

**TIMES INTERNET** | **Run Past Your Limits** | Not About Speed. About Spirit.

21.1Km Go All-In | 10Km Push Limits | 5Km Level Up | 2Km Run For Fun

Major Dhyan Chand National Stadium, India Gate **Book Your Slot**

(https://timesofindia.indiatimes.com/times-events/marathon?&acqSource=TOI\_Web\_Banner&acqSubSource=TOI\_Web\_Banner&utm\_source=TOI\_Web\_Banner&utm\_medium=TOI\_Web\_Banner&utm\_campaign=TOI\_Web\_Banner)

News (https://timesofindia.indiatimes.com/)

# Why India must aspire to be a green lab for climate innovation

Climate tech should be viewed as an opportunity for building industries, skilled jobs, and enhancing energy and national security. India now has the chance to show that economic expansion and deep decarbonisation can go hand in hand



**Arunabha Ghosh** (<https://timesofindia.indiatimes.com/toireporter/author-Arunabha-Ghosh-479267769.cms>) | TNN

Nov 26, 2025, 8:06 IST



Illustration: Uday Deb

India is seeing floods and erratic rain across states and the urgency of home-grown climate solutions has never been clearer. We cannot afford to remain mere technology takers in the fight against climate change. India must be an innovator, an adaptor, and, above all, a country that can scale solutions.

Climate technologies have for too long been viewed as niche 'green' alternatives. But climate tech is not merely an environmental play. It is an asset for industrial development, highvalue jobs, enhanced energy and national security. Climate tech can be an asset class — like the internet or AI — a general-purpose technology driving productivity across sectors. By leveraging climate tech and

institutional innovation, India can show how a large economy can grow and decarbonise — becoming a green beacon for the Global South.

### **Technologies that matter**

Consider the progress we have already made. A decade ago, utility-scale solar power in India cost around Rs 5 per unit; today, transparent auctions have yielded competitive tariffs that have fallen to approximately Rs 2-2.5 per unit, making solar the cheapest source of electricity. More importantly, recent solar-plus-storage auctions have delivered firm, dispatchable power at Rs 3.1/kWh, cheaper than new coal.

India's renewable energy capacity has nearly trebled over the last decade, growing from about 76GW in 2014 to 237GW in 2025. Further, India registered 1.9 million EVs in FY25, of which 59% were two-wheelers. Meanwhile, the UJALA programme has distributed over 360 million LED bulbs, reducing both bills and roughly 37 million tonnes of CO<sub>2</sub> emissions each year. These successes show what happens when technology is paired with smart policy and market creation.

But climate innovation cannot stop at solar panels and LEDs. We need to push across four fronts with a smart mix of each.

Foundational technologies that adapt proven solutions for Indian conditions — solar, EVs, and energy-efficient appliances. Rapid commercialisation of these already available technologies can drive clean energy adoption, create local manufacturing, and generate jobs. Solar-plus-storage for MSME clusters can offer cheaper power and increase competitiveness exactly when MSMEs (40% of exports) are buffeted by tariffs.

Transitional technologies that are not yet optimised for India but proven elsewhere. For instance, integrating 500GW of renewables into our grid by 2030 will require flexible storage, advanced forecasting, and upgraded distribution networks. We must invest in grid flexibility as well as leverage smart meters to optimise use of the sun and wind for lower energy bills and more efficient appliance use.

Climate resilience and breakthrough innovations complete the picture. Climate resilience innovations must tackle India's severe climate shocks. For example, using IoT and blockchain for surveillance and land-water monitoring, and AI for advanced modelling and hyperlocal forecasts. At the Council on Energy, Environment and Water (CEEW), we are building a Climate Resilience Atlas for India. It is a tool that empowers everyone — from banks and investors to policymakers, local administrators, the media and citizens — to pinpoint where climate change is accelerating extreme weather, downgrading agriculture yields, and damaging infrastructure. It turns complex climate data into actionable insights.

Breakthrough technological innovations are the moonshots — or rather earthshots — such as scaling green hydrogen via clear end-use cases, carbon sequestration in India's large basalt formations, or research and experiments in solar geoengineering. The risks are high, but so is the disruptive potential. To make informed policy decisions, we need research. To make venture investments, we need a willingness to fail.

These are not just climate technologies, but enablers of the growth engines of the 21st century.

### **The Enablers**

In its Intended Nationally Determined Contribution (INDC) submitted in 2015, India stressed that low-carbon growth would require moving technologies 'from lab to field'. The pathway must now extend from 'lab to field to market'. Three enabling conditions are non-negotiable.

The first is governance. India needs clear policy signals on where we seek to build a technological advantage. We also need to institutionalise a risk appetite that cuts two ways: using market instruments to induce competition and reduce risk, but also use institutional guarantees to encourage risks in breakthrough technologies. For instance, the National Green Hydrogen Mission is an ambitious start, but production targets will not materialise unless procurement commitments, blending mandates, and demand guarantees are in place.

The second is investment. India's innovation ecosystem is still capital-starved. We need a national climate innovation fund that blends public, private, and philanthropic capital to de-risk early pilots. Think about a combination of the US Advanced Research and Projects Agency for Energy (ARPA-E) and the UK's more recent Advanced Research + Invention Agency (ARIA). Every rupee of public capital should be designed to crowd in at least five rupees of private investment.

The third is market creation. Technologies do not scale in a vacuum. The LED transition worked because the government created assured demand through bulk procurement, driving down prices. Similar instruments could drive markets for low-carbon cement, biomass-based fuels, electric buses, and now even green ammonia.

### **A lab from the global south**

Without these enablers, India risks swapping oil imports for dependence on solar modules, batteries, or rare earths. Instead, it must position itself as a laboratory for climate innovation.

Our scale and scarcity make us uniquely suited for this role. Energy demand is expected to treble in the next two decades. Our urban population will double by

2050. Heatwaves, floods, and storms are already disrupting livelihoods and supply chains. If a technology can work in India, it can work in most places.

To play this role, India should establish mission-driven R&D consortia that bring together universities, national labs, and commercial enterprises, with flexible intellectual property arrangements that enable codevelopment. It should also build open-source platforms for patents, designs, and data, lowering barriers for startups and MSMEs.

Climate innovation is not just about technology; it is about geopolitics. Technologies may be renewable, but their supply chains are currently not. India must create trusted technology partnerships (especially with other countries in Asia, Africa, and Latin America), diversify supply chains, and invest in circularity. We must be co-owners of tech and not passive recipients.

Finally, for India's young engineers, entrepreneurs, and investors, the climate challenge is not a constraint. It is an opportunity.

The greatest infrastructure build-out in human history is under way. The materials we choose, the industries we power, and the cities we design will either lock us into carbon dependence or climate-proof our growth. India must aspire to become the green laboratory — and the green factory — for climate-friendly technologies for the world.

*The author is CEO, Council on Energy, Environment and Water (CEEW), and special envoy for COP30, representing South Asia*

### Be the first one to comment

Post a comment

---

### Up Next

**International** (<https://timesofindia.indiatimes.com/Toi-Plus/international-114042653>)

## How did an IIT Madras graduate's American dream end in tragedy?

From IIT Madras to UC Berkeley, Saketh's academic journey embodied the aspirations of many Indian students overseas. His sudden death has sent shockwaves across two continents.