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ENGINEERING REVIEW

1975 - 2025

August 16-31, 2026

Vol. 51 No. 15

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Pakistan Seeks Local Firms' Entry into \$1.8bn Karakoram Highway Project

By Manzoor Shaikh

Pakistan is preparing to ask China to open the bidding for the proposed \$1.8 billion replacement of the Karakoram Highway to leading Pakistani construction companies, in a move that could substantially reduce the cost of the project and give local engineering firms a larger role in one of the country's most important CPEC infrastructure schemes.

The proposal comes as Islamabad faces a deadline. The existing Karakoram Highway is expected to be submerged in sections by May 2028 because of the Diamer-Bhasha

Dam, making the construction of an alternative route increasingly urgent.

The government is expected to raise the issue with China at a Joint Technical Working Group meeting



tentatively scheduled for the end of August in Beijing. Planning Minister Ahsan Iqbal has directed officials to explore all options, including revising the existing govern-

ment-to-government arrangement, according to Pakistani authorities.

Under the present framework, competition for the project has been limited to three Chinese companies.

Pakistan now wants leading domestic contractors to be allowed to compete alongside them.

The proposed road is estimated to cost around Rs502 billion, or

\$1.8 billion, while its first phase, covering about 102 kilometers, has been estimated at Rs320 billion, or around \$1.1 billion.

The more striking figure, however, is the possible saving through localization.

Planning Ministry officials have estimated that if the first phase is designed according to applicable Pakistani standards, executed by local contractors and calculated using National Highway Authority (NHA) rates, its cost could fall by about 35 per cent to Rs208 billion.

That represents a potential saving of roughly Rs112 billion on the first phase alone.

The saving is significant, but it also raises an important question: if Pakistani companies can deliver the

Contd on page 2

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Page 9-28

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IEEE Workshop on Next-Generation Backhaul Networks for Industrial Applications, Hosted by NED University

The Department of Telecommunications Engineering at NED University of Engineering & Technology (NEDUET), in joint collaboration with Mehran University of Engineering and Technology (MUET), the

event took place at NEDUET.

The workshop brought together leading national and international researchers, academics, and industry experts to address key challenges and opportunities surrounding the adoption of 5G and 6G technologies for industrial application, collaborative R&D projects, innovation frameworks, and skills

delivered by Prof. Syed Sajjad Haider Zaidi of Pakistan Navy Engineering College, National University of Sciences and Technology (NUST). His session, titled "Industrial Digital Transformation through 5G/6G Networks: Research Challenges, Innovation Opportunities, and Future Directions," highlighted strategic pathways for integrating next-generation wireless architectures into

Sameer Hashmat Qazi from Iqra University. The panelists exchanged insights on scaling robust, low-latency, and high-reliability backhaul networks, emphasizing international research synergies between institutions in the UK and Pakistan.

The Chief Guest Prof. Noman Ahmed, Pro Vice Chancellor, NEDUET appreciated the efforts and emphasized the importance of effective



IEEE Communications Society (ComSoc), successfully organized a high-level technical workshop titled "Workshop on Next-Generation Backhaul Networks for Industrial Applications." Sponsored by the IEEE ComSoc Technical Working Group (TWG) on Backhaul for Next Generation Networking and Communications, the

development aimed at driving industrial digital transformation.

Prof. Muhammad Imran Aslam, Chairman Telecommunications Engineering Department at NEDUET, delivered the welcome address, setting an encouraging tone for the day's deliberations. Dr. Umair Ahmed Korai, Chair of the IEEE ComSoc Karachi Chapter provided an overview of IEEE Communications Society activities and initiatives promoting advanced research.

The keynote address was

industrial ecosystems.

Following the keynote, an engaging panel discussion was held on the theme "Digital Connectivity for Industrial Applications" moderated by Prof. Dr. Muhammad Zeehan Shakir from the University of the West of Scotland, the panel featured an esteemed group of international and local experts, including: Dr. Syed Ali Raza Zaidi and Dr. Maryam Hafeez University of Leeds, Prof. Saad Ahmed Qazi and Prof. Irfan Ahmed from NEDUET, Prof. Faisal Karim Shaikh from MUET, and Dr.

collaboration to overcome the challenges associated with Digital connectivity. Dr. Sundus Ali of NEDUET offered the formal Vote of Thanks, acknowledging the contributions of the organizing team—including Dr. Umair Ahmed Korai, Dr. Syed Talib Abbas Jafri, and IEEE Karachi section leadership Mohammad Shahid Shaikh and Parkash Lohana whose efforts ensured the success of the workshop. The program concluded with souvenir distribution, a group photo session, and a networking lunch.

Pakistan Seeks Local Firms' Entry into \$1.8bn Karakoram Highway Project

Contd from page 1

project at a substantially lower estimated cost, why have they not been part of the competitive process from the outset?

The answer lies partly in the financing and procurement structure of CPEC projects. Pakistan and China agreed in May 2025 on an implementation framework under which 85 per cent of the project financing would come from China, with the remainder to be provided locally. China subsequently shared financing terms for the first phase, but the two sides have yet to finalise a financing agreement.

Pakistan has reportedly been seeking a concessional loan, while China has indicated that commercial financing may be considered. The disagreement over financing has contributed to delays, with Pakistani authorities sending several requests over the past year for the arrangement to be finalised.

The government has now indicated that it may consider financing the project from its own resources if another delay occurs.

This is where the issue of local participation becomes particularly important.

Pakistan Engineering Council's own regulatory framework does not prohibit foreign companies from working on major engineering projects. In fact, the Construction and Operation of Engineering Works By-laws, as amended, require foreign constructors to enter into a joint venture with a Pakistani constructor registered with PEC in an appropriate category; a foreign firm cannot participate in bidding individually. The Pakistani partner's share in such a joint venture cannot be less than 30 per cent.

PEC's standard bidding documents also specifically state that a foreign constructor must form a joint venture with a Pakistani constructor registered with the Council.

The framework goes further in requiring foreign constructors to employ at least 70 per cent Pakistani engineers and relevant technical staff.

In other words, the principle of local participation is already recognised in Pakistan's engineering regulatory system. The issue in the Karakoram Highway project is whether the

CPEC-specific government-to-government arrangement can be amended to incorporate meaningful competition and participation by Pakistani firms.

Such participation could have implications beyond the immediate cost saving. Local companies could gain experience in large-scale mountain road construction, project management and specialised engineering, while Pakistani engineers could gain exposure to international construction practices and technologies.

But the biggest question now is time.

With May 2028 approaching, Pakistan cannot afford another prolonged procurement and financing dispute. If a new bidding process involving Pakistani firms requires substantial renegotiation with China, fresh approvals and another tendering cycle, the process itself could consume valuable time.

The government therefore faces a delicate choice: secure Chinese financing quickly under the existing framework, or reopen the structure to achieve potentially much lower costs and greater local participation.

Officials say they hope the financing agreement will be finalized during the upcoming technical meeting. But Ahsan Iqbal has also indicated that Pakistan may begin the project through its own resources if delays continue.

The Karakoram Highway is not simply another road project. It is a strategic link between Pakistan and China and an essential component of the country's northern connectivity. The replacement route must therefore be completed before the existing alignment becomes unusable.

The challenge for Islamabad is to achieve three objectives simultaneously: secure financing, bring down the cost and ensure timely completion.

If Pakistani contractors are brought into the process without creating another procurement delay, the project could become an important test of whether CPEC can move towards greater localization.

If, however, the debate over financing and bidding continues for another year, the potential saving of Rs112 billion may become less important than the much larger cost of missing the 2028 deadline. ■

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Pakistan's Mining Ambitions Gather Pace, But Questions Remain: Who Will Control the Mineral Wealth?

Pakistan's mining sector is beginning to move from a conversation about underground wealth to one about technology, investment and value addition.

nies provide new solutions and government provides policy direction. The challenge, he suggested, is to connect these capabilities rather than allowing them to work in isolation.

That message is particularly relevant for Pakistan because the country does

value Pakistan can capture.

Modern mines increasingly depend on automated machinery, remote monitoring, geological modelling, artificial intelligence, predictive maintenance, drones, sensors and digital twins. At the Karachi conference, SECMC officials pointed to

greater national role in developing Pakistan's mineral sector.

Sindh, understandably, will want a say in resources located within its territory, while the federal government will argue that minerals are a national economic opportunity requiring

scale mining and energy ecosystem. The next challenge is to determine whether the same model can be extended to other minerals — and whether Pakistan can develop processing industries around them rather than repeating the old pattern of exporting raw

communities and environmental institutions.

Pakistan may have the minerals. It now needs the institutions, technology, engineering capacity and political agreement to turn them into sustainable wealth.

And perhaps the most



But as the country looks towards minerals as a possible new source of exports and industrial growth, a more fundamental question remains unresolved: who will control and benefit from these resources — the provinces where they are located, or Islamabad?

The question gained renewed importance at the Mining Technical Conference 2026, held in Karachi on August 6 and organised by Sindh Engro Coal Mining Company (SECMC) under the theme "Driving Pakistan's Mining Sector through Collaboration, Innovation & Technology." The conference brought together government, mining companies, technology providers and academia, with Sindh Chief Minister Syed Murad Ali Shah describing it as a landmark gathering of the three pillars that will shape the future of mining: industry, academia and technology.

The conference was not simply about finding more minerals. Much of the discussion centred on how Pakistan can modernise the way it mines them.

Experts called for digital transformation of the mining industry, arguing that the sector still lags behind other industries in digital maturity. DMT Germany's Senior Project Manager Florian Beier pointed to the gap between digital strategy and actual execution, while industry representatives discussed artificial intelligence, machine learning, automation and data-driven maintenance.

SECMC, which organised the conference, highlighted the importance of bringing different parts of the mining ecosystem together. Its CEO Amir Iqbal said mining companies understand operational realities, universities bring research, technology compa-

not lack mineral resources. The Geological Survey of Pakistan lists large deposits of limestone, sandstone, dolomite, rock salt, gypsum, anhydrite, marble, industrial clays, barite, magnesite, talc, silica sand and fluorite, among others. Thar alone has enormous lignite resources, while Pakistan also has major copper and gold deposits and other metallic and industrial minerals.

Sindh itself has a particularly diverse mineral base. According to the Sindh government's Enterprise Development Fund, the province has resources including coal, limestone, marble, salt, clay, gravel and fuller's earth, with Tharparkar, Jamshoro and Thatta among the areas associated with coal and other mineral production.

The real economic opportunity, however, is not simply to dig these resources out and sell them.

A tonne of raw mineral has limited economic value compared with what can be produced from it through beneficiation, processing and manufacturing. Limestone can support cement and other industrial products; silica can feed glass and other industries; gypsum can support construction materials; salt can move into chemical and food processing; and metallic minerals such as copper and gold can support much larger industrial value chains.

Pakistan's national mining strategy is increasingly talking about precisely this shift — from extraction towards value-added mineral products. The US Department of Commerce notes that Pakistan is seeking to develop processing and refining capacity and reduce dependence on exporting raw materials.

Technology will determine how much of that

simulator-based training for excavator and haul-truck operators, while technology companies discussed automation, sustainability and interoperability.

For Pakistan, this could also create a new field for engineering universities and local technology companies. Mining engineers will increasingly need to work alongside electrical, mechanical, civil, geological, environmental and software engineers.

But beneath the technology debate lies the more politically sensitive issue of ownership and control.

Sindh has its own Mines and Mineral Development Department, which administers mining concessions and maintains a system for valid, expired and cancelled concessions. The provincial government also has its own Sindh Mines and Minerals Governance Act 2021 and Governance Rules 2023.

The Constitution, meanwhile, draws an important distinction. Article 172(1) provides that ownerless property located in a province vests in that provincial government. Article 172(2) deals with minerals and other resources beneath the continental shelf beyond territorial waters, which vest in the Federation. Oil and natural gas have a separate constitutional arrangement under Article 172(3), giving the province and Federation joint and equal ownership.

This means that the constitutional ownership question is not identical for every mineral or every project. Coal, limestone, granite, salt and other provincial mineral resources cannot simply be treated in the same constitutional category as petroleum and natural gas.

That distinction will become increasingly important as Islamabad seeks a

national investment, foreign partnerships, infrastructure and export strategy.

The mining conference therefore arrives at an important moment.

Thar has already demonstrated that a resource can be converted into a large-

resources.

The conference's emphasis on collaboration, innovation and technology is therefore timely. But collaboration will have to extend beyond industry and academia to include the Federation and provinces, local

important question is no longer simply how much mineral wealth Pakistan has underground.

It is who will own it, who will develop it, who will process it — and who will ultimately benefit from it. - ER Research Desk

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Amazon Plans Massive Gas Power Plant to Supply New Texas Data Centers

Amazon has confirmed plans to finance a massive private natural gas power plant in Texas to supply electricity to new data centers, as technology companies increasingly turn to dedicated power sources to meet the rapidly growing energy

permits filed by Amazon. The facility could be permitted to emit more than 30 million metric tons of greenhouse gases annually, although actual emissions would depend on how frequently the plant operates.

Amazon said producing electricity on-site would allow it to cover the full cost of powering its operations without passing infrastructure costs on to Texas households. The company said the data-

develop "behind-the-meter" power systems for data centers, allowing them to generate electricity independently of traditional grid infrastructure. Cleanview estimates that around 97 gigawatts of such projects are planned by major technology companies, including Meta, Microsoft and Oracle.

Energy analysts have warned that the expansion of gas-powered data centres could have significant envi-



demands of artificial intelligence.

The plant, known as GW Ranch, is being developed by Pacifico Energy in Pecos County. Previously filed permits indicate that the facility would have 35 gas turbines with a combined generating capacity of 7.65 gigawatts, making it larger than any gas-fired power plant currently operating in the United States.

The project was first reported by market intelligence firm Cleanview, which linked the power plant to three data-center construction

centre campus is designed to eventually connect to the wider electricity grid as inter-connection capacity becomes available.

The company also said it is exploring the use of solar power and battery storage at the site and plans to use non-potable, brackish groundwater to reduce pressure on local water resources. Amazon reiterated its commitment to achieving net-zero carbon emissions by 2040 under the Climate Pledge.

The project reflects a broader trend among major technology companies to

ronmental consequences. Natural gas produces fewer emissions than coal but still releases carbon dioxide, while gas production and use can also contribute to methane emissions. Gas plants can additionally release pollutants such as nitrogen oxides and fine particulate matter, which can affect air quality and public health.

The development highlights the growing challenge of meeting the enormous electricity requirements of AI while limiting the environmental impact of the technology boom.-ERMD

Govt vows to boost energy security, attract investment in petroleum sector

Federal Minister for Petroleum Ali Pervaiz Malik has said the government is taking steps to strengthen energy security, attract investment and improve transparency in Pakistan's petroleum

underscoring the need to accelerate indigenous oil and gas exploration.

He said the prime minister and field marshal had tasked a leading international company with preparing a comprehensive roadmap for the energy sector. The plan would be presented to the national leadership in the coming months, he added.

avenues for foreign investment. LPG tenders would open on Monday, while arrangements had also been made to issue new gas connections to consumers.

The minister said the Iran-US conflict had created major challenges for global energy markets and pushed crude oil and petroleum product prices higher. Despite the pressures, he



sector.

Addressing a press conference he said the country's next major priority after recent strategic and diplomatic successes was sustainable economic growth.

The minister highlighted Pakistan's heavy dependence on imported energy, saying around 90 per cent of the country's energy needs were met through imports. Domestic oil production stood at nearly 70,000 barrels per day against demand of around 500,000 barrels,

Ali Pervaiz Malik said the federal cabinet had approved the refinery policy and that the government was working to resolve long-standing financial issues in the petroleum sector. He claimed the flow of circular debt had been halted and efforts were underway to clear outstanding liabilities inherited from previous administrations.

He also announced that Turkey's Turkish Petroleum would soon begin offshore drilling operations in Pakistan's territorial waters, potentially opening new

said the government ensured uninterrupted fuel supplies and worked to protect consumers from the full impact of rising international prices.

He added that Prime Minister Shehbaz Sharif had introduced a transparent petroleum pricing mechanism, with pricing calculations available on the Oil and Gas Regulatory Authority (OGRA) website. The minister said recent economic decisions had helped stabilize the economy and shifted the focus from default concerns towards economic growth. — ER News Desk

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Thinking AI: How Artificial Intelligence Emulates Human Understanding By John McCormick

A Review by Aqeela Junejo

Artificial intelligence (AI) has become one of the most influential technologies of the 21st century. It powers search engines, voice assistants, recommendation systems, self-driving cars, and even chatbots capable of holding human-like conversations.

While many people use AI every day, few truly understand how it works. In his book 'Thinking AI: How Artificial Intelligence Emulates Human Understanding', John McCormick bridges this gap by presenting AI in a way that is both accessible and intellectually engaging. Rather than focusing on programming alone, the book explores the science, philosophy, and future of artificial intelligence, helping readers understand not only what AI can do but also what it means for humanity.

One of the book's greatest strengths is its clear and engaging writing style. McCormick avoids overwhelming readers with complicated mathematics or technical jargon. Instead, he explains difficult concepts using relatable examples and real-world applications. This makes the book suitable for students, teachers, professionals, and anyone with a curiosity about AI. Readers do not need a background in computer science to appreciate the ideas discussed in the book.

The book begins by introducing the history of artificial intelligence and the famous question asked by Alan Turing: Can machines think? From there, McCormick guides readers through the evolution of AI, explaining how computers have progressed from performing simple calculations to recognizing speech, translating languages, creating artwork, and even defeating world

champions in complex games such as Go. These examples demonstrate how rapidly AI has advanced over the past few decades.

A major highlight of the book is its explanation of modern AI techniques, including machine learning, deep learning, and neural networks. McCormick describes how computers learn from large amounts of data instead of relying solely on explicit instructions from programmers. He discusses groundbreaking systems such as AlphaGo, ChatGPT, and image-recognition models to show how AI is transforming industries around the world. Despite discussing

reflect on what thinking really means. These discussions add depth to the book and make it more than just a technical guide.

The author also addresses the ethical and social implications of AI. He discusses issues such as bias in algorithms, privacy, automation, employment, and the responsibilities of those who develop intelligent systems. Rather than presenting AI as purely beneficial or harmful, McCormick offers a balanced perspective, acknowledging both its remarkable potential and its challenges. This balanced approach encourages readers

Although the book is highly informative, some sections require careful reading because they explore abstract philosophical concepts. Readers expecting a quick introduction may need to slow down during these chapters. However, the effort is worthwhile because these discussions provide a richer understanding of artificial intelligence and its broader significance.

In conclusion, *Thinking AI: How Artificial Intelligence Emulates Human Understanding* is an outstanding introduction to one of the most important technologies of our time. John McCormick successfully combines science, history, philosophy, and ethics into a single engaging volume. The book explains complex ideas in simple language while encouraging readers to think critically about the future of AI. Whether you are a student, an educator, or simply someone fascinated by technology, this book offers valuable knowledge and fresh perspectives. It is an excellent choice for anyone who wants to understand not only how artificial intelligence works but also how it may shape the future of humanity.

The reviewer is a student of Class VIII at Government Girls Higher Secondary School, Dhamrah, District Larkana.

Note by Dr. Faizullah Abbasi T.I. (The School Mentor)

Aqeela is one of the gems of our school. A student of Class VIII, she is the youngest member of the "Magnificent Seven", a team of curious innovators at our school. These gems are receiving training from a New York-based company to develop AI agents and start the first global startup from Dhamrah.

These gems are now planning to organize a webinar from Dhamrah titled "AI Revolution Begins in Our School in Dhamrah." Aqeela is expected to present her review at the webinar, which will be held by the end of August. ■

GOVERNMENT GIRLS HIGHER SECONDARY SCHOOL DHAMRAH

THINKING AI: HOW ARTIFICIAL INTELLIGENCE EMULATES HUMAN UNDERSTANDING BY JOHN MCCORMICK

A REVIEW BY AQEELA JUNEJO OF CLASS VIII

advanced topics, the author maintains a balance between simplicity and depth, making challenging ideas understandable without oversimplifying them.

Another fascinating aspect of the book is its exploration of philosophical questions surrounding artificial intelligence. McCormick encourages readers to think beyond technology and consider whether machines can truly understand, reason, or become conscious. He examines the differences between human intelligence and machine intelligence, inviting readers to

to think critically about the future of AI and its impact on society.

One of the most impressive features of *Thinking AI* is its ability to inspire curiosity. Every chapter encourages readers to ask questions, challenge assumptions, and explore new ideas. Instead of simply memorizing facts, readers are invited to think deeply about intelligence, learning, and the relationship between humans and machines. This makes the book particularly valuable for students who want to develop analytical and critical-thinking skills.

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Strategic Planning Models for Sustainable Engineering Projects

Engr. Dr. Muhammad Nawaz Iqbal

While environmental, technological, social and economic considerations are traditionally treated as separate sets of evaluation categories, they are increasingly becoming part of a dynamic system in a sustainable engineering project that makes up a strategic planning model going beyond traditional project scheduling and cost-control models.

The project can then be conceptualized as a living system that is constantly engaging with its surrounding ecosystem, regulatory environment, communities, supply chain, technological infrastructure and resources, and a novel strategic planning model can be developed. The model should not have a fixed list of sustainability indicators but should create feedback loops so that the project's sustainability goals can adapt if project conditions, such as the environment, resources, expectations and technologies, change. This shifts strategic planning from a 'front-end'

activity to an adaptable process of governance that can help sustain the project over its life cycle.

One creative approach to strategic planning is the design of multi-horizon strategic planning models that take into account the performance of projects, the

into account the potentially decades-long impacts of completing the project. The multi-horizon model could be split into operational, tactical, transformational and intergenerational horizons to make strategic decisions. Operational-level decision-making would focus on effi-

being constructed today would provide adequate ecological and economic opportunities for future generations.

There is another emerging model, which is based on the concept of strategic carbon intelligence, in which carbon performance is a

technology-selection decisions in engineering projects. This would allow project managers to make life-cycle comparisons of the overall carbon impacts of options. Perhaps more important is that the model could be built with a "carbon opportunity cost" ele-



the way in which engineering decisions are made, as carbon efficiency would now become part of strategic competitiveness.

A model that is sustainable is also beneficial to engineering projects that use a digital-twin approach, with the strategic planning of physical infrastructures continually feeding the virtual infrastructure, and vice versa. Instead of digital twins being used just to monitor the performance of equipment, strategic planners can use digital twins to simulate different sustainability paths prior to making big investment decisions. For instance, a digital model of an industrial plant can simulate various energy sources, energy-production technologies, water-recycling systems, material flows



resilience of the organization, as well as the effects of projects on society and the environment in the long term. While traditional engineering planning often focuses on the project's completion deadline, sustainable engineering needs to take

ciency and implementation, while transformational planning would focus on technological substitution, circularity, adaptation to climate change and future resource scarcity. Intergenerational planning would consider whether the infrastructure

decision-making criterion and not just a reporting criterion. Embodied carbon, operational emissions, supply-chain emissions, avoided emissions, and carbon-removal opportunities could be directly incorporated into capital allocation and/or

ment – say, a high-carbon-intensive technology would need to be differentiated in terms of value as well as benefits to the economy. This approach will provide a new basis for engineering investment decisions and could fundamentally change

Contd on page 7

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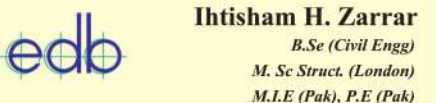
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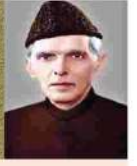
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سر سید یونیورسٹی کے چانسلر محمد اکبر علی خان نے کہا کہ اے آئی
لیب، طلباء اور محققین کو جدید ٹیکنالوجی اور وسائل تک رسائی فراہم

گورنر سندھ، سید محمد نہال ہاشمی نے سر سید یونیورسٹی آف
انجینئرنگ اینڈ ٹیکنالوجی کا دورہ کیا اور آرٹیفیشل انٹیلیجنس لیبارٹری کا

بھرپور فائدہ اٹھایا جاسکتا ہے۔ یہ
لیب مشین لرننگ، نیچرل لینگویج کی
پروسیسنگ، اور کمپیوٹر ویژن کے لیے
الگورتھم تیار کرنے پر توجہ دے گی،
جبکہ بڑے ڈیٹا سیٹس کا تجزیہ کر کے
فیصلہ سازی کی درستگی اور استعداد کو
بہتر بنائے گی۔ انہوں نے واضح کیا
کہ لیب کے تعاون سے معیار
زندگی، معاشی ترقی اور سماجی بہبود
میں خاطر خواہ بہتری کے روشن
امکانات ہیں اور اس کے ساتھ
ساتھ تعلیمی تجربات کو بھی تقویت ملتی
رہے گی۔ اے آئی کے شعبے میں

طلباء کو کامیاب کیریئر بنانے کے لیے لیب ایک فعال اور موثر
کردار ادا کر سکتی ہے۔ مزید برآں، آرٹیفیشل انٹیلیجنس لیب، طلباء اور
فیکلٹی کو ان کی تحقیق کی بنیاد پر اسٹارٹ اپ آئیڈیاز کو تیار کرنے میں
مدد دے کر انٹرپرائیور شپ کو فروغ دے گی۔ ■



افتتاح کیا جو طلباء کے لیے تحقیق،
اے آئی کی تعلیم کو فروغ دینے میں
ایک اہم سنگ میل ثابت ہوگی۔ اس
موقع پر شعبہ ایپلائیڈ اینڈ ایڈوانسڈ
سائنسز کے چیئر پرسن ڈاکٹر محمد عمران
سلیم نے گورنر سندھ کو لیب کے
مقاصد، مستقبل کی سہولیات اور
امکانات کے بارے میں تفصیلی
بریفنگ دی۔

گورنر نہال ہاشمی نے کہا کہ
ڈاکٹر علی خان فاؤنڈیشن کے تعاون
سے قائم کی گئی اے آئی لیب طلباء
کے لیے تحقیق، اختراعات اور اے
آئی کی تعلیم کو فروغ دینے میں ایک اہم پیش رفت کی نشاندہی کرتی
ہے۔ انہوں نے اسے ابھرتی ہوئی ٹیکنالوجی کے ساتھ اگلی نسل کو
بااختیار بنانے اور انہیں مستقبل کے چیلنجوں کے لیے تیار کرنے کے
لیے ایک اہم قدم قرار دیا۔



وفاقی ترقیاتی منصوبوں پر صرف 63 فیصد فنڈ خرچ ہوئے

وفاقی حکومت کی جانب سے رواں مالی سال میں ترقیاتی
منصوبوں پر صرف 63 فیصد فنڈ خرچ کیا جاسکے جبکہ ایک ہزار ارب
روپے کا وفاقی پی ایس ڈی پی 1837 ارب تک محدود کیا گیا تھا۔
تفصیلات کے مطابق جولائی تا مئی 11 ماہ میں تقریباً 530 ارب
روپے خرچ کیے گئے، اصل ہدف کے مقابلے میں پہلے 11 ماہ میں
صرف 53 فیصد فنڈ استعمال ہوئے، ارکان پارلیمنٹ نے 63 ارب
میں سے 44 ارب خرچ کیے، 33 مختلف وزارتوں، ڈویژنز نے
577 ارب میں سے 390 ارب خرچ کیے، وزارتوں، ڈویژنز کو

575 ارب سے زائد جاری کرنے کی منظوری دی گئی۔
کارپوریٹیشنز میں 260 ارب کے نظریاتی شدہ ہدف کے مقابلے
139 ارب خرچ ہوئے، وائرڈ منصوبوں پر 106.64 ارب میں سے
70 ارب ڈیفنس ڈویژن نے 11 ماہ میں 9 ارب میں سے 4.7
ارب روپے استعمال کیے۔ وزارت داخلہ کے منصوبوں پر 11.51
ارب میں سے 6.31 ارب، نیشنل فوڈ سیکورٹی پر 2.61 ارب میں
سے ایک ارب، صحت کے ترقیاتی منصوبوں پر 11.63 ارب میں
سے 3.89 ارب خرچ ہوئے۔ ■

Strategic Planning Models for Sustainable Engineering Projects

Contd from page 6

and maintenance systems under various future scenarios. Machine-learning algorithms could then be used to determine combinations that would be resilient, efficient in their use of resources, and have the greatest economic value. The result would be a model that would take strategic planning into a space of experimentation to test potentially disruptive decisions virtually before making them physically.

Another innovation is the embedding of resource circularity in the strategic architecture of projects. In conventional project planning, materials are often considered as waste that eventually will go to waste; the focus in circular strategic planning is that every material can be recovered, reused, remanufactured or recycled.

In such a model, it is the future material flows beyond the first life of the project that would be used to inform engineering decisions. Modularity, standardization of materials, reversibility, repair and traceability of materials could be key features in a procurement strategy. It would establish the basis for a "design-for-next-life" approach that would involve strategically engaging engineers as designers, builders and operators of infrastructure, as well as in its repurposing for productive systems after it has been decommissioned.

AI can be another pillar of anticipatory strategic planning, helping engineering organizations shift from a reactive approach to sustainability management to a predictive and prescriptive

approach to decision-making. AI-powered systems can predict trends in energy usage, equipment wear and tear, weather conditions, material costs, disruptions in supply and changes in regulations. But that's not the end of the strategic value of AI. Prescriptive analytics can provide alternative strategies and help to calculate their implications for various setups in the future. A good AI-driven planning model thus needs to incorporate human engineering judgment, explainability, ethical considerations and scenario testing. This forms a blended decision-making system, where Artificial Intelligence helps to increase strategic knowledge but does not eliminate responsibility.

An interesting approach is sustainability real-options plan-

ning – the idea that uncertainty can be valuable to a strategy. Knowing that the technology is coming to an end but failing to appreciate the uncertainty of its future economic, environmental and/or regulatory conditions can result in an engineering organization investing significant resources in a technology that, in the end, may prove to be a bad investment. Planners can plan projects that are staged, and technologies that are flexible, scalable and modular, rather than making any irrevocable decisions at the outset. For instance, the infrastructure could be planned to run a certain technology but be able to be future-proofed for new low-carbon technologies. This provides strategic 'options' that leave room for the future. ■

چین نے سینڈک کا پراگولڈ پروجیکٹ پر کام بند نہیں کیا، خبروں میں صداقت نہیں

چین نے سینڈک کا پراگولڈ پروجیکٹ پر کام بند نہیں کیا، خبروں میں صداقت نہیں، کیلئے چین کی کمپنی نے حال ہی میں پاکستان کا سینڈک میٹالورجی کمپنی بلوچستان میں سینڈک کا پراگولڈ پروجیکٹ پر بدستور کام کر رہی ہے کہ ایک بڑے پروجیکٹ میں سرمایہ کاری کیلئے چین کی کمپنی نے حال ہی میں پاکستان کا دورہ کیا اور اپنی سٹڈی مکمل کی ہے، چین کی ریسورس ڈویلپمنٹ لمیٹڈ کمپنی جو کہ چین کی



سرکاری کمپنی ایم سی سی کی ذیلی کمپنی ہے کا سینڈک میں کام کی لیز میں 2022 میں تجدید کی گئی تھی اور یہ کمپنی سینڈک منصوبے پر کام جاری رکھے ہوئے ہے۔

ہے اور سرمایہ کاری واپس لینے کی خبروں اور بیانات میں کوئی صداقت نہیں ہے نہ ہی یہ سینڈک پروجیکٹ بند کیا گیا ہے۔ وزارت منصوبہ بندی کے ترجمان نے کہا

بجلی کی بڑھتی قیمتیں اور بحران

پاکستانی شہری بیٹری انرجی اسٹوریج سسٹم میں سرمایہ کاری کرنے لگے

2025 کے اختتام تک پاکستان میں لیتھیم آئن بیٹری اسٹوریج کی مجموعی درآمدات 7.6 گیکواٹ گھنٹے تک پہنچ گئیں تیزی کی بڑی وجوہات میں بجلی کے بلند ٹیرف، بیٹری قیمتوں میں کمی، نیٹ بلنگ فریم ورک میں اصلاحات شامل ہیں

میں غیر معمولی اضافہ دیکھا گیا ہے۔ رپورٹ میں کہا گیا ہے کہ دیگر ممالک کے برعکس جہاں بیٹری اسٹوریج زیادہ تر پمپنگ کمپنیاں لگاتی ہیں، پاکستان میں اس مارکیٹ کی قیادت گھریلو صارفین کر رہے ہیں۔ رہائشی صارفین تمام بیٹری درآمدات کا 58 فیصد حصہ رکھتے ہیں۔ اندازے کے مطابق ہر 26 سولر والے گھروں میں سے 1 گھر اب بیٹری اسٹوریج سے بھی لیس ہے۔ ریونیو ایک فرسٹ کے پروگرام ڈائریکٹر مصطفیٰ امجد نے کہا کہ پاکستان پہلے ہی چھوٹی پروسرکری تیز رفتار اپنائیت کے ذریعے "صارفین کی قیادت میں منتقلی" دیکھ چکا ہے اور اب بیٹری اسٹوریج بھی اسی راستے پر لیکن اس سے بھی زیادہ تیزی سے گامزن ہے۔

صرف 2025 کے دوران ہوئیں۔ رپورٹ کے مطابق اس تیزی کی بڑی وجوہات میں بجلی کے بلند ٹیرف، چھوٹی پروسر لگانے والوں کی تعداد میں اضافہ، بیٹریوں کی قیمتوں میں کمی اور

ملک کے نیٹ بلنگ فریم ورک میں اصلاحات شامل ہیں۔ ریونیو ہیل فرسٹ کی سینئر ڈیپارٹمنٹ ایڈیٹ جاناوید نے کہا کہ 2018 سے 2023 تک بیٹری درآمدات سالانہ 0.5 GWh سے بھی کم تھیں، لیکن گزشتہ ایک سال میں طلب

بدلتی ہوئی توانائی پالیسیوں، بجلی کی بڑھتی ہوئی قیمتوں اور بجلی کی فراہمی میں عدم استحکام کے باعث پاکستانی شہری اب چھوٹی پرنسب سسٹمز کے ساتھ بیٹری انرجی اسٹوریج سسٹمز (BESS) میں بھی بڑے پیمانے پر سرمایہ کاری کر رہے ہیں، تاکہ توانائی کے حوالے سے خود فیصل ہو سکیں۔

تھنک ٹینک ریونیو ایل فرسٹ "کی نئی رپورٹ" پاکستان بیٹری یوم کا آغاز" کے مطابق 2025 کے اختتام تک پاکستان میں لیتھیم آئن بیٹری اسٹوریج کی مجموعی درآمدات 76 گیکواٹ گھنٹے (GWh) تک پہنچ گئیں، جو پچھلے سال کے مقابلے میں 220 فیصد اضافہ ظاہر کرتی ہیں۔ رپورٹ میں بتایا گیا کہ اب تک کی کل بیٹری درآمدات میں سے تقریباً 60 فیصد



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IEEEP FAIR 2026

18-20 August, 2026 Expo Center, Karachi

IEEEP Fair 2026: Can Pakistan Turn Its Electrical Industry from Importer to Manufacturer?

When the 15th IEEE Fair opens at the Karachi Expo Centre on August 18, it will bring together much more than electrical equipment, automation systems and energy technologies.

The three-day exhibition could also provide a useful snapshot of a question that has become increasingly important for Pakistan's economy: how much of the country's electrical and engineering equipment can actu-

ally be manufactured locally?

Organized by the Insti-



tute of Electrical and Electronics Engineers Pakistan (IEEEP), the fair will run

from August 18 to 20 and is being positioned as a major B2B platform for electrical

and electronics manufacturers, technology providers and industrial buyers. Its

exhibition categories include renewable energy, EVs and charging technology, battery

storage, smart grids, industrial automation, cables, metering, UPS and inverters,

power-generation equipment, transformers, switchgear and substation equipment.

The breadth of the exhibition reflects the changing nature of Pakistan's electrical

industry. Solar equipment, battery storage, electric vehicles, automation and smart-grid technologies are creating new markets alongside the traditional businesses of transformers, cables, switchgear and power equipment.

But the bigger story is the gap between local production and imports.

A government investment pitchbook prepared for Pakistan's electrical devices and equipment manufacturing sector provides a revealing picture. It estimates that Pakistan imported about \$3.54 billion worth of elec-

Contd on page 11

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VESRA, Business IT Solutions Join Hands to Bring Honeywell Lighting Solutions to Pakistan: An Interview with Ibrahim Abdalla

THE INTERVIEW

Engineering Review: Firstly, congratulations on this strategic partnership with Business IT Solutions in Pakistan. Could you please share the core vision behind this collaboration?

Ibrahim Abdalla: Thank you, we are happy to have such a great partner in Pakistan. The core vision behind this collaboration with Business IT Solutions in Pakistan is to leverage our combined expertise to deliver innovative lighting solutions that meet the evolving needs of our clients and expand our regional reach.

ER: What qualities and capabilities of Business IT Solutions earned your trust and confidence as a strategic partner?

IA: What earned our confidence first was the people. Shabbir Ahmed, CEO, Business IT Solutions, and his team showed us from the very beginning that they were serious, responsive, and genuinely invested in getting things right, not just closing a deal. That consistency of character is what builds trust in a partnership.

As a company, Business IT Solutions brought exactly the kind of capability we look for in this market: a strong local footprint, credibility with customers across Pakistan, and the operational strength to deliver at scale.

Beyond that, they have proven to be a consistent and reliable partner with an innovative approach to problem-solving and a deep understanding of our business needs.

ER: How do you view the LED Lighting market in Pakistan, and what growth opportunities do you see in this sector?

IA: The LED lighting market in Pakistan presents significant growth opportunities due to its large consumer base and expanding infrastructure. Both trade and project sectors offer numerous avenues for exploration and investment, making it a promising industry for stakeholders seeking to capitalize on future developments.

ER: What benefits will this partnership bring to customers, engineers, consultants,

architects, and electrical contractors in Pakistan?

IA: We take pride in providing a comprehensive range of lighting products, offering complete solutions at competitive prices, coupled with exceptional service through our official distributor for southern Pakistan, Business IT Solutions. We are confident that all the client categories you mentioned will be satisfied with the high standards we offer.

ER: Will Business IT Solutions provide only product distribution, or will it also offer

emphasize customer engagement through loyalty programs and educational content while promoting the products' premium quality and sustainability benefits.

ER: Will Business IT Solutions conduct technical training programs, seminars, or product demonstrations for engineers and industry professionals?

IA: Of course, it will be our pleasure to work together to conduct technical training programs, seminars, product demonstrations, and all the support for the professionals in the Pakistani market.



technical support, after-sales service, warranty, and customer assistance?

IA: Business IT Solutions will be a one-stop solution, providing technical support and after-sales customer care from a team of professionals with experience in the Pakistani market.

ER: What strategies will VESRA, Honeywell Authorized Licensee, and Business IT Solutions adopt for market development, brand awareness, and customer engagement of Honeywell Lighting products in Pakistan?

IA: We will focus on developing local partnerships, enhancing brand awareness and reach for Honeywell Lighting products in Pakistan through specific targeted marketing. Additionally, we will

ER: Energy efficiency is becoming a global priority. How do Honeywell Lighting solutions contribute to energy saving and sustainable development?

IA: At VESRA, we're committed to sustainability. Together with our partners, we're working towards a greener planet. We are committed to delivering a lighting experience that not only enhances brilliance but also uplifts well-being, all while nurturing the environment. Our Honeywell Lighting products are designed from the core as sustainable lighting solutions that make a difference.

ER: What are your key targets and milestones for the first one to three years of this

partnership?

IA: We are sure that this partnership will flourish and bring all of us a lot of fulfillment. We aim to expand into the region, develop key channel partners, capture market share by introducing new products based on regional requirements, and run an ecosystem that benefits all.

ER: Do you believe this collaboration will establish a new benchmark in Pakistan's lighting industry?

IA: The partnership between VESRA, a Honeywell Authorized Licensee, and Business IT Solutions is set to transform Pakistan's lighting industry. By combining VESRA's innovative products and vision with Business IT Solutions' local expertise, this collaboration aims to deliver cutting-edge, energy-efficient lighting solutions tailored to the needs of the Pakistani market.

This alliance will not only meet international standards but also address specific challenges, helping businesses reduce operational costs and improve energy management. Overall, it marks a significant step toward innovation and excellence in Pakistan's lighting sector, enhancing quality of life and driving economic growth.

ER: What message would you like to give to Pakistani businesses, developers, industrialists, and government organizations regarding this partnership?

IA: We are excited to work together to develop the lighting industry in Pakistan. Our goal is to create innovative lighting solutions and promote sustainable practices.

By combining our skills and resources, we can develop effective strategies that will help the lighting sector grow. This teamwork will open new opportunities and allow us to meet customer needs while staying competitive.

We aim to foster innovation focused on quality, efficiency, and sustainability. We are committed to building strong partnerships that support the local economy and benefit communities across the country. Together, we can shape the future of lighting in Pakistan. ■



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IEEE Fair 2026: Can Pakistan Turn Its Electrical Industry from Importer to Manufacturer?

Contd from page 9

trical machinery and equipment under HS-85 in 2023, with China accounting for around 86 per cent of those imports. By contrast, exports of electrical and electronic equipment were only about \$92.75 million in 2024.

The figures suggest that Pakistan has not yet made the transition from being a large market for electrical equipment to becoming a significant manufacturing and export base.

This does not mean that local manufacturing is absent.

Pakistan already has manufacturers producing power transformers, energy meters, switchgear, cables, electrical appliances and other equipment. The same government pitchbook puts local transformer production capacity at around 3,000 MVA annually. Companies such as PEL and a number of specialized manufacturers have established production capabilities, while local engineering firms manufacture panels, distribution equipment, cables and other components.

The problem is that domestic value addition remains relatively low, particularly when compared with the size of the market and the country's import requirements.

This is precisely where the IEEE Fair could become important.

At the soft launch of the 2026 fair, FPCCI Senior Vice President Saquib Fayyaz Magoon stressed the need for Pakistan to reduce its reliance on imported technology and develop local inno-

Plan under the National Electricity Policy 2021 and National Electricity Plan 2023. The proposed plan covers transformers, switchgear, cables, insulators, towers, energy meters and other transmission-related equipment, with the stated objectives of import substitu-

tion, localization and eventually greater export potential. The government also launched a Power Equipment Manufacturing Dashboard intended to track local production, vendor performance and investment opportunities.



vation and manufacturing. The organizers have also presented the exhibition as a platform where local and foreign companies can explore joint ventures, technology partnerships and technology transfer.

The government has itself recognized the problem. In 2025, the Engineering Development Board was tasked with preparing a Power Sector Indigenization

tion, localization and eventually greater export potential. The government also launched a Power Equipment Manufacturing Dashboard intended to track local production, vendor performance and investment opportunities.

The question, however, is whether these initiatives are translating into a measurable increase in manufacturing.

Available trade data sug-

gest that the answer is not yet at the scale Pakistan needs. The country continues to import billions of dollars of electrical machinery while exporting a comparatively small amount of electrical and electronic equipment. The gap is particularly significant in advanced compo-

nents, automation equipment, power electronics and other high-value technologies. This is also where the structure of the IEEE Fair becomes significant. The exhibition is not limited to traditional electrical equipment. Its categories include industrial automation, instrumentation and control, battery storage, EV charging, smart grids, renewable energy, testing equipment and

monitoring systems.

These are precisely the areas in which Pakistan will need to build domestic engineering capabilities if it wants to benefit from the next phase of electrification.

The global market is moving rapidly in that direction. Demand for transformers, switchgear and other grid equipment is rising because of renewable energy, electric vehicles, data centers and grid modernization.

assembly, testing, certification and eventually exports.

The second route will require more than tariff protection. Manufacturers will need reliable electricity, competitive financing, modern testing laboratories, international certifications, skilled engineers, research partnerships and predictable government procurement policies.

Universities will also have to become part of the equation. IEEE's visitor profile specifically includes engineering universities, while the fair is designed to bring manufacturers, consultants, utilities, government agencies and industrial buyers together.

That connection could be one of the most important outcomes of the exhibition.

For Pakistan, the real measure of success should therefore not be the number of stalls or visitors at the IEEE Fair. It should be whether the companies exhibiting there can increasingly say: this product is designed, engineered and manufactured in Pakistan — and it is good enough to compete outside Pakistan.

The country already has engineers, factories, a large domestic market and an expanding demand for electrical equipment. What remains missing is the scale, technology depth and policy consistency required to turn that foundation into an export-oriented engineering industry. — ER Report

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Jubilee Corporation: Six Decades of Powering Pakistan's Electrical Sector

For over six decades, Jubilee Corporation (JC) has been a cornerstone of Pakistan's electrical and automation industry.

Established in 1962 as a private engineering organization, JC has built a reputation for delivering high-quality and reliable electrical solutions. Its unwavering commitment to excellence has positioned it as a trusted partner for industries seeking technical expertise, operational reliability, and innovative solutions tailored to local needs.

Over the years, JC has played a vital role in supporting Pakistan's industrial growth. Its solutions are designed to optimize energy use, enhance safety, and streamline operations, ensuring that businesses can rely on consistent and efficient power delivery. This progress is guided by a clear mission: to lead the electrical, electronics, and automation technology market through top-quality products and services, while working for the satisfaction and progress of

customers and the broader community.

A Comprehensive Range of Engineering Solutions

Jubilee Corporation offers a diverse portfolio of products and services that cater to a broad spectrum of sectors—industrial, commercial, and residential. These include:

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- **Power Distribution Systems:** Engineered to streamline and optimize electrical infrastructure, enhancing performance and energy efficiency.

- **Automation Solutions:** Supporting the future of industrial automation, JC's offerings help industries boost productivity and streamline operations.

- **Energy Management:** Designed to help businesses monitor and optimize their energy consumption, contributing to sustainability and operational cost-effectiveness.

- **Power Quality Solutions:** Addressing voltage fluctuations, harmonics, and other disturbances, these products ensure a steady, clean power supply for sensitive applications.

- **Motion Division:** Enhancing operational efficiency with our Motion Division portfolio, featuring advanced drive and motor solutions tailored for diverse industrial applications.

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- **Instrumentation and Controls:** Delivering accurate monitoring and regulation of processes, crucial for modern industrial automation.

- **Pneumatic Systems:** Providing precision in motion control for a wide range of manufacturing applications.

This broad offering makes JC a one-stop destination for businesses seeking complete electrical and automation solutions.

A Nationwide Presence

With its head office located in Karachi and a regional office in Lahore, JC's network extends through liaison offices in Islamabad, Faisalabad, Multan, and Peshawar. This widespread presence is complemented by a robust distribution network that enables JC to deliver its products and services swiftly and efficiently across Pakistan. This geographical reach allows JC to serve industries, consultants, and contractors nationwide with prompt support and technical assistance.

Global Partnerships, Local Excellence

One of Jubilee Corporation's core strengths lies in its partnerships with more than 35 world-renowned engineering brands. As an authorized distributor of these specialist manufacturers, JC ensures access to top-tier technology and engineering innovation. These collaborations enable the company to bring global industry standards to the local market, keeping JC and its customers at the forefront of innovation in the electrical and automation fields.

Unparalleled Technical and After-Sales Support

Jubilee Corporation believes in providing exceptional customer service. Hence, JC prioritizes its customers at every stage of their interaction, from initial consultation to after-sales support.

The team of experts is dedicated to providing customized solutions and building lasting relationships with its customers. Whether it's advising them on the best products for their particular application or assisting them with safety measures and concerns, customers can rely on JC's support to be there every step of the way.

One of the key factors that set JC apart is its commitment to providing technical after-sale support. The company's team of highly skilled and experienced engineers is always on hand to help customers with any technical issues they may encounter. This level of support ensures that customers can trust JC's products and services for years to come.

Driving Innovation for the Future

In an era of rapid tech-

nological change, JC continues to adopt emerging technologies, including smart automation, energy-efficient systems, and advanced power management solutions. This forward-thinking approach reinforces its status as a trusted technical partner, enabling industries to achieve operational excellence while preparing for future challenges.

With a wide range of top-quality products, a nationwide presence, and partnerships with more than 35 world-renowned brands, Jubilee Corporation has solidified its position as a leader in Pakistan's electrical and automation sector. Looking ahead, the company remains dedicated to upholding this legacy while continuing to serve its customers and the wider community with the same commitment that has defined it since 1962.

For further details and queries, reach out to Jubilee Corporation at jubilee.corp@jubileecorporation.com or UAN: +92 21 111 000 520 or visit our website at www.jubileecorporation.com. ■




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Pakistan, Belarus Discuss Expanding Trade, Investment and Economic Cooperation

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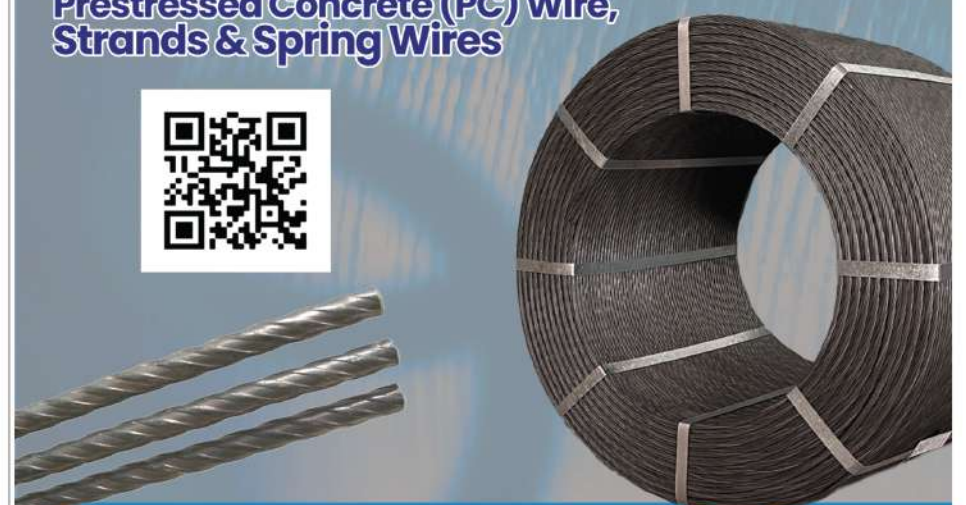
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meeting with Belarusian Minister of

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Instrumentation &
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Pakistan Has the Engineers — But Where Are the Engineering Products?

Pakistan does not have a shortage of electrical engineers. It has a shortage of opportunities that allow those engineers to work at scale in sophisticated product manufacturing.

That distinction goes to the heart of Pakistan's long-running struggle to build a competitive engineering industry.

According to the latest discipline-wise registration data available from the Pakistan Engineering Council (PEC), Pakistan had 108,952 registered electrical engineers as of December 31, 2024. Electrical engineering was the country's second-largest engineering discipline after civil engineering, with 58,243 electrical engineers registered in Punjab, 21,158 in Sindh, 20,748 in Khyber Pakhtunkhwa, 2,263 in the federal capital, 2,241 in Balochistan, 3,549 in AJK and 750 in Gilgit-Baltistan.

These figures, however, tell only part of the story. PEC registration tells us how many engineers are registered; it does not tell us how many are employed in manufacturing, how many are working overseas, how many are in utilities or government departments, how many are in consultancy or construction, or how many have moved into entirely different professions.

This absence of employment data is itself an important weakness in Pakistan's engineering policy.

The country can count engineers. It cannot adequately track where those engineers are creating engineering products.

The manufacturing paradox
Pakistan has a substantial domestic market for electrical equipment. Every power plant, transmission line, industrial unit, commercial building, hospital, housing project and renewable-energy installation requires electrical products.

Yet the country remains heavily depend-

ent on imports.

A government investment pitchbook on the electrical devices and electrical equipment manufacturing sector, published in May 2026, says Pakistan imported approximately \$3.54 billion of electrical machinery and equipment under HS-85 in 2023. China accounted for about 86 per cent of those imports. At the same time, Pakistan's exports of electrical and electronic equipment stood at only \$92.75 million in 2024.



The contrast is striking.

A country with more than 100,000 registered electrical engineers imported billions of dollars of electrical machinery while exporting less than \$100 million worth of electrical and electronic equipment.

This does not mean Pakistan has no electrical manufacturing.

It does.

The country manufactures transformers, cables, switchgear, energy meters, electrical

appliances and several other products. The government's sector assessment puts local transformer manufacturing capacity at about 3,000 MVA a year.

Companies such as PEL and several other local manufacturers have established production capabilities, while specialized firms produce transformers, switchgear, cables, panels and other equipment for the domestic market. But the problem is depth.

Much of Pakistan's electrical manufactur-

paper.

The Pakistan Standards and Quality Control Authority's electro-technical division says it has developed 3,069 standards, including 2,428 standards adopted on the basis of IEC and ISO standards. These cover electrical appliances, electrical measurements, rotating machines, batteries, transformers, circuit breakers, photovoltaic systems, energy efficiency, renewable energy and other areas.

This is significant.

It means that Pakistan is not operating in a completely isolated standards environment. Its technical standards are increasingly aligned with the international system.

But there is a major difference between having a standard and being able to demonstrate compliance with that standard in a form accepted by international buyers.

That requires testing, calibration, inspection, certification and accreditation.

Testing infrastructure exists — but is it enough?

Pakistan does have internationally recognized accreditation infrastructure through the Pakistan National Accreditation Council (PNAC), while laboratories can be accredited under ISO/IEC 17025.

The PNAC database lists a number of Pakistani laboratories involved in transformer and electrical testing. These include TransfoPower, Elmetec, Mega Transformers Testing Laboratory, AM Associates, Trafo Link and others.

This shows that the country has developed specialist testing capability.

But the infrastructure is fragmented and heavily concentrated in certain industrial centers, particularly Lahore.

More importantly, Pakistan needs to ask whether its testing and certification infrastructure covers the complete range of products that it hopes to export.

A manufacturer producing a transformer for the domestic market may have access to testing facilities. But an exporter of sophisticated switchgear, power electronics, solar inverters, EV chargers, protection equipment or smart-grid products may need a much wider conformity-assessment ecosystem.

International markets increasingly expect internationally recognized testing and certification.

For Pakistan to become a serious engineering exporter, therefore, the objective should not merely be to establish laboratories. It should be to establish laboratories and certification systems whose results are readily

accepted by international markets.

From assembly to design

This is where Pakistan's engineering policy needs to change.

There is a difference between manu-

facturing a product and assembling imported components.

Real engineering manufacturing begins much earlier — with product design, research and development, prototyping, testing, material selection, control systems, software, manufacturing processes and quality assurance.

A sophisticated electrical product may contain dozens or hundreds of components.

If the enclosure, control system, semiconductor devices, sensors, protection technology and critical components are imported and only final assembly takes place in Pakistan, the country gains some industrial value but remains technologically dependent.

The next stage should therefore be local design and component development.

Pakistan's engineering universities can play a central role here.

But university-industry collaboration remains weak in many areas. Universities often conduct research that does not directly translate into industrial products, while manufacturers frequently import technology

ing ecosystem remains dependent on imported components, machinery, technology and raw materials. Domestic value addition remains relatively low, according to the government's own assessment.

In other words, Pakistan has moved beyond simply importing finished electrical products, but it has not yet moved far enough towards designing, manufacturing and exporting sophisticated electrical systems.

Where are the engineers working?

This is perhaps the most important unanswered question.

Pakistan produces electrical engineers for power generation, transmission, distribution, industrial automation, electronics, telecommunications, renewable energy and manufacturing. But the country's industrial structure does not provide enough high-value manufacturing jobs for them.

An electrical engineer can find work in a power utility, construction company, consultancy, government department, telecom company, oil and gas company, banking sector, software company or education.

There are also engineers who migrate abroad.

Consequently, the number of electrical engineers registered with PEC cannot be used as an indicator of the number working in manufacturing.

What Pakistan needs is an engineering employment map.

The country should know how many electrical engineers are employed in: transformer manufacturing; switchgear and circuit-breaker manufacturing; cable production; electrical meters; power electronics; solar inverters and energy-storage systems;

industrial automation; EVs and charging equipment; generators and motors; protection and control systems; electronics manufacturing; and export-oriented engineering companies.

Without such information, it becomes difficult to determine whether engineering education is actually connected to industrial demand.

Pakistan has standards — but standards alone are not enough

Another important part of the equation is quality infrastructure.

Pakistan does not lack standards on





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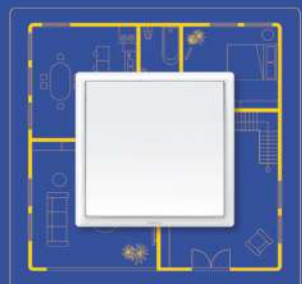
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Pakistan Has the Engineers — But Where Are the Engineering Products?

Contd from page 14 rather than working with local researchers to develop it.

A stronger model would connect universities, manufacturers, utilities and government procurement agencies around specific products.

For example, instead of merely producing electrical engineering graduates, Pakistan could establish national programs around: smart meters, transformers, switchgear, solar inverters, EV chargers, battery systems, industrial automation and protection equipment.

Each program could bring together universities, manufacturers, testing laboratories and utilities.

That would give engineers a real industrial problem to solve.

Government procurement could become a powerful tool

Pakistan is already a large buyer of electrical equipment.

Public-sector utilities, infrastructure projects and government agencies spend billions

on transformers, cables, switchgear, meters and other equipment.

If procurement policies reward interna-

localization.

A Pakistani manufacturer should receive an opportunity to compete, but it should also

The export question

The most difficult test is exports.

Pakistan cannot claim to have developed a successful electrical manufacturing industry simply because locally manufactured products are being used inside Pakistan.

The real test is whether those products can compete in international markets.

The government's own trade figures show how far Pakistan has to travel: approximately \$3.54 billion in electrical machinery imports against \$92.75 million in electrical and electronic equipment exports in the cited years.

This imbalance represents a problem, but it also represents an opportunity.

Pakistan has a huge domestic

market that can serve as the first customer for local manufacturers. If manufacturers can use that market to achieve scale, improve products, obtain certification and develop engineering expertise, they could then target



Contd on page 17



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Tengen Global is a global manufacturer recognized for its comprehensive range of power distribution and control products, engineered to deliver safe, efficient, and dependable performance across industrial, commercial, and infrastructure applications. The brand's portfolio spans Power Distribution, Power Electric, Motion Division, Modular Devices, and Control Devices—offering a complete ecosystem of solutions

for modern electrical systems.

At the core of Tengen Global's offering are its switchgear and protection products, including air circuit breakers, moulded case circuit breakers, control and protection devices with the allied and support accessories designed for robust fault protection and system reliability. Complementing these are motion and drive solutions engineered to support industrial automation, alongside control devices built for precision and operational efficiency. Together, these product lines reflect Tengen Global's commitment to advancing smart, resilient power infrastructure for evolving energy demands.

As Tengen Global's authorized distributor in Pakistan, Jubilee Corporation ensures local access to this technology, backed by JC's established distribution network and technical support capabilities

across Karachi, Lahore, Islamabad, Faisalabad, Multan, and Peshawar. This partnership allows Pakistani industries to benefit from globally engineered power solutions, supported by JC's decades of regional expertise and after-sales service.

By integrating Tengen Global's product range into its diverse portfolio of over 35 world-renowned brands, Jubilee Corporation continues to strengthen its position as a comprehensive, reliable source for electrical and automation solutions, connecting Pakistani industries with the technology needed to power their operations safely and efficiently.

For further details and queries, reach out to Jubilee Corporation at jubilee.corp@jubileecorporation.com or UAN: +92 21 111 000 520 or visit their website at www.jubileecorporation.com. ■

Pakistan Has the Engineers — But Where Are the Engineering Products?

Contd from page 16

markets in the Middle East, Central Asia, Africa and other developing regions.

The government itself describes Pakistan's electrical equipment sector as having the potential to become a manufacturing and export hub for South Asia, the Middle East, Africa and Central Asia.

The potential is there—



fore recognized.

The challenge is execution.

The real shortage Pakistan's real shortage, therefore, is not electrical engineers.

It is engineering ecosystems.

An engineer needs a factory in which to design and manufacture. The factory needs R&D. R&D needs laboratories. Laboratories need accreditation. Products need standards and certification. Manufacturers need finance. Exporters need internationally accepted cer-

tification. And all of them need a market large enough to justify investment.

Without these links, the engineer becomes an isolated professional rather than part of an industrial system.

Pakistan has already built several pieces of that system.

It has more than 100,000 registered electrical engineers. It has manufacturers.

today.

The country does not need merely more engineers. It needs more engineer-led companies, product-development centers, industrial laboratories, technology-transfer programs and export-oriented manufacturing plants.

And it needs to measure the outcome not by the number of engineering

degrees awarded, but by a much harder question: How many products designed and engineered by Pakistani engineers are being manufactured in Pakistan, meeting international standards, used successfully at home and sold successfully abroad?

Until Pakistan can answer that question with convincing numbers, its large engineering workforce will remain an under-used economic asset rather than the foundation of a globally competitive manufacturing economy. ■

What is missing is the connection between these pieces.

That is perhaps the central challenge facing Pakistan's engineering sector



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A new way to watch heat move through electronics

The same overheating problem that happens to our laptops also plagues computer servers and data centers around the world—and heat management is only getting harder as computer chips get more compact and powerful.

Understanding how heat moves through chips at the microscale is essential for continuing to improve their performance. Unfortunately, most methods for measuring heat flow struggle with multilayered devices like the electronics that power our modern world.

Now MIT researchers have demonstrated a new way to study how heat moves through multilayered materials, combining X-rays that penetrate multiple layers with laser pulses to deliver heat. The researchers used the technique to measure how heat moves inside a promising device for transistors and flexible electronics.

The method was so precise it allowed the researchers to quantify the effect of a single micron-scale defect in the device, revealing a surprising four-fold reduction in the material's ability to transfer heat at that spot. They also found that the defect caused heat to spread unevenly, moving more easily in one direction than in the other.

The team believes the approach could help researchers understand overheating in devices and help companies develop more power-dense electronics for everything from AI applications to wearables and clean energy systems.

"Chip developers need

devices that can handle heat," says Mingda Li, an associate professor of nuclear science and engineering at MIT and co-corresponding author on an open-access paper about the work published in Nature Communications.

"I think overheating has become the real bottleneck in device performance. When doing these diagnoses using

those transistors get to each other, the hotter the device gets as it operates, and the more heat needs to be moved.

Most people learn about the problem from their laptops overheating on their lap. At the data center scale, it means an enormous amount of energy must be devoted to cooling the servers.

The quest to design more

uses optics, it doesn't allow you to study different layers," co-corresponding author and MIT Associate Professor Jeehwan Kim explains. "Real devices have five or more layers. It also only provides an overall signal, and that makes it hard to see thermal transport happening in layers buried under the surface."

Other techniques, like

what is basically the brightest X-ray source in the world," co-lead author Thanh Nguyen says. "That allows you to focus an X-ray beam and get incredibly fine spatial resolution. You can also use a laser to heat the sample while the X-ray scans and shows how the heat dissipates across space in real time."

The technique offered a

their technique to a test device made of a layer of gallium nitride, which has shown promise for conducting heat efficiently, on top of silicon. The material combination has been studied for years, but its thermal performance has been shown to deteriorate because of tiny defects created during processing.

The researchers measured a fourfold reduction in heat dissipation across a wrinkle defect on the device and a 25% drop in heat dissipation across materials, showing more disruption to heat flow than they had expected.

"When people model heat dissipation, they model perfect crystals without defects," Buxuan Li, PhD '24, says. "But these types of large wrinkle defects are very common in 2D materials. People never even knew how much heat is blocked by these wrinkles. Those are things we can now directly observe with this technique."

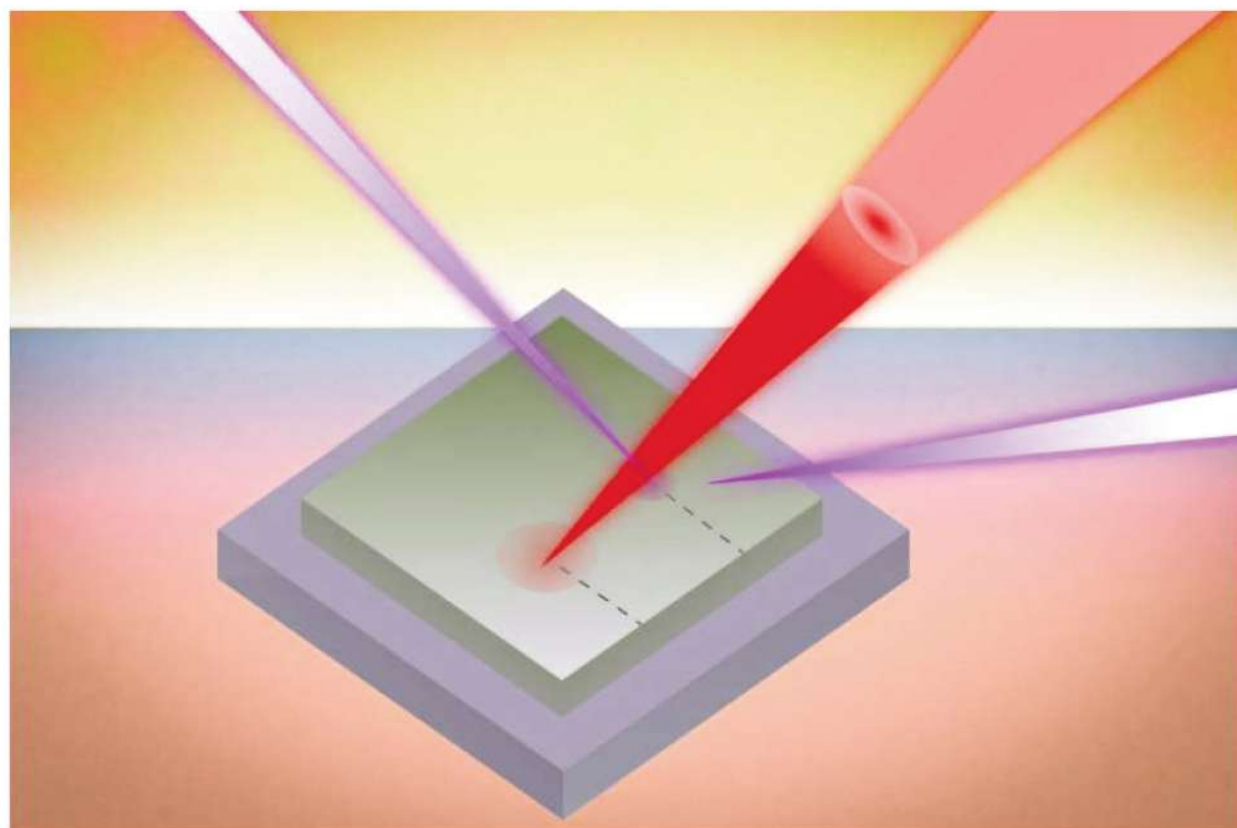
Designing better chips

Li says a leading semiconductor industry consortium has already reached out to collaborate on applying the measurement technique to study different types of chips. He believes the technique will work to study a wide array of materials and devices.

"We can now pass a current and shine an X-ray on a device and see how the heat dissipates at a very small scale," Kim says. "That's something the industry has been longing for."

Li says the approach will provide researchers with new information to improve the design of electronic systems.

"This will enable better thermal design of electronic systems," Kim says. "Even with the same type of materials, the geometry and how the materials are laid out is quite complicated, so it will show us how those differences impact thermal flow by providing direct experimental measurements." - TX



traditional techniques, they couldn't get down to the micro- or nanometer scale. But eventually they'd like to go beyond that to study the heat carriers and understand exactly what causes failure, in order to avoid local hotspots and design better devices. This approach is a step in that direction."

Tracking heat

Making more powerful computers and electronics often comes down to cramming more transistors into a smaller area. But the closer

power-dense computers and electronics is thus a quest to find materials that can transport heat most efficiently.

Researchers have used a number of methods to measure and model heat flow across materials, but they all have limitations when it comes to studying realistic device architectures. One common optical method to study heat at the microscopic level, for instance, is called time domain thermal reflectance.

"Because that technique

infrared cameras, don't capture tiny changes at a fast enough frame rate to be useful at small scales.

To address those limitations, the researchers wanted to create something that could measure heat transfer at the nanoscale in multilayer systems. To do that, they used an emerging analysis technique that sends electron pulses and ultrafast X-rays at a material and measures changes in energy.

"Over the last few years, researchers have developed

better view of heat transfer because the laser-powered electron pulse can capture changes in material strain at the atomic level while the X-rays can penetrate into multiple layers of the material, and the measurements can be combined to provide a clearer view of how a material moves heat.

"Using previous measurement techniques, in real devices, you couldn't resolve what happens on one layer versus another, so you'd just measure the average," co-lead author and MIT postdoc Chuliang Fu says. "X-rays can clearly show how heat propagates across the interface through their diffraction."

The researchers applied

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Emerging Green Solutions (Pvt.) Ltd. is a leading renewable energy company dedicated to delivering innovative, efficient, and sustainable energy solutions across Pakistan.

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everyone. The company continuously invests in modern technologies and technical expertise to deliver solutions that meet the evolving demands of the renewable energy sector.

Emerging Green Solutions remains committed to powering a sustainable future by delivering reliable products, advanced energy solutions, and exceptional service that drive Pakistan's clean energy transformation.■

Pakistan, Belarus Discuss Expanding Trade, Investment and Economic Cooperation

Contd from page 12
Energy Denis Moroz and a high-level delegation to discuss bilateral economic relations, trade, investment and ways to further strengthen economic cooperation between the two countries.

Welcoming the Belarusian delegation, Senator Aurangzeb noted the longstanding engagement between Pakistan and Belarus and stressed the need to translate bilateral relations into greater commercial activity and investment flows.

The meeting also reviewed the broader areas of Pakistan-Belarus cooperation, including industrial collaboration, agriculture, education and culture. Both sides discussed opportunities to expand engagement in these sectors and strengthen coordination between relevant institutions.

The finance minister reaffirmed Pakistan's

commitment to working closely with Belarus to turn ongoing discussions into concrete economic outcomes. He emphasised that continued engagement and broader consultations were essential to expanding bilateral trade and investment.

Minister Denis Moroz appreciated the finance minister's support and expressed confidence that continued coordination between the institutions of the two countries would help facilitate trade, investment and wider economic cooperation.

The meeting was attended by the Secretary of the Ministry of Economic Affairs and senior officials from the Finance Division. The Belarusian delegation included Ambassador of Belarus to Pakistan Andrei Metelitsa, First Deputy Minister of Industry Viktor Shchetko, Director of the Department at the Belarusian Ministry of Foreign Affairs Andrei Prokopchuk, and Viktor Nikitin of the National Bank of Belarus.■

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Jawad Electric: Powering Pakistan's Industry with Quality Electrical Solutions and Automation

THE INTERVIEW

Engineering Review: What products and solutions does Jawad Electric offer, and what makes the company different from other electrical solution providers?

Jawad Electric provides a complete portfolio of low-voltage electrical and industrial automation solutions for residential, commercial, and industrial applications. Our product range includes Miniature Circuit Breakers (MCBs), Molded Case Circuit Breakers (MCCBs), Air Circuit Breakers (ACBs), RCCBs, ELCBs, Automatic Transfer Switches (ATS), contactors, protection relays, panel meters, selector switches, current transformers, and other control and automation products. We also provide technical consultation, product selection support, and dependable after-sales service.

What differentiates Jawad Electric is our commitment to genuine international-quality products, technical expertise, ready stock availability, fast nationwide delivery, and customer-focused support. Every product is carefully inspected before dispatch, ensuring reliability and long-term performance for every project.

ER: Why did Jawad Electric choose to partner with Sigma Electric (Türkiye), and what benefits does this partnership bring to customers in Pakistan?

Jawad Electric partnered with Sigma

Elektrik (Türkiye) because of its globally recognized reputation for manufacturing high-quality, internationally certified low-voltage electrical products. Sigma's commitment to innovation, safety, and European

* Local inventory with faster availability.

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Customers can compare solutions, receive project-specific recommendations, and experience the latest innovations in electrical protection and automation under one roof. The upgraded environment also strengthens our ability to host corporate meetings, technical training sessions, dealer interactions, and product launches, creating a more engaging and efficient customer journey.

ER: What industries and major projects has Jawad Electric served, and what are its future expansion plans?

Over the years, Jawad Electric has supplied electrical solutions to a wide range of industries, including textiles, steel, sugar, flour mills, manufacturing plants, hospitals, commercial buildings, infrastructure projects, and residential developments. We are also proud to have served leading organizations such as PEL, Haier, Descon, Gourmet, FFC, DHA, Mughal Steel, and many other respected industrial clients across Pakistan.

Looking ahead, our vision is to expand our nationwide distribution network, strengthen partnerships with international manufacturers, introduce more advanced automation and smart electrical solutions, and further establish Jawad Electric as Pakistan's leading provider of premium low-voltage electrical products and industrial switchgear solutions. We remain committed to innovation, quality, and delivering world-class electrical solutions that power Pakistan's industrial growth. ■

manufacturing standards perfectly aligns with our mission of delivering premium electrical solutions to the Pakistani market.

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ER: How does the newly upgraded showroom and corporate office improve the customer experience?

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New engineering studies aim to slow battery aging while idle

Most batteries spend more than 70% of their lifetime at rest. Yet few studies have examined calendar aging, which is how a battery degrades when it is neither charging nor being used.

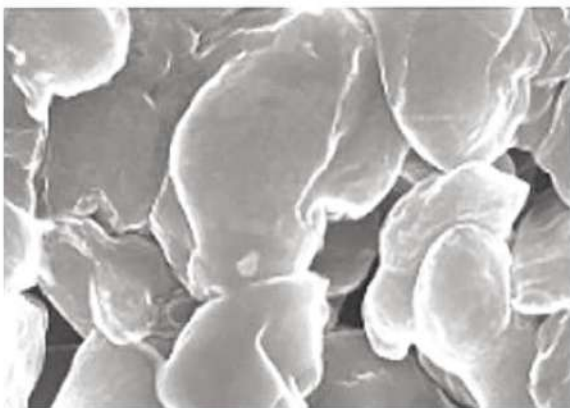
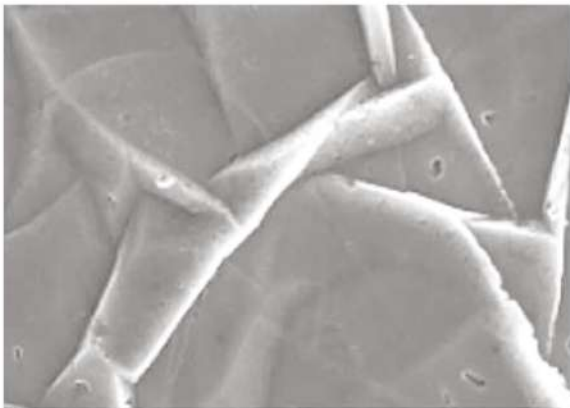
Now, a pair of complementary papers published in *Joule* and *Nature Communications*, both led by chemical engineers at the UCLA Samueli School of Engineering, has found that many next-generation metal-anode batteries can lose significant capacity during calendar aging. Across the two studies, the researchers compared losses for various metals and designed strategies to reduce them, providing new pathways to extend battery life.

Metals such as zinc, sodium and magnesium are being explored as alternatives to lithium-ion batteries for their potential to store more energy. To evaluate their performance, most studies have focused on cycling efficiency—how efficiently the battery recovers charge over repeated use. It is often assumed that if a battery cycles well, it will also remain stable while idle. But cycling performance alone does not tell the full story of how a battery holds up in real-world use.

"We understand very little about how next-generation metal batteries degrade during rest," said Yuzhang Li, an associate professor of chemical and biomolecu-

lar engineering at UCLA Samueli and the corresponding author on both papers. "These two papers further our understanding and present new concepts on how to improve battery aging during rest."

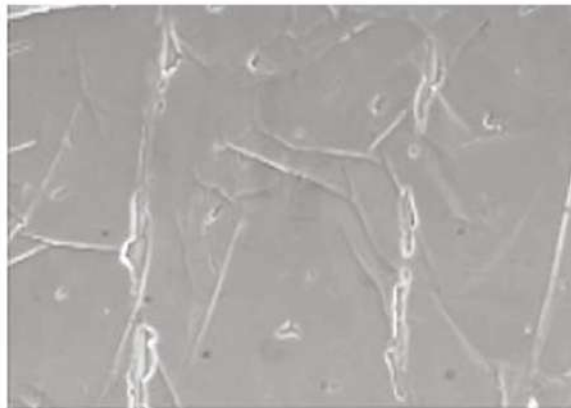
The *Joule* paper investigates how different metal anodes age over time when they're not in use. The research team looked at batteries based on lithium,



sodium, aluminum and magnesium.

All of them showed high cycling efficiencies. Yet, after two weeks of sitting unused, lithium, sodium and aluminum batteries had each lost roughly a tenth to a fifth of their capacity—losses that

would add up quickly over a battery's lifetime. Magnesium, by contrast, lost less than half a percent due to a naturally formed protective layer on its anode during rest that significantly limits corrosion. The protective layer reversibly dissolves once the battery begins charging, making the interphase on magnesium uniquely stable and dynamic.



The *Nature Communications* paper outlines a strategy to reduce corrosion in zinc-anode batteries by redesigning the electrolyte—the liquid that carries ions between the cathode and anode.

The team found that water molecules

surrounding dissolved zinc ions were substantially more reactive than free water molecules in the bulk electrolyte, making them a major driver of zinc corrosion. A conventional zinc battery electrolyte can lose more than a third of its capacity after just one day of sitting idle. By creating an ultra-dilute electrolyte and adding specific ingredients, the team cut that loss to less than 1.5% after 24 hours, while still maintaining stable performance over thousands of charge cycles.

While this particular paper focused on zinc, the concept could be broadly applicable to other metal-anode batteries, the researchers said.

Designing for longer shelf life

"Together, these papers suggest that battery aging during rest can be reduced by fine-tuning the electrolyte environment and encouraging protective layer formation on electrodes," Li said. "These two findings shift battery design from focusing mainly on cycling performance toward improving total lifetime under real-world use."

The research is still at the proof-of-concept stage and further work is needed to validate the design principles in larger-format cells under practical operating conditions and over longer lifetimes. Ultimately, the findings could lead to commercial batteries with longer lifetimes, improving electric vehicle range and enabling more sustainable grid applications. - TX

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Green Energy Is Giving Pakistan's Industry a New Cost Advantage — But Can It Last?

For Pakistan's industries, the solar boom is no longer simply an environmental story. It is increasingly a business decision: reduce electricity costs, protect production from an unpredictable grid, improve competitiveness and, in some cases, turn energy savings directly into higher profits. But the country's changing solar-billing regime is also forcing industries to rethink how they generate, consume and store electricity.

Pakistan's transition towards green energy has happened faster than many policymakers expected. Solar panels have spread across factory rooftops, warehouses, farms, commercial buildings and homes, while industries that once relied almost entirely on the national grid are increasingly generating electricity for themselves.

The reason is simple: electricity has become too important and too expensive for industry to treat it merely as a utility expense.

For a textile mill, steel

plant, food-processing unit or engineering factory, electricity is directly connected to the cost of production. When power becomes expensive, the cost of every metre of cloth, every kilogram of steel, every tonne of processed food and every manufactured component rises.

Solar changes that calculation.

And there is now growing evidence that Pakistani businesses are already benefiting.

A textile mill owner in Khurrianwala, Faisalabad, told The News earlier this year that his factory's 1MW solar installation was generating about 4,000 units a day, or nearly 1.44 million units annually. He said the system was saving the mill more than Rs5.4 million a month in electricity bills.

That is not a theoretical benefit. It is a direct reduction in the cost of running a factory.

Why industry is moving towards solar

Pakistan's industrial sector has faced a difficult combination of high electricity prices, tariff adjustments, fuel costs and uncertainty over energy supply.

For years, many industries responded by installing captive power plants, often using gas or other fuels. But rising fuel prices and changes in captive-power

and installation has been paid, the marginal cost of generating electricity is extremely low. The economics become particularly attractive for industries that consume large quantities of electricity during daylight hours — precisely when solar generation is at its strongest.

This is why textile mills,

size, electricity tariff, solar capacity, operating hours and the proportion of electricity consumed directly rather than exported to the grid.

The important point is that self-consumption has become more valuable than selling surplus electricity.

That distinction has become especially important after Pakistan changed its regulatory framework.

The economics have changed

Pakistan's original net-metering system made rooftop solar particularly attractive because consumers could export excess electricity to the grid and receive credits against electricity imported from the grid.

But the regulatory framework has changed.

NEPRA notified the Prosumer Regulations, 2026 in February, while subsequent amendments and consultations have continued to shape the framework. NEPRA's own documents also protect existing distrib-

uted generators with valid agreements under the previous regulations until the expiry of those agreements.

The new environment makes one principle increasingly clear:

The best solar project for an industrial consumer is not necessarily the one that produces the most electricity. It is the one that allows the factory to consume the greatest possible proportion of its own solar generation.

This changes the way factories should design solar systems.

A factory operating its machinery during daylight hours can use a large share of solar power directly. Every unit consumed on-site effectively replaces a unit that would otherwise have been purchased from the grid.

By contrast, a factory that produces substantial surplus electricity during the day and exports it may receive considerably less value for that exported electricity under the new system.

NEPRA's 2026 power-purchase forecast puts the National Average Power Purchase Price at Rs25.32 per kWh, while the National Average Energy Purchase Price is projected at Rs8.13 per kWh.

The difference illustrates

Contd on page 25



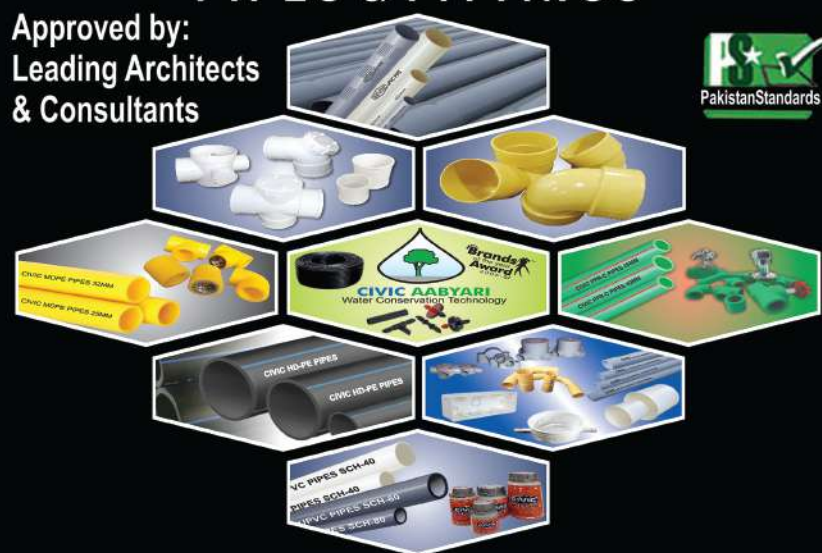
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Green Energy Is Giving Pakistan's Industry a New Cost Advantage — But Can It Last?

Contd from page 24

the broader economics of the new system: electricity produced for one's own consumption can be considerably more valuable than electricity exported.

For industry, therefore, the solar strategy is changing from "generate and sell" to "generate and consume."

Solar is becoming a profit strategy

The impact goes beyond electricity bills.

Suppose a factory reduces its annual electricity expenditure by tens of millions of rupees. That money does not disappear from the economy. It can improve the company's cash flow, reduce production costs, finance new machinery, support expansion, increase wages, reduce borrowing requirements or improve its ability to compete in export markets.

This is particularly important for Pakistan's export industries.

Textile manufacturers, for example, compete with producers in Bangladesh, Vietnam, India, China and other countries. Energy is one component of their production cost. If a Pakistani manufacturer can reduce its electricity cost substantially without compromising reliability, it gains a competitive advantage.

The same applies to

engineering industries.

A manufacturer producing cables, transformers, switchgear, pumps, motors or electrical equipment needs reliable and reasonably priced electricity to remain competitive. Energy savings can therefore become part of the industrialisation strategy.

There are already signs that companies are treating solar investment as a capital investment rather than simply an environmental initiative.

In July 2026, Shadab Textile Mills reported that it had fully utilised Rs47.5 million allocated for installation of a solar system from the proceeds of a rights issue.

Another publicly discussed example is Saif Textile Mills, where the company had projected annual electricity savings of around Rs700 million, equivalent to about 30 per cent of its previous electricity cost. That figure comes from company-related investor discussions rather than an independent

audit, so it should be treated as a company projection rather than a sector-wide benchmark.

Nevertheless, the direction is unmistakable.

Industries are putting their own money into renewable energy because they see a financial return.



The hidden benefit: energy security

There is another benefit that is sometimes overlooked.

Solar gives an industrial consumer greater control over its electricity supply.

A factory cannot afford to stop a production line simply because electricity is unavailable or because the cost of running a conven-

tional generator has suddenly become prohibitive.

Solar, particularly when combined with batteries and energy-management systems, can provide a degree of protection against grid interruptions.

This does not mean solar can automatically replace the grid.

Industrial plants have varying load profiles, and many require continuous

gy system.

Pakistan's solar revolution is much bigger than official figures

One of the most interesting features of Pakistan's renewable-energy transition is that official grid-connected data may not capture the full scale of solar deployment.

NEPRA reported that it issued 3,736 net-metering licences adding 591MW during 2023-24.

More recent sector data reviewed by Arab News showed electricity fed into the grid by rooftop solar users outside Karachi more than doubled over the preceding year, rising from around 80GWh per month in late 2024 to about 174GWh per month by mid-2025, with output exceeding 300GWh in April.

But a large amount of solar generation takes place behind the meter and therefore does not necessarily appear in conventional grid statistics.

This is particularly important for industry.

A factory installing solar primarily to consume its own electricity does not need to export large amounts

of power to the grid.

It simply reduces its demand.

That means the country's solar transition may be considerably larger than the number of net-metering connections suggests.

There is also a national economic benefit

Every unit of solar electricity replacing imported fuel or expensive conventional generation can potentially reduce pressure on Pakistan's energy import bill.

But the benefit depends on what solar replaces.

If solar replaces electricity generated from expensive imported fuel, the national economic benefit is greater than if it simply displaces low-cost domestic generation.

At the same time, rapid solarisation creates a problem for the existing power system.

Pakistan has invested heavily in generation capacity and must continue paying capacity-related costs even when some consumers reduce their grid consumption.

Reuters reported that Pakistan's solar boom has already created tension within the power sector, with industries and wealthier consumers benefiting from lower electricity costs while the fixed costs of the grid remain distributed across a shrinking pool of conventional consumers.

Contd on page 26

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Green Energy Is Giving Pakistan's Industry a New Cost Advantage — But Can It Last?

Contd from page 25 This is the difficult side of the green transition.

Solar is good for the consumer who installs it.

But if the policy is poorly designed, it can create a financial problem for the grid.

The next step should be batteries and smart consumption

Pakistan therefore needs to move beyond the old debate of solar versus grid.

The future should be about integrating the two.

Industries should be encouraged to consume solar power when it is generated, use batteries where economically justified, shift flexible industrial loads to daylight hours and deploy energy-management systems that optimise consumption.

This would make solar more valuable to both the industrial consumer and the national grid.

It would also reduce the pressure created by excessive daytime exports.

The new economics already point in this direction.

For an industrial consumer, the greatest financial return comes from using its own electricity rather than depending heavily on the value of surplus electricity sold to the grid.

Green energy can also create a new industrial opportunity

Pakistan's solar revolution, however, should not remain an import story.

The country has imported huge quantities of solar panels and related equipment, largely from China. Reuters has described the rapid growth of solar adoption as one of the most significant transformations in Pakistan's electricity sector.

The next challenge is to develop local

capabilities in:

solar mounting structures; electrical panels; cables; transformers; inverters and power electronics; batteries and energy-storage systems; monitoring equipment; engineering, procurement and construc-



tion services; and

operation and maintenance.

This is where Pakistan's engineering sector can benefit.

If factories are becoming solar-powered, Pakistani engineers should not merely install imported panels. They should increasingly design energy systems, develop control technologies, manufacture components and build

products that can eventually be exported.

Green energy can therefore become an industrialisation opportunity.

The danger of policy uncertainty

The biggest threat to this transition may ultimately be uncertainty.

Businesses invest millions of rupees in energy infrastructure. They need to know what the rules will look like over the next five, ten or fifteen years.

Frequent changes in net-metering arrangements can make investors hesitate.

At the same time, the government has a

show that the government is already grappling with this question.

From relief to competitiveness

For Pakistan's industry, the green-energy story is ultimately about much more than climate change.

It is about survival.

A factory that can reduce its electricity bill, protect itself against supply interruptions and make its production costs more predictable has a better chance of surviving in a highly competitive international market.

A textile mill saving millions of rupees a month can invest that money elsewhere.

An engineering company reducing its energy costs can become more competitive.

A food-processing plant can reduce the cost of refrigeration.

A cold-storage facility can use solar and batteries to improve reliability.

A farmer can solarise a tubewell and reduce dependence on diesel or grid electricity.

These are not abstract environmental benefits. They are economic benefits.

Pakistan's solar transition has already crossed the point where it can be dismissed as a fashionable technology.

It is becoming a structural change in the country's economy.

The question now is whether Pakistan can turn that change into a broader industrial advantage.

The country has the sunlight.

It has a growing engineering workforce.

It has industries desperate to reduce costs.

It has a large domestic market.

What it needs is a stable policy framework that connects all four.

If that happens, green energy could do something much more important than simply reduce electricity bills.

It could reduce the cost of producing Pakistani goods — and in doing so, help Pakistan become more competitive in the global market. — ER Research Desk

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Pakistan Moves to Outsource Lahore and Karachi Airports and Prepare LESCO, MEPCO Sales

Pakistan has taken another step in its expanding privatization program, with the Privatization Commission (PC) Board approving key measures for the outsourcing of operations at Lahore and Karachi international airports and initiating the process for the proposed Privatization of two major electricity distribution companies, LESCO and MEPCO.

The decisions were taken at the 257th meeting of the Privatization Commission Board, chaired by Muhammad Ali, Adviser to the Prime Minister on Privatization and Chairman of the Commission.

The Board approved a consortium led by EY-Parthenon as the top-ranked interested party to serve as Financial Adviser for the proposed outsourcing of Allama Iqbal International Airport, Lahore (AIIAP), and Jinnah International Airport, Karachi (JIAP). A Negotiation Committee was also constituted to finalise the Financial Advisory Services Agreement with the successful consortium.

The government is pursuing airport outsourcing through management contracts or long-term commercial concessions rather than necessarily selling the airports themselves. The Privatization Commission says the objective is to improve efficiency and passenger services, increase revenues, upgrade infrastructure and attract domestic and international private investment.

The decision is part of a wider government plan covering Pakistan's three major international airports — Islamabad, Karachi and Lahore. Islamabad International Airport has also been brought into the active Privatization program under a long-term concession model.

The airport outsourcing program, however, has already experienced delays. In January 2025, a Turkish consortium was the sole bidder for operating Islamabad International Airport but offered a concession fee of 47 per cent of revenue against the government's minimum requirement of 56 per cent. The proposal was referred for further evaluation.

The government has subsequently continued exploring different options for Islamabad airport, including engagement with potential investors from the UAE, Türkiye, Saudi Arabia and other countries.

LESCO and MEPCO enter the privatization pipeline

The PC Board also declared Lahore Electric Supply Company (LESCO) and Multan Electric Power Company (MEPCO) as major transactions, paving the way

for the appointment of Financial Advisers.

The two companies represent the second batch of DISCOs to be moved into the Privatization process under the government's current program, according to the Commission's classification. The first batch comprises IESCO, GEPCO and FESCO, for which the government has already initiated the process.

Other distribution companies, including HESCO, SEPCO, PESCO and HAZECO, have also been earmarked for private-sector participation, while the government has separately initiated processes involving generation companies.

The government's broader 2024-29 privatization program lists 25 entities, covering aviation, real estate, financial services, retail, industry and the power sector. The aviation component includes Islamabad, Karachi and Lahore airports, while the power list includes IESCO, FESCO, GEPCO, LESCO, MEPCO, HAZECO, HESCO, PESCO and SEPCO, along with four GENCOs.

Privatization is not new for Pakistan

The latest moves are part of a much longer process rather than a completely new policy.

Pakistan has previously transferred ownership or control of several major state-owned enterprises to the private sector. Among the most prominent examples is K-Electric, formerly Karachi Electric Supply Company. The Privatization Commission's historical record shows that 73 per cent of KESC shares were privatized in 2005-06. The same period also saw the sale of a 26 per cent stake in PTCL, while other transactions included Mustehkam Cement and several industrial assets.

More recently, the government completed the sale of 96.6 per cent of Heavy Electrical Complex (HEC) to IMS Engineering in January 2024, after resolving longstanding land-transfer issues. HEC was a major manufacturer of power transformers, making the transaction particularly relevant to Pakistan's engineering and electrical manufacturing sector.

The government has also pursued the Privatization of Pakistan International Airlines (PIA). In December 2025, a consortium led by Arif Habib won a bid for a 75 per cent stake in the national carrier for about \$482 million, although the transaction was subject to regulatory requirements.

Thus, the present program represents another stage in a decades-long attempt to reduce the state's direct role in commercial operations.

Outsourcing versus pri-

vatization

An important distinction, however, is that outsourcing an airport is not the same as selling the airport.

Under an outsourcing or

agreed period and under specified conditions.

Privatization generally involves transferring ownership or a controlling stake in a state-owned enterprise.



concession arrangement, the state can retain ownership of the underlying asset while giving a private operator responsibility for running commercial operations for an

This distinction will be important in the case of Lahore and Karachi airports because the government's stated objective is to bring in private expertise and invest-

ment while retaining the strategic importance of the aviation infrastructure.

The same question will be closely watched in the case of DISCOs.

The government argues that private-sector participation can improve billing, reduce losses, strengthen investment and improve service delivery. But the transition will also require a strong regulatory framework because electricity distribution remains a heavily regulated and politically sensitive business.

Prime Minister Shehbaz Sharif, while reviewing DISCO privatization in June, specifically directed authorities to ensure transparency and establish a robust regula-

tory framework following the transition to private ownership.

The Privatization Commission says its current program is intended to be conducted through transparent and competitive processes, with emphasis on accountability and maximizing value for the government and the public.

The scale of the program nevertheless means that its success will ultimately depend not simply on how many state assets are transferred to private hands, but on whether private participation actually produces better services, greater investment, lower losses and stronger economic returns without creating new monopolies or weakening public oversight. ER News Desk

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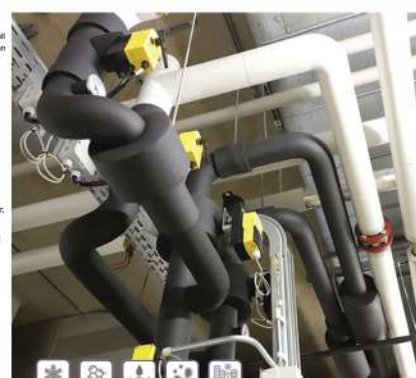
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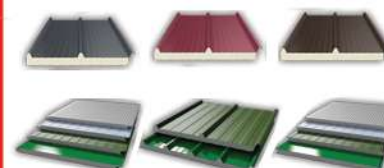


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