

TV RAMACHANDRAN

INDIA'S DIGITAL RISE RUNS INTO AN ENERGY WALL



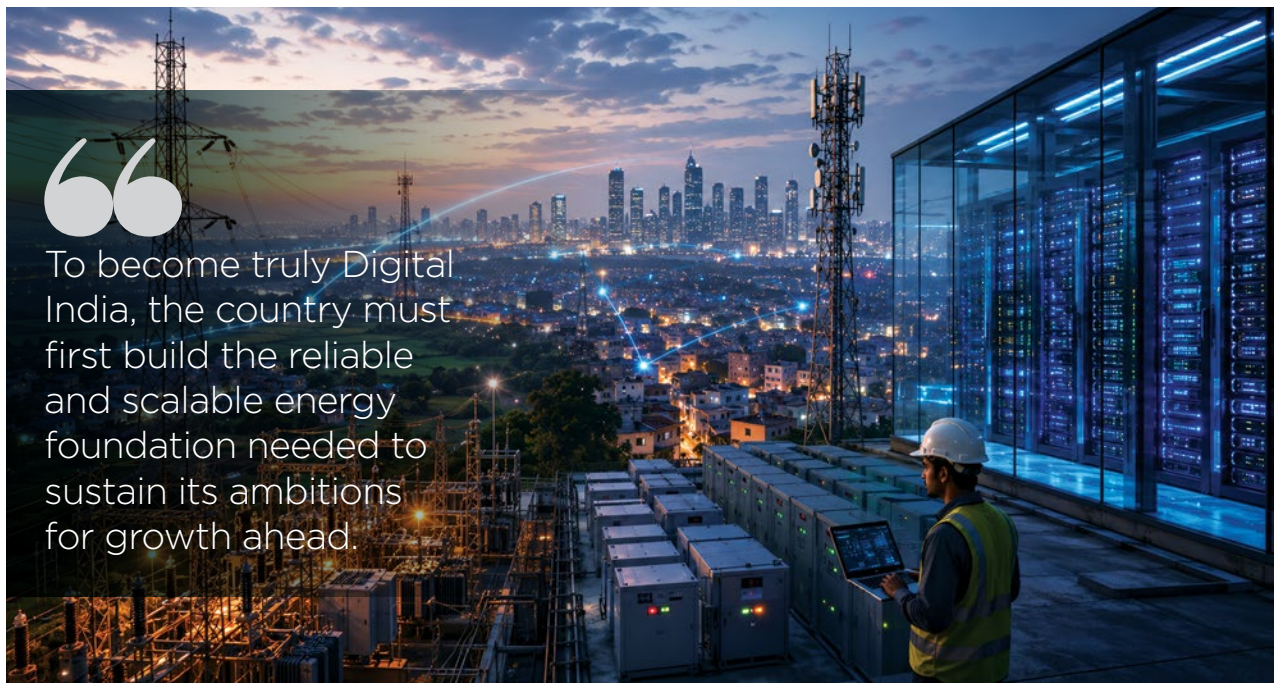
AI workloads, data centres, and broadband growth are pushing India toward a defining challenge: power resilience and nationwide digital expansion.

Unarguably, quality living in modern times demands heavy data usage, as the internet and data-intensive apps are woven into almost every aspect of our day-to-day work, socialising and entertainment. Hence, India's digital transformation is one of the most remarkable stories of our time.

From digital payments to online education, from e-governance to e-commerce, the country has adopted technology at a prodigious scale. However, somewhat overlooked is the significant sustainability price to be paid for it - the high energy costs, and this is probably because India is at the lower end in the global scale of per capita energy consumption.

There is a temptation in some quarters, especially among environmentalists, to portray India's low per capita energy consumption as a "green" advantage—a sign of an advanced, low-carbon, frugal society. This is a dangerous delusion.

India, home to nearly one-fifth of humanity, currently consumes less than one-tenth of global energy. Our per capita energy consumption is one-third of the global average, one-tenth of the USA's and one-fourth of China's. This low consumption level, unfortunately, reflects both a harsh developmental reality and a future challenge. As digital adoption deepens, particularly as AI permeates every facet of our lives and economic activity expands, energy demand is set to rise sharply.



To become truly Digital India, the country must first build the reliable and scalable energy foundation needed to sustain its ambitions for growth ahead.

India's ambitions in AI, cloud, and digital infrastructure may ultimately depend on how rapidly it expands reliable, affordable power nationwide.

The digital ecosystem is becoming a significant contributor to this demand. Mushrooming mobile towers and data centres, which power everything from streaming services to cloud applications, require vast amounts of electricity. Sharpening the per capita increase in energy requirement is inevitable.

For India, the challenge is not just to meet this rising demand, but to do so sustainably. This requires a fundamental rethink of how digital infrastructure is built. We are having to strike the right balance in bridging the rather deep chasm between India's digital dreams and its power deficit.

We have to grant that in today's grand theatre of global geopolitics, energy consumption is the most honest indicator of a nation's metabolic rate. While services and high-finance manoeuvres can massage GDP figures, energy—the physical capacity to do work—reveals the raw truth of a country's industrial depth, domestic comfort, and technological sophistication. For India, a nation currently intoxicated by dreams of becoming a "Digital Superpower" and an "AI-First Economy," the energy data presents a sobering, almost chilling, reality.

As of 2024-25, India's per capita electricity consumption stands at approximately 1,460 kWh. To the uninitiated, this might seem like a respectable climb from the dark days of the early 2000s. However, when placed on the global scales alongside the titans India aspires to emulate, the disparity is not just a gap—it is quite startling.

An American citizen consumes nearly 9 times as much electricity as an Indian. Even China, which shared a similar developmental trajectory with India for decades, now consumes nearly five times as much electricity per person. Perhaps most telling is Brazil—a fellow BRICS member with a significant tropical footprint—whose citizens still utilise more than double the energy of their Indian counterparts.

In a developing economy, low energy consumption is not a merit; it is a constraint. It is actually a proxy for thousands of small-scale industries that cannot automate due to "peak-load" shedding, and for a rural population that still likely uses biomass for cooking, leading to severe indoor air pollution and other problems.

In the context of India's "Viksit Bharat 2047" (Developed India) vision, our current energy position needs urgent improvement. Energy is the "master resource. Without a massive surge in the availability of cheap, reliable power, the transition from a developing to a developed nation is physically impossible. You cannot run a first-world economy on a third-world energy level.

THE DIGITAL AMBITION VS THE PHYSICAL CONSTRAINT

The most pressing concern lies in the collision between India's digital roadmap and its energy reality. India is currently undergoing a "Data Centre Frenzy." With 'unique internet penetration' crossing 55% in 2025—predominantly through mobile—monthly data usage has reached 32 GB per user. However, this is just the tip of the iceberg, since the really intensive data-critical apps would need heavy fixed broadband penetration and usage and, as already seen in the USA and Europe, per fixed-line monthly data consumption would soon exceed 500 GB. This is already being experienced on the limited fibre-based fixed broadband in India. This is bound to scale up fast.

Moreover, Artificial Intelligence is not just software; it is a power-thirsty. Training a single large language model can consume more electricity than a small Indian town uses in a year. If India intends to build its own sovereign AI stacks, it will need a massive, dedicated power surplus that does not exist yet.

The cooling crisis: Unlike the USA or Germany, India's data centres must operate in ambient temperatures often exceeding 40°C. The energy required to keep these "digital brains" from melting is a significant overhead that nations with cooler climes do not face.

The reliability gap: Digital economies require "five-nines" reliability (99.999% uptime). Our current grid, while improving, still struggles with quality and stability. For a global tech hub, a millisecond flicker in the power supply could mean a catastrophic failure.

THE PATH FORWARD: A RADICAL EXPANSION

The Indian government's Draft National Electricity Policy 2026 recognises this existential threat. It sets an

A mobile-first internet model helped India scale connectivity quickly, but fibre and Wi-Fi may prove far more sustainable for future demand across modern networks.

ambitious target of 2,000 kWh per capita by 2030 and 4,000 kWh per capita by 2047.

Is this achievable? The evidence suggests we are moving in the right direction, but the path is steeply uphill. India added a historic 34.6 GW of non-fossil fuel capacity in FY2025-2026 alone. As of late 2025, over 50% of our installed capacity comes from non-fossil sources. This is a global gold standard for energy transition.

However, “installed capacity” is not the same as “generation.” Solar does not work at night, and wind is seasonal. To support a 24/7 digital economy, India must solve the storage puzzle. We need massive investments in Battery Energy Storage Systems (BESS) and Pumped Hydro, alongside a pragmatic realisation that “baseload” power from nuclear and high-efficiency coal cannot be abandoned prematurely.

Today, India’s internet usage is overwhelmingly mobile-driven. While this has enabled rapid access, it is not the most efficient way to deliver high volumes of data. Mobile networks are energy-intensive, particularly when scaled for dense usage and high data consumption. Fibre-based broadband, on the other hand, offers a more sustainable alternative. It can deliver significantly higher capacities with lower energy consumption. When paired with Wi-Fi for local access, it offers a significantly more energy-efficient and cost-effective connectivity model.

This is particularly relevant for India, where indoor data usage dominates. Wi-Fi-based access reduces the need for high-power mobile transmissions, improving both energy efficiency and user experience.

India’s ambition to become a global hub for data centres and digital services depends on reliable, efficient, and sustainable infrastructure. Energy costs are a major component of data centre operations. By adopting energy-efficient connectivity models and integrating renewable energy sources, India can enhance its attractiveness as a destination for digital investments. Such an approach would also align with India’s broader sustainability commitments.

Reducing the energy intensity of the digital economy can contribute to climate goals while supporting economic growth. Policy support will be critical in enabling this transition. Expanding fibre infrastructure, particularly in underserved areas, must remain a priority. Public Wi-Fi initiatives, such as PM-WANI, can play a key role in extending connectivity while maintaining efficiency.

The recent de-licensing of 500 MHz of spectrum for Wi-Fi in the 6 GHz band, which facilitates low- and very-low-power use cases, should further enhance capacity and performance while conserving energy sustainably. At the same time, industry must invest in energy-efficient technologies, from advanced cooling systems in data centres to optimised network equipment.

India now stands at a crossroads. It can either follow traditional, suboptimal and energy-intensive models of digital growth, or it can chart a more sustainable path that leverages efficiency as a core principle. The choices made today will determine not just the pace of digital expansion but also its long-term viability.

India’s low energy consumption per capita is the final frontier of development. While we celebrate our digital apps and our fintech prowess, we must remember that every byte of data is ultimately a stream of electrons.

To be “Digital India,” we must first be “Powered India.” We should try to reach the middle energy bracket occupied by China and Brazil as soon as possible. If we fail to bridge this gap to the middle, our digital ambitions will remain just that—dreams deferred by a flickering light bulb. The “India Story” of the next two decades might then not be written in code; it could be written in the power of our grid.

India’s digital future must not become an energy burden. Instead, it could become a model of how growth and sustainability can go hand in hand. 🌱

The author is Hon. FIET (London) and the President of BIF.

(Views are personal.)

Research inputs by Neha Hathari.

feedbackvnd@cybermedia.co.in