings, and receive unrestricted access to all GRI Club content.

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