

FORTNIGHTLY
ENGINEERING REVIEW
GOLDEN JUBILEE
50
1975-2025
The voice of engineers

Founded by **Najam ul Hassan** (Marhoom)
 June 16-30, 2026
 Ph: +92-21-32215961-2
 info@engineeringreview.com.pk

Vol. 51 No. 2

PAKISTAN'S MOST POPULAR CHOICE
 Since 1975

**CHOOSE WISE
 CHOOSE RIGHT**

POPULAR
 PROUDLY EXPORTING TO
UK | UAE | KSA

www.popularpipesgroup.com
 +92-42-111-11-8782

**HSK78G
 2MW Lean Burn
 Gas Generator**
 44.2% Electrical
 Efficiency

Energy Solutions (Pvt.) Limited
 customercare@eslpk.com | www.eslpk.com | 111-222-ESL (375)

www.engineeringreview.com.pk **in linkedin.com/company/the-engineering-review**

Budget 2026-27: Stability at Cost of Development?

By Manzoor Shaikh
 The federal government has presented a Rs18.77 trillion budget for fiscal year 2026-27, projecting fiscal stability, higher revenues, and a reduced budget deficit. However, leading economists argue that the budget reflects a continuing pattern of prioritizing debt servicing and fiscal consolidation over human development, economic growth, and structural reforms.

According to the budget documents, total federal resources have been estimated at Rs18.77 trillion. Net revenue receipts stand at Rs11.75 trillion, while the government plans to mobilize an additional Rs7.02 trillion through borrowing, privatization proceeds, and external financing.

On the expenditure side, total spending is also estimated at Rs18.77 trillion, of which Rs17.49 trillion—more than 93 percent—is allocated to current expenditures. Development spending and net lending account for only Rs1.28 trillion.

The single largest expenditure item remains debt servicing. Interest payments alone are estimated at Rs8.05 trillion, consuming nearly 43 percent of the entire federal budget. Defence expenditure has been allocated Rs3 trillion, while pensions will require Rs1.17 trillion. Subsidies, grants, and transfers together account for nearly Rs3.8 trillion.



In contrast, the federal Public Sector Development Programme (PSDP) has been allocated Rs1 trillion.

Stability Without Progress?
 Economic analyst Asad Ali Shah spoke in a

SZABUST program on budget acknowledged that Pakistan had successfully avoided sovereign default in 2024 and achieved a degree of macroeconomic stability under the IMF programme. However, he argued that the government's repeated emphasis on stability masks deeper structural weaknesses. "Pakistan today remains suspended between collapse and stability," he said. "The

government celebrates fiscal discipline every year, but it has failed to explain why the country is unable to progress despite repeated IMF programmes."

Shah noted that the fiscal deficit had declined from around 8-9 percent of GDP to approximately 4 percent, reflecting improved fiscal management. However, he argued that this achievement has come at the expense of human development.

"History shows that no country has achieved sustained progress without investing in education, skills, and human development," he said. "What we have achieved is fiscal discipline at the cost of human development."

Citing figures from the Economic Survey, Shah pointed out that spending on education and health has fallen to around 0.8 percent of GDP each, amounting to a combined 1.6 percent of GDP.

He recalled that the Pakistan Muslim

Contd on page 4

GM Cables & Pipes (Pvt.) Ltd. **Pakistan Standards**

**WE KNOW
 YOUR SAFETY**

UAN: 111-222-369 www.gmcables.com [gmcablesandpipes](https://www.facebook.com/gmcablesandpipes)

Sigma elektrik **MADE IN TURKEY** www.sigmaelektrik.com

Approved By **LAHORE** **Jawad electric**

Low Voltage Products

ZELKON electric

Sole Distributor of Sigma Elektrik in Pakistan
 Lahore Electric Market
 14- Brandreth road, Lahore
 04237641116-7
 +92 321 8061111
 info@jawadelectric.com

CHINT POWER **POWER zone** **TIER 1**
INVERTER & ENERGY STORAGE MANUFACTURER*

COMMERCIAL ESS 125 (kW) - 261 (kWh)
COMPACT ESS LV & HV Modular Lithium Ion ESS
INVERTER 6 - 20 (kW)

042-111-111-087

BILAL **BILAL SWITCHGEAR ENGINEERING (PVT.) LIMITED**
SWITCHING ON RELIABILITY SINCE 1978

LV TYPE TESTED SWITCHGEAR
 System Pro E Power
 • Fully type tested for Conformance to IEC-61439 1 & 2.
 • Rated Current: up to 6300A.
 • Form of Segregation: Form-1 to Form-4b.
 Manufactured under license by **ABB**.

BUSBAR TRUNKING SYSTEM WAVEPRO — ABB
 Certified by KEMA-KEUR to latest standard IEC 61439-6 and IEC 60331-1 for fire proofing.

ABB MV TYPE TESTED SWITCHGEAR
 Manufactured under license by **ABB**.

www.bilaleng.com | UAN: +92- 42-111 19 19 19
 Lahore | Karachi | Islamabad | Faisalabad | Multan

Head Office / Factory: 11KM, Raiwind Road, Lahore Park Stop, Lahore, Pakistan



Change your life

THERE'S A **PEL**
IN EVERY HOME

SINCE 1956

2026





CM, World Bank Review Progress of Karachi Water and Sewerage Services Improvement Project

KARACHI (June 4): Sindh Chief Minister Syed Murad Ali Shah holds a virtual review meeting from Karachi with World Bank Country Director Ms Bolormaa Amgaabazar to assess progress on the Karachi Water and Sewerage Services Improvement Project (KWSSIP).

The meeting was attended by Minister for Planning & Development Syed Nasir Hussain Shah, Mayor Karachi Barrister Murtaza Wahab, Chief Secretary Asif Hyder Shah, Chairman P&D Najam Ahmed Shah, Secretary Local Government Waseem Shamshad, CEO Karachi Water & Sewerage Corporation (KW&SC) Ahmed Siddiqui, Project Director KWSSIP Ayesha Hameed and other senior officials.

The Chief Minister and the World Bank Country Director discussed the implementation status of KWSSIP-I, progress on the K-IV Augmentation Project.

The water board officials also reported progress toward providing safe drinking water access to nearly two million people through the expansion of chlorination facilities and improved water quality monitoring systems.

Karachi's water and sewerage infrastructure is one of the most critical public service challenges facing the province. We are committed to completing all

reform and development initiatives under KWSSIP in a transparent and timely manner," said Mr Shah.



The Chief Minister emphasised that

improving water supply, sewerage services, and institutional efficiency remained a top

priority of his government. "Our objective is not merely to construct infrastructure but

to create a modern, efficient and financially sustainable water utility that delivers quality services to the people of Karachi," he said.

The meeting reviewed progress on the 2.7-kilometre common corridor component of the K-IV Augmentation Project. Water board officials informed the meeting that work on both the 72-inch and 96-inch diameter pipelines was underway and that the project was expected to be completed by August 2026.

The World Bank Country Director appreciated the Sindh government's commitment to implementing reforms in Karachi's water sector and acknowledged the progress made in addressing key project requirements.

The meeting was further informed that customer service centres, rehabilitation works in Soba Nagar, metering initiatives, and several operational facilities were nearing completion.

Reviewing recruitment and institutional strengthening measures, the Chief Minister directed officials to expedite the hiring of key technical and management staff and complete the induction of members to the KW&SC Board.

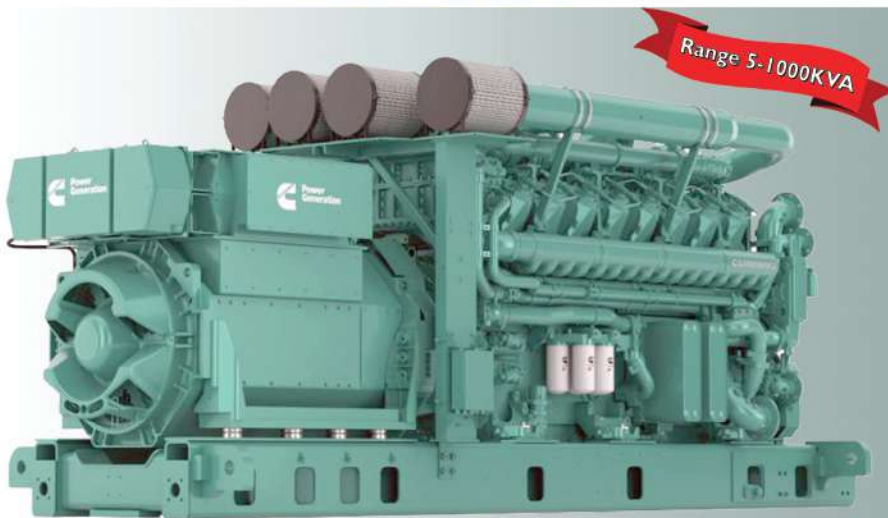
Concluding the meeting, Mr Shah reiterated the Sindh government's resolve to transform Karachi's water and sanitation sector through sustained investment, improved governance, and continued collaboration with development partners. ■



PREMIER ENGINEERING & SERVICES

Many Challenges, One Power Solutions Partner

DIESEL GENSETS



- Brand New Diesel Gensets
- Certified Used Diesel Gensets
- Rental Diesel Gensets
- After Sales Services
- Operational and Maintenance (O & M)



SWITCHGEARS

- ATS/AMP Panel
- Synchronizing and Load Sharing Panel
- PFI Panel



RENEWABLE

- Integrated Power Generation and Smart Microgrid Solutions with BESS
- Grid connected, Islanded, and Hybrid Energy Systems
- ROI-Driven EPC Project Delivery



INSPECTION & TESTING

- Grid Testing
- Vibration Analysis
- Thermography



DAEWOO BATTERY

- Maintenance Free
- Low Maintenance
- Deep Cycle
- Backup



8 Civic Centre Mustafa Town, Lahore

Lahore

(042) 35412722

Islamabad

info@premier-power.com

Karachi



POWER QUALITY MANAGEMENT
POWER FACTOR CORRECTION &
POWER METERING EQUIPMENT

MADE IN ITALY
WWW.GRUPPOENERGIA.COM



GEAHF

Active Harmonic Filters, 3 in 1
Wall mounted type, from 30A up to 100A,
230V - 400V, 50/60Hz
Cabinet type, from 70A up to 400A,
230V - 690V, 50/60Hz

GESVG

Static VAR Generators
Wall mounted type, from 20kVAR up to 100kVAR,
230V - 480V, 50/60Hz
Cabinet type, from 40kVAR up to 400kVAR,
230V - 690V, 50/60Hz



GESBZ

Voltage Stabilizer
from 1kVA up to 3000kVA,
110V - 440V, 50/60Hz



3CBAmLV

PFC Capacitor Banks LV
from 5kVAR up to 1500kVAR,
400V - 690V, 50/60Hz
With or without Harmonic reactors



3CBAmMV

PFC Capacitor Banks MV
from 100kVAR up to 500kVAR,
1kV - 15kV, 50/60Hz
With or without Harmonic reactors



PA007JB

Power Analyzer Tariff Meter
& Data Logger
For Single phase & Three phase LV & MV,
electric power distribution systems.
With large color LCD display.



RCM-INB, RCM-INP, RCM-INA

PFC Capacitors Three Phase LV
from 1.25kVAR up to 62.5kVAR,
400 - 780V, 50/60Hz,
Type Standard,
Type Heavy Duty,
Type Extra Heavy Duty.

GE-RT3/GE-RTM3

Detuned Harmonic Reactors LV
from 2.5kVAR up to 100kVAR,
400V - 690V, 50/60Hz
P = 5.67% - 210Hz / P = 7% - 189Hz
P = 14% - 134Hz.



3TRD

Three Phase Dry
Type transformers LV

Type Safety transformers.
Rated Power up to 25kVA
Rated input Voltage 100V - 600V
Rated output Voltage 24V - 600V

Type Isolating transformers.
Rated Power up to 40kVA
Rated input Voltage 100V - 600V
Rated output Voltage 24V - 600V

Type Power transformers.
Rated Power from 41kVA up to 1000kVA
Rated input Voltage up to 1000V
Rated output Voltage up to 1000V



ERD 6/ERD 12 ERDS 7/ERDS 13

Power Factor controllers LV & MV.
Fully Automatic.
Type ERDS with LCD graphic display.



GE-VC-3

Load Break Switches LV
from 160A up to 3150A,
415V, 50/60Hz



GRUPPO ENERGIA srl
Via Cavezzo, 36 - 25045 Castegnato (Bs) - Italy
Phone: +39 030 320 301 - Fax: +39 030 2411 006
Mobile: +39 348 007 6538 / +39 389 619 1385
www.gruppoenergia.com - mail: info@gruppoenergia.com

Head Office (Karachi): Ameejee Chambers, Campbell Street, Karachi-74200, Pakistan
Phones: + 92-21 32625492-5, Fax: +92-21 32627817 & 32621910
Lahore Office : +92-42 36676507-9 Islamabad Office: Tel: 051-2321191-2 Fax: 051-2321193
Email: avsltd@avs.com.pk Web: www.gruppoenergia.com

NEA KP Executive Committee Raises Concerns Over PEC Governance

An Executive Committee meeting of the PEC Engineers Alliance (NEA Chapter Khyber Pakhtunkhwa) was held at the Peshawar Garrison Club on Saturday and was attended by a large number of elected Governing Body members, Governing Body members, and Executive Committee members. The meeting was convened to review the performance of the present PEC Governing Body and to discuss the way forward in light of the commitments made to the engineering community during the election campaign.



the basis of our election manifesto.

The participants noted with concern that several major commitments made to the engineering community remain unfulfilled. These include:

1. Meaningful representation and empowerment of young engineers, including a commitment to secure at least ten seats for young engineers in the Governing Body.
2. Creation of overseas employment opportunities for Pakistani engineers through organized international job fairs and professional networking initiatives.
3. Protection of engineering jobs and positions currently occupied by non-engineers, a matter that continues to adversely affect both young and mid-career engineers.
4. Upgradation of engineering curricula

manifesto is a collective responsibility and cannot be achieved through a one-person approach.

The meeting unanimously urged the Chairman and the present leadership to immediately take corrective measures, restore consultative decision-making, and constitute an effective team-based mechanism involving all elected representatives. A comprehensive action plan should be developed and implemented without delay to achieve the remaining objectives within the limited tenure left for the current Governing Body.

The participants reaffirmed their commitment to the engineering community and emphasized that the confidence and trust placed in them over the past twenty-one years

must be honored through performance, transparency, and collective leadership. It was noted that this is the first time the alliance has faced such widespread concern regarding the implementation of its commitments.

The forum therefore strongly urges the present leadership to wake up to the challenges facing the engineering profession and ensure that the election manifesto is pursued in both letter and spirit. Failure to undertake meaningful corrective action may compel alliance members to place the facts before the engineering community and the media, and to publicly dissociate themselves from decisions and actions that do not reflect the commitments on which the mandate was secured. – PR

Budget 2026-27: Stability at Cost of Development?

Contd from page 1

League-N's Vision 2025 had envisaged education spending alone reaching 4 percent of GDP. Combined spending on education and health, he argued, should be at least 7 percent of GDP if Pakistan is serious about improving human capital.

According to Shah, another factor behind declining social sector spending is the pressure placed on provinces to generate fiscal surpluses to support federal deficit reduction.

He said provinces are expected to generate surpluses of approximately Rs1.9 trillion during the coming fiscal year and may effectively provide additional fiscal support to the federal government through reduced development spending.

"In practical terms, provinces are sacrificing development and human development spending so the federal government can meet IMF fiscal targets," he argued.

Borrowing to Pay Borrowing

Development economist Dr Kaiser Bengali offered an even harsher assessment, describing the budget as another example of Pakistan's long-standing dependence on debt.

"The story has remained the same for the last two decades," he said. "The figures look impressive, but implementation remains weak. We borrow to repay old loans and then borrow again."

According to Bengali, Pakistan has effectively been operating under conditions of financial insolvency for years because it lacks sufficient domestic resources to meet its obligations.

He argued that the country's two chronic problems remain the budget deficit and the trade deficit.

While successive governments have focused on increasing revenues, Bengali said the approach has increasingly resembled an aggressive tax collection drive rather than a strategy for economic growth.

"The economy is slowing, industries are closing, and agriculture is weakening," he said. "Yet taxes continue to rise. Every economist knows that when economic activity declines, governments typically provide relief to stimulate growth."

Bengali pointed to what he described as an unsustainable rise in government expenditure over the past two decades.

"In 2003, for every Rs100 of revenue, government expenditure was around Rs130. Today, for every Rs100 of revenue, expenditure has reached roughly Rs230," he said.

Rather than focusing exclusively on raising taxes, Bengali called for significant reductions in government spending.

He said a report he submitted to the federal govern-

ment in 2004 had recommended abolishing 17 federal ministries and nearly 60 attached departments that he considered redundant.

"It is time to reduce expenditure dramatically," he said. "The size of government has to shrink. Non-development expenditure, including non-combat defence spending, must be reviewed and reduced."

Budget Priorities Under Scrutiny

The budget figures appear to support concerns regarding the imbalance between debt obligations and development spending.

Interest payments and defence expenditure together account for more than Rs11 trillion, nearly nine times larger than the combined allocation for federal development spending and net lending.

Critics argue that such a structure leaves little fiscal space for investments in education, healthcare, infrastructure, and poverty reduction.

Government officials, however, maintain that fiscal consolidation remains essential for sustaining economic stability, restoring investor confidence, and ensuring compliance with IMF programme targets.

The debate surrounding the 2026-27 budget therefore reflects a broader question confronting Pakistan's economy: whether fiscal stability alone can deliver long-term prosperity, or whether greater emphasis on human development and structural reforms is required to break the country's recurring cycle of debt, IMF programmes, and slow economic growth.

As the new fiscal year begins, the answer may ultimately depend not only on the government's ability to meet revenue targets, but also on whether economic stability can be translated into meaningful improvements in the lives of ordinary Pakistanis. ■

Bijli Ghar



Karimi Electromech Systems

Plot No: 8/5-2, Street 5, Sector 12-C, North Karachi, Industrial Area, Karachi, Pakistan.
TEL: (+92-21) 36909873, 36909874, 36909875 Cell: 0300-2190590;
E-mail: info@karimisystems.com, karimswitch@yahoo.co.uk | website: www.karimisystems.com

Engineering Review

MH ENGINEERING
PRIVATE LIMITED

Engineering Solutions for Inspection, Calibration, Mechanical, Electrical & Training

MH Engineering, a Pakistan-based company, offers specialized inspection services to the energy industry, including:

- Lifting Gear Inspection
- Drill Pipe & Tubular Inspection
- Rig Inspection
- NDT Inspections
- Rope Access Services

CALIBRATION SERVICES

MH Engineering provides calibration services with highest degree of accuracy. Our professional team provides equipment calibration which meets international standards. Mentioned below are services but not limited to:

□ Weight	□ Torque
□ Pressure	□ Speed
□ Temperature	□ Load Cell
□ Time	□ Hardness Test
□ Length	□ Electrical/Electronic
□ Humidity	□ Test & Measuring
□ Distance	□ Devices

CONTACT US

Office # C-9, 3rd Floor, Farah Center adj: KFC, Block 13-C, Gulshan e Iqbal, Karachi.
Mob: (+92) 346 4844441, Phone: (+92) 213 4819992,
Email: info@mhgroup.com.pk Website: www.mhgroup.com.pk

PROGRESSIVE POWER GENERATORS (PVT) LIMITED
Suite # 403, Anum Estate Building, Main Shahrah-e Faisal, Karachi-75350

PPG www.progressivepower.com.pk
info@progressivepower.com.pk

CUMMINS / CAT TEAM
WE DEAL IN NEW & USED GENSET SALES, SPARES, SERVICE IN POWER GENERATION & INDUSTRIAL EQUIPMENTS

- GENERATORS SALES
- RADIATORS
- WORKSHOP & LAB
- ALTERNATORS
- TOP / MOJAR OVERHAULING
- PORTABLE GENERATOR

24X7 SERVICE

GENUINE & OEM Parts Importer

CAT Perkins
DRESSER VOLVO PENTA
Hino Denyo

FOR FURTHER DETAILS & ENQUIRIES CONTACT US ON:
PH: 021-34322307-8, MOBILE: 0345-2681973, 0300-9260047
EMAIL: maqsood.cummins@gmail.com

AL-MADINA Electric Corporation Estd. since 1967
www.almadinaelectric.com

Pressure Controls
Pressure Switches
Pressure Transmitters
High Performance
Solenoid Valves for all Purpose
Magnetic Contactor Over Load Relays

Danfoss

Maxthermo & Maxtech

Temperature Controller
Humidity Controller
Thermostat
Thermocouple
Proximity Sensor
Multi Range Timer
Micro Processors
Push Button all sorts

International Standard Available
16 Amp 3/4/5 Pins } IP 44
32 Amp 3/4/5 Pins } IP 44
63 Amp 5 Pins } IP 67
125 Amp 5 Pins } IP 67

YEEDA
Plug & Socket

All KINDS OF ELECTRICAL PRODUCTS FOR CONTROLS, DISTRIBUTION & AUTOMATION
Address: 19-Nishtar (Brandrth) Road, Lahore - 54000 (Pakistan)
Ph: (+92-42) 37641306-37641307, 37662197 Fax: 37634579
Email: almadina786@yahoo.com

0301-8441311

"Life is a gift and it offers us the privilege. an opportunity and responsibility to give something back by becoming more."

Tetty Reamie

FORNIGHTLY ENGINEERING REVIEW

Redefining Power Continuity, Control & Independence

By: Muhammad Tariq Haq

In a world where data centers, hospitals, manufacturing plants, commercial complexes, utilities, telecom networks, and critical infrastructure depend upon uninterrupted electrical power, the cost of a power disruption is measured not merely in downtime, but in lost production, compromised operations, damaged equipment, missed opportunities, and reputational risk.

Power continuity is no longer a luxury.

It is a business necessity.

At Energy Solutions (Pvt.)

Limited, we help organizations take complete control of their power systems through advanced **Generator Paralleling, Synchronisation, Load Sharing, Hybrid Power Integration, and Intelligent Power Management Solutions.**

Whether the requirement involves diesel generators, gas generators, utility power (MAINS), renewable sources, or a combination of multiple power assets, our engineering teams design and implement solutions that ensure maximum reliability, flexibility and operational efficiency.

Engineering Beyond Conventional Power Systems

Our expertise includes:

- Generator Paralleling Systems
- Synchronisation of Generators with MAINS Supply
- Intelligent Load Sharing Solutions
- Diesel + Gas + Grid Hybrid Integration
- Automatic Power Management Systems
- Critical Facility Power Continuity Solutions
- Custom Control & Monitoring Architectures

Every project is engineered around the specific needs of the customer rather than forcing customers to adapt to standard templates.

Because no two facilities are exactly alike.

The Deep Sea Advantage

To deliver reliability that our customers can depend

✓ Scalability for future expansion

✓ Ready availability of spares and replacements

Most importantly, they provide customers with freedom.

Breaking Free from Proprietary Limitations

One of the biggest challenges faced by generator owners today is dependence upon proprietary controller platforms.

Far too often, customers become locked into expensive ecosystems where routine modifications, spare parts, software changes, and upgrades come at an unjustifiably high cost.

We help customers regain control.

Our engineers specialize in replacing proprietary controller systems with open, customer-friendly architectures that provide:

- ✓ Greater flexibility
- ✓ Reduced lifecycle costs
- ✓ Easier maintenance
- ✓ Better spare parts availability
- ✓ Enhanced future scalability

The result is a power system that belongs to the customer—not the controller manufacturer.

Seamless Power Transfer

When It Matters Most

Electrical failures rarely announce themselves in advance.

That is why we provide sophisticated Bumpless Transfer Solutions, enabling seamless transitions between power sources with minimal disruption to critical loads.

When milliseconds matter, engineering excellence makes the difference.

Let's Build the Future of Reliable Power

Whether you are planning a new synchronisation project, upgrading an existing installation, eliminating controller dependency, or seeking greater operational reliability, our engineering team is ready to help. ■



upon, we primarily deploy industry-proven **Deep Sea Electronics (DSE)** controllers and modules.

These globally respected platforms provide:

- ✓ Superior reliability
- ✓ Flexible system architecture
- ✓ Advanced monitoring and diagnostics

INTELLIGENT POWER SEAMLESS CONTINUITY COMPLETE CONTROL

Smart Paralleling. Reliable Synchronisation.
Balanced Load Sharing.

OUR SPECIALISATIONS



Generator Paralleling

Multiple Gensets Working
as One Powerful System



Synchronisation

Precise Matching
with MAINS & Other Sources



Load Sharing

Optimal Performance
Lower Fuel & Wear



Hybrid Integration

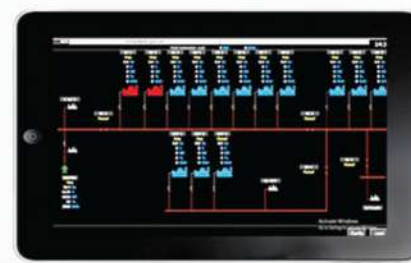
Diesel + Gas + Grid
Future Ready Power

WE USE. WE TRUST. WE STOCK.

DEEP SEA MODULES

Proven Reliability

Ready Availability



BUMPLESS TRANSFER ZERO DOWNTIME

Automatic Seamless
Transfer During Electrical
Breakdowns

BREAK FREE FROM PROPRIETARY CONTROLLERS.

We Replace, We Simplify.
We Put Control
Back in Your Hands.



INTELLIGENT POWER
Smarter Control, Stronger Output



COMPLETE CONTROL
More Insight, Total Control



SEAMLESS CONTINUITY
Uninterrupted Power, Always



TRUSTED PARTNER
We Stand by Your Power

READY FOR RELIABLE POWER? LET'S BUILD THE RIGHT SOLUTION TOGETHER



Energy Solutions (Pvt.) Limited

customer@esl.com |

www.esl.com |

111-222-ESL (375)

Tribute to Pakistan-China Friendship

A Zhejiang University Alumnus's Perspective on 75 Years of Iron Brotherhood

By Prof. Dr. Tariq Rahim Soomro

Alumnus, Zhejiang University, Hangzhou, China

Today, I had the privilege of attending a seminar commemorating the 75th anniversary of the establishment of diplomatic relations between China and Pakistan at the Consulate General of the People's Republic of China in Karachi.

As we gather to mark this historic milestone, my heart swells with pride, not just as a Pakistani, but as an alumnus of Zhejiang University (ZJU) in Hangzhou, one of China's most prestigious institutions of higher education.

Seventy-five years. In the grand sweep of history, it may seem a fleeting moment, but for our two nations, these decades have woven a story nothing short of legendary. From the rugged passes of the Karakoram to the corridors of the United Nations, Pakistan and China have stood shoulder to shoulder through seasons of change and storms of uncertainty. We are not merely allies; we are iron brothers, bound by trust, respect, and an unshakable commitment to each other's progress.

My own journey at Zhejiang University deepened this understanding in ways no textbook could. ZJU taught me the meaning of

qiushi chuangxin (求是创新) – "seeking truth and pursuing innovation". As walking its historic campuses, surrounded by Chinese professors who treated me like their own and classmates who became family, I learned something more profound: the Pakistan-China friendship lives not only in treaties and trade figures, but in everyday acts of warmth and solidarity.

I recall my regular visits to the library, discussing politics and poetry with Chinese friends who already knew the names of our poets, such as Allama Iqbal. I remember my Chinese advisors, Prof. Zheng Kougen and Prof. Pan Yunhe, who worked tirelessly to help me navigate research challenges, saying with a smile, "Pakistan and China are one family".

What has made these 75 years extraordinary? I believe it is respect. We have never lectured each other. We have never imposed conditions on our friendship. China's development has inspired Pakistan, and Pakistan has remained a steadfast partner in China's vision for a shared future. The China-Pakistan Economic Corridor (CPEC)

is not just a network of roads and power plants; it is a promise kept. A promise that prosperity should be shared, that growth should lift neighbors together.

As an alumnus of Zhejiang University, I am especially proud that so many of Pakistan's brightest minds have been shaped by Chinese

loudly of this bond. Tell the next generation that true friendship is possible between nations – different in geography, culture, and faith, yet united in heart.

Since our childhood, we have heard these words: Pakistan-China friendship is higher than the Himalayas, deeper than the ocean, sweet-

than a spring in the Karakoram, and brighter than the silk of Hangzhou.

• Our relationship is more faithful than the monsoon rains, more unbreakable than the bonds of a shared library at Zhejiang University.

• Our bond is warmer than the tea shared in Hangzhou, deeper than the roots of a thousand-year-old ginkgo tree.

• Our friendship is not written in ink, but imprinted in granite. Not spoken in whispers, but echoed from the rooftops of Islamabad to the shores of Shanghai.

• A friendship that asks no price, demands no proof, and bends but never breaks under the weight of the world.

I drank from the same well of knowledge as my Chinese brothers. That taste – of respect and shared

dreams – is sweeter than any honor the world could bestow. As an alumnus of Zhejiang University, I wish to pay tribute to the Pakistan-China friendship. We planted a seed in 1951. Today, it is a banyan tree whose roots have crossed the Karakoram and whose branches shelter generations. We honor the vision

• Pakistan-China friendship is closer than brothers, more loyal than a shadow, more durable than the Great Wall.

• This friendship is purer



of leaders who saw not borders, but bridges.

To our Chinese brothers and sisters: thank you for 75 years of standing with Pakistan. Thank you for your investments, your scholarships, your technology, and your trust. And to my Pakistani family: let us remain worthy of this friendship. Let us invest in our youth, in transparency, in the promise of CPEC, and in the dream of a regional future defined not by rivalry, but by cooperation.

The next 25 years will take us to our centenary. Imagine what we can build together: green corridors, digital highways, joint laboratories, and exchange programs that make our students citizens of both nations. The foundation is solid. Now, let us raise the roof.

**Pakistan Zindabad.
China-Pakistan Dosti
Zindabad.■**



universities. We return home not only with degrees, but with a deep, personal love for China – its language, its culture, and its people. We become bridges. And today, on this 75th anniversary, I call upon every Pakistani who has studied in China, and every Chinese who has worked in Pakistan, to speak

er than honey, and stronger than steel.

Now, on this 75th anniversary, I venture to add a few more:

• Pakistan-China friendship is closer than brothers, more loyal than a shadow, more durable than the Great Wall.

• This friendship is purer

Engineering Bazar

Engineering Review 5

C&M AUTOMATION (PVT) LTD.

SIEMENS REGIONAL DESIGNATED SYSTEM INTEGRATOR
C-188, Sector 31-D, P&T Society, Korangi Industrial Area, Karachi-74000, Pakistan
Tel: +92-21-35070751, 36018008, Mob: 0301-8241554
E-mail: cmautomation@pakistanic.com Web: www.pakistanic.com

SERVICES

- Energy Management
- PLC Troubleshooting & Repair
- Automation Panel Building
- Instrument Commissioning & Integration
- Data-Logging & Monitoring Systems
- Plant Commissioning Support
- Migration from Obsolete Control

PRODUCTS

- PLC's, PAC's and HMI's
- SCADA Software
- Remote I/O and Data Acquisition
- Isolated Transmitters/Signal Converter
- VFD's, Servo and Motion Control
- Motors and Switchgear
- Industrial Communication Gateways



Urethane Systems & Products Corporation
(A Member of the Product Group of Companies)
OUR RIGID POLYURETHANE FOAMS' HOT & COLD INSULATION APPLICATIONS
are widely used in Building and Constructions because of its High Strength & Energy Saving, Void-free, Heat & Sound Insulation, Water & Moisture resistance.

PLEASE CONTACT US FOR:
SPRAY FOAM applications over walls & roofs.
SANDWICHED PANELS for pre-fabricated structures
PIPE INSTALLATIONS & HVAC DUCTINGS

www.theproductgroup.com/usp
www.facebook.com/usp.cpk
0300-2374459, 0333-2480659

FOOD GRADE PVC & PUR HOSES

piab

- FREE OF PHTHALATES
- SMOOTH INTERIOR WALLS PROVIDE FOR OPTIMAL FLOW
- THE HOSE IS SUITABLE FOR ALL TYPES OF AIR AND FUMES AND TO TRANSPORT DUST AND POWDER

For Details Please Contact:

NETWORK TRADE MARKETING

Ph: +92-21-36707233 - 36608964; Cell: +92 300 8299153
E-mail: ntmpiab@gmail.com Website: www.ntmpk.com

FOIF
Approved by PTA

The latest technology in GNSS RTK System,

- One can now do topographic surveys much faster than ever before (5 to 10 time faster) with FOIF A30 GNSS RTK System. Project cost may be equivalent to Total Station survey or little less. The range of FOIF GNSS RTK
- System is 30km in radius. Accuracy: Horizontal: ± 10mm+1 PPM (part per million) Vertical: ± 20mm+1 PPM (part per million) This accuracy of GNSS System is more than 1/2 second Total Station.

G.R.MIRZA & CO.

Land Surveying and Navigational Products

Plot No. C-6, Sector V-1, Gulshan -e- Maymar, off: Super Highway Karachi.
Ph: 021-36350500, 36350230
Email: grmirza@grmiza.co Website: www.grmirza.co

Thermocouples

Type: J, K, T, R, S, ... others
RTD: DIN PT-100
IEC, BS, JIS standards.
Standard & made to order
Sizes/ shapes.
Shortest delivery time

TOHO Japan

Micro Processor Based Programmable Controllers and Recorders PID, Auto Tuning, user selectable inputs

PAPERLESS RECORDER

Features:

- ◆ 1 to 34 channel recordings.
- ◆ Multi input Thermocouple/RTD / DC Voltage / Current.
- ◆ Monochromatic / Colour / LCD Display.
- ◆ RS-232 communication / Ethernet.

Thermcraft

Phone: (021) 3272 0757, Fax: (021) 3277 1108;
E-Mail: thermcraft@gmail.com Website: www.thermcraft.com.pk

"When you aim for perfection, you find out it is a moving target."

- George Fisher

ENGINEERING REVIEW
The voice of engineers

(021) 32215961-62 - 32632567
info@engineeringreview.com.pk
engineeringreview@yahoo.com
www.engineeringreview.com.pk

In Loving Memory of Noordin Sheriff Chairman, Jubilee Corporation

It is with profound sadness that Jubilee Corporation announces the passing away of Mr. Noordin Sheriff on 5 June 2026.

A founding member of the company and a pioneer of Pakistan's low-voltage switchgear industry, he was a man whose vision, technical expertise, and dedication shaped an organization that has served this country for

father, Mr. Noor Mahomed Sheriff, and elder brother, Mr. Akbar Noor Mahomed Sheriff, bringing with him valuable technical knowledge and industry experience.

At a time when Pakistan largely relied on conventional rewirable fuses for electrical protection, Mr. Noordin Sheriff recognized the need for safer and more advanced technologies. Through his technical leadership, Jubilee Corporation introduced High Rupturing Capacity (HRC)



over six decades. His passing marks the end of an era.

Mr. Noordin Sheriff, son of Mr. Noor Mahomed Sheriff, was among the founding members of Jubilee Corporation and a driving force behind the company's early technological advancements. After serving as an Electrical Engineer at Siemens Pakistan, he joined the family business founded by his

Fuses based on German technology to the Pakistani market in 1960s. This marked a significant milestone in the evolution of electrical protection systems in the country and laid the foundation for modern low-voltage switchgear practices.

As one of the pioneers behind Jubilee Corporation, Mr. Noordin Sheriff helped establish a company that would go on to become one



of Pakistan's longest-serving and reliable organizations in the electrical engineering sector. His contributions extended beyond products and technologies; he helped build a culture of innovation, technical excellence, and commitment to customer service that continues to define Jubilee Corporation today.

The journey that began with the vision of three brothers transformed Jubilee Corporation into a trusted engineering solutions

Mr. Noordin Sheriff's role in this journey remains an integral part of the company's history and legacy.

The entire Jubilee Corporation family remembers him with gratitude and respect for his invaluable contributions to both Jubilee Corporation and Pakistan's electrical industry. His dedication, professionalism, and pioneering spirit will continue to inspire future generations.

May Allah grant him the highest place in Jannah, and



provider, introducing numerous global innovations to Pakistan over the decades.

may his family be granted patience and strength in this time of grief. Ameen.■

Let's Boost Your Startup!

If you are running an Engineering or Non-Engineering Startup, we are here to boost your Startup.

It is a tough struggle to run a startup. A small team, limited budget, pitching the new idea in the market, resistance from old market players, these are the challenges for new Startups, Engineering Review stands with you in your struggle.

Engineering Review is the most circulated and readable newspaper in the engineering sectors. It is a popular journal among engineering professionals. We are now in the 48th year of publishing. Engineering Review has a large number of followers on its YouTube channel and Facebook Page. We can boost your Startup among engineers and as well as the general public.

Together we will Pitch your Idea to the world!

FORTNIGHTLY
**ENGINEERING
REVIEW**
The voice of engineers

Phones: (021) 32215961-62, 32632567

0334-2668581

E-mail: info@engineeringreview.com.pk

Web: www.engineeringreview.com.pk

إِنَّا لِلّٰهِ وَإِنَّا إِلَيْهِ رَاجِعُونَ



جناب نور الدین شریف صاحب

کے انتقال پر ملال پر ہم جوبلی کارپوریشن، ان کے اہل خانہ، دوست احباب کے غم میں برابر کے شریک ہیں۔

ہماری دعا ہے کہ اللہ تعالیٰ جناب نور الدین شریف صاحب کی مغفرت فرمائے اور ان کے درجات کو بلند فرمائے آمین۔

FORTNIGHTLY
**ENGINEERING
REVIEW**
The voice of engineers
Golden Jubilee 50
ENGINEERING REVIEW 1978-2026

PAK HEI Consortium Advances Immersive Learning in Romania

The ERASMUS+ Capacity Building in Higher Education (CBHE) initiative, under the flagship CATCH_VR Project, successfully convened its Project Review Meeting and Core Sessions of the Executive Committee from 4 partner universities (MUET, GIKI, QUEST, UETP) from Pakistan and 4 partner Universities from Europe (UoO Romania, UL Ireland, TUS, Bulgaria and UCC, Ireland) at the University of Oradea (UoO), Romania. The four-day event brought together distinguished academic leaders, researchers, and institutional partners from across Europe and Asia under the theme “Redefining Skills with Digital Twin & Immersive Experience.”

The meeting served as a critical platform to assess project progress, validate key performance indicators (KPIs), and chart a strategic roadmap for the project's successful completion and long-term sustainability. Participants engaged in comprehensive discussions covering all major work packages, including project management, infra-

structure development, academic program implementation, capacity building, quality assurance, and dissemination.

A key highlight of the meeting was the strong alignment observed between project activities and the objectives outlined in the Grant Agreement. Partners reported significant achievements since the interim review, particularly in establishing AR/VR and Digital Twin laboratories,

anisms based on the PDCA (Plan-Do-Check-Act) model.

In the area of academic development, partners reviewed the progress of the Master's program in Immersive Technologies and Digital Twin, highlighting advancements in curriculum design, accreditation processes, and student enrollment. The consortium reaffirmed its commitment to fostering industry linkages and practical training

on dissemination and impact, underscoring the need to expand outreach efforts and increase visibility through digital platforms, publications, and collaborative events. The project's contributions to education, industry, and society were widely acknowledged, reinforcing its relevance in addressing emerging technological and socio-economic challenges.

One of the most significant

program on “Innovations in Immersive Learning: AR/VR and Digital Twin Technologies in Education” will be held at GIKI on 17–18 August 2026, focusing on enhancing the technical and academic capacities of project partners. A hybrid international conference, titled “Immersive Futures: Transforming Education through AR/VR Technologies,” is planned for 27–28 August 2026, to be

applications, VR development pipelines, immersive experience design, AI-driven sustainability, and capstone design projects. Additionally, cross-laboratory training sessions will be conducted at MUET on 12-14 Oct 2026 to enhance inter-institutional collaboration and knowledge exchange, reinforcing the project's commitment to building a cohesive and innovative learning ecosystem.

The consortium also announced that the Final Project Meeting will be held in Peshawar on 16-18 November 2026, bringing together all partners to review achievements, finalize deliverables, and approve the final project report. A one-day symposium on “Smart Learning Environments with AR/VR and Digital Twin Technologies” will also be held alongside this meeting, further amplifying the project's outreach.

The meeting concluded with a strong reaffirmation of the consortium's shared vision and commitment to excellence. By leveraging immersive technologies and digital innovation, the CATCH_VR Project is poised to make a lasting impact on higher education, research, and industry, contributing significantly to global efforts in digital transformation and sustainable development. - PR



developing innovative academic curricula, and launching specialized Master's programs focused on immersive technologies and Digital Twin.

The Executive Committee sessions emphasized the importance of achieving all remaining deliverables within the stipulated timeframe. Particular attention was given to strengthening KPI performance, ensuring continuous data updates on the project portal, and enhancing the quality and impact of deliverables through robust quality assurance mechanisms.

opportunities to enhance employability and real-world impact.

Capacity building remained a central pillar of the discussions, with partners presenting outcomes from various training programs and identifying gaps to address in upcoming activities. These initiatives aim to equip students, faculty, and stakeholders with cutting-edge skills in AR/VR, digital twin technologies, and immersive learning environments.

The meeting also focused

outcomes of the meeting was the endorsement of a Global Strategic Roadmap, designed to ensure the project's sustainability beyond its funded duration. This roadmap outlines a transition from a grant-based initiative to a self-sustaining, scalable ecosystem, driven by academic excellence, diversified funding models, and strategic partnerships.

Looking ahead, the consortium agreed on several key initiatives to further strengthen the project's impact. A two-day specialized training pro-

hosted by QUEST under the leadership of Prof. Dr. Saleem Raza Samo. This event will serve as a global platform to showcase project outcomes and innovations in immersive learning.

Further strengthening the capacity-building agenda, a five-day advanced training program is proposed at the Technical University of Sofia (TUS), Bulgaria, in mid-September 2026. This program will cover cutting-edge themes such as holographic digital twins, smart city



SMJ
S. M. JAFFER & CO
SINCE 1949



Baudouin
A WEICHAI COMPANY

FRENCH TECHNOLOGY

WITH 100 YEARS PROVEN HISTORY









AFTER SALE SERVICES 24/7

RANGE

20-6250KVA

GENSET FROM OEM (SINGLE SOURCE PRODUCT)

SPECIALIZED FOR DATA CENTERS, HOSPITALS, BANKS AND POWER INDUSTRIES

EMISSION COMPLIANT – ENVIRONMENT FRIENDLY

LONG OVERHAULING INTERVAL (UP TO 32000 HOURS)

IMPORTED & LOCAL COUPLED – Both options available

HEAD OFFICE

Jaffer House, 17-Timber Pond, Keamari, Karachi-75620, Pakistan.

BRANCHES

LAHORE | ISLAMABAD | MULTAN | FAISALABAD | QUETTA | HYDERABAD | SUKKUR

SERVICE CENTERS

| RAHIM YAR KHAN | KOHAT | JHELMUM | CHITRAL | MARDAN | MIRPUR KASHMIR | D. I. KHAN | GAWADAR |
| PESHAWAR | GILGIT | JACOBABAD | LARKANA | GUJRAT | ABBOTTABAD | SWAT |

info@smjaffer.com | www.smjaffer.com | 111-765-765



JES
Instrumentation & Controls

From Concept To Commissioning

AIR VENTURI VALVES



Air Venturi Valve precision gives you better ventilation and energy – use without the hassles.



Unitary Controller

- HVAC & BMS controller
- Energy efficient control
- BACnet/IP & RS485 support



Optimizer Advanced Controller

- High-performance building automation controller.
- Built-in Ethernet connectivity for fast data exchange.
- Advanced HVAC monitoring and control capabilities.



Spyder™ Model 7 VAV Controller

- Programmable VAV controller with integrated actuator.
- Supports BACnet/IP and BACnet MS/TCP communication.
- Built-in Bluetooth (BLE) for wireless commissioning.



Honeywell
Authorized System Integrator




/com/company/jes-instrumentation-control/

302, Europa Centre, Hasrat Mohani Road,
Off. I.I Chundrigar Road, Karachi-Pakistan
info@jes.solution ☎ +9221-32626436

Haier

More Creation, More Possibilities



Feel Free With Smartlink

MRV5 DC INVERTER



Labour Saving Without
Complex Wire Connection



Smart Auto-network
Establishment



Easy Troubleshoot &
Maintenance



Project: **Emaar Giga**
Building Type: **Appartments Tower**
Location: **Karachi**
Capacity: **2,834 Ton**



Project: **Centaurus, Islamabad**
Building Type: **Appartments Tower**
Location: **Islamabad**
Capacity: **3,500 Ton**



Project: **Bakht Tower**
Building Type: **Appartment Tower**
Location: **Karachi**
Capacity: **494 Ton**



Project: **Karakoram Greens**
Building Type: **Appartment**
Location: **Islamabad**
Capacity: **4,500 Ton**



Project: **Mall of Wah**
Building Type: **Mall**
Location: **Wah Cantt**
Capacity: **1,000 Ton**



Ai, Innovation & Global Research Converge In Karachi

4th International Conference On Information Science And Communication Technology 2026

The 4th International Conference on Information Science and Communication Technology (ICISCT 2026) was formally inaugurated on 15 April 2026 at the Bashir A. Malik Auditorium, Sir Syed University of Engineering and Technology (SSUET), Karachi.

Jointly organized by UBIT (University of Karachi) and SSUET, in collaboration with the Sindh Higher Education Commission and with technical backing from IEEE, the conference united academics, researchers, technology professionals and distinguished guests from across Pakistan and the world. All accepted papers will be indexed in IEEE Xplore.

The opening ceremony commenced with Quranic recitation, followed by the national anthem. Conference Chair Dr M. Sadiq Ali Khan extended a warm welcome, highlighting themes of Artificial Intelligence, IoT, cybersecurity and quantum computing. Recorded addresses were delivered by Ms. Mary

Ellen Randall, 2026 IEEE President & CEO, and Ms. Grace Lewis, 2026 IEEE Computer Society President — who marked the Society's 80th anniversary and called on researchers to advance the mission of "Computing Together" for humanity's benefit.



Dr M. Sadiq Ali Khan,
Conference Chair
**Inaugural Keynote —
Science As An Engine Of
Growth**



Prof Dr Atta-ur-Rahman,

Keynote Speaker
The inaugural keynote was delivered by Prof Dr Atta-ur-Rahman, Fellow of the Royal Society (London) and former Federal Minister of Science and Technology, on "Science and Technology: Engines for Socio-Economic Development." He traced Pakistan's transformation into a knowledge economy during 2000–2008 a period the Royal Society described as a model for developing countries and cited the establishment of PERN and Pakistan overtaking India in per-capita research output by 2017 as landmark achievements.



Ms. Mary Ellen Randall
2026 IEEE President &
CEO IEEE President & CEO
Ms. Mary Ellen Randall
delivered a recorded welcome address to ICISCT 2026, emphasising that engineering is ultimately about

people and how technological innovation can uplift lives. She praised the organisers for directing technology toward improving communities, protecting the planet, and serving humanity. Ms. Randall encouraged participants to think beyond algorithms and systems, and to reflect on the human stories behind every breakthrough from bringing electricity and Internet access to remote regions, to developing smarter cities and creating opportunities for those who need them most. She expressed hope that the conference would spark new partnerships and fresh perspectives in support of the global good.



Ms. Grace Lewis
2026 IEEE Computer Society President
IEEE Computer Society President
Ms. Grace Lewis, 2026 President of the IEEE Computer Society, delivered a warm recorded welcome marking a particularly significant year — the Society's 80th anniversary and the launch of its new five-year strategic plan. She highlighted the Society's commitment to leading in emerging technologies while upholding ethical and humanitarian principles, broadening global participation in computing, and fostering interdisciplinary collaboration. Ms. Lewis expressed special hope for increased engagement from Pakistan's research community in IEEE Computer Society Region 10 activities, and affirmed that events like ICISCT are central to advancing the shared mission of "Computing Together" for positive human impact.



Day One — Technical Sessions At Ssuet
Inauguration Ceremony — 15 April 2026, Bashir A. Malik Auditorium, SSUET
Plenary I — Deepfakes, AI in Education & VR
Dr Tariq Rahim Soomro, Rector of IoBM Karachi,



addressed the growing threat of digital deception and outlined institutional countermeasures against AI-generated manipulated media. Dr Sohrab Khan of Balochistan University examined the transition toward AI-driven universities, arguing that higher education can serve as an engine of regional economic transformation. Prof Dr Sajjad Ahmad Madani of COMSATS raised ethical questions from self-driving vehicles to academic integrity in the age of generative AI. Plenary II — GenAI, Healthcare AI & Islamic Ethics
Prof Dr Muazzam A. Khan Khattak of QAU ranked among the world's top 2% most cited scientists presented on AI-powered diagnostics, robotic surgery and the governance challenges of algorithmic bias. Dr Salman Ahmed of GIKI explored AI through Islamic principles, linking the concept of Maslahah to conditions under which AI may be ethically permissible. Prof Dr S. M. Aqil Burney closed with Multi-Criteria Decision Making applications in textile and renewable energy sectors.

baijan, Malaysia, the United Kingdom and Pakistan.
Plenary Sessions — 16 April 2026, ICCBS, University of Karachi
Plenary III — LLMs, AGI & Digital Sovereignty
Dr Waheed Noor of the University of Balochistan presented a roadmap from today's large language models toward AGI, arguing progress will emerge from collective intelligence networks of specialized agents. Prof Rabie A. Ramadan of the University of Nizwa, Oman, declared the era of AI as a mere tool is over. Prof Dr Athar Mahboob made the case for open-source digital sovereignty. Engr Zaka Ul Haque of HBL presented a maturity model for responsible AI governance in South Asian banking.
Plenary IV — Smart Farming, Edge AI & Defence Tech
Mr Mohamed Rawidean Mohd Kassim of Malaysia's MIMOS presented on smart farming via IoT and AI. Prof Dr Yasir Ayaz, Founding Chairman of NCAI at NUST, asserted AI has become the new electricity the infrastructure underpin-

Contd on page 11

CHINT | Next series

CHINT ELECTRIC

The Next Reliable Choice

Air Circuit Breaker | Moulded Case Circuit Breaker | Modular Din Rail Product | Motor Control & Protection

Authorized Distributor

Ameejee Valleejee & Sons (Pvt.) Ltd.

Head Office (Karachi): Ameejee Chambers, Campbell Street, Karachi-74200. Pakistan.
Phones: +92-21 32625492-5, Fax: +92-21 32627817 & 32621910
Lahore Office: +92-42 36676507-9, Islamabad Office: +92-51 2321191-2,
Email: avsltd@avs.com.pk Web: www.next.chint.com

Your Industry Leader in Prestressed Concrete (PC) Wire, Strands & Spring Wires

PRODUCT YOU CAN TRUST

0300 0552122 | 0303 3336970
www.unitedwire.com.pk
info@unitedwire.com.pk

unitedwire

Pakistan Launches First Consumer-Focused Clean Energy Platform to Accelerate Solar Adoption

Marking World Environment Day, TheNetwork for Consumer Protection, in collaboration with Consumers International, launched Pakistan's first consumer-focused One-Stop-Shop (OSS) platform, SabzBijli.pk, aimed at helping households and small businesses make informed decisions about adopting solar energy and other renewable technologies.

The initiative comes at a time when consumers across Pakistan are grappling with rising electricity tariffs, growing energy insecurity, and increasing interest in alternative energy solutions. The platform seeks to simplify the often-complex

cal support throughout their clean energy journey," he said.

He emphasized that Pakistan's transition toward sustainable energy can only succeed if consumers are equipped with reliable information and have access to affordable, transparent, and high-quality clean energy solutions.

The newly launched platform forms part of a broader international initiative led by Consumers International to place consumers at the centre of the global clean energy transition. According to a recent Consumers International study, households worldwide invested approximately US\$184 billion in climate mitigation measures in a single year—almost double the amount spent by governments globally—highlighting the growing role of consumers in advancing sustainable energy solutions.

use could contribute significantly to global emissions reductions. Consumers International's Clean Energy Futures Programme estimates that demand-side measures could account for up to 70 percent of the emissions reductions needed worldwide by 2050.

The One-Stop-Shop model has been designed to support consumers throughout every stage of the clean energy adoption process—from awareness and decision-making to financing, installation, operation, and grievance redressal. International experience indicates that such platforms can lower costs, improve consumer trust, accelerate renewable energy uptake, and enhance energy resilience.

As part of the initiative, TheNetwork will engage with policymakers, regulators, consumer organizations, industry stakeholders, and development partners to



process of transitioning to clean energy by providing independent information, practical tools, trusted service providers, and step-by-step guidance for consumers.

Speaking at the launch ceremony, Chief Executive Officer of TheNetwork for Consumer Protection, Nadeem Iqbal, said the energy landscape is changing rapidly, with consumers increasingly playing an active role in energy generation and management.

"Consumers are no longer passive users of energy; they are becoming producers, managers, and beneficiaries of clean energy solutions. However, many households face difficulties in understanding technical information, comparing suppliers, and evaluating financing options. SabzBijli.pk is designed to empower consumers with trusted guidance and practi-

The study also identified 113 One-Stop-Shop platforms operating across different countries, helping consumers access renewable energy technologies through integrated and trusted services.

SabzBijli.pk offers users a single access point for information on solar energy systems, estimated installation costs and savings, technology comparisons, financing opportunities, and connections with credible suppliers and installers. By consolidating these services on one platform, the initiative aims to reduce information gaps, build consumer confidence, and protect households from misleading claims and poor-quality services.

Experts noted that consumer-led actions such as adopting renewable energy technologies, improving energy efficiency, and electrifying household energy

promote consumer-centric energy policies and strengthen public participation in Pakistan's clean energy transition.

The launch event brought together leading experts, including Imtiaz Hussain Baloch, Hussain Jarwar, Mir Ahmad Shah, Dr. Zagum, and Dr. Omais Abdur Rehman, who highlighted the importance of renewable energy, supportive policy frameworks, consumer awareness, and climate action in achieving Pakistan's sustainability goals.

Organizers said the platform represents an important step toward making clean energy more accessible, affordable, and reliable for Pakistani consumers while contributing to the country's broader objectives of energy security, climate resilience, and sustainable development. — ER News Desk

Ai, Innovation & Global Research Converge In Karachi

Contd from page 10

ning all future systems. Dr Shoab Ahmed Khan closed with a technical analysis of AI and autonomous systems in current global conflicts, with implications for Pakistani cybersecurity engineers.

semantic plagiarism detection with over 30 research papers presented across technical sessions.

Paper submissions came from across Pakistan SSUET, NED, DHA Suffa, FAST-NUCES, UET Peshawar, GIKI and COM-SATS and internationally from Indonesia and



Panel Discussion: AI & Business Innovation — ICCBS, Day Two

Closing Ceremony & Key Outcomes
The closing ceremony commenced with Conference Chair Dr M. Sadiq Ali Khan summarising over 20 keynote and invited

Azerbaijan. ICISCT 2026 is the fourth edition of the conference, first held in 2019, and will continue to foster interdisciplinary research at national and international levels. All accepted papers are indexed in IEEE Xplore.

Shield Distribution Ceremony — Day



speakers from more than 10 countries covering AI sovereignty, agentic systems, hydrogen safety, VR healthcare training and

One, SSUET
Prof Dr Khalid Mahmood Iraqi, Vice Chancellor, University of Karachi. ■

EXPERIENCE HIGH EFFICIENCY

With the lowest total cost of ownership (TCO)

UPTO **3MW**

LARGEST STOCKS IN PAKISTAN:

- Design, Installation, Testing & commissioning of Turnkey Power Solutions.
- Technical expertise and advisory services for the best available Power solutions.
- Annual maintenance contract available.
- Comprehensive warranty with parts.
- Backup time Minutes to Hours.

IDEAL FOR
MODERN DATA CENTER DEMANDS

EX-STOCK AVAILABILITY
 SERVICE ENGINEERS TRAINED & CERTIFIED BY **ABB**

HEAD OFFICE

Jaffer House, 17-Timber Pond, Keamari, Karachi-75620, Pakistan.

BRANCHES

LAHORE | ISLAMABAD | MULTAN | FAISALABAD | QUETTA | HYDERABAD | SUKKUR

SERVICE CENTERS

| RAHIM YAR KHAN | KOHAT | JHELUM | CHITRAL | MARDAN | MIRPUR KASHMIR | D. I. KHAN | GAWADAR |
 | PESHAWAR | GILGIT | JACOBABAD | LARKANA | GUJRAT | ABBOTTABAD | SWAT |

info@smjaffer.com | www.smjaffer.com | 111-765-765



Web: www.engineeringreview.com.pk

ITANZ Technologies Secures \$3.5 Million IoT and Analytics Contract in Middle East

ITANZ Technologies Limited has secured a major international contract worth approximately US\$3.5 million to serve as the technology delivery partner for a large-scale Internet of Things (IoT) and Analytics rollout for one of the Middle East's largest and most strategically

important telecommunications operators. The company disclosed the development in a notice submitted to the Pakistan Stock Exchange (PSX), stating that the project has been secured through its international operations and represents a significant milestone in the company's regional expansion strategy.



According to the disclosure, the initial deployment phase of the project carries a value of US\$2.6 million and

will be executed over a period of 24 months. The deployment program has been structured into four six-month phases, with ITANZ receiving US\$650,000 for each phase of implementation. Following the completion of the deployment stage, the company expects to generate additional recurring revenues through annual subscription and support services valued at US\$300,000 per year for three years. This will bring

the total value of the assignment to approximately US\$3.5 million.

ITANZ said the project will involve the deployment of advanced IoT and analytics solutions designed to support the telecom operator's digital transformation and operational efficiency objectives.

The company noted that the post-deployment phase will provide a stable and predictable revenue stream through annual subscriptions and managed maintenance services. These services will

include platform access, continuous artificial intelligence (AI) model updates, software enhancements and upgrades, hardware maintenance and technical support, as well as round-the-clock Network Operations Center (NOC)-backed managed services.

Industry observers view the contract as a significant achievement for the Pakistani technology company, reflecting growing international demand for locally developed digital solutions

and advanced analytics platforms.

In its statement, ITANZ reaffirmed its commitment to maintaining the highest standards of corporate governance and ensuring compliance with all applicable regulatory requirements.

The latest contract is expected to strengthen the company's international footprint while enhancing recurring revenue generation through long-term subscription and support arrangements. – ER News Desk

Pakistan's First Coal-Based Fertilizer Plant

The Pakistan China Joint Chamber of Commerce and Industry (PCJCCI) welcomed the establishment of Pakistan's first coal-based fertilizer plant under the China-Pakistan Economic Corridor (CPEC), terming the USD 1.12 billion project a landmark investment that will strengthen agricultural productivity, improve food security, create employment opportunities, and promote industrial growth across the country.

In a joint statement, PCJCCI President Nazir Hussain, Senior Vice President Brig. Mansoor Saeed Sheikh, Vice President Amir Ali, and Secretary General Salahuddin Hanif said the project represents a strategic step towards utilizing Pakistan's indigenous energy resources for value-added industrial production.

They explained that the fertilizer plant will use locally available coal as a primary feedstock to produce chemicals required for manufacturing fertilizer, particularly urea. Through a gasification process, coal will be converted into synthetic gas (syngas), which contains hydrogen and carbon monoxide. The hydrogen extracted from the gas will then be used to produce ammonia, the basic ingredient required for fertilizer manufacturing. The ammonia will subsequently be converted into urea and other fertilizer products used extensively in agriculture.

According to PCJCCI officials, the project will significantly reduce Pakistan's dependence on imported fertilizer inputs and raw materials, helping ensure a more stable and affordable supply of fertilizer for farmers. Lower input costs are expected to enhance agricultural productivity and improve the competitiveness of Pakistan's farming sector.

"The first coal-based fertilizer plant under CPEC is not merely an industrial project; it is a strategic investment in Pakistan's agricultural future," the chamber leaders said. "By utilizing domestic coal resources, Pakistan can reduce foreign exchange expenditures on fertilizer imports, strengthen supply chains, and support long-term agricultural sustainability."

They noted that fertilizer remains one of the most critical inputs in crop production, directly affecting yields of wheat, rice, cotton, sugarcane, and other major crops. A reliable domestic supply of fertilizer would help farmers achieve better yields while minimizing the risks associated with international price fluctuations and supply disruptions.

The PCJCCI leadership further highlighted Pakistan's vast untapped agricultural potential across diverse agro-climatic zones. They said that dry-land farming in Zones III-A and III-B could be expanded through modern irrigation systems, advanced seed technologies, and improved cultivation practices. Similarly, the Indus Delta region offers significant opportunities for integrated rice and fish farming models inspired by successful Chinese agricultural experiences.

They emphasized that the fertilizer project could act as a catalyst for broader agricultural modernization initiatives. China's expertise in agricultural mechanization, precision farming, aquaculture, smart irrigation, and agro-industrial development can help Pakistan unlock the full

potential of its agriculture and blue economy sectors.

The chamber officials also pointed to the project's wider economic benefits. Beyond fertilizer production,

the plant is expected to generate thousands of direct and indirect employment opportunities during construction and operation. The investment is likely to stimulate related industries, including mining, transportation, engineering services, logistics, equipment manufacturing, and agricultural processing.

They said the project reflects the evolving nature of CPEC cooperation, which is increasingly focused on industrialization, technology transfer, food security, and sustainable economic development. By linking Pakistan's natural resources with modern Chinese technology and investment, the initiative can contribute significantly to the country's economic growth and agricultural resilience.

PCJCCI expressed confidence that the coal-based fertilizer plant would become a model for future industrial projects aimed at strengthening Pakistan's self-reliance, enhancing food security, and creating long-term economic opportunities for rural and urban communities alike. – ER News Desk



Professional Club

Engineering Review

ASSOCIATED CONSULTING ENGINEERS ACE LIMITED

Established in 1958, ACE, being a multi-disciplinary and multi-sectorial organization, has become one of the premier engineering consulting houses of Pakistan in the Private Sector.

FIELDS OF ACTIVITIES:

- Dams and Barrages • Irrigation and Drainage • Power Engineering
- Public Health Engineering • Architecture and Town Planning
- Highways and Transportation Engineering
- Environmental Impact Assessment • Socio-Economic Studies
- Industrial Engineering • Hydraulic Structures
- Environmental Planning • Ground Water Resources Development
- River Basin Projects • Flood Control

SERVICES:

- Project Planning • Surveys & Investigations
- Feasibility Studies • Conceptual Designs
- Preliminary & Detailed Designs • Tender Documents
- Contract Award Process • Construction Supervision
- Management Consultancy • Inspection & Remedial Works
- Operation & Maintenance • Project Management
- Institutional Development & Capacity Building
- Training

website: www.acepakistan.com

Corporate Office
D-185, KDA Scheme No. 1, Tipu Sultan Road, Karachi-75350, Pakistan
Tel: (92-21)34530825, 34534128, 34539219
Fax: (92-21)34546679 Email: corporate@acepakistan.com

Regional Office (North)
1/C-2, M.M. Alam Road, Gulberg-III, Lahore-54660
Tel: (92-42)35759417-9 Fax: (92-42)35878278
Email: aceron@brain.net.pk, aceron@acepakistan.com

Regional Office (South)
C-35, Muhammad Ali Cooperative Housing Society, Tipu Sultan Road, Karachi-75350
Tel: (92-21)34320171-76 Fax: (92-21)34141175
Email: acesouth@gmail.com, acesouth@acepakistan.com

Transportation Engineering Services
36-Civic Centre, 3rd Floor, M-Block, Model Town Ext. Lahore-54700
Tel: (92-42)3571081-3 Fax: (92-42)3571084
Email: ace.transportation@ndv@gmail.com

ACE Architectural & Town Planning Services
36-Civic Center, Ground Floor, M-Block, Model Town Ext. Lahore-54700.
Tel: (92-42)3570871-4 Fax: (92-42)3570875
Email: acearts@r@gmail.com

Islamabad Office
Suit # 101, Victoria Heights, Sohan, (Near Sohan Overhead Bridge), Main Service Road East, Islamabad Expressway, Islamabad
Tel: (92-51)2612283, Fax: (92-51)2612294, WhatsApp: 0309-6649732

Peshawar Office
House No. 1945, Afzalabad Old Bara Road, University Town, Peshawar
Tel: (92-91)5700397
Email: acepeshawar@acepakistan.com

Foreign Offices: Malaysia, Indonesia

NATIONAL DEVELOPMENT CONSULTANTS (PVT.) LIMITED

FIELDS OF ACTIVITIES

- Dams & Hydropower
- Irrigation & Drainage Design
- River Training & Flood
- Transportation & Tunneling
- Public Health & Environmental
- Agriculture & On-Farm
- Building & Urban
- Physical & Numerical
- Surveys & Investigations

SERVICES

- Feasibility Studies
- Detailed Engineering Design
- Contract Administration
- Construction Supervision
- Third Party Validation
- Engineering/Monitoring
- Tender Documentation
- Water
- Management Bid Evaluation
- Rehabilitation Including Development QA/QC
- Operation &

NDCC Head Office:
114, Sector-A, Commercial Broadway, Phase-VIII, Defence Housing Authority, Lahore, Pakistan
Tel: +92-42-37135034-37 Fax: +92-42-37135038
Email: ndc@ndcpak.com Website: www.ndcpak.com

ATIF NAZAR (PVT.) LTD.

PROJECT MANAGERS | ARCHITECTS
PLANNERS | CONSULTING ENGINEERS

ENGINEERING EXCELLENCE
DELIVERING SINCE 1982

INFRASTRUCTURE
• Water Supply
• Sewage
• Storm Water Drainage

TRANSPORTATION
• Highway Design
• Bridges
• Traffic Engineering

STRUCTURAL
• Building Design
• Bridge Design
• Retrofit & Strengthening

MECHANICAL/PLUMBING
• HVAC Systems
• Plumbing
• Fire Protection

ARCHITECTURE/INTERIOR
• Architectural Design
• Interior Design
• Building Planning

PLANNING
• Urban Planning
• Rural Planning
• Space Planning

ELECTRICAL & CCTV
• Power Distribution
• Lighting Design
• CCTV & Security

HEALTHCARE
• Hospitals
• Clinics
• Allied Health Facilities

INNOVATION | QUALITY | SUSTAINABILITY | EXPERIENCE

D-11/A, Block 17, Gulshan-e-Iqbal, Karachi, Pakistan
www.atifnazar.com | mail@atifnazar.com | +92 21 34982561

Engr. Muhammad Saleem Qureshi
B.E. (Civil) NED Engg. Univ., Karachi
M.S. (Structure Engg.), Univ. of Illinois, USA
LLB, Karachi Univ., Chief Engineer
0300 2572829

HI WAYS ENGINEERING CONSULTANT
Consulting Civil & Structural Engineers
Karachi-Pakistan
Email: hiways.engineering@gmail.com
Tel: 021-35841844
www.hiwaysengineering.com

Consultancy & Design Services:
Structure Design of Buildings
Industrial Structures
Long span roof
Steel Structure
Roads & Bridges.

Specialized Services:
Structural Soundness Assessment
Construction Quality Check
Structural Load Audit
Survey, Inspection & Report
Due Diligence
Arbitration & Legal Consultation.

ADOMATION
www.cadomation.com

CAD Customization **CAD Automation**

CAD Migration **CAD Drafting**

CAD Cartography **3D Printing & Diorama**

THE SPATIO
Engineering & Geo-Spatial Consultants

92-42-3546 898 2
info@thespatio.com info@cadomation.com
www.thespatio.com www.cadomation.com

KPWS CONSULTING

We operate in the following areas:

- Electrical and Power Engineering
- Building Systems
- Power Generation & Heat Recovery
- Energy Management
- Renewable Energy
- HVAC
- Pumping, Water treatment
- Firefighting
- Industrial utilities
- Solid Waste treatment & disposal

Our Services include:

- Engineering services: End-to-end conceptualization, design, documentation, tendering, procurement support and construction supervision
- Studies: Feasibility and specialist techno-commercial studies related to Energy, Power systems, Mechanical systems, Plumbing, Security, etc.
- Audits: Fire Safety, Energy, System Worthiness, Power Quality, Hazardous Installations, etc.
- Renovation/Augmentation: Electrical, HVAC, Plumbing, ICT, Building Systems, Security, Utilities, etc.

304, Progressive Square, Block-6, PECHS, Shahr-e-Faisal, Karachi - 75400
T: (+9221) 3432 1350-1 | info@kpwsconsulting.com | www.kpwsconsulting.com

Eleken ASSOCIATES
Consulting Engineers, MEP & IT

Electrical
• Power Generation
• HV, MV, LV Distribution System
• Electronic Safety & Security
• Automation & IBMS
• Renewable Energy

M & P
• HVAC System
• Plumbing
• Fire Fighting
• Water Treatment

Specialized Services
Value Engineering
Construction Management
Energy Audit

eleken@eleken.com
021 3432-5537
Suite 513, RSM Square, Shaheed-e-millat, Karachi

A.E.A INTERNATIONAL (PVT.) LIMITED
PLANNERS & CONSULTING ENGINEERS

MEP and Renewable Energy Consulting Engineers

We offer consultancy services in the following fields:

- Power Generation & Distribution
- Internal & External Lighting
- Flood Lighting
- Heating, Ventilation & Air-Conditioning
- Tariff & Bill verification
- Earthing & Lightning Protection
- Co-Generation System
- Renewable Energy (Solar PV & Wind)
- Fire Alarm & Security Systems
- Fire Fighting Systems
- Networking & CCTV
- Industrial Environment Control

Energy Audit & Safety Survey of Electrical & Mechanical Systems
Suite # 313, 3rd Floor, Anum Estate, Shahr-e-Faisal, Karachi- 75350.
Tel: +92 21 34311985-6; Cell: +92 345 2123474
E-mail: info@aea-agc-green.com - aea.i@yahoo.com
web: www.aea-agc-green.com

Join us on facebook

ENGINEERING REVIEW

AI-Driven Sustainability Strategies in Modern Engineering Systems

Engr. Dr. Muhammad Nawaz Iqbal

Artificial Intelligence (AI) and sustainability are among the most transformative developments in modern engineering systems.

As industries increasingly seek ways to reduce their environmental footprint without compromising productivity and competitiveness, AI offers powerful tools to optimize resource utilization, minimize waste, and enhance operational efficiency. Traditionally, engineering systems have relied on static models and decision-making processes that depend heavily on human intervention. However, these approaches often struggle to cope with rapidly changing environmental and operational conditions. AI's ability to learn from data and adapt to changing circumstances enables engineering systems to continuously analyze performance, identify inefficiencies, and implement corrective actions in real time. This represents a paradigm shift in which sustainability is integrated directly into the design, operation, and management of engineering infrastructure.

The growing complexity of engineering projects requires innovative solutions capable of balancing economic, environmental, and social objectives simultaneously. AI-driven sustainability strategies help achieve this balance by leveraging vast amounts of data collected from sensors, monitoring systems, and operational databases. These data are transformed into intelligent decision-support systems that can evaluate sustainability metrics such as energy consumption, carbon emissions, material efficiency, and lifecycle costs. Through predictive analytics and optimization techniques, AI enables engineers to make informed decisions that align with long-term sustainability goals while maintaining

organizational performance and profitability.

One of the most significant applications of AI in sustainable engineering is the optimization of energy management systems. Industrial facilities, transportation networks, and smart buildings generate enormous volumes of operational data that can be analyzed using machine learning algorithms. These algorithms identify demand patterns, predict fluctuations, and recommend adjustments that reduce unnecessary energy consumption. Through intelligent automation, engineering systems can dynamically regulate lighting, heating, cooling, and production processes, thereby minimizing energy losses and reducing greenhouse gas emissions. Such capabilities are becoming increasingly important as nations strive to meet cli-

in real time, detect operational anomalies, and optimize equipment performance. Predictive maintenance algorithms can identify potential equipment failures before they occur, reducing downtime and extending asset lifespans. By enhancing operational reliability and minimizing material waste, AI significantly improves productivity, cost-effectiveness, and environmental sustainability within manufacturing environments.

AI also serves as a powerful enabler of circular economy principles in engineering. The circular economy emphasizes reusing, recycling, and regenerating resources rather than following the traditional linear model of extraction, consumption, and disposal. AI technologies facilitate this transition by tracking material flows, optimizing recycling operations, and identifying opportunities for resource recovery. Intelligent systems can evaluate product life cycles, recommend sustainable design improvements, and support reverse logistics processes. These capabilities allow engineering organizations to reduce environmental impacts while creating new economic opportunities through more efficient resource utilization.

The influence of AI on sustainability is particularly evident in the development of smart infrastructure and smart cities. Modern urban environments rely on networks of sensors, communication technologies, and intelligent algorithms to manage transportation, utilities, waste management, and public services. AI-powered systems can respond dynamically to changing condi-

Contd on page 15



mate targets and transition toward low-carbon economies.

Another major advancement in sustainable engineering is the integration of AI into manufacturing systems. Manufacturing industries often face challenges related to resource scarcity, waste generation, and production inefficiencies. AI-powered analytics enable organizations to monitor production processes

Professional Club

Engineering Review



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LIMITED

A WORLD CLASS ORGANISATION OF CONSULTING ENGINEERS

FIELDS OF SPECIALISATION: Power and Mechanical, Water Resources Development, Agriculture, Architecture and Planning, Highways and Bridges, Airports and Seaports, Environmental and Public Health Engineering, Engineering for Industry, Building Services, Heating, Ventilation & Air-Conditioning (HVAC), Renewable Energy, Disaster Management and Reconstruction, Information Technology, Geographical Information System

SERVICES: Pre-feasibility and Feasibility Studies, Surveys, Planning, Investigations, Designs, Design Review and Vetting, Tender and Contract Documents, Construction/ Installation Supervision, Contract Management, Post-Construction Services, Public Private Partnership BOT Project Services, Asset Valuation

HEAD OFFICE NESPAK House, 1-C, Block-N, Model Town Extension, P.O. Box: 1351 Lahore 54700, Pakistan
Tel: 92-42-99090000 Fax: 92-42-99231950
E-mail: info@nespak.com.pk Website: www.nespak.com.pk

REGIONAL OFFICES Karachi Islamabad Quetta Peshawar
OVERSEAS OFFICES Riyadh Muscat Doha Kabul



Fahim, Nanji & deSouza (Pvt.) Limited
Consulting Engineers

FND

OUR MEP SERVICES

MECHANICAL

- Air-Conditioning & Refrigeration
- Cogeneration
- Plumbing
- Fire Protection
- Steam Plants
- LPG - Air Mix Plant
- Oil Storage
- Fire & Life Safety Analysis
- Alternate Energy Systems
- Acoustical Engineering
- Solid Waste Management

ELECTRICAL

- Power Distribution
- Lighting Design
- Communication
- Fire & Security Alarm Systems
- Stand-by Emergency Power
- ELV Systems
- Vertical Transportation System
- Building Management Systems
- Electrical Safety Audit

4th Floor, ILACO House, State Life Building No.5,
Abdullah Haroon Road, Saddar, Karachi-74400, Pakistan
Phone: 92-21-35637878 & 82
Email: info@fnd.com.pk
Website: www.fnd.com.pk

The First Engineering Consultancy Company



since 1959 in Pakistan

SERVICES

- ◆ Transportation
- ◆ Roads & Highways
- ◆ Marine
- ◆ Architecture & Planning
- ◆ Environmental
- ◆ Power
- ◆ Special Services
- ◆ Non-Destructive Testing (NDT)
- ◆ Post Completion Audit
- ◆ Project Management
- ◆ Economic Feasibility
- ◆ Data Collection
- ◆ Irrigation & Agriculture
- ◆ Research & Development
- ◆ Asset

Engineering Consultants International (Pvt.) Ltd.
Head Office: 29, Block 7/8, D.A.C.H. Society, Sharea Faisal, Karachi-75350 PAKISTAN
Voice: +92 (21) 3454-2280 (4 lines) 3430 2271 (4 lines),
Fax: +92 (21) 3454-5255,
E-mail: info@ecil.com URL: http://www.ecil.com

Islamabad 23-A, Bhittai Road, (Old School Road), Sector F-7/1, Islamabad
Ph: +92 (51) 265 1993 (3 lines)
Fax: +92 (51) 265 1996
E-mail: info@ecil.com
Houston, United States of America 611, 8011 Hillcroft Avenue, Houston, TX 77081, USA
Ph: +1 713 272 7184, Fax: +1 713 995 4744,
E-mail: info@ecil.com
Almaty, Kazakhstan 925, 142 Bogenbay Batyr Street, Almaty 480091, Kazakhstan
Tel/Fax: +7 (3272) 508 001, 508 002
E-mail: info@ecil.com
Dubai, UAE 307 Al-Nayili Building, Abu Hail Road, P.O. Box: 86544, Dubai, U.A.E.
Ph: +971 4 297 3298, Fax: +971 4 297 3299
E-mail: info@ecil.com

SEP
SEM-Engr Partnership
YOUR MEP DESIGN PARTNER

40+ YEARS OF LEGACY 1500+ PROJECTS 150+ STAFF

• HVAC • FIRE PROTECTION
• ELECTRICAL • PLUMBING & SANITARY
• IT & COMMUNICATION • VERTICAL TRANSPORT
• SAFETY & SECURITY • LIFE SAFETY
• LEED CERTIFICATION • BIM SERVICES

AFFILIATIONS
ASHRAE NFPA ISO 9001 ISO 14001 ISO 45001 PSPP

SME
Engr. Al Kazim Mansoor
B.E. (Civil), M.S. Geotech (U.S.A.) P.E.
Consulting Engineer
0300-8207186

Geotechnical, Material, Structural Engineering & Testing Laboratories

SOILMAT ENGINEERS
B-136, Block 1, Opp. N.E.D. University,
Main University Road, Gulistan-e-Jauhar, Karachi.
Ph: 34623161-2, 35458647; Fax: 021-34632483
Web site: www.soilmatengineers.com

Techno-Consult International (Pvt.) Ltd.
Consulting Engineers
Over 50 years of Professional Services

37 - K, Block -6, P.E.C.H.S., Karachi - 75400 Pakistan,
Tel: (92-21) 3453 0630/31/32, 34557392, 34557425
Fax: (92-21) 3454 6606 E-mail: email@techno-consult.com

Maritime Ports Harbours Coastal Engineering, Dams Irrigation Canals Water Resource, Roads & Highways.
TCI is very Senior Consulting Engineering firm of Pakistan.

edb
Ihtisham H. Zarrar
B.Se (Civil Engg)
M. Sc Struct. (London)
M.I.E (Pak), P.E (Pak)

Services:
Highway • Bridges
Structures • Communication Towers
• Architecture

Engineering Design Bureau
Consulting Engineers, Planners & Architects

30-A Nazam-ud-Din Road, F-7/1 Islamabad. Ph: +92-51-8432832, 8432833 Fax: +92-51-2651020
216-A, Ground Floor, S.M.C.H.S. Karachi. Ph: +92-21-34525111 Fax: +92-21-34556128
271-M, Model Town Extension, Lahore. Ph: +92-42-35169798, 35177494 Fax: +92-42-35168429
E-mail: izarrar@edb.com.pk E-mail: izarrar@edb.com.pk E-mail: izarrar@edb.com.pk

JAFRI AND ASSOCIATES (Pvt) Ltd.
CONSULTING ENGINEERS

Since 1971

Electrical
Grid Stations, EHV/MV/LV Distribution System; Commercial; Residential; Industrial Installation; BMS Bldg LV system; Computer Networking; Lifts and Escalators.

Energy and Power Generation
Energy Audit/ Conservation; Energy Management Systems; Standby and Base Load Power Generation, Co-Generation; Solar Energy; Wind Energy; Renewable Sources e.g. MSW and Bio Mass Based Plants etc.

Heating, Ventilation and Airconditioning
Air-conditioning of all types of buildings; Refrigeration Systems; Humidification; Air Treatment; etc.

Room # 206, 2nd Floor, Ibrahim Trade Tower, Maqbool Co-operative Housing Society, Shakra-e-Faisal, Karachi 75400.
Ph # +92-21-34327671-4,
Fax # +92-21-34327675
E-mail: jafriandassociates@gmail.com
website: www.jafriandassociates.com.pk



آوازِ اقبال

اقبال کا ترانہ بانگ درا ہے گویا
ہوتا ہے جادوہ بیا پھر کارواں ہمارا

اے ہمالہ کوئی بازی گاہ ہے تو بھی جسے
دست قدرت نے بنایا ہے عناصر کے لئے
ہائے کیا فرط طرب میں جھومتا جاتا ہے ابر
فیل بے زنجیر کی صورت اڑا جاتا ہے ابر

تیری عمر رفتہ کی اک آن ہے عہد کہن
وادوں میں ہیں تیری کالی گھٹائیں خیمہ زن
چوٹیاں تیری شیا سے ہیں سرگرم سخن
تو زمیں پر اور پہنائے فلک تیرا وطن
چشمہ دامن ترا آئینہ سیال ہے
دامن موج ہوا جس کے لئے رومال ہے
ابر کے ہاتھوں میں رہوار ہوا کے واسطے
تازیانہ دے دیا برق سر کوہسار نے

کلزے کلزے کر رکھے ہیں۔ ہندوستان کے نقشہ پر مسلم ہندوستان
اور ہندو ہندوستان پہلے ہی سے موجود ہیں نہ معلوم اس کے متعلق
اتنا دوا کیا کیوں کیا جاتا ہے۔ وہ ملک ہے کہاں جس کے کلزے کلزے
کیے جائیں گے؟ اور وہ قوم کہاں ہے جس کی قومیت فنا کی جائے گی؟
وہ طاقت جس کے قبضہ قدرت میں آج ہندوستان ہے وہ
انگریزوں کی طاقت ہے اور یہ جو ایک خیال دماغوں میں بیٹھ گیا
ہے کہ ہندوستان ایک متحدہ ملک ہے اور اس کی اپنی حکومت ہے وہ
صرف اس وجہ سے ہے کہ انگریز اس سارے ملک پر حکمران ہیں۔
(مسلم لیگ کانفرنس، بمبئی، 26-27 مئی 1940ء)

فرمانِ قائدِ عظمیٰ



اصول اور تفصیلات

گاندھی جی کہتے ہیں: "ہندوستان کو جیتنے کی کلزے کلزے کیا جا رہا ہے"
راج گوپال چاریہ کہتے ہیں: "بچے کے کلزے کے جادے ہیں"
قدرت نے پہلے ہی سے ہندوستان کو تقسیم کر رکھا ہے اور اس کے

GOLDEN JUBILEE



Founder

Najamul Hasan (Marhoom)

Founding Editor

Riazul Hasan (Marhoom)

Publisher / Managing Editor

Muhammad Salahuddin

Editor

Manzoor Shaikh

Honorary Consulting Editors

Prof. B. S. Chaudhry	Education
Engr. Farhat Adil	Civil Engg.
Engr. Khalid Pervaiz	Elect. Engg.
Engr. Abul Islam	Intl Business
Dr. Shahneela Zardari	Software Engg
Mahmood Nawaz Shah	Agriculture
Dr. Tariq Soomro	Information Tech
Mariam Durrani	Industry

Graphic Designer

Shaikh Muhammad Raza ur Rehman

Production Manager

Waheed Ahmed

Social Media

Muhammad Amin

Branch Manager (Lahore)

Hamza Idrees

Regional Manager (Islamabad & North)

Muhammad Arif

Annual Subscription

2,400

Advertisement Tariff

Display Ads (Colour)

Per Col. cm Rs.425

Full Page	240 Col.cm	Rs. 102,000
½ Page	120 Col.cm	Rs. 51,000
¼ Page	60 Col.cm	Rs. 25,500
¼ Page	30 Col.cm	Rs. 12,750

Engineering Bazar

A package for small budgets

	10 Col.cm	15 Col.cm	20 Col.cm
Inserts	24 Rs.75,000	Rs.112,000	Rs.149,000
	12 Rs.38,500	Rs.57,000	Rs. 76,500

Professionals' Club

Only for listing consultants' specialties

	4x6 cm	8x6 cm	8x12 cm
Inserts	24 Rs.35,000	Rs.69,000	Rs.137,500
	12 Rs.18,000	Rs.36,000	Rs. 70,500

Printer

Aslam Zaki, Ayisha Printers,
Eveready Chambers,
Off: Chundrigar Road, Karachi.



Member All Pakistan Newspapers Society

Head Office

305, Spotlight Chambers, Dr. Billimoria Street,
Off: Chundrigar Road, GPO Box 807,
Karachi-74200, Pakistan.
Ph: 021-3221-5961-62
+92 335 224 6787
Email: info@engineeringreview.com.pk
engineeringreview@yahoo.com

Lahore

Room # 29, 6th Floor
Goldmine Plaza
105-Ferozepur Road Lahore.
Ph: 042-3540-4622; Mobile: 0322-4881881
Email: engineeringreview_lahore@yahoo.com

Islamabad

M-29, Mezzanine Floor, Malik Arcade,
Opp. Cheezious, Main Boulevard,
Ghouri Town Phase- 5, Islamabad.
Ph: 051-2348-6200
Mobile: 0300-9202824
Email: engineeringreview.isb@gmail.com
www.engineeringreview.com.pk



AI-Driven Sustainability Strategies in Modern Engineering Systems

Contd from page 14

tions by optimizing traffic flows, reducing fuel consumption, improving public safety, and enhancing service delivery. Through continuous monitoring and adaptive control mechanisms, smart infrastructure contributes to greater urban sustainability and improved quality of life for growing populations.

AI also plays a critical role in sustainable water resource management. Water scarcity, pollution, and distribution inefficiencies remain significant global challenges. AI-enabled water quality sensors can continuously monitor critical parameters, forecast water demand, and detect leaks within distribution networks. Machine learning models assist in optimizing water allocation across agricultural, industrial, and residential sectors. By improving conservation practices and minimizing waste, AI enhances the resilience and sustainability of water management systems while supporting long-term environmental stewardship.

Environmental monitoring and ecosystem protection have also benefited substantially from AI-powered technologies. Traditional environmental assessment methods are often labor-intensive, time-consuming, and insufficient for rapidly changing environments. AI can process data collected from satellite imagery, remote sensing platforms, and Internet of Things (IoT) sensors to provide continuous environmental monitoring. Intelligent algorithms enable the detection of pollution sources, prediction of environmental risks, and support for conservation initiatives with unprecedented accuracy. As a result, engineering systems can operate more harmoniously with natural ecosystems while minimizing ecological disruption.

The transportation sector is undergoing a major transformation through AI-driven sustainability solutions. Intelligent transportation systems utilize AI to optimize vehicle routing, reduce traffic congestion, and improve fuel efficiency. Emerging technologies such as autonomous and connected vehicles further contribute to sustainable mobility by enhancing transportation safety and reducing opera-

tional inefficiencies. AI-powered logistics systems optimize delivery schedules and freight movement, helping to lower transportation-related emissions. Collectively, these innovations support the development of environmentally responsible transportation networks capable of meeting future economic demands.

Digital twin technology represents another valuable application of AI in sustainable engineering. Digital twins create virtual replicas of physical assets, processes, and infrastructure systems, enabling engineers to simulate various scenarios before implementing changes in the real world. These virtual environments support predictive analysis, risk assessment, and performance optimization. By identifying inefficiencies and sustainability challenges early in the project lifecycle, digital twins help reduce waste, improve resource utilization, and support more informed decision-making.

AI is also accelerating the adoption of renewable energy technologies. Renewable energy sources such as solar and wind power are inherently variable and require sophisticated management strategies to ensure grid stability. AI algorithms can forecast energy generation patterns, optimize energy storage systems, and manage fluctuations in supply and demand. Intelligent energy management solutions facilitate the seamless integration of renewable resources into existing power networks, enhancing reliability while reducing dependence on fossil fuels. These capabilities are essential for achieving global sustainability objectives and strengthening energy security.

Modern sustainable engineering increasingly relies on data-driven decision-making supported by AI technologies. Large-scale engineering projects generate vast quantities of structured and unstructured data that can be transformed into actionable insights through advanced analytics. AI systems can model future scenarios, evaluate sustainability performance, and identify emerging risks. These capabilities enable organizations to assess strategic alternatives, prioritize sustainability initiatives, and measure outcomes more effec-

tively. Consequently, AI enhances the transparency, accountability, and effectiveness of engineering practices.

Despite its numerous benefits, implementing AI-driven sustainability strategies presents several challenges. Issues related to data quality, cybersecurity, algorithmic bias, and infrastructure limitations can hinder successful deployment. Engineering organizations must establish robust governance frameworks to ensure the transparent, accountable, and ethical use of AI technologies. Additionally, workforce development initiatives are essential to equip engineers with the skills needed to interpret and apply AI-generated insights effectively. Addressing these challenges is critical for maximizing the value of AI while maintaining organizational trust and resilience.

The entrepreneurial dimension of AI-driven sustainability is also gaining prominence. AI-powered innovations are enabling startups and technology firms to develop solutions for environmental monitoring, renewable energy management, waste reduction, and sustainable manufacturing. These enterprises often introduce disruptive business models that challenge conventional engineering practices and accelerate technological progress. By fostering collaboration among engineers, entrepreneurs, policymakers, investors, and researchers, innovation ecosystems can drive the commercialization of sustainable technologies and address pressing global challenges.

Looking ahead, AI-powered sustainability initiatives will continue to reshape the landscape of modern engineering systems. Advances in machine learning, edge computing, quantum technologies, and intelligent automation are expected to further enhance the capabilities of engineering infrastructure across industries. Sustainability will increasingly become a core design criterion rather than a secondary consideration, supported by intelligent systems that optimize environmental, economic, and social outcomes simultaneously. As engineering systems become more resilient, adaptive, and sustainable, AI will serve as a key enabler in meeting the needs of future generations while preserving the planet's resources. ■

بقیہ: عثمان انسٹیٹیوٹ آف ٹیکنالوجی کا سالانہ جلسہ تقسیم اسناد

مخاطب کرتے ہوئے کہا کہ بہترین کارکردگی کے حصول کے ہمیشہ
کوشاں رہیں اور سیکھے کا عمل کبھی نہ چھوڑیں، پاکستان کی ترقی میں
ثبوت کردار ادا کریں۔

اس سفر میں نئے چیلنجز کا سامنا کرنا ہوگا اب اس کی ڈگری سوسائٹی
میں اپور وونٹ لائے گی اس موقع پر وائس چانسلر این ای ڈی
یونیورسٹی، پروفیسر ڈاکٹر محمد طفیل نے تمام طلبہ کو ڈگری تقویض کی اور

جبکہ پاور انجینئرنگ سے عبدالصور نے پہلی پوزیشن حاصل کی۔ شعبہ
پیچر آف کمپیوٹر سائنس میں عدینہ آصف نے پہلی پوزیشن جبکہ
سافٹ ویئر انجینئرنگ میں حمنا حمید الدین اور محمد شہیر زمان خان نے



جلسہ میں رجسٹرار این ای ڈی یونیورسٹی غفور حسین، پور ڈیپٹی
عثمان میموریل فاؤنڈیشن، وائس چانسلر یو آئی ٹی یونیورسٹی ڈاکٹر ولی
الدین ودیگر کے ہمراہ یو آئی ٹی کے اساتذہ اور انڈسٹری سے بڑی تعداد
میں مہمانوں نے بھی شرکت کی۔ ■

مبارکبادی، انہوں نے طلبہ کو مخاطب کرتے ہوئے کہا کہ پاکستانی
طلباء طالبات میں ٹیکنالوجی کی نہیں ہے اب ہمیں اس ملک میں رہ
کر اس کی خدمت کرنی ہے۔
جبکہ وائس چانسلر یو آئی ٹی یونیورسٹی ڈاکٹر ولی الدین نے طلبہ کو

پہلی پوزیشن حاصل کی۔
تقریب کے مہمان خصوصی چیئر پرسن سندھ ایچ ای سی ڈاکٹر
ایس ایم طارق رنی نے طلباء طالبات کی محنت کو سراہتے ہوئے انہیں
مبارکبادی اور کہا کہ اب طلبہ کی زندگی کا اہم سفر شروع ہو رہا ہے

Multiple Purpose Raw Food Washer
(Meat, Vegetables & Fruits)

LOW WATER CONSUMPTION
THOROUGH CLEANING
EASY TO USE
TIME SAVING
LOW LABOUR COST
INCREASE PROFITABILITY

NETWORK TRADE MARKETING
Ph: +92-21-36707233 - 36608964; Cell: +92 300 8299153
E-mail: ntmptab@gmail.com Website: www.ntmpk.com

پندرہ روزہ

جینرل ریفیو

GOLDEN JUBILEE
50
ENGINEERING REVIEW
1975 - 2025

بانی: نجم الحسن بانی ایڈیٹر: ریاض الحسن

• جلد نمبر: 51 • شمارہ نمبر: 12 • جون 2026 • 16-30 • فون: +92-21-32215961-2, 32632567 • ویب سائٹ: www.engineeringreview.com.pk • ای میل: info@engineeringreview.com.pk



www.engineeringreview.com.pk www.youtube.com/engineeringreviewER

عثمان انسٹیٹیوٹ آف ٹیکنالوجی کا سالانہ جلسہ
تقسیم اسناد 273 گریجویٹ طلبہ کو ڈگریاں تفویض
پہلی پوزیشن حاصل کرنے والے 6 طلبہ کو سونے کے تمغوں کیساتھ
25 ہزار نقد رقم سے نوازا گیا

عثمان انسٹیٹیوٹ آف ٹیکنالوجی کا سالانہ جلسہ تقسیم اسناد کو منعقد کیا گیا۔ تقریب کی صدارت وائس چانسلر این ای ڈی پورنیوسٹی پروفیسر ڈاکٹر محمد طفیل نے کی۔ جلسہ تقسیم اسناد میں 273 طلبہ کو ڈگریاں تفویض کی گئیں۔



گولڈ میڈل سے نوازا گیا۔ عثمان انسٹیٹیوٹ آف ٹیکنالوجی کے شعبہ الیکٹریکل انجینئرنگ، کمپیوٹر سسٹم سے محمد واکم، الیکٹریکل انجینئرنگ سے محمد عمر خاور بقیہ: صفحہ 15 پر

پاکستان کا گوادریٹس اسٹریٹجک آئل ذخائر قائم کرنے کا منصوبہ

غیر معمولی حالات کی صورت میں پاکستان کو ان ذخائر کے استعمال کا پہلا حق حاصل ہوگا

بحری معیشت کو جدید خطوط پر استوار کرنے اور علاقائی تجارت و توانائی راہداری میں اہم کردار ادا کرنے کے لیے بین الاقوامی شراکت داری کا خواہاں ہے۔ کویت کو پیش کیے گئے منصوبوں میں کراچی کے قریب واقع پورٹ قاسم پر ایک کثیر المقاصد ٹرمینل بھی شامل ہے۔

اپریل 2026 میں وزیر بحری امور نے پاکستان میری ٹائم انرجی سٹی (PMEC) کے قیام کا اعلان کیا تھا، وزیر نے، "ہنڈر ڈائریزن 2047-2147 کے تحت قائم 12 کنٹینر کو ہدایت کی ہے کہ نئے گہرے سمندری بندرگاہوں اور متعلقہ انفراسٹرکچر کے لیے موزوں مقامات کی نشاندہی کے ساتھ جامع ترقیاتی منصوبہ تیار کیا جائے۔ انھوں نے واضح کیا کہ منصوبے کے باضابطہ آغاز سے قبل تمام متعلقہ فریقین، خصوصاً صوبائی حکومتوں سے مشاورت کی جائے گی۔"

متعارف کر رہی ہے، جس میں اسٹریٹجک آئل ذخائر کے ساتھ ساتھ ایل این جی اور ایل پی جی ٹرمینل بھی قائم کیے جائیں گے۔ وفاقی وزیر برائے بحری امور محمد جنید انور چوہدری نے کویت کو پاکستان کے ساحلی اور توانائی لائحہ عمل کو ریز میں سرمایہ کاری کی دعوت دیتے ہوئے مختلف بندرگاہی اور بحری منصوبوں پر بریفنگ دی۔ کویتی سفیر ناصر عبدالرحمان جاسرالم طیری نے وزیر سے ملاقات میں گوادریٹس سرمایہ کاری کے مواقع پر تبادلہ خیال کیا، جہاں انہیں اسٹریٹجک آئل ذخائر کے قیام میں سرمایہ کاری کی پیشکش بھی کی گئی۔

حکومت سعودی عرب کی جانب سے بھی کسی مثبت پیش رفت کی منتظر ہے، وزیر بحری امور نے کویت کو فیول اسٹوریج، بانڈ ڈزمنٹلو، جیٹی تعمیر، پورٹ انفراسٹرکچر اور مجوزہ انرجی سٹی میں سرمایہ کاری کی پیشکش کی۔ انھوں نے کہا کہ پاکستان اپنی

پاکستان نے گوادریٹس پورٹ پر مجوزہ انرجی سٹی میں تیل پیدا کرنے والے ممالک کو اسٹریٹجک آئل ذخائر قائم کرنے کی دعوت دینے کا فیصلہ کیا ہے تاکہ ہنگامی حالات میں ملک کو توانائی کی فراہمی یقینی بنائی جاسکے۔ سرکاری ذرائع کے مطابق جنگ یا دیگر غیر معمولی حالات کی صورت میں پاکستان کو ان ذخائر کے استعمال کا پہلا حق حاصل ہوگا۔

حکام کا کہنا ہے کہ کویت نے گوادریٹس اسٹریٹجک آئل ذخائر قائم کرنے میں خصوصی دلچسپی ظاہر کی ہے، جبکہ بلوچستان میں نئے بندرگاہی مقامات اور انرجی سٹی کے لیے موزوں زمین کی نشاندہی کے لیے ایک اعلیٰ سطح کی کمیٹی کام کر رہی ہے۔ ذرائع کے مطابق ماضی میں گوادریٹس آئل سٹی بنانے کا منصوبہ بعض دوست ممالک کی مخالفت کے باعث عملی شکل اختیار نہ کر سکا تھا، تاہم اب حکومت انرجی سٹی کے نام سے ایک جامع منصوبہ

PAKISTAN CABLES

TRUSTED NOT TO COMPROMISE

Har Connection Ke Peechay, Aapki Mehnat

On International Electrician Day, we honour the professionals who bring power, safety, and reliability to every connection.

International Electrician Day | 10th June



021 111 222 537



Pakistan Cables
LOYALTY CLUB



ENGINEERING REVIEW

Science & Technology

THE MULTI-MILLION DOLLAR HANDSHAKE

Five Surprising Realities Inside a National Power Deal

By Farhan Mujeeb

To the average consumer, electricity is a binary reality. You flip a switch, and the light comes on. The extraordinary complexity that makes that moment possible is entirely invisible buried inside a document most people will never read, running to well over a hundred pages, governing relationships between institutions whose names most citizens have never encountered.

That document is the Power Purchase Agreement. In Pakistan's power sector, it is the legal and commercial foundation upon which the entire grid has been built, and it is considerably more surprising than its reputation suggests.

Pakistan's power sector has recently undergone one of the most significant institutional reorganisations in its history. The National Transmission and Despatch Company (NTDC) which sat at the heart of every PPA written over the past two decades, no longer exists in its original form. The Federal Cabinet approved its dissolution in November 2024, and by March 2025, three new entities had emerged from its shell. The National Grid Company of Pakistan Limited (NGC) took over NTDC's name, its transmission assets, and its ownership of the 220kV and 500kV grid stations and lines across the country. The Independent System and Market Operator (ISMO) was incorporated in December 2024 and absorbed the two functions that previously sat uncomfortably within a single institution: the system operator role from NTDC's National Power Control Centre, and the market operator role from CPPA-G. And the Energy Infrastructure Development and Management Company (EIDMC) took on the capital project development mandate that NTDC previously held. CPPA-G, meanwhile, did not disappear. It retained its role as Power Purchaser for all legacy contracts, but shed its market operator function to ISMO, and is now transitioning toward becoming what regulators call a Special Purpose Agent the administrator of every PPA signed before Pakistan's competitive electricity market formally commences operations.

Understanding what changed, and what did not, matters enormously if you want to understand how the PPA framework works in practice. The agreements serve as the legal instruments governing hundreds of billions of rupees in contracted capacity, explicitly naming NTDC as the entity holding both transmission and despatch authority. Those contractual references do not automatically migrate when institutions are renamed and bifurcated. How the obligations flow from NTDC to NGC, ISMO, and CPPA-G under the Business Transfer Agreements signed between the parties is a live question with direct commercial and legal consequences for every IPP currently holding a PPA. It is the kind of question that keeps lawyers and lenders awake. And it sits on top of a framework that was already, before the restructuring, considerably more complex than it appeared from the outside.

The most counter-intuitive aspect of any national power deal and the one that generates the most public confusion is that the government pays for electricity that is never generated. Under the Capacity Payment mechanism, CPPA-G is contractually required to compensate the producer simply for being ready to operate. Not for generating. Not for delivering energy to the grid. For maintaining the plant in a state of readiness, with fuel arrangements in place and equipment available, regardless of whether ISMO ever issues a despatch instruction that calls upon it. The logic is not irrational, even if it is counter-intuitive. A power plant's fixed costs the debt servicing on the financing that built it, the insurance, the operations and maintenance obligations do not pause when the grid does not need the plant's output on a given day. The investor who committed capital to construct the facility requires certainty that those fixed obligations will be met. Capacity Payments provide that certainty. Energy Payments, separately, compensate for the actual fuel consumed and the variable costs of generation when despatch does occur.

The agreement distinguishes with considerable precision between Contract Capacity, the commitment the producer underwrites at financial close and that forms the basis of the investment decision and Tested Capacity, the actual net generation demonstrated under real operating conditions during the commissioning process. Annual Capacity Tests throughout the life of the contract continuously reverify that performance, and a plant that cannot meet its tested capacity faces a proportional reduction in its payment entitlement. The system is designed so that what is being paid for genuine, verified readiness is exactly what is being delivered. In practice, this is where billions in capacity payments have flowed toward plants that were technically available on paper but physically unable to despatch because the transmission network could not carry their output, or because the fuel supply chain had broken down, or because ISMO's predecessors were managing a system with insufficient visibility to optimise what was available. The contract performs as written. The system, as those of us who have stood in a control room understand intimately, does not always perform as intended.

There is a particular precision to the way the agreement handles measurement, the physical act of verifying what actually flows between the producer and the grid. Trust, in a multi-billion-dollar energy transfer conducted over decades, is replaced entirely by protocol. NGC owns the primary metering system. The producer owns the back-up. Both must be jointly sealed, and both parties must have representatives physically present whenever a seal is broken or applied. Neither party takes the other's word for what the meter reads. Tampering with that arrangement carries a consequence that the agreement states with unusual directness: the company must compensate CPPA-G for two times the amount of any overpayment that resulted from the tampering. By signing the agreement, the producer explicitly waives any legal argument that this 2 times penalty is disproportionate, excessive, or void as a penalty at law. The

price of dishonesty is not a matter for negotiation after the fact. It is pre-agreed, pre-signed, and precisely double the amount improperly received. The clarity is deliberate. The deterrent is sized to make the economics of dishonesty unambiguously negative, regardless of the sophistication of the legal argument available to contest it.

What happens if a private company simply stops running a plant that the country depends upon? It is the kind of scenario that sits uncomfortably between contract law and national emergency, and the PPA has a very specific answer. If the producer fails to declare Available Capacity for 48 consecutive hours without a valid reason a formally declared Forced Outage, which has its own precise contractual definition; CPPA-G acquires the right to physically enter the site and operate the facility directly, under what the agreement calls the Step-In Right. This is not a theoretical provision. It is an acknowledgement that a power plant of national significance cannot be allowed to sit idle because of a commercial dispute between private parties, and that the state has a pre-agreed mechanism to prevent that outcome. The conditions attached to the step-in right are important. CPPA-G must operate the plant within its Technical Limits. It must bear all costs of the operation, both fixed and variable. And critically, it must continue to pay the Debt Servicing portion of the Capacity Payment to the company throughout the entire period of step-in. The lenders' position is protected even when the operator's contractual rights are suspended. This provision reflects a truth that infrastructure finance has learned, at considerable cost, across multiple countries and multiple decades: the interests of the private investor and the energy security obligations of the state cannot be allowed to come into direct conflict without a predetermined resolution in place before the crisis that requires it.

The financial mathematics of the agreement are not fixed. They move with the weather, in a way that surprises almost everyone encountering a Pakistan PPA for the first time. The Declared Available Capacity that a producer submits each day is adjusted based on Ambient Site Conditions; temperature and humidity, as measured by a dedicated on-site Weather Station using manufacturers' correction curves applied against the Reference Conditions under which the plant's Tested Capacity was originally established during commissioning. The consequence is material: a sustained heatwave reduces a plant's effective contractual output obligation, and the financial exposure follows the thermometer rather than the nominal rating. A producer is not penalised for a degradation in output that physics, not performance failure, has caused. In a country where summer ambient temperatures regularly exceed forty-five degrees Celsius across the thermal generation belt, this is not a theoretical provision. It is a mechanism that adjusts payment obligations across entire fleets of plants for months at a time, with consequences running into hundreds of millions of rupees.

Perhaps the most consequential provision in the entire agreement and the one that receives the least public attention in analyses of Pakistan's power sector is the Suspension



Right. If overdue invoices reach the Maximum Amount prescribed in the agreement, equivalent to five months of combined capacity and energy payments, the producer has the legal right to suspend operations entirely until the outstanding balance is cleared to the prescribed Minimum Amount. The lights, in a strict legal sense, can go out. To ensure the producer is not financially depleted while waiting for payment that has been contractually earned, late invoices carry interest at the Delayed Payment Rate; the Karachi Inter-Bank Offer Rate plus two percent. An additional protection, addressing what lawyers call double jeopardy, ensures that the company cannot be penalised under the PPA for an event that has already been addressed under its Implementation Agreement with the Government of Pakistan. The legal architecture is designed to insulate the producer and by extension the lenders and equity investors who financed the project from the institutional and fiscal volatility that has characterised Pakistan's power sector across multiple economic cycles.

When disputes arise within this framework, they follow a prescribed sequence that reflects the reality that parties who have committed to a thirty-year relationship cannot afford to reach for litigation at the first disagreement. The Operating Committee, comprising two representatives from each of the three parties to the agreement, handles day-to-day operational interface and procedural matters. When disagreement escalates beyond what the Operating Committee can resolve, the parties are directed first to mutual discussion between senior management, then to Expert determination for technical disputes, and finally to formal Arbitration under LCIA or UNCITRAL rules. The arbitration clause is where developers and their lenders spend the most time during due diligence, and where Pakistan has spent the most money in contested proceedings. The country's experience with PPA arbitration has been extensive, expensive, and has materially shaped the way subsequent agreements have been drafted.

Force majeure under the agreement is

Contd on page 18

Going up against the heat: Vertical greenery keeps cities cool

Climate change and urbanization have intensified the urban heat island (UHI) effect, where urban areas are significantly warmer than rural areas.

This has, in turn, increased the frequency of extreme heat events, such as heat waves, and deteriorated both outdoor environments

the interior and exterior. So it is essential to evaluate them in an integrated manner. Furthermore, building resilience under compounded extreme conditions, such as heat waves coinciding with power outages, has not been sufficiently investigated.

To address this, an international research team led by Associate Professor Jihui Yuan from Osaka Metropolitan University's Graduate School of Human Life and Ecology evaluated the impacts of UHI mitigation

which reproduces indoor thermal conditions, with an Urban Microclimate Model (UMM), which captures outdoor microclimate dynamics.

Based on weather data records, the simulations considered future climate scenarios as well as extreme conditions, including summer heat waves and power outages, to evaluate building performance under realistic and severe conditions. Thermal comfort was assessed using the

of light reflected by a surface, showed significant effects on thermal comfort.

Low-albedo exterior surfaces improved outdoor thermal comfort by 1.5°C, while high-albedo exterior surfaces were found to be particularly effective in reducing indoor temperatures. Additionally, it was found that the radiative properties of exterior materials have a stronger influence on thermal environments than their heat capacity.

"This study could function as an initial



and indoor thermal conditions in buildings, leading to higher cooling energy demands, greater strain on power grids and an elevated risk of power outages.

Previous studies on UHI mitigation have primarily focused on improving outdoor environments, but indoor and outdoor thermal conditions interact dynamically through building envelopes, the material separating

strategies (UHIMS), such as green roofs, vertical greenery and envelope materials, on both indoor and outdoor thermal environments. The study focused on an educational facility in Shahrud, Iran, a city characterized by extremely hot summers.

In the analysis, the researchers used an integrated simulation approach that combines a Building Energy Model (BEM),

Physiologically Equivalent Temperature (PET), enabling consistent evaluation of both indoor and outdoor environments.

The research is published in the journal Energy and Buildings.

The results revealed that a green wall installed on the south-facing facade improved indoor thermal conditions by up to 1.7°C. In addition, albedo, the amount

guide for resilient buildings that can maintain acceptable thermal conditions even under extreme conditions," said Yuan. "It could also contribute to the advancement of urban heat island mitigation strategies that integrate both urban- and building-scale approaches, while helping to achieve both reduced energy consumption and improved thermal comfort." - TX

Five Surprising Realities Inside a National Power Deal

Contd from page 17
categorised with a precision that reflects Pakistan's particular combination of political, regulatory, and natural risk. Pakistan Political Force Majeure Events cover government actions, civil unrest, and conflict. Change in Law Force Majeure covers regulatory shifts that materially alter the economics of the project after financial close the kind of retrospective policy change that investors and lenders treat as one of the primary risk factors in any emerging market infrastructure transaction. Other Force Majeure covers natural disasters and events genuinely outside any party's control. The categorisation is not semantic. Different triggers carry different compensation entitlements, different obligations to mitigate, and different termination consequences. A producer who cannot identify precisely which category their specific risk falls into has not, in any

commercially meaningful sense, read their contract.

What all of this looks like from the control room, from the side of the institution actually responsible for making the system function in real time is something that legal and financial analysis of the PPA framework rarely addresses, and almost never gets right. The picture has been complicated further by the restructuring. Under the old arrangement, NTDC held despatch authority and was simultaneously a party to the commercial agreements governing how that authority was exercised. A degree of institutional tension was built into the structure by design. Under the new arrangement, ISMO now holds the system operator function and issues Despatch Instructions, while CPPA-G retains the Power Purchaser role for legacy contracts and NGC owns the physical infrastructure through which the despatched power flows. The

functions that once sat within a single institution have been distributed across three. Whether that distribution resolves the operational tension or simply spreads it across entities that now need to coordinate in real time under the pressure of a live system, with incomplete information, against contractual obligations that were written for a different institutional structure remains genuinely open.

The Available Capacity declaration that arrives in the system control room each morning is a commercial document with a specific legal status under the PPA. It is also the primary operational input to every despatch decision ISMO makes for the hours that follow. When that declared capacity is constrained by fuel unavailability because the RLNG cargo did not arrive, or the domestic gas allocation was reduced, or the furnace oil stock ran out

or by transmission limitations that prevent the output from physically reaching the load, or by protection scheme configurations that were never modelled in the planning study that justified the connection, the gap between the contractual picture and operational reality does not resolve itself through a clause in the agreement. It lands on the system operator, working in real time, with what is actually available, making decisions that will be reviewed in hindsight against a framework that assumed conditions that did not exist.

The PPA defines what should happen. The control room manages what does. I say that not as a criticism of the legal instrument, which is carefully constructed and reflects decades of negotiating experience on all sides. I say it as someone who has stood in that control room and understood, from the inside, that the distance

between those two sentences is where some of the most consequential and least visible decisions in Pakistan's power sector are made by operators who inherit conditions they did not create, working with information that is always incomplete, on a system that behaves nothing like the planning model it was assessed against.

As Pakistan builds its competitive electricity market under CTBCM, this framework will be tested in ways its original drafters did not fully anticipate. ISMO, newly separated from NTDC and still consolidating its functions, will administer a competitive market while simultaneously honouring the operational obligations embedded in hundreds of legacy PPAs written for a different institutional world. CPPA-G, transitioning from single buyer to Special Purpose Agent, will manage legacy

contracts whose terms were negotiated on assumptions about the sector's structure that no longer hold. NGC, stripped of its despatch function, will maintain the physical infrastructure through which competitive market transactions flow infrastructure that was planned, built, and rated for a generation mix and a load profile that rooftop solar and distributed energy resources are quietly but fundamentally reshaping. The handshake between these institutions, and the agreements that govern it, will define the quality of that transition. Getting the institutional coordination right between NGC, ISMO, and CPPA-G, and between all three and the independent power producers who built and financed the generation fleet is not a legal or administrative detail. It is the central challenge of Pakistan's power sector for the decade ahead.■