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Specialized Publication On Infrastructure Industry Of Bangladesh

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FEBRUARY 2026 | 5th Edition

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Editorial

Welcome to the fifth edition of GreenScape Bangladesh, a specialized publication dedicated to the critical analysis and advancement of the nation's infrastructure industry. In this installment, We further extend our commitment to disseminating knowledge on sustainable, innovative, and inclusive paradigms within the built environment.

As Bangladesh undergoes an era of unprecedented vertical and horizontal expansion, characterized by transformative mega-projects, the discourse on structural resilience has reached a critical juncture. The nation's geographical reality—defined by its proximity to complex tectonic junctions and soft alluvial soil—presents a profound seismic threat. Recent tremors have served as a sobering reminder of the "quiet risk" lingering beneath our urban centers.

Our lead feature explores the consensus among top architectural minds that the scale of a potential disaster is not merely a geological inevitability, but a consequence of urban governance. Kazi Golam Nasir, former President of the Institute of Architects Bangladesh (IAB), argues for a shift from alarmist narratives toward rigorous building maintenance and structural audits to restore public confidence. This sentiment is echoed by Professor Dr. Abu Sayed M. Ahmed, President of the IAB, who stresses the imperative of collective survival strategies and post-disaster planning. Furthermore, Asifur Rahman Bhuiyan, Chief Architect of the Department of Architecture, underscores that professional accountability in structural integrity remains our primary defense against the unpredictability of tectonic forces.

Beyond the immediate concerns of seismic safety, this issue examines the global trajectory of sustainable development. Encouragingly, recent data suggests a robust shift in capital allocation; the global green construction technology market, valued at $32.12 billion in 2024, is projected to surge to $86.67 billion by 2032, maintaining a CAGR of over 13%. This fiscal momentum reflects a growing synergy between institutional investment and energy-efficient building solutions.

Complementing this, we explore the rise of agrivoltaics in Asia—a pioneering model that synchronizes solar energy generation with agricultural production. As we navigate the dual demands of energy security and food stability, such integrated land-use strategies offer a blueprint for future-proof infrastructure.

We hope this issue informs, inspires, and fosters cross-disciplinary collaboration. Your continued engagement is vital as we document and shape the evolution of Bangladesh's infrastructure landscape.

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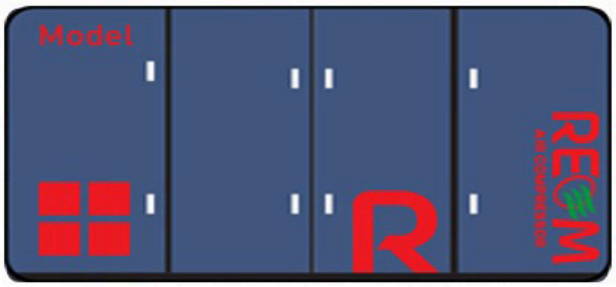

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HITACHI LAUNCHES SUSTAINABLE HVAC SOLUTIONS FOR SOUTHEAST ASIA'S GROWING DATA CENTRE SECTOR

Southeast Asia's rapidly expanding data centre industry is driving demand for advanced cooling technologies, and Hitachi Cooling & Heating is positioning itself at the forefront of this shift. The company has recently launched a new range of energy-efficient HVAC and chiller systems designed specifically for the region's tropical climate and rising digital infrastructure needs.

As countries such as Singapore, Malaysia, Indonesia, and Thailand become key data centre hubs, the strain on electricity and water resources has intensified. Cooling systems account for a significant portion of data centre energy consumption, making efficiency a critical concern. Hitachi's newly introduced S Series, VG Series, and VM Series chillers aim to address this challenge by reducing energy use while maintaining high reliability under heavy workloads.

A key feature of these systems is their use of low global-warming-potential (GWP) refrigerants, helping operators meet increasingly strict environmental regulations. The chillers are also designed to perform efficiently in high-humidity and high-temperature environments, which are common across Southeast Asia. This makes them particularly suitable for urban data centres where space, power availability, and water use are tightly constrained.

Beyond environmental benefits, the new HVAC solutions support long-term cost savings for operators by lowering operational expenses and improving system lifespan. With governments across the region pushing for greener infrastructure and carbon-reduction targets, such technologies are becoming essential rather than optional.

As Southeast Asia continues to attract investment in cloud computing, artificial intelligence, and digital services, sustainable HVAC systems like these are expected to play a central role in enabling data centre growth without overwhelming local power grids or water supplies.

CLIMATE CHANGE INCREASINGLY THREATENS ASIA'S POWER AND WATER INFRASTRUCTURE

Across Asia, climate change is placing growing pressure on critical power and water infrastructure, raising concerns about long-term resilience and service reliability. Recent assessments warn that extreme heat, floods, and prolonged droughts are disrupting electricity generation, water supply systems, and sanitation networks in several countries, including India, Indonesia, Malaysia, and China.

Rising temperatures have reduced the efficiency of thermal power plants, while erratic rainfall has impacted hydropower generation by lowering river flows. At the same time, severe flooding has damaged substations, pipelines, and water treatment facilities, resulting in costly repairs and service interruptions. These climate-related disruptions are becoming more frequent, increasing operational risks for utilities across the region.

Experts warn that Asia's fast-growing cities are particularly vulnerable. Aging infrastructure, rapid urbanization, and inadequate climate adaptation planning have left many systems ill-prepared for extreme weather. In coastal and low-lying areas, saltwater intrusion is contaminating freshwater sources, further complicating water management efforts.

According to regional development institutions, Asia will require trillions of dollars in investment over the coming decades to climate-proof its power and water systems. This includes upgrading transmission networks, diversifying energy sources, strengthening flood defenses, and improving water efficiency through smart monitoring technologies.

Governments and utilities are increasingly exploring nature-based solutions, renewable energy integration, and digital infrastructure to improve resilience. However, experts stress that without coordinated policy action and sustained investment, climate change could significantly undermine economic growth, public health, and energy security across the continent.

AIIB MOBILIZES $6 BILLION TO ACCELERATE SUSTAINABLE INFRASTRUCTURE ACROSS ASEAN

The Asian Infrastructure Investment Bank (AIIB) has announced a major financing initiative aimed at boosting sustainable infrastructure development across

the ASEAN region. Partnering with leading financial institutions including Maybank, CIMB, AmBank, and BPMB, the bank plans to mobilize up to USD 6 billion for projects focused on clean energy, water systems, and climate-resilient infrastructure.

The funding will support a wide range of sectors, including renewable power generation, smart utilities, water treatment, and low-carbon transport. These investments are designed to help fast-growing Southeast Asian economies meet rising infrastructure demands while aligning with global climate goals.

Urbanization and population growth across ASEAN have placed significant pressure on existing infrastructure, particularly in energy and water supply. Many cities are struggling to expand services without increasing carbon emissions or environmental degradation. AIIB's initiative aims to bridge this gap by promoting private-sector participation and innovative financing models.

By working with regional banks, the program also seeks to improve access to long-term capital for infrastructure developers and utilities. This approach is expected to accelerate project implementation while strengthening financial resilience in local markets.

AIIB officials emphasized that sustainable infrastructure is critical for long-term economic stability in Asia. Investments in resilient power grids, efficient water systems, and clean energy not only reduce climate risks but also support job creation and regional competitiveness.

The initiative reflects a broader shift toward green finance in Asia, as governments and financial institutions increasingly prioritize infrastructure that can withstand climate shocks while supporting inclusive growth.

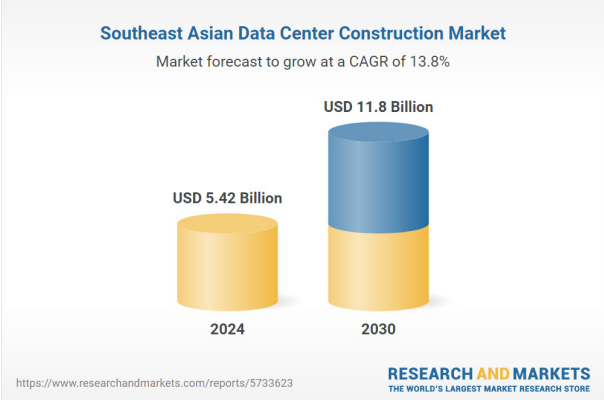
DATA CENTRE CONSTRUCTION BOOM IN ASIA RAISES POWER AND COOLING CHALLENGES

The Asia-Pacific region is experiencing a sharp surge in data centre construction, driven by rising demand for cloud services, artificial intelligence, and digital connectivity. Southeast Asian markets such as Singapore, Malaysia, Vietnam, and Indonesia are emerging as key destinations, but the rapid expansion is creating new challenges for power supply and HVAC infrastructure.

Industry reports indicate that the region's data centre construction market is set to grow rapidly through the end of the decade. However, data centres are among the most energy-intensive facilities, placing heavy pressure on local electricity grids. In response, developers are increasingly adopting modular power systems, on-site energy storage, and renewable energy sourcing to reduce grid dependency.

Cooling remains one of the biggest challenges, particularly in tropical climates. Operators are turning to advanced HVAC solutions, including liquid cooling, high-efficiency chillers, and AI-driven thermal management systems to control energy use and maintain operational reliability.

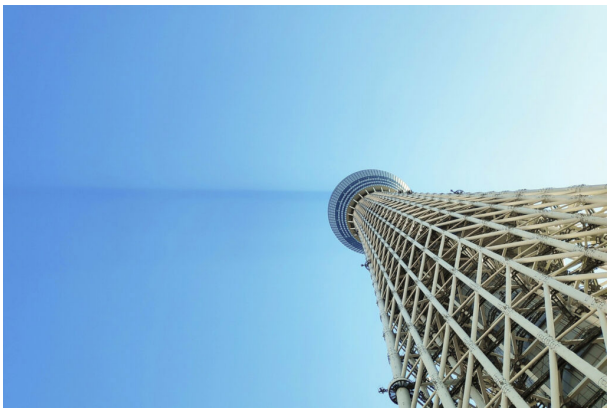
Governments across the region are responding with supportive policies, such as tax incentives, streamlined approvals, and renewable energy mandates for large data facilities. These measures aim to balance digital infrastructure growth with sustainability and grid stability.



Experts warn that without careful planning, uncontrolled data centre expansion could strain power and water resources. As a result, future projects are increasingly designed with energy efficiency, heat reuse, and water conservation in mind, signaling a more sustainable approach to digital infrastructure development in Asia.

JAPAN'S EARTHQUAKE-RESILIENT REAL ESTATE

One of the foundations of Japan's success in earthquake safety is its strict and continually updated building code. Since significant revisions in the late 20th century, especially post-1981, the standards require engineers to design buildings that not only resist collapse but also protect occupants during strong earthquakes. Moderncodes account for soil type, foundation depth, height, and added shock-absorbing technologies.



Buildings undergo mandatory inspections during construction and after major seismic events, ensuring long-term resilience.

Innovative engineering also plays a major role. Many structures use seismic isolation bearings, allowing the building to move with quake forces rather than fight them. Advanced damping systems, such as oil or pendulum dampers, absorb and dissipate energy, significantly reducing building sway. New materials like flexible exterior coatings further prevent cracking and falling debris, enhancing safety for residents and pedestrians.

Beyond safety, earthquake resistance is becoming a financial advantage. Properties built or retrofitted to modern seismic standards often command higher market value and attract better insurance terms. In Japan, insurance premiums can be discounted for buildings with base isolation or high resistance classifications, making resilient buildings attractive investments. Government incentives, including tax breaks and subsidies for retrofitting older structures, further promote seismic upgrades.

As other earthquake-prone countries look to reduce risk and protect property value, Japan's model shows how seismic engineering and stringent regulation can turn natural hazard mitigation into a real estate strength.

INDIA UPGRADES NATIONAL HIGHWAY CORRIDOR TO BOOST CONNECTIVITY AND SAFETY

The Indian government has approved a major upgrade to a 100-km stretch of National Highway-16 (NH-16) between Muppavaram in Prakasam district and Kaja in Guntur district, converting it into a fully access-controlled corridor to enhance connectivity across Andhra Pradesh. This move is part of a broader push to modernize the country's infrastructure network, aiming to facilitate faster travel between key economic hubs while improving road safety and regional trade flows.

The project will transform the existing six-lane highway into an access-controlled expressway, eliminating direct access from local roads and reducing conflict points that often lead to accidents. Instead, vehicles will use designated entry and exit points, which is expected to reduce congestion and ensure smoother traffic flow, especially for long-distance freight movement. Toll collection will be structured on a distance-based system, aligning with global best practices for toll financing.

Another key feature of the upgrade will be the construction of service roads on both sides of the highway, allowing local traffic to move safely without interfering with high-speed expressway operations. A Detailed Project Report (DPR) will be prepared within a year, detailing land acquisition requirements, environmental considerations, and cost estimates. The planning authority, under the Indian Ministry of Road Transport & Highways, has emphasized compliance with environmental safeguards and community impact mitigation. (The Times of India)

This infrastructure development aligns with India's larger strategy to expand its expressway network under national initiatives to support economic growth. Expressways like this provide critical links between industrial zones, ports, and agricultural regions, supporting job creation and economic diversification. Analysts also note that better highways attract private investment and ease the logistics burden for exports, making India more competitive in global markets.

PAKISTAN AND ADB SIGN $730M DEALS TO STRENGTHEN NATIONAL POWER GRID

In a move to reinforce Pakistan's energy infrastructure, the Asian Development Bank (ADB) and the Government of Pakistan have signed two major financing agreements totaling $730 million, aimed at modernizing the country's power transmission system and accelerating State-Owned Enterprise transformation.

Under the agreements finalized in late December 2025, $330 million has been allocated to the Second Power Transmission Strengthening Project, which seeks to upgrade and expand the national grid. The project is expected to enhance the system's ability to evacuate electricity from

new and upcoming hydropower plants across the country — enabling more reliable energy distribution and reducing transmission bottlenecks that have historically hampered Pakistan's electricity supply stability.

The remaining $400 million will fund the Accelerating SOE Transformation Program, a policy-focused initiative designed to improve the governance, transparency, and efficiency of Pakistan's state-owned entities. Officials highlighted that this program aims to align the operational performance of key infrastructure agencies, such as the National Highway Authority and power utilities, with international best practices.

ADB Country Director Emma Fan noted that these agreements reflect the bank's confidence in Pakistan's reform efforts and its commitment to supporting sustainable infrastructure development. Strengthening the power grid is seen as critical for unlocking the potential of Pakistan's hydropower resources, which, once fully tapped, could help reduce reliance on expensive fossil fuels and improve energy affordability for consumers.

Investors and policy analysts have also applauded the focus on institutional transformation, saying that stronger governance and financial discipline within infrastructure agencies will attract greater private investment and enhance public-sector project delivery.

REMOTE INDO-NEPAL BORDER VILLAGE SEES MAJOR INFRASTRUCTURE AND WATER IMPROVEMENTS

In the remote village of Chaugurji, located along the India–Nepal border, longstanding infrastructure deficits are being addressed through a suite of recent government interventions that promise to transform local livelihoods. Residents who once endured hours-long journeys for basic services can now reach nearby towns in minutes thanks to the construction of a new pontoon bridge over the Karnali and Mohana rivers.

Alongside improved connectivity, the village has benefited from India's Jal Jivan Mission, which has provided tap water connections to every household. This initiative eliminated dependence on arsenic-contaminated groundwater, significantly improving public health outcomes and offering safe water access for cooking, cleaning, and other daily needs.

Solar-powered street lighting has enhanced safety and community activity after dark, while digital inclusion projects — such as smart classrooms and solar-powered learning facilities in primary schools — are equipping children with modern educational tools and opportunities comparable to urban peers.


Photo: Dreamstime

Local officials emphasize that these improvements are part of a broader strategy to reduce rural isolation and promote equitable development in border regions. By linking Chaugurji to essential services like healthcare, education, and markets, planners aim to foster economic activity and reduce migration pressures toward cities. Solar lighting and classroom technologies also underscore a shift toward sustainable, resilient community infrastructure in line with national goals.

Residents report that the changes have already boosted agricultural productivity, reduced school absenteeism, and improved emergency response times. As infrastructure projects continue, officials hope that Chaugurji's transformation will serve as a model for similar rural communities across the region.

NEPAL STRENGTHENS REGIONAL ENERGY COOPERATION THROUGH HISTORIC HYDROPOWER TRADE

Nepal is increasingly emerging as a key player in South Asia's clean energy landscape, highlighted by the recent launch of trilateral hydropower trade involving Nepal, India, and Bangladesh. This agreement marks the first of its kind in the region, enabling Nepal to export 40 megawatts of electricity to Bangladesh through India's transmission grid, while collaboration on larger hydropower ventures continues to advance. The initiative is part of broader regional cooperation efforts designed to optimize South Asia's renewable energy potential and address shared electricity shortages. Hydropower-rich Nepal has leveraged its abundant water resources to become an energy exporter, supplying clean electricity that complements India's energy mix and supports Bangladesh's growing demand.

Beyond electricity trade, India, Nepal, and Bangladesh are jointly developing the 683 MW Sunkoshi-3 hydropower project. Located approximately 60 km from Kathmandu, this project represents a significant investment in regional infrastructure and reflects strengthened diplomatic ties across borders. The collaborative model brings together government agencies and private developers from all

three countries in a rare example of transnational energy integration.

Officials from Kathmandu have emphasized the economic and environmental benefits of expanding hydropower capacity, noting that clean energy exports will generate revenue, reduce fossil fuel imports, and help stabilize regional grids. For Bangladesh, the additional electricity supply provides much-needed capacity during peak demand periods, while India benefits from enhanced grid connectivity and export transit fees.

Energy analysts say that Nepal's hydropower trade could serve as a blueprint for deeper South Asian cooperation on renewable infrastructure, potentially extending to other countries where shared water resources and grid systems can support sustainable power solutions.

CAMBODIA'S FUNAN TECHO CANAL PROJECT ADVANCES TO IMPROVE WATERWAY TRADE

Cambodia is progressing on the ambitious Funan Techo Canal project, a 180 km waterway that aims to connect the Mekong River at Takeo with the Phnom Penh Autonomous Port and the Gulf of Thailand. The project, officially named the Tonle Bassac Navigation Road and Logistics System Project, is designed to boost inland water transport, reduce logistics costs, and catalyze economic growth across southern Cambodia.

Construction began with a groundbreaking ceremony in August 2024, and land demarcation and preparation for Phase I were reported to be over 50 percent complete by late 2024. Once finished — with a target date around 2028 — the canal will support vessels up to 3,000 DWT, opening a major commercial route from Cambodia's interior to international shipping lanes.

The infrastructure plan includes building three dams with sluices and eleven bridges, along with widened navigation channels and modern port facilities. This combination of hydraulic and transport infrastructure is expected to improve water management, flood mitigation, and year-round navigability in regions prone to seasonal water fluctuations.

Funding for the US$1.7 billion project has involved both Cambodian and Chinese stakeholders, although investor confidence has fluctuated amid concerns about economic returns and long-term maintenance costs. The Cambodian government has nonetheless pushed ahead, seeking to develop a more resilient and diversified logistics network that reduces dependence on road transport and enhances trade competitiveness with neighboring countries.

Officials argue that once operational, the canal will not only strengthen Cambodia's internal trade connectivity but also support regional integration by linking with broader Mekong basin transport initiatives — potentially benefiting Vietnam, Thailand, and beyond.

HITACHI LAUNCHES ADVANCED HVAC CHILLERS TO POWER DATA CENTRE GROWTH IN SOUTHEAST ASIA

Hitachi Cooling & Heating has recently rolled out a new line of next-generation HVAC centrifugal chillers aimed at supporting the booming data centre sector in Southeast Asia. As the region continues to attract global investment in cloud computing, artificial intelligence, and digital infrastructure, efficient and sustainable cooling has become a critical operational priority. Traditional cooling systems account for a significant share of energy use in data centres, and energy costs can make or break long-term profitability for operators. To address this need, Hitachi's S Series, VG Series, and VM Series chillers have been engineered to offer high reliability, rapid response after outages, and advanced energy management features — a strong value proposition for data centre developers and facility managers alike.

One of the standout technical features of the new chillers is their ability to restart within just 35 seconds after a power interruption. In environments where continuous cooling is essential to prevent overheating and equipment failure, this rapid restart capability can drastically reduce operational risk and downtime. Alongside this, the systems use Direct Drive Inverter Technology, which adjusts cooling output based on real-time load and environmental conditions, improving energy efficiency and lowering overall operational costs. These capabilities are especially relevant in Southeast Asia, where power constraints and rising electricity prices are key challenges for large facilities.

Environmental sustainability is another core focus. The chillers employ low global-warming-potential (GWP) refrigerants such as R513A, R1233zd, and R1234ze, supporting both corporate carbon-reduction goals and stricter regional regulatory standards on refrigerants. This aligns with broader industry efforts to reduce the carbon footprint of cooling systems, which are responsible for a significant share of energy use in buildings and industrial facilities.

With data centre infrastructure expanding rapidly across Singapore, Malaysia, Thailand, and Vietnam, cooling efficiency is becoming a decisive factor in site selection and design. Hitachi's advanced chillers aim to set a new performance benchmark for sustainable HVAC solutions in the region's competitive digital infrastructure landscape.

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AI STARTUP KAYA TRANSFORMS CONSTRUCTION SUPPLY CHAINS

The construction industry, long challenged by fragmented supply chains and manual procurement processes, is seeing a new wave of innovation with the emergence of Kaya, an AI-driven startup focused on modernizing construction purchasing and materials management. Recently featured by Engineering News-Record (ENR), Kaya has introduced an intelligent platform designed to significantly reduce procurement delays, cost overruns, and inefficiencies across large construction projects.

Kaya's platform uses artificial intelligence and data automation to consolidate supplier information, pricing data, lead times, and historical purchasing behavior into a single, actionable dashboard. Traditionally, construction procurement teams rely heavily on emails, spreadsheets, and disconnected vendor systems—methods that are time-consuming and prone to error. Kaya's solution replaces this with real-time insights that help contractors make faster and more informed purchasing decisions.

Backed by USD 5.3 million in early-stage funding, Kaya is positioning itself as a next-generation procurement tool for general contractors, developers, and infrastructure firms managing complex, multi-supplier projects. The system can analyze thousands of data points to predict delivery risks, compare supplier performance, and flag potential disruptions before they affect project schedules.

What makes Kaya particularly notable is its focus on supply-chain resilience at a time when global construction markets continue to face material shortages, price volatility, and extended lead times. By applying AI to procurement workflows, Kaya aims to improve cost certainty, reduce administrative workloads, and strengthen collaboration between contractors and suppliers.

As digital transformation accelerates across the built-environment sector, solutions like Kaya demonstrate how AI-powered platforms can deliver measurable productivity gains while supporting smarter, more transparent construction supply chains.

CARRIER LAUNCHES FIELD TRIALS OF BATTERY-ENABLED HVAC SYSTEMS TO SUPPORT THE GRID

Carrier Global Corporation has embarked on a major field trial program testing next-generation battery-enabled HVAC systems designed to transform residential heating and cooling equipment into flexible, grid-supporting energy resources. These trials represent a strategic leap forward in how climate control systems can contribute to electricity reliability and energy transition goals across the United States.

At the heart of the initiative is a new Home Energy Management System (HEMS) that integrates a variable-speed heat pump with an onboard battery. By storing energy during off-peak periods and deploying it when demand peaks, these smart HVAC units can help reduce strain on power grids — particularly during heatwaves and periods of high demand. Working with utilities and the Electric Power Research Institute (EPRI), Carrier's

trials aim to quantify real-world demand response, emissions impacts, and load-shifting benefits.

With an estimated 30 million Carrier HVAC systems already installed in homes across North America — equating to more than 100 gigawatts of potential flexible load — the implicit promise is significant. If even a fraction of these units participate in aggregated grid services, utilities could see marked improvements in reliability, renewable integration, and operational cost savings.

"This field trial isn't just a milestone — it's proof that Carrier is helping lead the energy transition," said Carrier's Chief Technology & Sustainability Officer. The trials are set to continue collecting performance data through the next year, with insights expected to shape broader market deployment strategies.

THAILAND'S 5,300 MW COMBINED-CYCLE POWER PROJECT WINS GLOBAL RECOGNITION

Thailand's massive dual combined-cycle gas turbine power project, delivering an aggregate of 5,300 megawatts of generation capacity, has been honored with a Top Plant award by POWER Magazine — a leading industry publication recognizing exceptional achievements in power design, construction, and performance.

The facility, composed of two parallel 2,650 MW plants, is strategically significant as it strengthens Thailand's electricity grid, expands generation reliability, and addresses growing demand in one of Southeast Asia's dynamic economic regions. Built to high efficiency standards, the project incorporates advanced turbines and systems that maximize output while minimizing fuel consumption and emissions relative to older fossil generation plants.

According to industry analysts, the deployment of such high-efficiency combined-cycle technology represents a major milestone for thermal power infrastructure in emerging markets. It demonstrates how large-scale conventional power plants can still play a vital role in regions balancing economic growth, energy security, and the integration of renewables.

The Top Plant award underscores both engineering excellence and project execution, celebrating the collaboration between plant developers, contractors, and operators who delivered a robust power solution ahead of many competitors worldwide. Operators report extended reliability margins during peak load seasons and a capacity factor that supports broader national electrification goals.

As global energy demand continues to grow — particularly in industrial and urban centers — projects like Thailand's combined-cycle initiative highlight the importance of scalable, efficient, and reliable power generation capacity in building resilient energy infrastructure.

EXOWATT SECURES $50 MILLION TO ACCELERATE DISPATCHABLE SOLAR THERMAL POWER

Exowatt — a U.S. renewable energy developer focused on modular long-duration energy storage solutions — announced it has raised $50 million in new funding to scale production and deployment of its innovative Exowatt P3 systems, aimed at meeting rising power demands from AI data centers and other energy-intensive industries.

The Exowatt P3 integrates solar capture and thermal energy storage to deliver round-the-clock, dispatchable power without reliance on fossil fuels. Unlike conventional solar installations that produce power only when the sun is shining, the P3 stores energy as heat in long-duration thermal batteries and converts it to electricity on demand — making it a promising candidate for facilities where reliability and continuous output are critical.

This latest round builds on a prior $70 million Series A financing, bringing the company's total capital raised to approximately $140 million within two years. Investment was led by venture firms including MVP Ventures, 8090 Industries, and returning backers such as Felicis and Sam Altman.

With order backlogs exceeding 90 GWh, Exowatt is squarely positioning itself in the high-growth market for clean, dispatchable power tailored to the meteoric rise of computing infrastructure, particularly AI applications. Deployments can be sited close to demand centers such as data facilities, reducing grid interconnection delays and enabling faster build-outs compared to traditional utility-scale storage options.

In addition to its technology's technical merits, industry

Photo: EXOWATT

recognition such as Fast Company naming Exowatt the 2025 "Next Big Thing in Tech" highlights the company's potential to reshape how renewable power and storage are integrated into commercial energy strategies.

EXOWATT P3 MODULAR PLATFORM ADVANCES DISPATCHABLE CLEAN POWER INNOVATION

Exowatt continues to attract global attention as its pioneering P3 modular renewable energy platform wins industry accolades and accelerates deployment for data centers and C&I applications. The system's design — capturing solar energy as heat and storing it in a long-duration thermal battery — enables dispatchable clean power around the clock, a capability that crosses a crucial threshold for decarbonizing high-demand infrastructure.

Recently, Exowatt was named Fast Company's 2025 "Next Big Thing in Tech", underscoring the P3's potential to transform how industries source reliable and sustainable electricity. This recognition positions Exowatt among breakthrough innovators whose technologies have broad implications across power, transportation, and large-scale computing sectors.

The P3's modular architecture means it can be rapidly deployed close to load centers like AI data farms, industrial parks, and manufacturing hubs — a strategic advantage in markets where grid upgrades lag behind demand growth. By delivering power continuously from onsite stored solar energy, the technology provides resilience without the emissions or fuel volatility of conventional backup generation.

Exowatt's aggressive funding trajectory — including contributions from prominent venture capital firms and strategic angel investors — is accelerating scaling efforts. Investors point to the platform's combination of dispatchability, scalability, and carbon reduction as key drivers of market interest and commercial traction.

As global energy systems pivot toward cleaner, more resilient solutions, technologies like Exowatt's P3 highlight the industry's evolution from intermittent renewable power toward continuous renewable dispatchability, integrating sustainability with practical power delivery.

IKEA BREAKS GROUND ON MASSIVE ZERO-CARBON DISTRIBUTION CENTRE IN CANADA (HAMILTON, ONTARIO)

IKEA Canada has officially begun construction on a major new Customer Distribution Centre (CDC) and collection point in Hamilton, Ontario, marking a significant milestone in both industrial infrastructure and sustainable building practice in Canada. This landmark development is part of IKEA's USD 400 million investment aimed at strengthening supply chain accessibility, reducing delivery lead times, and enhancing customer convenience across the Greater Toronto Area.

The future 483,285-square-foot facility is designed with sustainability at its core, targeting net-zero carbon national certification and LEED Gold certification—a


Photo: Wikipedia

commitment that places it among the largest zero-carbon industrial buildings in Ontario once complete.

Beyond its environmental credentials, the project is expected to generate thousands of direct and indirect jobs, supporting economic growth in the region while demonstrating how major corporate investments can deliver both social and environmental value through thoughtful infrastructure development.

This initiative reflects broader trends in Canada's built environment, where private-sector investment and public collaboration are increasingly driving nation-building projects designed for climate accountability and future resilience.

A2A TOWER ADVANCES MILAN'S URBAN TRANSFORMATION AHEAD OF THE OLYMPICS

In Milan, Italy, the A2A Tower is rising as a signature commercial skyscraper project linked to the broader redevelopment of the historic Porta Romana railway yard and preparation for the 2026 Winter Olympics. Standing at 144 m, the building will serve as the new headquarters for energy group A2A and anchor an ambitious mixed-use district that reconnects urban fabric while introducing new office space, public plazas, and civic amenities. Approved by Milan's municipal authorities, the tower is part of a strategic vision to leverage major global events (like the Olympics) as drivers of innovation, sustainable design, and long-term urban value. Its completion is anticipated by the end of 2025, with inauguration in 2026 — a timeline that aligns with optimized integration of infrastructure improvements for transportation, visitor accommodation, and community revitalization.

THE OCTAGON: BIRMINGHAM'S WORLD-FIRST OCTAGONAL RESIDENTIAL LANDMARK

In Birmingham, UK, The Octagon has topped out as a world-first pure octagonal residential skyscraper and a major milestone in the city's renewed downtown development. Completed in 2025 as part of the Paradise regeneration scheme, the 155 m tower introduces 364 modern apartments, co-working spaces, wellness facilities, and ground-level retail — contributing to urban densification and mixed-use vibrancy. Its unique geometry was developed to maximize daylight access, structural efficiency, and spatial quality while symbolizing civic renewal. Recognized as Birmingham's tallest building, The Octagon not only elevates the city skyline but also demonstrates innovative architectural expression paired with efficient urban housing delivery, serving as a new benchmark for mid-sized European cities pursuing sustainable downtown living frameworks.

CANADA INVESTS $17.5 M IN AI-DRIVEN CONCRETE TECHNOLOGY TO LOWER CARBON EMISSIONS

The Canadian government has committed CAD $17.5 million to advance AI-enhanced concrete technology as part of its broader clean-growth strategy. This funding supports Giatec Scientific Inc.'s SmartMix™ platform, a project aimed at optimizing concrete mixtures to reduce carbon emissions and improve performance in construction. The investment is part of a larger CAD $65.8 million initiative backed by Canada's Strategic Innovation Fund, cementing support for innovation that accelerates decarbonization in the built environment while fostering local job creation and industrial competitiveness. The program will also lead to the construction of a smart concrete demonstration plant in Ottawa, expected to create more than 160 new jobs and serve as a showcase for digital integration in heavy materials production. By embedding AI analytics directly in material formulation and onsite deployment, the project addresses one of construction's largest contributors to greenhouse gases and supports Canada's 2050 net-zero goals through technology-enabled manufacturing transformation.

CEMENT-FREE CONCRETE TECHNOLOGY HITS MAJOR INDUSTRIAL DEPLOYMENT

A groundbreaking advancement in low-carbon building materials is accelerating as CarbiCrete's cv moves from pilot scale to industrial production and commercial adoption across North America and Europe. The technology replaces traditional Portland cement — one of the largest contributors to construction-related CO_2 emissions — with industrial steel slag, an abundant by-product of steelmaking. During curing, captured carbon dioxide is permanently mineralized within the concrete, meaning the material not only avoids CO_2 emissions from cement manufacturing but also sequesters carbon inside the product itself.

In Hauts-de-France, France, POINT.P — a major Saint-Gobain brand — and CarbiCrete have announced the launch of the first commercial cement-free concrete block production line, scheduled to begin operations in early 2026. The facility will produce approximately 20,000 tonnes of low-carbon blocks in its first year with plans to double capacity in the following year, a clear sign that low-carbon materials are transitioning into mainstream industrial supply chains.

CarbiCrete's patented process has already demonstrated performance comparable to conventional concrete while significantly lowering global warming potential (GWP) — industry environmental reports show its blocks can have a carbon footprint up to 20 times lower than standard masonry units.

Beyond production lines, the company has also partnered with Meta to accelerate deployment of low-carbon concrete equipment in Ontario, expanding manufacturing capacity for decarbonized products destined for North American markets.

The combination of industrial scaling, multinational collaboration, and verified environmental benefits positions CarbiCrete's technology as a transformative influence on sustainable construction materials — particularly in markets striving for net-zero embodied carbon goals and reduced lifecycle emissions in infrastructure projects.

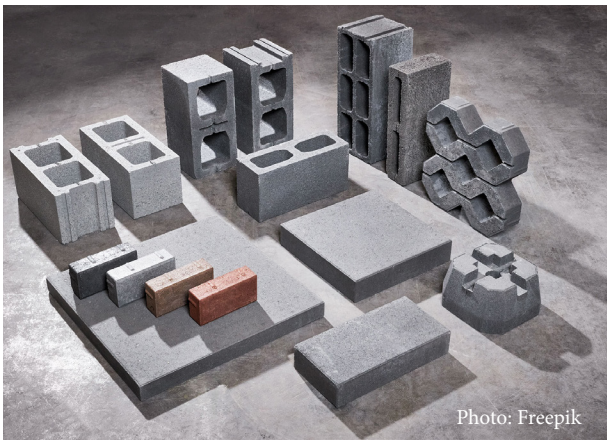


Photo: Freepik

CONSTRUCTION MARKET SET TO

MORE THAN DOUBLE BY 2032

The market for green technology in construction is undergoing rapid expansion as governments, developers, and institutional investors channel funding into sustainable infrastructure and energy-efficient building solutions. According to recent industry research, the global green technology in construction market, valued at approximately US$32.12 billion in 2024, is forecast to grow to US$86.67 billion by 2032, representing a compound annual growth rate (CAGR) of more than 13 % over the next several years.

Driving this surge are several structural forces. Built environment sectors are responding to rising regulatory standards that mandate energy efficiency, emissions reductions, and lifecycle carbon accounting. In many regions, government programs and financial incentives support the deployment of advanced insulation, smart energy systems, and modular green building technologies. For example, the U.S. Department of Energy invests hundreds of millions annually to promote emerging energy-saving technologies in construction.

The anticipated growth reflects not just regulatory pressure but the economic value proposition of green tech — developers and building owners are increasingly seeing reduced operating costs, improved tenant demand, and higher asset value for sustainably constructed buildings. New materials (such as low-carbon concrete, high-performance glazing, and advanced thermal insulation) and digital tools (including AI for energy optimization and IoT building management systems) are among the fastest-growing subsegments.

Market expansion is expected across all regions, with

North America projected to command a significant share, driven by energy efficiency mandates and private sector commitments to ESG goals. The construction industry's broader shift toward net-zero targets and sustainability certifications (LEED, BREEAM) further underlines the strategic importance of green technologies in future infrastructure development.

SOLAR FARMS AND BIFACIAL PANEL TECH DRIVING NEXT-GEN EFFICIENCY

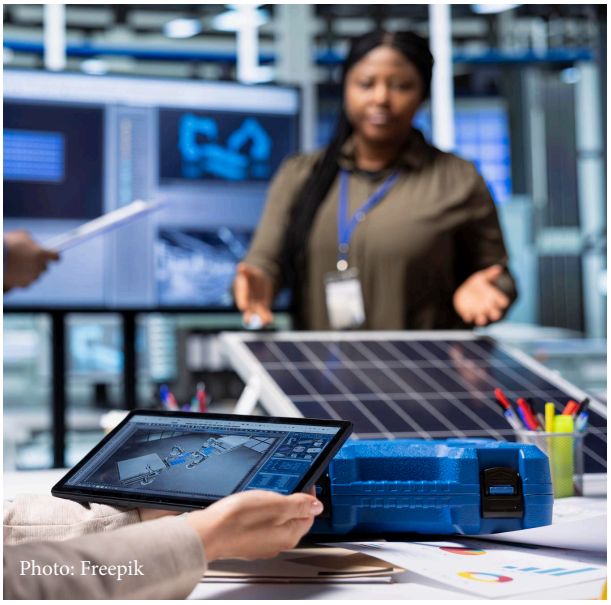


Photo: Freepik

The global solar energy sector continues to evolve rapidly, with multiple technology trends reshaping how solar power is deployed and integrated into buildings and infrastructure. Among the most impactful innovations are bifacial solar panels, which capture sunlight from both the front and back surfaces — boosting generation by up to 20-30 % compared to traditional modules when installed in reflective environments. This increases energy yield without requiring additional land or footprint. Alongside this, emerging perovskite and multi-layer cell materials are delivering higher efficiencies and lower production costs, accelerating commercial deployment of advanced photovoltaic systems. Building-integrated photovoltaics (BIPV) — where solar elements are directly embedded into roofs, facades or even windows — is another transformative trend, enabling structures to generate power at the point of use and reducing dependence on external grids. Digital tools like AI and IoT for performance monitoring and smart grid integration are adding to operational efficiency and predictive maintenance capabilities for solar assets.

These innovations help lower the levelized cost of electricity (LCOE), improve return on investment for developers and investors, and expand applications into urban and commercial projects where space is at a premium.

LONG-DURATION ENERGY STORAGE MARKET ACCELERATES AS KEY COMPONENT OF RENEWABLE GRID EXPANSION

The long-duration energy storage (LDES) market — systems capable of storing electricity for hours to days — is emerging as one of the fastest-growing segments of the global clean energy transition. A recent Long-Duration Energy Storage Market Overview Report (2025-2046) underscores how LDES technologies are being positioned as critical infrastructure for deep decarbonization, grid reliability, and high renewable penetration. These storage systems help overcome the intermittent nature of solar and wind power by providing extended discharge capabilities that traditional short-duration batteries cannot deliver.

According to the report, the LDES market is experiencing strong growth, with the global market forecast to expand significantly by 2030 and beyond. The report covers a broad spectrum of storage technologies — including flow batteries, compressed air energy storage (CAES), liquid air energy storage (LAES), gravity storage, and hybrid systems — and highlights the role of innovation and scaling in driving down costs and improving performance.

Photo: Unsplash

Market expansion is supported by increasing demand for grid flexibility, energy security and reliability, and long-term renewable integration strategies. As electric grids incorporate ever-higher shares of solar and wind generation, long-duration storage helps smooth out supply fluctuations and balance supply-demand mismatches over time scales ranging from hours to days. This functionality becomes especially vital as regions push toward net-zero targets and broaden electrification across sectors like transportation and industry.

In practical terms, LDES projects are gaining momentum worldwide — from innovative liquid air facilities such as those being developed by Highview Power to expanded pipelines of battery storage coupled with renewables in both utility-scale and distributed contexts. As capital flows toward energy storage innovation and deployment, LDES is rapidly evolving from a niche technology into core infrastructure for resilient, clean energy systems.

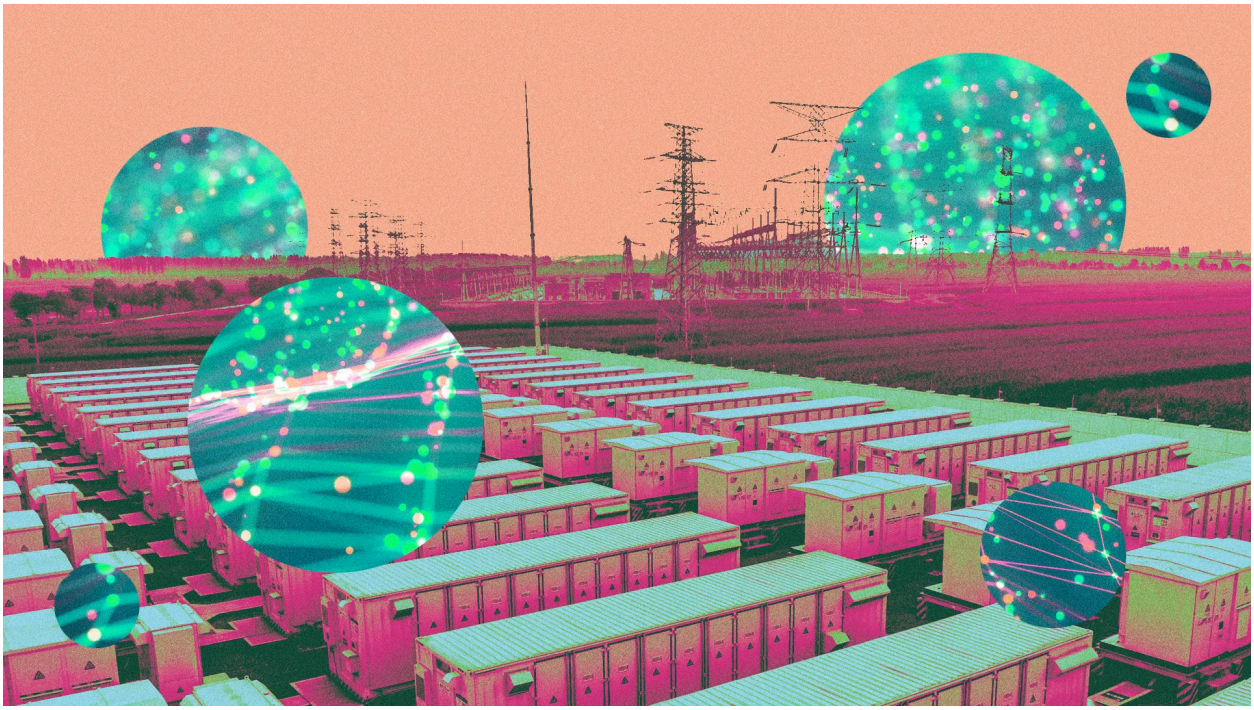
U.S. SOLAR INDUSTRY LAUNCHES NEW PUSH ON ENERGY STORAGE TO STRENGTHEN CLEAN GRID INTEGRATION

The Solar Energy Industries Association (SEIA) — the leading solar trade organization in the United States — has intensified its advocacy and strategic efforts to accelerate energy storage deployment alongside solar generation. This renewed push, revealed in January 2026, underscores solar's evolving role not just as a clean generation source but as part of an integrated solar-plus-storage ecosystem that enhances grid reliability and market value.

SEIA's campaign emphasizes the importance of utility-scale battery storage systems in capturing, storing, and dispatching solar energy during times of peak demand, evening hours, or grid stress. By pairing storage with solar, developers can help maintain grid stability as intermittent renewables scale, reducing reliance on fossil backups and enabling more resilient power systems. SEIA President and CEO Abigail Ross Hopper highlighted that storage deployment is also a driver of manufacturing growth, job creation, and U.S. competitiveness in the global clean energy economy.

The initiative aims to influence federal, state and local policy to create clearer incentives, remove deployment barriers, and enable faster interconnection of both distributed and grid-scale storage assets. While solar installations have grown rapidly — with solar and storage accounting for the majority of new U.S. power capacity additions in recent years — SEIA notes that storage deployment still faces challenges related to policy uncertainty, permitting and grid integration frameworks.

SEIA's advocacy is not only about expanding capacity but also about sustaining momentum for manufacturing and job creation. Strengthening domestic storage supply chains — from battery cells to complete systems — will be crucial in meeting both the rising demand for clean energy and broader economic goals. This strategic emphasis reflects how storage is increasingly seen as indispensable to solar's continued growth and the overall energy transition.



BUILT FOR BANGLADESH

Inside Walton's Rise as the Country's No. 1 AC Brand

Md. Tanvir Rahman serves as the Chief Business Officer (AC) at Walton Hi-Tech Industries PLC, where he oversees the strategic growth, product development, and market expansion of Walton's air conditioning portfolio. With Walton emerging as Bangladesh's leading homegrown electronics and appliance manufacturer, Rahman has played a key role in strengthening the brand's position in both residential and commercial cooling solutions. His focus spans local manufacturing excellence, technology-driven product innovation, energy efficiency, and building long-term consumer trust in a highly competitive market.

In this conversation, he shares insights into Walton's brand strategy, technological direction, evolving consumer behavior, and the company's long-term vision for sustainable and smart cooling solutions.

Walton has emerged as a leading local brand in the air conditioner market. From a brand strategy perspective, what has been the key driver behind this growth and consumer trust?

Walton's growth in the air conditioner market is driven by a strong local manufacturing foundation combined with expanding technological capabilities. Recognized as Bangladesh's No. 1 AC brand, Walton has set benchmarks for quality, innovation, and performance in the air conditioning industry.

Walton AC has secured patents for four innovative technologies, including Offline Voice Control in both Bangla and English, Iconic Smart Display, and Bluetooth technology. Beyond residential air conditioners, Walton also designs and manufactures VRF systems and chiller solutions, enabling us to serve both household and large-scale commercial cooling requirements.

By engineering products specifically for Bangladesh's high ambient temperatures, humidity, and power conditions, Walton ensures consistent performance and long-term durability. This technical strength—supported by competitive pricing and a nationwide after-sales service network—has been central to building long-term consumer trust. Our ability to deliver reliable solutions across multiple capacity ranges positions Walton as a comprehensive and dependable cooling solution provider.

Walton ACs increasingly emphasize energy efficiency and eco-friendly technology. How are innovations like inverter systems and R290 refrigerant shaping the future of cooling in Bangladesh?

Inverter technology and eco-friendly refrigerants are reshaping the cooling landscape in Bangladesh, and Walton is at the forefront of this transition. Walton's inverter ACs use variable-speed compressor control to match cooling output with real-time demand, resulting in faster cooling, quieter operation, and significant energy savings.

The adoption of R290 refrigerant—with its very low Global Warming Potential (GWP) and excellent heat-transfer properties—further improves system efficiency while substantially reducing environmental impact. Together, inverter technology and R290 support lower electricity consumption, a reduced carbon footprint, and long-term sustainability, which are increasingly important for Bangladesh's future energy ecosystem.

In a market crowded with both local and international brands, how does Walton differentiate its air conditioners in terms of performance, value, and after-sales service?

Walton differentiates itself through a balanced value proposition that combines performance, affordability, and ownership experience. Our air conditioners are engineered for high-ambient operation, stable performance under fluctuating power conditions, and long-term reliability. Local manufacturing allows us to integrate advanced features while maintaining competitive pricing.

Beyond the product, Walton's extensive after-sales service network—supported by trained technicians, fast response times, and readily available spare parts—ensures minimal downtime and peace of mind for customers. This end-to-end value proposition clearly distinguishes Walton in a highly competitive marketplace.

How do changing construction trends—such as high-rise living, commercial buildings, and energy-conscious design—influence Walton's AC product development and marketing strategy?

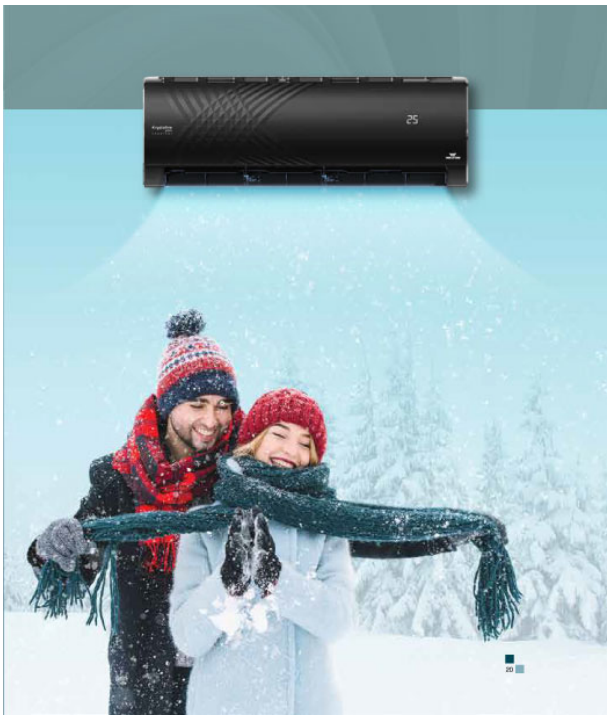
Modern construction trends are significantly shaping our product development strategy. High-rise residential buildings and commercial spaces require cooling systems that are compact, energy-efficient, quiet, and adaptable to complex layouts. In response, Walton has expanded its portfolio to include inverter-based split systems, VRF solutions, and commercial air conditioners optimized for modern building requirements.

From a marketing perspective, the focus has shifted from cooling capacity alone to total lifecycle cost, energy efficiency, and system suitability. We increasingly collaborate with developers, consultants, and facility managers to ensure optimal system selection aligned with energy-conscious building designs.

From a business perspective, how important is customer education in driving responsible AC usage, energy savings, and long-term brand loyalty?

Customer education plays a critical role in maximizing the benefits of modern air conditioning technology. Proper capacity selection, correct installation, and informed usage—such as optimal temperature settings and regular maintenance—can significantly enhance energy efficiency and extend product lifespan.

By educating customers on both the technical and practical aspects of AC usage, Walton helps reduce electricity consumption, minimize service issues, and improve overall satisfaction. This approach creates informed users, encourages responsible energy behavior, and strengthens long-term brand loyalty.



Looking ahead, what is your vision for Walton Air Conditioner over the next five years, particularly in relation to smart technology and sustainable building solutions?

Over the next five years, Walton aims to further strengthen its position as a provider of high-efficiency, sustainable, and globally competitive cooling solutions. A key focus area will be the development of high-COP VRF systems that deliver superior energy performance for modern residential and commercial buildings.

We are also investing in higher-capacity inverter and non-inverter chillers to support large commercial, industrial, and infrastructure projects. In line with global environmental trends, Walton plans to introduce VRF systems using low-GWP refrigerants to minimize environmental impact while maintaining high system efficiency.

Alongside product innovation, we are placing greater emphasis on export-oriented manufacturing—ensuring compliance with international standards and expanding our footprint in overseas markets. Through smart controls, energy monitoring, and sustainable technologies, Walton aims to support energy-efficient buildings and reinforce its role as a trusted cooling solutions provider both in Bangladesh and internationally.

BUILDING COOLING INDEPENDENCE

Inside Elite Hitech Industries' Vision for Bangladesh

For over three decades, Elite Hitech Industries Ltd. (EHIL) has played a quiet yet transformative role in shaping Bangladesh's air-conditioning and cooling landscape. From residential comfort to heavy commercial and industrial solutions, EHIL's journey has been driven by one powerful idea: manufacturing independence.

In this exclusive conversation, Md. Noor A Alam, Deputy Managing Director of Elite Hitech Industries, speaks about nation-building through technology, the importance of R&D-led manufacturing, sustainability, and why Bangladesh must own its industrial future.

Elite Hitech Industries has emerged as a leading air conditioner manufacturer in Bangladesh. What have been the key drivers behind this growth and diversification?

Elite Hitech Industries has always carried a strong sense of responsibility toward the nation. From the very beginning, our goal was not just commercial success—it was manufacturing independence.

If profit had been the only objective, there were many other businesses that could have generated quicker or higher returns. But we believed that even after 50 years of independence, Bangladesh should not remain dependent on other countries for critical technologies like air-conditioning. No country should have to rely on another's mercy for performance, quality, or supply.

That belief shaped our direction. When we entered manufacturing, our first priority was building internal knowledge—strengthening R&D, engineering capability, and learning processes. We wanted to own our technology, not just assemble imported systems.

The people of Bangladesh recognized that integrity and effort. A brand cannot grow without public trust. We put in the work, and the people turned that effort into a brand. At the core, our key driver has always been R&D concentration, technical learning, and self-reliance.

How is EHIL improving RAC and CAC efficiency while keeping air-conditioning solutions affordable for residential and commercial users?

Efficiency begins with autonomy. When manufacturers rely on semi-finished or disassembled imported products, efficiency levels are dictated by external suppliers. That limits both performance control and pricing flexibility.

By manufacturing our own products, we can adjust design parameters, optimize efficiency, and remove unnecessary cost layers. External suppliers always include their own margins, which ultimately increase prices for consumers. Our approach allows us to deliver energy-efficient and cost-effective solutions simultaneously.

This decision had a broader impact on the industry as well. When competitors saw that local manufacturing could succeed at this level, it encouraged technological growth across the sector.

For Commercial Air Conditioning (CAC), durability has always been critical. We benchmark ourselves against Japanese industrial standards, particularly for robustness and long-term performance. We never compromise on core raw materials like steel and copper. Today, we produce some of the most robust industrial-grade air conditioners in the country, and public appreciation confirms that effort.

It took nearly 12 years of manufacturing experience to reach this stage. Our next focus is process cooling and cold chain solutions—a crucial yet heavily import-dependent sector in Bangladesh. With dedicated R&D over the next one to two years, we aim to achieve autonomy there as well.

Your product range includes split, ducted, cassette, portable, and industrial systems. How do these solutions address modern infrastructure demands?

We work across the entire spectrum of air-conditioning solutions. Our portfolio includes wall-mounted splits, ceiling units, cassette systems, ducted ACs, floor-standing units, dehumidifiers, and customized solutions.

While cooling remains the standard requirement in Bangladesh, many of our systems offer both cooling and heating options, especially for light commercial and specialized applications. This becomes increasingly important as we move into process cooling and thermal management, where cooling alone is often insufficient.

Another critical factor is environmental adaptation. Bangladesh has coastal regions, high-humidity zones, and chemically aggressive environments that can severely damage standard air conditioners. To address this, we develop units with special protective coatings designed for moisture, corrosion, and chemical resistance.

Our strength lies in designing air conditioners that are not generic, but context-specific—built for Bangladesh's climate, industries, and infrastructure realities.

Sustainability is a major focus for EHIL. How do eco-friendly refrigerants and advanced treatment systems support your environmental goals?

Sustainability and decarbonization are central to our future roadmap. One major focus area is the transition to eco-friendly refrigerants with low to near-zero Global Warming Potential (GWP).

We work closely under the guidance of the Department of Environment, UNDP, Ozone Cell, and international development partners to align with next-generation refrigerant standards.

From an operational standpoint, we centrally manage and monitor our Effluent Treatment Plants (ETP) and Water Treatment Plants (WTP). EHIL also maintains internationally recognized certifications, including:

- ISO 9001 (Quality Management)
- ISO 14001 (Environmental Management)
- ISO 45001 (Occupational Health & Safety)

Sustainability is not a checkbox for us—it is integrated into manufacturing, compliance, and long-term planning.

With over 30 years of contribution to national development, how does EHIL plan to continue delivering "Quality Performance with Cool Comfort"?

Our ambition is to be a technology-driven company that competes confidently on both local and global platforms. With three decades of local market understanding and global-standard technical expertise, we aim to lead in customized air-conditioning and cold chain solutions for Bangladesh.

At the same time, we want to stand shoulder to shoulder with global brands at international technical forums. Bangladesh must not fall behind in global practices or innovation cycles.

Our mission is clear: to protect national interests, strengthen local capability, and ensure that this 56,000 square miles of market is not dominated by external forces when we have the capability to lead ourselves.

What kind of reactions do you receive from international markets and industry peers?

Reactions usually fall into two contrasting categories. One group is genuinely surprised—"We didn't know Bangladesh was doing this level of manufacturing." The other reaction is more cautious: "If you are moving this fast, what does that mean for us?"

Competition and geopolitics are part of industrial growth. We welcome competition, but we also believe that if policy support aligns, Bangladesh can expand beyond borders. Even without that, our priority is to safeguard national capability in this sector.

Today, nearly half a million air-conditioning units produced by Elite Hitech Industries are serving the country. That, for us, is the true testament of commitment. And from here, we believe the sky is the limit.

Closing Note

Elite Hitech Industries' journey reflects a larger narrative—one where industrial self-reliance, technological courage, and long-term thinking converge. As Bangladesh steps into its next phase of growth, companies like EHIL demonstrate that local manufacturing, when powered by vision and integrity, can shape national destiny.

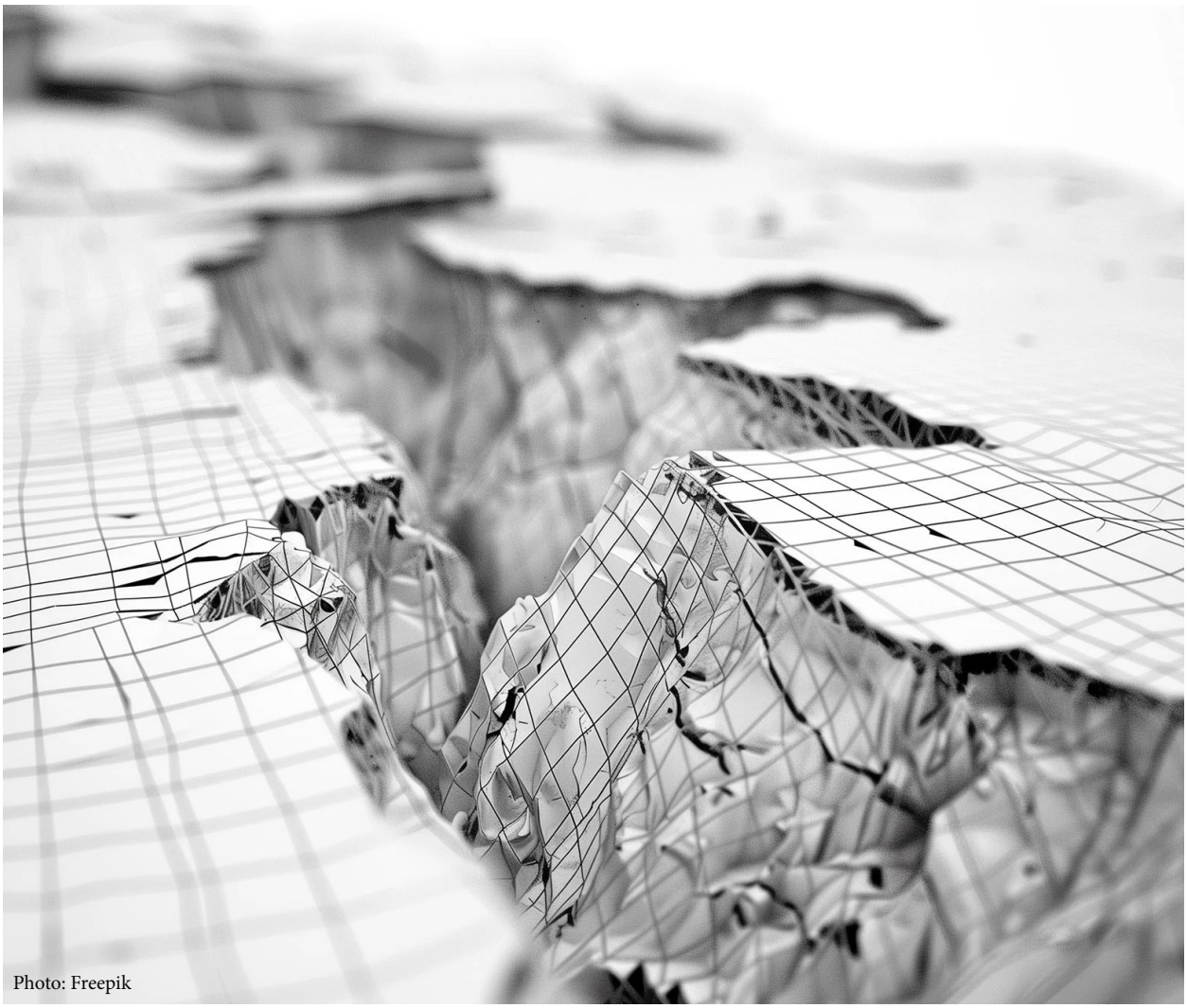


Photo: Freepik

EARTHQUAKES
EVERYDAY FEAR
and the Quiet Risk Beneath Bangladesh

The tremor lasted only a few seconds, but it unsettled an entire city. In apartments across Dhaka, ceiling fans swayed, cupboards rattled, and mobile phones lit up almost instantly with messages: Did you feel it? Was that an earthquake? Some people rushed toward stairwells. Others froze, unsure whether to move or wait. Children cried. Elderly parents were guided to chairs. And then, just as suddenly as it began, the movement stopped.

Within minutes, the city returned to its rhythm. Traffic resumed. Offices reopened. Tea stalls filled again. For many, the moment dissolved into a fleeting anecdote, something to be mentioned briefly before attention shifted back to work deadlines and daily errands. Yet beneath the surface calm lingered an unease that Dhaka knows well. Earthquakes in Bangladesh rarely arrive with devastation, but when they do come, even briefly, they expose a deeper vulnerability that tends to be forgotten once the ground falls silent again.

Bangladesh is an earthquake-prone country. This is not speculation or fear-mongering; it is a geographic reality shaped by tectonic forces far beyond human control. Recent tremors, combined with renewed analysis of seismic history, have prompted warnings from some experts that a large earthquake could occur at any time. What troubles many professionals is not the inevitability of an earthquake itself, but the uncomfortable truth that Dhaka, and Bangladesh more broadly, remains dangerously unprepared to face one.

REMEMBERING SHAKING THROUGH STORIES

In older neighborhoods of Dhaka, earthquakes live on through memory rather than measurement. Elderly residents recall stories passed down from parents who experienced the great Assam earthquake of 1950, how walls cracked, ponds rippled, and fear spread through communities unaccustomed to such movement. These stories are often recounted as moments of shock rather than lasting transformation, reminders of how fragile everyday life can suddenly become.

Younger generations remember more fragmented moments: a tremor during school hours that sent teachers scrambling, a chandelier swaying during a wedding ceremony, a sudden jolt in the middle of the night that left families awake long after the earth settled. These moments are unsettling but rarely decisive. They interrupt life without reshaping it.

As a result, earthquakes occupy an uneasy space in the public imagination. They are acknowledged as dangerous, yet treated as distant. Floods arrive every year, forcing communities to adapt through repetition. Cyclones follow a recognizable season, reinforced by early-warning systems and evacuation drills. Earthquakes, by contrast, feel irregular and unpredictable, making them easier to dismiss once the immediate fear fades.

Residents stand in an alley after vacating their house next to a fallen scaffolding following an earthquake, Dhaka, Bangladesh, Nov 21, 2025.

But seismic risk does not diminish because it is infrequent. In fact, the most destructive earthquakes often strike after long periods of quiet, when preparedness has eroded and complacency has taken root.

THE SCIENCE BENEATH THE DELTA

Geologically, Bangladesh is far from stable. The country sits near a complex junction of tectonic plates that have shaped South Asia over millions of years. To the north, the Indian plate presses relentlessly against the Eurasian plate, forming the Himalayan range. To the east, interactions with the Burma plate generate seismic activity along active fault systems extending toward Bangladesh's eastern regions.

Several of these faults lie uncomfortably close to major population centers. The Dauki Fault near the northern border, the Madhupur Fault beneath central Bangladesh, and fault systems in the east all pose credible threats. Long periods of inactivity along these faults do not signal safety. Instead, scientists warn, strain accumulates gradually, increasing the potential for a stronger release when it finally occurs.

Adding to this risk is the nature of the land itself. Much of Bangladesh, including Dhaka, is built on soft alluvial soil deposited by rivers over centuries. During strong earthquakes, such soil can amplify shaking or even liquefy, undermining foundations and causing buildings to fail. Structures that appear solid under normal conditions may behave very differently under seismic stress.

These geological realities remain largely invisible in daily urban life. Buildings rise rapidly. Neighborhoods densify. The city expands upward and outward, often without fully accounting for what lies beneath its foundations.

A CITY BUILT FASTER THAN SAFETY

Dhaka's transformation into a megacity has been driven by necessity. Millions migrate to the city for work, education, and survival, pushing housing demand to relentless levels. Construction responds accordingly, fast, dense, and often poorly regulated.

The result is an urban fabric marked by deep inequality. Reinforced concrete buildings stand beside aging masonry structures. Informal settlements grow without formal oversight. High-rise towers compete for skyline dominance, sometimes prioritizing floor area over structural integrity. Older neighborhoods with narrow lanes and closely packed buildings remain home to millions, even as infrastructure ages around them.

Decades of development that ignored or bypassed regulations have produced thousands of unsafe structures. Building codes exist, but enforcement has been inconsistent. Supervision is often weak. Material quality varies widely. The city has grown faster than its capacity to manage risk, creating layers of vulnerability that accumulate silently over time.

Photo: Freepik

PREPAREDNESS GAPS THAT MATTER MOST

In a city of nearly 20 million people, Dhaka has only 19 fire stations. The number of registered volunteers nationwide stands at approximately 45,000, far too few to manage large-scale post-earthquake rescue operations. Emergency response capacity remains severely limited, particularly in dense neighborhoods where access is already constrained.

If major hospitals were to collapse in a large earthquake, there would be no alternative facilities ready to provide care. Bangladesh has not developed mobile hospitals or field ICU units that could be rapidly deployed. Even the logistics of managing mass fatalities, including ensuring dignified handling of bodies, remain largely unplanned.

These are not abstract concerns. They are structural weaknesses that would determine survival and recovery in the aftermath of a major earthquake.

CALM, NOT PANIC: WHAT EXPERTS ARE SAYING

At the same time, many senior engineers, architects, and researchers caution strongly against fear-driven narratives around earthquakes. They argue that panic itself can increase casualties, often turning manageable situations into dangerous ones. According to them, preparedness, not prediction, is the most effective way to reduce loss of life and injury.

These views were articulated at a recent roundtable discussion titled “Earthquake: Reality, Perception, and Strategies for Awareness,” organized by the Institute of Architects Bangladesh (IAB). The discussion brought together architects, engineers, geologists, urban planners, and disaster-management professionals. Rather than focusing on worst-case scenarios, the participants emphasized practical steps, professional responsibility, and public awareness.

Dr. Shamim Z. Bosunia, a renowned civil engineer and Emeritus Professor at the University of Asia Pacific, stressed that competent engineering and proper construction oversight are far more important than fear. He pointed out that many injuries during earthquakes occur not because buildings collapse immediately, but because people panic and make unsafe decisions. Rushing down staircases, jumping from balconies, or crowding exits during shaking often leads to serious injury or death. According to him, calm behavior, combined with structurally sound buildings, can significantly reduce risk.

Former IAB president and former Chief Architect Kazi Golam Nasir echoed this concern. He warned against speculative forecasting and alarmist media narratives that attempt to predict the exact timing of a major earthquake. Such claims, he argued, distract people from what truly matters. Fear can cause confusion, helplessness, and inaction. Instead of spreading anxiety, he emphasized the need to build confidence through inspection, maintenance, and the identification of structurally vulnerable buildings. For him, hope grounded in preparation is more useful than fear rooted in uncertainty.

From a planning perspective, RAJUK Chief Town Planner Ashraful Islam offered a sobering assessment of Dhaka’s readiness. He highlighted the lack of reliable data on how many buildings in the city are structurally safe. He also pointed to the shortage of open spaces that could serve as emergency assembly areas. In addition, he warned that Dhaka lacks the capacity to manage the enormous volume of debris that would be generated by a major earthquake. Without advance planning, debris removal alone could paralyze rescue and recovery efforts.

Together, these expert voices convey a clear message. Earthquakes should neither be ignored nor sensationalized. The greatest danger lies not in uncertainty about when an earthquake will strike, but in failing to prepare for one.

UNEQUAL RISK, UNEQUAL SURVIVAL

Earthquake risk in Bangladesh is deeply unequal. Those living in poorly constructed buildings, working in overcrowded factories, or residing in older parts of cities face far greater danger than residents of newer, well-engineered developments. Yet these same populations often have the least power to demand safer conditions.

A garment worker may be aware that a factory building is unsafe, but refusing to work is rarely an option. A family in Old Dhaka may understand the risks posed by narrow staircases and aging structures, but financial limits and social ties make relocation difficult. A schoolteacher may worry about how students would respond during an earthquake, yet receive no training or guidance from authorities.

These examples show that preparedness is not only a technical issue. It is shaped by income, access, and power. Safety is often treated as a privilege rather than a right. As a result, the people most exposed to risk are often those least able to reduce it. Preparedness, in this sense, is social and political. It reflects whose lives are prioritized, whose neighborhoods receive attention, and whose risks are accepted as normal.

EVERYDAY PREPAREDNESS INSIDE BUILDINGS

Beyond infrastructure and governance, earthquake preparedness is also shaped by what happens inside buildings. How rooms are arranged, where furniture is

placed, and whether people know where to take shelter all influence survival during shaking. Even when buildings remain standing, unsecured interiors can cause serious harm.

Everyday objects such as bookcases, wardrobes, televisions, and glass tables can turn dangerous during earthquakes if they are not properly secured. Heavy furniture placed near beds, workspaces, or children's play areas poses particular risk. In many earthquakes around the world, injuries occur not from collapsing buildings but from falling furniture and shattered glass.

Simple, low-cost measures can reduce this danger significantly. Anchoring shelves and cabinets to walls helps prevent them from toppling. Storing heavy items on lower shelves reduces the risk of falling objects. Moving fragile or glass furniture away from walkways and sleeping areas lowers the chance of injury. These choices may seem minor, but during an earthquake they can be life-saving.

Knowing where to shelter is equally important. Sturdy tables and strong interior corners can provide protection during shaking. International guidance promotes the Drop–Cover–Hold On approach: drop to the ground, take cover under strong furniture, and hold on until the shaking stops. Yet in Dhaka, few homes, schools, or offices clearly identify safe zones or practice these actions.

Public drills remain rare. Schools seldom conduct earthquake simulations. Offices focus on fire safety but rarely address seismic risk. Residential buildings lack signage or basic instructions. When the ground moves, people rely on instinct. In dense urban settings, instinct often leads to panic rather than protection.

GOVERNANCE OVER GUESSWORK

Earthquakes cannot be predicted with certainty. What can be predicted, however, is the outcome of poor governance. Weak enforcement, fragmented authority, and delayed investment in prevention turn natural hazards into human disasters.

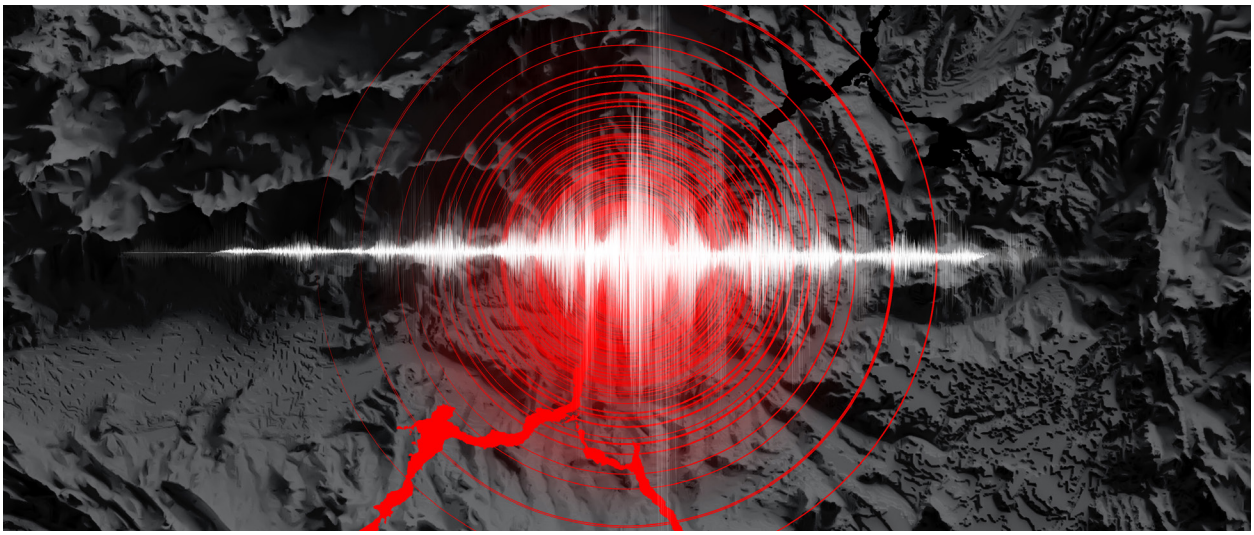
Effective preparedness requires coordination across planning, construction, education, health, and emergency services. It demands regular building inspections, retrofitting of vulnerable structures, public drills, and continuous awareness campaigns. Most importantly, earthquake safety must be treated as part of everyday urban governance, not as a temporary concern after tremors.

Preparedness also requires space. Open grounds for assembly, emergency access routes, and temporary shelter areas are essential. In Dhaka, where public space has steadily disappeared, this poses a serious challenge. The loss of playgrounds and open fields is not only an urban design failure; it is a failure of disaster planning.

LIVING WITH THE GROUND WE HAVE

Bangladesh cannot move away from its fault lines. It cannot stop tectonic movement. What it can do is decide how its cities live with uncertainty. Earthquake safety is not a single project or policy. It is an ongoing process that requires learning, enforcement, accountability, and public trust. Development without resilience is fragile, no matter how impressive it looks.

The next earthquake felt in Dhaka may again pass without major damage. Or it may not. What will determine the outcome is not the strength of the shaking alone, but the choices made long before it begins.Until preparedness becomes routine rather than reactive, Bangladesh will continue to live with a quiet risk beneath its feet, one that waits patiently, unseen, and unchanged by how busy the city above it becomes.



AGRI-SOLAR INTEGRATION

Cultivating the Future of Food and Energy Security in Asia

As Asia confronts the twin challenges of feeding a rapidly growing population and meeting escalating energy demand, a groundbreaking model is gaining traction: agrivoltaics — the integration of solar power generation with active agricultural production. This dual-use land strategy, already scaling across China and India, promises to transform rural livelihoods, enhance climate resilience and usher in a sustainable era where food and energy systems flourish side by side.

A NEW DAWN FOR LAND USE

In much of Asia, pressure on land is intensifying. Agricultural lands must feed billions, yet conventional utility-scale solar farms often compete for the same finite space, triggering land-use conflicts and raising concerns about food security. Agrivoltaics offers a compelling alternative: co-locating photovoltaic (PV) systems with crops or livestock, allowing the same area to produce both food and clean electricity. This "dual land use" approach can boost overall productivity per hectare while mitigating the trade-off between energy and agriculture that has historically hampered sustainable development strategies.

At its core, agrivoltaics recognizes that solar panels and crops need not be adversaries — when thoughtfully designed, they can be symbiotic. PV modules shaded above crops can reduce heat stress and evaporation, improving microclimates, while crops help cool panels, enhancing electrical efficiency. Agrivoltaics spans a range of configurations — from elevated arrays over crop rows to semi-transparent panels in greenhouses and integrated systems combining grazing livestock with solar installations.

CHINA: SCALING THE AGRIVOLTAIC REVOLUTION

China has emerged as a global leader in agrivoltaic deployment. Over the past decade, more than 500 agrivoltaic projects integrating solar with agriculture, aquaculture or greenhouses have been identified, totaling 31 gigawatts (GW) of installed capacity — an extraordinary scale for a model still in early global adoption.

These initiatives reflect Beijing's strategic push to embed renewable energy within rural development and its

"dual-carbon" goals — aiming to peak carbon emissions before 2030 and achieve carbon neutrality by 2060. By placing solar on farmland or degraded land adjacent to agricultural plots, China is not only generating clean energy but also creating new economic opportunities in rural regions traditionally reliant on farming alone.

In Shandong and Inner Mongolia, agrivoltaic farms have demonstrated how solar arrays can coexist with crops like grains, vegetables and berry plantations, delivering revenue from power sales while sustaining — and in some cases improving — agricultural yields.

For example, installations of solar panels above goji berry cultivation in arid regions highlight agrivoltaics' climate resilience benefits: the partial shading ameliorates excessive heat, reduces irrigation needs and helps stabilize crop output, while the energy sold into the grid provides farmers with a dependable supplemental income.

China's massive technical potential for agrivoltaics is estimated at over 60,000 GW if fully realized under dual land-use principles — dwarfing current deployments and underscoring the scale of opportunity ahead.

INDIA: POLICY, PILOTS, AND PRACTICAL PROMISE

India, home to one of the world's largest agricultural sectors, is embracing agrivoltaics as both a climate and rural development strategy. With ambitious renewable energy targets — including 500 GW of installed renewable capacity by 2030 — and a large swath of sun-soaked farmland, the agrivoltaic model aligns with national priorities to enhance energy security while safeguarding food systems.

Under the PM-KUSUM scheme (Pradhan Mantri Kisan

Photo: Wikipedia


Photo: Pexels

Urja Suraksha evam Utthan Mahabhiyan), launched by the Ministry of New and Renewable Energy, farmers are incentivized to adopt solar technologies — including those that support dual land use. Government subsidies cover a significant portion of capital costs, with additional financing mechanisms designed to make agrivoltaic investments viable for smallholders and cooperatives.

State-level policies have further stimulated deployment. Programs like Gujarat's Suryashakti Kisan Yojana and Delhi's Mukhyamantri Kisan Aay Badhotri Solar Yojana offer attractive feed-in tariffs and lease-based income streams, signaling a robust, decentralized approach to agrivoltaic rollout.

Field trials and pilot installations across wheat, tomato, turmeric, leafy greens and pulses have shown encouraging results: soil evaporation can be reduced by up to 30%, lowering irrigation demand, while crops that tolerate partial shading often maintain or even exceed open-field yields. These outcomes not only optimize land productivity but also help farmers diversify income sources through energy sales.

On the technical front, research into agrivoltaic configurations — such as vertical bifacial PV modules strategically oriented east-west or north-south — shows promise for enhancing dual land use in India's tropical and subtropical regions. These innovations allow solar generation peaks in both morning and evening while facilitating agricultural operations below.

WHY AGRIVOLTAICS MATTERS FOR FOOD AND ENERGY SECURITY

Agrivoltaics directly addresses three interconnected challenges:

1. Land Scarcity: Traditional solar installations can require large tracts of dedicated land, potentially displacing agricultural use. Agrivoltaics reduces this tension by maximizing land efficiency.

2. Climate Resilience: In regions prone to heat stress or water scarcity, the microclimates created by solar shading can help crops conserve moisture and withstand extreme weather patterns.

3. Rural Livelihoods: By enabling farmers to generate and sell electricity in addition to crops, agrivoltaics introduces diversified income streams that reduce economic risk and enhance financial resilience.

From a macro perspective, agrivoltaics contributes to national energy matrices while preserving agricultural output—a critical balance as Asia navigates climate commitments and sustainable development goals.

CHALLENGES AND THE ROAD AHEAD

Despite compelling potential, agrivoltaic adoption faces hurdles. Regulatory frameworks in many countries still classify land strictly for either agriculture or commercial energy production, complicating dual-use implementation. In India, unclear land titles and legal ambiguity around dual land use have slowed some projects, highlighting the need for policy reforms that explicitly enable agrivoltaics.

Moreover, initial investment costs remain higher than conventional single-use systems, and stakeholders require clear evidence of long-term agricultural performance and profitability to build confidence. Research into optimized panel configurations, cost-benefit models and crop-specific shading strategies is ongoing and will be pivotal in overcoming these barriers.

TOWARD A HARVEST OF SUNSHINE

Agrivoltaics is not a panacea, but it represents a powerful blueprint for a resilient, equitable and sustainable land-use future. In China's vast rural landscapes and India's sun-drenched farms, the convergence of solar energy and agriculture illustrates how innovation can unlock value across sectors — fostering food security, advancing rural livelihoods and powering economies with clean energy.

By embracing agrivoltaics, Asian nations can sow the seeds of a greener and more prosperous future — one where every hectare delivers both abundant harvests and rays of sustainable power.

Photo: Freepik

WHEN ENGINEERS STOP FIGHTING WATER

For a century, modern civilisation tried to tame water with concrete, steel, and straight lines. It worked—until it didn't. As floods intensify and droughts deepen, a new generation of water engineers is turning to an unlikely ally: nature itself. From rivers allowed to roam again in the Netherlands to stormwater quietly sinking into the ground beneath Los Angeles, this is the story of how designing with water—not against it—may be the most radical infrastructure shift of our time.

On a winter afternoon in the Netherlands, the river looks almost calm. It is swollen, yes, thick with snowmelt and rain from upstream Europe, but it no longer carries the menace it once did. There is no panic along its banks, no urgent watching of water levels creeping toward catastrophe.

Instead, the river spreads.

It flows sideways, outward, into land that was deliberately lowered and reshaped to receive it. Water fills new channels, shallow basins, and restored wetlands. Cattle graze on higher ground. Cyclists pass without glancing up. This is not a flood emergency. This is the plan working.

For generations, water engineers were trained to prevent moments like this. Rivers were meant to stay in their lanes. Floodplains were seen as wasted space. Water that strayed beyond its channel was a failure of design.

Now, allowing rivers to move is considered one of the most advanced engineering decisions a country can make.

THE END OF THE CONCRETE ILLUSION

The twentieth century was the golden age of grey infrastructure. Dams promised control. Levees promised safety. Pipes promised efficiency. In many ways, they delivered. Cities grew. Disease declined. Water arrived on demand.

But the systems were built for a stable climate and predictable rainfall. They were sized for averages, not extremes. They assumed tomorrow would look like yesterday.

Climate change shattered that assumption.

Storms grew sharper. Rainfall arrived in bursts instead

of seasons. Long droughts were punctuated by sudden floods. Infrastructure designed to resist water found itself overwhelmed by it.

Engineers began to notice something unsettling: when rigid systems fail, they fail all at once. A levee breach is not gradual. A sewer overflow does not negotiate.

Nature-based solutions emerged not as ideology, but as pragmatism.

REDISCOVERING THE INTELLIGENCE OF LANDSCAPES

Long before pipes and pumps, landscapes managed water elegantly. Forests slowed rainfall. Wetlands filtered pollutants. Floodplains stored excess flows. Aquifers held water patiently underground.

Modern engineering removed these systems in the name of efficiency—then spent billions trying to replicate their functions mechanically.

Nature-based solutions reverse that logic. They restore natural processes, but with intent. Flow paths are calculated. Retention times are modelled. Performance is monitored.

This is not environmental nostalgia. It is applied hydrology with humility.

WHERE WASTEWATER LEARNS TO SLOW DOWN

At the edge of a town, beyond the treatment plant, wastewater enters a constructed wetland. The water is already treated—but not finished. It spreads into shallow basins thick with reeds and grasses. Microbes cling to roots. Sediments settle. Nutrients are absorbed.

Nothing hums. Nothing spins.

And yet, the water leaves cleaner than it arrived.

Constructed wetlands do not replace treatment plants; they complete them. They are especially valuable when systems are stressed—during heavy rain, power outages, or operational upsets. Where mechanical systems depend on constant control, wetlands rely on processes that evolved over millennia.

Engineers like them for reasons rarely mentioned in glossy brochures: they are forgiving. They tolerate mistakes. They absorb shocks.

And in a world of increasing uncertainty, forgiveness is a design asset.

CITIES THAT LET RAIN LINGER

Cities were never meant to be waterproof. Yet asphalt, rooftops, and concrete have sealed urban land so completely that rain behaves like a trespasser—rushing off surfaces, overwhelming drains, flooding streets.

Green infrastructure asks a simple question: what if rain were allowed to stay for a while?

A green roof answers by absorbing rainfall, releasing it slowly, cooling buildings in the process. A bioswale invites runoff into planted channels where it slows, sinks, and filters through soil instead of racing into pipes.

Individually, these interventions seem modest. Collectively, they reshape urban hydrology.

Engineers have measured it: peak flows drop, flood risks decline, combined sewer overflows become less frequent. But something else happens too. Streets feel calmer. Heat softens. Water becomes visible again.
Infrastructure stops hiding.

STORING THE FUTURE UNDERGROUND

Los Angeles is often framed as a city running out of water. Less discussed is how much water passes through it, unused, every year.

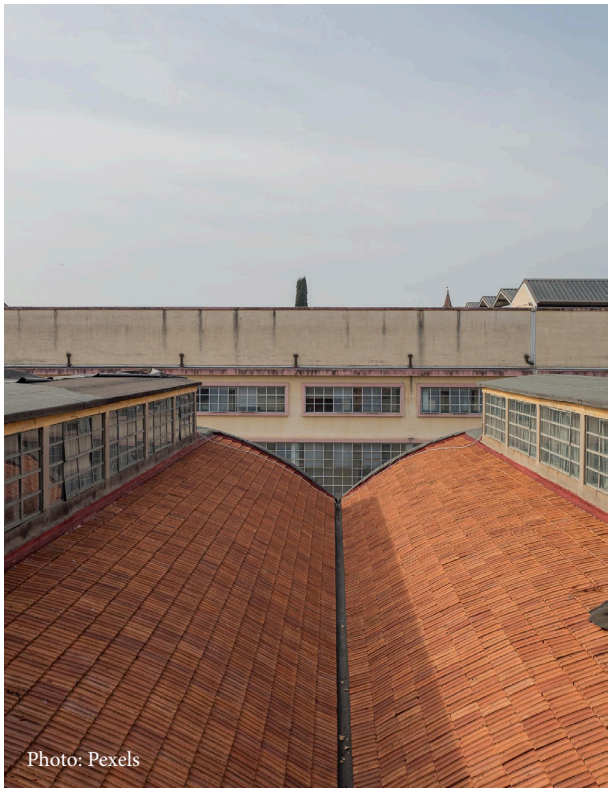


Photo: Pexels

Stormwater once flowed swiftly from streets to the ocean. Now, much of it is captured in spreading grounds—broad, engineered basins where water pools briefly before sinking into the earth.
Below the city, aquifers quietly refill.

Managed aquifer recharge is among the most understated water innovations of the century. It lacks the drama of dams or desalination plants. Yet it may be more powerful than both.

Aquifers do not evaporate. They do not require walls. They store water invisibly, securely, patiently. In an era of climate volatility, they function as time machines, moving water from moments of excess to moments of scarcity.

For engineers, this is systems thinking at its best: flood control, water supply, and water quality improvement delivered by the same intervention.

GIVING RIVERS THEIR SPACE BACK

The Dutch learned the hard way that higher dikes lead to higher consequences. After catastrophic floods in the 1990s, the country chose restraint over escalation.

The Room for the River program did something radical: it redesigned the landscape around rivers instead of reinforcing the rivers themselves.

Floodplains were lowered. Side channels carved. Land uses reimagined. Water was allowed to spread without destroying cities.

The brilliance of the program lies not only in reduced flood risk, but in its acceptance of reality: rivers will rise. The question is not whether, but how—and where.
This is engineering that listens.

WHY NATURE-BASED SOLUTIONS ENDURE

Nature-based solutions succeed because they align with physics, biology, and time.

They reduce flood damage not by blocking water, but by slowing it. They improve water quality not by force, but by filtration and transformation. They enhance biodiversity not as a side effect, but as a function.

Most importantly, they age well. Wetlands grow stronger. Soils adapt. Systems evolve.

Grey infrastructure degrades. Nature-based systems mature.

CASE STUDY

Los Angeles—Turning Flood Risk into Groundwater Security

Los Angeles is a city defined by paradox. It imports water from hundreds of kilometres away, yet sends billions of litres of stormwater to the ocean every year.

For decades, floods were managed by concrete channels designed to move water out of the city as fast as possible. The solution worked—until drought made the cost of waste impossible to ignore.

The shift came when engineers began to view stormwater not as a threat, but as supply.

Across Los Angeles County, spreading grounds—large, engineered recharge basins—now intercept stormwater flows. During rain events, water is diverted into these basins, where it pools briefly before infiltrating into underlying aquifers.

The engineering is deceptively simple. The impact is profound.

- Flood peaks are reduced
- Groundwater reserves are replenished
- Imported water demand decreases
- Water quality improves through natural filtration

Unlike reservoirs, aquifers lose no water to evaporation. Unlike desalination, they consume little energy. Unlike dams, they sit quietly in the landscape, unnoticed by most residents.

In a future of climate extremes, Los Angeles is learning to bank water underground—using nature as its vault.

A NEW ENGINEERING MINDSET

The rise of nature-based solutions signals a deeper shift in engineering culture. The question is no longer “How do we control water?” but “How do we live intelligently with it?”

This requires new skills—ecology alongside hydraulics, patience alongside precision. It demands collaboration across disciplines and communities. It challenges engineers to design not for certainty, but for change.

The irony is that the most forward-looking water infrastructure often looks ancient: rivers that meander, wetlands that breathe, ground that absorbs.

In an era obsessed with speed and scale, the future of water engineering may depend on learning how to slow down.

And in doing so, we may finally build systems resilient enough for the world we are entering—not the one we have already left behind.

WHAT NATURE-BASED WATER INFRASTRUCTURE DELIVERS

Function	Grey Infrastructure Approach	Nature-Based Approach	Long-Term Outcome
Flood control	Dikes, channels, pipes	Floodplains, wetlands, bioswales	Reduced peak damage, graceful failure
Water quality	Mechanical filtration, chemicals	Soil, plants, microbes	Lower energy use, natural polishing
Water storage	Reservoirs	Aquifers, soils	No evaporation, climate buffering
System resilience	Fixed design thresholds	Adaptive, multi-path systems	Better performance under extremes
Co-benefits	Limited	Biodiversity, cooling, recreation	Higher social and ecological value

TAPPING EARTH'S STEADY HEAT

Geothermal and Renewable-Integrated HVAC in the West

As Western nations push toward net-zero buildings amid volatile energy prices and tightening emissions rules, geothermal heat pumps and solar-assisted systems stand out as reliable, ultra-low-carbon solutions. Offering 50-70% long-term energy savings, near-zero operational emissions, and strong policy support, these technologies are gaining momentum in residential retrofits and commercial projects—especially in cold climates like Scandinavia and the US Northeast—future-proofing comfort against climate and market shifts.

In the quest for sustainable indoor comfort, few technologies rival the elegance of geothermal heat pumps (GHPs). By tapping the Earth's stable subsurface temperatures—typically 10-15°C (50-59°F) year-round—these ground-source systems exchange heat with the ground via buried loops, delivering heating, cooling, and often domestic hot water with exceptional efficiency. Unlike air-source heat pumps that struggle in extreme cold, GHPs maintain high performance regardless of outdoor swings, making them ideal for the West's diverse climates.

Market data underscores accelerating adoption. Globally, the geothermal heat pump sector was valued at around USD 13-14 billion in 2025, with projections showing steady growth through 2034 at CAGRs of 5-7%. In Europe, the market reached about USD 1 billion in 2024 and is expected to expand at 4.9% annually, driven by decarbonization goals. North America sees strong momentum, with residential and commercial installations rising amid incentives. While air-source heat pumps dominate headlines, geothermal's superior efficiency—often achieving coefficients of performance (COP) of 4-5—positions it for premium applications.

Energy savings are compelling: homeowners and businesses commonly report 50-70% reductions in heating and cooling costs compared to traditional fossil-fuel systems. Emissions plummet since GHPs run on electricity (increasingly renewable), displacing gas or oil combustion. Over a system's 20-50+ year lifespan, the payback from lower bills often offsets higher upfront drilling and loop costs.

COLD-CLIMATE MASTERY

Scandinavia and US Northeast Successes

Scandinavia exemplifies geothermal's viability in harsh winters. Sweden boasts widespread adoption, with

ground-source systems common in homes and covering up to 90% of heating needs (often backed by electric resistance for peaks). Norway and Finland have tens of thousands of units, thriving in sub-zero conditions where stable ground heat ensures reliable output. These nations' high penetration—over 40 heat pumps per 100 households in some cases—stems from policy support, energy pricing, and proven durability.

In the US Northeast, cold-climate geothermal installations are surging in states like New York, Massachusetts, and Vermont. Companies like Dandelion Energy lead residential deployments with optimized designs, while commercial projects integrate GHPs for schools, offices, and multifamily buildings. Case studies show systems performing efficiently at -20°C (-4°F) or lower, with minimal auxiliary heating. Pairing with improved insulation amplifies benefits, slashing overall energy use.

SOLAR INTEGRATION

Hybrid Systems for Peak Efficiency

Renewable integration elevates geothermal further. Solar-assisted setups combine rooftop PV with GHPs, powering the electric compressor while offsetting consumption. In sunny Western regions like California or parts of the Midwest, excess solar generation charges batteries or feeds the grid, creating near-net-zero HVAC. Commercial examples in the Mid-Atlantic and Pacific Northwest blend geothermal with solar PV for dramatic cost and emission cuts—geothermal reduces load, making solar more viable for full building needs. Hybrid approaches also include solar thermal boosting ground loops or direct hot water production, enhancing year-round performance.

INCENTIVES AND FUTURE-PROOFING

Supportive policies accelerate uptake. In the US, the Inflation Reduction Act (IRA) historically offered 30% tax credits for geothermal under Section 25D (though residential credits phased out post-2025, commercial ITC persists with bonuses). State rebates, like New York's Clean Heat program or Maryland's incentives, fill gaps. In Europe, EU Green Deal funding, national subsidies, and building codes favor low-carbon heating, pushing geothermal in renovations and new builds.

These systems shield against energy price volatility—electricity from renewables is more stable than gas—and align with stricter codes aiming for zero-carbon readiness. As grids green and drilling tech improves (reducing installation costs), geothermal and hybrids become mainstream for resilient, comfortable buildings.

Geothermal isn't flashy, but its quiet genius—harnessing Earth's vast thermal battery—delivers profound impact. In the West's push for sustainable comfort, it's proving that the most reliable green path often lies beneath our feet.

Photo: Freepik

Photo: Pexels

2026 GLOBAL INFRASTRUCTURE INVESTMENT REVIEW

The Age of Pragmatic Green Growth

As we move through 2026, the global infrastructure investment landscape has entered what analysts are calling a "Supercycle of Execution." After years of high-level net-zero pledges, the focus has shifted from ambitious rhetoric to the gritty, capital-intensive reality of building the physical backbone of a decarbonized economy. Global infrastructure needs are now projected to exceed $100 trillion by 2040, and 2026 stands as a pivotal year where the convergence of digitalization, decarbonization, and energy security is dictating capital flows.

While the "green" label remains a primary driver, the motivations have evolved. Green investment in 2026 is no longer just a matter of environmental stewardship; it is increasingly viewed through the lens of industrial competition, national security, and the insatiable power demands of the Artificial Intelligence (AI) revolution.

1. The AI-Energy Nexus: A New Infrastructure Driver

Perhaps the most significant shift in 2026 is the role of AI as a primary catalyst for green infrastructure. The global data center build-out has accelerated beyond early-decade projections, with investment in data infrastructure expected to reach $620 billion this year.

- Firm Clean Power: Hyperscalers (Amazon, Google, Microsoft) are no longer satisfied with "bundled" renewable credits; they are now direct investors in "firm" low-carbon power. This has led to a resurgence

in nuclear energy and a massive scale-up of Battery Energy Storage Systems (BESS).

- Grid Modernization: In 2026, the "grid bottleneck" has become the single largest risk to both digital and green transitions. Consequently, investment in power grids is surging, with global spend expected to approach $500 billion this year. The focus is on "smart grids" capable of bidirectional flow and the integration of decentralized energy resources.

2. Green Finance: From Billions to Trillions

The financial instruments supporting these projects have matured significantly. Sustainable bond issuance is expected to exceed $1 trillion in 2026, underpinned by a more "steely pragmatism" among institutional investors.

Instrument	2026 Outlook/Trend	Key Driver
Green Bonds	Continued dominance; market size ~$2 trillion	Transparency and standardized impact reporting.
Transition Bonds	Rapid growth in "hard-to-abate" sectors	Financing the "greening" of steel, cement, and shipping.
Green Loans	Focus on "Use-of-Proceeds"	Move away from vague sustainability-linked targets toward specific assets.
Private Credit	High appetite for sustainable infra	Attractive yields in a landscape of higher-for-longer interest rates.

3. Regional Shifts: The "Great Fragmentation"

The "one-size-fits-all" model of global green investment has given way to a fragmented, regionally distinct landscape shaped by industrial policy.

The United States: Despite some rollbacks of early-decade subsidies, the U.S. remains a powerhouse of "safe-harbor" projects. Developers are front-loading construction to secure tax eligibility, while the Foreign Entity of Concern (FEOC) rules are forcing a massive onshoring of the green supply chain—from lithium refining to solar cell manufacturing.

China: China remains the world's largest renewable market, but its focus has shifted from sheer capacity to grid stability and export dominance. China now accounts for nearly 50% of the world's offshore wind growth and leads globally in pumped-storage hydropower.

Europe: Faced with high energy costs, Europe is doubling down on "Strategic Autonomy." The Carbon Border Adjustment Mechanism (CBAM) is now a major factor, forcing global exporters to certify the carbon footprint of the infrastructure used to produce their goods.

Emerging Markets: A widening gap persists. While India is becoming a "swing factor" for global climate goals with its massive solar auctions, many African nations struggle under high debt-servicing costs that equal nearly 85% of their total energy investment.

4. The Rise of "Resilience and Adaptation"

A major theme of 2026 is the mainstreaming of Adaptation Finance. With physical climate risks (wildfires, floods, extreme heat) now impacting municipal bond ratings and insurance premiums, investors are allocating more capital to "climate-proofing" existing infrastructure.

"In 2026, the economics of cleantech has overtaken the politics. We are no longer debating if we should build green, but how fast we can build it to ensure economic resilience."

This shift is visible in the G7's Partnership for Global Infrastructure and Investment (PGII), which aims to mobilize $600 billion by 2027. Much of this is targeted at "green corridors"—integrated transport and energy networks in Africa and Southeast Asia designed to secure supply chains for critical minerals like nickel and graphite.

5. Key Challenges and Risks

Despite the momentum, 2026 is not without its "growing pains":

- Affordability & Regulatory Risk: As utilities pass the costs of massive grid upgrades to consumers, political backlash over rising electricity bills is a growing concern.

- Supply Chain Volatility: The move toward "de-risking" from Chinese components has increased the cost of wind and solar projects in the West by 30-50% in some regions.

- The "Show Me" Period for AI: There is mounting pressure on the tech sector to prove that the massive infrastructure investments are delivering the promised productivity gains.

Case Studies

Building on the global overview, the regional dynamics of 2026 reveal two distinct models of green infrastructure development: Europe's transition from a "subsidy-led" to an "industry-first" powerhouse, and Southeast Asia's shift from bilateral projects to a unified regional energy market.

REGIONAL DEEP DIVE: THE EU AND SOUTHEAST ASIA

1. The European Union: Transitioning to "Clean Industrialism"

In 2026, the European Union is navigating a critical fiscal crossroads. The NextGenerationEU recovery fund, which fueled the initial post-pandemic green surge, is nearing its expiration. In its place, the EU has pivoted toward the Clean Industrial Deal, prioritizing infrastructure that directly supports domestic manufacturing and energy sovereignty.

Key 2026 Focus Areas:

- The "Made in Europe" Procurement Shift: Starting this year, new EU rules favor green technologies manufactured within the bloc for public tenders. This is a direct response to global competition, ensuring that the €1.2 trillion annual investment required for net-zero goals also builds the European industrial base.

- The Hydrogen Backbone: 2026 marks the first year of large-scale construction for the European Hydrogen Backbone. Notable projects include the Gronau underground storage facility in Germany—the first of its kind to receive cross-border EU funding—designed to stabilize the industrial heartlands of Northwest Europe.

- Cross-Border Interconnectivity: The EU has allocated €650 million in new grants this year for 14 flagship energy projects. These focus on integrating the "energy islands" of the Baltics and improving the flow of cheap solar power from the Iberian Peninsula to the high-demand centers of Central Europe via projects like the Aguayo II pumped-storage plant in Spain.

Project Type	2026 Milestone	Strategic Objective
Smart Grids	Bulgaria-Romania Interconnector	Reducing price disparities across the Single Market.
Energy Storage	Čierný Váh (Slovakia)	Combining traditional hydro with utility-scale batteries.
Offshore Wind	North Sea "Energy Hubs"	Moving from individual farms to integrated offshore grids.

Photo: Freepik

2. Southeast Asia: The Rise of the ASEAN Power Grid (APG)

In Southeast Asia, 2026 is being defined by the "connectivity leap." Historically, the region relied on isolated national grids. This year, the implementation of the ASEAN Plan of Action for Energy Cooperation (APAEC) 2026–2030 has catalyzed a shift toward a multi-lateral energy market.

Key 2026 Focus Areas:

- The "Battery of Southeast Asia" Maturity: Laos has successfully expanded its hydropower export capacity, but the 2026 strategy has shifted focus toward green hydrogen. Leveraging seasonal hydro excesses, Laos is positioning itself to export carbon-neutral fuels to its neighbors.

- The Green Energy Auction Program (GEAP): The Philippines has emerged as a regional leader in private capital mobilization. By allowing 100% foreign ownership in renewable assets and conducting massive auctions (targeting 35% RE by 2030), it has become the most attractive "pure-play" renewable market in ASEAN this year.

- The Digitalized Grid: In Indonesia and Vietnam, the focus has moved to Smart Grid Control Centers. After the "solar boom" of the early 2020s strained Vietnam's infrastructure, 2026 investments are dominated by grid-firming technologies and AI-driven load management to prevent curtailment.

Regional Fact: ASEAN requires roughly $200 billion per year in green investment through 2030. In 2026, for the first time, private credit and blended finance (via the ADB and World Bank) are providing over 70% of this capital, reducing the historical reliance on state-owned utility balance sheets.

3. Comparing the Two Landscapes

While both regions are scaling rapidly, their challenges in 2026 differ:

The EU is struggling with regulatory complexity and the transition from public subsidies to private market sustainability. Its main hurdle is "speed to market" for permitting.

Southeast Asia is battling institutional readiness. While the technology and capital are available, harmonizing grid codes and cross-border legal frameworks remains the primary "soft infrastructure" challenge of the year.

SUMMARY: THE 2026 INFLECTION POINT

The narrative of 2026 is no longer about the necessity of green investment, but the efficiency of its execution. Whether it is the EU protecting its industrial core or ASEAN integrating its disparate markets, infrastructure has become the primary tool for securing economic relevance in a decarbonizing world.

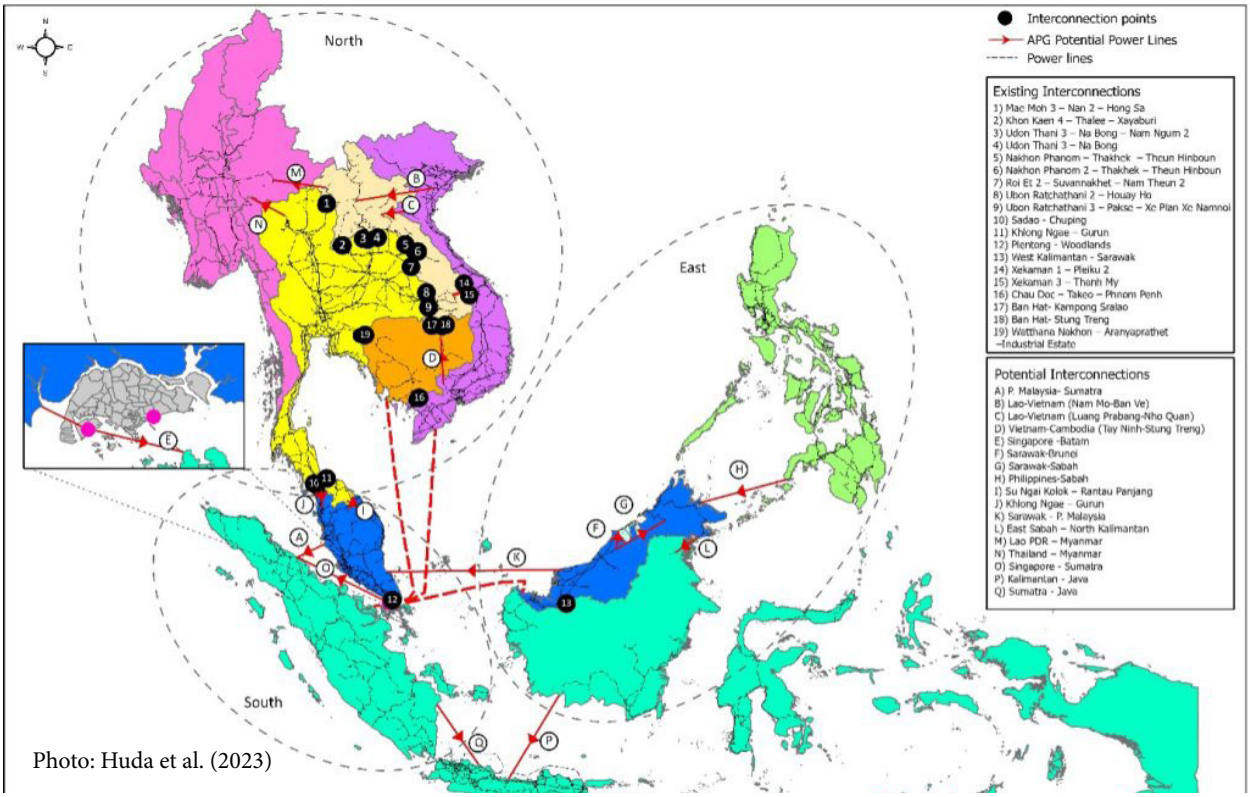
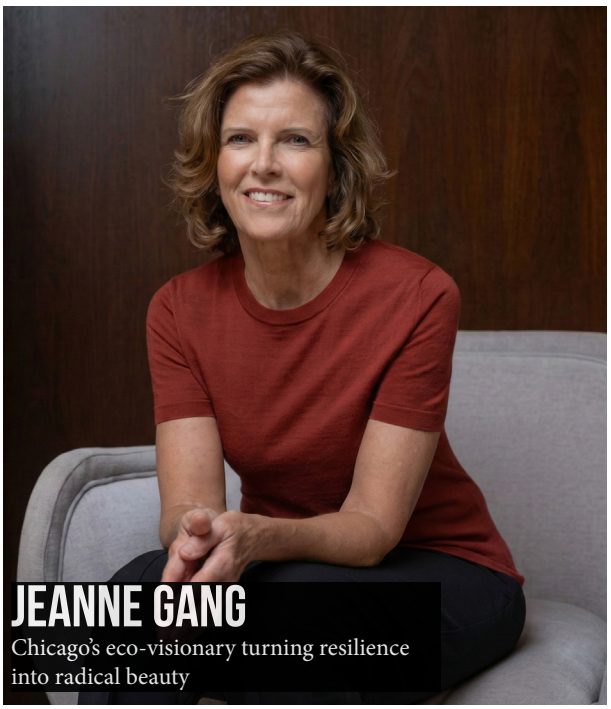


Photo: Huda et al. (2023)

BREAKING BARRIERS, BUILDING FUTURES

Five Women Redefining Architecture in 2026

In an era where architecture confronts climate urgency, social equity, and technological evolution, these women lead with vision, resilience, and innovation. From poetic minimalism to community-driven sustainability, their work continues to shape skylines, institutions, and public life worldwide.



JEANNE GANG

Chicago's eco-visionary turning resilience into radical beauty

Founder of Studio Gang, Jeanne Gang remains at the forefront of climate-responsive design. Her signature undulating forms—like the iconic Aqua Tower—merge structural ingenuity with environmental performance, while recent projects emphasize adaptive reuse, ecological integration, and community empowerment. Honored in major influential lists and as a past recipient of awards like the Charlotte Perriand Prize, Gang exemplifies how bold architecture can address urban challenges without sacrificing humanity or aesthetics.

Co-founder of SANAA, Kazuyo Sejima crafts luminous, boundary-dissolving spaces that prioritize openness, light, and subtle interaction. Enduring masterpieces such as the Rolex Learning Center, Louvre-Lens, and Kanazawa's 21st Century Museum continue to influence global institutional design. As the 2010 Pritzker Prize co-laureate (one of the few women ever awarded), Sejima's minimalist yet profoundly experiential approach inspires architects to create environments that feel weightless and welcoming.

KAZUYO SEJIMA

Master of ethereal transparency and spatial serenity

YVONNE FARRELL & SHELLEY MCNAMARA

Chicago's eco-visionary turning resilience into radical beauty

This acclaimed partnership delivers robust, context-rich buildings that celebrate materiality, light, and communal vitality. From the University of Limerick's engineering complexes to the Stirling Prize-winning Kingston University Town House, their work fosters connection and cultural depth. As the 2020 Pritzker Prize recipients (the first all-female duo) and RIBA Royal Gold Medal winners, Farrell and McNamara set enduring benchmarks for thoughtful, people-centered public architecture.

ELIZABETH DILLER

Interdisciplinary provocateur reimagining public realms

Co-founder of Diller Scofidio + Renfro, Elizabeth Diller fuses architecture with art, technology, and cultural critique. Transformative projects like New York's High Line, The Broad Museum, and Lincoln Center's redevelopment challenge conventions and create immersive, socially engaging environments. Consistently ranked among design's most powerful figures by outlets like Dezeen and TIME, Diller drives architecture that provokes thought, integrates performance, and responds to contemporary society.

TATIANA BILBAO

Champion of equitable, culturally rooted sustainable design

Through Tatiana Bilbao Estudio, she develops humane, adaptable architecture that addresses social justice and environmental needs. From low-cost housing prototypes and pilgrimage chapels to community complexes, her projects blend vernacular wisdom with modern innovation. Bilbao's focus on inclusivity and place-sensitive practice has earned widespread acclaim, making her a vital voice for ethical design that prioritizes vulnerable communities and long-term resilience.

These architects represent a dynamic spectrum of excellence—poetic, monumental, activist, and innovative—while advancing gender equity and sustainability. As 2026 unfolds, their influence underscores architecture's power to build not just structures, but more just and responsive worlds.

SHOW PREVIEW

Photo: Freepik

EARTHQUAKE RESILIENCE IN CONSTRUCTION ENGINEERING 2026

Taipei City, Taiwan | 18–19 May 2026

As cities grow taller, denser, and more complex, the question is no longer whether earthquakes will strike—but how prepared our built environments are when they do. Against this urgent global backdrop, the International Conference on Earthquake Resilience in Construction Engineering convenes in Taipei City, Taiwan, on 18–19 May 2026, bringing together the minds shaping the future of safer, smarter infrastructure.

Taipei is a fitting host. Situated along the Pacific Ring of Fire, Taiwan has long been a testing ground for seismic engineering innovation. From high-rise towers to critical transport networks, the city stands as a living laboratory for resilience—making it an ideal setting for deep technical exchange and forward-looking dialogue.

WHY THIS CONFERENCE MATTERS

Earthquakes remain one of the most destructive natural hazards, capable of undoing decades of development in seconds. As climate change compounds multi-hazard risks and urban populations swell, construction engineers are under increasing pressure to design structures that are not only strong, but adaptable, sustainable, and recoverable.

This conference addresses that challenge head-on—bridging research, practice, and policy. It focuses on how cutting-edge engineering solutions can be translated into real-world construction, building codes, and disaster-risk-reduction strategies. The conversations here are not theoretical; they influence how cities will be built, rebuilt, and protected in the decades ahead.

WHO SHOULD ATTEND

The event is designed for a broad yet highly focused audience, including:

- Structural and civil engineers
- Construction and infrastructure professionals
- Academic researchers and postgraduate students
- Urban planners and disaster-risk specialists
- Government officials, regulators, and policy advisors
- Technology providers working in construction innovation

Whether attendees are presenting new research, seeking practical solutions, or shaping policy frameworks, the conference offers a rare opportunity to engage across disciplines and regions.

INDUSTRY AND INSTITUTIONAL PARTICIPATION

The conference is expected to attract participation from major construction and engineering firms, infrastructure developers, and technology providers involved in seismic design and resilience planning. This includes organizations working in:

- Large-scale infrastructure and urban development
- Structural design and consultancy
- Advanced construction materials and smart systems
- Seismic monitoring, modeling, and risk assessment

Alongside industry, representatives from universities, research institutes, standards bodies, and international development organizations are anticipated, creating a balanced forum where innovation meets implementation.

The 2026 Conference will bring together leading global and specialized firms at the forefront of seismic and resilient design. Miyamoto International, Stantec, and Arup are among the major players expected, alongside consultancies like Haley & Aldrich, Geosyntec, Simpson Gumpertz & Heger (SGH), and Rutherford + Chekene, all known for their expertise in earthquake engineering and structural resilience.

Academic and research institutions, including Taipei's National Center for Research on Earthquake Engineering (NCREE), as well as representatives from standards organizations and regulatory bodies, will round out the lineup, ensuring a rich mix of technical insight, policy discussion, and practical solutions for building safer, more resilient infrastructure.

WHAT TO EXPECT

Across two intensive days, the program will feature keynote talks, technical paper presentations, expert panels, and collaborative discussions covering topics such as performance-based design, resilient materials, retrofitting strategies, and integrated disaster-preparedness planning.

More than a conventional academic gathering, the event positions itself as a knowledge-exchange platform—one that encourages collaboration, mentorship, and long-term partnerships aimed at building earthquake-resilient cities worldwide.

In an era where resilience is no longer optional, the Earthquake Resilience in Construction Engineering Conference 2026 offers timely insight, practical direction, and a shared sense of responsibility—set in one of Asia's most seismically aware capitals.

BANGLADESH ARCHITECTS AND ENGINEERS RALLY

for Earthquake Preparedness

The Institute of Architects Bangladesh (IAB) convened a high-level roundtable in Dhaka to address the nation's earthquake vulnerability. Experts from architecture, engineering, urban planning, and government highlighted critical gaps in building safety, emergency response, and regulatory oversight, while calling for evidence-based preparedness, retrofitting, and community awareness programs to safeguard lives in Bangladesh's most at-risk areas.

The Institute of Architects Bangladesh (IAB) recently hosted a high-level roundtable discussion titled "Earthquake: Reality, Perception, Awareness & Strategic Preparedness through Action" at the IAB Center in Agargaon, Dhaka, bringing together leading experts to address Bangladesh's growing vulnerability to seismic disasters.

The urgency of the discussion was underscored by recent seismic activity in the country, including a 5.7-magnitude earthquake on November 21 near Madhabdi, Narsingdi, which claimed 10 lives and injured over 600 people. Between 2021 and 2024, Bangladesh experienced 39 earthquakes, 11 of which were near Dhaka, highlighting the capital's acute exposure.

The session featured an array of voices from architecture, engineering, urban planning, and government. Senior IAB Fellows, including Iqbal Habib, Kazi Golam Nasir, Asifur Rahman Bhuiyan, Dr. Qazi Azizul Mowla, and Patrick D' Rozario, shared architectural and urban planning perspectives. Civil engineering insights came from Professor Dr. Shamim Z Bosunia, Professor Dr. Raquib Ahsan, Abdullah Al Hossain Chowdhury, and Shakhawat Hossen, while urban planning and policy perspectives were represented by Md. Ashraful Islam, Dr. Mohammad Giyasuddin Haydar, Professor Dr. Badruddoza Miah, Golam Mostafa, and Lieutenant Colonel Mohammad Tajul Islam Chowdhury.

The roundtable was chaired by IAB President Architect Professor Dr. Abu Sayed M Ahmed, with Vice President Architect Nowajish Mahbub moderating and General Secretary Architect Dr. Masud Ur Rashid delivering the welcome address.

Experts emphasized the role of proper structural supervision and compliance in mitigating earthquake risks. Professor Shamim Z Bosunia advised calm and precautionary action during seismic events:

"If those skilled in structural engineering do their work properly, and if construction supervision is done correctly, there is no reason to fear. Trust in Allah. Take shelter safely, stay alert, and many lives can be saved through such precautions alone."

Architect and urban planner Iqbal Habib stressed that while earthquakes cannot be prevented, the damage can be minimized. He highlighted gaps in building approvals and called for regulatory authority formation, block development, and implementation of TDR measures to reduce risks from fire hazards, gas leaks, and poor construction.

Professor Raquib Ahsan pointed out that not all civil engineers are trained in earthquake-resistant design, urging continuous professional development and collaboration between architects and engineers to enhance building safety.

Former IAB president Kazi Golam Nasir warned against spreading fear through unscientific predictions, advocating instead for immediate practical measures: "Identify vulnerable buildings, widen narrow roads for emergency access, retrofit critical government infrastructure, secure free-standing furniture, ensure proper soil testing, and clearly mark emergency exits."

IAB President M. Sayed Ahmed reaffirmed the institute's commitment to national safety: "We want to save the country and protect everything in it. Through post-disaster planning, we can recommend actions to the government and ensure collective survival."

The roundtable revealed critical gaps in Dhaka's disaster preparedness, including only 17 fire stations serving over 30 million residents. Experts called for building retrofits, stricter codes, community drills, and integration of disaster management into school curricula, emphasizing evidence-based strategies over misconceptions.

The session concluded with a unified commitment to forward actionable recommendations to policymakers and strengthen Bangladesh's preparedness against future earthquakes, focusing on safeguarding lives and minimizing losses in the country's most vulnerable areas.

Photo: Freepik

ENGINEERING INTELLIGENCE. POWERING PROGRESS.

In a world increasingly shaped by technology, Images Group stands at the intersection of innovation, engineering, and execution. Established with a vision to harness technology as a force for transformation, the company has evolved into a forward-thinking technology organization delivering intelligent, scalable, and future-ready solutions.

From infrastructure to integrated systems, Images Group designs and delivers technology that enables businesses to operate smarter, faster, and more securely in an ever-changing digital landscape.

Origins Rooted in Innovation

Images Group was founded on a simple but powerful idea: technology should solve real problems, not create complexity. What began as a specialized technical initiative has grown into a diversified technology group, trusted by clients who demand reliability, precision, and measurable outcomes.

Through continuous learning, strategic investment, and a culture of innovation, the company has steadily expanded its capabilities while maintaining the agility of a modern tech enterprise.

A Technology Partner, Not Just a Provider

At Images Group, technology is never deployed in isolation. Each engagement begins with a deep understanding of the client's ecosystem—business goals, operational challenges, infrastructure constraints, and growth ambitions.

This consultative approach allows Images Group to architect solutions that are:

- Aligned with long-term strategy
- Secure by design
- Scalable for future expansion
- Optimized for performance and efficiency

The result is technology that integrates seamlessly into existing environments while opening pathways for innovation.

Core Technology Capabilities

Images Group delivers end-to-end technology solutions across multiple domains, supported by a multidisciplinary team of engineers, technologists, and project specialists.

Intelligent Systems & Integration

The company specializes in designing and implementing integrated systems that connect hardware, software, and data into unified, intelligent platforms. These systems improve visibility, automation, and decision-making across operations.

Digital Infrastructure & Networking

From structured cabling and data centers to enterprise networking and cloud-ready infrastructure, Images Group builds robust digital foundations that support high availability, security, and performance.

Software-Driven Solutions

Leveraging modern architectures and development frameworks, Images Group delivers software solutions that are modular, interoperable, and designed for real-world use. Emphasis is placed on reliability, usability, and lifecycle support.

Automation & Smart Technologies

By incorporating automation, IoT, and smart technologies, the company enables organizations to reduce manual processes, enhance operational intelligence, and unlock new efficiencies.

Engineering Excellence at Every Layer

Technology is only as strong as the engineering behind it. Images Group applies rigorous engineering methodologies, international standards, and best-practice frameworks throughout the project lifecycle.

From system design and prototyping to deployment and optimization, every solution is validated for performance, security, and resilience. Comprehensive testing, documentation, and knowledge transfer ensure long-term value beyond implementation.

Security, Reliability, and Compliance

In today's digital environment, trust is non-negotiable. Images Group embeds cybersecurity principles and risk management protocols into every system it designs.

- Key priorities include:
- Data protection and access control
- Network and system resilience
- Compliance with relevant industry standards
- Business continuity and disaster recovery planning

This disciplined approach allows clients to operate with confidence in mission-critical environments.

People Behind the Technology

The strength of Images Group lies in its people. The company brings together professionals with expertise across engineering, IT, project management, and emerging technologies.

A culture of continuous learning ensures that teams stay current with evolving tools, platforms, and methodologies—allowing the company to anticipate trends rather than react to them.

Innovation with Purpose

Innovation at Images Group is practical, not experimental. New technologies are evaluated through the lens of real-world applicability, return on investment, and long-term sustainability.

By combining innovation with discipline, the company delivers solutions that are not only advanced, but dependable—designed to perform today and adapt tomorrow.

A Vision for the Digital Future

As industries accelerate toward digital transformation, Images Group remains committed to shaping that future responsibly and intelligently. The company continues to invest in emerging technologies, strategic partnerships, and talent development to expand its capabilities and global reach.

With a strong foundation and a future-focused mindset, Images Group is positioned to support organizations as they navigate complexity, scale with confidence, and unlock the full potential of technology.

ENGINEERING THE SUN

How Cynergy Limited is building Bangladesh's next-generation solar infrastructure

As Bangladesh's industrial sector searches for reliable, low-carbon energy, Cynergy Limited is quietly solving a complex engineering puzzle—how to design, build, and operate solar systems that perform at scale, under real-world industrial conditions. From intelligent system design to advanced monitoring and long-term O&M, Cynergy's work sits at the intersection of engineering precision and energy economics.

Solar, Designed for Industry

Solar power is no longer an experimental add-on for Bangladeshi industries—it is infrastructure. Cynergy Limited understood this early. Since its founding in 2021, the company has focused almost exclusively on commercial and industrial (C&I) solar EPC, where system reliability, load matching, and lifecycle performance matter as much as headline capacity.

Rather than standard layouts, Cynergy begins each project with site-specific engineering analysis—roof loading, shading patterns, grid availability, operational load profiles, and future expansion potential. This data-driven design approach allows systems to be optimized for maximum yield per square meter, not just installed megawatts.

Engineering Beyond Panels

At the core of Cynergy's technical strength is its in-house engineering and design team, responsible for electrical, structural, and performance modeling. System layouts are designed to minimize losses, improve inverter loading ratios, and ensure compliance with local grid codes and international safety standards.

Component selection follows the same philosophy. Cynergy works with Tier-1 PV modules, high-efficiency inverters, and corrosion-resistant mounting structures suited for Bangladesh's climate. Where required, systems are integrated with irradiance meters, lightning protection systems (LPS), SCADA platforms, and energy monitoring software, giving clients real-time visibility into performance and generation.

From Construction to Commissioning

Execution is where many solar projects fail to meet projections. Cynergy's EPC model emphasizes precision construction and disciplined project management—from procurement logistics to on-site safety and quality control. Skilled installation teams ensure accurate alignment, secure mounting, and seamless grid synchronization, reducing commissioning delays and post-installation issues.

For large multi-site deployments, such as telecom or industrial portfolios, Cynergy applies standardized engineering templates combined with localized execution, ensuring consistency without sacrificing site-specific optimization.

Operational Intelligence and O&M

Once operational, systems are continuously monitored through 24/7 performance tracking and data analytics. Deviations in output, inverter behavior, or system efficiency are flagged early, enabling preventive maintenance rather than reactive repairs. This approach directly improves uptime and long-term energy yield.

Cynergy's Operation & Maintenance (O&M) services include scheduled inspections, cleaning strategies tailored to dust and weather conditions, and rapid-response technical support—an often overlooked but critical factor in achieving projected ROI.

Advanced Solutions for a Changing Grid

As energy demand grows more complex, Cynergy is expanding beyond conventional rooftop solar. Its solution portfolio includes Battery Energy Storage Systems (BESS) for load shifting and backup power, floating solar PV systems for land-constrained environments, EV charging and solar carports, and building-integrated photovoltaics (BIPV).

These technologies reflect a forward-looking understanding of where Bangladesh's energy system is heading—toward decentralization, resilience, and smarter consumption.

Scaling with Purpose

With over 81 MWp installed capacity, 75+ projects delivered, and a roadmap targeting 250 MWp by 2027, Cynergy is scaling rapidly—but deliberately. Each project contributes not only to carbon reduction but also to measurable financial savings, typically delivering payback within four to five years for industrial clients.

The Bigger Picture

Cynergy Limited's work demonstrates that the real challenge of solar energy is not generation—it is engineering integration at scale. By combining robust design, quality components, intelligent monitoring, and disciplined execution, the company is helping redefine solar power as dependable industrial infrastructure.

In doing so, Cynergy is not just installing solar systems—it is engineering the foundation of Bangladesh's clean energy future.

ENDLESS FRONTIER

A High-Performance Aluminium Glazing System Built for Modern Architecture

Endless Frontier is a next-generation aluminium glazing and façade system designed for contemporary buildings that demand structural strength, thermal efficiency, and clean architectural lines—without compromising long-term performance.

FEATURE PRODUCT REVIEW

Endless Frontier is a premium aluminium glazing and façade system engineered for modern residential, commercial, and mixed-use architecture. Designed to balance aesthetics with engineering performance, the system addresses the growing demand for larger openings, improved energy efficiency, and long-lasting structural reliability.

From high-rise façades to expansive glazed elevations, Endless Frontier positions itself as a solution for architects and developers who expect more from building envelopes.

ENGINEERED FOR STRUCTURAL STRENGTH

At the core of Endless Frontier is a precision-engineered aluminium profile system designed to support large glass panels while maintaining structural stability. High-grade aluminium alloys and reinforced profile geometry provide excellent load-bearing capacity, even in demanding wind and environmental conditions.

This strength allows for wider spans and slimmer sightlines—an essential combination in contemporary architectural design.

ADVANCED THERMAL & ACOUSTIC PERFORMANCE

Endless Frontier integrates modern thermal break technology to reduce heat transfer and improve overall energy efficiency. The system is compatible with high-performance double and triple glazing, significantly enhancing thermal insulation and acoustic control.

For occupants, this translates into:

- More stable indoor temperatures
- Reduced energy consumption
- Improved sound insulation in urban environments

Performance is achieved without compromising the clean, minimal appearance of the system.

PRECISION FABRICATION, SEAMLESS INSTALLATION

One of the standout qualities of Endless Frontier is its attention to precision. Tight tolerances in manufacturing ensure accurate alignment, smooth operation, and consistent performance across installations.

The system is designed for efficient fabrication and installation, reducing on-site complexity and minimizing the risk of long-term operational issues.

DESIGNED FOR MODERN ARCHITECTURE

Aesthetically, Endless Frontier is unmistakably contemporary. Slim profiles, clean lines, and flexible configuration options allow it to integrate effortlessly into a wide range of architectural styles.
The system supports:

- Large glazed openings
- Façade and curtain wall applications
- Custom finishes and configurations
- Integration with modern building systems

This flexibility makes it suitable for both landmark projects and refined residential developments.

BUILT FOR LONGEVITY

Beyond appearance and initial performance, Endless Frontier is engineered for durability. Corrosion-resistant

finishes, high-quality hardware, and weather-resistant sealing systems ensure long service life with minimal maintenance.

Compliance with relevant international building and performance standards further reinforces its suitability for long-term investment projects.

VERDICT

Endless Frontier is not just another glazing system—it is a well-engineered architectural solution. By combining structural strength, thermal efficiency, and refined design, it meets the practical and aesthetic demands of modern buildings.

For architects, developers, and fabricators seeking a reliable, future-ready aluminium glazing system, Endless Frontier delivers clarity of purpose and confidence in performance.

THE GENIUS OF ISLAMIC MOTIFS

Timeless Patterns in Contemporary Architecture

Photo: Freepik

Islamic architectural motifs—geometric interlacing, flowing arabesques, intricate muqarnas, perforated mashrabiya, and sacred calligraphy—embody a profound fusion of mathematics, spirituality, and environmental wisdom. In modern design, these elements are reinterpreted through digital tools and sustainable innovation, proving their enduring genius in creating harmonious, functional, and culturally resonant spaces.

Islamic architecture's brilliance stems from its deliberate avoidance of figurative representation in sacred contexts, channeling creativity into abstract forms that evoke infinity, unity, and divine order. Emerging from the 7th century across vast regions, these motifs draw on advanced mathematical knowledge—Islamic scholars pioneered developments in geometry, proportion, and astronomy. The result is an architectural language where every pattern serves multiple roles: aesthetic, symbolic, structural, and climatic.

THE MATHEMATICAL FOUNDATION

At the heart of Islamic design lies geometric abstraction. Simple shapes—circles, squares, and polygons—interlace into complex, repeating tessellations like girih knots or star-and-polygon grids. These appear in historic masterpieces such as the Alhambra's tilework or the Great Mosque of Kairouan, creating optical illusions of endless expansion that symbolize the infinite nature of creation and tawhid (God's oneness). Far from decoration,

these patterns demonstrate structural logic and optical sophistication, influencing later figures like M.C. Escher and even modern quasi-crystalline discoveries.

In contemporary architecture, geometric motifs inform parametric design and sustainable facades. They enable precise solar shading, acoustic control, and visual complexity without material excess—perfect for addressing climate challenges.

MUQARNAS: STRUCTURAL ILLUSION AND SPIRITUAL DEPTH

Muqarnas, the three-dimensional "honeycomb" or stalactite vaulting, represent engineering poetry. Evolving from Abbasid innovations, they transition smoothly from square bases to domes or arches, distributing loads while producing cascading shadows and light effects that evoke celestial movement. Used in mihrabs, entrances, and domes, muqarnas turn static architecture into dynamic contemplation.

Modern adaptations use digital modeling and 3D printing to recreate muqarnas in lighter, sustainable materials. Contemporary mosques, such as those featured in recent roundups of avant-garde designs, blend traditional vaulting with minimalist forms, maintaining spiritual resonance in secular or hybrid spaces.

MASHRABIYA: CLIMATE INTELLIGENCE AND PRIVACY

The mashrabiya—intricate wooden lattice screens—offers practical genius for arid climates. Allowing breezes while blocking direct sun, they enable passive cooling through evaporative techniques (historically with water jars) and provide privacy without isolation. Their geometric perforations filter light into patterned glows, creating serene interiors.

This motif has seen widespread revival. Jean Nouvel's Institut du Monde Arabe in Paris pioneered a modern mashrabiya with mechanically adjusting metal apertures for daylight control. Today, perforated facades echo it in skyscrapers, cultural centers, and healthcare buildings across the Middle East and beyond, reducing energy demands while symbolizing cultural continuity.Projects like the King Abdullah Petroleum Studies and Research Center use parametric lattices for shading, merging heritage with efficiency.

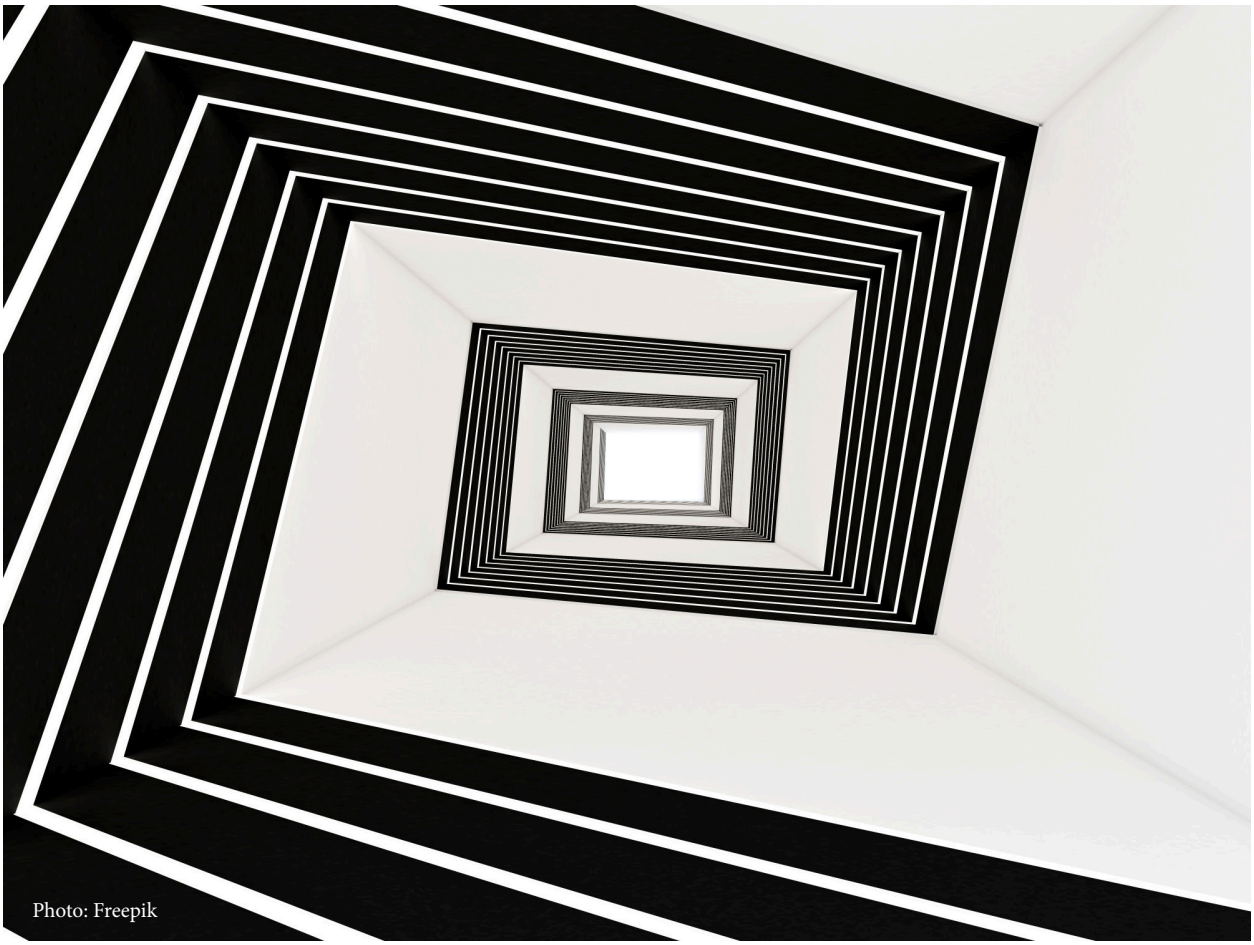


Photo: Freepik

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ARABESQUES, CALLIGRAPHY, AND SYMBOLIC FLOW

Flowing vegetal arabesques represent paradise gardens and eternal growth, while calligraphy integrates Quranic verses directly into architecture, making buildings "read" sacred text. These elements add layers of meaning, turning surfaces into meditative experiences.

In today's global context, architects like Zaha Hadid drew subtle inspiration from arabesque fluidity in her sweeping forms, while cultural institutions reinterpret calligraphy in illuminated or digital displays.

CONTEMPORARY REVIVAL AND GLOBAL RELEVANCE

Recent examples highlight this renaissance. Modern mosques, as showcased in 2025 features, reimagine domes, minarets, and screens with bold minimalism—think seamless concrete muqarnas or modular prayer spaces using local materials like date palm waste. The Louvre Abu Dhabi's vast perforated dome creates a "rain of light" akin to traditional lattices, blending regional heritage with futuristic scale.

These motifs thrive because they are adaptable: abstract yet profound, functional yet transcendent. In an age of sustainability and identity-seeking, they provide tools for responsive design—passive environmental control, cultural expression, and visual harmony. Parametric software now allows infinite variations, preserving essence while innovating.

The genius of Islamic motifs endures not as nostalgia but as living wisdom. They remind architects that true innovation often revisits timeless principles, where mathematics meets mystery, and patterns point toward something eternal. As the built world evolves, these elements continue to inspire buildings that are efficient, poetic, and deeply human.


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