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
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
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Karachi
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Karachi-74200, Pakistan, P.O Box 677
UAN: +92 21 111 000 520
TEL: +92 21 3260 2200-07 (8 lines)

Regional Office

Lahore
House No. 20-A, Block G, Gulberg III, Lahore, Pakistan
UAN: +92 42 111 000 520
Tel: +92 42 3588 3360-61

Liaison Offices

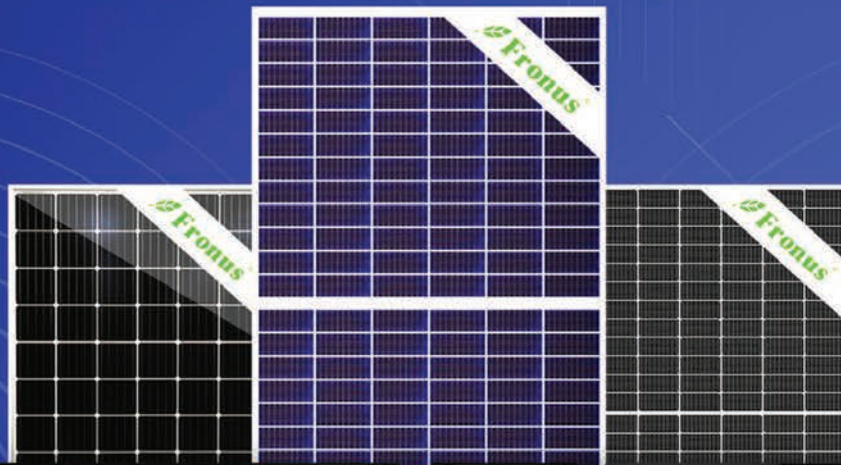
Islamabad
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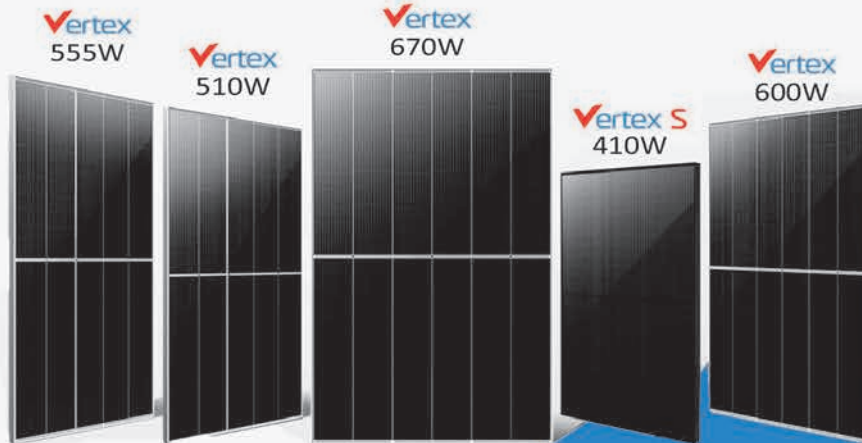
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KAMRAN RAFIQUE

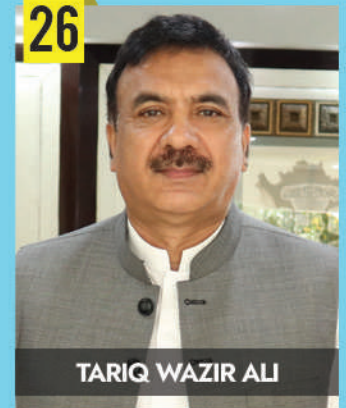
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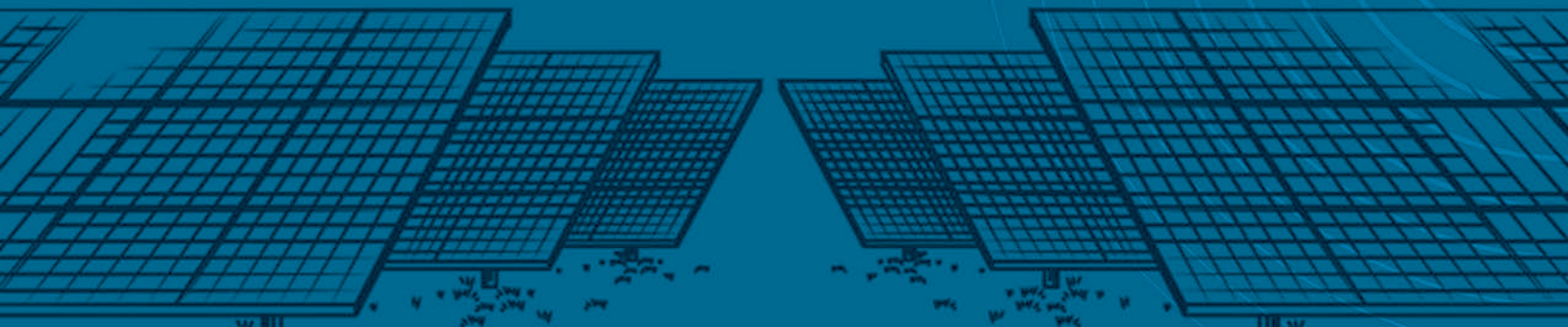


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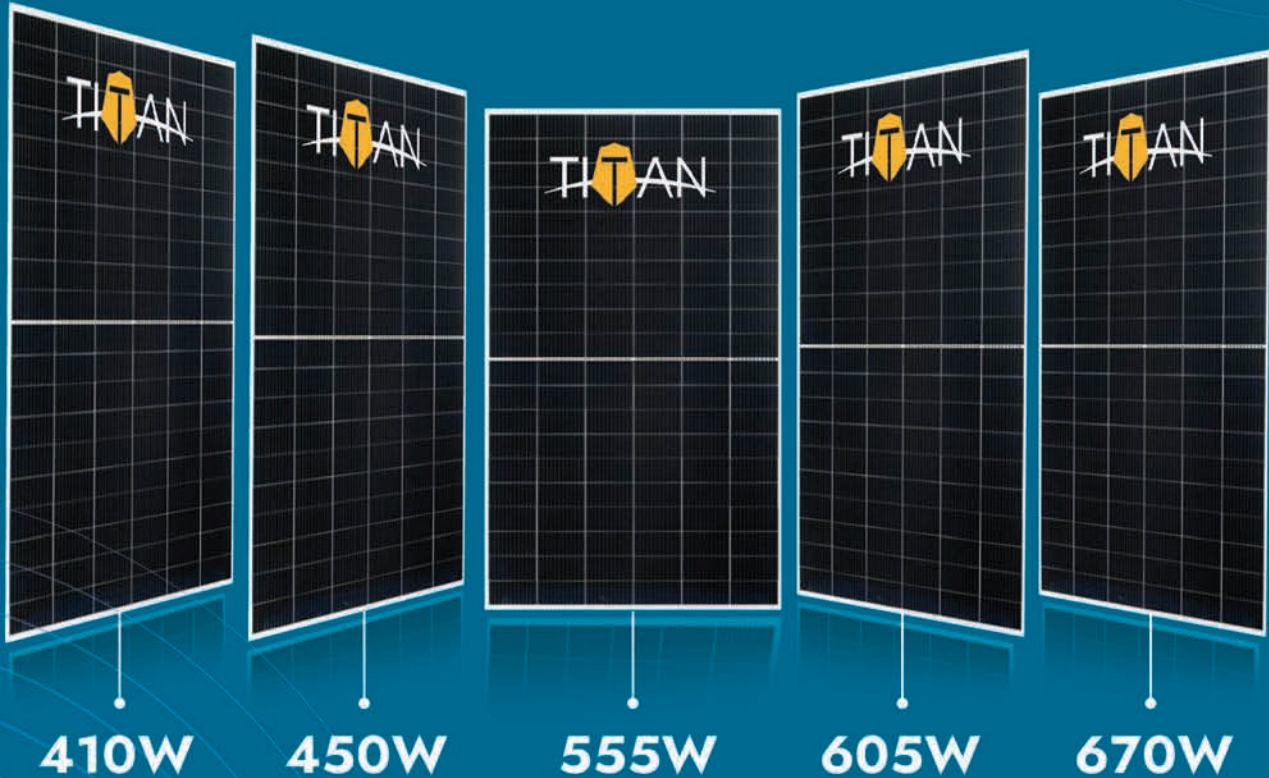
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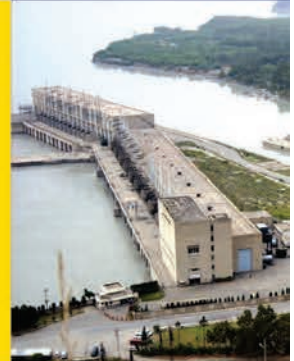
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Energy prices, crisis go together

At a time when people are demanding relief from merciless energy prices and crippling crisis, Oil & Gas Regulatory Authority (Ogra) has asked the government to increase gas tariff by 45% to 50% to meet the revenue requirement of Sui Northern Gas Pipelines Limited (SNGPL) and Sui Southern Gas Company Limited (SSGCL) for the fiscal year 2023-24.

Ogra's this move is unwise and unjustified as it will bring more miseries on industrial and domestic consumers. Pakistan is facing a severe gas crisis as its demand has highly grown due to a rise in domestic, commercial, and industrial use. There is a need to withdraw such an unjustified gas price hike recommendation besides abolishing gas meter rent increased from 40 rupees to 500 rupees per month.

It is not a gas price issue alone, but there has also been power rate hikes as the government has also increased power tariff several times within six months, making the socio-economic life too difficult. In Jan, DISCOs' power tariff was raised by Rs4.46 per unit; in Feb, the government approved Rs3.3-Rs15.52 raise in power rate per unit for residential consumers, farmers, and exporters; In March, the Ministry of Energy jacked up the power tariff by Rs 4.76 per unit for K-Electric consumers; In April, Nepra increased KE power tariff by Rs6 per unit; In May, K-Electric raised the price of per unit by Rs.3.93.

Furthermore, petrol and diesel prices are also skyrocketing and are hitting people hard.

There should be no denying that the energy crisis and its highest-ever prices in the country are the result of ill-energy policies and lack of interest by all successive rulers in public service as they have always been seen busy in saving power chairs rather than making effective and efficient energy policies. Almost, all the successive governments have failed to reduce energy prices which are affecting the progress of the people, commercialization, and industrialization.

Natural gas and imported LNG contribute more than 40 percent to the country's current energy mix, including gas resources used in electricity generation. In recent years, the demand for gas has increased rapidly in Pakistan. However, gas exploration and production have declined, and the LNG operational and regulatory framework is weak, leading to a nationwide shortage and increased supply costs.

Although 78% of households have no access to natural gas in Pakistan, natural gas consumption in the domestic sector has grown by about 11% over the years- maximum growth among all the sectors. Supplying gas to households requires significant investments. The cost of gas supply to households is much higher than the cost of supply to the industry or power sector. In our gas prioritization policies over the years, this has not been taken seriously, leading to a shortage of gas supplies. Gas allocation policy has remained based on political priorities rather than on the objective of maximizing value addition. Low gas prices and inefficient gas allocations have encouraged higher demands.

It is therefore advised that the government should reduce all energy tariffs forthwith to ensure greater socio-economic progress of the country. There is a need to reduce the luxury allowances of bureaucrats and ministers besides controlling corruption instead of raising energy prices so frequently on IMF demand.



ENERGY UPDATE

Managing Editor
M. Naeem Qureshi
info@energyupdate.com.pk
energyupdate@gmail.com

Editor
Sajid Aziz
saziz75@gmail.com

Chief Financial Officer
Ruqiya Naeem
ruqiya.nfeh@gmail.com

Chief Marketing Officer
Engr. Nadeem Ashraf
marketing@energyupdate.com.pk
nadeem.event@gmail.com

Marketing Consultant
Khalid Iqbal
hikhaid@live.com

Marketing and Promotions Manager
Mustafa Tahir
mustafa_mt92@hotmail.com

Head of corporate Affairs and Sustainability
Halima Khan
mccm.energyupdate@gmail.com

Coordinator/Commerce Reporter Lahore
Rashid Hussain Ansari
Mohammad Asif

Art Director
Rizwan Ahmad
rizwanahmed55@gmail.com

Advisors
Zafar Sobani
Kalim. A. Saddiqui
Sohail Butt
Anwar Shahid Khan
Raziuddin Razi
Engr. Irfan Ahmed

Circulation & Subscription
Zahid Ali
Alizahid210@gmail.com

Shakeel Qureshi

Overseas Correspondents
Arif Afzal - USA
Kazim Wasti - Canada

Legal Advisors
M. Nadeem Sheikh Advocate

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#309, Al-Sehat Centre, Hotel Regent Plaza,
Shahrah-e-Faisal, Karachi-Pakistan.
Tel: 021-3565 3676, 3521 3853, 35674570
Email: info@energyupdate.com.pk
Web: www.energyupdate.com.pk

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Local, global solar market trends



Solar PV prices coming down continuously

SYED AKHTAR ALI

There has always been a problem in Pakistan's energy sector. Earlier, there were load-shedding issues due to generation capacity limitations. Now, there is capacity surplus causing circular debt. There is also higher fuel prices issue and lower transmission capacity and its discontinuities.

Alternative projects were delayed due to high capacity payment liabilities. Now, high fuel costs and lack of foreign exchange have compelled us to go solar in a big way.

In this space, we will take a view of the national and international solar market in terms of supply conditions and other details.

Solar PV prices have been coming down continuously. Some prices are too low to be taken as benchmark prices, while others are more reasonable representing average conditions.

MENA region, primarily containing the UAE and Saudi Arabia, has had solar PV utility from 1.5 to 3.0 US cents per kilowatt-hour (kWh) over the years between 2017 and 2019. Main reasons are high insolation exceeding 2,200 kWh/m²/yr and low cost of capital varying between 3% and 6%.

In Chile, in September 2022, Canadian Solar won solar PV bids at 3.738 US cents per kWh for a 253-megawatt project and 1 gigawatt-hour (GWh) storage.

Earlier in August 2021, Canadian Solar also won its lowest bid at 1.332 US cents per kWh, among other offers which were in the range of 2.1 to 2.8 US cents.

The most recent bidding results that are available in public domain and are relevant to Pakistan's conditions are from India and Uzbekistan.

In Uzbekistan, the lowest bid of French firm Voltalia has been accepted for 100MW at 2.888 US cents per kWh. Masdar, a Saudi firm, won a bid of 3.044 cents per kWh for a 250MW solar PV plant. And Power China won a 150MW solar project at 4.828 cents/kWh.

There is a wide variation among project bids. Perhaps locations and specs were responsible for such variations. One notable point is that a French company quoted the lowest bid and won against Chinese, negating a common perception about countries' competitiveness.

Perhaps the most relevant and competitive solar market is India. We have access to public data on 12 successful tenders of 2022 and 2023 with capacities ranging from 250MW to 1,200MW. Three types of projects are there – solar PV only, solar PV and wind

hybrid, and solar PV, wind hybrid plus storage.

Four types of solar PV utility projects are in vogue these days. These are solar PV only, solar PV with battery storage of one to four hours, solar PV-wind hybrid without storage, and solar PV-wind hybrid with battery storage of one to four hours.

Most popular have been solar alone for covering the day-time load providing the cheapest power. However, solar PV-wind hybrid with storage is emerging to provide 24-hour power supply.

Battery prices are still high, although they are coming down fast. With lower battery prices, type 4 will get more popular eventually offering a complete individual power supply solution.

Solar rooftop projects have been popular at home rooftops, both in Pakistan and elsewhere. Commercial and social buildings requiring daytime electricity mostly have found solar PV installations providing electricity at cheaper rates with and without net-metering provisions.

Solar PV project size has started going up, which started with 30-50MW a decade ago. Recently, India has gone for 1,000-1,200MW hybrid projects, although 500-600MW projects are more common. Next popular size is 250-300MW. In Pakistan, solar

projects of 50MW have been popular.

Solar capital expenditure (capex) was reported to be the lowest in India in 2019 at \$619 per kW. Lowest labour cost in installation and low transportation cost due to local manufacturing are probably responsible for the lowest cost figures in India.

For China, unit capex cost of \$795/kW has been quoted, although this figure appears to be higher than actual. There are problems in obtaining price data in public domain in China.

In the same year, Russia and Japan had the highest unit capex at \$2,000/kW plus. In Europe, the same has been at \$900-1,000/kW. In Pakistan, Nepra has earlier approved projects at 4 US cents per kWh. For Muzaffargarh project of 600MW, Nepra has approved a benchmark tariff at 3.4108 US cents/kWh.

European sources have, however, expressed pessimism about competition, calling the benchmark tariff too low due to a higher risk in Pakistan's market. On average, Pakistan's electricity prices have been higher by 40-50% due to higher risk, interest rates, rent-seeking and monopolistic trends in the supply market.

Internationally, interest rates have increased as measured by Libor, which is quoted at 5.5% at present. Nepra's earlier tariff of 4 cents was based on lower interest rates of 0.5% Libor and a margin of 4.5%. Local interest cost is even higher at treasury rates of 20-21% and the IMF has demanded a further increase in rates.

It appears that Nepra's benchmark tariff of 3.4108 cents/kWh for Muzaffargarh project is based on earlier lower interest rates. However, one is not sure, if and when interest rates would go down, depending on the early recovery of world economy. Energy projects have a long cycle of 30 years. Nepra may like to seek international input from experts with respect to interest rates trend in the long run, although such forecasts can be dicey.

Bidders may be in a better position to project and calculate. It is said that bidders and the market are better than regulators at predicting prices.

Ironically, local investors have not welcomed the Muzaffargarh project as it has delayed the implementation of their approved projects which are generally of lower capacity of 50MW. For Pakistan's market, many argue that this is a better project size.



EVENT REPORT



Pakistan attends energy conference in Bangkok

◆ EU Report ◆

Pakistan's delegation attended the Future Energy Asia conference 2023 organized by the USAID in Bangkok. The delegation was led by the Federal Minister of Energy Khurram Dastgir.

The delegation comprised three additional members including Additional Secretary Power Division Amjad Majeed Khan, MD Private Power & Infrastructure Board (PPIB) Shah Jahan Mirza and Director Alternative Energy Development Board (AEDB) Syed Aqeel Hussani Jaffri.

The agenda of the conference was "Emerging Clean Energy Investment Opportunities in Pakistan". At the conference, the minister discussed the vision of Pakistan's transition to clean energy and the goals set in the National Electricity Policy 2021. These goals are to be achieved by 2030 and are in line with Sustainable Development Goals (SDGs).

Pakistan's progress so far was shared as the clean energy mix of Pakistan has surpassed 6% with an installed capacity of 2436MW. The importance of solar and wind energy projects was discussed as the Wind Corridor in Sindh holds great contribution potential for the transition to Alternative Renewable Energy (ARE).

Pakistan's 2030 vision aims at a smooth transition to ARE to 60% by 2030 by phasing out the dependence on fossil fuels. It also includes increasing the number of electric



vehicles to 30% by 2030. The Federal Minister Khurram Dastgir highlighted that the share of Pakistan in the global emissions is only 0.8% yet it is among the top ten most climate-stressed countries.

"Pakistan is a victim of pollution emitted by others," said Federal Minister Khurram Dastgir. ARE projects and potential were highlighted in the conference. Gul Ahmad and Metro Wind projects have a capacity of 2x50 MW.

The Prism Energy Rooftop Solar Project has a capacity of 8.9 MW with seven solar parks across different cities. Prime Minister Shehbaz Sharif announced a 10000MW solar initiative and the bidding of the first 600MW will be done by the end of this month.

Journey towards clean energy Navigating ESG challenges in critical mineral supply chains

—●— Dr Khalid Waleed —●—

In the drive to attain the global climate goals, the humans have embarked on a transformative journey towards clean energy transitions from fossil fuel-powered anthropogenic activities. Post-COVID19, the world has seen a rapid momentum building in favor of energy transition. In this drive, the role of mines and minerals is imperative.

It is crucial to acknowledge that the path to a rapid energy transition and sustainable green future must be people-centered and inclusive. Policies, initiatives, government, and private businesses driving this critical transition can play a pivotal role in sustainable and inclusive development, but only if they address the potential adverse impacts associated with their activities regarding mining the energy transition minerals. Thus, the importance of environmental, social, and governance (ESG) risks should be the most significant component in decision-making processes all over the globe.

According to the International Energy Agency's (IEA) forecasts, clean energy technologies will require higher amounts of minerals and metals as com-

pared to fossil fuels. The rapid shift to these technologies is expected to drive a significant increase in demand for many minerals, including lithium, nickel, cobalt, graphite, copper, aluminum, and rare earth elements. These critical minerals are vital components in renewable energy systems, electric vehicle batteries, and energy storage technologies. However, their extraction and supply have sparked a vigorous debate about the implications for the environment, human rights, and global supply chains.

Proponents argue that the transition to clean energy is essential for mitigating climate change and reducing greenhouse gas emissions. They emphasize that the increased demand for critical minerals is a necessary trade-off to achieve a sustainable future. They argue that the risks associated with extraction and supply chain challenges can be addressed through responsible mining practices, stringent ESG standards, and international cooperation.

On the contrary, the critics are raising concerns about the potential environmental and social inequality related adversities of energy transition mineral extraction. Finding a balance between the need for critical minerals and the ESG considerations surrounding their extraction is a pressing challenge.

In response to the debate, initiatives are emerging to promote responsible mineral production and trade.

Certification schemes, such as the Initiative for Responsible Mining Assurance (IRMA), aim to establish standards for responsible mining practices and ensure

Governments, businesses, and international organizations must work together to manage supply of critical minerals; Demand for many minerals, including lithium, nickel, cobalt, graphite, copper, aluminum, and rare earth elements to rise

transparency throughout the supply chain. Collaboration between governments, industry stakeholders, and civil society is crucial to develop regulatory frameworks that incentivize sustainable mining practices and enforce ESG standards.

Furthermore, technological advancements and research efforts are focused on finding alternatives to critical minerals and developing recycling and circular economy strategies to reduce reliance on primary mineral extraction. These innovations can help alleviate the pressure on mineral supply chains and minimize environmental and social impacts associated with extraction.

This article reviews the dual challenge presented by role of critical mining for energy transition, meeting the increased demand for critical minerals while addressing the environmental, social, and governance risks associated with their extraction and supply. Striking a balance between these competing concerns requires collaborative efforts, innovative solutions, and responsible practices. By integrating ESG considerations into the transition process, we can ensure that the pursuit of clean energy is not only effective in combating climate change but also sustainable and equitable for all stakeholders involved.

ESG Impacts on Mining Projects

There are substantial risks associated with the ESG impacts of mining projects. These risks encompass a range of factors, including geopolitical tensions, armed conflict, human rights violations, bribery and corruption, emissions, water stress, and loss of biodiversity.



Engaging Stakeholders for Sustainable Solutions

Inclusive engagement with stakeholders, including local communities, indigenous peoples, and civil society organizations, is vital to ensure that the benefits of clean energy transitions and mineral extraction are shared equitably. By incorporating diverse perspectives, concerns, and aspirations into decision-making processes, interregional governments and businesses particularly from the global South can foster social acceptance, build trust, and reduce conflicts.

Conclusion

As the world moves towards clean energy transitions, the demand for critical minerals will increase significantly, presenting both opportunities and challenges. Achieving a sustainable and successful transition requires striking a delicate balance between meeting the demand for critical minerals and addressing environmental, social, and governance (ESG) considerations. Governments, businesses, and international organizations play a pivotal role in managing the supply of critical minerals responsibly. They must implement regulations, policies, and incentives that promote sustainable mining practices while addressing potential human rights abuses, environmental degradation, and corruption. By fostering international cooperation and information sharing, best practices can be developed to enhance ESG standards throughout the mineral supply chain. ■

The writer is Research Lead, Energy Unit, Sustainable Development Policy Institute (SDPI), Islamabad.

Investment in renewable energy rises

—◆ EU Report ◆—

LONDON: Investment in clean energy will extend its lead over spending on fossil fuels in 2023, the International Energy Agency (IEA) said on Thursday, with solar projects expected to outpace outlays on oil production for the first time.

Annual investment in renewable energy is up by nearly a quarter since 2021 compared to a 15% rise for fossil fuels, the Paris-based energy watchdog said in its World Energy Investment report.

Around 90% of that clean energy spending comes from advanced economies and China, however, highlighting the global divide between rich and poor countries as fossil fuel investment is still double the levels needed to reach net-zero emissions by mid-century.

“Clean energy is moving fast – faster than many people realise,” said IEA Executive Director Fatih Birol. “For every dollar invested in fossil fuels, about 1.7 dollars are now going into clean energy. Five years ago, this ratio was one-to-one.”

CLIMATE RESILIENCE



brings clean energy

US envoy says investment will help strengthen Pakistan's climate resilience

—◆ Salman Siddiqui ◆—

In a significant milestone for Pakistan's water management and clean energy sectors, the country has attained self-sufficiency through scientific research and studies. The US-Pakistan Center for Advanced Studies in Water (USPCAS-W), established at Mehran University of Engineering and Technology in Jamshoro nine years ago with USAID funding, has successfully delivered clean water energy solutions and contributed to socio-economic assessments of multiple dams. Under the US-Pakistan 'Green Alliance' framework, the USAID has also provided funding for the establishment of power grid stations in Jhimpir, Sindh.

One of these stations has the capacity to transmit nearly half of the total 1,700 megawatts (MW) of wind power generated in the country's power corridor to the national grid station. Additionally, a 50MW wind power project in the same vicinity has received financial backing from the USAID. During his visit to the water and power project sites, US Ambassador to Pakistan Donald Blome underscored the significance of the US-Pakistan 'Green Alliance' framework and emphasised the strengthened bilateral partnership between the two countries.

He said, “This trip is a chance to see and highlight US investment in the region, and how it is focused on supporting Pakistan as it strengthens climate resilience, pursues energy transformation, and fosters inclusive

economic growth. The 'Green Alliance' framework is helping us jointly meet the climate, energy, water, and economic needs of the present and future.” The Vice-Chancellor of Mehran University of Engineering and Technology, Professor Dr Tauha Hussain Ali, welcomed the first-ever visit of the US ambassador in the university's 60-year history and highlighted the recognition of the Center for Advanced Studies in Water as a national water center.

The center's six laboratories provide analytical and consultancy services to various entities, including government departments, NGOs, and public and private organisations in sectors such as irrigation, public health engineering, textiles, fisheries, and sugar industries. Their expertise has been particularly crucial during the floods in 2022, where they prepared inundation maps through numerical modeling and GIS, said Ali. Moreover, there is hope that the center will be assigned the task of conducting socio-economic assessments for the proposed Sindh Barrage, which is set to be constructed near Kotri Barrage on the River Indus.

Experts emphasised the need for a comprehensive flood management plan to mitigate water and climate challenges and prevent future disasters. Under the exchange program facilitated by the US-Pakistan partnership, over 169 individuals have visited universities in the United States, and 70 students are currently enrolled in PhD and post-doctorate programs at the University of Utah, USA, and the water center in Jamshoro. ■

Courtesy: Express Tribune

Plastics account for 65% of Pakistan's total waste

Plastic takes 500-1000 years to degrade following which it becomes microplastics, without fully degrading; government needs to ban manufacturing plastic bags instead paper bags should be introduced

Special Report by Mansoor

Plastic pollution is on the rise in Pakistan with each passing day due to a lack of government interest in curbing this non-biodegradable material. Plastic pollution alters habitats and natural processes. It is also affecting marine life including fish production. Microplastics are tiny particles of plastic that can be eaten by marine animals and end up in their bodies and tissues, entering the food chain and leading to disastrous consequences for the health of our planet and all its inhabitants.

Even if human beings are becoming more and more aware of the hazards this material poses to life, the presence of plastic in our ocean is continually increasing, and plastic pollution is still one of the main causes of marine species extinction, health problems for human beings and animals alike, and the destruction

of our ecosystems.

According to a UNDP report, more than 3.3 million tons of plastic is wasted each year in Pakistan and most of it ends up in landfills, unmanaged dumps, or strewn about land and water bodies across the country damaging the environment and people's health.

Pakistan has one of the highest percentage of mismanaged plastic in South Asia. During the Innovation-Accelerator's Lab Exploration stage we found that current municipal waste management is a major problem. Waste is picked from communal bins and disposed outside of cities without segregation, material recovery or recycling. Communities are not expected to take responsibility for the waste. The

entire system of waste management is in effect a system of dumping waste with-

out any management.

Pakistan has issued a Statutory Regulatory Order to ban plastic bags in the Federal Capital Islamabad and other cities including Lahore, and Hunza. However, over time we have seen plastic bags make a comeback because the policy framework does not address alternative, and the larger waste management system. Simply banning plastics in a struggling economy like Pakistan will put many people out of jobs and reduce customer footfall if no relevant alternative is available. The blanket ban is only addressing the symptom but not the root cause.

The issue of plastic pollution is a symptom of a larger system which is the linear take-make-waste model in which products are designed to be used once and then discarded. Our InnovationAccLab has deduced that the issue of plastic waste needs to be treated as a symptom of the larger linear take-make-waste system, which is essential for shifting towards



a circular economy model.

This system shift is what will ultimately be the sustainable solution. A core assumption for this work is to meaningfully address the plastic waste challenge. Creating a systems shift cannot be achieved through a traditional linear problem-solving project approach that features one (or a series of) single-point technical solutions. We need a holistic approach that uses systems thinking and tests a combination of solutions that creates the conditions towards a systemic movement into a circular economy. However, this shift is not simply possible with a set of policy solutions and development projects alone. We must also find approaches that fundamentally change the way communities, government, and private sector think about the problem of waste.

In sum, the Lab's learning portfolio of plastic waste and circular economy holds the following assumptions from its initial field exploration:

Pakistan has the highest percentage of mismanaged plastic in South Asia[2]. There are several countries that have duly banned the use of plastic bags such as Bangladesh, France, and Rwanda. Pakistan learning from these countries' initiatives has issued a (Statutory Regulatory Order) SRO to ban plastic bags in Federal Capital Islamabad and other cities including Lahore and Hunza. Currently, the policy framework is non-existent at the federal and provincial levels that addresses the aspects of single-use plastics and plastic waste management in a broader domain.

According to a WWF-Pakistan report, "Plastics account for 65 percent of the total waste in Pakistan. 55bn plastic bags are being used in the country with an expected annual increase of 15 percent in their usage. Immediate and effective steps are required to curtail the usage of plastics in order to save our country

and our planet."

The plastic waste in Pakistan is primarily generated by urban areas, and the waste collection and disposal infrastructure is inadequate to handle the volume of plastic waste generated. As a result, plastic waste is often burned or dumped in open areas, including water bodies, which leads to environmental pollution and health hazards.

According to a UNESCO report, plastic waste makes up 80% of all marine pollution. By 2050, plastic will likely outweigh all fish in the sea. Plastic generally takes between 500-1000 years to degrade. Even then, it becomes microplastics, without fully degrading.

Most of the plastic we find in the ocean comes from land: it flows downstream through rivers all the way to the sea. At first, it may stay in coastal waters, but it can soon be picked up by rotating ocean currents, called gyres, and transported literally anywhere in the world.

According to National Geographic, scientists found plastic coming from Russia, the United States, Europe, South America, Japan, and China on Henderson Island, an uninhabited isolated atoll halfway between Chile and New Zealand.

Usually, marine plastic debris groups up in what we call garbage patches, plastic accumulation areas, in the center of the ocean's gyres. The biggest is the Great Pacific garbage patch, located between Hawaii and California.

What are the causes of plastic pollution? There are plenty of causes of plastic pollution, but we've detailed the most prominent causes below. Some of these causes are complicated to tackle, but having knowledge of them can help us make more informed decisions as we consume.

Causes of plastic pollution

We create large amounts of waste. A lot of our

waste is made of plastic, and we create a lot of litter as a society. If we were less wasteful, we could make a difference in this area.

Commercial fishing nets: While sometimes necessary, fishing nets can leak toxins, break and pollute oceans, and even stay permanently and trap sea life. Better management and harsher fishing laws are needed.

Mismanaged plastic disposal: So much plastic doesn't get recycled when it should – instead, it goes to landfills or ends up scattered around the landscape. It is also often burned, releasing fossil fuels and creating air pollution.

Decomposition time: It takes over 400 years for plastic to decompose, which is an incredibly long time considering the amount of plastic we need to get rid of. Nature spreads pollution: Unfortunately, the wind, rivers, and ocean can all spread pollution naturally due to the commonly lightweight nature of plastic.

Overuse of plastic: This is the biggest cause – we overproduce plastic to an enormous extent. We can't possibly manage the amount of waste created.

Ways to control plastic pollution

It is mandatory to first raise awareness of the solution to plastic pollution; river-lake-oceans cleaning drives should be conducted by NGOs and the government; reuse of shoppers to a possible level be ensured, stop throwing plastic in rivers, lakes, canals, and oceans; plastic should be recycled into new products; reduce plastic consumption to a possible largest level; refuse plastic whenever possible; say no to straws, lids, plastic bags, and plastic takeaway containers; carry your own utensils and avoid using plastic utensils; replace plastic items at home with alternatives made from natural materials; and not last but the least, governments should ban manufacturing and use of plastic bags forthwith. ■

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Technology mandatory for business progress

MM Pakistan's Technical Account Leader

Kamran Rafique

says in an interview

We have adopted Google Workspace and developed AI-powered solutions to energize our systems

— Engr. Nadeem Ashraf —

Kamran Rafique, Technical Account Leader at MM Pakistan (MMP), is a seasoned energy professional with over three decades of experience in project management, including front-end design, project concept development, and project execution. He has successfully delivered projects in diverse locations, such as the Gulf of Mexico, Trinidad, Egypt, Angola, Indonesia, Brazil, North Sea UK, Norway, Azerbaijan, and UAE. He currently serves as the Technical Account Leader at MMP, one of the largest engineering & management consulting firms in Pakistan, successfully overseeing project development and management.

Q: Technology is playing an increasingly important role in today's world. How do you see the role of technology in the engineering, and management consulting industry in Pakistan?

Ans: We live in an era where technology is not a choice, but a fundamental business strategy that must be interwoven into every part of an organization. Companies have to deal with increasing amounts of data, rising consumer requirements, evolving work environments, and the constant need to streamline processes and find more efficient ways to conduct business activities. The engineering management consulting industry is not immune to this change. In fact, they should be at the forefront of embracing new technologies to stay competitive and meet the evolving needs of clients.

Q: Has the industry been slow to adopt new technologies?

Ans: Unfortunately, Pakistan has been relatively slow in adopting new technologies. There are a few reasons for this, including a lack of awareness about new technologies, a lack of investment in training and development, and the perception that traditional methods of working are still effective. However, this mindset is slowly changing, and companies are beginning to realize the benefits of technology adoption, such as increased efficiency and cost savings.

Q: Is MMP adopting new technologies?

Ans: We believe that our commitment to innovation and staying ahead of the curve sets us apart from other consulting firms in the industry. That's why we recently adopted Google Workspace and developed AI-powered solutions to energize our systems, processes, and project delivery mechanisms. This has allowed us to streamline our workflows, enhanced collaboration among teams and departments, and delivered high quality solutions.

We are unique in this way; no other local company in Pakistan has yet embraced such innovative technologies at the same scale. In fact, our ability to quickly transition onto the Google ecosystem and create multiple tools and systems has even prompted Google to develop a customer case study on our company. The story will be featured on Google Cloud's website.

Q: Can you tell us about any upcoming technological advancements that you think will have a significant impact on the industry?

Ans: Machine learning, big data analytics, automation etc have dominated technology discourse this past decade. The consulting industry, specifically in developed countries, has utilized these innovations for their advantage: improving project management, promoting collaboration and communication among teams, analyzing data, and developing more accurate insights and solutions for clients.

GPT, for example, is a recent groundbreaking technology that is capable of understanding and interpreting complex language structures and contexts, making it a powerful tool for various applications, including natural language processing, chatbots, and content creation. I believe GPT is a game changer and will definitely have a significant impact on not just businesses but our daily lives - and we have only just scratched the surface of what GPT can do! The possibilities are endless.

At MMP, we are always exploring new technologies and how they can benefit our clients, and I hope Pakistani companies begin prioritizing technology adoption as well; otherwise, we will be left behind compared to our international counterparts. ■



Ahmed Saleh Baabood

Ahmed Saleh Baabood is an Omani national who is a graduate in Business Administration & Finance and holds a Master's degree in Economics and Social Studies. Ahmed is an active Board Member of the Oman Chamber of Commerce & Industry, where he heads the Investment & Promotions Committee and is a member of the Investment & Economic Committee for the Chamber.

Recently appointed as a board member of the Public Authority of Investments Promotion & Export Development (PAIPED). Ahmed, manages and sits on the board of several companies in Oman and the Gulf. Currently, he is the Executive Chairman of Oman International Trade and Exhibitions (OITE). He is also involved with several companies within the IT & Telecoms sector, electrical trading, and electro-mechanical projects in the Gulf and is a Board Member of Baabood LLC, Al Haq Trading & Contracting LLC and Apex International Technologies & Projects LLC.

Renewable energy is the need of the hour

A lot of protentional exist in Pakistan to launch projects for manufacturing solar panels: Ahmed

—◆— Halima Khan —◆—

Q: Tell our readers about yourself and your work experience.

Ans: I am a graduate in business administration and finance, and also holds Masters degree in Economics and Social Studies from Swansea University in Wales, United Kingdom. I have been involved in exhibitions and industry events for the past 22 years. I was the first elected Vice Chairman for the Middle East & Africa region and Board Member of the Union des Foires International (UFI). In 2005, I was awarded Oman's Entrepreneur of the Year Award, which was the first of its kind to be given to the exhibition industry.

Q. Tell our readers about White Papers Summits and its operations

Ans: White Papers Summits is one of the leading business event organizers (Summits, Exhibitions, and Trainings) in the Middle East region with its headquarters based in Muscat, Sultanate of Oman. The regional office of White Paper Summits is established in Karachi, Pakistan.

White Paper Summits in a strategic partnership with the Institution of Electrical and Electronics Engineers Pakistan (IEEEP). It also organized a conference where national and international expert speakers shared their case studies, technical presentation, and the latest insights on the problems and solutions addressing the power and renewable energy sector of Pakistan. As many as 150 national and international companies, manufacturers, and distributors gathered under one roof to exhibit their products regarding solar and alternative energy options for the benefit of the end users. Local and international energy and power sector experts, primarily working in renewable power with a focus on solar power generation, attended this event.

Q. What do you think about the Pakistan market potential for such type

of events?

Ans: I believe the Pakistani market has a lot of protentional to carry out such events and gain knowledge and networking through these events. In this ISEM, more than 12,000 visitors participated, which was aimed at augmenting a serious debate on the available options for renewable energy. It was also aimed at providing a unique platform for industry players to get together and discuss and devise ways and means to help the government overcome the lingering energy crisis in the country. We need to make it more sustainable and profitable for the economy of the country.

Q. What was the focus to organize ISEM in Pakistan

Ans: The focus of organizing the 2nd series of solar energy moot was to provide a platform where technological partners, engineers, and end users gather under one roof for sustainable solutions. The main focus of the exhibition and conference was on Power Transformers, Power Technology, Capacitors, Batteries, Heavy Duty Cables, Power Distribution Equipment, Wind Energy, Hydropower, Bioenergy, Bio Gas, BioFuel, Hydrogen, GeoThermal Energy, Solar Energy, and much more. It was so heartening to see so much knowledge sharing at the conference during Q&A sessions, networking programs, and B2B networking to facilitate much-needed access to a wealth of industry-leading knowledge, information exchange, and actionable takeaways.

Q. What recommendations do you wish to share with the public and private sector of Pakistan?

Ans: Renewable energy is the need of the hour and the government is allocating resources and putting in sincere efforts to mitigate the carbon footprint in the country.

The Federal Minister also said that the government is encouraging the proliferation of clean and green energy solutions. In my point of view, "This event is a step towards the future of renewable and wind energy, which will reduce the power cost of the consumers,"

I also believe there is a lot of protentional in this country to launch projects for the manufacturing of solar panels in the country. We are looking forward to having such huge events in the future too. ■

Thar coal mine expansion

Main issues are diesel and financing cost

—◆ Syed Akhtar Ali —◆

Sindh Engro Coal Mining Company (SECMC) has filed a tariff petition for expanding its capacity. This is a third expansion. The mine started its phase-I at 3.8 MTPA (Million Tons per Annum) through phase-II at 7.6 MTPA to the current Phase-III expansion at a cumulative capacity of 11.2 MTPA.

We will make a few comments on improving the proposal and approaches for reducing foreign exchange component. The bulk of the production cost appears to be in foreign exchange, which is a larger problem of Pakistan's local production and even export items.

The production cost has been coming down gradually with plant expansion; it has come down to the proposed 30-year tariff of 37.26 USD/ton.

The incremental CAPEX of the Phase-III is 104.97 USD out of which 68.18 USD is EPC (engineering, procurement and construction) cost, all in USD. One would have expected a marginal FE component. However, diesel cost, which is in foreign exchange, is a whopping 18.8 million USD. We will discuss this later in this space. Similarly, one would have expected lower FE component in over-burden removal (OBR), which is costing 22.91 million USD. Localization of mining activities is a much desirable objective which has multiple advantages.

The main issues appear to be the financing cost and the diesel cost. We will first deal with the diesel cost and then take up the financing cost issues. Diesel cost appears to be one of the significant costs at 6.58 USD per ton coming out to be 15-16 percent of the per ton cost of production. In total annual terms, this would amount to 73.7 million USD per year — all in foreign

exchange. We are passing through a foreign exchange crisis.

It is almost a perpetual problem; exports being less than half of the imports and rest expected to be filled by remittances and foreign loans. Not much explanation is required in this respect. SECMC itself is suffering from the lack of foreign exchange to pay off the liabilities of its foreign contractor which has served a notice. SECMC has enough cash but cannot convert it into dollars.

What can be done to do away or at least reduce this heavy out-flow of foreign exchange? The answer is electricalization. Electricalization of mining is being done almost everywhere in the world.

With the introduction of EV, this has become to use EV trucks and shovels. Cheap local Thar electricity is already being produced at site. EV mining trucks of 30 to 400 tons have been developed which work on batteries. Similarly, electrical conveyors may be added as much as possible.

Earlier, one would have spoken about the need of BWE (Bucket Wheel Excavator) but these are diesel operated. One is not aware if electrical BWE has been developed. These may be a bit more expensive. I am not sure. It may add much to operating cost but would save diesel cost in foreign exchange. SECMC and the regulator may like to examine the electricalization issue.

Financing cost, especially, RoE at 18 percent in USD terms, appears to be high. But it is a contractual matter and has relevance to larger issues of IPP (independent power producer) projects. There is a debate on requesting renegotiations of the financial terms of these projects. However, a rate of 4 percent interest on long-term loan on sovereign guarantees, if quoted correctly, has saved our skin.

Today, LIBOR is at 5.5 percent as opposed to 0.5 percent only a few years

Opening-up the power sector

Introduction of competition in power sector to be beneficial; some quarters call for cancellation of KE's licence

—◆ Jawwad Rizvi —◆

The power sector in Pakistan is going through a transformational shift and moving towards liberalisation of the market through a competitive trading bilateral contract market (CTBCM) model.

While the overall framework is still in the works, the National Electric Power Regulatory Authority (NEPRA) has taken a significant step in this direction by issuing non-exclusive licences to ex-WAPDA distribution companies (XWDISCOs) for the next 20 years. The licences were issued in early May. Sources close to the decision making suggest that the NEPRA may face resistance in this regard from these distribution companies.

On the other hand, K-Electric, the country's only privatised and vertically integrated power utility, has chosen to apply for a non-exclusive licence for the distribution and supply segment. According to Moonis Alvi, the company's CEO, this step was taken because the company recognises the market potential as well as the abundance of opportunities available. He says in the interest of consumers, it is ready to embrace competition on its territory.

Along with its licence request, the company has submitted a Rs 484 billion investment plan for 2024-2030. According to the plan, the company is aiming to achieve its Vision 30 by 30 which includes taking the share of renewables in its energy mix to 30 percent.

The K-Electric's choice of a non-exclusive licence indicates a willingness to avoid monopolistic practices and challenge the status quo. However, some quarters are calling for the cancellation of KE's licence altogether.

The power sector circular debt currently stands at Rs 2.6 trillion, which is around 27.3 percent of the country's budget for the fiscal year 2022-23. Given the circumstances, NEPRA's effort to introduce competition through CTBCM is likely to attract foreign direct investment. It may also be able to pave the way for the privatisation of other government-owned DISCOs which

are currently struggling with their financials and continue to incur heavy losses every year that become a part of the country's burgeoning circular debt. According to NEPRA officials, it has already offered non-exclusive licences to ex-WAPDA DISCOs for the next two decades. The K-Electric has requested the NEPRA to end its 'exclusive' rights of power supply distribution in the company domain areas and open the field to any company interested in investing in a power distribution network.

The decision taken by K-Electric to opt for a non-exclusive licence shows their willingness to avoid monopolistic practices and challenge the status quo. However, some quarters are calling instead for the cancellation of KE's licence.

The step is in line with NEPRA and the government of Pakistan's vision defined in the Indicative Generation Capacity Expansion Plan (IGCEP-2022-31) and Competitive Trading Bilateral Contract Market (CTBCM) framework. The NEPRA has published a public notice to invite comments on K-Electric's request to renew its distribution licence for another 20 years.

A NEPRA official says that the omission of the exclusivity clause is aligned with the amended NEPRA Act 2018 and global best practices. NEPRA Chairman Tauseef Farooqi says he is very keen on swift implementation of the open market framework (CTBCM) in line with the proposed timelines. Several hearings have already taken place and consultative sessions are under way.

The fact that competition is being introduced in the power sector is a positive development. It will lead to increased efficiency, better service and ultimately, lower costs for consumers. K-Electric, which has been associated with Karachi for more than 113 years now, is also set to learn and develop in the process.

K-Electric's request for the renewal of its distribution and supply licence on a non-exclusive basis is a progressive step in line with the vision of the NEPRA and the government of Pakistan. It has the potential to pave the way for a new phase of sectoral development. It is highly likely that the licence will be renewed. ■

back when Nepra (national electric power regulatory authority) was merrily awarding high margin at 4.5 percent.

For the phase-III project under consideration in this petition, the debt is being financed in local currency at KIBOR plus 2.5 percent, while KIBOR is being quoted at 21.99 percent. A margin of 2.5 percent is rather high. Usual rates for such established companies are in fraction of a percent. There are extraordinary conditions prevailing these days. It is wondered if alternative cheaper financing could be availed.

The benefits of Thar coal became more evident when recently international coal prices tripled reaching 300 USD/ton. Rupee depreciation multiplied the problem. Unfortunately, we have installed three large coal power plants working on imported coal. Cheaper Afghan coal was available and also some local sub-bituminous coal from Balochistan was there which helped reduce the calamity. There is much more potential of Thar coal than is being evident in this particular project. About 20 MTPA of coal is imported for the three imported coal power plants. And industries like cement, glass, tiles and others also use gas or imported coal. Only cement industry has been converted to coal but largely uses imported coal; all of these can be converted to Thar coal.

It is hoped that the regulator will consider our suggestions while examining the tariff petition. The federal government and Sindh government should resolve the issue of implementation of Thar rail link, which has been delayed enough by now.

Other steps required are to involve third parties in coal mining beyond captive mining. Facilities and investments are required for processing Thar coal for industrial uses.

Growatt shines at SNEC Exhibition with top brand awards



Growatt, a world-renowned provider of distributed energy solutions, concluded its successful participation at the SNEC PV Power Expo in Shanghai. The company's achievements were highlighted by its receipt of the Top Brand PV 2023 award from EUPD Research, along with the showcase of an impressive array of cutting-edge energy solutions.

Top Brand PV Awards

The Top Brand PV 2023 award further solidifies Growatt's leading status in the industry, with a dominant presence in the residential sector and a prominent standing among the top three global players in the commercial and industrial (C&I) market. "We are delighted to award Growatt as a Top Brand PV 2023 for multiple key markets, reflecting the company's ongoing performance and dedication to driving the energy transition on an international level," commented Daniel Fuchs, Vice President of EUPD Research at the award handover

ceremony.

Full Range Battery Ready Solutions

One of the highlights of Growatt's exhibition was the comprehensive suite of battery-ready solutions. With capacities from 2.5 to 30 kW, the solutions empower households worldwide to adopt low-carbon lifestyles by providing the flexibility to integrate battery systems at a later time. By combining the battery-ready inverters with the latest APX HV battery, homeowners gain enhanced control over their energy management, increasing solar self-consumption and elevating overall system safety.

Solar Energy Solutions for Businesses

The brand's advancements in C&I energy storage systems were also on display, featuring the WIT inverters and APX commercial batteries. The WIT series 50-100kW storage

inverters, boasting advanced functions such as built-in UPS, black start capability, 100% unbalanced output, and 110% continuous AC overloading, work seamlessly with the APX Commercial battery. This powerful combination empowers businesses to achieve energy independence while optimizing operational efficiency.

Innovations for Vast Application Scenarios

To address diverse energy needs, Growatt impressed attendees with its revolutionary NEO 2000M-X, a flexible and scalable micro-inverter that not only prioritizes high yields with four MPP trackers and a maximum efficiency of 96.5% but also supports long signal transmission distance with Lora communication. Additionally, the innovative portfolio of off-grid products, THOR EV chargers, and portable power stations exemplify the manufacturer's ongoing efforts to provide sustainable energy solutions across various application scenarios. ■



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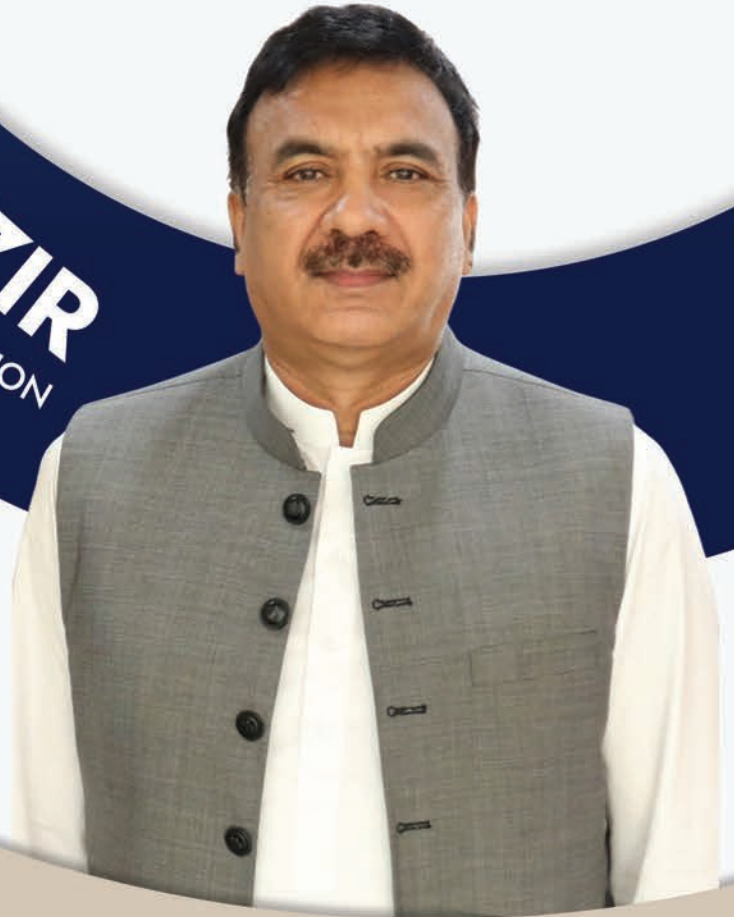
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OIL MARKETING SECTOR CAN PLAY A PIVOTAL ROLE IN SHAPING THIS FUTURE

TARIQ WAZIR
CHAIRMAN, OIL MARKETING ASSOCIATION
OF PAKISTAN (OMAP)

Says in an interview that smooth and reliable supply chain is crucial for OMCs; aim to lead OMAP towards becoming a trusted and influential organization that empowers its members



— Halima Khan —

Energy Update (EU): How would you assess the current energy landscape in Pakistan and its impact on the oil marketing sector?

Tariq Wazir Ali (TWA): The current energy landscape in Pakistan presents a mix of challenges and opportunities for the oil marketing sector. The sector's success will depend on its ability to adapt to changing market dynamics, align with government policies, invest in infrastructure, and explore new avenues in renewable and cleaner energy sources.

It presents a complex and challenging environment, with significant implications for the oil marketing sector. Pakistan's energy mix is heavily reliant on fossil fuels, particularly natural gas and oil. However, the country has been actively diversifying its energy sources by incorporating renewable energy, such as wind and solar power, into the grid.

This shift towards cleaner energy sources has the potential to reduce the long-term demand for traditional petroleum products. The country experiences regular power outages and relies on imported oil and gas for electricity generation. This reliance on

imports exposes the oil marketing sector to fluctuations in global oil prices and supply disruptions, impacting their profitability and operational efficiency. As the country moves towards a more sustainable energy future, the oil marketing sector will need to adapt and explore opportunities in alternative fuels, such as compressed natural gas (CNG) and electric vehicle charging infrastructure.

EU: What are the key challenges faced by the oil marketing industry in Pakistan, and how do you plan to address them?

TWA: Currently, in Pakistan, our industry is facing several key challenges, and addressing them requires strategic planning and proactive measures. The industry operates under price regulations set by the Oil & Gas Regulatory Authority (OGRA), which can impact profit margins for oil marketing companies (OMCs). To address this challenge, OMCs can focus on

operational efficiency, cost optimization, and diversification into value-added services or alternative energy sources.

Further, a smooth and reliable supply chain is crucial for OMCs. Challenges can arise from transportation logistics, storage capacity, and distribution network optimization. Investing in robust infrastructure, adopting advanced technology for supply chain management, and building strategic partnerships can help address these challenges.

This industry is highly competitive, with multiple OMCs vying for market share. To stay competitive, OMCs can focus on differentiation through superior customer service, innovative marketing strategies, product diversification, and expanding their network of retail outlets. The smuggling of Iranian petroleum products poses a significant challenge to the industry, impacting revenue, market share, and fair competition. Collaboration with law enforcement agencies, investment in robust tracking and

monitoring systems, and stricter enforcement of regulations can help mitigate this challenge. In addition, there are several other challenges like changing consumer demands with increasing awareness, strict regulatory compliances required by OGRA, and embracing technological advancements is crucial for the growth and sustainability of the industry.

EU: How do you envision the future of energy in Pakistan, and what role can the oil marketing sector play in shaping that future?

TWA: This is a very important question and very much relevant to the future vision. The future of energy in Pakistan holds significant opportunities and challenges. As the country strives for sustainable development and energy security, the oil marketing sector can play a crucial role in shaping this future. OMCs can support the transition to a cleaner and more sustainable energy system by investing in diversifying energy mix as it will reduce reliance on traditional fossil fuels.

The industry can play a pivotal role in promoting cleaner fuels, such as low-sulfur diesel and gasoline, which contribute to reduced emissions and improved air quality. Encouraging the adoption of cleaner fuels and supporting initiatives for cleaner technologies can contribute to a greener and more environment-friendly energy future landscape in Pakistan.

One very important factor is energy secu-

ity and resilience as Pakistan aims to enhance its energy security, the oil marketing sector can contribute by ensuring a reliable and resilient energy supply chain. This includes diversifying fuel sources, investing in storage and distribution infrastructure, and implementing robust risk management strategies. By prioritizing energy security, OMCs can help mitigate disruptions and support the country's economic growth. This is how I envision the future of energy in Pakistan and the role of the oil marketing sector.

EU: Finally, what is your vision for the future of the Oil Marketing Association of Pakistan, and how do you plan to lead the organization towards that vision?

TWA: My vision for the future of the Oil Marketing Association of Pakistan (OMAP) is to position it as a leading and influential voice within the oil marketing sector, dedicated to advancing the interests of its members, promoting sustainable growth, and contributing to the energy landscape of Pakistan. We foster collaboration and partnerships with key stakeholders, including oil marketing companies, industry experts, technology providers, and research institutions. By forging strong alliances, we can pool resources, share knowledge, and drive innovation. I will encourage collaboration on initiatives such as infrastructure development, adoption of new technol-

ogies, and sharing best practices to enhance the overall efficiency and competitiveness of the sector. I do recognize the importance of continuous learning and skill development in a rapidly evolving industry.

I will prioritize initiatives that enhance the capabilities of our members through training programs, workshops, and knowledge-sharing platforms. By equipping our members with the necessary skills and knowledge, we can enhance their competitiveness, foster innovation, and drive sustainable growth. I believe in the strength of a united and engaged membership base. I do my best to foster an inclusive and supportive environment that encourages active participation, knowledge sharing, and collaboration among OMAP members. By understanding their needs, challenges, and aspirations, I will ensure that OMAP provides tailored support, services, and resources that add value and drive their success. By staying responsive to industry changes, OMAP can effectively navigate challenges and seize emerging opportunities.

I aim to lead OMAP towards becoming a trusted and influential organization that empowers its members, drives industry growth, and contributes to the sustainable development of the oil marketing sector in Pakistan. I am committed to working closely with the OMAP team, members, and stakeholders to translate this vision into tangible results and create a brighter future for all. ■



New options to use plastic waste

Pakistan has also constructed its first plastic road in Islamabad

—◆ Amin Ahmed ◆—

As the United Nations roadmap outlines solutions to cut global plastic pollution, new options are being explored to use plastic waste as partial substitute for raw material as a bitumen modifier in road construction.

A report of the World Bank, "Plastic Waste in Road

Construction: A Path Worth Paving?" says the upcoming international, legally binding treaty to reduce plastic pollution calls for a full life cycle approach to reduce plastic pollution, incorporating both upstream and downstream measures.

The use of plastic waste in road construction is a downstream measure to utilise plastic waste as an input material and further upstream measures to reduce plastic waste are needed, the report says. The use of plastic waste as a bitumen modifier in roads, referred to here as plastic roads, has emerged as an innovation which uses plastic waste as an input material. The report found that many companies are starting to implement or pilot this technology worldwide though key gaps in engineering performance, such as cracking resistance, remain.

Since the use of plastic waste in road construction targets plastic waste after the use and maintenance stages, plastic roads are considered a downstream measure. Authors of the report found that the use of plastic waste in road construction is a viable option for the application of plastic waste that also protects environmental and human health.

The report found 132 total plastic roads project worldwide. Recently, Pakistan has also constructed its first plastic road in Islamabad. The report estimates that 58 per cent of plastic roads projects surveyed were in planning, pilot, or construction phases while 37 per cent were already constructed and in use.

The Capital Development Authority's member of engineering, when contacted, told Dawn that over a kilometre plastic road had been recently constructed from Ayub Chowk to Margalla in collaboration with a private company.

The report says that further research is needed to fill major gaps in our knowledge base of plastic roads. Opportunities for close monitoring and further research may be found in countries that are already piloting or using plastic roads.

Courtesy Dawn



Climate-smart National Finance Commission awards

NFC award mechanism has failed to keep pace with the changing times; This mechanism does not address increasing poverty, climate vulnerability, degrading physical environment, and falling quality of life indicators

—◆ Ali Tauqeer Sheikh ◆—

At the heart of the controversies surrounding Census 2023 is the National Finance Commission award that determines the basis of financial flows from the federation to the provinces. The current formula rewards the provinces that record higher population growth rate and occasionally brings the simmering differences between more populous and less-populated provinces to a boiling point. The NFC award criteria has simply failed to keep pace with the changing times. Instead of serving as a catalyst for accelerated and inclusive development, the NFC award has perpetuated elite capture and a political system that does not rest on local governance and service delivery institutions. Each chief minister annually receives an envelope from the federal government. Based on an unsustainable formula, he spends it all without worrying about the provincial financial commission and without systematically transferring resources to lower tiers of government. This mechanism does not address increasing poverty, climate vulnerability, degrading physical environment, and falling quality of life indicators. In this system of top-down dispensation, the envelope is delivered without building mechanisms for performance, resource efficiency, transparency and accountability.

The soul of the NFC award continues to be a prisoner of the colonial purpose defined by Sir Otto Niemeyer in 1936 and later adopted by Liaquat Ali Khan's finance minister in 1951: the central government will collect and distribute the collected revenue to the federating units. The focus was on strengthening the capacity of the central government to collect taxes. Strengthening capacities of the federating units to generate and collect revenues was not the objective. There was no room to tax and spend locally. The same principle has continued to drive the federal-provincial financial allocation system.

After East Pakistan left the federation, population was adopted as the sole basis for distribution of finances. Hence, the NFC award began to increase economic and social disparities between the provinces and widened the development gap between less and more populated regions simply because more financial resources were flowing into more populated areas.

The existing formula should be revisited in order to respond to the emerging provincial needs.

This arrangement continued for 50 years and was revised only by

OGRA webinar's two sessions on LNG held

The Oil & Gas Regulatory Authority conducted the 1st session of the knowledge-sharing Webinar on LNG. The participants included the Ministry of Energy, Engro Elengy Terminal Limited, Pakistan Gasport Consortium Limited, Taber Energy Private Limited, Energas Terminal Private Limited, Port Qasim Authority, and Karachi Port Trust.



Chairman OGRA Masroor Khan gave the opening remarks highlighting the importance of the LNG sector in the energy mix of Pakistan. He pointed out that Pakistan's energy landscape has undergone a transformation in the last few years with the LNG sector emerging as a vital component of the country's energy mix. The development of LNG infrastructure, including re-gasification terminals, has enhanced Pakistan's energy availability and flexibility. He further highlighted the challenges and opportunities associated with its adoption. The following topics were covered in the presentations by the participants: History of LNG, Global LNG Outlook, LNG Sector in Pakistan, Policy provisions, supply demand and market overview, FSRU and Land based LNG storage and re-gasification terminals, projects regulatory and financial challenges, projects applicable codes and standards, Stages and challenges of LNG project development, production, Liquefaction and re-gasification technologies, Safety and environmental aspects of LNG projects, Current trends and future projections of the LNG Global market, trading and risk management strategies and tools, Fundamentals of Third party access to LNG infrastructure, Global LNG infrastructure and utilization, Risk assessment, Safety and security at Ports for LNG projects, Role of Port Authorities in managing and operation of LNG projects etc.

Second webinar

The Oil & Gas Regulatory Authority conducted its second knowledge-sharing session of Webinar on LNG which was attended by Pakistan State Oil, Pakistan LNG Limited, SSGCL, SNGPL, CNG Association, LNG Virtual Pipeline licensees (LNG Easy, LNG Flex, Gawadar Gasport Limited), and Department of Explosives.

At the start of the session, the Chairman OGRA Masroor Khan and Member (Oil) Zain ul Abideen Qureshi appreciated the efforts of the OGRA LNG department for organizing the webinar on a very important segment of the energy sector. The OGRA chairman highlighted that out of 48 FSRUs operating worldwide, two are in Pakistan, however, the utilization of one of them is below the desired level and needs to be augmented.

Important topics were covered in the presentations by the participants which included: present and future global LNG market trends, LNG contracts, global imports, market and pricing mechanisms, trends in LNG contracts and challenges for Pakistan, the current state of Pakistan's gas market and its liberalization, impact of natural gas market liberalization on energy security, challenges of implementing natural gas market liberalization in Pakistan, virtual pipeline infrastructure and its equipment and technology, regulatory safety technical and logistical challenges of LNG virtual pipelines, code and standards adopted by Department of Explosives for LNG related infrastructure. ■

the 7th NFC award in 2009. A new beginning was made by revisiting the formula and reducing the weightage of population to 82 per cent, resulting in 5.2pc reduction in Punjab's share. The sum that accrued created space for three additional parameters: poverty and (economic) backwardness (10pc), revenue collection and generation (5pc), and inverse population density (2.7).

This formula can be distilled into four guiding principles that can help shape future NFC awards. First, it recognised the principle of give and take, whereby for collective benefit a province allows reduction in its given share. Second, poverty and economic backwardness were recognised as a shared concern by all provinces. Third, revenue collection and generation capacity in the provinces was recognised as a source of prosperity for all federating units. Fourth, affirmative action was taken to cater to the special needs of some federating units.

Regrettably, successive governments have failed to build upon these principles, despite some significant enabling changes introduced by the 18th Amendment. The amendment transferred 17 social sector ministries to the provinces and made it mandatory for them to make local governments functional. In reality, the then existing local governments have been withdrawn by violating the constitutional amendment.

Subsequent awards, if issued, should have redefined and refined these parameters, or simply revisited their respective percentages in order to respond to the emerging provincial needs and demands — a task that is staring in the face of the present government.

Successive federal governments have invoked debt servicing, defence, terrorism, merger of Fata with KP, the Covid-19 pandemic and climate induced-disasters to revisit the existing formula, while GB is knocking on the door for its fair share. Rather than ring-fencing, Islamabad has undermined the NFC award by randomly accessing it for contingencies.

This dysfunctionality is an inevitable result of an overly centralised system that denies the provinces powers to generate and collect revenues except through property and agricultural income taxes, the latter remaining a pipe dream. Likewise, the federal government is accused of defining the

services sector arbitrarily to increase its own share.

Finally, the efforts to weave environment and climate resilience in development planning has been far from successful since the efforts at national and provincial levels began in the early 1990s. This has made Pakistan a high-risk country, routinely suffering unbearable losses and damages. The 2022 floods alone cost over \$30 billion. The NFC award is an underutilised policy instrument for Pakistan to adopt a climate-smart development pathway. Climate-compatible NFC awards can help to systematically pursue SDG targets and build climate resilience.

Given the present transitional nature of the polity, it is unlikely that the government can constitute the commission, or muster a new consensus. What then are the government's options for immediate remedial measures? Creating a national pool of funds to manage contingencies.

In operational terms, the government may like to roll back the 1pc fund that was set aside for KP to tackle terrorism, now that it has been largely tamed. The provinces have been asking to bring this pre-allocation to a closure. Herein lies an opportunity to repurpose this allocation as an inter-provincial climate risk pool. This fund can lend collective support to the provinces immediately following any climatic disasters. Timely support will save ongoing projects from repurposing and skimming from the development portfolio. This practice has already robbed the country of important development projects at least twice, first to combat Covid-19 and then to meet the emergency requirements of last year's floods.

The creation of such a fund will help foster a national policy dialogue on climate risk management. The global experience is that such funds help increase impact by developing pre-agreed disaster response plans, initiate insurance solutions for infrastructure, crops, livestock, and housing. The creation of a dedicated fund by the NFC can help upfront payments of insurance premiums and enable a shift toward proactive risk management. If introduced, it can help Pakistan meet her SDG targets and lay the foundation for a climate-smart NFC award. The writer is an expert on climate change and development. ■

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Expensive RLNG burdens economy

Pakistan forced to import RLNG at \$13.40/ mmbtu

— EU Report —

Pakistan's reliance on costly regasified liquefied natural gas (RLNG) imports under long-term agreements is taking a toll on the country's economy. While international spot markets offer RLNG at a cheaper rate of \$9.5/ mmbtu, Pakistan is compelled to import it at an average price of \$13.40/mmbtu.

This significant price disparity is raising concerns among experts. According to data from Arif Habib Limited (AHL), Pakistan imported 10 cargoes of RLNG in May 2023 under long-term agreements. The weighted average

price for Sui Northern Gas Pipeline Limited (SNGPL) stood at \$13.40/mmbtu. Speaking to The Express Tribune, AHL, Head of Research, Tahir Abbas explained that Pakistan is bound by these long-term agreements, ranging up to 15 years, and cannot abandon them to procure cheaper gas from the spot market.

However, additional RLNG cargoes can be purchased from the spot market to meet domestic demand. The combination of RLNG imported under long-term agreements and spot market purchases could result in an average lower price, benefiting consumers. However, Pakistan faces challenges due to a

lack of foreign exchange reserves to procure additional gas cargoes to meet local requirements. Additionally, the gas circular debt has escalated to approximately Rs500-600 billion, contributing to the total circular debt of Rs1.7 trillion in the energy sector. Abbas highlighted that long-term suppliers have consistently sold gas to Pakistan at fixed prices, even during global energy crises when RLNG prices surged to \$40/mmbtu in winter 2022. The current drop in RLNG prices in the spot market is a result of the summer season and low global demand, coupled with sluggish economic growth and high inflation worldwide.



Solar Park inaugurated in KPC

It is a gift from Sindh govt, says Imtiaz Sheikh

Sindh Energy Minister Imtiaz Ahmed Sheikh has said that the provision of the solar system to Karachi Press Club is a gift from the Sindh government. Electricity will also be provided for housing societies of Karachi Press Club under the Village Electric Plan. It is our commitment to ensure affordable electricity to consumers. The provincial government is going to solarize government buildings, as well as prisons. He expressed these views while addressing the inauguration ceremony of Solar Park at KPC. KPC President Saeed Sarbazi, Secretary Shoaib Ahmed Khan, and Governing Body members were also present. Imtiaz Sheikh said: "It is a matter of honour for me to have been awarded honorary membership by KPC." This is a total 100KW project, out of which 60KW electricity is being provided and soon 40KW will be added soon. He said that the government had started solarization system on a large scale. As many as 35 big hospitals had been solarized with the help of the World Bank.



Ecneec approves four projects worth Rs120bn

— EU Report —

The Executive Committee of the National Economic Council (Ecneec) has approved four development projects in Azad Kashmir, Gilgit-Baltistan and Khyber Pakhtunkhwa with a total estimated cost of Rs120.185bn. Presided over by Finance Minister Ishaq Dar, the meeting of the committee was also attended by Minister for Planning and Development Ahsan Iqbal, SAPM on Finance Tariq Bajwa, Senator Nisar Ahmed Khuhro from Sindh and federal secretaries and other senior officers from federal ministries and provincial governments. The Ecneec approved a project of the AJK government to be executed by the Power Development Organisation for the establishment of a 48-megawatt Shounter Hydropower Project in Neelum Valley District at an updated cost of Rs14.985bn including a foreign exchange component (FEC) of Rs12.737bn. The project is to be financed 85pc from the Saudi Fund for Development (SFD) and 15pc of the cost will be met through AJK's annual development plan. The meeting also approved in principle a project of the Ministry of Kashmir Affairs and GB for the Establishment of Regional Grids in Gilgit-Baltistan Phase-I in Astore, Gilgit, Hunza, and Skardu Districts in GB at the revised cost of Rs17.425bn with FEC of Rs1.824bn. The Ecneec also approved another project of the Gilgit Baltistan government to be executed by the Water & Power Department Gilgit-Baltistan of 26MW Shagharthang Hydropower Project in District Skardu at the revised cost of Rs18.374bn including FEC of Rs4.461bn. Khyber Pakhtunkhwa Rural Accessibility Project to be executed by the KP's Communications and Works Department was also approved by the Ecneec for Rs69.4bn including foreign aid/loan of Rs67.2bn to be provided by the World Bank and local component to be funded by the provincial government.

Salient Features of Budget

Incentive for manufacturing solar panels, equipment; promotion of energy efficiency & conservation; no increase in duties on import of essential items; trade facilitation and ease of doing business.

—◆ EU Report —◆

Finance Minister Ishaq Dar has unveiled a Rs14.5 trillion federal budget, with the highest-ever deficit of Rs7.6 trillion. About half of the budget will be paid in loan payments. The budget seems neither good nor bad. Dar claimed that no new tax had been imposed in the next fiscal year. The government has announced new revenue measures of Rs223 billion in the latest budget but retained all taxes introduced in a mini-budget unveiled in mid-February.

The budget carries tax relief and subsidies for nearly a dozen sectors, including 30% increase in salaries of officers and 35% for

employees of Grade-1 to Grade-16. He has also announced a 17.5% increase in pensions, besides setting the minimum wage at Rs32,000.

The relief measures of the budget are: An incentive for manufacturing solar panels and allied equipment by exempting customs duties on the import of machinery, equipment, and inputs; an incentive for exporters of IT and its related services by allowing duty-free import of IT-related equipment equivalent to 1% value of their export proceeds.

Promotion of energy efficiency & conservation; no increase in duties on the import

of essential items; trade facilitation and ease of doing business; encourage industrialization and investment; incentives for the agriculture sector; promotion of energy efficiency & conservation; promotion of Information Technology (IT).

Revenue Measures

Withdrawal of capping of the fixed duties and taxes on the import of old and used vehicles of Asian Makes above 1300 CC under SRO 577(I)/2005 by omitting serial numbers 4,5 and 6 of the said SRO.

Grant of sales tax exemption on plant saplings, combine harvesters, dryers for agricultural products, no-till-direct seeders, planters, trans-planters, other planters, and bovine semen.

Grant of exemption of sales tax on import of IT equipment by exporters of IT and ITeS registered with Pakistan Software Export Board.

Harmonization Measures

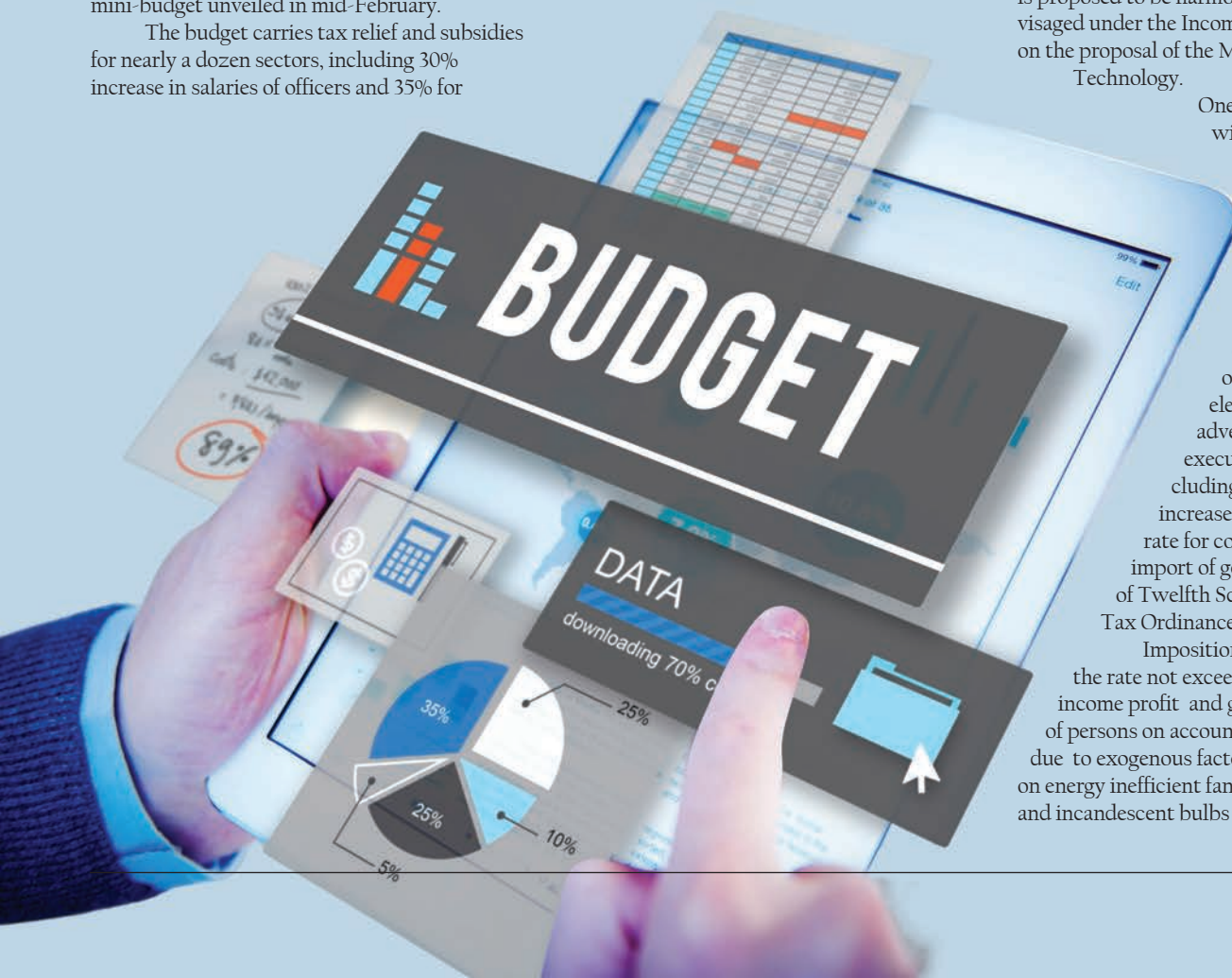
Production, transmission, and distribution of electricity are proposed to be excluded from the purview of sales tax in accordance with the decision of the National Tax Council.

Streamlining Measures

Rate of tax on IT based system development consultants is proposed to be reduced to 15% from 16%. Scope of IT and IT enabled services is proposed to be harmonized with scope envisaged under the Income Tax Ordinance, 2001 on the proposal of the Ministry of Information Technology.

One percent increase in withholding tax rates on supply of goods other than sale of rice, cotton seed or edible oils, on rendering of services including service subject to a concessionary tax rate of 3% but excluding electronic and print media advertising services and on execution of contracts excluding sportsperson. A 0.5% increase in withholding tax rate for commercial importer on import of goods falling in Part III of Twelfth Schedule to the Income Tax Ordinance, 2001.

Imposition of additional tax at the rate not exceeding fifty percent on income profit and gains of a person or class of persons on account of extraordinary gains due to exogenous factors. Imposition of FED on energy inefficient fans @ Rs. 2000 per fan and incandescent bulbs @ 20%. ■



OGDCL, PRL sign energy cooperation deal



Oil and Gas Development Company Limited (OGDCL) and Pakistan Refinery Limited (PRL) signed a Memorandum of Understanding (MOU) to establish a strategic cooperation relationship in the energy industry, a statement said on Wednesday. The MOU sets the framework for future collaboration and cooperation between the two companies. Under the MOU, OGDCL, a leading Oil and Gas Exploration and Production company in Pakistan, and PRL, a prominent refinery engaged in the production and sale of petroleum products, will engage in good faith negotiations to identify potential areas of cooperation and collaboration. One of the key aspects of the strategic cooperation includes OGDCL's equity investment in PRL as a strategic investor, with adequate board representation, aimed at the upgradation and growth of the refinery. Both companies will work together to execute necessary agreements, including confidentiality agreements for data exchange, to identify suitable investment opportunities. The parties will also facilitate and support each other in realizing the objectives outlined in the MOU, with a commitment to defining a specific Scope of Work/TOR for any joint investment opportunity prior to entering into a definitive agreement.

Muzaffargarh solar project tariff approved

— EU Report —

ISLAMABAD: The National Electric Power Regulatory Authority (NEPRA) has approved a tariff of 3.4 cents (Rs7.8 per unit) for the 600 MW solar project to be installed at Muzaffargarh, but the regulator has also imposed some conditions on the project, including indexation of 70 percent on the tariff due to change in exchange rate variations, on a quarterly basis. In addition, the income tax of 15 percent on the income and gains of the power producer of the 600 MW solar plant to be installed at Muzaffargarh will be paid by end consumers as it will be part of the benchmark tariff. Alternate Energy Development Board had pleaded that the 15 percent income tax should be treated as a pass through item, which the regulator rejected and made it part of the benchmark tariff. In addition, the consumers will also pay yearly lease rentals at the rate of 5 percent (Rs70 million) of the proposed cost of land (Rs1,400 million) that will translate into tariff impact of Rs0.06/kWh. The NEPRA has approved the Request for Proposal (RFP) documents for the government's pilot project of a 600 MW solar power plant. The RFP will be open for bids from investors until May 31, and the winner will be awarded the contract for the project.

Pakistan exports record 90,000 tons of fuel oil in May

— EU Report —

Pakistan shipped 90,000 tons of fuel oil in May 2023 to reduce a huge stock built up over the last several months amid low demand in the country, industry sources said. Fuel oil exports reached 250,000 tons in the last three months (March to May), according to the sources, who foresee more exports in the coming days as the consumption of fuel oil has not seen any increase, thanks to an economic slowdown and cold/moderate weather, especially in central and north parts of the country. Pakistan currently has over 510,000 tons of fuel oil stock, which is being held by oil marketing companies (OMCs), power plants, and local refineries. Power plants in the country have a stock of around 40 percent or 200,000 tons, followed by OMCs with 180,000, whereas refiners have the rest of the stock. According to sources in the oil sector, Pak Arab Refinery Limited (PARCO) shipped 50,000 tons of fuel oil and Pakistan Refinery Limited (PRL) exported 40,000 tons of fuel oil in the month of May, 2023. The sources revealed that refineries have been exporting the fuel oil to keep the operations of their plants running smoothly, and have been exporting it in the global market even at a lower price compared to the domestic price of fuel oil.



Wind Power Project's success celebrated

Pakistan's pioneering Wind Power Project has celebrated 10 years of its commercial operations, at Plant Site Jhampir with the leaders of the wind industry, senior government officials, and notables from the community. In the last 10 years, the wind farm has exported 1,175 GWh of clean energy abating 745,000 tons of CO₂. FFC Energy is the country's most experienced Wind IPP carrying out complete O&M activities of its plant in compliance with OEM and DNV-GL certification guidelines. The company has also made significant progress in the provision of services to the Pakistan wind industry. FFC Energy remained at the forefront of CSR activities aimed at the development of the local community in the field of health, education, and capacity building. FFC Energy's state-of-the-art Training Center (TTC), which is the first and only Technical Training Centre for the Wind Industry in Pakistan, is providing a service to the industry and the community both by training the HR as per Global Wind Organization standards.



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Administrator Karachi Dr. Saif ur Rehman, President NFEH Naem Qureshi, CEO Shazil Shariq Vohra, General Secretary NFEH Ruqiya Naeem, CEO EHS services Saqib Ejaz Hussain, VP NFEH Engr. Nadeem Ashraf, Sr. Journalist Shabina Faraz, Zahra Ali, Ali Asghar addressing at the Seminar on Plastic Pollution



NFEH marks World Environment Day

No authentic data on Karachi waste: moot told



Group Photo of Speakers and Team NFEH with chief guest administrator KMC Dr. Saif ur Rehman.

—◆ Ruqiya Naeem —◆

There is no authentic data available on the massive quantity of solid waste including plastic trash generated in Karachi daily owing to which it is very difficult to devise an effective plan to deal with this hazardous issue of the city.

This was stated by the speakers including environmentalists who spoke at a seminar on plastic pollution organized by the National Forum for Environment and Health (NFEH) to mark World Environment Day.

Shariq Vohra, former president of the Karachi Chamber of Commerce and Industry (KCCI) and who himself is involved in the plastic recycling industry, said that authentic data on solid waste is vital for adopting an effective trash disposal scheme.

He told the audience that quite often it was informed that Karachi generated around 12,000 tonnes of solid waste every day but given his firsthand involvement in the plastic recycling

business, he had come to know that the quantity of trash generated in the city was much higher.

Vohra said that a blanket ban imposed by the government to deal with the issue of polythene bags would prove counterproductive as instead the policies of recycling and reuse should be adopted for dealing with the issue of plastic pollution. Vohra recalled that during his tenure as the KCCI president, the ban on plastic shopping bags had come into effect but the government's order in question had provided an opportunity for the police to receive bribes from the traders involved in the polythene business.

He said the culture of recycling and reuse was the best way to deal with the issue of waste generated due to plastics which is otherwise a very valuable industrial innovation given its widespread use in many fields including health-care services.

He urged the citizens to minimise the use of products made of single-use plastic to do their due role in lessening solid waste generated in the cities.

The KCCI former president also called for

establishing waste-to-energy plants in the main urban centers of Pakistan so that there was no need for transporting municipal waste for several kilometers for their disposal at the designated landfill sites.

Senior environmentalist, Saqib Ejaz Hussain, said the issue of plastic waste was directly related to goal number 12 and 14 of the Sustainable Development Goals of the UNO dealing with responsible production and consumption and protection of underwater life.

He said that Pakistan had to deal with 3.9 million tonnes of plastic waste every year causing serious pollution in the country. He lamented that Pakistan had the most mismanaged situation of plastic pollution in entire South Asia. He said that microplastic particles were present everywhere including in the indoor environment creating serious hazards to human health. Senior environmental journalist Shabina Faraz said the developed countries should compensate for the massive losses Pakistan had suffered due to floods and other extreme weather events owing to these nations' massive involvement in the issues of global warming and climate change.

Ali Asghar Khadim, briefed the audience, about the efforts of the Dawoodi Bohra community to improve the environment by taking part in the cleanliness and tree plantation campaigns in Karachi.

In his remarks as the chief guest, Karachi Administrator, Dr Syed Saif-ur-Rehman, said that people should consume water very cautiously due to fast-depleting water reserves and also make efforts to discourage the consumption of single-use plastic products.

NFEH President Naem Qureshi said that his non-governmental organization would host more such awareness and interactive programs to discuss and find effective ways and means to tackle major environmental challenges in the country including plastic pollution. He demanded of the government to announce a national action plan to reduce and recycle plastic waste.

Secretary General NFEH Ruqiya Naeem, VP Engr. Nadeem Ashraf & Environmentalist Zahra Ali Syed also spoke on this occasion. ■

17th Anniversary of **Energy Update** & Seminar on **energy crisis**



Group Photo of Team Energy Update and Speakers with Chief Guest Governor Sindh Kamran Tessori at 17th anniversary celebration of Energy Update

◆ Mustafa Tahir ◆

Karachi needs at least four more power distribution companies like the existing K-Electric to serve the city's power consumers in the best possible manner with maximum efficiency of service and the lowest rates of electricity.

Sindh Governor, Kamran Khan Tessori, gave the suggestion to this effect while speaking as the chief guest at 17th Anniversary of Energy Update Magazine and seminar on Energy Crisis and Way Forward organised by the Energy Update. The Sindh Governor House hosted the event. The Governor told the audience at the seminar that the earliest the monopoly of K-Electric on the power distribution system of the city ended the better it was both for the city's electricity consumers and the power utility itself.

Amir Iqbal, CEO of Sindh Engro Coal Mining Company (SECMC), said that the main issue of Pakistan's energy sector was its excessive reliance on imported sources for electricity production despite having massive potential for power generation both through conventional and renewable means.

He said that up to 45 to 48 per cent of Pakistan's peak power demand of 25,000 MWs to 26,000 MWs was met through imported

fuels. He said that India was capable of fulfilling up to 80 per cent of its energy needs through indigenous energy sources. He said that Indian industries were the main beneficiary of this situation owing to the supply of cheap electricity.

Mahfooz Qazi, who heads the Sindh Solar Energy project, said the Thatta-Jhimpir wind corridor in Sindh had been producing 1835 MWs of clean electricity. He said that out of a total of 35 renewable energy projects in the wind corridor, 22 ventures were of local investors.

He also told the audience about the Sindh government's drive to install solar systems on the rooftops of public sector buildings including hospitals and educational institutions.

Naeem Qureshi of Energy Update said that more such seminars would be organised to provide a viable forum to the power sector experts from government, prospective private, and foreign investors, for resolving the energy problems of Pakistan in the shortest possible time.

Shaaf Mehboob CEO ADAPTIVE TECHNOLOGIES, Mian Fahad Country Director Growatt, Saleem Mughal Media Consultant, Saleem Diwan CEO Diwan International, Ruqiya Naeem Head of Admin and Accounts Energy Update, GM QA Bahria Town Ghulam Dastageer and others also spoke on this occasion.



Governor Sindh Kamran Tessori, CEO SECMC Amir Iqbal, Managing Editor Energy Update Naeem Qureshi, Director Solar Project Sindh Mehfooz Kazi, Director Admin and Accounts EU Ruqiya Naeem, Energy Expert Zafar Sobhani, CEO Diwan International Saleem Diwan, GM QA Bahria Town Ghulam Dastageer, CEO Adaptive Technologies Shaaf Mehboob, Country Director Growatt Mian Fahad and Media Consultant Saleem Mughal addressing at 17th Anniversary of Energy Update and Seminar on Energy Crisis.

◆ Dr Khalid Waleed ◆

In the pursuit of a cleaner, greener, and sustainable energy future, Pakistan faces new challenges in terms of transition towards modern and renewable energy sources. The increasing prominence of clean energy technologies brings to the forefront the critical role of minerals in ensuring energy security.

Therefore, the action plan in Pakistan must address the unique demands and vulnerabilities arising from the clean mineral-intensive

by 50 per cent, mirroring the growing share of renewables in investment.

Key minerals crucial for clean energy technologies include lithium, nickel, cobalt, manganese, graphite, and rare earth elements. These minerals play a vital role in enhancing battery performance, longevity, and energy density. Rare earth elements are particularly essential for wind turbines and EV motors' permanent magnets. Additionally, electricity networks heavily rely on copper and aluminium, with copper serving as a cornerstone for all electricity-related technologies.

The transition to a clean energy system is

for copper and rare earth elements, 60-70 per cent for nickel, and cobalt, and nearly 90 per cent for lithium. Electric vehicles and battery storage have already surpassed consumer electronics as the largest consumers of lithium, and by 2040, they are set to supersede stainless steel as the primary end-user of nickel. As countries intensify efforts to reduce emissions, ensuring resilient and secure energy systems becomes paramount. Present international energy security mechanisms primarily focus on mitigating risks associated with disruptions or price fluctuations in hydrocarbon supply, predominantly oil. However, minerals present a distinct set of challenges, necessitating energy policymakers to broaden their perspective and account for potential vulnerabilities. Concerns regarding price volatility and the security of mineral supply persist even in an electrified, renewables-rich energy system.

Pakistan's transition to cleaner and sustainable energy sources necessitates addressal of the challenges posed by mineral-intensive clean energy technologies.

Pakistan's energy transition action plan must take into account the mineral requirements of clean energy technologies while ensuring energy security. Collaboration with international partners, increased investment in domestic mineral extraction, and diversification of mineral sourcing are essential strategies to address these challenges. Additionally, the nation should explore opportunities to promote research and development in mineral recycling and alternatives to reduce dependency on scarce resources.

The energy transition represents a transformative opportunity for Pakistan to reduce its carbon footprint and embrace a sustainable future. By formulating a comprehensive action plan that acknowledges the importance of minerals in clean energy technologies, Pakistan can pave the way for a resilient and secure energy system that balances environmental goals

Pakistan faces new challenges in energy transition

Action plan must take into account mineral requirements of clean energy technologies

nature of solar photovoltaic (PV) plants, wind power plants, and electric vehicles (EVs) compared to their fossil fuel alternatives. In this context, clean energy technologies, such as PV plants, wind plants, and electric vehicles, rely on clean minerals during their manufacturing.

The construction of an electric vehicle typically requires 6 times the mineral inputs of a fossil fuel-powered vehicle, likewise, a wind power plant imposes 9 times more mineral resources than a gas-fired plant. As per the International Energy Agency (IEA) Over the past decade, the average mineral requirements for new power generation capacity have increased

expected to drive a significant surge in demand for these minerals, placing the energy sector at the forefront of the mineral market. While in the past, the energy sector represented a minor share of total mineral demand, the rapid pace of energy transitions has transformed clean energy technologies into the fastest-growing segment. According to the International Energy Agency (IEA)'s Sustainable Development Scenario (SDS) aligned with the Paris Agreement goals, the share of total demand for minerals will rise substantially over the next two decades.

This projection includes over 40 per cent



with the challenges of mineral demand and supply. Keeping the potential in view, Pakistan has received a significant boost in exploring and researching lithium reserves through a strategic agreement between the China-Pakistan Joint Research Centre on Earth Sciences and Tianqi Lithium Co in December 2022.

Firstly, establish a National Green Mineral Exploration Program to create a dedicated program aimed at identifying and assessing Pakistan's green mineral potential, with a particular focus on the key minerals required for clean energy technologies. This program should include partnerships with international experts and leverage advanced exploration techniques to maximize the chances of discovering economically viable mineral deposits. Secondly, enhance Geological Surveys and Data Accessibility to conduct comprehensive geological surveys across the country to gather detailed information about mineral resources.

Improve the accessibility of geological data, making it available to potential investors, researchers, and industry stakeholders. This will facilitate informed decision-making and encourage investment in mineral exploration and extraction. Thirdly, create Incentives for Green Mineral Exploration and Extraction to introduce incentives and tax credits for companies engaged in green mineral exploration and extraction activities. Encourage public-private partnerships to attract investment and technical expertise in the mining sector. Streamline regulatory processes to facilitate smooth operations while ensuring environmental sustainability and social responsibility.

Fifth is to strengthen International Partnerships and foster collaboration with international partners, including countries with advanced mineral extraction capabilities, to benefit from their expertise, technology, and investment. Establish partnerships to exchange knowledge, promote capacity building, and encourage joint ventures in mineral exploration and development. Sixth, is to develop Domestic Refining and Processing Capacity. It will require investments in establishing domestic refining and processing facilities to add value to raw minerals.

Ninth caters to the building of Human Capital by developing specialized educational programs and vocational training to equip the local workforce with the skills required for mineral exploration, extraction, and processing. Foster knowledge transfer and encourage partnerships between educational institutions and the mining industry. Finally, the regulatory framework is required to be strengthened to review and update existing regulations bottlenecks related to mineral exploration, extraction, and processing to ensure environmental sustainability, worker safety, and social responsibility.

Establish robust monitoring and enforcement mechanisms to prevent illegal mining activities and promote responsible mining practices. In conclusion, Pakistan's transition to cleaner and sustainable energy sources necessitates addressing the challenges posed by mineral-intensive clean energy technologies. Collaboration, domestic investment, and diversification of mineral sourcing are essential strategies. By implementing a comprehensive policy roadmap, Pakistan can develop clean mining, reduce dependence on imports, and foster a resilient and sustainable energy sector. Emphasizing environmental sustainability and social responsibility will be key to achieving success. The writer is associated with SDPI as an energy consultant. ■

RE NEWS

Govt urged to approve Cat-III project

— EU Report —

German Ambassador Alfred Grannas has urged the government to approve Category-III renewable energy projects to provide affordable and clean energy to underprivileged parts of the country.

In a letter to Minister for Power, Khurram Dastgir Khan, German Ambassador referred to M/s ibvogt GmbH, one of the German largest solar developers, which has been actively involved in the development of a solar project portfolio in Pakistan, with a total capacity nearing 300MW.

According to the ambassador, amongst these projects, the Gwadar solar project, named "P&G Energy Pvt Ltd" stands out as the most advanced and developed initiative, with a capacity of

62.2 MW. This project has successfully obtained a generation licence and a tariff of Cents 3.77/kWhr from the National Electric Power Regulatory Authority (Nepra), having accomplished all significant milestones.

"Having secured the necessary construction finance for the project, ibvogt GmbH is eagerly awaiting the issuance of the Letter of Support (LoS) from the Government of Pakistan to commence construction," the Ambassador said adding that Power Minister's Office has formed a Committee under PM's Office Unofficial Note of January 31, 2023. This committee has conducted three meetings thus far, and during the third meeting, the Federal Minister for Power proposed a way forward for the approval of 13 Cat-III wind and solar projects that have already obtained generation licenses and tariffs from Nepra.



Solar panels to become much affordable

— EU Report —

The federal government has proposed eliminating customs duty on solar panels and its related equipment in the budget for the fiscal year 2023–2024 in an effort to promote power generation using alternative energy sources.

The initiative aims to support domestic solar panel producers and pro-

mote solar energy consumption throughout the nation. The government proposes to exclude inverters, batteries, and other similar equipment from the duty in the financial bill.

In light of the country's serious economic and political challenges, Finance Minister Ishaq Dar unveiled the federal budget for the fiscal year 2023–2024 with a total expenditure of more than Rs14 trillion.

Three major drivers in solar growth

Solar power becomes increasingly accessible, financially viable

—◆ Mian Fahad —◆

Solar energy has undergone a remarkable transformation in recent years, transitioning from a niche technology to a mainstream source of power worldwide. This paradigm shift has been driven by a confluence of factors that have led to the exponential growth of solar energy adoption. This comprehensive article explores in detail the three major drivers fueling the expansion of solar power: declining costs, supportive policies and incentives, and the growing emphasis on environmental awareness and sustainability.

By examining each driver in-depth, we aim to provide a comprehensive understanding of the forces propelling the solar energy revolution.

1. Declining Costs: The significant decline in the cost of solar energy technologies has been a game-changer, making solar power increasingly accessible and financially viable. The following sub-sections delve into the various factors contributing to this cost reduction:

Technological Advancements: Significant advancements in solar technology have played a pivotal role in driving down costs and improving efficiency. Key technological breakthroughs include increased conversion efficiency.

Solar cells are becoming more efficient in converting sunlight into electricity, resulting in higher energy output from each panel.

Thin-Film Solar Cells: Thin-film

solar cells, which are lighter, more flexible, and less expensive to produce than traditional silicon-based cells, have gained popularity and contributed to cost reduction.

Improved Manufacturing Processes: Refinements in manufacturing techniques, such as automated production lines, improved material utilization, and reduced waste, have led to greater efficiency and lower production costs.

Economies of Scale: The expansion of the solar industry has led to economies of scale, resulting in significant cost reductions. With increased demand and larger production volumes, solar panel manufacturers have been able to negotiate better prices for raw materials and streamline their manufacturing processes. The benefits of economies of scale extend to installation and maintenance costs as well.

Declining Photovoltaic (PV) Module Costs: The cost of photovoltaic modules, which are the primary components of solar panels, has experienced a substantial decrease in recent years. Factors contributing to this decline include improvements in manufacturing techniques, increased competition, and economies of scale.

Additionally, technological advancements have enabled the use of lower-cost materials without compromising performance, further contributing to cost reduction.

Balance of System (BoS) Costs: While PV module costs have received significant attention, the balance of system (BoS) costs, including inverters, mounting structures, wiring, and installation expenses, have also



witnessed substantial declines. Innovations in these components, along with increased installation efficiency, standardized designs, and improved supply chain management, have collectively reduced the overall cost of solar energy systems.

2. Supportive Policies and Incentives: Governments and regulatory bodies worldwide have implemented a range of policies and incentives to promote the

adoption and development of solar energy. The following sections explore the most influential policy drivers:

Feed-in Tariffs (FiTs): Feed-in Tariffs (FiTs) have proven to be a highly effective policy mechanism for promoting solar energy growth. FiTs guarantee long-term contracts and a fixed payment rate for solar energy fed into the grid. By providing stable and attractive returns on investment, FiTs have stimulated private sector participation and encouraged the deployment of solar installations.

The success of FiTs can be observed in countries like Germany, Spain, and China, where significant solar capacity was added as a result of these policies.

Power Purchase Agreements (PPAs): Power Purchase Agreements (PPAs) have emerged as another vital mechanism to drive solar energy growth. Under a PPA, a developer enters into a contract with a utility or corporate entity to sell solar power at a predetermined price over an extended period. PPAs provide long-term revenue certainty and mitigate the financial risks associated with solar projects, thus attracting investment and facilitating the expansion of solar installations.

Net Energy Metering (NEM): Net Energy Metering (NEM) policies enable solar energy system owners to receive credits for the surplus electricity they generate and feed into the grid. These credits can offset the electricity consumed from the grid when the solar system is not producing enough power. NEM policies incentivize residential and commercial customers to install solar panels, as they can effectively reduce their electricity bills and even earn revenue by exporting excess power.

Investment Tax Credits (ITCs) and Grants: Many governments offer investment tax credits and grants to incentivize the adoption of solar energy. These financial incentives significantly reduce the upfront costs of solar installations, making them more financially attractive to individuals, businesses, and communities. Governments may also provide grants for research and development (R&D) initiatives aimed at advancing solar technology and improving its efficiency. **Renewable Portfolio Standards (RPS) and Targets:** Renewable Portfolio Standards (RPS) and targets mandate that a certain percentage of electric-

ity generation come from renewable sources, including solar energy.

Governments set these targets as a means to reduce greenhouse gas emissions, diversify their energy mix, and enhance energy security. RPS and targets provide regulatory certainty and create a market demand for solar power, prompting utilities and energy providers to invest in renewable energy infrastructure.

3. Environmental Awareness and Sustainability: Growing concerns about climate change, air pollution, and the finite nature of fossil fuels have fueled a global shift towards sustainable energy sources. The following sections explore how environmental awareness has influenced the growth of solar energy.

Climate Change Mitigation: Solar power plays a vital role in mitigating climate change by reducing greenhouse gas emissions. Unlike fossil fuel-based electricity generation, solar energy produces electricity without emitting carbon dioxide or other harmful pollutants. As countries strive to meet their climate change mitigation goals outlined in international agreements like the Paris Agreement, solar power has gained significant traction as a clean and sustainable energy option.

Air Quality Improvement: The combustion of fossil fuels for electricity generation contributes to air pollution and adverse health effects. Solar energy, being emission-free during operation, offers a viable solution for improving air quality. The reduction in air pollution associated with solar energy deployment can lead to significant health benefits, including lower rates of respiratory diseases and improved overall well-being.

Public Demand for Sustainability: Consumer preferences have shifted towards sustainable products and services. As individuals become more environmentally conscious, there is an increasing demand for clean and renewable energy sources. This demand has prompted companies to adopt solar power as a means to meet customer expectations, enhance brand reputation, and demonstrate environmental responsibility.

Corporate Commitments: A growing number of businesses are proactively investing in renewable energy, including solar power,

as part of their corporate social responsibility initiatives. By transitioning to solar energy, companies can significantly reduce their carbon footprint, demonstrate environmental leadership, and align their operations with sustainable practices. Additionally, solar power installations on corporate premises can act as visible symbols of their commitment to renewable energy.

Energy Independence and Resilience: Solar energy offers energy independence and resilience, particularly in remote areas or during power outages. By generating electricity on-site, solar installations reduce reliance on centralized power grids and the vulnerabilities associated with them. This aspect has gained prominence in disaster-prone regions, where solar power can provide a critical electricity supply during emergencies and aid in post-disaster recovery efforts.

Conclusion

The exponential growth of solar energy can be attributed to a combination of declining costs, supportive policies and incentives, and the growing emphasis on environmental awareness and sustainability. Technological advancements, economies of scale, and improved manufacturing efficiency have all contributed to the significant decline in the cost of solar technologies.

Supportive policies and incentives, such as FiTs, PPAs, and tax credits, have created a conducive environment for solar energy investment and deployment. Furthermore, the increasing awareness of environmental challenges and the desire for sustainable solutions have elevated the demand for clean energy, positioning solar power as a vital component of the global energy transition.

As we look ahead, the continued advancements in solar technology, coupled with ongoing policy support and heightened environmental consciousness, are expected to fuel further growth in the solar energy sector, ushering in a cleaner and more sustainable future. He is currently Country Head – PK, Shenzhen Growatt New Energy.

The views and opinions expressed in this article are the author's own and do not necessarily reflect those held by Growatt or Energy Update. ■





SolaX, Fronus

empower Pakistan's solar sector

SolaX, a renowned global leader in the solar sector, together with its partner in Pakistan, Fronus, conducted a series of highly informative training seminars in Lahore and Islamabad in May, catering to Pakistan's growing interest in high-performance solar solutions.

With over 200 enthusiastic participants in attendance at both locations, the seminars proved to be an invaluable platform for professionals from diverse backgrounds to gain in-depth knowledge about SolaX's cutting-edge solar technologies. SolaX's team of experts guided attendees through comprehensive sessions on the features, installation, and maintenance procedures of SolaX solar solutions. The seminars were specifically tailored to address the unique requirements and concerns of the local Pakistani market, ensuring that participants fully grasped the potential of SolaX's offerings.

One of the key highlights of the training was a technical lecture focused on X3-MEGA G2 and X3-FORTH, two highly sought-after C&I inverters. Engineered with advanced technology, these inverters boast an impressive power range of 40kW to 150kW, achieving exceptional efficiency levels of up to 98.4% and 99%, respectively. With a maximum MPPT current of 32A, they support 150% PV oversizing input and 110% overloading output, making them compatible with high-power PV modules available in the market today. They are also equipped with an array of advanced features that provide superior intelligence to users, including smart I-V curve diagnosis, night-time reactive power compensation, and 24-hour operation monitoring, etc.

In addition to the C&I solutions, SolaX also introduced its hybrid inverters, catering



to both high-voltage and low-voltage applications. X-Hybrid G4 series of high-voltage hybrid inverters are available in single-phase

(3-7.5kW) and three-phase (5-15kW) variants, supporting up to 10 units in parallel, with a maximum power output of 150 kW. ■



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Power sector reforms

Strong political will, stakeholders' collaboration mandatory

— Mustafa Tahir —

The power sector in Pakistan faces several challenges that need to be addressed through comprehensive reforms. Here are some key areas where reforms can improve this sector.

Tariff Rationalization: The power sector in Pakistan suffers from a large difference between the cost of electricity production and the tariffs being charged from the consumers. Reforms should focus on rationalizing tariffs to ensure they reflect the actual cost of generation, transmission, and distribution. This will encourage efficiency, reduce losses, and attract investment.

Reduction of Transmission and Distribution Losses: Pakistan has high transmission and distribution losses, commonly known as T&D losses. These losses occur due to outdated infrastructure, theft, and technical inefficiencies. Reforms should prioritize upgrading transmission and distribution infrastructure, implementing smart grid technologies, and taking strict measures to curb electricity theft.

Enhanced Governance and Accountability: Improving governance and accountability in the power sector is crucial for its sustainable development. Hence, reforms should focus on reducing corruption, improving transparency in decision-making processes, and strength-

ening regulatory bodies to ensure fair and effective regulation of the sector.

Renewable Energy Integration: Pakistan has a vast potential for renewable energy, particularly solar and wind. Reforms should prioritize the integration of renewable energy sources into the power generation mix. This can be achieved through attractive incentives for renewable energy investments, streamlined regulatory frameworks, and the development of renewable energy zones.

Private Sector Participation: Encouraging private sector participation can bring in much-needed investments, expertise, and innovation in the power sector. Reforms should aim to create a conducive environment for private sector involvement, including transparent procurement processes, clear contractual arrangements, and a level playing field for all market participants.

Demand-Side Management: Promoting energy conservation and demand-side management practices can significantly reduce the strain on the power sector. Reforms should include public awareness campaigns, incentives for energy-efficient technologies, and the adoption of demand response mechanisms to manage peak load demands.

Financial Sustainability: Reforms should address the financial sustainability of power sector entities, such as power generation companies and distribution companies. This can be achieved by improving revenue collec-

tion mechanisms, reducing inefficiencies, and developing a long-term financial strategy for the sector.

Skill Development and Capacity Building: Investing in skill development and capacity building programs for the power sector workforce is also essential. Reforms should focus on training programs, knowledge-sharing platforms, and partnerships with international institutions to enhance technical and managerial capabilities among employees.

Cross-Border Energy Trade: Exploring opportunities for cross-border energy trade can benefit the power sector in Pakistan, therefore, reforms should aim to develop interconnections with neighboring countries to facilitate the import and export of electricity, promoting regional cooperation and energy security.

Consumer Empowerment: Reforms should prioritize consumer empowerment by ensuring an affordable and reliable electricity supply. Measures such as improved customer service, grievance redressal mechanisms, and transparent billing practices can enhance consumer satisfaction and trust in the power sector.

These reforms, when implemented effectively and consistently, can contribute to a more efficient, reliable, and sustainable power sector in Pakistan. However, it's important to note that the implementation of reforms requires strong political will, stakeholders' collaboration, and a long-term vision for the sector's development. ■



COP28: Targets are still far from being achieved

—◆ EU Report —◆

There are only six months to go until COP28. The conference is being held in November in Dubai this time. The progress has been slow and the targets are still far from being achieved. But what can be expected from the UN Climate Change Conference this time?

The main focus will definitely be on finances. And everything else will be lined to climate finance. Back in COP27, countries had agreed to set up a fund for the developing nations that are facing the adverse impacts of climate change as compensation for damage caused by climate change. COP28 would most likely include further details of who pays, how it is operated, etc. Moreover, the climate

finance target as promised and pledged in 2009 for \$100 billion still remains unmet.

A key question at COP28 will also be whether the world has been keeping its promises made at COP26 – COP28 will include stocktake. A slew of commitments were made at COP26, and it was decided under the 2015 Paris Agreement that the first stocktake will begin at COP26 and will conclude at COP28. A stocktake is a two-year assessment every five years of how countries are performing against their pledges to meet the deal made in 2015 under the Paris Agreement. The results don't look very promising as the progress has been slow and jittery due to geopolitical unrest, economic turmoil, and commodity crises.

Then, adaptation will also be a key focus area. Back in COP27, the countries had

agreed to establish a framework for achieving the Global Goal of Adaptation set under the Paris Agreement with the aim of collective action. The framework that was decided upon will most likely be discussed. Climate finance is split between mitigation (e.g. investing in renewable energy), and adaptation. The latter, which is the most pressing and immediate issue in low-income countries has been neglected relatively. Also, COP27 pushed up agriculture as a factor in global emissions and included a 4-year plan on food security and agriculture. Actionable discussions on the roadmap to reduce emissions from the agriculture systems are also expected at COP28

One thing is important: The UN Climate Change Conference should see a move from negotiation to action as time is running out!

OGDCL empowers athletes for Olympics

—◆ EU Report —◆



Oil and Gas Development Company Limited (OGDCL) continues its commitment to supporting unique talent by sponsoring 20 exceptional athletes to represent Pakistan in the Special Olympics World Games Berlin 2023.

This initiative in collaboration with Special Olympics Pakistan highlights OGDCL's dedication to social responsibility and provides a platform for these athletes to showcase their skills on a global stage. At a heartwarming farewell event held at the OGDCL Head Office, MD/CEO of OGDCL Ahmed Hayat Lak, delivered an inspiring speech to motivate the special athletes. He emphasized the company's belief in the inherent abilities and potential of every individual, irrespective of their physical or intellectual challenges.

SSGC LPG's commercial utilisation Govt urged to allow access to parties

The LPG Industries Association of Pakistan has asked the federal government to allow third-party access for commercial utilization of SSGC LPG (Pvt) Limited at Port Qasim to those parties interested in building LPG storages in Pakistan.

In a letter, the association argued that Pakistan lacked LPG storage. The purpose of allowing a third party was to increase Pakistan's LPG reserve stock from two days to 30 days. The association acknowledges the government had helped LPG industry in maintaining the supply chain of LPG throughout Pakistan, due to which the LPG

is available at economic rates to all consumers of Pakistan.

The largest LPG storage unit is going to be installed at Port Qasim by Interplast (Pvt) Ltd and which will enhance Pakistan LPG reserve stock from two days to 30 days.

This enhanced LPG storage capacity is not only going to help maintain an uninterrupted supply chain of LPG at economic rates throughout the country but will also help to bridge the demand and supply gap during the ups and downs of LPG markets and during the shortage of natural gas/ petrol/ diesel.

SSGC | LPG

Keeping in view the public interest at large and the betterment of the LPG industry of Pakistan, the association urges the government to allow third-party access for commercial utilization of SSGC LPG (Pvt) Ltd pipelines to the Interplast (Pvt) Ltd so that LPG reserve stock may be increased from two days to 30 days; hence, benefiting the LPG industry of Pakistan and the overall economy of Pakistan.

Pakistan needs rapid environment sustainable development



Environmental degradation adversely affecting the economy and people's livelihood

—◆ Special Report By Mansoor —◆

Pakistan direly needs environment-sustainable development to maintain its ecological balance in our planet's natural environment and conserve natural resources to support the well-being of current and future generations. It is a development that ensures the better environmental needs of the present without compromising the ability of future generations to meet their own needs.

There is a dire need to ensure environmental protection and development in Pakistan as the normal environment has been badly affected by climate change, deforestation, air pollution, water contamination, soil degradation, marine pollution, noise pollution and carbon emissions.

In Pakistan, environmental degradation and climate change are adversely affecting the economy, livelihood of the poor and sustainable development. On the one hand, the growing population, unplanned urban expansion, and dependence on natural resources put immense pressure on the environment that triggered climate change.

More than 80% of Pakistan's population is living in the Indus Basin. It has served as the core of the region's socio-cultural and economic life for over a documented 5,000 years. Indus Basin is facing multiple threats ranging from Climate Change due to poor

resource management, environmental hazards, and unsustainable use of this valuable resource. Unaddressed, the economic cost to Pakistan of poor water resource management is estimated to be USD \$12 billion per annum (4% of GDP).

In addition, the Indus Basin faces an existential threat in the wake of Climate Change, which is the biggest longer-term and currently unmitigated external risk to Pakistan's water endowment. Climate change is expected to bring about an increase in the frequency and intensity of extreme weather events, coupled with the increased variability in South Asian Summer Monsoon (SASM) rains causing frequent and intense floods and droughts in the country (IPCC 2013).

United Nations in Pakistan is assisting the Ministry of Climate Change, Government of Pakistan in developing a vision and agenda which aspires to an Indus Basin that can sustain a thriving civilization from its sources to the ocean whose natural resources and ecosystems have been repaired and restored and are resilient in the face of climate change. Through this initiative, it is intended to establish the health of the Indus Basin at a higher level of urgency and ambition, both through the implementation of a series of new and innovative interventions in the short term and through the identification and deployment of as-yet-untried approaches drawn from and adapting approaches tried in other parts of the world.

With rapid population growth and urbanization, Pakistan is facing the worst air quality for many years. Air pollution results from fossil fuel burning, industrial processes, transport, and agriculture activities. There is no doubt that urgent and collective action is required in order to tackle the issue of air quality and greenhouse gas emissions

There is a need to raise forests significantly because of the fact that the importance of forests for the well-being of people and the planet is clear. Some 1.6 billion people worldwide depend directly on forests for food, shelter, energy, medicines, and income. Forests provide clean air and fresh water and help to avert desertification. They are home to 80 percent of all known terrestrial species, and they regulate our climate, absorbing one-third of global greenhouse gas emissions.

According to international standards, every country should have 28 percent of its total land under forest cover. Our country Pakistan has only 5.1 percent of its total land under its forest cover. There is a need to raise forests gradually with the help of international, government, local NGOs, and local communities.

Plantation is the most appealing strategy to expand forest cover area in the country. Forestation will increase the absorption capacity of greenhouse gases, regulate water flows and protect coastal communities from extreme events and sea level rise. In addition, they provide migrating plant and animal

species routes to resilient habitats. In Pakistan, the existing meager forest resources are crucial to environmental stability, which appeal for serious interventions supported with a commitment to adequate financial flows to improve and enhance the overall forestry, wildlife, and biodiversity sector. However, the TBTP is helping to restore the ailing ecosystems and it will improve natural capital as well.

Major causes of environmental pollution are population growth, urbanization, increasing industrialization, intensification of agriculture, forest hacking, rising energy use, and transportation.

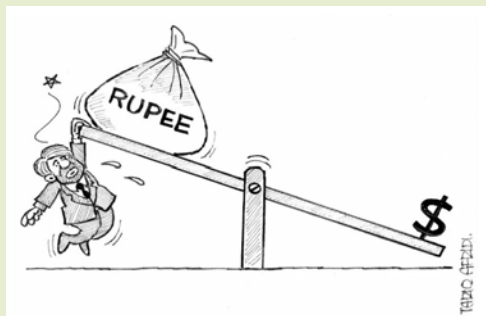
Ways to get sustainable environmental development are: Planting more and more forests and conserving existing forests. The forests should be raised as per international standards. Replacing smoke-emitting vehicles with electrical and solar vehicles. Solarizing the power plants of offices, factories, and other industrial places to reduce emissions. Avoiding chemical fertilizer use in crops by replacing it with animal dung. Treating sewerage before draining it in oceans, rivers, canals, lakes, watercourses, and other water bodies. Controlling emissions from nuclear and coal-fired power plants, and oil refineries.

Cleaning villages, towns, and cities on a daily basis and disposing of garbage at designated dumping places.

There is also a need to dump hospitals' waste at designated dumping places besides stopping the burning of garbage of any kind at open places because smoke generated from this garbage fire causes lung and heart diseases. It is also mandatory to avoid mixing of drinking water with drainage water through pipelines. Check and balances are a must for this. Cleaning hospitals regularly and disposing of their garbage at designated places should also be ensured.

The goal of environmental sustainability is also to conserve natural resources and to develop alternate sources of power while reducing pollution and improving the environment. Renewable energy sources are solar, wind, biomass and hydroelectric, and tidal energy.

There is a need to install large-scale solar power plants at government and private local to stop the use of fossil fuels. Governments across the world, including in Pakistan, should install wind energy power plants in open places where wind speed is good. ■



DEVELOPING ENVIRONMENT

Centre allows Sindh to earn \$200m through carbon credits



Khaleeq Kiani

In the absence of an approved policy, the federal government has allowed Sindh to earn \$200-220 million (about Rs57-63 billion) of carbon credits over the next two decades for its efforts to expand mangrove forests under Pakistan's commitments for unconditional contribution to a global drive for reducing greenhouse gas emissions.

In 2021, the Ministry of Climate Change submitted the nationally determined contributions (NDC) to the United Nations Framework Convention on Climate Change. The ministry pledged that 15pc of the carbon credits generated — i.e. reducing around 240 tonnes of carbon dioxide equivalent — in the country will be Pakistan's unconditional contribution towards the NDCs. Major sectors included in this reduction are energy, industry, forests, agriculture and transport. NDCs are at the heart of the Paris Agreement and the achievement of its long-term goals. They embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. Besides national-level commitments by countries, the Paris Agreement for a reduction in greenhouse gas emissions allows private entities to generate carbon credits and trade them with international entities on voluntary carbon markets.

These markets allow carbon emitters to offset their unavoidable emissions by purchasing carbon credits emitted by projects targeted at removing or reducing greenhouse gas from the atmosphere.

However, the carbon credits traded on these voluntary markets cannot be counted against the NDC commitments of the country. Therefore, the private entities need an

undertaking from the national governments that they will make "corresponding adjustments" in their NDC targets by excluding those private carbon credits. For this, there is a need for a carbon market policy for regulating the trading of carbon credits so that Pakistan's commitment under the NDCs does not get compromised. However, the country does not have such a policy at present and would be unable to have one over the next two years. The climate ministry has reported to the federal cabinet that it was preparing a carbon market policy, a voluntary carbon market, and a net-zero framework with World Bank's technical help that may take about two years, but an interim framework was currently being expedited.

On the other hand, the Sindh Forest Department is already implementing two Indus Delta mangrove projects — Delta Blue Carbon 1 and 2 — in collaboration with a private entity selected by the department. Under the first project, started in 2015, about 3.1 tonnes of CO₂ equivalent have been sequestered and traded in international voluntary carbon markets, generating \$14.7m in revenue for Sindh. The agreement for the second project was executed in March 2020, and its planting operations began this year. With the support and consent of the provincial government, the Sindh Forest Department sought a no-objection certificate (NOC) from the federal government through the climate ministry to continue selling carbon credits in international voluntary carbon markets until 2042. The NOC would mean that those carbon credits will not be counted by Pakistan against its NDC commitment till 2043. The climate ministry tried to convince the Sindh government to reduce the concession period until 2033 to help the national commitments be fully honoured. ■

OGDCL to launch Bettani field production

—◆ EU Report —◆

In an ambitious move to strengthen Pakistan's energy sector, the Oil and Gas Development Company Limited (OGDCL) is gearing up to commence gas and oil production from the Wali exploration block, known as the Bettani field, located in F.R. Laki, Khyber Pakhtunkhwa. With production set to begin in June 2023, OGDCL aims to contribute 10 Million Standard Cubic Feet per Day (MMscf/d) of gas and 1,000 barrels per day (BPD) of oil to the country's energy resources.

As the leading Exploration and Production company in Pakistan, OGDCL holds 100% working interest in the field and estimates the

recoverable reserves to be approximately 13 million barrels of oil and 219 billion cubic feet of gas, equivalent to 55 million barrels of oil equivalent (BOEs). To expedite the production process, OGDCL has developed early production facilities at Bettani-1, paving the way for the extraction of the field's vast potential. The gas produced from the Bettani field will be connected to the SNGPL network in June 2023, opening doors for additional development potential of up to 50 MMscf/d. OGDCL's aggressive installation of processing and production infrastructure in Baluchistan and KPK, particularly in Jhal Magsi and Bettani, sets the stage for future exploratory discoveries in these regions.

With over 1,025 MMSCF/d of gas already

being produced from its own and operated joint venture fields, OGDCL remains at the forefront of gas production in Pakistan. Notable fields include Uch Gas Field, Qadirpur Gas Field, Kunrar Pasakhi Deep-Tando Allah Yar Gas Condensate Field, Nashpa Oil Field, and Sinjhora Gas Condensate Field. The sustainable and affordable supply of energy is vital for Pakistan's socio-economic development, and OGDCL is committed to meeting the country's energy needs. By prioritizing development plans and accelerating the monetization of discovered assets, OGDCL aims to generate early cash flows and contribute to the nation's growth.



Gas from KPD field: Initial deal inked

—◆ EU Report —◆

An initial agreement has been inked before the Gas Sale Agreement (GSA) between the Oil and Gas Development Company Limited (OGDCL) and the Sui Southern Gas Company (SSGC) on the supply of gas from the KPD field - a 10-year-old dispute.

During the audit of the OGDCL for the fiscal year 2020-21, it was observed that there existed a measurement dispute between the OGDCL and the SSGC on the supply of gas from the KPD field during 2012-13 but the management failed to resolve the dispute despite lapse of considerable time.

The SSGC started making provisional payments against invoices raised by the

OGDCL from 2017 onwards but the amount pertaining to February 2012 to March 2013 was found outstanding. This resulted in the non-settlement of the measurement dispute on the sale of gas of Rs11.7 billion between the SSGC and the OGDCL.

All such disputes that are not settled amicably within 60 days from the date of notification of such disputes shall be referred to arbitration. The measurement facilities shall be as per American Gas Association Committee Report-3 or the latest revision thereof with an online gas chromatograph and flow computer at the delivery point. Measurements facilities at the KPD gas field shall be jointly calibrated and checked every calendar month by both parties.



Khurram Dastgir inaugurates 500kV transmission line

—◆ EU Report —◆

Federal Minister for Energy Khurram Dastgir on Thursday inaugurated the 500-kilovolt Thar-Matiari transmission line. He visited Noh Hotiani village in Matiari district where he inaugurated the 500KV Thar-Matiari transmission line. According to a spokesperson for the National Transmission & Despatch Company (NTDC), the project was completed in a record period of two-and-a-half months. The 220-kilometre-long transmission line connecting Thar with the national grid cost around Rs20 billion. Earlier, Dastgir spoke at a ceremony organised by the NTDC in connection with the inauguration of the transmission line at a hotel in Hyderabad. Talking to the media at the ceremony, he said the project of the power line from Thar to Matiari was founded in 2017, the cost of which was set at Rs21 billion, but due to the integrity of the current government, it was saved by one billion rupees.

Direct containerised shipping service inaugurated

—◆ EU Report —◆

In a bid to enhance energy growth and achieve a sustainable GDP growth rate of at least 5 percent, Pakistan is set to enter into a comprehensive energy agreement with Central Asian countries, including Russia.

This announcement was made by Minister of State for Petroleum, Dr Musadik Malik, during the inaugural ceremony of a direct containerised shipping service between Karachi and Saint Petersburg, held at a local hotel. Dr Malik emphasised the significance of the comprehensive energy security agreement, which is expected to be presented to the pub-

lic by the end of this year.

Russia to commence direct shipping service by 25th. He stated that to meet the energy requirements of Pakistan's growing population, a consistent annual growth rate of 7.5-10 percent in the energy sector is needed to support a GDP growth of 5 percent. This comprehensive energy agreement aims to facilitate this growth.

While the details of the agreement were not disclosed, Dr Malik revealed that a substantial investment of \$ 10 billion in the refinery sector is imminent in Pakistan. Prime Minister Shehbaz Sharif will inaugurate this significant investment, the specifics of which are currently confidential.



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Deals worth Rs2.5bn finalized at Solar Expo

—◆ EU Report —◆

The second International Solar Energy Meet (ISEM) Expo and IEEEEP IREM Expo, held at Expo Centre Lahore, concluded with deals worth over Rs2.5 billion, showcasing the increasing interest in solar energy and alternative power solutions. The exhibition brought together more than 150 national and international companies, manufacturers, and distributors to showcase their products and discuss ways to address Pakistan's energy crisis. With attendance exceeding 12,000 visitors, the event aimed to facilitate a meaningful dialogue on renewable energy options and provide a platform for industry players to collaborate in overcoming the country's energy challenges. A conference organised by White Paper Summits and the Institution of Electrical and Electronics Engineers Pakistan (IEEEEP) featured expert speakers sharing case studies, technical presentations, and insights on solutions for Pakistan's power and renewable energy sector. Pakistan's heavy reliance on imported fossil fuels, which account for 60% of the energy mix, coupled with a depreciating rupee, has exacerbated the energy crisis. The country's current share of green energy is a mere 5 to 6%, despite the significant potential for leveraging clean energy resources.





International Industries Ltd goes green

International Industries Limited (IIL), Pakistan's largest manufacturer & exporter of steel and polymer pipes, proudly announces the successful commissioning of a state-of-the-art 1 MW solar power system at IIL Factory 1 in Karachi. This initiative marks a significant step towards IIL's larger commitment to sustainability and reducing its environmental footprint by installing a total of 4MW of renewable energy across all its factory locations. "We are thrilled to unveil our new solar power system, which represents our strong commitment to sustainability and environmental stewardship," said Mr. Sohail R. Bhojani, CEO of International Industries Limited. "By harnessing renewable energy, we are not only reducing our carbon footprint but also demonstrating our dedication to responsible business practices and to contributing towards a greener future for Pakistan and the world at large", he further added. Aside from the significant contribution to carbon footprint reduction, the solar power system is expected to generate substantial cost savings for International Industries Limited over its operational lifespan. By relying on solar energy, the company will significantly reduce its dependence on conventional power, thereby mitigating the impact of rising energy costs and enhancing its long-term financial sustainability.

E&P firms seek Rs500bn tariff differential subsidy

— Khalid Mustafa —

Oil and gas exploration and production (E&P) companies have sought a budgetary grant or tariff differential subsidy of at least Rs500 billion in the 2023-24 fiscal year to partially adjust the accumulated revenue shortfall of state-owned gas companies. They said that recovering the past years' revenue shortfall from the consumer will take considerable time. "This will greatly facilitate E&P companies in meeting operating expenditures and planned exploration and development activities for enhancing indigenous gas production," Pakistan Petroleum Exploration and Production Companies Association (PPEPCA) said.

Local oil and gas exploration (E&P) companies have trimmed their drilling activities by 50 percent due to a cash flow crisis resulting from a halt in outstanding payments from Sui gas companies, totaling Rs 1,244 billion.

Non-payment of the huge outstanding amount has virtually made E&P companies unable to meet their contractual obligations like payment to contractors for rig rentals/ services, payment of cash call to operators, royalty/ taxes and other overheads. In a recent letter to the petroleum division, PPEPCA argues that the revenue shortfall of SSGC and SNGPL has reached Rs 512 billion and Rs 817 billion respectively due to which payments to E&P companies have been virtually halted as E&P companies are now receiving only 10 percent-15 percent of outstanding bills.

Invoices of 12-30 months are pending for payment. Cessation of payment of gas producers would lead to energy starvation of lifeline consumers. PPEPCA has asked the government functionaries to make amendments in the E&P Rules for allowing E&P companies to make payment of royalty within one week from receipt of payment from the buyers.

Rehmat Ali Hasnie Honored as CEO of the Year by CEO Club Pakistan

Karachi: Rehmat Ali Hasnie, President and CEO of National Bank of Pakistan (NBP), has been recognized as the CEO of the Year by the CEO Club Pakistan. The prestigious award was presented to Mr. Rehmat Ali Hasnie by Mr. Muhammad Baligh Ur Rehman, Governor Punjab during a grand ceremony held at the Governor House in Lahore. Mr. Ijaz Nisar, President and Founder of CEO Club Pakistan was also present at the occasion.

One of Hasnie's notable contributions has been his pivotal role in NBP's Digital Transformation. Under his guidance, NBP has embraced cutting-edge technologies and digital solutions, revolutionizing the banking experience for customers and ensuring seamless and secure transactions. This progressive is solidifying NBP's position as a frontrunner in the digital banking landscape.



PM aides appointed to Parco board

— EU Report —

The government has appointed two independent directors to the board of Pak Arab Refinery Limited (Parco).



Sources said that the board of directors of Parco was reconstituted recently, though its term was going to expire in August 2023. The government has appointed Ahad Cheema, Adviser to the Prime Minister with the status of federal minister, as an independent director to the Parco board.

Dr Jahanzeb, Special Assistant to the Prime Minister (SAPM) with the status of minister of state, has also been appointed as an independent board director of Parco.

Fish waste biodiesel

Social, environmental, and economic benefits

◆ Absar Ahmed, Talha Ahmed,
Huzaifa Iftikhar, Zaki Ahmed ◆

According to Trade Development Authority of Pakistan's December 2021 Report, approximately one million metric tons of fish are caught annually from the sea of Sindh and Balochistan as well as from land farming all over Pakistan.

This leads to nearly 350k metric tons of waste that is produced from fish consumption in form of discarded bones, scalps and viscera. A small amount is used to make animal feed while the rest is discarded either on land or dumped into the sea. Fish waste when dumped on land fill results in chronic illness for the nearby population, contaminating the land and groundwater.

While waste material dumped into the sea makes the ecology unfavorable for marine life which adversely affects the blue economy.

Pakistan's marine ecology is currently facing challenges such as overfishing, climate change, and pollution. The buildup of organic contaminants, such as fish waste, coming from the fish processing industry is one of the biggest problems causing marine pollution. The toxic nutrients and chemicals in this trash, which are routinely dumped in the ocean, also contribute to eutrophication. This process can lower the oxygen content of the water and cause marine animals including fish, crabs, and corals to perish. Additionally, these contaminants endanger the health of both marine life and people by spreading harmful viruses and germs.

The pollution in coastal lands and oceanic life can be prevented by utilizing the waste into value-added products. The cost of biodiesel produced from this process is less than 15% of the conventional diesel as of October 2022. Using 10% to 20% blends of biodiesel with conventional diesel for transportation vehicles can reduce GHG emissions, which is one of the major contributors to increasing global warming in the world.

Upon conducting numerous experiments to determine the optimal blend of biodiesel with conventional diesel, it has been observed that the combination results in a significant reduction in the emission of carbon monoxide, a highly detrimental gas known to contribute to air pollution. Unlike traditional fossil fuels, biodiesel does not release sulphur oxides (SOx) when they are burned for energy. This is because biodiesel is derived from organic matter, such as plants and animal waste, and does not contain sulphur in their composition.

However, it has been noted that the emission of NOx, another harmful pollutant, tends to increase with the use of biodiesel. Nevertheless, this issue can be effectively addressed by incorporating suitable additives into the biodiesel blend. According

to current research, biodiesel can enhance engine performance by making the fuel more lubricious and lowering particle and greenhouse gas emissions. Due to the high fuel consumption of heavy-duty trucks, using biodiesel can be particularly advantageous in this case. Particulate matter and greenhouse gas emissions, which are significant issues in the transportation industry, can be decreased with the use of biodiesel. However, when using biodiesel in heavy-duty vehicles, consideration must be given to things like cold weather performance, fuel storage, and engine compatibility.

In addition to its environmental benefits, biodiesel does have some drawbacks, including its relatively poor cold flow properties. But, this limitation can be mitigated through the use of various additives, such as Methanol, Ethanol, Kerosene, and Magnesium (Mg) additives, which help improve the cold flow behavior of biodiesel. These additive-enhanced biodiesel blends show promise as a more viable option for the transportation industry, despite their initial limitations.

Alternative renewable fuel implementation holds the key to tackling the energy crisis in Pakistan. In recent years, Pakistan has used up 80% of its oil reserves according to the audit report of 2021-22 and the import of crude oil takes a major share in the import bill of the country. By encouraging proper utilization of fish waste, the government can reduce the growing marine pollution, while simultaneously promoting its blue economy.

In recent years, the total import of diesel has been around the cost of \$17.4 billion, using a 10 to 15 % blend of biodiesel we can save up to \$1.74 to 2.61 billion per annum which can help to save our economy and reduce the massive import budget. The production of biodiesel from fish waste not only has the potential to save millions of dollars in terms of foreign exchange of crude oil but also provides the opportunity for in-house biodiesel production. This, in turn, promotes energy independence and reduces reliance

on fossil fuels, leaving a greener and more sustainable option for future generations.

A research study conducted at the Department of Environmental Engineering, NED University of Engineering & Technology, Karachi under the supervision of Dr. Mehmood Ali on fish waste biodiesel showed the fish waste biodiesel produced was having comparable properties as compared to mineral diesel, having better engine performance and emissions characteristics.

This can lead to increased energy security, as countries can become less reliant on foreign sources of oil and gas. Furthermore, the production of fish waste biodiesel can help reduce waste and pollution, as the waste material from the fish processing industry is repurposed into a useful energy source. This can lead to improved environmental security, as it helps reduce the amount of waste that is dumped into landfills or oceans.

In terms of emissions, fish waste biodiesel has been found to produce lower levels of greenhouse gases than traditional diesel fuel. This can help mitigate the impacts of climate change and improve environmental security for future generations. Overall, the use of fish waste biodiesel can help promote sustainable energy practices, reduce waste and pollution, and mitigate the impacts of climate change. These advantages can lead to increased energy and environmental security, contributing to a more sustainable and resilient future.

Current examples of nations that have successfully produced biodiesel from palm oil are Malaysia and Indonesia, which have had a positive socioeconomic and environmental impact. These nations now have more opportunities for employment. They are experiencing economic growth, and are less dependent on importing crude oil from elsewhere, which has increased their energy security. ■

Writers are final year students of the Department of Mechanical Engineering, NED University of Engineering & Technology, Karachi



New guidelines on LPG air-mix plants okayed

Private sector will be free to set up such plants, notify consumer tariff

The government has approved new policy guidelines on the installation of liquefied petroleum gas (LPG) air-mix plants by the private sector.

Under the new regulations, the private sector will be free to set up LPG air-mix plants on commercial considerations by bearing the cost and liabilities subject to meeting the regulator's, the Oil and Gas Regulatory Authority (Ogra), licensing and operational requirements.

The supply preference or dedication mentioned in the LPG (Production & Distribution) Policy 2016 will not be applicable to the

air-mix plants developed by the private sector.

However, the air-mix plants may be entitled to bulk LPG purchase at the producer price notified by Ogra from time to time. Tariff for the air-mix plants, developed and operated by the private sector, will be deregulated.

The status of air-mix plant licences will be the same as that for LPG storage, filling and distribution plant licences and that they will also be entitled to LPG import governed by the prevailing trade policy and any other applicable policies/ law/ rule or instructions/ directives of the federal government.

Under the guidelines, the air-mix plant

licensee will not prohibit consumers/ suppliers from switching to alternative, competing fuels supplied by any third party (be it piped natural gas, LPG cylinders, another air-mix plant, virtual LNG pipeline, etc).

The licensee will notify a monthly tariff for consumers and also submit details of tariff to Ogra by the 10th of every month. The regulator will ensure that the air-mix plant licensee does not take any measures to prevent the marketing of LPG cylinders in the area where the plant supplies the fuel.

The resolution of complaints in respect of the pipeline network for LPG distribution and its metering for households will be undertaken by Ogra, as being done in the natural gas sector. "Ogra, being a regulator of LPG sector, is advised to comply with policy guidelines," the Petroleum Division said.

High electricity prices moving beyond consumers' affordability: study

— EU Report —

A study found that rising electricity tariffs are increasingly moving beyond the affordability of the masses and adversely impacting their consumption patterns. The study was conducted by the Institute of Policy Studies, Islamabad titled "Impact of Rising Electricity Prices on Consumer Behavior: The Case of Power Distribution Companies in Pakistan".

The research study covered over 1,000 households and 140 shop owners in the top 10 cities of Pakistan. The survey results indicate that most of the respondents have experienced moderate to significant increases in their electricity bills in recent months.

The study further highlights the correlation between the magnitude of the bill increase and the extent of consumption reduction, indicating that higher price hikes lead to more significant efforts in reducing electricity usage. However, despite the overall reduction in electricity consumption, a significant portion of the survey participants reported no noticeable decrease in their bills.

It recommends the need for improved governance and regulatory measures in the energy sector along with

affordable electricity tariffs and alternative payment options to accommodate different economic circumstances. The study also stresses the importance of addressing issues such as load shedding and raising consumer awareness about peak hours when electricity costs are higher.

Moreover, it also found that the alarming trend also caused a sharp decline in the recoveries of distribution companies (DISCOs) which can lead to difficulties in paying for power purchases from the generation companies, maintaining distribution networks, and servicing debts. These factors further hinder the ability of DISCOs to invest in infrastructure upgrades, provide quality services, and improve the overall reliability of electricity supply.

The research emphasises effective measures to address power affordability concerns and suggests strategies for distribution companies to mitigate the negative effects of rising prices. Overall, the study provides valuable insights into the impact of rising electricity prices on consumer behaviour in Pakistan and offers recommendations for DISCOs and policymakers to address affordability concerns and ensure a sustainable balance between electricity prices and consumers' ability to bear these costs.

KE, Oracle Power intent to relocate Thar plant

— EU Report —

ISLAMABAD: K-Electric (KE) and M/s Oracle Power PLC have indicated their intent to relocate Thar coal-based 1320-MW plant, for offtake by K-Electric seeking assistance from Minister for Planning, Development and Special Initiatives Ahsan Iqbal. In a joint letter written by Naheed Memon, CEO Oracle Power PLC, CEO K-Electric Syed Moonis Abdullah Alvi and Country Representative of Power China International Group Company for Pakistan Yang Jian Duoto to Ahsan Iqbal it has explained that the project, which is already listed as a China Pakistan Economic Corridor (CPEC) energy priority project, would be of national significance. It would not only bring in base load power fuelled by indigenous coal, but also contribute towards economic growth, result in creation of jobs, and further increase the utilization of Thar coal resources which is primed to be the cornerstone of the future energy security of Pakistan. Out-of-court settlement: KE asked to start talks on Rs47bn clawback dispute Energy Department Government of Sindh (GoS), Oracle Power PLC (Oracle), K-Electric Limited (KE), Power China International Group Company (Power China International) have recently entered into a Memorandum of Understanding (MoU) to promote the project. The understanding reached amongst these parties underscore their seriousness to contribute meaningfully towards the economic uplift of the country. The project was envisioned to be at the Thar Block VI, and the parties have agreed to evaluate its possible relocation to Port Qasim subject to technical, commercial and timely development considerations.



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Pak-Sino collaboration in PV sector sustainable development goals

—◆ EU Report —◆

On May 31, China's leading solar solutions provider LONGi officially released the sixth annual corporate sustainability report for 2022 in Beijing, providing an elaborate summary of its practices and achievements in the field of environment, society and governance (ESG) in the past year.

Launching ceremony of LONGi 2022 Sustainability Report [Photo provided to Gwadar Pro]

Pakistan, as an indispensable international market for LONGi, poised to show more competitiveness in global PV market. "Since 2020, LONGi Solar has successfully exported more than 1GW of solar panels to the Pakistani market, as a momentous milestone," Ali Majid, General Manager, Pakistan, LONGi Solar, told Gwadar pro in an exclusive interview.

As Pakistan is one of the most vulnerable countries to the adverse impact of increasingly severe climate change, the sustainable development has become a pressing issue in the country. Photovoltaic power generation, as the best choice to solve Pakistan's power shortage and optimize its energy structure to a great extent based on fossil fuels, while saving foreign exchange required for energy imports, has vast potential for future development.

From 2012 to 2022, LONGi produced a total of 290GW of photovoltaic products, with the cumulative output of clean electricity exceeded 1,148,287 GWh. According to the International Energy Agency's global power grid average emission factor, it is equivalent to avoiding 536 million tons of carbon



dioxide emissions. As for Pakistani market, both distributed and centralized PV products have market segment demand, distributed PV systems, such as rooftop solar installations on residential, commercial, and industrial buildings, have been gaining popularity in Pakistan. Net metering policies and incentives have been introduced to promote distributed generation and allow consumers to offset their electricity bills by exporting excess power back to the grid, Majid mentioned.

"At the same time, our government has been focusing on the development of large-scale centralized PV projects, including solar parks and utility-scale solar installations," he added, "these centralized PV systems contribute to the overall renewable energy capacity of the country and help diversify the energy mix."

Currently, both local and international players are competing to capture a share of Pakistan, such a burgeoning PV market. In 2022, China's photovoltaic module exports to Pakistan has reached approximately USD 870 million, with a total installed capacity of 3.2GW, a year-on-year increase of 54 percent and 37 percent, respectively, according to the statistics of China Photovoltaic Industry Association (CPIA).

On the other hand, for Pakistan itself, in order to maximize the development of sustainable industries such as photovoltaics, it is imperative to solve problems such as the foreign exchange gap. A large foreign exchange gap can put pressure on the country's ability to finance its imports, including PV products, and may necessitate measures such as foreign exchange controls, import restrictions, or adjustments to import tariffs, Majid told the reporter.

"Currency fluctuations, for example, can affect the pricing of imported PV products. Thus, a stable economic environment, the basis for ensuring the smooth development of such a sustainable industry, need the joint efforts of the government, industry and enterprises ourselves," Majid noted that if Pakistan hopes to truly carve out a niche in the global photovoltaic market with unique competitiveness, resultant force of the three are indispensable.

Energy is one of the areas where CPEC has invested the most, progressed the fastest, and achieved the most remarkable results. "The global photovoltaic industry is developing in full swing. China-Pakistan cooperation in related industries can make due contributions to the global response to climate change," Majid concluded. ■



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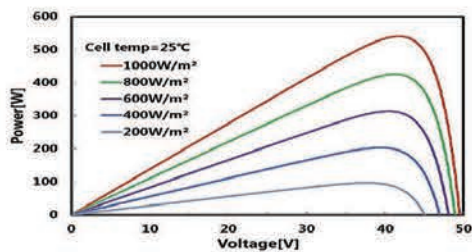
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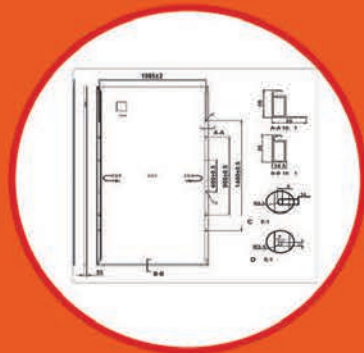


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