

HIGH PERFORMANCE BUILDINGS (HPBs): AN EXPLAINER



Why consider HPBs?

India's real estate sector - large, rapidly growing, and a major contributor to carbon emissions - needs transformative intervention. The sector presently accounts for about 7-8% of the Gross Domestic Product (GDP), is projected to grow 5x from 2021 levels by 2030, and accounts for 21-22% of India's current emissions.

The case for intervention is strongest in commercial buildings. Commercial buildings in India typically consume much more energy (150-200 kWh/m² annually) compared to residential buildings (30-70 kWh/m² annually).

Resource-efficient design that improves building performance is key to transforming India's energy and carbon intensive real estate sector. It promises reduced operational costs for business, reduced greenhouse gas (GHG) emissions, and an opportunity to reprioritise public expenditure on new power plants.

What are HPBs?



HPBs are highly resource efficient and cost-effective buildings, using only Factor 2 (half) to Factor 4 (one-fourth) of the energy and water benchmarks specified by current Indian codes. They also meet national standards for indoor air quality (IAQ), waste management, and resilience, and their performance is continuously monitored and verified.

HPBs use technologies such as high-performance windows, advanced insulation, efficient lighting, heating, ventilation, and air-conditioning (HVAC), and electrical systems, smart controls, water-efficient systems, and building management systems. Together, these technologies improve thermal comfort, IAQ, and overall resilience, throughout the building's life cycle.

HPBs present a game-changing opportunity to respond to business, climate, sustainability, innovation, and job creation goals in India. For instance, even if half of the country's projected commercial building stock of 2030 is constructed or retrofitted on HPB principles, it will save businesses USD 432 billion in energy costs, create 10 million permanent and skilled green jobs, avoid 600 million tCO₂-eq of GHG emissions, and help reprioritise USD 1.1 billion of public sector energy investments.

These efficiencies and outcomes make a compelling business and ESG case for real estate developers to build HPBs at scale, for building buyers/ tenants/ occupants to strongly embed building performance parameters in their decision-making, and for policymakers and financial sector decisionmakers to consider enabling measures and arrangements for HPBs.

What are the key features of HPBs?



Performance Optimisation: Building performance is enhanced, with an Energy Performance Index (EPI)¹ lower than 70



Resource Efficiency: Building is designed to be resource efficient, with smart design strategies and deployment of advanced building envelope, HVAC systems, water-saving features, and low-carbon building materials



Operational Efficiency: Building incorporates smart technologies like building management systems (BMS) and energy management systems (EMS) for real-time monitoring for continued performance improvements



Thermal Comfort: Building ensures comfortable indoor temperature, humidity, and lighting for occupants through better building envelope design, window-to-wall ratios, and climate control systems



Indoor Air Quality (IAQ): Building uses modern ventilation and filtration systems to create a healthy and comfortable indoor environment



Durability and Resilience: Building uses efficient materials to help it withstand environmental challenges and last longer

¹EPI is the energy used per unit area measured on an annual basis in kWh/m²/year and is the key metric used for benchmarking energy use in buildings.

Are HPBs more expensive to make and run?

With care and attention, HPBs can be built with low or no additional cost. Even if higher initial costs are incurred, the operational savings from HPBs on energy and water bills, reduced maintenance costs, and potential tax incentives, lead to an attractive return on investment.

Maintaining HPBs often requires specialised facilities due to the advanced technologies and systems involved (add comma) and the staff expertise in energy management, building automation, and sustainable operations. While costs associated with these maybe higher compared to those in conventional commercial buildings, operating costs of HPBs are significantly lower on account of energy and water savings (add comma) and make HPBs less costly to run.

Overall, HPBs offer a strong return on investment over the building's life span.

Importantly, there are other opportunities they present for businesses, including:



Improved property value proposition with buyers/ tenants who prioritise operating efficiencies and occupant comfort and health and wish to signal responsible corporate citizenship and alignment with evolving regulations and disclosure requirements



Available policy and regulatory support, including tax deduction on energy-efficient investments, incentives for installing renewable energy systems, faster approvals and concessional loans for green-certified buildings, property tax rebates, and higher FAR



Potential access to climate finance and ESG investment, given HPB's significantly reduced carbon footprint

How are HPBs distinguished from green (-certified) buildings?

HPBs set more ambitious and customised performance goals than typical green buildings, as presented in the Table below.

Energy Performance Index values achieved for different building standards

Building Typologies	Standard Building	Energy Efficient / Green Buildings	High-Performance Buildings
Office: New	125 - 150	90 - 110	70 - 75
Office: Retrofit	150 - 175	150 - 175	100 - 125
Institutional	150 - 175	75 - 90	70 - 75
Healthcare (24hr)	325	225 - 275	190 - 200
Hospitality (24hr)	325	275 - 300	200 - 225

Further, water use in a HPB is typically 25 lpcd (litres per capita per day), lower than the 45-50 lpcd targeted in standard buildings, and HPBs typically reduce carbon emissions to 0-20 kg CO₂e/m²/year, compared to the 20-60 kg CO₂e/m²/year targeted in a green building.

Given their accent on performance, HPBs accord higher emphasis to the following:



Technological Integration: HPBs achieve: (a) higher energy savings with advanced technologies like efficient HVAC, automated lighting, and energy-saving appliances; (b) lower cooling needs with better insulation, high-quality windows, and smart building designs strategies; and (c) higher water savings with water recycling, rainwater harvesting, and low-flow fixtures



Ongoing Performance Optimisation: HPBs achieve this through: (a) BMSs and EMSs that track and adjust energy, water, and IAQ, leading to 10-20% improvements in operational efficiency annually; (b) advanced technologies like IoT sensors and data analytics that provide real-time control over lighting, HVAC, and water systems, reducing energy and water consumption by an additional 10-15% beyond initial design expectations; and, (c) periodic fine-tuning with continuous commissioning that saves an 5-10% in energy cost and reduces carbon emissions by 20-30% compared to non-monitored systems

ASSURE Approach to Technical Assistance (TA) for Lighthouse HPB Projects

ASSURE will partner with lighthouse projects aggregating to 100 million sq. ft., by offering technical assistance to turn them into HPBs. This will involve working with developers and their planning and design, operations, and facilities management teams to demonstrate the potential for change and innovation at scale across India's largest cities.

The TA will include support for:



Customised Goal Setting for Performance: Clear, measurable goals for energy efficiency, water conservation, IAQ, and overall sustainability will be set together with the project teams



Comprehensive Technical Advice: Advice will be available at the design, construction, and operation phases and will include advice on materials, systems, and ongoing support to help meet goals set initially



Selecting the Right Systems: The ASSURE team will assist in selecting the systems for HVAC, lighting, and building material to match the performance goals established



Financial Analysis: Detailed analysis of capital (CAPEX) and operational (OPEX) costs will enable informed decisions that ensure good Return on Investment (ROI)



Performance Monitoring: Energy use, water consumption, IAQ, and other parameters will be tracked with BMSs and EMSs to assist adaptive facilities management

Institutions behind ASSURE



IIHS, India's premier knowledge and practice institution working on the equitable, sustainable, and efficient transformation of Indian settlements, anchors ASSURE in a knowledge partnership with Infosys.



Infosys, a global leader in next-generation digital services and consulting and an early mover in setting and achieving ESG goals and transitioning to low-carbon operations, is India's largest builder of HPBs, with 30 million sq. ft. in current use.

Find out more about ASSURE at factor4assure.iihs.co.in

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