GreenScape BANGLADESH

Specialized Publication On Infrastructure Industry Of Bangladesh

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AUGUST 2025 | 3rd Edition

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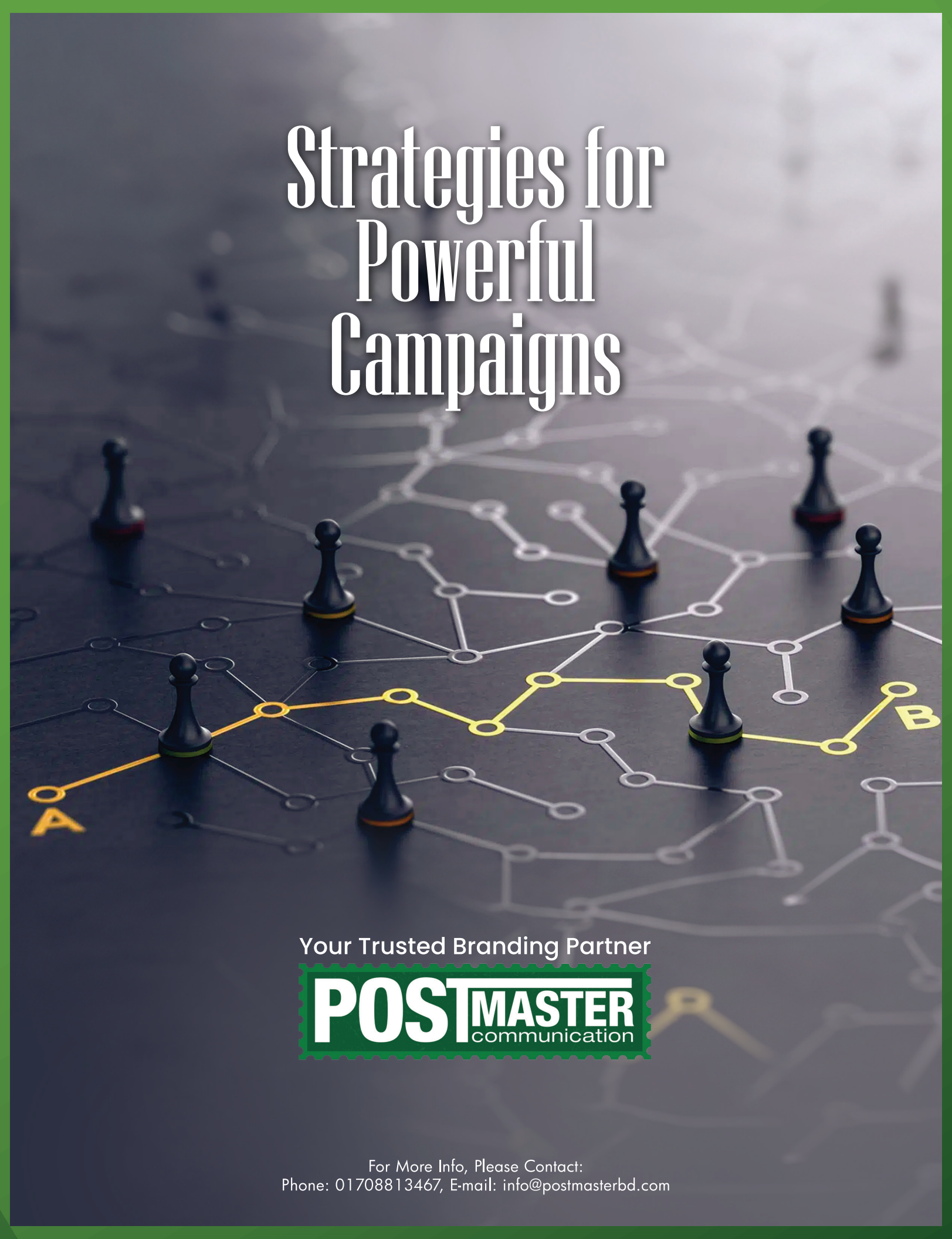

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Editorial

Welcome to the 3rd edition of GreenScape Bangladesh: Specialized Publication on the Infrastructure Industry of Bangladesh, where we continue our journey towards advocating sustainable, innovative, and inclusive practices in infrastructure and construction.

As with our previous issues, we extend our focus beyond national boundaries with dedicated sections on regional innovations across Asia and transformative global advancements shaping the future of the built environment. From climate-conscious policymaking to pioneering feats in automated, digital-first engineering, these stories both inspire and inform.

Our cover story highlights groundbreaking innovations in concrete—the foundation of all infrastructure. It explores how advancements in eco-friendly concrete can pave the way for more sustainable housing and a resilient, greener future. The story also challenges the misconception that going green is costly. By showcasing global practices, it reveals how innovation and compelling business cases are driving the adoption of greener concrete manufacturing.

In Bangladesh, rapid urban growth and climate risks make sustainable housing essential. In his interview, Mohammad Abu Sadeque, Executive Director of HBRC, discusses efforts to address gaps in housing safety, advocating for stricter regulations and building retrofitting. Focused on "Sustainable Housing for All," HBRC promotes energy-efficient, resilient homes using local materials like ferrocement and thermal blocks.

Engr. Md. Al-Emran Hossain, President of the Bangladesh Green Building Academy (BGBA), is a mechanical engineer and building systems expert. In his interview, he reflects on his professional journey, critical gaps in safety compliance, and the urgent need to redesign the country's built environment. From fire safety to climate adaptation, Engr. Al-Emran advocates for smarter, more sustainable infrastructure that aligns with both global standards and local realities.

We are thrilled to provide a strong Features section addressing key topics such as sustainable cooling, future energy storage, the emergence of floating power plants, the need for a national Smart Grid, and smart water solutions from international case studies. These perspectives are designed to equip professionals and policymakers with the information needed to guide us toward cleaner futures.

We're proud to spotlight trailblazing women shaping the infrastructure industry. Our Offbeat section brings some lightness with humor and anecdotes—because even in sustainability, there's room to smile.

We hope this issue informs, inspires, and sparks collaboration. Your feedback is key to making GreenScape Bangladesh a true reflection of our evolving profession.

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CHINA BEGINS CONSTRUCTION ON

MASSIVE ¥1.2 TRILLION

HYDROPOWER PROJECT IN TIBET

Construction has officially begun on a ¥1.2 trillion (approximately US$167 billion) hydropower project in Tibet, marking one of the most ambitious infrastructure developments in the world.

Chinese Premier Li Qiang recently inaugurated the start of the project, which is poised to become one of the largest hydroelectric installations ever built. The scale of the new dam is reportedly nearly three times that of the iconic Three Gorges Dam — currently the world's largest hydroelectric power station — also located in China.

The facility will be managed by the newly formed China Yajiang Group, which was established specifically to oversee the design, construction, and operation of the complex, according to China's state-run Xinhua News Agency.

Initially approved in December 2024, the development will include five cascading power stations built along a strategic stretch of the Yarlung Tsangpo River, high in the Himalayas. Once fully operational, the dam is expected to produce more than 300 billion kilowatt-hours of electricity per year — enough to meet the energy needs of over 300 million people.

The location of the project has drawn international attention due to its sensitive geography. The dam will sit near the India-China border and lies within a region known for high seismic activity, raising concerns about environmental and geopolitical risks.

India has previously expressed concern over upstream water projects in the region, urging China to ensure that such developments do not disrupt water availability for downstream countries. In response, Chinese officials have reiterated that the project will not have adverse transboundary effects and that China remains open to dialogue with its neighbors.

The dam is a critical part of China's strategy to expand renewable energy generation, improve regional grid stability, and reduce reliance on fossil fuels. It also aligns with Beijing's broader goals of infrastructure expansion and economic integration in Tibet.

No exact timeline has been given for the project's completion, but due to its scale and complexity, construction is expected to span several years.

Source: Construction Briefing

HONG KONG LAUNCHES 'CENTRE FOR FUTURE CONSTRUCTION' TO DRIVE INDUSTRY INNOVATION

The Construction Industry Council (CIC) officially launched the Centre for Future Construction (CFC) on 29 May 2025, marking a major step forward in Hong Kong's efforts to modernise and future-proof its construction sector.

Located on the third floor of the Hong Kong Institute of Construction's Kowloon Bay Campus, the new 10,000- square -foot facility is designed to serve as a hub for innovation, collaboration, and hands-on training in emerging construction technologies.

The CFC is divided into five thematic zones: the Digital Twin Hub, 4S Hub, AI Hub, Robotic Hub, and Immersive Cave. These areas showcase a wide range of cutting-edge technologies including AI-driven safety tools, robotics, digital twin simulations, and immersive training through virtual and augmented reality (VR/AR). The centre aims to expose students, professionals, and stakeholders to next-generation solutions that are rapidly reshaping the global construction landscape.

The official opening ceremony was attended by key industry and government figures. CIC Chairman Ir Prof. Thomas Ho highlighted the centre's role in equipping the next generation with the tools and expertise needed to thrive in a tech-driven construction environment. He expressed hopes that the CFC would act as a guiding light for the industry, driving innovation and nurturing future talent.

Ir Joseph Lo, Head of the Project Strategy and Governance Office at Hong Kong's Development Bureau, emphasised the government's ongoing commitment to industry transformation. He praised the CIC's partnership in promoting professionalism and innovation across the construction sector.

Following the launch, guests were invited to tour the centre and explore the technology on display, as well as learn more about how industry participants can engage with the CFC through training programmes and collaborative projects.

CIC Executive Director Ir Albert Cheng noted that the centre is expected to receive over 24,000 visits each year. The facility will support more than 100 courses, ranging from short-term workshops to advanced diploma and masterclass programmes, creating a dynamic learning environment to help build a smarter, more resilient construction workforce.

The launch of the CFC represents a major investment in the future of construction in Hong Kong, reinforcing the city's position as a regional leader in digital and technological advancement within the industry.

Source: South Asia Construction

CONSTRUCTION BEGINS ON $8 BILLION LAS VEGAS SANDS EXPANSION IN SINGAPORE

Las Vegas Sands has officially commenced construction on its highly anticipated $8 billion expansion project in Singapore. The development marks a major addition to the existing Marina Bay Sands resort and is set to further elevate the city-state's position as a global luxury and entertainment destination.

The project includes a 55-storey hotel tower with 57 high-end suites, a 15,000-seat live entertainment arena designed by Populous, upscale retail offerings, and 200,000 square feet of premium meeting and event space. Positioned along the Marina Bay waterfront, the new complex will offer sweeping views of the Singapore Strait.

One of the architectural highlights of the hotel tower is its rooftop "Skyloop" — a series of overlapping ellipses that will host observatories, restaurants, and rooftop gardens. The tower will also include a cantilevered wellness centre designed to enhance guest relaxation and wellbeing.

Safdie Architects, led by renowned architect Moshe Safdie, is spearheading the design of the expansion. Sustainability plays a key role in the project, with Las Vegas Sands committing to use low-carbon concrete and recycled steel during construction. The company also aims to divert at least 75% of construction waste away from landfills.

To improve energy efficiency and guest comfort, the design includes a self-shading façade system using high-performance glazing and internal blinds. Each hotel suite will offer a private

terrace and garden space, further enhancing the resort's ultra-luxury positioning.

According to Las Vegas Sands, the project's new entertainment arena is expected to attract global talent and international audiences, solidifying Singapore's appeal as a hub for high-end tourism and live events.

The expanded resort is scheduled to be completed by 2030.
Source: Construction Briefing

JAPAN'S AGING INFRASTRUCTURE FACES **FUTURE CHALLENGES AS DIGITAL SOLUTIONS STEP IN**

Las Vegas Sands has officially commenced construction on its highly anticipated $8 billion expansion project in Singapore. The development marks a major addition to the existing Marina Bay Sands resort and is set to further elevate the city-state's position as a global luxury and entertainment destination.

Japan's rapid urban development in the post-war decades has left the country with a vast stock of aging buildings and infrastructure. Many of these structures—especially those built over 50 years ago under outdated regulations—are now in urgent need of repair. This includes deteriorating water and sewage systems, as well as seismic retrofitting for safety compliance. While the long-standing practice of demolishing old buildings and replacing them with new ones—known as "scrap-and-build"—continues to shape cities like Tokyo and Osaka, this trend is projected to decelerate significantly by 2040 due to Japan's shrinking population.

Despite this demographic shift, infrastructure maintenance remains critical. Rather than focusing solely on demolition and redevelopment, attention is now turning toward the upkeep and longevity of existing structures. Companies in the construction and technology sectors are closely monitoring government policy, aligning their strategies with public sector priorities.

In the next 15 years, Japan is expected to experience a marked demographic transformation. A declining and aging population will lead to a contraction of the domestic market and widespread labor shortages. By 2040, it's estimated that the workforce could fall short by up to 11 million people, presenting serious implications for the construction sector.

To help alleviate these pressures, Kensetsu System—a company established in 1992 to digitize construction management—offers a suite of IT solutions aimed at improving productivity. One example is their software that supports remote operation of construction machinery, such

as shovel carts. These systems supply the data required for remote automation and have been developed in line with the Japanese government's push for digital transformation across industries.

Traditionally, site managers were responsible for extensive documentation, limiting their ability to oversee operations at multiple locations. By delegating administrative work through digital tools, site managers can now focus more on-site coordination and supervision across projects.

Kensetsu System's success lies in its customer-centric approach. All solutions are tailored from the ground up, based on direct feedback from clients. This includes their flagship platforms such as INNOSiTE (2D to 3D model conversion), Kaisoku-Navi (survey automation), and SiteBox (a photo-sharing tool for site documentation).

The company's products are widely adopted, with over 42,000 firms using their systems—including more than 90% of major players in the sector. Their strength also comes from localized support via trading company partnerships across Japan, enabling them to stay responsive to customer needs and regional requirements.

As Japan's construction industry faces increasing demographic and operational challenges, Kensetsu System believes ICT and automation will be central to ensuring continuity and innovation in the built environment.

Source: The World Folio

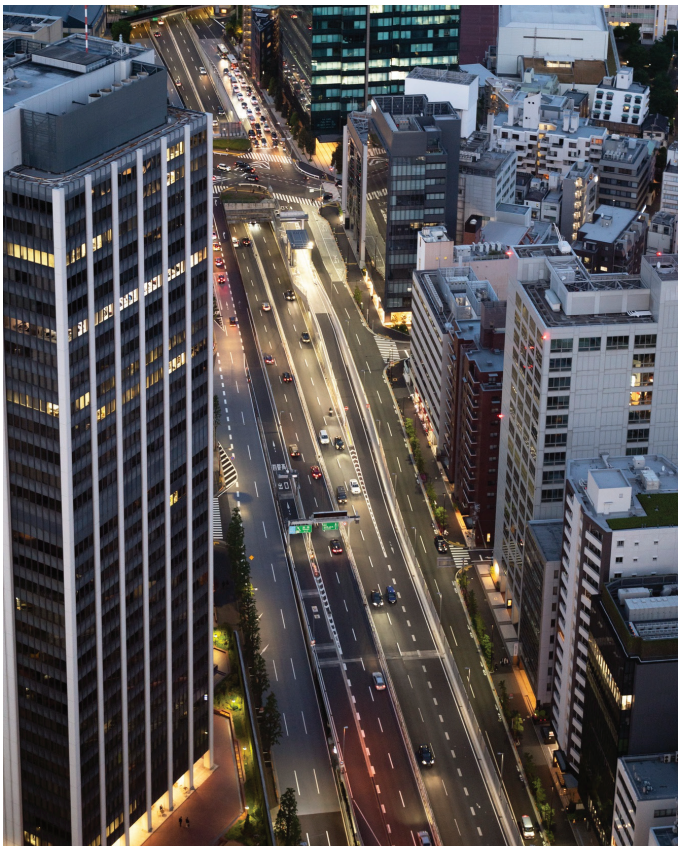
INDONESIA COMMISSIONS MCKINSEY TO **STUDY CAPITAL RELOCATION TO BORNEO**

The Indonesian government has appointed global consulting firm McKinsey & Company to carry out a feasibility study on relocating the nation's capital from Jakarta to Borneo, with funding plans for the massive undertaking still under discussion.

As reported by Reuters, McKinsey was chosen over more than 100 contenders, including rival consultancies Roland Berger and Boston Consulting Group, for the $1.77 million, three-month contract. The firm will assess the viability of moving the country's administrative center to East Kalimantan, a province on the island of Borneo, as part of a project estimated to cost $33 billion.

The relocation plan is driven by the need to reduce Jakarta's chronic congestion and environmental pressures. The new capital, to be built on a 3,000-hectare site, will initially house government institutions and residential areas for around 1.5 million civil servants.

In addition to studying the social, environmental, cultural, and economic implications, McKinsey's scope includes evaluating funding models. A bidder involved in the tender told Reuters that the ability to assess "investment



mechanisms—whether through public funds or private sector involvement"—was a key factor in selecting the firm. The finance ministry has previously been tasked with creating a model to facilitate private investment in the project.

Rudy Soeprihadi Prawiradinata, deputy for regional development at Indonesia's National Development Planning Agency, said the groundwork for the project is already well underway. "We are not starting from scratch," he said, noting that McKinsey will refine and define the implementation strategy. "That's why we need world-class consultants."

Indonesia's former National Development Planning Minister Bambang Brodjonegoro has said that previous studies focused on establishing viable business models for the capital move. "We aim to diversify and develop new engines of economic growth," he said, adding that the city's vision is to be "Smart, Green, and Beautiful."

McKinsey's 2024 report on ASEAN smart cities estimated a $26 billion annual market for private-sector investment in Southeast Asia's urban infrastructure, emphasizing the importance of public-private collaboration and resident engagement in successful smart city development.

Despite offering incentives and boasting solid domestic demand, Indonesia has struggled to attract substantial foreign direct investment. It has been viewed as missing out on regional shifts triggered by the U.S.-China trade tensions, with companies favoring countries like Vietnam and Thailand. President Joko Widodo has called on ministries to urgently address the challenges hindering FDI growth.

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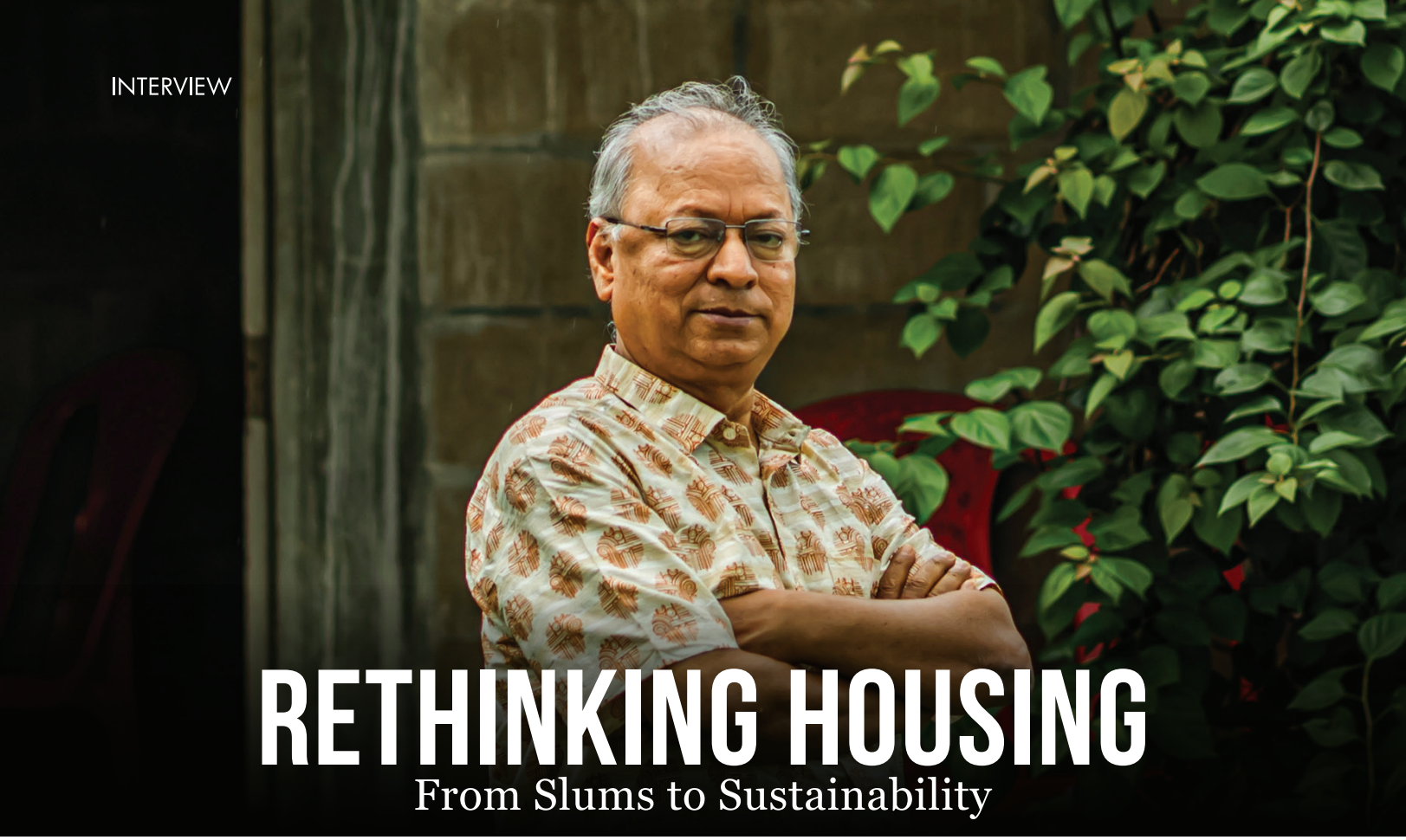

RETHINKING HOUSING

From Slums to Sustainability

In Bangladesh, where rapid urban growth intersects with acute climate risks, the urgency for safe, affordable, and sustainable housing is greater than ever. Leading efforts to tackle these intertwined challenges is **Mr. Mohammad Abu Sadeque, PEng, Executive Director of the Centre for Housing and Building Research (HBRC)**. A forward-thinking engineer and passionate policy advocate, Mr. Sadeque has devoted his career to transforming not just how we construct homes, but how we create resilient, environmentally responsible communities where every citizen can live with dignity. In this discussion, he provides an insightful perspective on the critical shortcomings in Bangladesh's housing sector and explains how HBRC is addressing them through pioneering innovations, advocating for better regulations, and empowering communities at the grassroots level.

How is HBRC working to ensure city building safety, especially considering the number of old buildings in Dhaka? Are we prepared for large- scale disasters like earthquakes?

HBRC's initiatives extend well beyond urban boundaries, prioritizing building safety throughout Bangladesh, including rural regions. However, ensuring building safety becomes challenging if structures are built without proper adherence to regulations. Without structurally sound construction, safe urban development remains unattainable. Unfortunately, the existing building permit system in Bangladesh has notable shortcomings, lagging behind even other South Asian countries in quality and thoroughness. Despite these obstacles, HBRC continues advocating vigorously for policy reforms, pushing the government to adopt a comprehensive and standardized building permit process that requires submission and approval of complete structural, mechanical-electrical-plumbing (MEP), and fire safety design drawings. Additionally, HBRC recognizes a widespread lack of awareness and commitment among professionals and authorities regarding safe city planning and is actively working to bridge this knowledge and commitment gap.

Despite Bangladesh being highly vulnerable to earthquakes, this risk is seldom incorporated into city development processes. Typically, authorities approve only architectural designs during construction, while critical aspects such as structural integrity, mechanical, plumbing, and fire safety systems are frequently neglected and lack proper regulatory oversight. This creates severe vulnerabilities, particularly in older buildings, most of which do not comply with the National Building Code (BNBC). HBRC actively promotes the practice of regular building health audits, structural assessments, and retrofitting. Recently, HBRC audited a renowned pharmaceutical factory, provided comprehensive retrofitting design plans, and supervised the ongoing retrofitting work. Thus, HBRC remains committed to providing support for auditing and retrofitting both public and private buildings, irrespective of their occupancy type.

You're working with the 'Housing for All' vision. Realistically, is affordable housing still a dream, or can we see its practical implementation soon?

"Housing for All" has been a popular national slogan since Bangladesh's independence, but HBRC emphasizes the vision as "Sustainable Housing for All," highlighting sustainability as the crucial factor. If homes aren't built sustainably, this vision can't be realized effectively.

Sustainable housing can comfortably last 50 to 70 years or more, significantly reducing the risk of families becoming homeless again. With the right policies and sincere government commitment, affordable housing is realistically achievable in the near future.

The lack of adequate representation for low-income communities in policy-making teams means that their pressing concerns are often excluded from policy debates. The absence of comprehensive housing codes, particularly for rural areas, and clear policy guidelines discourages the adoption of sustainable and suitable building materials and technologies, despite the limited efforts of organizations like HBRC. With nearly 70 percent of households in the country living in substandard housing, it is crucial to address these issues through inclusive and sustainable housing initiatives to achieve the goals of SDG 7 and SDG 11. Nevertheless, housing, which is a fundamental human need after food and clothing, still lacks a dedicated national budget allocation.

Sustainable housing also demands alternative building materials and technologies. HBRC is nationally and internationally recognized and awarded for its sustainable and energy-efficient innovations. Current reliance on clay bricks makes housing vulnerable to disasters and energy-inefficient. HBRC's innovative, low-energy alternatives to traditional bricks, if adopted widely through government policies, can transform the vision into reality. HBRC remains hopeful and believes there is no reason for despair.

We often use imported materials in construction. How is HBRC promoting local innovations or indigenous materials?

At present, Bangladesh's construction sector depends significantly on imported materials like steel, cement clinker, and crushed stone. One of HBRC's key goals is to lessen this reliance by promoting locally sourced, innovative alternatives. Ferrocement stands out as a notable example; it provides an effective substitute for clay bricks and conventional reinforced concrete, while eliminating the need for imported stone. Remarkably, ferrocement components require nearly half the steel and cement typically used for comparable reinforced concrete elements. In addition, ferrocement reduces the use of imported resources such as timber, plastic, and aluminum, offering a comprehensive solution for sustainable construction.

HBRC is deeply invested in exploring local resources, including indigenous sand and riverbed soil, to develop durable, energy-efficient building materials tailored to Bangladesh's environment and economy. Through innovations such as thermal blocks, sandwich panels, ferrocement single & and dual-cavity walls, and lightweight roofing systems, HBRC is advancing alternatives that are both affordable and environmentally responsible. Due to the use of lightweight infill materials, imported steel, cement, and crushed stone requirements have been reduced, thereby reducing dependency on imports.
These efforts not only cut construction costs but also create employment opportunities by supporting local industries. HBRC complements its research with extensive knowledge-sharing activities, equipping engineers, architects, and workers with the skills to implement these materials widely. This approach is helping build a self-reliant, climate-smart construction sector that supports Bangladesh's long-term sustainable development objectives.

What initiatives has HBRC taken in energy-efficient housing, and how applicable is this to middle- and low-income groups?

HBRC has initiated several innovative projects focusing specifically on energy-efficient housing, promoting the use of sustainable, affordable, and climate-resilient building materials. Notable innovations include thermal insulation blocks, sandwich panels for walls and roofs, and lightweight ferrocement walls and roofs. These solutions significantly reduce heat transfer, lowering indoor temperatures and decreasing the need for artificial cooling, thus minimizing energy consumption and costs. Pilot projects constructed using HBRC's innovative material and technology reduced the embodied energy consumption as low as 70% compared to conventional ones.

These energy-efficient technologies are particularly beneficial for middle- and low-income groups due to their affordability, ease of construction, and reduced long-term maintenance expenses. By using locally available materials like riverbed soil and sand, HBRC ensures these innovations remain economically viable and accessible. HBRC's projects, including affordable housing schemes and disaster-resilient shelters, practically demonstrate these materials' effectiveness, affordability, and durability.

Moreover, HBRC provides comprehensive training programs for masons, technicians, and engineers to ensure widespread adoption. If supported by appropriate government policies and financial incentives, HBRC's energy-efficient housing solutions can significantly enhance living conditions for low- and middle-income families, addressing both environmental sustainability and affordability simultaneously.

Globally, there's a growing focus on climate resilience. How climate-adaptive are our housing designs in Bangladesh?

Globally, climate resilience is gaining significant attention, and Bangladesh, being particularly vulnerable to climate change, requires highly adaptive housing designs. However, traditional housing practices in the country often lack climate-resilient features. Recognizing this gap, HBRC has developed and demonstrated numerous innovative housing solutions specifically tailored to withstand Bangladesh's climate hazards, such as flooding, cyclones, salinity, and extreme heat.

HBRC's climate-adaptive designs include raised-platform or stilt houses for flood-prone and tidal surge-prone areas, lightweight ferrocement portable shelters for disaster-affected communities, and cavity-wall and sandwich-panel systems that provide insulation against extreme temperatures. These innovations significantly enhance the structural durability, thermal comfort, and disaster-resilience of homes.

Despite these advancements, broader adoption is limited due to low awareness, inadequate policy support, and a reliance on conventional building methods. HBRC is actively advocating for developing a Rural Housing Code by integrating climate-resilient design standards and promoting wider dissemination through capacity-building initiatives. With stronger government policies, incentives, and public-private collaborations, Bangladesh can effectively mainstream climate-adaptive housing designs to mitigate risks, protecting communities against the growing threats posed by climate change.

HBRC is an interesting initiative. How can young engineers and architects benefit from this platform?

The HBRC is a unique and dynamic platform designed specifically to engage young engineers and architects by offering direct access to sustainable and innovative construction practices. Through regular training sessions, seminars, workshops, and site visits, young professionals can gain valuable exposure to alternative building technologies like ferrocement, thermal blocks, sandwich panels, and climate-resilient design strategies. The HBRC actively promotes knowledge-sharing and collaboration, providing networking opportunities with experts, industry leaders, and experienced professionals.

Furthermore, HBRC organizes practical, hands-on training programs, equipping young engineers, planners, and architects with the technical skills required to implement sustainable and energy-efficient construction methods in real-world projects. Participation in pilot projects and live demonstrations allows young professionals to gain experience and build their professional portfolios, enhancing their career prospects. Overall, the HBRC serves as a nurturing platform that bridges academic knowledge with practical expertise, preparing young engineers and architects to actively contribute toward Bangladesh's sustainable development and climate resilience goals.

The construction industry is a huge employment sector. How is HBRC contributing through skill development or training?

The construction industry is one of Bangladesh's largest employment sectors, and HBRC is playing a proactive role in developing the skills of this vital workforce. A key initiative is the nationwide Bar Binder Training Program, implemented in partnership with Bangladesh Steel Rerolling Mill (BSRM). This five-year program, now in its third year, is training construction workers across the country in proper steel reinforcement binding techniques, improving workmanship and ensuring quality and safety at construction sites.

Beyond this, HBRC regularly organizes workshops, seminars, and hands-on training for a broad range of professionals, including engineers, architects, site supervisors, and masons, focused on sustainable construction materials, energy-efficient technologies, and climate-resilient design practices. These training programs ensure that both technical professionals and field-level workers can manufacture and apply HBRC's innovative solutions, such as ferrocement construction, interlocking blocks, thermal blocks, sandwich panels, and cavity wall systems.

As a self-funded voluntary organization, HBRC manages these skill development efforts with limited resources, but remains deeply committed to further research and capacity building. The institute also has plans to expand its research and training reach further if additional funding or collaboration becomes available. Through these efforts, HBRC is helping create a skilled workforce capable of delivering safer, greener, and more sustainable construction across Bangladesh and beyond.

The growing number of concrete buildings in Dhaka is contributing to rising urban temperatures. How can we address this issue? Are there any innovations to make building more environmentally friendly?

The proliferation of concrete structures in Dhaka has intensified the urban heat island effect, driving daytime temperatures higher and increasing energy demand for cooling. To counter these trends, a combination of passive design measures, such as high-albedo roof coatings, green roofs, and vertical gardens, and optimized building orientation with deep overhangs, can significantly reduce solar heat gain. Permeable paving systems and expanded tree canopies also lower pavement temperatures and improve microclimates at street level. In parallel, deploying low-carbon and reflective concrete mixes, incorporating supplementary cementitious materials like fly ash, slag, or locally sourced rice-husk ash, helps both diminish embodied CO_2 and boost surface reflectivity.

Building on these strategies, HBRC has developed a suite of innovations tailored to Dhaka's needs. Its Thermal Block is a lightweight, air-entrained masonry unit with integrated insulation layers that cut wall-surface temperatures by up to 70 % compared to conventional clay or solid concrete blocks. The Sandwich Panel Wall and Roof system uses two thin ferrocement skins bonded to a lightweight insulating core to deliver rapid, modular construction with superior thermal resistance. Meanwhile, Ferrocement Cavity Walls and Roofs employ thin, stiffened ferrocement plates arranged to form a continuous air cavity; this not only reduces material use and embodied energy but also exploits the cavity as a thermal break, further reducing heat transfer into interiors. Together, these HBRC-designed systems accelerate construction, cut both operational and embodied energy, and improve occupant comfort without sacrificing structural performance.

To maximize impact, these innovations should be piloted in public and affordable-housing projects, integrated into the national building code with incentives for developers, and coupled with capacity-building programs for engineers and masons. By pairing green urban planning with HBRC's thermal-optimized materials, Dhaka can both cool its streets and shrink the carbon footprint of its expanding concrete skyline.

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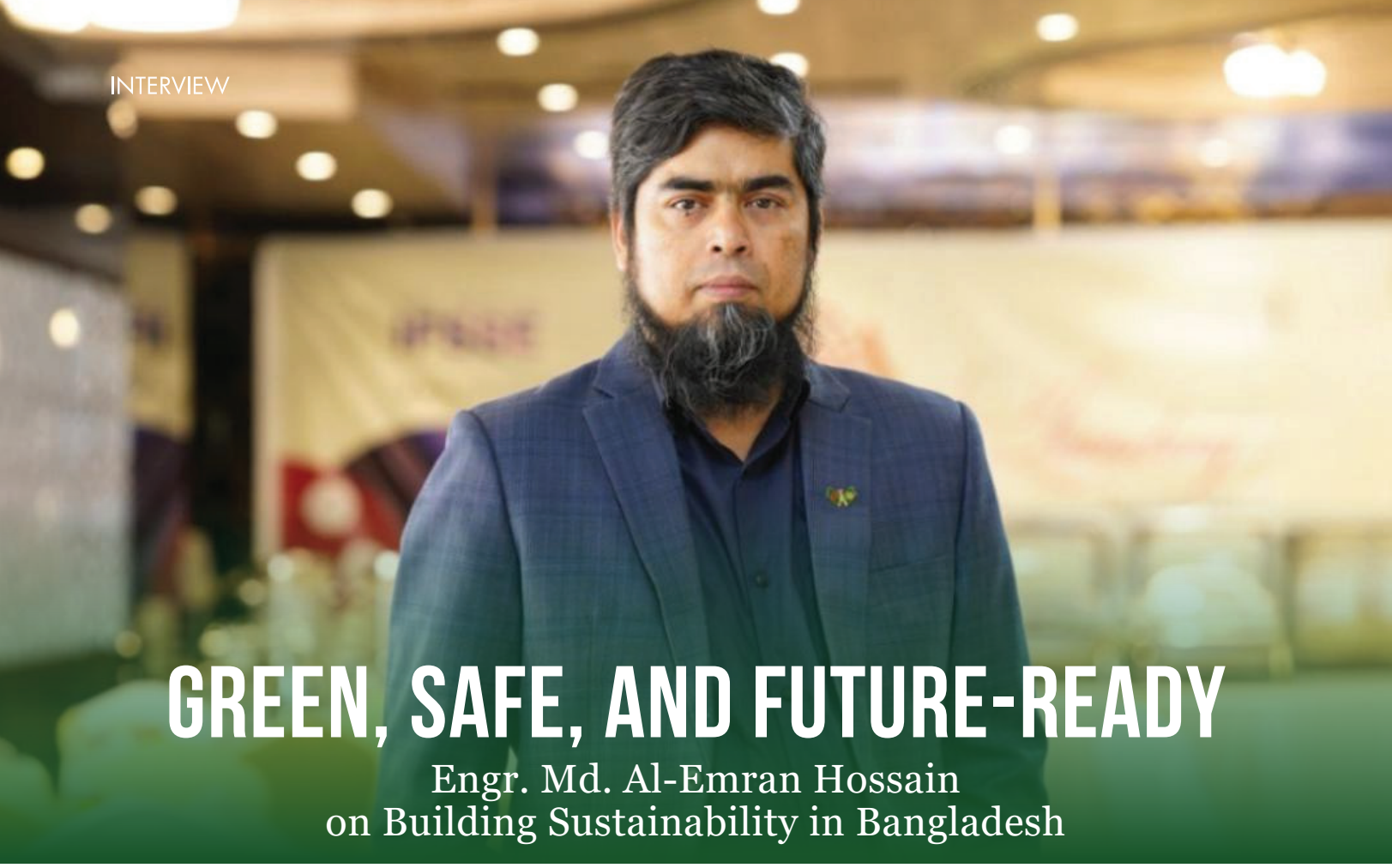

GREEN, SAFE, AND FUTURE-READY

Engr. Md. Al-Emran Hossain on Building Sustainability in Bangladesh

As Bangladesh continues its rapid urbanization journey, the conversation around safe and sustainable construction has never been more pressing. Amid growing environmental concerns, increasing urban temperatures, and infrastructure vulnerabilities, one engineer has taken the lead in pushing for meaningful change. **Engr. Md. Al-Emran Hossain, a mechanical engineer and building systems expert**, currently serves as the President of the Bangladesh Green Building Academy (BGBA). With certifications including LEED AP (BD+C) and ASHRAE Building Commissioning Professional (BCxP), he brings global best practices to the local context.

In this in-depth conversation, Engr. Al-Emran reflects on his professional journey, the realities of safety compliance in the construction sector, and the urgent need to rethink how Bangladesh designs its built environment—from fire safety to climate adaptation.

FROM VENTILATION TO VISION:

A CAREER ROOTED IN SAFETY AND SUSTAINABILITY

Engr. Al-Emran's journey began in MEP consulting, where an early project designing HVAC systems sparked his interest in indoor air quality and workplace comfort. That experience was the beginning of a deeper engagement with sustainable building principles.

His later work in data centers and fire protection systems, combined with international certifications like LEED and ASHRAE BCxP, shaped a vision where sustainability and safety are inseparable priorities. His career has since evolved into a mission: to create buildings that not only meet codes—but protect lives and preserve the planet.

ASHRAE IN BANGLADESH:

LOCAL CLIMATE, LOCAL LOGIC

Global standards such as ASHRAE offer comprehensive guidelines, but applying them directly in Bangladesh can lead to inefficiencies. For example, thermal comfort indices like PMV need recalibration for our hot and humid climate, where people feel comfortable at higher temperatures with proper ventilation.

Engr. Al-Emran advocates for using free cooling strategies—such as nighttime ventilation—to reduce reliance on air conditioning, thereby cutting energy costs and improving grid stability. He also stresses the importance of maintenance culture, something that's still developing in many parts of Bangladesh.

THE SAFETY GAP:

FIRE & ELECTRICAL COMPLIANCE STILL A CHALLENGE

Although safety codes like BNBC 2020 and NFPA standards exist, compliance remains inconsistent—particularly in small to mid-scale construction. Three core issues stand in the way:

Lack of awareness among informal sector builders
Shortage of trained safety inspectors
Weak regulatory enforcement, with limited site audits or accountability

Without a functioning implementation authority, safety protocols often remain theoretical. Engr. Al-Emran believes that regulatory digitization, mandatory certifications, and insurance incentives could improve adherence significantly.

BREAKING THE MYTH:
GREEN DOESN'T MEAN EXPENSIVE

One of the most persistent misconceptions in the industry is that green buildings are more costly. Engr. Al-Emran counters this by focusing on life cycle cost analysis (LCCA). An initial 2% cost increase can yield up to 20% savings over a building's lifespan.

Through pilot projects, ROI-driven case studies, and finance-focused workshops, he and his team are reshaping how developers, investors, and even banks view sustainability—not as a luxury, but as a smart investment.

BANGLADESH GREEN BUILDING ACADEMY:
SHAPING THE FUTURE OF CONSTRUCTION

The BGBA, founded by Engr. Al-Emran, has become a national platform for promoting sustainability in the built environment. Its key initiatives include:

Training over 100 engineers and architects in green design and international codes

Drafting a green building chapter for BNBC 2020, filling a critical policy gap

Small-scale retrofits that demonstrate practical ways to cut energy use in older buildings

These efforts are helping institutionalize sustainability—not just in high-end projects, but in everyday practice.

BEAWORLD
A GLOBAL BRIDGE FOR BANGLADESHI ENGINEERS

As the Bangladesh Chapter Head of BEAWorld, Engr. Al-Emran is connecting local engineers with global experts. The platform offers:

- Monthly webinars on international standards and real-world project insights
- Mentorship programs pairing young professionals with senior engineers abroad
- Online collaboration forums where project challenges are solved in real time by a global knowledge pool

This initiative is nurturing a generation of engineers fluent in both global innovation and local needs.

COMPLIANCE REALITY CHECK:
ARE WE SAFE ENOUGH?

In Engr. Al-Emran's words, "Formal compliance is missing in 60% of mid to small-scale projects." Many of these sites lack basic safety measures and operate without approved designs or licenses. To improve this, he recommends:

Digital regulatory systems to track violations and streamline accountability

Mandatory safety certifications for on-site engineers and contractors

Insurance-linked incentives that reward safety- compliant sites with lower premiums

These are practical, scalable reforms that can drastically raise the safety bar across the sector.

LEARNING FROM THE WORLD, ADAPTING FOR BANGLADESH

International training platforms like ASHRAE, NFPA, and LEED have given Engr. Al-Emran access to global best practices. But his key takeaway is this: localization is non-negotiable. Copying international codes without adapting them to our economy, climate, and construction culture leads to ineffective results.

He argues for a "glocal" approach—global vision, local execution—where standards are tailored for Bangladesh's realities.

FINAL WORD:
ENGINEERING CHANGE, BUILDING HOPE

At a time when climate shocks, rapid urban growth, and resource constraints threaten our cities, Engr. Md. Al-Emran Hossain is leading a movement that blends technical expertise with visionary thinking. Through BGBA, BEAWorld, and his policy-level advocacy, he is pushing for a built environment that is not just green—but smart, safe, inclusive, and future-ready.


Green Concrete
BIG IMPACT

Low-carbon innovations are reshaping the world's most-used construction material. Here is how.

Introduction

Concrete is the unsung hero of the modern built environment—forming the backbone of our cities, roads, and infrastructure. Yet, it is also one of the most environmentally damaging materials on Earth. With global concrete production contributing approximately 7–8% of annual carbon dioxide (CO_2) emissions, the construction industry faces an urgent need to decarbonize.

However, innovation is now transforming this age-old material. From carbon-capturing cement to recycled aggregates and AI-optimized batching, a new generation of "green concrete" technologies is redefining the way concrete is produced and used. This transformation is not only reducing the carbon footprint of the construction sector but also setting new benchmarks for sustainability and performance.

This article explores the evolution of concrete, examines its environmental footprint, and highlights five cutting-edge case studies of innovation from global leaders such as Heidelberg Materials, LafargeHolcim, and others. It also considers how these developments will shape the future of construction.

The Evolution of Concrete

Concrete's origins can be traced back to ancient civilizations. The Romans famously used a mix of volcanic ash, lime, and seawater to create a remarkably durable form of concrete—evident in structures like the Pantheon, which still stands today. Over centuries, this early recipe was gradually refined, culminating in the development of Ordinary Portland Cement (OPC) in the 19th century.

OPC became the dominant binder for modern concrete, known for its uniform strength and durability. However, its production is energy-intensive and heavily reliant on the calcination of limestone, a process that releases vast amounts of CO_2. With the global demand for concrete exceeding 30 billion tonnes annually, its environmental cost has become untenable.

The Environmental Impact of Traditional Concrete

The carbon footprint of concrete is primarily associated with cement, its most energy-intensive ingredient. Cement production contributes roughly 900 kg of CO_2 per tonne—driven by two key emission sources:

Table 1: Sources of CO_2 Emissions in Cement Production

Emission Source	Approximate Share
Calcination of limestone	~60%
Fossil fuel combustion in kilns	~30%
Electricity use (grinding, milling)	~5%
Transportation and logistics	~5%

Green Concrete: A Paradigm Shift

Green concrete refers to concrete products engineered to reduce environmental impact—particularly carbon emissions—without compromising strength, durability, or workability. Key approaches include:

- Replacing OPC with Supplementary Cementitious Materials (SCMs) such as fly ash, slag, and calcined clay.
- Incorporating recycled aggregates to reduce the need for virgin materials.
- Carbon capture and utilization (CCU) technologies that inject and mineralize CO_2 into concrete.
- Alternative binders including geopolymer and limestone calcined clay cement (LC3).
- AI and digital optimization tools that reduce material use through smarter mix designs.

CASE STUDIES
GLOBAL LEADERS IN GREEN CONCRETE INNOVATION

Heidelberg Materials (Germany) – Carbon-Neutral Clinker with EvoZero

Heidelberg Materials has pioneered one of the world's most ambitious carbon capture initiatives through its product line EvoZero, the first carbon-neutral cement. The company has integrated full-scale carbon capture and storage (CCS) technology at its Brevik plant in Norway. The captured CO_2 is liquefied and transported for permanent storage under the North Sea.

- Innovation: Full CCS integration with clinker production
- Impact: Eliminates up to 100% of CO_2 emissions from the process
- Status: Commercial operations starting in 2025

LafargeHolcim (Switzerland) – ECOPact Low-Carbon Concrete

LafargeHolcim's ECOPact range offers concrete products with 30–70% lower carbon emissions compared to traditional mixes. This is achieved through the use of SCMs, recycled materials, and local sourcing. ECOPact is now available in over 20 markets worldwide.

- Innovation: Blend of low-emission cement and recycled materials
- Impact: 30–70% reduction in embodied carbon
- Status: Used in projects like Google HQ and Metro Manila Subway

CarbonCure Technologies (Canada) – CO_2 Mineralization

CarbonCure injects captured CO_2 into concrete during mixing. The gas reacts with calcium ions to form solid calcium carbonate, permanently sequestering the CO_2 and improving the compressive strength of the concrete.

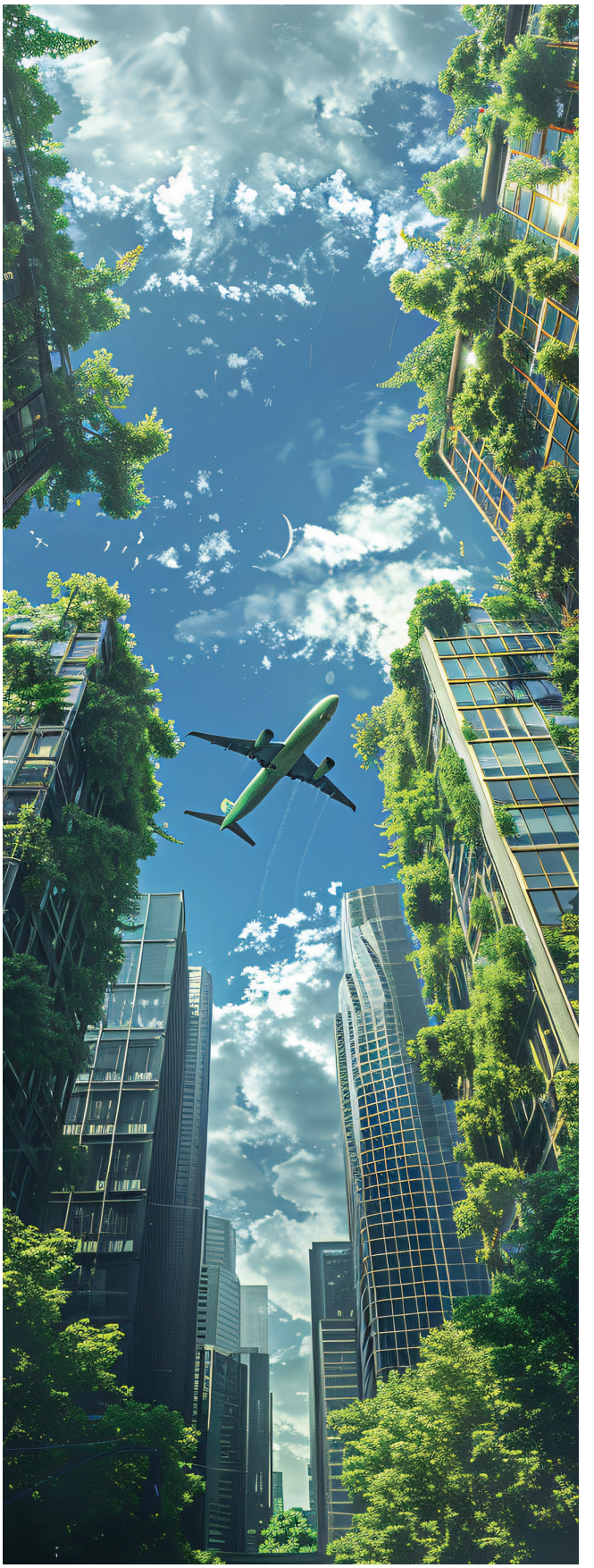

Photo: Business Wire

- Innovation: CO_2 injection and mineralization in ready-mix plants
- Impact: ~10% emissions reduction per cubic meter
- Adoption: Over 700 concrete plants globally
-
- Cemex (Mexico) – Vertua and AI-Driven Mix Designs
- Cemex has developed Vertua, a line of sustainable concretes that use admixtures, SCMs, and digital mix optimization. Vertua offers products ranging from 30% to 100% carbon-neutral, with advanced AI helping to reduce overdesign and waste.
-
- Innovation: AI-optimized low-carbon mixes
- Impact: Up to 70% carbon reduction
- Adoption: Used in airport expansions and highway tunnels across Europe
-
- **Solidia Technologies (USA) – CO_2-Cured Cement**
- Solidia replaces OPC with a proprietary low-lime cement and cures it with CO_2 rather than water. This not only cuts emissions but also saves water and produces higher-strength precast elements.
-
-
- Innovation: CO_2 curing of precast concrete
- Impact: 30–70% CO_2 reduction plus water savings
- Adoption: Paving stones, hollow-core slabs, and pipes

Table 2: Green Concrete Innovation Overview

Company	CO_2 Reduction Potential	Key Innovation	Application Type
Heidelberg Materials	Up to 100%	Carbon capture & storage (CCS)	Clinker / Cement
LafargeHolcim	30–70%	SCMs, recycled aggregates	Ready-mix / Infrastructure
CarbonCure	~10%	CO_2 mineralization	Ready-mix
Cemex	Up to 70%	AI batching, Vertua concrete	Urban / Industrial
Solidia	30–70%	CO_2-cured cement for precast	Precast Components

How Green Concrete Will Reshape Construction

The implications of green concrete stretch far beyond environmental metrics. As regulatory frameworks evolve,

builders and developers are under mounting pressure to decarbonize their operations. Green concrete offers multiple co-benefits:

- Regulatory compliance with green building codes and environmental impact assessments
- Higher long-term durability and reduced lifecycle costs
- Improved insulation and energy efficiency in buildings
- Brand differentiation and alignment with ESG mandates
- Readiness for carbon credits or trading systems

Innovations such as 3D-printed concrete and geopolymer-based solutions are also gaining ground, allowing for new structural forms, less waste, and faster construction timelines.

Conclusion

From carbon-heavy to climate-smart, the transformation of concrete is underway. Driven by innovation, necessity, and regulation, green concrete is fast becoming the cornerstone of sustainable construction.

Companies like Heidelberg, LafargeHolcim, and Cemex are showing the way forward—proving that it is possible to retain the strength and versatility of concrete while drastically cutting its environmental toll. As demand grows for climate-resilient infrastructure, green concrete will play a vital role in building a more sustainable and livable world.

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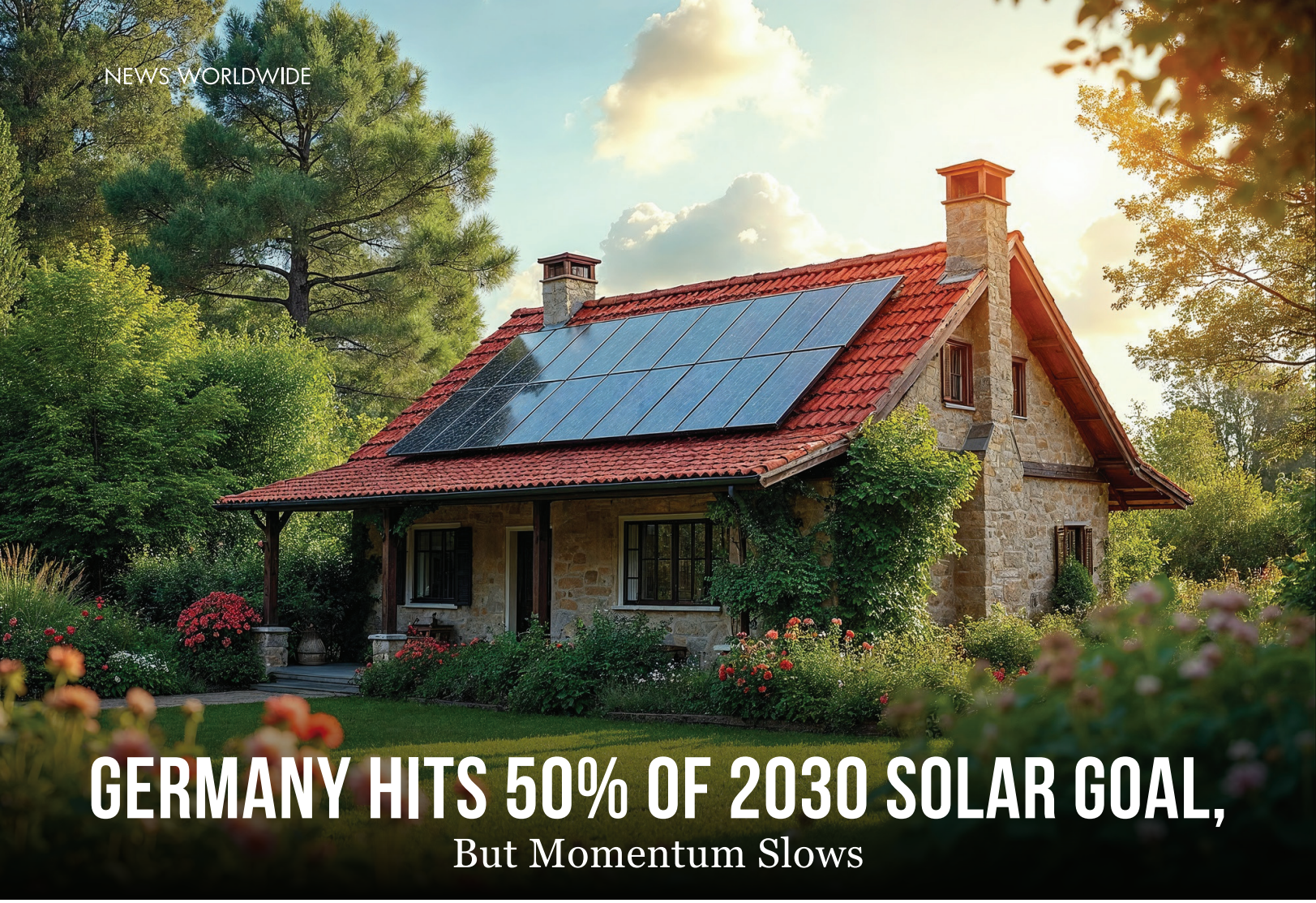

GERMANY HITS 50% OF 2030 SOLAR GOAL,
But Momentum Slows

Germany has reached a major milestone on its path to a cleaner energy future—installing more than half of the solar capacity it aims to have in place by 2030. But new figures suggest that progress may be losing steam just as the energy transition enters its most critical phase.

According to the latest data from the Federal Network Agency (BNetzA), Germany now has approximately 107.5 GW of installed solar power capacity—just over 50% of its 2030 target of 215 GW. These installations include more than five million systems spread across rooftops, balconies, and open land. Together, they now generate about 15% of the country's electricity supply, according to an analysis by solar industry group BSW-Solar.

However, the pace of new installations has slowed in recent months, triggering concerns from industry leaders. BSW-Solar warns that unless the country ramps up deployment again, it may fall short of its 2030 climate and energy goals.

"Electricity demand is growing, and the solarisation of roofs, façades, and open spaces must not slow down," said Carsten Körnig, CEO of BSW-Solar. "Half the journey has been completed, but the next stage will not happen automatically."

Investment Stability and Policy Reform Needed

To maintain momentum, the association is calling on the federal government to create more stable investment conditions and to eliminate remaining barriers in the solar and battery storage markets. Among the key concerns are delays in approving the EU's Solar Package under state aid rules and sluggish progress on digitalising and streamlining grid connections.

BSW-Solar has submitted a set of policy recommendations aimed at speeding up these reforms. These include:

- Accelerating state aid approval for solar support measures
- Fast-tracking digital tools for faster and easier grid access
- Implementing promised changes to building codes to allow more widespread solar installations

Battery Storage the Next Crucial Frontier

While solar power capacity has surged, the availability of battery storage to balance variable generation still lags. Currently, around two million battery storage systems are in use across Germany, offering a combined capacity of about 20 GWh. However, experts say between 100 and 150 GWh will be needed by the end of the decade to support a renewable-heavy grid.

BSW-Solar is urging immediate action to expand storage deployment, noting that grid stability and solar efficiency will depend increasingly on flexible energy storage.

What's at Stake

Germany's solar ambitions are central to its broader energy transition, which aims to phase out fossil fuels and increase reliance on renewables. Hitting the 2030 goal would dramatically reduce emissions, cut reliance on energy imports, and reinforce Germany's leadership in clean energy. But delays in implementation and investment uncertainty could derail these gains.

For now, industry leaders are pressing for urgency. The second half of the journey to 215 GW may prove more complex than the first, requiring coordinated policy, regulatory clarity, and significant infrastructure upgrades.

Source: renewablesnow.com

CONSTRUCTION PROJECT ABANDONMENTS CLIMB IN MAY AS ECONOMIC PRESSURES MOUNT

STRESS INDEX JUMPS OVER 11%, REACHING HIGHEST POINT SINCE 2019

The construction industry is showing signs of significant strain, with the latest data pointing to a sharp increase in the number of abandoned projects. According to ConstructConnect, its Project Stress Index (PSI)—which measures the health of the nonresidential construction pipeline—rose by 11.4% in May, marking its steepest climb in years and signaling deepening uncertainty within the sector.

The PSI evaluates risk levels across various construction stages by monitoring trends in delays, suspensions, and outright cancellations. A rising index indicates a growing number of troubled projects, often a reflection of broader economic volatility and tightening financial conditions.

What the Numbers Show

In May, the PSI climbed to 122.8, a level not seen since 2019. While the volume of delayed or temporarily suspended projects held relatively steady, the number of abandoned initiatives spiked—up 30.3% from April. This surge in cancellations drove most of the index's movement and suggests increasing concern among project developers and investors.

One particularly worrying trend is the shift in the private sector, where the fallout has been more severe. Project abandonments in private developments surged 62.6% month-over-month and showed a staggering 92.2% increase compared to May of the previous year. These figures suggest that developers are facing growing challenges, especially in projects that depend heavily on private capital and investor confidence.

The Role of Economic Headwinds

Multiple financial stressors are feeding the increase in cancellations. Rising interest rates have made borrowing more expensive, while lenders are adopting stricter approval standards, making it harder for projects—especially those with slim margins or speculative returns—to move forward.

Although materials inflation has eased slightly from pandemic-era peaks, costs remain high enough to disrupt budgets. Persistent labor shortages and supply chain disruptions further complicate project planning, adding unpredictable variables that are leading many developers to back away from commitments.

Clean Energy Projects Also Hit

Interestingly, even the renewable energy sector—typically seen as resilient due to strong long-term demand—is not immune. In recent months, over $8 billion worth of green energy developments have been shelved or scrapped entirely. Experts attribute this in part to shifting government incentives and rising capital expenditures, both of which have undermined the financial attractiveness of some solar and wind initiatives.

What Rising Stress Means for the Industry

The current rise in the PSI suggests a possible downturn in the construction project pipeline, particularly within the nonresidential private sector. If the trend continues, it could lead to slower activity across related industries—from architecture and engineering to materials supply and specialty contracting.

Components Monitor

Delay Bid Date	On Hold	Abandoned
103.4	93.5	171.5
↓	=	↑

(Month-on-month changes of less than 0.25% are indicated as unchanged)

The PSI serves as a key forward-looking indicator, offering stakeholders insight into where the market is heading. May's spike in cancellations is seen as a strong signal that caution and conservatism are taking hold, especially in segments most exposed to interest rate shifts and financing risks.
Source: ConstructionConnect.com

CALIFORNIA SUES TRUMP ADMINISTRATION OVER REVOKED HIGH-SPEED RAIL FUNDING

The California High-Speed Rail Authority (CHSRA) has filed a lawsuit against the Trump administration following the federal government's decision to revoke nearly $4 billion in grant funding for the state's long-delayed high-speed rail project linking San Francisco and Los Angeles.

The funding, originally secured during the Biden administration, was intended to support ongoing work on the ambitious 494-mile rail line. The CHSRA alleges that the termination of the grants is unlawful and politically motivated, accusing the federal government of using the move as retaliation against the state and its signature infrastructure project.

California Governor Gavin Newsom formally announced the legal challenge on July 17. The lawsuit arrives one day after U.S. Transportation Secretary Sean P. Duffy declared the grants terminated, citing lack of progress and mounting costs as key reasons for the decision.

According to the Department of Transportation, the Federal Railroad Administration (FRA) had conducted a compliance review of the grant agreements and concluded that California had failed to meet key contractual obligations. The FRA highlighted that, after 16 years and approximately $15 billion spent, no high-speed track has been laid.

The project's ballooning costs have drawn intense scrutiny. Initially estimated at $33 billion when first approved by voters in 2008, the total projected cost has now climbed above $100 billion. Federal officials estimate that the same amount of money could fund thousands of air travel routes between the Bay Area and Southern California for decades.

In contrast, the CHSRA and California officials argue that the project is making measurable progress. They point to the construction of more than 50 major structures, including viaducts, bridges, and overpasses, along with 60 miles of completed guideway. The state anticipates launching passenger service between Merced and Bakersfield as part of an "initial operating segment" in the Central Valley by 2030–2033.

The rail authority claims that rescinding the grants at this stage would jeopardize a critical infrastructure investment and disrupt economic activity in regions already committed to the project. They maintain that the project, while behind schedule and over budget, remains viable and essential to California's long-term transportation and climate goals.

The revoked grants had been part of a broader federal commitment to support clean energy, sustainable infrastructure, and regional development. To date, less than 25% of the total project cost has come from federal sources, according to data reported by the Associated Press.

The CHSRA now seeks judicial intervention to block the grant termination, arguing that pulling funding after construction has reached an advanced stage could compromise not just state progress, but national leadership in high-speed rail.

If completed, California's bullet train would become the first true high-speed rail system in the United States, with trains traveling at speeds exceeding 200 mph. In the long term, it aims to provide an alternative to short-haul flights and reduce greenhouse gas emissions in a heavily congested corridor.

For now, the legal battle adds another layer of complexity to a project that has already faced delays, design changes, and political opposition across multiple administrations. The outcome could have significant implications not just for California, but for the future of high-speed rail nationwide.
Source: Global Construction Review

TRUMP UNVEILS $92 BILLION INFRASTRUCTURE VISION, PUTTING PENNSYLVANIA AT THE HEART OF A NATIONAL ENERGY-AI PUSH

In a high-profile campaign appearance in Butler, Pennsylvania, former President Donald Trump announced a sweeping $92 billion plan aimed at revitalizing the U.S. economy through major investments in energy, artificial intelligence (AI), and infrastructure. Positioned as a strategy to boost American leadership in emerging technologies and restore energy independence, the initiative promises significant impacts for Pennsylvania's construction sector.

Linking AI Dominance to Energy Infrastructure
Central to the proposal is the understanding that advanced AI systems will require vast computing power—and by extension, immense energy resources. Trump's strategy calls for a large-scale buildout of infrastructure to support this

future demand. The proposal outlines a nationwide effort to construct data centers, upgrade energy grids, build new gas power facilities, and repurpose legacy coal plants across Pennsylvania and beyond.

This infrastructure will serve not only as the digital backbone for AI development but also as a catalyst for job creation and industrial revitalization, particularly in areas that have seen economic decline due to shifting energy trends.

Construction Employment Set to Surge
While the plan stops short of providing an exact employment forecast, its scale suggests a major hiring boost for construction workers, engineers, and skilled tradespeople. According to Pennsylvania Senator Dave McCormick, who co-hosted the summit, the proposal could generate tens of thousands of new roles in sectors such as electrical work, heavy machinery operation, structural steel fabrication, and even AI system integration.

The plan's emphasis on co-locating power sources with AI data infrastructure means construction crews will be needed not just for standard builds, but also for complex, tech-enabled installations. That includes smart-grid systems, sustainable retrofits, and intelligent building management frameworks.

Energy Meets Technology on the Construction Site
One innovative aspect of Trump's proposal is its focus on pairing power generation with AI facilities. This model envisions companies owning and operating their own energy assets—such as gas turbines or modular nuclear systems—next to data centers, creating a closed-loop system for power and profitability. Such a setup would give firms the option to sell surplus energy back to the grid.

This integrated approach requires construction firms to adapt, merging traditional building expertise with emerging tech disciplines. That includes not only electrical and civil engineering, but also software coordination, energy analytics, and AI-enabled control systems—fostering a new kind of cross-disciplinary workforce.

Opportunity for the Building Industry
The plan arrives at a time when many construction companies are seeking long-term, federally backed projects to stabilize their pipelines. If enacted, it could unlock access to public-private partnerships, expanded procurement budgets, and potentially incentives tied to innovation in materials and construction methods.

Organizations such as the Associated General Contractors of America (AGC) are closely monitoring the proposal's trajectory. They anticipate that even a partial rollout could kick-start a wave of demand for concrete, steel, electrical systems, and smart infrastructure tools. Some firms may also benefit from increased R&D funding for automation, AI-assisted project planning, and advanced materials.

A Pivotal Moment for Pennsylvania's Construction Ecosystem
Trump's announcement has cast Pennsylvania as a potential epicenter of next-generation infrastructure growth. The state's mix of legacy industrial zones, skilled labor base, and existing energy facilities make it a natural candidate for early deployment. Rural counties and former coal towns in particular could see revitalization if the plan moves forward.

More broadly, the proposed strategy signals a paradigm shift in how construction intersects with technology and energy policy. While political dynamics will determine the proposal's fate after the election, it has already reshaped the national dialogue around infrastructure and innovation.

Whether or not the full $92 billion package becomes reality, construction leaders are taking note. From regional contractors to national engineering firms, the consensus is that any movement toward AI-energy synergy will demand an evolution in both capabilities and mindsets. As Pennsylvania—and the broader U.S.—prepares for what could be a new infrastructure era, the lines between tech, energy, and construction are becoming more blurred than ever.

Source: World Construction review

DISNEY ANNOUNCES FIRST NEW THEME PARK

in 15 Years—Set for Abu Dhabi

The Walt Disney Company has confirmed it will build a new theme park and resort in Abu Dhabi, marking its first new park in over 15 years and its seventh global destination. The project will be fully funded and developed by Miral, the emirate's leading leisure and entertainment developer, with Disney retaining full control over creative and operational elements.

Construction is expected to begin in the coming years, with a projected opening in the early 2030s. The announcement signals Disney's expanded commitment to the Middle East, with Abu Dhabi chosen for its strategic location and rising profile in global tourism.

According to Disney, more than 500 million people live within a four-hour flight of Abu Dhabi, making it one of the most accessible locations for international visitors. The emirate is forecast to attract 39 million tourists annually by 2030.

The park is expected to incorporate cutting-edge technologies and interactive experiences. Disney Imagineers and R&D teams are already involved in the early design phase, exploring the integration of gamification and digital storytelling. Plans include linking online and physical experiences through immersive entertainment platforms.

Disney's approach in Abu Dhabi mirrors its model in Tokyo, where local partners fund infrastructure while Disney manages content and operations. This royalty-based agreement allows Disney to expand internationally without diverting funds from its $30 billion domestic investment strategy.

Miral's Chairman, Mohammed Al Mubarak, described the project as a major milestone for Yas Island, reinforcing Abu Dhabi's goal to become a global cultural and tourism hub. Disney executives highlighted the alignment between Abu Dhabi's tech-forward vision and Disney's push into immersive entertainment and digital spaces.

The resort is still in the design phase, with no fixed opening date. Disney says large-scale parks of this nature typically take 18 months to design and up to six years to complete. CEO Bob Iger has confirmed that early planning is underway but emphasized no commitments have been made on the timeline.

The Abu Dhabi development follows successful Disney expansions in Paris, Tokyo, and Shanghai and is expected to contribute significantly to regional tourism, economic growth, and cultural engagement.

Source: Middle East Construction News

A CLEANER TOMORROW
Through Wastewater Innovation

In a world increasingly burdened by polluted waters, innovation is essential. From bustling factory towns to remote rural landscapes, communities and scientists are racing to find sustainable, efficient methods to reclaim and purify water. Leading this wave of change is a groundbreaking discovery from Hong Kong Baptist University (HKBU), alongside pioneering wastewater case studies that show technology transforming lives—one drop at a time.

HKBU'S CATALYTIC MEMBRANE
TURNING OXYGEN INTO A WASTEWATER HERO

Imagine cleaning toxic water in the blink of an eye. That's the reality of NGCF-OV, a novel catalytic membrane created by a team under Professor Zhao Jun at HKBU. Detailed in Advanced Functional Materials, this membrane harnesses the power of singlet oxygen ($^1O_2$)—a fiercely reactive form of oxygen—to degrade harmful pollutants at breathtaking speeds.

How It Works

NGCF-OV combines N-doped reduced graphene oxide with cobalt ferrite, creating defect-rich catalytic hotspots. These unique sites stretch the bond in O_2 molecules, speeding up electron transfer and unlocking $^1O_2$ production—without external energy or toxic chemicals. A secondary feature, graphitic nitrogen traps contaminants close to the reaction sites, ensuring instant degradation—specific tests show complete breakdown of Bisphenol A in just 86 milliseconds.

Professor Zhao notes, "This research marks a significant advancement... offering a more sustainable and efficient approach to treating contaminated water".

Crucially, NGCF-OV is versatile—capable of dismantling dyes, antibiotics, pesticides, and more. The membrane's solo act—oxygen activation and pollutant degradation—places it as a promising candidate for everyday treatment and emergency spill cleanups alike.

LEGACY OF INNOVATION
KEY SCIENTIFIC MILESTONES IN WATER TREATMENT

Before NGCF-OV, several pioneering breakthroughs redefined wastewater purification:

Activated Sludge Revolution (1970s)
Researchers uncovered highly efficient microbial communities that could process organic pollution in wastewater—a foundation for biological treatment in municipal plants.

Membrane Bioreactors (2000s)
Integrating biological degradation with membrane filtration delivered safer, reuse-quality water in a compact setup—ushering in a new standard of treatment.

Photocatalysis with TiO_2 (2010s)
Titanium dioxide plus UV light marked a leap forward in tackling pharmaceuticals and so-called "forever chemicals," demonstrating that light-driven oxidation could reach deep into contaminant breakdown.

Now, catalytic membranes like NGCF-OV carry the torch forward—combining nanotechnology, materials science, and chemistry—all without fossil energy or environmental side effects.

Real-World Triumphs

Case 1: Solar Ozone in Kenya's Water Crisis
In Nakuru County, rural communities and farms battled pesticide-contaminated runoff impacting drinking water and Lake Naivasha. A combined solution—a solar-powered ozonation unit—delivered a 3-log reduction in E. coli and nearly 90% drop in pesticide levels, all in a decentralized unit ramped by sunshine.

Case 2: Zero Liquid Discharge in India's Textile Mills
Arvind Mills, in Tiruppur's textile hub, implemented a sophisticated Zero Liquid Discharge system incorporating ultrafiltration, reverse osmosis, and evaporators. The result: complete wastewater recovery, 98% reduction in chemical load, and a sustainable circular process that transforms waste into resource.

Case 3: Singapore's Groundbreaking NEWater
Singapore's PUB pioneered reusing municipal wastewater for drinking. Through triple-level treatment—microfiltration, reverse osmosis, and UV sterilization—NEWater now accounts for 40% of the city's water needs, setting a global gold standard for reuse.

THE PATH FORWARD
CLEANER, SMARTER, GREENER

The NGCF-OV membrane exemplifies the future: membrane-based, catalytic, energy-free, and scalable. As Professor Zhao notes, its dual-action capability creates a "game-changing" tool for both daily and emergency water treatment.

Upcoming horizons include enhanced sensor integration, mobile treatment units, and renewable-powered systems like electrocoagulation—a sustainable and efficient process.

Despite hurdles such as cost, scale-up, and regulatory compliance, the convergence of material science, nanotechnology, and renewable energy offers a future where usable water becomes the rule, not the exception.

CONCLUSION
WATER'S NEW DAWN

From microbial cultures to high-speed membranes, the story of wastewater treatment is one of relentless evolution. HKBU's NGCF-OV doesn't just add a page—it rewrites the ending: smart, sustainable, and astonishingly fast.

As we move toward a future of climate urgency and recycled economies, breakthroughs like NGCF-OV and global case studies—from Kenya to Singapore—highlight an emerging truth: clean water isn't just technology—it's humanity's greatest renewable resource.

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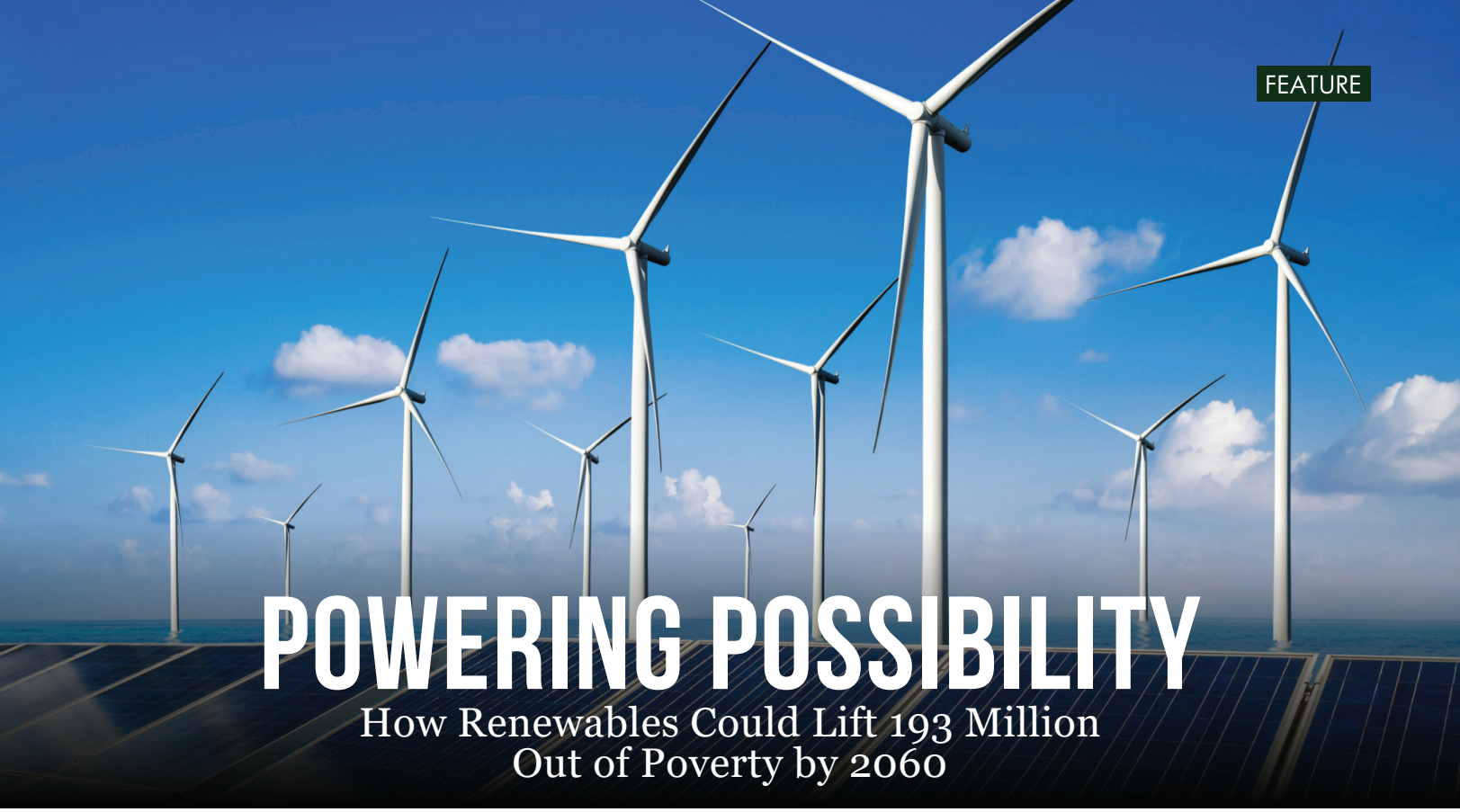

POWERING POSSIBILITY

How Renewables Could Lift 193 Million Out of Poverty by 2060

- In the dry highlands of northern Kenya, where solar rays blanket the land from dawn to dusk, Aisha brews tea on a smokeless stove. Her home is lit by a rooftop solar panel—an asset that, just five years ago, was unthinkable. But the real power in Aisha's life now? It's the promise that her children, studying under clean LED light, will grow up free from the hardship she endured.
-
- Now imagine that transformation, 193 million times over. That's the vision put forth in a bold new study from the United Nations Development Programme (UNDP), developed in partnership with the University of Denver's Pardee Center for International Futures and Octopus Energy. The report finds that by integrating renewable energy goals with development investments in health, education, water, and clean cooking, the world could lift nearly 200 million people out of extreme poverty by 2060 and generate $20.4 trillion in cumulative savings (UNDP, 2025).
- It's a scenario that's not only desirable—it's viable.
-

THREE FUTURES
BUSINESS-AS-USUAL, RENEWABLES, AND INTEGRATION

- The UNDP study models three global development trajectories out to 2060:
-
- Business-as-usual (BAU): Fossil fuels still dominate more than 50% of energy consumption. Greenhouse gas emissions remain high, and essential services—like electricity, sanitation, and clean cooking—are out of reach for billions.
- Renewables Acceleration (RA): The world follows ambitious energy goals, tripling renewable capacity and doubling energy efficiency. By 2060, fossil fuel use drops to 12%, and global temperature rise stabilizes near 2°C.
- RA + SDG Integration: The most ambitious path. In this scenario, renewables scale in tandem with deep investments in social infrastructure—from universal education to clean water and sanitation. The result: not only are climate goals met, but extreme poverty is nearly eradicated (UNDP, 2025).

It's the third path that reaps the greatest rewards—both in human development and economic returns.

HUMAN IMPACT
FROM DARKNESS TO DIGNITY

The study shows that the RA + SDG integration scenario delivers a cascade of benefits:

- 193 million people lifted out of extreme poverty
- 142 million fewer people suffering from malnutrition
- 550 million more people gain access to clean water and sanitation
- Universal access to electricity and clean cooking is achieved globally

These changes are not theoretical. They are about human lives transformed. In rural Bangladesh, a girl can do homework under solar lighting. In Peru, a health clinic can store vaccines with reliable refrigeration. In Nigeria, a farming co-op can irrigate crops with solar pumps.

ECONOMIC TRANSFORMATION
THE $20 TRILLION WINDFALL

The RA + SDG scenario doesn't just reduce poverty—it supercharges global economic growth.
By 2060, the world saves:

- $8.9 trillion through improved energy efficiency
- $11.5 trillion through cost reductions in renewables and expanded productivity
- Combined, a staggering $20.4 trillion in cumulative savings (UNDP, 2025)

Per capita income increases globally by an average of $6,000, and GDP grows by 21% compared to the base case.

As Greg Jackson, CEO of Octopus Energy, said:
"Renewables can offer the chance to bring electricity to hundreds of millions of people, improving lives and driving growth" (UNDP, 2025).

It's a rare win-win: climate action that pays back—and pays forward.

CASE STUDIES
WHERE PROGRESS IS ALREADY TAKING ROOT

Ecuador: A Small Nation, A Big Energy Shift

In Ecuador, renewable energy is being used as a foundation for broad development gains. By 2060, under the integration model, the country could achieve universal electricity access and eliminate extreme poverty.

UNDP-supported projects have helped fund solar microgrids in Amazonian villages and small hydroelectric projects in the Andes. These efforts align with Ecuador's updated Nationally Determined Contributions (NDCs)—climate plans that now embed health, education, and clean cooking in energy transitions (Renewable Energy Magazine, 2025).

Nigeria: Africa's Sleeping Giant Awakens

Nigeria's 2023 Electricity Act paved the way for decentralized energy governance, giving states the autonomy to implement localized renewable energy solutions. Under the RA + SDG scenario, Nigeria achieves universal access to electricity and clean cooking by 2060.

This is already visible in UNDP pilot programs: solar mini-grids now power schools and hospitals in Kano, while clean cooking campaigns target over 10 million households in Lagos (UNDP Climate Promise, 2025).

Bangladesh: Women at the Forefront

In rural Bangladesh, solar-powered hubs are helping women launch small businesses—from tailoring shops to mobile clinics. UNDP's integration model predicts not just energy access, but a sharp rise in female economic participation, school attendance, and maternal health (UNDP, 2025).

THE PRICE TAG—AND THE PAYOFF

Transitioning to this integrated model requires a significant global investment increase—from $1.8–1.9 trillion annually today, to around $2.5–3.4 trillion per year by mid-century.

Critics might balk at the cost. But the alternative—continuing fossil-fuel dominance—is already costing over $7 trillion annually when factoring in subsidies, pollution, and health impacts (IMF, 2024).

And unlike fossil-fuel investments, renewables paired with development generate long-term dividends: lower healthcare costs, stronger economies, and more resilient communities.

WHY IT MATTERS NOW

The window to act is shrinking. According to the UNDP report, over 90% of new global electricity generation capacity in 2025 came from renewables. Yet fossil fuels still make up 70% of global energy supply (UNDP, 2025).

The report is not merely a warning—it's a blueprint. It urges nations to:

- Update their NDCs with clear, time-bound renewable targets
- Invest in health, water, education, and clean cooking infrastructure
- Explore innovative financing models like blended finance, carbon markets, and debt-for-climate swaps
- Build local institutional capacity to deploy and maintain renewable systems

In short, we already have the tools. What's needed now is the political will to act on them.

A FUTURE WORTH FIGHTING FOR

"This research shows it is possible to balance global development with environmental protection while managing the inherent trade-offs," said Dr. Jonathan Moyer, director at the Pardee Institute (UNDP, 2025).

Aisha, the mother in Kenya, might not know about the UNDP report. But she lives its promise every day. Her children now have clean air, electric light, and ambition in their eyes. Her story, multiplied across millions, is the heart of this report—not just charts and forecasts, but lives changed forever.

As the world barrels toward 2060, the UNDP study offers a profound truth: we are not stuck in our present. If we dare to imagine an integrated future—and act—we can power not just economies, but possibilities.

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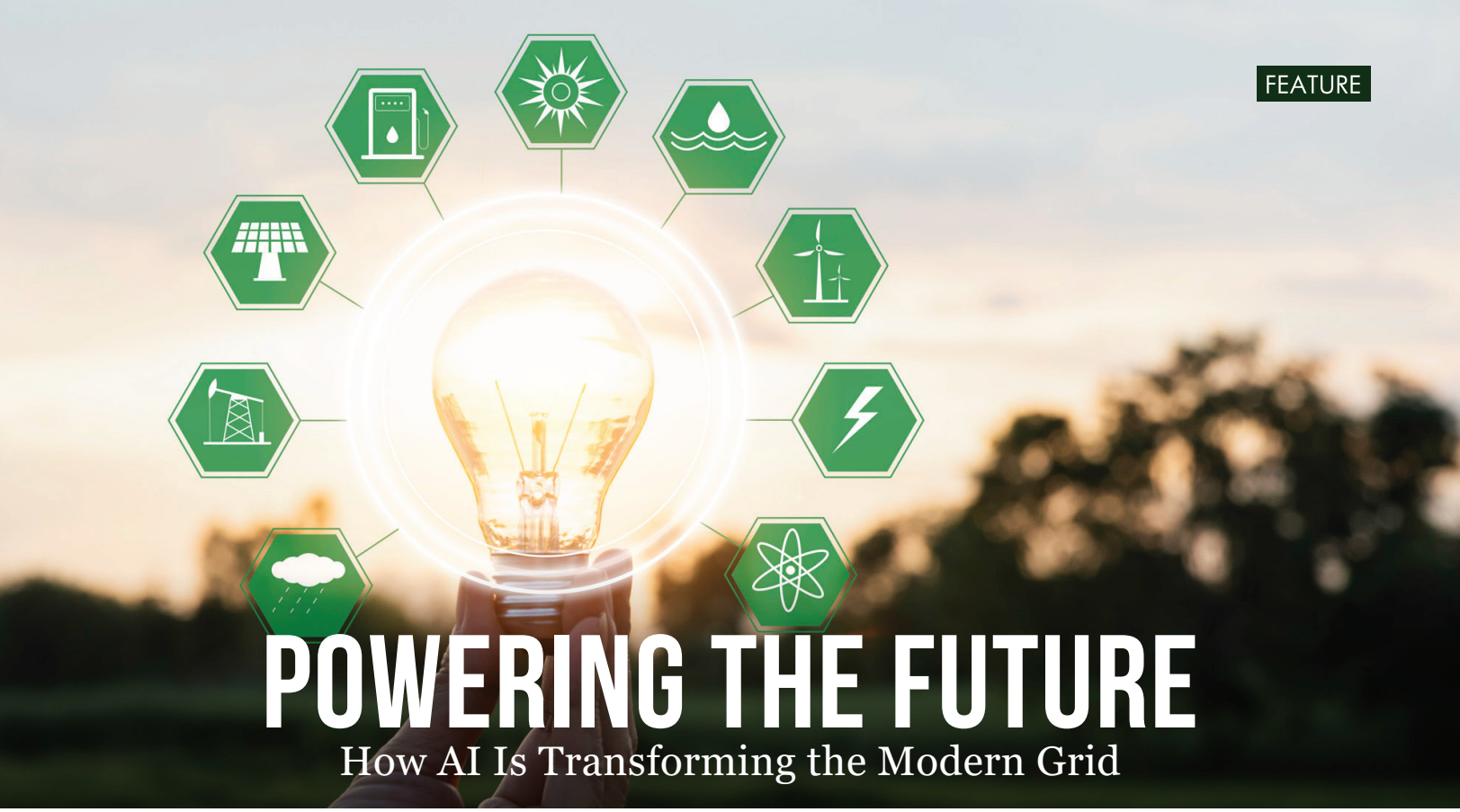

POWERING THE FUTURE

How AI Is Transforming the Modern Grid

In a world increasingly reliant on digitization, artificial intelligence is quietly overhauling the power grid. This transformation is no longer sci-fi—it's underway now, reshaping energy reliability, efficiency, and sustainability across continents.

WHY AI MATTERS TO THE GRID

Traditional grids were built for one-way electricity flow: big power plants→transmission lines→homes. But today's grid must accommodate decentralized energy—from rooftop solar panels to community wind farms—while also withstanding climate volatility. AI is the critical ingredient that lets the grid adapt in real time.

Smart grids powered by AI reduce losses in transmission and distribution by 15–20% on average.

AI-based load balancing systems improve grid reliability by up to 30%, while predictive algorithms reduce the risk of blackouts by around 20%.

Between 65–78% of utilities now believe AI is essential for grid modernization, and 65% of utilities have already adopted AI tools for forecasting, maintenance, or demand management

LIVE DEPLOYMENTS
REAL-WORLD AI IN ACTION

- Google & PJM (U.S.) — Speeding Up Interconnections
  In North America's PJM Interconnection—the region powering 67 million people—Google has partnered to deploy AI tools that dramatically accelerate the process of connecting new solar and wind farms to the grid. By automating labor-intensive review steps, the goal is to shorten long wait times that have delayed thousands of megawatts of clean energy projects.

- GridBeyond (U.K., U.S., Australia)
  GridBeyond recently secured €52 million to expand its AI-based energy management platform. Their system enables businesses—especially those with solar and battery storage—to optimize energy use, reduce waste, and sell surplus power into the grid automatically based on real-time weather and pricing data

- Chattanooga EPB Virtual Power Plant (U.S.)
  Chattanooga's EPB utility pioneered a local Virtual Power Plant, integrating home solar panels, batteries, and smart systems. Between 2014–2020, this network helped avoid 7,900 metric tons of CO_2 emissions, while energy upgrades delivered more than 5,200 kWh/year savings per home for over 400 low-income households. This demonstrates how AI-driven aggregation benefits both communities and the environment.

DEEP DIVE
WHAT AI ACTUALLY DOES

Load Forecasting & Demand Management
Smart meters and AI-powered analytics now allow utilities to predict daily power demand with up to 95% accuracy, reducing peak loads by as much as 10–15% via targeted

demand-side actions

Predictive Maintenance & Fault Detection
AI systems can detect equipment degradation and resolve issues up to 48 hours before failure, cutting downtime by 25–30% and extending asset life by up to 15%. Real-time sensors identify anomalies rapidly—preventing cascading failures and reducing outage times by 20–22%.

Renewable Integration
AI improves the accuracy of renewables forecasting (sun and wind) by up to 35%, reducing curtailment and enabling smoother integration of distributed resources like solar and wind farms. Smart algorithms simultaneously manage distributed generation and minimize grid stress.

Cybersecurity & Grid Resilience
AI tools scan the network for intrusions and anomalies, preventing hundreds of cyberattacks annually. Utilities using AI in security report 45% fewer security breaches and much faster detection times.

BENEFITS THAT GO BEYOND TECHNOLOGY

When layered together, these AI-enabled capabilities produce a powerful multiplier effect:

- Annual savings from smart grid AI adoption are estimated at $18–20 billion by 2027 SEO Sandwich.
- Operational costs drop by 15–20%, while carbon emissions from electricity systems decline by 5–10%, depending on deployment scale SEO SandwitchGitnux.
- Faster response to outages and better forecasting enhance customer satisfaction; the deployment of AI reduces response times by around 26% and improves reliability metrics.

CHALLENGES AND THE PATH FORWARD

Despite promises, smart grid transformation is neither easy nor inexpensive.

- The International Energy Agency estimates net-zero electricity systems will require annual smart-grid investments of $600 billion by 2050—a doubling from today's level.
- Regulatory frameworks slow innovation; utilities must balance legacy infrastructure and emerging AI models while safeguarding privacy and fairness.
- Organizational buy-in and consumer awareness remain hurdles; utilities need clear communication, smart-integrated pilot projects, and measurable KPIs to keep stakeholders aligned.

LOOKING AHEAD
THE SMART-GRID FUTURE

AI adoption in the energy sector is on track for explosive growth—the global AI-in-energy market is expected to reach $6–11 billion by 2028–2030, with compound annual growth rates in the 20–25% range.

As utilities embrace AI, tomorrow's grid will no longer be reactive infrastructure—it will be an intelligent, resilient ecosystem, powered by data and optimizing itself dynamically.

For communities, companies, and climate, that is nothing less than a revolution in how we generate, deliver, and experience electricity.

BEAT THE HEAT

How to Keep Your Home Cool Without Overworking Your HVAC

Summer's oppressive temperatures drive many indoors, but the battle to stay cool often comes with overheating bills and stressed-out HVAC systems. Luckily, leading U.S. provider Service Experts—alongside brands like Trane, and major clean energy player Google—are sharing smarter, safer ways to stay comfortable under the sun.

Inside the Air Conditioner: Prevention Is Your Best Friend
One of Service Experts' top rules: ensure your outdoor unit is clear of grass clippings, debris, and obstructions that can choke airflow. Filters are just as critical—clean filters allow cool air to flow efficiently; clogged ones force the system to strain, reducing both comfort and lifespan.

One odd but real hazard? Male dogs lifting their leg on the unit can cause aluminum corrosion—destroying fans and requiring costly replacements. A simple solution: fence protection or deterrents around the unit.

THE MYTH OF "THERMOSTAT WARS" AND SMART SETTINGS

Lowering the thermostat means faster cooling? Not true. HVAC engines cool at a steady rate, so constantly turning it down only makes your system work harder—and costs more Real Simple. Experts recommend:

- Keep your thermostat at a consistent, comfortable level
- Set it between 74–76°F, which could cut cooling costs by 3–5% for every degree higher you go.
- Add ceiling or floor fans to offset higher temps—fans enable comfort even at 4°F higher settings

These simple tweaks help maintain indoor chill without overworking your AC.

SOLAR SMARTS TRANE'S PROACTIVE MAINTENANCE BLUEPRINT

As climate change intensifies, heatwaves become more frequent. Trane, serving Charlotte and beyond, emphasizes pre-heat-season inspections—changing filters every 30–90 days and sealing cracks to prevent hot air intrusion.

Trane Comfort Specialists also recommend:

- Tune-ups before summer
- Weather-stripping doors/windows
- Proactive system checks, rather than reactive fixes

This strategy ensures home energy systems are ready to perform—cutting repairs and maximizing efficiency.

COOLING AT EVERY LAYER HOME DESIGN AND BEHAVIOR

Keeping interior heat out and circulating cool air matters:

- Blinds, curtains, shutters: PVC or aluminum shutters block up to 15°F of solar heat. Heavy, tightly woven fabrics double-down on insulation.
- Exhaust fans in kitchens and bathrooms help reduce humidity—since although they don't lower temperature,

lower humidity feels cooler and reduces AC load

- Minimize entering/exiting during peak heat—openings invite warm air and moisture, forcing AC systems to restart GlobeNewswire.
- House maintenance: sealing attic doors and insulating can cut cooling power losses; homes and gardens also contribute to lower household energy use Homes and GardensKiplinger.

THE TECH EDGE
SMART THERMOSTATS THAT SAVE & PROTECT

Beyond manual tuning, smart thermostats automatically adjust based on occupancy patterns—and can even detect refrigerant leaks before you notice performance drops. An example: Google's partnerships are streamlining the process for integrating solar and storage—allowing users to manage energy use more intelligently.

Real-World Results and Savings

- Service Experts: Serving 800,000+ homes, the company credits these combined strategies with reduced service calls and steady customer satisfaction through turbulent summer months.
- Trane in Charlotte: Since implementing pre-season routine maintenance programs, they report improved system uptime, home comfort, and customer trust.
- Google–PJM Clean Energy Integration: While outside HVAC, the project shows how efficiency-minded tech upgrades—like AI-based grid coupling—enhance energy distribution amid rising demand.

BOTTOM LINE

Staying cool doesn't require turning your HVAC into a power hog. By combining:

- Proactive maintenance (like Service Experts and Trane),
- Optimized equipment use (smart sensors, thermostats),
- Design & behavior tweaks (shading, humidity control),
- Tech upgrades (AI, leak detection)

families can stay comfortable, cut costs, and avoid equipment stress during summer's worst. As energy burdens mount—averaging $784 per US household this summer—these tried-and-tested approaches help balance relief and resilience.

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- *Smart thermostat tech and refrigerant leak detection*
- *Google–PJM AI for renewable integration context*
- *Rising summer energy costs ($784 average)*

WHAT THIS MEANS FOR YOU

Strategy	Immediate Benefit	Long-Term Gain
Clean airflow & filters	Better cooling, lower electric use	Fewer repairs, longer equipment lifespan
Smart thermostat (74–76 °F)	3–5% energy saving per degree adjustment	More consistent comfort, lower bills
Blinds, shading, fans	Reduces direct heat gain	Keeps HVAC offline longer
Smart leak detection tech	Avoids performance degradation	Prevents costly failures
Pre-season maintenance (Trane)	Early detection of faults	Reliability during peak heat

BUILDING SAFELY

Strategies to Protect Workers and Ensure Compliance on Construction Sites

When a high-rise rises, so do dangers—from heavy machinery to falling debris to regulatory missteps. The construction industry remains one of the most hazardous workplaces, with frequent injuries, project delays, and regulatory fines. But the tide is turning. Industry leaders, backed by insurance experts like The Hartford, are now deploying smarter strategies that combine technology, training, and trust to create safer, more compliant job sites. Here's how construction firms can mitigate risks—while protecting workers and their bottom line.

CULTIVATE LONG-TERM RELATIONSHIPS WITH TRUSTWORTHY PARTNERS

Building a strong safety culture begins before ground breaks. The Hartford emphasizes the importance of selecting project owners and subcontractors with shared values—especially commitment to safety and open communication. By choosing partners who invest in training and timely payments, companies can reduce the risk of rushed work, cutting corners, or using cheap, dangerous materials. These relationships foster accountability and lead to safer, more reliable work environments.

EMBED RISK MANAGEMENT INTO EVERY STEP

Risk planning isn't a checkbox exercise—it's a guiding principle. Using a risk management plan, companies identify site-specific hazards early on. These plans typically include a matrix of potential risks, likelihood, and impact, followed by mitigation strategies—like safety protocols, emergency response measures, and resource allocation (Wikipedia). Regular reviews ensure evolving site conditions—from weather to design changes—don't introduce overlooked dangers.

HARNESS TECHNOLOGY WEARABLES & VIDEO MONITORING

Smart technology is transforming compliance and worker safety in real time:

- Wearable sensors can detect workers approaching dangerous zones, alerting them and site managers to prevent injury
- 24/7 video monitoring, especially AI-enabled, helps identify hazards—like missing PPE or cluttered walkways—while also deterring theft or vandalism
    - High-def, cloud-linked cameras offer continuous oversight.
    - Alerts can trigger if workers lack hard hats or fall in unsafe zones.
    - Post-incident, footage aids investigations and serves as learning tools

These tools allow remote supervisors to detect and correct risks proactively, keeping workers safe and projects compliant, even when on-site inspections are infrequent.

TIGHTEN INSURANCE AND CONTRACT COMPLIANCE

Insurance is more than paperwork—it's a safety backstop. Construction firms should:

- Verify certificates of insurance (COIs) for all subcontractors and enforce coverage limits before work starts.
- Include safety and compliance clauses in contracts outlining responsibilities, inspections, and penalties for non-compliance (Constrafor).
- Require periodic audits to reinforce accountability and catch issues early.

These measures create a robust legal safety net and clarify expectations for all partners.

INVEST IN CONTINUOUS WORKER TRAINING

Even the best technology is only as good as the people who use it. Regular, targeted training builds a workforce that understands not just how to work safely—but why safety matters:

- Orientation and ongoing refreshers ensure protocols stay top-of-mind. For example, XR-based safety training enhances real-world awareness (arXiv).
- Hazard-specific drills—from crane safety to fall arrest techniques—reinforce correct behaviors.
- Training empowers workers to report unsafe conditions anonymously and invites them to own the site's safety culture.

Ultimately, a safety-aware workforce becomes a site's strongest line of defense.

PROACTIVE RISK-CONTROL COLLABORATION

Insurance and risk-engineering teams, like those at The Hartford, partner directly with firms to enhance onsite safety:

- Risk engineers evaluate job sites and recommend structural or procedural changes to reduce exposure.
- Collaboration often includes fault-tree analysis or safety modeling to spot high-risk processes before they lead to accidents.

This collaborative approach—blending engineering insights and operational knowledge—yields long-term, measurable safety improvements.

FOSTER A CULTURE OF **SAFETY OWNERSHIP**

Safe sites are built on shared responsibility—not fear. When managers and workers alike feel ownership over workplace safety, compliance becomes continuous rather than sporadic:

- Visible leadership involvement shows that safety is a top priority.
- Recognition programs celebrate safe behaviors and proactive risk spotting.
- Open communication channels—like daily huddles and site-wide bulletins—keep safety front and center.

This collective vigilance ensures that compliance is woven into the everyday fabric of the job.

THE BOTTOM LINE BUILDING SAFER, SMARTER, COMPLIANT PROJECTS

Combining relationship-building, detailed planning, smart technology, verified contracts, ongoing training, professional partnerships, and cultural reinforcement creates a powerful safety ecosystem. This integrated strategy not only reduces on-site injuries and compliance breaches but also brings tangible benefits:

- Fewer delays and lower claims keep budgets intact.
- Improved morale and retention from safer work environments.
- Stronger reputations, increasing client trust and market competitiveness.

As construction projects grow larger and regulations tighter, only those firms embedding risk management at their core will excel. And while challenges remain, the blueprint is clear—and field-proven.

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URBAN DRAINAGE SYSTEMS
in the Age of Climate Change

In the age of climate change, the monsoon season has become more unpredictable, and urban flooding has turned into a recurring nightmare for many cities around the globe. From the inundated streets of Dhaka and Lagos to flash floods in Berlin and New York, it's clear that traditional urban drainage systems—built for a different era—are no longer enough. A new generation of flood-resilient infrastructure is emerging, one that views water not as an enemy, but as a resource to be managed wisely. At the heart of this transformation are design innovations like sponge cities, permeable pavements, and green roofs.

THE URBAN FLOOD CHALLENGE

Rapid urbanization often replaces green, absorbent land with concrete and asphalt, leaving rainwater with nowhere to go but into overwhelmed drains. The Intergovernmental Panel on Climate Change (IPCC) projects that extreme rainfall events will become more frequent and intense, especially in coastal and low-lying regions. Traditional drainage systems—often designed for 20th-century rainfall patterns—simply can't cope.

In response, forward-thinking urban planners are turning to nature-based solutions. These aren't just fixes; they represent a shift in philosophy—from resisting water to working with it.

THE SPONGE CITY MODEL:

Soaking Up the Storm

The term "sponge city" originated in China in 2013 as a bold initiative to combat urban flooding while replenishing groundwater. The idea is simple: design cities to absorb, store, purify, and release water using natural processes.

CASE STUDY: WUHAN, CHINA

Wuhan, known for its rivers and lakes, was one of the first pilot cities under China's Sponge City Program. By integrating wetlands, bio-swales, green roofs, and permeable surfaces across the urban landscape, Wuhan increased its water retention capacity significantly. According to China's Ministry of Housing and Urban-Rural Development, sponge infrastructure in Wuhan helped reduce surface runoff by up to 70% in some districts during heavy rain events.

Sponge cities are no longer just a Chinese experiment. Countries like Germany, Australia, and even the U.S. are incorporating similar techniques under different names: blue-green infrastructure, water-sensitive urban design, or green stormwater infrastructure.

PERMEABLE PAVEMENTS: LETTING THE GROUND BREATHE

Traditional pavements create runoff, but permeable pavements—made from porous concrete, pavers, or gravel—allow water to pass through into layers of soil or storage reservoirs below. This reduces the load on storm drains and promotes natural groundwater recharge.

CASE STUDY: PORTLAND, OREGON

Portland has embraced permeable pavement in streets, parking lots, and sidewalks as part of its broader "Green Streets" initiative. These pavements, along with curbside rain gardens and bioswales, have helped reduce sewer overflows and urban flooding. The city reported a 30% reduction in stormwater entering the sewer system, while also improving water quality in nearby rivers.

For cities like Dhaka, which struggle with both waterlogging and depleted aquifers, permeable pavements could serve a dual benefit—if integrated during new construction and road renovations.

GREEN ROOFS: RAINWATER'S FIRST LINE OF DEFENSE

A green roof is more than just a garden on top of a building. It's a functional stormwater management system, capable of absorbing rainfall, reducing runoff, and cooling urban heat islands.

CASE STUDY: BASEL, SWITZERLAND

Basel made green roofs mandatory for new flat-roofed buildings over a decade ago. As a result, the city now has more than 1 million square meters of green roofs. During intense storms, these roofs absorb up to 50–80% of rainfall, reducing peak runoff while insulating buildings and enhancing biodiversity.

In dense urban areas where land for ground-level green infrastructure is limited, rooftop solutions like this are particularly appealing.

RECOMMENDATIONS FOR STORM-RESILIENT CITIES

To prepare for a wetter, stormier future, cities must reimagine urban infrastructure with resilience and equity in mind. Based on global best practices, here are five key recommendations:

- **Adopt integrated water-sensitive urban design:** Combine grey infrastructure (pipes, pumps) with green solutions like wetlands, swales, and rain gardens.
- **Revise urban planning codes:** Mandate permeable materials and green roofs in new construction and major renovations.
- **Retrofit vulnerable neighborhoods first:** Prioritize low- income, flood-prone areas in public investment plans to ensure equitable climate resilience.
- **Invest in data and modeling:** Use real-time data, satellite imagery, and hydrological models to forecast flooding and design interventions accordingly.
- **Educate and involve communities:** Engage local residents in water stewardship programs to ensure long-term maintenance and community ownership of green infrastructure.

Climate resilience is no longer optional for urban planners—it's urgent. As cities grapple with rising seas, flash floods, and infrastructure stress, the case for flood-resilient design becomes not only practical but essential. The solutions are here, tested across the globe. Now it's time for cities everywhere—from Dhaka to Durban—to make the leap from concrete jungles to storm-ready, sponge-smart urban ecosystems.

SAFECON 2025

A Glimpse into Bangladesh's Future of Sustainable Infrastructure

Held at ICCB in Dhaka, the 10th edition of SAFECON showcased a dynamic convergence of construction innovation, renewable energy, and global partnerships. Over three days, SAFECON 2025 illuminated a bold future for Bangladesh's infrastructure with a clear emphasis on sustainability, modern tech, and cross-border collaboration.

The bustling halls of the International Convention City Bashundhara (ICCB) came alive from May 29 to May 31, 2025, as the 10th International SAFECON Exhibition opened its doors to industry professionals, innovators, policy leaders, and curious visitors. Orchestrated by Savor International Ltd., this year's SAFECON was more than just an exhibition—it was a vivid display of Bangladesh's ambition to become a regional leader in safe, sustainable, and tech-forward infrastructure development.

TIGHTEN INSURANCE AND CONTRACT COMPLIANCE

The inauguration ceremony on May 29 was marked by optimism and a strong call for embracing innovation. Commerce Secretary Mahbubur Rahman, attending as the Chief Guest, set the tone with a keynote speech that underscored the necessity of sustainable practices. "To build a resilient and future-ready nation, we must embrace innovation and environmentally sound construction practices," he remarked, addressing an audience that included diplomats, engineers, investors, and developers.

The inauguration was also graced by international guests such as Mr. Han Jingchao, Trade & Services Branch, Chinese Enterprises Association in Bangladesh (CEAB); Ms. Stoyanka Stich, Cluster Coordinator (Energy), GIZ Bangladesh; and local dignitaries like Mr. Syed Moazzem Hossain, President, Australia Bangladesh Chamber of Commerce & Industry (ABCCI); Engr. Md. Hasmotuzzaman, President, FESCAB; and Md. Faizul Alam, Managing Director, Savor International Ltd.

WHAT WAS ON DISPLAY?

Sprawling across multiple segments, SAFECON 2025 housed five concurrent expos under one roof:

- BuildEx 2025: Focusing on construction materials, safety solutions, and digital construction tools.
- BPLX 2025: Highlighting power generation technologies and smart grid solutions.
- RenEx 2025: Dedicated to renewable energy, including solar panels, wind turbines, and energy-efficient designs.
- WaterEx 2025: A deep dive into water purification, wastewater management, and smart irrigation.
- IEMX 2025: Industrial Equipment & Machinery Expo featuring heavy-duty equipment, automation tech, and safety systems.

Each section offered a window into emerging trends—from eco-bricks and zero-VOC paints to AI-powered construction analytics and solar-integrated building facades.

A SHOWCASE OF GLOBAL AND LOCAL COLLABORATION

The exhibition saw participation from a wide range of local and international companies, with booths displaying cutting-edge innovations across the entire infrastructure and energy ecosystem. Multinational corporations rubbed shoulders with Bangladeshi startups, while NGO representatives and academia explored tech solutions for sustainable development.

Among the international displays, Chinese and European companies were particularly prominent, offering smart city technologies and sustainable power solutions tailored for emerging economies. Bangladeshi companies, meanwhile, showcased their growing capabilities in producing quality construction materials, energy equipment, and green alternatives.

One of the key takeaways from the exhibition was the synergy between global innovation and local implementation, something echoed by representatives from GIZ Bangladesh and CEAB who stressed the importance of knowledge transfer and joint ventures in their public remarks.

KNOWLEDGE SHARING AND NETWORKING

Beyond the exhibition floor, SAFECON 2025 offered a robust lineup of seminars, workshops, and panel discussions. Topics ranged from "Building Resilient Urban Infrastructure in the Face of Climate Change" to "Bangladesh's Readiness for Net-Zero Buildings." These sessions were well-attended by students, engineers, urban planners, and government officials, fostering dialogue and collaboration.

Live demonstrations were also a highlight, with several booths offering hands-on experiences. For example, a solar microgrid model attracted enthusiastic crowds, while an augmented reality (AR) showcase allowed users to visualize smart building systems in real-time.

A PLATFORM FOR GROWTH

SAFECON 2025 wasn't just about technology—it was about connections. The three-day event proved to be a valuable networking hub for business deals, public-private partnerships, and long-term collaborations. Startups found new mentors and investors; policymakers gained exposure to practical solutions; and visitors received a crash course in the future of Bangladeshi infrastructure.

For a country balancing rapid urbanization with sustainability goals, SAFECON emerged as a powerful reminder that safety and growth are not mutually exclusive. With the UN's Sustainable Development Goals (SDGs) on everyone's mind, the exhibition provided tangible paths forward—from circular economy models to green construction frameworks.

THE VERDICT

As the doors closed on May 31, SAFECON 2025 left behind more than product brochures and handshakes. It left behind a sense of purpose. In a world racing toward urban expansion, Bangladesh is now better poised to build smarter, safer, and more sustainably—thanks to platforms like SAFECON that bring visionaries together under one roof.

A Sustainability Revolution in Motion – Pioneering Carbon-Zero Solutions for the Cement & Concrete Industry

A Carbon-Zero Transformation – Advancing Sustainable Practices for a Clean Future in Cement & Concrete

Engage with leading pioneers in sustainable cement and concrete practices and connect with 200+ industry leaders to shape the future of carbon-zero solutions

Brought to you by:

APEX EVENTS

GreenCement &Concrete

As the cement and concrete industry confronts its massive carbon footprint—accounting for roughly 7% of global CO_2 emissions—Asia is emerging as a pivotal battleground for sustainable transformation. Green Cement & Concrete Innovation Asia 2025, hosted by APEX EVENTS, offers an unparalleled opportunity for professionals to explore advanced solutions and shape the future of low-carbon construction across the region.

Why this event matters

- Global urgency meets regional action. Cement decarbonization is not just a European or North American concern; with booming infrastructure and construction demands, Asian markets must lead the charge locally.
- Cross-border knowledge exchange. Bringing together global experts, industry leaders, technology pioneers, and policy designers, the event emphasizes shared solutions and scalable innovations AllEventsEco-Business.
- Strategic timing. With the European counterpart having taken place in February 2025, the Asian edition adapts key learnings to the regional context, opening new pathways tailored to Southeast Asia's unique challenges

Program highlights (Oct 28–29)

Though a detailed schedule is still being finalized, based on past editions, expect:

- Opening keynote on the regional cement CO_2 landscape, with insights on Vietnam's rapid manufacturing development and newly launched "green-labelled" cements, boasting 20–70% lower emissions than OPC
- Deep-dives into green cement technologies, such as:
  - Limestone-calcined clay blends
  - Use of biomass and waste-derived fuels
  - CCUS (Carbon Capture, Utilization & Storage) strategies
- Concrete innovation panels, focusing on advanced admixtures, ultra-high-performance concrete (UHPC), and circular economy guidelines for recycling and reuse
- Tech demos + exhibitions showcasing:
  - AI-powered process optimization
  - Low-carbon SCMs (e.g. fly-ash, slags)
  - On-site carbon measurement tools
- Case studies and success stories:
  - Vietnam companies like Fico Tay Ninh and SCG's progress in green cement production
- Policy & finance forums:
  - Incentivizing green cement uptake
  - Embodied carbon standards
  - Carbon border adjustments
  - Financing CCUS for industrial players
- Networking sessions, fostering deal-making between local manufacturers, technology providers, investors, and regulators.

Who should attend?

- Cement and concrete manufacturers (especially in Southeast Asia) adapting to green standards
- Tech companies bringing low-carbon solutions: CCUS, SCMs, digital optimization, alternative fuels
- Construction and infrastructure developers seeking sustainable materials
- Financial institutions evaluating ESG investments in industry decarbonization
- Regulators and policymakers planning for embodied-carbon frameworks and incentives
- Channel partners, NGOs, sustainability advisers, and research institutions

Why Ho Chi Minh City?

Vietnam stands at the heart of Asia's infrastructure expansion. Its cement sector is not only growing fast but also innovating significantly—Fico Tay Ninh Cement reports a 350–600 kg CO_2/t footprint, 70% lower than OPC, and SCG has introduced a 20%-less CO_2 option Global Cement. Hosting the event at Hotel Nikko Saigon places participants right at the center of this transformation—physically and strategically.

What differentiates this event?

Feature	Green Cement Asia 2025
Asia-centric focus	Tailored to regional growth, regulation & markets
Follow-up from Europe	Builds on pilot strategies and case studies
Holistic agenda	Combines R&D, finance, policy, and deployment
Exhibition floor	Live technology showcase & business match-making
Networking	From supply chain to policy-level stakeholders

What to do now

- **Register early:** Tickets available via Eventbrite tiered (early bird, standard, group rates).
- **Get involved as a sponsor or exhibitor:** Contact APEX at marketing@apexevents.cn or james.chen@apexevents.cn
- **Submit speaker proposals or case studies:** Present real-world results on decarbonization, CCMs, waste reuse, CCUS trials, or policy implementation.

Final take

As Asia accelerates toward a sustainable infrastructure future, Green Cement & Concrete Innovation Asia 2025 is your front-row seat to that transformation. It's more than a conference—it's a living marketplace where ideas meet capital, pilots become policy, and green cement becomes construction's global standard.

Join us in Ho Chi Minh City this October to connect, innovate, and lead the low-carbon concrete revolution.

SUPER STAR SOLAR

Empowering Tomorrow with Renewable Energy

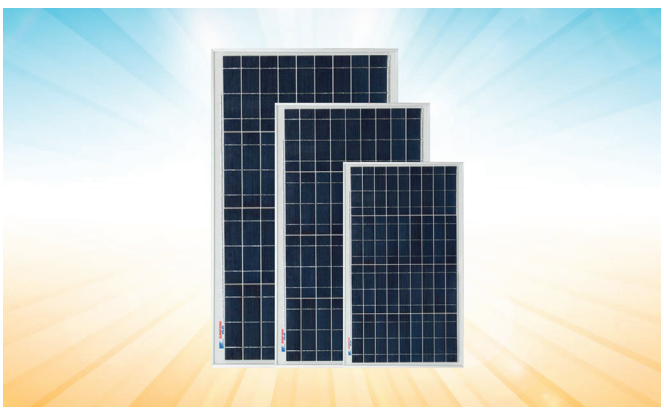
Super Star Renewable Energy Ltd. (a Strategic Business Unit of Super Star Group, Bangladesh) delivers innovative, eco-friendly solar energy solutions. With globally certified components, advanced R&D, and a reputation for customer satisfaction, Super Star Solar provides products that are energy-efficient, affordable, and ideal for sustainable living and development across rural and urban landscapes.

Solar Panels

Product Type: Monocrystalline & Polycrystalline Solar Modules
Capacity Range: 10Wp to 300Wp
Certifications: IEC, UL, TUV, CE, IDCOL-approved

Key Benefits:

- High conversion efficiency
- Durable in all weather conditions
- Suitable for residential, commercial & off-grid systems



Batteries

Product: Lead Acid Tubular Plate Industrial Batteries
Purpose: Specially designed for solar home systems

Features:

- High charging efficiency
- Low self-discharge
- Long service life
- High rate of discharge
- Reliable off-grid backup power

Solar Charge Controller

Function: Manages energy flow from panels to batteries and loads
Capacity: 12V/24V
Design: Intelligent, user-friendly & energy-efficient

Protection Features:

- Short circuit protection
- Reverse polarity protection

LED Lights

- LED Bulb Type
  - Power: 3W, 5W, 9W
  - Lumen Efficacy: 100 lm/Watt
  - Lifespan: 50,000 hours
  - Material: Aluminum Alloy / Plastic Cover
  - Voltage: 12V DC
  - Global LEAP Award Winner

- LED Tube Light Type
  - Power: 3W, 5W, 7W
  - Length: 1ft to 1.5ft
  - Voltage: 12V DC
  - Material: Aluminum Alloy / Plastic Cover
  - Global LEAP Award Winner

Solar Street Lighting System

Type: LED-based with dusk-to-dawn auto controller
Pole: Galvanized steel
Battery: High-efficiency solar grade
Autonomy: Up to 3 days without sunlight

Applications:

- Highways, bridges, roads
- Housing colonies, townships
- Watch towers, hotels, resorts, forest trails

Solar Fans

- DC Table Fan
  - Sizes: 12", 14", 16"
  - Power: 12V, 12–36W
  - Motor: Brushless/Brush
  - Material: PPA/Aluminum
  - Adjustable speed control
  - Wide-angle air distribution
  - Global LEAP Award Finalist
- AC/DC Ceiling Fan
  - Size: 56 inches
  - Input Voltage: 12V DC
  - Power: 12–36W
  - Suitable for solar & hybrid systems
  - Global LEAP Award Finalist
- AC/DC Super Speed Full Stand Fan
  - Rated Power: AC-18/19/30, DC-10/18/28W
  - Rated Voltage: AC-220V, DC-12V
  - Air Delivery: Up to 43 m^3/min
  - Speed: 1600±50 RPM
  - Blade: 3 pcs
  - Service Value: 1.33–1.5 m^3/min/W

Cables & Structure Accessories

- Solar Cable
  - Made from 99.99% pure copper
  - Available Sizes: 14/0076, 23/0076, 40/0076
  - Designed for solar home applications
- Battery Cable
  - Durable insulation for solar batteries
- Panel Structure
  - Material: Good-quality flat bar steel
  - Supports: 10Wp to 130Wp solar panels
  - Purpose: Stable mounting for rooftop or ground systems
- Solar Home System (SHS)
  - A complete packaged system for homes or small businesses.

Includes:

- Solar panel
- Battery
- LED lights (bulb & tube)
- Charge controller
- DC fan
- Cabling & structure kit

Applications:

- Household lighting
- Emergency lighting
- Fishing boat lighting
- Disaster-prone area lighting

Cost-effective, eco-friendly, and IDCOL-approved, SHS units bring clean energy to off-grid and semi-grid areas.

Why Choose Super Star Solar?

- Proven Track Record: Over two decades of excellence in electrical and solar products
- Recognized Excellence: Global LEAP Award–winning products
- Certified Quality: Products tested and approved by international standards (ISO, UL, TUV, CE, IDCOL)
- Dedicated Support: Strong after-sales service team and technical training programs
- Innovative Design: Energy-saving, intelligent technology integration
- Locally Engineered: Tailored for South Asian climates and energy demands

Contact Us

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Facebook: @SuperStarSolar

SINCOS GREEN TECH LTD.

Switch to Solar. Switch to Savings

At Sincos Green Tech, we believe in a future powered by clean energy. As a subsidiary of the renowned Sincos Group—with over 40 years of industrial experience—we're uniquely positioned to deliver high-quality, reliable, and intelligent solar energy solutions to businesses across Bangladesh.

We're not just a solar EPC provider. We're energy engineers, integration specialists, and sustainability partners. Our ISO 9001:2015 certification reflects our commitment to quality and performance, while our growing portfolio of solar projects proves our impact.

What We Offer

Solar Panels for Every Need
Whether you're planning a rooftop installation for a garment factory or a utility-scale solar farm, we supply a wide range of high-efficiency solar panels–monocrystalline, polycrystalline, and thin-film—to suit your requirements. Designed for the long haul, these modules ensure peak performance with minimal maintenance.

Inverters That Power Performance
A solar system is only as good as its inverter. That's why we offer industry-leading hybrid and grid-tie inverters from globally trusted names like Solis, Deye, Sungrow, and Siemens. With features like MPPT tracking, surge protection, and SREDA certification, our inverter solutions provide stable, optimized energy conversion for both on-grid and hybrid applications.

The Synchross Hybrid Controller
For businesses looking to integrate solar with diesel gensets, our proprietary Synchross Fuel Save Controller is a game changer. It dynamically balances power sources, ensuring maximum solar utilization while minimizing fuel consumption—critical for industrial clients running 24/7 operations.

Smart Energy Monitoring with Syncross EMS
We go beyond hardware. Our IoT-based SCADA system, Syncross EMS, gives you a real-time window into your energy performance. From voltage and current tracking to power factor insights and automated fault alerts, you'll have total visibility and control over your energy consumption.

Engineered to Last–Mounting Structures & Cabling

Every component we provide is built for durability. Our mounting frames are engineered for both rooftop and ground applications, while our flame-retardant, UV-resistant copper cables ensure safe, efficient power flow for years to come.

End-to-End Services

From concept to commissioning, Sincos Green Tech handles every aspect of your solar project. We offer:

- EPC (Engineering, Procurement & Construction): Complete project execution—from feasibility study and site analysis to installation, grid connection, and post-installation support.
- System Integration: We specialize in integrating solar energy into complex industrial setups, whether it's automation systems, gensets, or energy control platforms.
- Ongoing Support: Our dedicated service team provides maintenance, monitoring, and performance optimization to keep your system running at its best

Who We Work With

Our clients span a wide range of industries—from textiles and cold storage to corporate campuses and tobacco manufacturers. Some of our key installations include:

Client	Location	Capacity
British American Tobacco (BAT BD)	Savar, Dhaka	3.2 MWp
Fakir Apparels Ltd.	Narayanganj	1.1 MWp
Arrival Fashions Ltd.	Sylhet Region	643 kWp
Elite Garments Industries	Gazipur	296 kWp
OFMA Camp Ltd.	Chattogram	510 kWp
Younus Cold Storage Ltd.	Munshiganj	231 kWp

Each project is tailored, ensuring system design matches client goals—from reducing energy bills to enhancing ESG compliance.

Why Choose Sincos Green Tech?

project is tailored, ensuring system design matches client goals—from reducing energy bills to enhancing ESG compliance.

- **Decades of Experience:** Backed by the Sincos Group's 40+ years in industrial automation and energy systems
- **Global Tech, Local Execution:** Partnerships with top-tier brands ensure best-in-class products
- **Turnkey Delivery:** From engineering to execution, we take full ownership of project success
- **Smart Energy Management:** Advanced SCADA and IIoT solutions give our clients total energy insight and control
- **Reliable After-Sales Support:** A team you can count on, long after installation

Let's Build a Greener Future Together

With the right partner, going solar is simple. Sincos Green Tech delivers the reliability, expertise, and innovation you need to transition your business to a more sustainable and cost-effective energy model.

Contact & Inquiries

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DJDC ENERGY STORAGE SOLUTIONS

Powering the Future, Sustainably

In the age of rapid electrification and the global pivot to green energy, DJDC Energy Storage emerges as a critical player offering advanced, integrated solutions for energy storage across industries. Positioned at the crossroads of innovation, manufacturing excellence, and sustainability, DJDC is enabling a seamless transition toward renewable-powered futures.

Who We Are

DJDC Energy Storage, a flagship of the DJDC Group, is a high-tech manufacturer dedicated to delivering advanced energy storage solutions. With a global outlook and localized customization, the company serves clients in sectors ranging from telecommunications and renewable energy to home backup systems and commercial infrastructure.

Core Strength: Tailor-made solutions that combine lithium battery packs, battery cabinets, BMS (Battery Management Systems), and inverter technologies.

Product Ecosystem

DJDC's diverse and modular portfolio is structured to serve multiple application domains:

Home Energy Storage

Models: D-H3U, D-H5U, D-H8U, D-H10U
Features:

- Stackable, plug-and-play lithium battery modules
- Built-in smart BMS
- 5KWh to 10KWh capacity ranges
- Optional inverter pairing

Ideal For: Residential backup, solar integration, energy cost optimization.

Telecom Energy Storage

Models: D-T48100, D-T48150, D-T48200
Key Attributes:

- 48V systems with 100Ah–200Ah capacities
- Intelligent BMS with remote monitoring
- Enhanced cycle life and charge retention

Use Cases: Telecom tower backup, edge infrastructure support, off-grid mobile units.

Rack-Mounted Storage

Models: D-R2U, D-R3U, D-R4U, D-R5U

- Advantages:
  - Compact rack integration
  - 2U–5U modular design
  - Enhanced safety features with overcharge/discharge protection
  - RS485/CAN communication protocols
- Targeted For: Data centers, server rooms, industrial automation
-
- All-in-One Integrated Storage Systems
- Solutions: Containerized ESS
- Configuration:
  - Up to 215KWh systems in 40ft containers
  - Integrated lithium batteries, PCS (power conditioning systems), fire suppression, and thermal controls
- Utility: Commercial/industrial scale solar farms, grid support, peak shaving, emergency backup
-
- **Innovation & Quality Standards**
- DJDC products are built on a bedrock of research, precision engineering, and global safety standards. Every product undergoes rigorous testing, ensuring it meets or exceeds industry benchmarks such as:
- CE, UN38.3, MSDS, and ROHS certifications
- Up to 6000 life cycles for battery cells
- Intelligent BMS integration for real-time data monitoring and remote diagnostics

The commitment to excellence is visible in their focus on low internal resistance, fast charging, temperature tolerance, and intelligent protection circuits.

Sustainability & the Green Energy Vision

DJDC plays a vital role in the global green energy movement. By promoting clean backup power and solar-integrated systems, DJDC solutions reduce carbon footprints, optimize energy efficiency, and reduce reliance on fossil-fuel-driven generators.

Their containerized energy storage systems contribute to scalable clean energy infrastructure — a core requirement for decarbonizing industries and supporting smart cities.

Smart Integration Capabilities

In a smart grid-ready future, DJDC products support:

- RS485, CAN, and Ethernet communication
- Compatibility with leading solar inverter brands
- Customizable IoT & remote monitoring platforms
- Integration with microgrids, EV charging hubs, and hybrid solar system

Global Reach, Local Understanding

DJDC caters to both developed and emerging markets. With a focus on:

- OEM/ODM flexibility
- Fast shipping logistics
- After-sales service & global technical support
- Multilingual interface designs

They position themselves as partners, not just suppliers, adapting solutions to local climate, grid infrastructure, and customer needs.

Looking Ahead: Scaling Energy Confidence

With increasing demand for energy independence and off-grid capabilities, DJDC's growth roadmap includes:

- Expansion of AI-driven BMS
- Smart microgrid deployment solutions
- Enhanced focus on modular container systems for disaster zones
- Building strategic partnerships with governments and renewable energy players

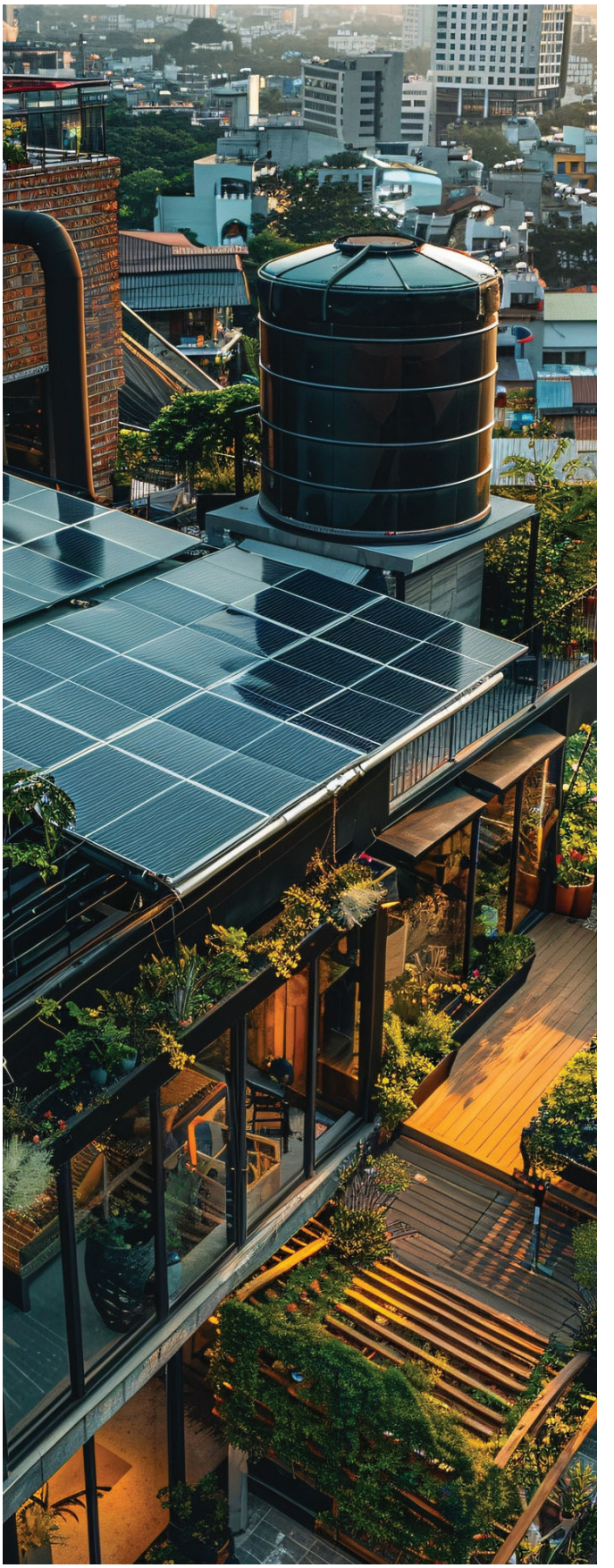
Final Word

Whether powering a village, a telecom tower, or a high-rise apartment complex, DJDC Energy Storage is reshaping how energy is stored, shared, and sustained. Its commitment to safety, reliability, and innovation cements its position as a top-tier solution provider in the global energy storage ecosystem.

Contact & Inquiries

For partnerships, technical consultation, or distribution opportunities:

Email: sales@djdc.com
Website: www.djdc.com
Head Office: [Location based on regional hub – not specified in the catalog]
Logistics & Warehousing: Located near key Asian shipping routes for efficiency



WOMEN LEADING SUSTAINABLE INFRASTRUCTURE IN THE GLOBAL SOUTH

Leadership & Impact

Ogunbiyi has led the global charge to electrify underserved communities—especially in sub-Saharan Africa—under the UN's "Mission 300" initiative, which aims to provide electricity for 300 million people by 2030. Previously, as managing director of Nigeria's Rural Electrification Agency, she spearheaded a $550 million World Bank–backed program that delivered electricity access to over 5 million Nigerians.

Why It Matters

Her work marries sustainable infrastructure development with social equity—extending green energy to the Global South and empowering women and marginalized communities through energy access, essential for education, healthcare, and livelihood.

Leadership & Impact

Sinha has played a pivotal role in India's renewable energy expansion, co-founding ReNew—one of the largest renewable power producers in the country. She also leads the ReNew Foundation, which connects sustainable infrastructure deployment with gender-inclusive CSR initiatives (e.g. workforce development ensuring 30% women employees by 2030).

Why It Matters

Her work advances integrated infrastructure strategy—where energy projects serve communities while promoting women's professional empowerment, especially in technical and operational roles.

Leadership & Impact

As a seasoned civil engineer and infrastructure advisor, Carluccio guides governments, city planners, and financiers across Africa, Asia, and Latin America in designing inclusive and resilient infrastructure systems. She champions standards that embed both sustainability and equitable access into public infrastructure projects.

Why It Matters

Savina's influence lies in shaping institutional and technical frameworks—advising on how to ensure infrastructure is climate-smart, inclusive, and designed with women's mobility and safety in mind.

Leadership & Impact

Muhamad led Colombia's environmental and infrastructure policy to prioritize nature-based solutions, social inclusion, and climate adaptation. As chair of C40 Cities' Latin America Climate Action Planning, she advanced urban resilience initiatives in major cities including Bogotá and Cali

Why It Matters

Under her leadership, infrastructure planning integrated conservation efforts, resilient public works, and protection of Amazon ecosystems—while promoting women's participation in environmental and infrastructure decision-making.

WHY THESE WOMEN MATTER

Community-Centered Planning

These leaders align infrastructure with local needs—prioritizin energy access, mobility, and climate resilience while ensurin women are both users and decision-makers.

Gender-Inclusive Workforce

Whether through direct hiring targets, skills development, o workforce engagement, they focus on including women i technical, managerial, and operational roles.

Sustainable, Resilient Infrastructure

By championing renewable energy, nature-based solutions and climate-adaptive planning, they position infrastructur as a tool for sustainable development and equity.

Global and Local Impact

Operating at different scales—from national ministries t global coalitions—they collectively influence policies standards, and large-scale projects rooted in bot sustainability and inclusivity.

Inspiring the Next Generation

Their visibility and leadership paths serve as powerful models for future women engineers, planners, and policymakers across the Global South and beyond.

LOOKING AHEAD: BUILDING FOR BOTH CLIMATE AND EQUITY

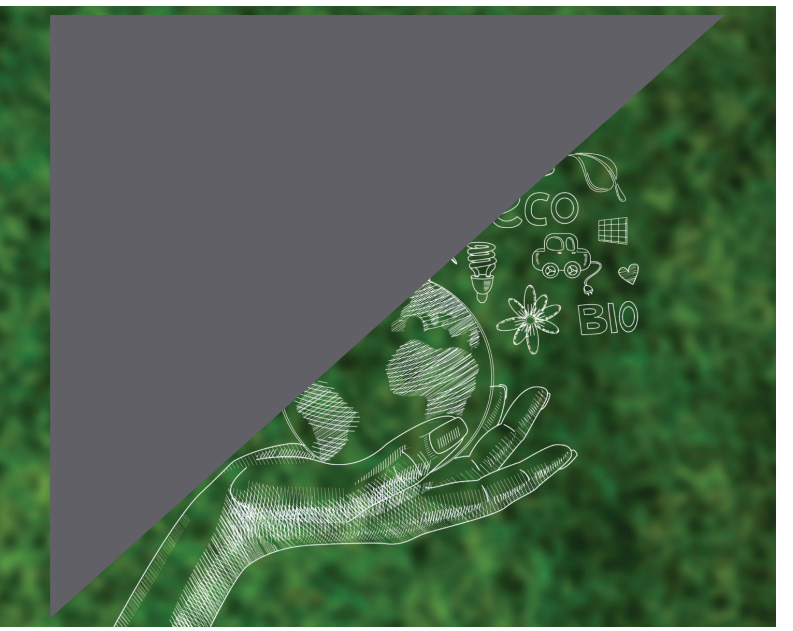
As countries in Africa, Asia, and Latin America scale up infrastructure for climate adaptation, energy access, and resilience, these four women demonstrate that:

- Infrastructure must be designed for communities, especially women and vulnerable populations.
- Equity and sustainability are not optional, but foundational to long-term infrastructure success.
- Investments in training, workforce inclusion, and leadership pathways are as critical as physical assets.

Their work provides a concrete pathway: infrastructure built not just to last—but to lift lives, forge inclusion, and safeguard communities against climate disruption.

Sources

- Damilola Ogunbiyi profile and UN role TIMEIISDGlobal Girls Development Foundation
- Vaishali Nigam Sinha leadership and CSR focus
- Savina Carluccio's work at ICSI and global infrastructure standards
- Susana Muhamad's policy impact in Colombia and C40 leadership
- Gender-inclusive infrastructure insights from GI Hub, World Bank, and SDG frameworks



Where shadows whisper and walls remember what the world forgot

Across the globe, there are structures that seem to have absorbed the pain, horror, or mystery of what once occurred within their walls. From abandoned hospitals to decaying mansions and war-ravaged fortresses, these haunted places have become magnets for ghost hunters, thrill-seekers, and curious skeptics. Whether cursed by tragedy or simply steeped in a dark history, these eerie buildings are steeped in tales that refuse to die.

Here are ten of the most haunted structures in the world—each with a reputation that chills the spine.

POVEGLIA ISLAND – VENICE, ITALY

Type: Abandoned Island Hospital
Built: 1700s
Haunting: Ghosts of plague victims and the insane

Poveglia is often called one of the most haunted locations in the world. Used as a quarantine station during plague outbreaks and later as an insane asylum, the island is believed to be littered with mass graves. Locals claim to hear screams, see strange shadows, and feel an oppressive energy. Even the Italian government has restricted public access.

THE STANLEY HOTEL – ESTES PARK, COLORADO, USA

Type: Hotel
Built: 1909
Haunting: Ghostly children, piano music, and phantom figures
This grand hotel inspired Stephen King's The Shining after he stayed there in Room 217. Guests report ghostly apparitions, laughter in empty corridors, and the sounds of parties long ended. Paranormal tours are now part of the hotel's regular offerings.

EASTERN STATE PENITENTIARY – PHILADELPHIA, USA

Type: Abandoned Prison
Built: 1829
Haunting: Tormented prisoners and shadow figures

Once one of the most notorious prisons in the U.S., this Gothic fortress housed murderers and mobsters like Al Capone. Known for its cruel solitary confinement practices, the prison is now a museum where visitors report hearing whispering, footsteps, and eerie laughter in the empty cellblocks.

AOKIGAHARA FOREST BASE CAVES – MOUNT FUJI, JAPAN

Type: Lava Tube Cave Structures
Built: Natural geological formations, with WWII bunkers
Haunting: Spirits of the dead, including suicides and lost soldiers

While the Suicide Forest itself is infamous, the lava caves and abandoned bunkers at its edge are even more unsettling. Some believe the area is cursed, home to yūrei (Japanese spirits of the dead). Paranormal investigators have recorded electronic voice phenomena and magnetic disturbances in these caves.

CHÂTEAU DE BRISSAC – LOIRE VALLEY, FRANCE

Type: Castle
Built: 11th century
Haunting: The "Green Lady," a murdered noblewoman

Known as the tallest château in France, this Renaissance castle is haunted by Charlotte de Brézé, a noblewoman who was murdered by her husband after an affair. Guests often report seeing her ghost, dressed in green, wandering the halls and moaning through the night.

HASHIMA ISLAND (BATTLESHIP ISLAND) – NAGASAKI, JAPAN

Type: Abandoned Coal Mining Town
Built: 1887
Haunting: Spirits of forced laborers

Once one of the most densely populated places on Earth, Hashima Island is a decaying fortress in the sea. Japanese and Korean workers, including POWs, were reportedly abused and even worked to death here. Now abandoned, it's visited only by stormy waves, rust, and ghost stories.

THE MYRTLES PLANTATION – ST. FRANCISVILLE, LOUISIANA, USA

Type: Plantation Mansion
Built: 1796
Haunting: The ghost of Chloe and multiple restless spirits

Touted as "one of America's most haunted homes," the Myrtles Plantation is said to be built atop an Indian burial ground and the site of at least 10 murders. The most famous ghost is Chloe, a former slave said to have poisoned the owner's family and now appears in photographs and mirrors.

HUMBERSTONE AND LANORIA – ATACAMA DESERT, CHILE

Type: Abandoned Nitrate Mining Towns
Built: Late 1800s
Haunting: Apparitions in graveyards and collapsing houses

These desolate ghost towns in the world's driest desert are said to be home to more than just desert winds. Stories tell of abandoned cemeteries where the dead are not at rest—locals claim to hear voices, witness figures roaming through collapsing homes, and feel watched by unseen eyes.

EDINBURGH VAULTS – EDINBURGH, SCOTLAND

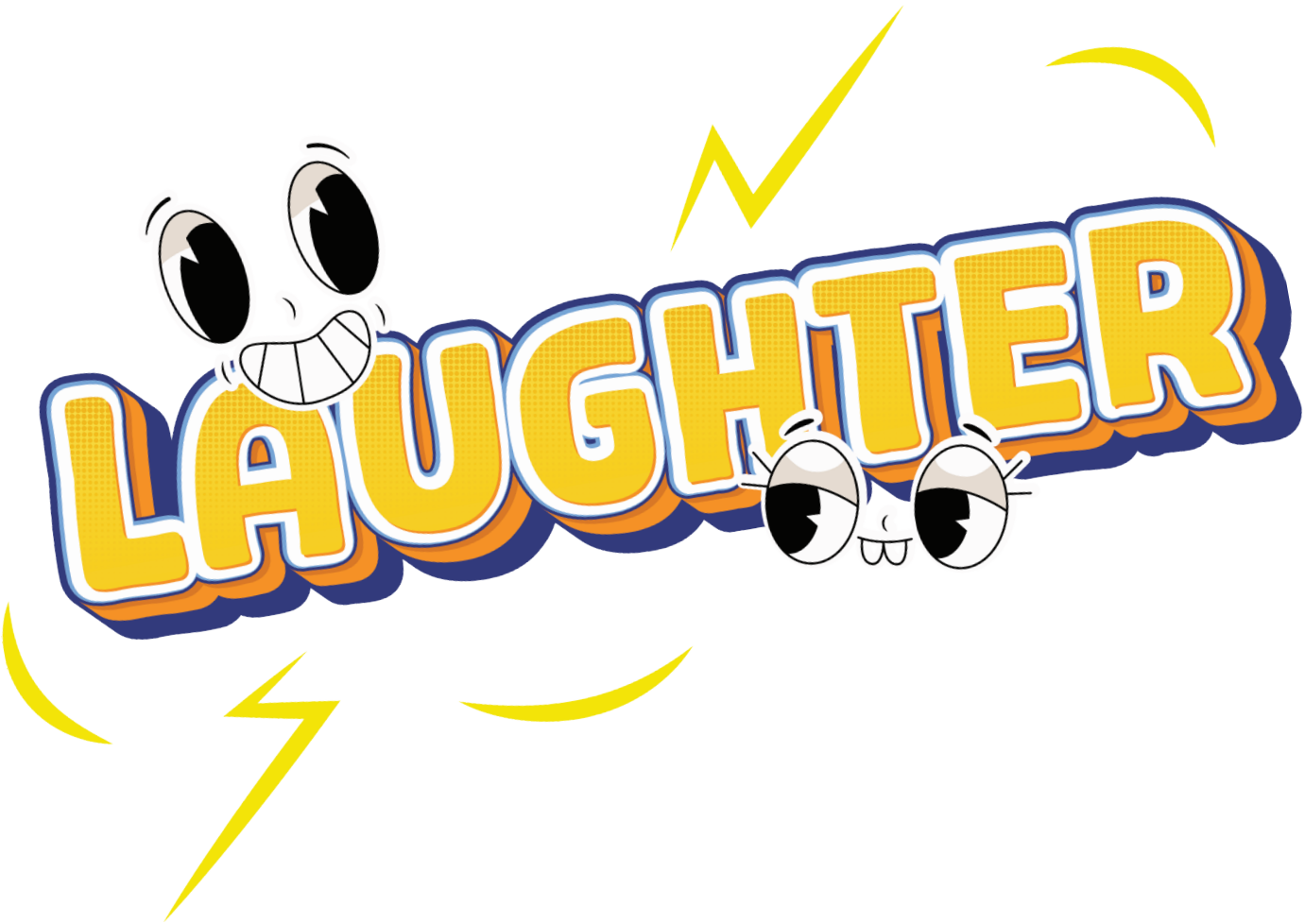
Type: Underground Vaults and Storage Rooms
Built: Late 1700s
Haunting: Ghosts of criminals, plague victims, and the impoverished

Beneath Edinburgh's South Bridge lies a labyrinth of stone vaults, once used for storage, illegal taverns, and even as slums. Tour guides and visitors frequently report poltergeist activity, cold spots, and sudden disorientation. "Mr. Boots," a violent spirit, is said to stalk the tunnels.

BEELITZ-HEILSTÄTTEN HOSPITAL – BRANDENBURG, GERMANY

Type: Abandoned Hospital Complex
Built: 1898
Haunting: Ghostly doctors, screaming patients, shadowy figures

Once a military hospital where a young Adolf Hitler recovered during WWI, this vast complex later became a Soviet sanatorium. Left to decay after the Cold War, its blood-stained surgical theaters and long, echoing corridors are now famous among ghost hunters and urban explorers for their terrifying energy.



Why did the construction worker bring a ladder to the bar?

Because he heard the drinks were in the house!

Why don’t construction workers ever tell secrets on the job?

Because the walls have ears—and they're not soundproof yet!

What’s a builder’s favorite type of music?

Heavy metal

Why did the cement mixer break up with the jackhammer?

It felt like they were just going in circles and breaking things apart.

What did the construction foreman say to his lazy apprentice?

You’re really building a reputation... for doing nothing!

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A SHOWCASE OF SAFE & SUSTAINABLE INFRASTRUCTURE

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Date: 16 17 18 April, 2026, ICCB, Kuril, Dhaka, Bangladesh

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