

Be the Energy SALviour

- By Amitabh Kant*

In the years following the COVID-19 pandemic, we have witnessed one of the most transformative revolutions in technology history: the advent of useful, ubiquitous, and unlimited artificial intelligence. The race is on to secure the technology, infrastructure, and economic opportunities emerging from this new AI era. As AI continues to transform industries and revolutionize our daily lives, the demand for energy-intensive AI processing is skyrocketing. India, with its abundant renewable energy resources and burgeoning AI ecosystem, is well-positioned to become a global leader in green energy-powered AI processing.

AI processing requires massive amounts of energy, with estimates suggesting that training a single AI model can consume up to 284,000 kilowatt-hours (kWh) of electricity in the data center. A single ChatGPT query takes nearly ten times as much energy as a typical Google search and as much energy as keeping a five-watt LED bulb on for an hour. Furthermore, data centers alone account for 1% of global electricity demand, highlighting the need for sustainable energy solutions. AI computing needs necessitate the immediate build-up of large-scale data centers, known as hyper-scale data centers. These new hyper-scale data centers require reliable green power at a scale and speed that most regions struggle to accommodate. Global data center energy requirements are projected to reach 4,000 TWh by 2030, accounting for 5% of global electricity demand.

Renewable power plants have the least commissioning timelines due to their modular nature. Many regions struggle to keep up with the rapid pace of renewable energy construction, while also ensuring sufficient transmission lines to deliver the power to consumers. India has set ambitious renewable energy targets, aiming to generate 50% of its electricity from non-fossil fuels by 2030. With over 300 days of sunshine per year and generous wind speeds, India has immense solar energy potential, which can be harnessed to power AI processing.

India's true strength lies in local green energy champions, from the private and public sectors, who have the capacity to implement world-class and world-scale energy projects. The renewables industry is backed by a modern single national grid and a dynamic regulatory framework. India's AI ecosystem is growing rapidly, with over 1,000 AI startups operating in the country. Moreover, 20% of global AI talent resides in India, making it an attractive location for AI companies. The AI market size in India is expected to reach USD 7.8 billion by 2025, driven by increasing demand for digital services, e-commerce, and cloud computing.

India's data center market is growing rapidly, driven by increasing demand for digital services, e-commerce, and cloud computing. According to a report by *MarketsandMarkets*, the Indian data center market is expected to reach 1,432 MW of installed capacity by 2025, growing at a CAGR of 21.1%. By 2030, the market is projected to reach 3,243 MW of installed capacity, with a growth rate of 15.6%. A recent Financial Times article posits that India may quickly become Asia Pacific's No 1 data center market – led by hyper-scale data centers.

The needs of a data center are distinct from other infrastructure projects. The data center is designed and built for the highest standards of reliability, security, modularity, redundancy, and

security. The ability of the data center to provide backup power with redundancy is also critical for its success. Even though diesel generators are the dominant backup technology for current data centers, green technologies such as batteries (6-hour backup) and hydrogen fuel cells (48-hour backup) are increasingly explored by big tech to reduce carbon intensity. With water being a significant barrier to the expansion of hyper-scale data centers, intelligent integration with technologies such as fuel cells that produce water as a by-product could be an interesting proposition.

Google's AI-powered data center in Hyderabad is powered by 100% renewable energy, setting a precedent for sustainable AI processing. Microsoft's AI-powered data center in Pune uses solar power for primary energy needs, further demonstrating the potential for green energy-powered AI processing. The Indian government's "Make in India" initiative encourages the development of green data centers and AI infrastructure, providing a supportive policy framework for the growth of this sector.

To ensure success in the AI data center sector, India should promote a net-zero hyperscale data center policy aiming to position itself as the world's most sustainable data center destination. The country should aim to unlock a significant number of carefully selected sites that can provide round-the-clock green power with appropriate green backup power options. Additionally, India should attract and nurture skilled talent capable of building cutting-edge data centers with high levels of autonomy and security. Innovations for efficient configuration of data centers that minimize energy and water requirements should be promoted through publicly funded pilots. Finally, India should build global trust in the integrity of data protection on Indian soil with appropriate policy, regulatory, and outreach initiatives.

India's clean energy strengths and growing AI ecosystem make it an ideal location to become a world leader in green energy-powered AI processing. By leveraging its renewable energy strengths and addressing the challenges of AI data centres ahead, India can reduce its carbon footprint, enhance its reputation as a hub for sustainable business and innovation, and drive economic growth and job creation in the clean energy and AI sectors.

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