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MOVING TOWARDS SUSTAINA- BILITY



Moving towards sustainable living is not just an ecological obligation; it's a compassionate choice that benefits both us and our planet. Sustainability ensures that we leave a healthier, more harmonious world for future generations. By reducing our environmental footprint through responsible consumption, renewable energy, and mindful resource management, we can mitigate climate change, protect biodiversity, and foster resilient ecosystems.

Sustainable living also brings personal advantages. It promotes a healthier lifestyle, as it encourages fresh, locally sourced foods and active transportation. It fosters community connections and reduces stress, making us happier and more fulfilled. Moreover, it bolsters economic stability, as green industries create jobs and lower our energy bills.

#cleanenergy

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As we enter the cooler months, I want to take a moment to express my heartfelt gratitude for your continued support and engagement with our magazine. Together, we've navigated through an eventful year, highlighting the critical strides Pakistan is making in sustainability and clean energy. With your enthusiasm for a greener future, we are optimistic that the conversations and actions around environmental responsibility will only continue to grow.

Pakistan has made significant progress on the sustainability front, especially with the implementation of forward-thinking policies aimed at reducing carbon emissions, promoting renewable energy, and tackling climate change. The government's focus on expanding solar and wind energy projects, as well as fostering energy-efficient practices, shows the country's commitment to a cleaner and more sustainable future. Initiatives like the 10 Billion Tree Tsunami and policies supporting electric vehicles are also paving the way for long-term environmental benefits.

As the temperatures cool, we are reminded of the importance of energy efficiency, especially in urban areas where power consumption spikes during peak months. This is a crucial time to reflect on sustainable energy solutions that can carry us into a future that not only respects but nurtures the planet.

Thank you once again for being part of this journey toward a cleaner, greener, and more sustainable Pakistan. Together, we can continue to drive change and make a lasting impact.

Local Scoop.

Here we bring you the latest updates on the green revolution happening in your region. Read about how your community is harnessing the power of renewables to shape a sustainable future and create positive environmental impact, one innovation at a time. We talk about breakthrough technologies, and local initiatives driving the renewable energy movement forward.



CHINESE ELECTRIC CAR GIANT BYD ENTERS PAKISTANI MARKET



Senator Muhammad Aurangzeb, the Federal Minister for Finance and Revenue, delivered a keynote speech emphasizing the significance of sustainable innovation for Pakistan's future.

The finance minister welcomed BYD's entry into the market, praising the company's dedication to advanced technology and environmental responsibility. Aurangzeb stated, "BYD's introduction to our market is not merely about new vehicles; it represents a commitment to a sustainable future and aligns with Pakistan's energy efficiency and environmental goals."

He further stressed the government's commitment to supporting initiatives that will not only promote green technology but

also significantly boost the local economy by generating new jobs and encouraging technological progress in the automotive industry. Additionally, the minister highlighted that the involvement of a major global player like BYD could enhance Pakistan's export potential in the rapidly growing electric vehicle sector, aligning with the national strategy to increase high-tech exports and address trade imbalances.

Aurangzeb also affirmed that the government and industry stakeholders will collaborate to introduce innovations that contribute to the country's sustainability objectives and economic stability in the years ahead.

SINDH TO DISTRIBUTE 200,000 SOLAR KITS AMONG LOW-INCOME FAMILIES

“Sindh Chief Minister Syed Murad Ali Shah, speaking at the signing ceremony of framework agreements for solar systems, said that 200,000 Solar Home Systems (SHS) would be provided to low-income households selected through the Benazir Income Support Program (BISP) data in all districts of the province.”

He said that by the end of October first batch of 50,000 SHS kits would reach Karachi for onward distribution. Murad Shah said that the Sindh Solar Energy Project (SSEP) was being executed for Rs27.4 billion with the \$100 million financial support of the World Bank.

According to the CM Component – III of the SSEP the Provision of 200,000 Solar Home Systems (SHS) to low-income households in all districts of the province under BISP Data.

Murad Shah said that the Solar Home Systems would consist of an 80-100 W Solar PV Plate, a minimum 18 AH Lithium-ion battery, one DC fan, three LED bulbs and a mobile charging facility. The SHS set was shown to the CM which he approved.

The chief minister disclosed that the system’s estimated cost was around Rs.55,000, including transport, taxes and duties and would be provided to eligible low-income families at around 80 per cent subsidy. Sharing the criteria, the CM said that the selection of low-income households has been made by using the Benazir Income Support Program (BISP) register of low-income households as the criteria for household eligibility; The poverty scorecard ranging from 21 to 50 has been initially used.

SKYELECTRIC MAKES INROADS INTO JAPANESE MARKET

SkyElectric, a prominent Pakistani solar technology company, has achieved a major milestone by completing the first phase of the Japan Electrical Safety & Environment Technology Laboratories (JET) testing program. This accomplishment paves the way for the company’s entry into the highly competitive Japanese market, reinforcing its commitment to quality and technological innovation.

Since its founding in 2015, SkyElectric has been at the forefront of Pakistan’s solar industry, integrating AI and machine learning into its energy management systems. These innovations help optimize energy use, predict maintenance needs, and enhance overall system efficiency. SkyElectric’s product range serves both residential and commercial customers, offering reliable power solutions backed by cutting-edge technology and strong after-sales support. The company is also known for its focus on cybersecurity and customer satisfaction, setting new standards in the solar industry. Co-founder and CEO Amin Sukhera called the completion of the JET testing phase a “monumental milestone,” emphasizing its importance in expanding into Japan and beyond. COO Zeeshan Ahmad noted that Japan’s strict regulatory environment provides an ideal platform to showcase SkyElectric’s advanced solar solutions, positioning the company for further growth and collaboration on a global scale.

KP GOVT DECIDES TO SWITCH ALL REGISTERED SEMINARIES TO SOLAR ENERGY

The Khyber Pakhtunkhwa government has announced plans to transition all registered seminaries in the province to solar power, marking a significant step towards sustainable energy use in religious institutions. The Auqaf department, responsible for religious and charitable matters, is collaborating with the Provincial Energy and Power Department to initiate a comprehensive survey aimed at facilitating this solar energy conversion.

This initiative builds on an earlier decision by the provincial government to provide free solar systems to over 1,000 seminaries. By shifting these institutions to solar power, the government seeks to address energy challenges while promoting environmental

sustainability. The move is part of a broader strategy to enhance energy efficiency and reduce reliance on traditional power sources, which are often costly and environmentally damaging.

The government's focus on solar energy for seminaries not only ensures a more reliable power supply for these institutions but also aligns with the global push towards renewable energy. This initiative reflects the Khyber Pakhtunkhwa government's commitment to fostering green energy solutions across the province, setting a precedent for other regions to follow in integrating renewable energy into public and religious infrastructure.

CHINESE COMPANY AIKO TO ESTABLISH SOLAR PANEL MANUFACTURING FACILITY IN PUNJAB

Chinese clean energy firm AIKO has signed an agreement with the Punjab government to establish a solar panel manufacturing plant in the province, aiming to boost Pakistan's renewable energy sector. Facilitated by the Special Investment Facilitation Council (SIFC), the deal was formalized at a ceremony attended by Punjab's Minister of Industries and Commerce, Chaudhry Shafay Hussain, and AIKO's South Pacific Region President, Alex Heng.

The new facility will cater to both local and

export markets, reducing Pakistan's reliance on imported solar panels. Minister Hussain emphasized the importance of the plant, stating it will support local energy needs and contribute to exports. AIKO's investment aligns with broader provincial initiatives, including plans to convert 7,000 tube wells to solar power and distribute solar panels to low-income households. The plant is expected to strengthen Pakistan's renewable energy landscape, which currently depends heavily on fossil fuels.

KE RECEIVES BIDS FOR 150MW SOLAR PROJECTS IN BALOCHISTAN

K-Electric has announced that it has received 15 bids for its inaugural renewable energy initiative, comprising 150-megawatt (MW) solar projects located in Winder and Bela, Balochistan. In a statement, the power utility highlighted the completion of a significant milestone in its efforts to increase the share of renewable energy in its generation mix, as outlined in the company's Power Acquisition Programme (PAP).

Earlier this year, KE initiated a competitive bidding process for various renewable energy projects following the National Electric Power Regulatory Authority (Nepra) approval. Over the next five years, the power utility aims to add 1,300 MW of renewable energy projects, underscoring its commitment to sustainable energy solutions. KE Chief Executive Officer Syed Moonis Alvi stated that receiving 15 bids for the first phase of the solar energy project was a landmark achievement for both KE and Pakistan. "It demonstrates the trust of local and international players in KE as a brand, as well as the growing confidence in Pakistan's economic potential. I am thrilled to see several reputable firms sharing our vision of building a resilient, robust, and sustainable energy future for Karachi," he remarked.

He noted that the company's future investment plans, valued at nearly USD 2

billion, focus on enhancing its transmission and distribution infrastructure and emphasize its commitment to innovation and sustainable growth. KE Chief Strategy Officer Shahab Qader Khan stated that these renewable energy projects align with KE's vision and NEPRA's directives to prioritize local fuels and green sources.

"We are optimistic that the success of these projects will encourage others to participate in the subsequent processes as well. This will play a crucial role in KE's pursuit of fuel mix diversification and contribute significantly to catalyzing the country's economic progress," he said. The statement noted that KE invited reputable local and international companies with experience in power projects and sound financial standing to participate in the bidding process. A total of 15 bids were received for the initial renewable energy projects.

In addition to the 150MW solar project in Balochistan, for which bidding has closed, projects totaling 270MW in Sindh—including a 120MW project at Deh Halkani, a 150MW project at Deh Metha Ghar in District West, Karachi, and a 220MW hybrid (wind and solar) project at Dhabeji—are currently at the bidding stage.



PACKAGES LTD IMPLEMENTS SAP SUSTAINABILITY SOLUTIONS

Packages Limited, in partnership with SAP Pakistan, has achieved a historic milestone as the first company in the country to sign a sustainability agreement with SAP. This initiative is set to drive the adoption of SAP sustainability solutions across Pakistan's export-related industries. By utilizing verified and actionable data, these industries can enhance their green credentials and improve their market positioning.

As the first company in Pakistan to implement SAP's Sustainability Control Tower

(SCT), Packages Limited demonstrates its commitment to monitoring and managing its carbon footprint. This deployment will allow Packages Limited to provide its international partners and importers with verified data on its adherence to global best practices for carbon reduction, carbon footprint management, and sustainable operations. This strategic partnership marks a significant step in Packages Limited's ongoing dedication to sustainability and ethical business practices.

OGDCL TAPS PAKISTAN'S FIRST-EVER TIGHT GAS PROJECT

Oil and Gas Development Company Limited (OGDCL) has successfully initiated early commercial production from Pakistan's first-ever tight gas project at Nur West Well-1, located in Sindh's Sujawal District. The well is currently producing 1.5 million standard cubic feet per day (mmscfd) of gas with a wellhead pressure of 1,050 PSI, contributing to the national gas supply via the Sui Southern Gas Company Limited (SSGCL) network.

Tight gas production, which was previously hindered by high costs and limited technology, became viable through the use of hydraulic fracturing—a cutting-edge technique used to enhance production. This marks a major milestone in OGDCL's efforts to leverage advanced technologies to boost

energy output and meet Pakistan's growing demand for gas.

OGDCL has developed a strategic plan for the continued exploration and development of tight gas reserves, emphasizing its commitment to national energy security and sustainable development. In April 2024, the company informed the Pakistan Stock Exchange (PSX) about the gas reserve discovered at a depth of 2,975 meters.

Under the recently approved Tight Gas Policy 2024, operators can sell gas at negotiated prices, with the government having the first right of refusal. The policy sets a wellhead price of \$7.5 per MMBTU and includes provisions for tax and royalty incentives.

LARGE PETROLEUM AND NATURAL GAS RESERVES DISCOVERED IN PAKISTAN

A major petroleum and natural gas deposit has been discovered in Pakistan's territorial waters after a three-year survey conducted in collaboration with a partner nation. According to a senior Pakistani security official, this find has the potential to significantly boost the country's economy.

The survey successfully pinpointed the location of the reserves, and relevant government agencies have been notified. These resources, located deep within Pakistan's waters, represent a crucial opportunity to develop what the official referred to as the "blue water economy."

While the discovery is promising for Pakistan's energy sector, exploration is still in its early stages, and extracting the oil could take several years. The official also highlighted the broader potential of the blue water economy, including the extraction of valuable minerals from the ocean, which could further benefit the economy.

Initial estimates suggest the reserves could be among the world's largest, possibly placing Pakistan as the holder of the fourth-largest deposit globally. However, Muhammad Arif, a former member of the Oil and Gas Regulatory Authority (OGRA), cautioned that while the discovery is promising, the size and recoverability of the reserves are not guaranteed. Offshore exploration alone could require up to \$5 billion in investment, Arif added.

US PLEDGES \$5 MILLION TO SUPPORT PAKISTAN'S RENEWABLE ENERGY PUSH BY 2030

The United States is supporting Pakistan in achieving its goal of sourcing 60% of its energy from renewable resources by 2030, according to US Ambassador Donald Blome. Speaking at an event organized by the Pakistan Institute of Parliamentary Services (PIPS), Blome noted that the US has contributed \$5 billion to the Green Climate Fund to help Pakistan pursue sustainable energy solutions.

At the "Recharge Pakistan" event, Blome emphasized the initiative's role in enhancing flood resilience and water security in vulnerable regions. He explained that the project's green infrastructure will restore floodwater channels, reforest wetlands, and improve groundwater absorption. Blome highlighted the broader partnership between the US and Pakistan, announcing an additional \$5 million pledge to Recharge Pakistan, which aims to cut carbon emissions by 52,900 tons of CO₂.

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Global Scoop.

Here we dive into the latest developments in the industry as we explore the remarkable strides countries are making towards sustainable power sources, highlighting groundbreaking innovations and initiatives that promise a greener future for our planet.

From cutting-edge solar technologies to revolutionary wind farms, this is your gateway to staying informed on the global transition to clean energy.



EGYPT'S ELECTRICITY MINISTRY TARGETS 30 GW BOOST IN CAPACITY



The Ministry of Electricity and Renewable Energy is targeting an increase of up to 30 gigawatts (GW) in renewable energy capacity, as announced by Minister of Electricity Mahmoud Esmat during a meeting with Prime Minister Mostafa Madbouly. The meeting focused on reviewing ongoing renewable energy projects, with this ambitious expansion potentially saving the country \$4.1 billion annually in fuel costs.

During the discussion, Esmat also highlighted the necessary capacities for green hydrogen production. Additionally, Minister of Planning, Economic Development, and International Cooperation Rania Al-Mashat provided updates on the progress of 18 ongoing renewable energy projects.

In a related development, the Egyptian Council of Ministers recently approved Dubai-based AMEA Power's proposal to connect 2 GW of renewable energy capacity to Egypt's power grid by the summer of 2025. The projects include an additional 500 MW of solar capacity for the existing 500 MW Abydos solar project, which is currently under construction. Moreover, 1.5 GW of solar and wind energy will be integrated into

the national grid, comprising 1 GW of solar capacity and the 500 MW Amunet wind farm in Ras Ghareb. AMEA Power expects these projects to be operational by mid-2025 and will include a battery energy storage system (BESS).

By the end of 2023, wind energy accounted for 2.7% of Egypt's installed capacity, with 1.6 GW, and contributed 2.8% to power generation, producing 6.7 TWh. Solar energy represented 3% of installed capacity with 1.8 GW and 1.9% of power generation, delivering 4.4 TWh. Egypt has set a goal to generate 42% of its electricity from renewables by 2035, with 25% from solar, 14% from wind, and 2% from hydropower.

The Islamic Development Bank (IsDB) has played a crucial role in financing energy projects in Egypt, leading to a 14% increase in energy production between 2012 and 2022, which now constitutes 94% of the country's total energy capacity. The IsDB has contributed nearly 4,000 megawatts—approximately 14% of this growth—through 19 approved projects valued at \$2.02 billion, including six solar power projects.

QAIR ACQUIRES MAJORITY STAKE IN BRITISH RENEWABLE ENERGY COMPANY GSC

Independent European renewable energy company Qair has secured a majority stake in Green Switch Capital (GSC), a UK-based developer specializing in offshore wind, solar, and storage projects.

This strategic acquisition is poised to enhance Qair's renewable energy footprint in the UK, positioning the company as a significant player in the country's renewable sector.

Qair CEO Louis Blanchard stated, "We are thrilled to welcome such a talented team to Qair.

"This acquisition is perfectly in line with our strategic goal of expanding our presence

in the UK market and further reinforces our commitment to delivering competitive renewable energy solutions.

"Qair is now well-placed to become a major player in key European markets." GSC's development pipeline exceeds 15GW, with half of these projects already having secured grid offers, land leases, and connections.

The first project is expected to be operational by 2026.

This acquisition complements Qair's existing UK portfolio, which includes interests in offshore wind, energy from waste, and onshore renewable projects.

EDF RENEWABLES UK TO ACCELERATE UK'S CLEAN ENERGY WITH OVER 300 MW OF BATTERY STORAGE PROJECTS

EDF Renewables UK is currently constructing six battery storage projects, set to go live within the next 12 months. These include a 57 MW battery in Braintree, Essex, and a 47.5 MW battery in Indian Queens, Saint Austell. Recently, a significant milestone was reached with the completion of a 52 MW battery in Sundon, Bedfordshire, in mid-July. Additionally, Dorset Council approved a 47.5 MW battery near Mannington last week.

In total, these projects will provide 313 MW of storage capacity, capable of powering over 400,000 homes for two hours. As the UK works towards a zero-carbon electricity system by 2030, battery storage will play a

crucial role in balancing renewable energy supply and demand. The government aims to triple solar capacity to 50 GW, quadruple offshore wind to 55 GW, and double onshore wind to 35 GW by the end of the decade.

Simone Sullivan, Head of Solar at EDF Renewables UK, emphasized the importance of battery storage in improving energy security and achieving these ambitious targets. EDF Renewables UK is building momentum, aiming to deliver up to 2 GW of battery storage, with 400 MW already approved and 313 MW currently under construction.

AUSTRALIA GREENLIGHTS \$19BN SOLAR PROJECT TO EXPORT POWER TO SINGAPORE

The Australia-Asia Power Link is expected to generate 6GW of renewable energy, with one-third of that power transmitted to Singapore through an undersea cable.

SunCable, owned by billionaire software entrepreneur and climate advocate Mike Cannon-Brookes, announced that its project will eventually meet up to 15 percent of Singapore's energy needs by the early 2030s. Australia's Environment Minister, Tanya Plibersek, stated on Wednesday that the 12,000-hectare (29,650-acre) solar farm in the remote Northern Territory will generate 14,300 jobs and position Australia as a "renewable energy superpower."

"This is a generation-defining infrastructure project," Plibersek said, highlighting that it will be the largest solar precinct globally, establishing Australia as a world leader in green energy. The approval for the project comes with "strict conditions" to safeguard the natural environment, including measures to avoid the habitat of the greater bilby, a vulnerable species.

SunCable Managing Director Cameron Garnsworthy called the government's decision a vote of confidence in the project and in the company's role as "responsible stewards of the local Northern Territory environment." Garnsworthy added that SunCable will now focus on the next phase of planning, with a Final Investment Decision expected by 2027.

AMPRION SECURES €1.1 BILLION FOR GREEN ENERGY PROJECTS

Amprion has successfully raised €1.1 billion through a green bond issuance, divided into two tranches, as part of its €9 billion debt issuance program. This move has garnered strong interest from investors, highlighting confidence in Amprion's commitment to green energy projects.

The first tranche, valued at €500 million, carries a 3.125% coupon with a 6-year maturity, while the second tranche of €600 million offers a 3.850% coupon with a 15-year maturity. Amprion's CFO, Peter Rütth, emphasized that the bond's success reflects investor trust in the company's strategy. The proceeds will fund sustainable projects aimed at expanding and modernizing the transmission grid to integrate more renewable energy, aligned with the United Nations Sustainable Development Goals (SDGs) 7 (Affordable and Clean Energy) and 9 (Industry, Innovation, and Infrastructure).

Amprion's Green Finance Framework, validated by ESG rating agency Sustainalytics, ensures the bond's compliance with international sustainability standards. The company enjoys solid investment-grade ratings, with Moody's rating it Baa1 and Fitch rating it BBB+, both with stable outlooks.

ADB PROPOSES MAJOR RENEWABLE ENERGY PROJECT FOR UZBEKISTAN

The Asian Development Bank (ADB) has proposed a major new initiative to advance Uzbekistan's renewable energy sector. The Samarkand Solar Photovoltaic and Battery Energy Storage System (BESS) project will include a 500-megawatt (MW) solar photovoltaic plant, a 500-megawatt-hour (MWh) battery storage system, a transmission line, and other critical infrastructure.

Led by ACWA Power, this project marks one of the first utility-scale renewable energy ventures in Uzbekistan to incorporate a BESS component. It supports Uzbekistan's ambitious target to expand its renewable energy capacity to 12 gigawatts (GW). The project is expected to set new standards for bankability and attract further private investment into the country's energy sector.

In a related development, ADB and Masdar have secured a \$46.5 million loan agreement to fund the construction of the Nur Bukhara solar power plant, which will also feature a battery energy storage system. The financing package includes \$26.5 million from ADB's ordinary capital resources and \$20 million from the Leading Asia's Private Infrastructure Fund, managed by ADB.

The Nur Bukhara project will have a generation capacity of 250 MW and a storage capacity of 126 MWh. It will also involve building a 20-kilovolt substation and a 3.1-kilometer transmission line to connect the facility to the grid.

MONTENEGRO GETS FIRST LAW ON THE USE OF ENERGY FROM RENEWABLE SOURCES

Montenegro's Parliament has passed its first Law on the Use of Energy from Renewable Sources, introducing a new framework to promote investment in renewables. Energy Minister Saša Mujović emphasized that the law is vital for reducing carbon dioxide emissions and increasing renewable energy production. This legislation is also a key component of Montenegro's efforts to meet European Union membership criteria, particularly completing chapter 15 of its EU accession negotiations, which had a missed deadline of December 31, 2022.

The law aligns Montenegro with its obligations to the Energy Community by implementing the EU's Renewable Energy Directive (2018/2001). Mujović explained that the primary goals include improving environmental standards, lowering CO2 emissions, and boosting renewable energy output to meet EU requirements.

A key aspect of the law is the shift from the current incentive model, which requires the government to purchase renewable electricity. Currently, state-owned utility EPCG covers 85% of these costs, with the remainder funded by citizens. The new law replaces this with a market premium-based system, relieving citizens of these financial obligations as renewable energy will now be sold on the open market. Additionally, the law sets the stage for renewable energy auctions, with the first expected by 2025, supported by the European Bank for Reconstruction and Development (EBRD).



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PVH WINS SOLAR TRACKER SUPPLIER CONTRACT FOR GÖLCÜK 157 MW SOLAR PROJECT IN TURKEY



PV Hardware (PVH) has been selected as the supplier of solar tracking systems for the pioneering Kalyon PV solar project in Viranşehir, Turkey. This significant collaboration between GE Vernova and Kalyon PV will showcase PVH's latest

AxoneDuo Infinity tracker innovations, recognized as the fastest stowing trackers globally. PVH's dominance in the Turkish market is evident, with an impressive 95% market share, underscoring the superiority and reliability of its tracker solutions. This leading market position reflects PVH's dedication to efficiency, advanced technology, and dependable service, making its trackers the top choice in the region.

Ali Murat Soydan, Managing Director of Inojen, highlighted the critical role of local support, stating, "PVH benefits from strong backing through 'Inojen,' our local manufacturing partner, which provides a significant advantage over other suppliers. This partnership ensures best-in-class service during the construction and operation of the plant, offering local content, domestic manufacturing, and advantageous lead times."

The Viranşehir solar power station is poised to supply renewable electricity to Kalyon Enerji's 157 MW solar photovoltaic (PV) factory. PVH's cutting-edge solar trackers will play a key role in maximizing the efficiency and output of the solar power station, ensuring optimal energy production. Álvaro Casado Portuondo, Chief Revenue Officer of PVH Middle East, expressed his enthusiasm, stating, "PVH is excited to contribute to Kalyon PV's visionary project in Viranşehir. Our advanced AxoneDuo Infinity tracking systems are engineered to deliver the highest efficiency at lower costs, with pre-assembled delivery and reliable solar power installations. We are committed to supporting Turkey's ambitious renewable energy goals."

The collaboration is further strengthened by comprehensive financing from GE Vernova, including support from export credit agencies. This robust financing package ensures competitive options to facilitate and expand the adoption of renewable energy technologies. Megi Gabryiel, Regional Leader of Solar & Storage Solutions for the Middle East, Africa, and Turkey at GE Vernova, remarked, "GE Vernova offers comprehensive financing for this project, including support from export credit agencies."

NEGATIVE POWER PRICES HIT EUROPE AS RENEWABLE ENERGY FLOODS THE GRID

European power markets are undergoing a significant transformation as renewable energy sources, especially wind and solar, become increasingly dominant in the energy mix. On Wednesday, power prices in several European markets, including Germany, dropped below zero due to a surge in green electricity production.

In Germany, wind generation is expected to reach 22.7 gigawatts, marking the highest output in four months. This surge in renewable energy has overwhelmed the grid, resulting in negative prices during six separate hours on Tuesday, according to data from Epex Spot SE. Negative pricing occurs when electricity supply exceeds demand, a scenario becoming more common as Europe aggressively pursues renewable energy.

The rapid expansion of wind and solar capacity is reshaping Europe's energy landscape. On days when both sources produce at high levels, the market can become flooded with cheap power, driving prices so low that they turn negative. While this benefits consumers in the short term, it underscores the challenges of managing a grid increasingly dependent on intermittent renewable sources. Integrating battery storage systems will be crucial in the long term to manage these fluctuations. By storing excess energy generated during periods of high wind and solar output, batteries can release power when renewable generation is low, stabilizing prices and ensuring a consistent electricity supply.

SAUDI ARABIA TO RAISE CLEAN ENERGY FUNDING, CUT OIL CAPEX

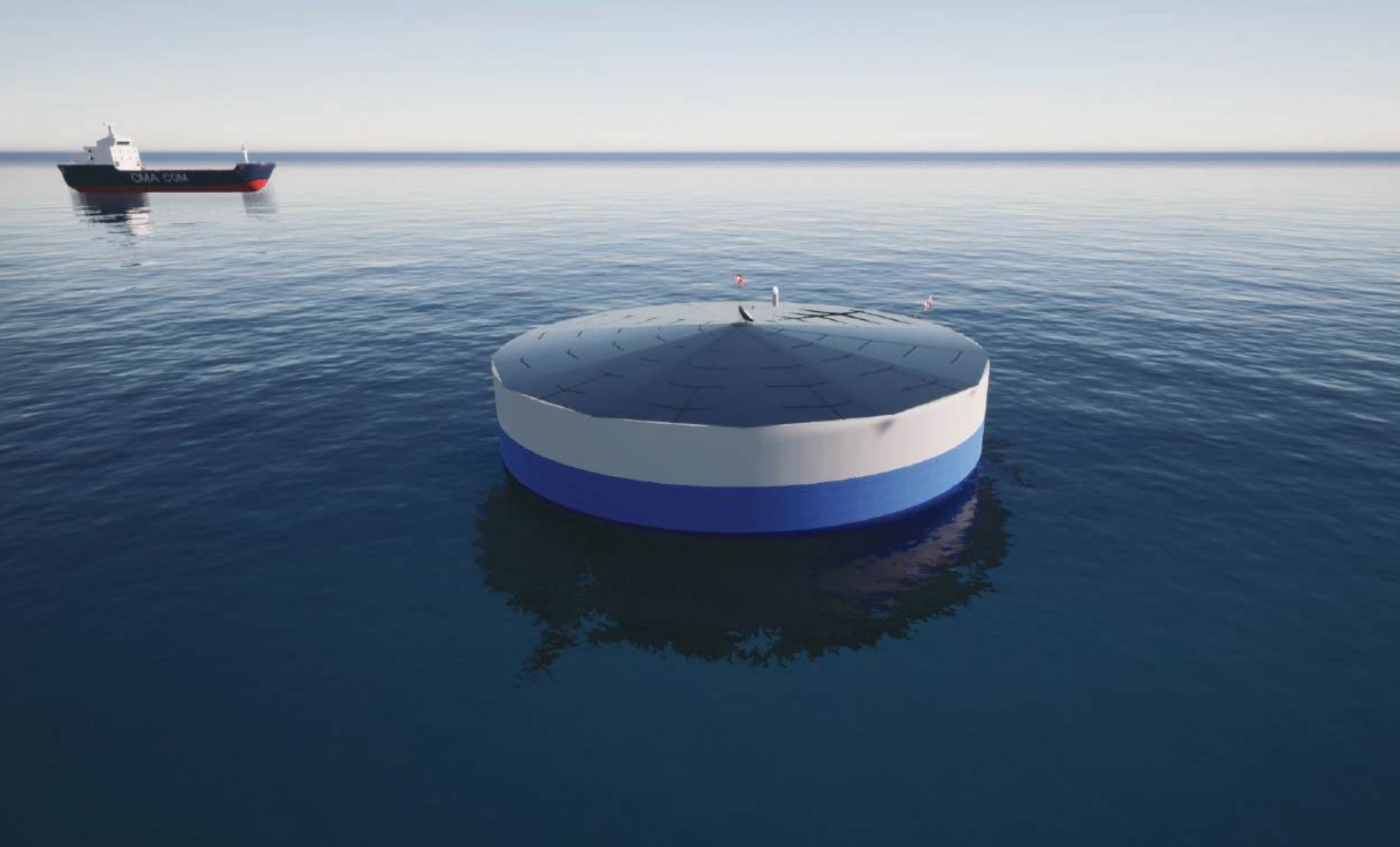
Saudi Arabia is increasing its investment in clean energy while reducing spending on the oil sector, according to a Goldman Sachs Research report. By 2030, the Kingdom plans to allocate USD 1 trillion across six key sectors, with non-oil investments projected to rise to 73%, up from an earlier estimate of 66%. Clean energy funding will grow to USD 235 billion, a significant jump from the previous estimate of USD 148 billion, driven by a doubling of Saudi Arabia's 2030 renewable energy targets.

The report highlights USD 190 billion for renewable energy projects and USD 36 billion for clean hydrogen initiatives. By mid-2024, 11 GW of solar photovoltaic capacity will be in development, with 16.7 GW of solar and wind projects in planning. Meanwhile, capital expenditures in the oil sector are expected to fall by USD 40 billion between 2024 and 2028, although natural gas will still account for 50% of the Kingdom's power mix by 2030.

Happen- ings.

Get ready to immerse yourself in a comprehensive exploration of the dynamic world of renewable energy and beyond. Here we will uncover the latest trends, breakthroughs, and impactful events shaping the global transition to sustainable practices, empowering you with the knowledge and inspiration to be at the forefront of the green revolution.





STORM-RESISTANT PROTOTYPE TO PAVE THE WAY

Did you know? The OTEC prototype being developed by PLOTEC uses the temperature difference between warm surface seawater and cold deep water to generate electricity, providing a 24/7 renewable energy source even in the aftermath of severe tropical storms.

The Ocean Thermal Energy Conversion (OTEC) prototype, designed to withstand severe tropical storms, has reached the 50% completion mark at the Hidramar Shipyard in Gran Canaria, Spain. This major milestone for the PLOTEC project, funded by the EU, marks significant progress since fabrication began in March 2024. The cylindrical hull and key

components will be assembled and tested in the Atlantic Ocean.

Recent progress includes finishing the platform's first level by cutting over 660 steel plates of various thicknesses. Each plate is carefully prepared, fitted onto the keel, and welded, with all welds thoroughly inspected for defects. Lead Engineer Sam Johnston noted that the keel's complexity and the need for multiple welds make this phase particularly time-consuming. This careful process prevents warping and ensures a strong structure. Once the keel plate is finished, the project will move faster as the cylindrical shells are added to the keel.

Advancing Renewable Energy for SIDS

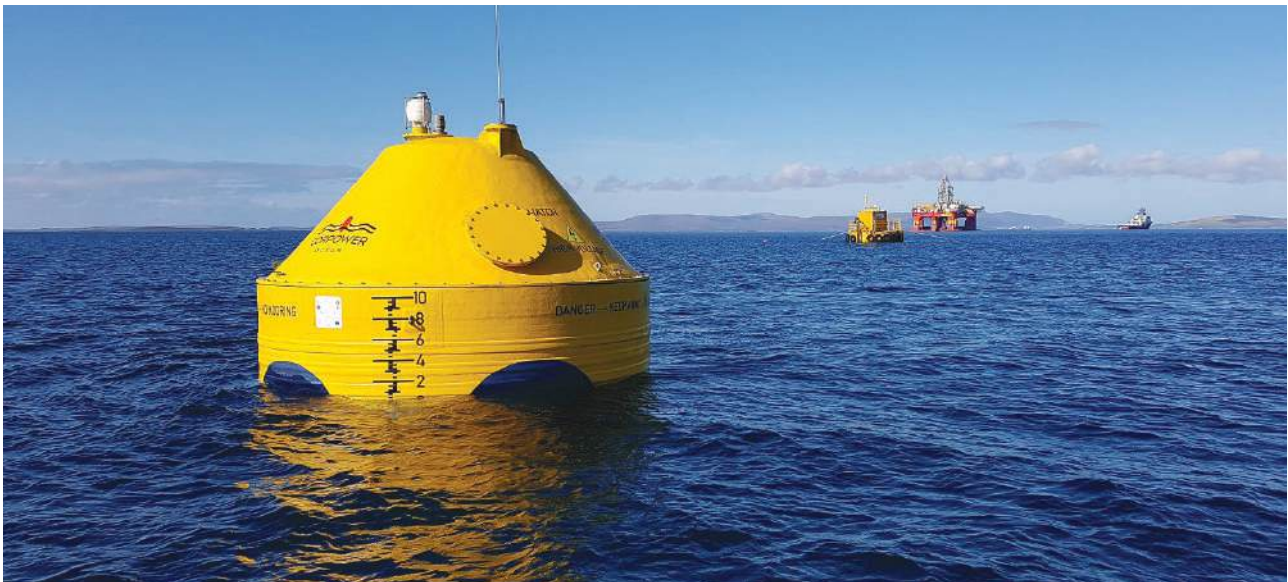
The primary goal of this project is to facilitate the renewable energy transition for Small Island Developing States (SIDS) that are especially vulnerable to severe weather. These regions, predominantly reliant on outdated diesel generators, lack viable clean energy alternatives. Given the ocean as their most abundant natural resource, OTEC technology presents a suitable solution for power generation. The PLOTEC project aims to enhance OTEC technology with an offshore platform designed to endure intense tropical storms, hurricanes, and cyclones.

The 1:5 scaled prototype will undergo testing at the Oceanic Platform of the Canary Islands (PLOCAN), situated approximately three kilometers off the coast. Throughout its operational life, the prototype will be exposed to Atlantic Ocean conditions, allowing for extensive analysis of its resistance, materials, and design. Previous computer simulations and a scaled tank test conducted in London last year have already confirmed the structure's functionality. The insights gained from this project will not only enhance OTEC's viability for tropical islands but also contribute to advancements in marine engineering design, novel materials, computational modeling, and other offshore floating energy devices.

Consortium and Technology Overview

The PLOTEC consortium consists of seven companies, including Global OTEC (UK), Cleantech Engineering Limited (UK), WavEC Offshore Renewables (Portugal), The Oceanic Platform of the Canary Islands PLOCAN (Spain), Quality Culture (Italy), Agru Kunststofftechnik Gesellschaft m.b.H. (Austria), and the University of Plymouth School of Engineering, Computing and Mathematics (UK).

OTEC technology leverages the temperature difference between warm surface seawater and cold deep water to generate electricity. The process involves using warm seawater to vaporize a working fluid, which then drives a turbine. Cold deep water is used to condense the working fluid, allowing the cycle to repeat continuously. This renewable energy technology harnesses the tropical ocean's power, providing a consistent, cost-effective, and clean energy supply with significant environmental benefits over fossil fuels and nuclear power. By integrating PLOTEC's developments with global OTEC power demonstration facilities, this technology can become an even more reliable solution for tropical islands, capable of generating electricity 24/7 and reducing power outages in the aftermath of tropical storms.



ADB: UP TO 70% OF POPULATION IN PAKISTAN FAILS TO PAY ELECTRICITY BILLS



The Asian Development Bank (ADB) has revealed that up to 70% of the serviced population in Pakistan failed to pay their electricity bills. This issue stems from a combination of factors, including the inability of some citizens to afford the payments, as well as inefficiencies and widespread irregularities in the billing and collection processes.

In its report titled “Pakistan National Urban Assessment,” the ADB highlighted that the country’s inadequate tariff regime poses a complex challenge that threatens the financial sustainability of Distribution Companies (Discos). The problem is particularly acute in rural areas, where 50% to 70% of the serviced population has not paid their electricity bills, due to a mix of affordability issues and operational inefficiencies.

The report also pointed to the role of Pakistan’s courts in exacerbating the problem, noting that stay orders have delayed legal proceedings for up to a year. This has allowed offenders involved in meter tampering and similar violations to avoid significant penalties, often getting away with just a fixed fine, which perpetuates the issue.

The ADB report singled out K-Electric as the only financially sustainable electricity provider in Pakistan, attributing its success to privatization. Before privatization, K-Electric had suffered significant losses, but it has since turned around and now operates solely on its revenue collections.

Despite facing significant resistance, K-Electric has successfully implemented metering across its vast 6,500 km service area, which extends beyond Karachi to five districts in Sindh and Balochistan. This effort has reduced electricity theft and the associated income losses for the company.

Additionally, K-Electric has managed to control losses from illegal connections in certain areas through the strategic implementation of load-shedding. The ADB presented K-Electric’s success as a model for other Discos in Pakistan. However, political issues and strong opposition from trade unions have hindered the privatization of other Discos. In response, the government is considering segmenting utility operations and infrastructure, such as separating urban and rural areas, to reduce costs and better manage losses.

PAKISTAN LAUNCHES ITS FIRST LOW-CARBON ESaaS PROJECT

Pakistan marked the launch of its first low-carbon Energy Storage as a Service (ESaaS) project on Sunday, a groundbreaking initiative expected to reduce the telecom sector’s carbon footprint by 58.3 kT—comparable to planting nearly 2 million trees. This project showcases how business innovation can align with environmental sustainability.

Organized by the Brillanz Group in collaboration with Telenor Pakistan, Bank of Punjab, and Saudi-Pak Investment Company, with support from the Ministry of Climate Change, the event highlighted the nation’s dedication to environmental responsibility and technological advancement in the telecom sector. Fahd Haroon, Special Assistant to the Prime Minister on Digital Media, praised the ESaaS project as a significant step forward in both environmental sustainability and financial innovation. He emphasized the crucial role of digital platforms in amplifying this success, attracting foreign investment, and positioning Pakistan as a leader in resilient business practices. Romina Khurshid Alam, Coordinator to the Prime Minister and Minister-in-Charge of Climate Change and Environmental Coordination, lauded the project as a model of how technology and innovation can drive meaningful climate action, aligning with Pakistan’s broader climate objectives and enhancing the country’s environmental

capabilities. Bilal Qureshi, Co-founder and CEO of Brillanz Group, highlighted the project’s transformative impact, stating, “This initiative sets a new benchmark for sustainable innovation in the telecom sector. It’s more than an investment; it’s a commitment to reducing over 21 million litres of diesel consumption in Phase I, resulting in significant cost savings of over Rs5 billion and substantial environmental benefits.”

Telenor Pakistan CEO Khurram Ashfaq emphasized the project’s role in pioneering sustainable network transformation, while CTO Awais Vohra discussed the technical advancements, including reduced reliance on diesel generators and improved network uptime.

Saad Liaquat and Sohaib Tariq from Thunder Energy introduced the GenAI features of the Thunder Intelligence Platform, which aims to revolutionize energy management through AI and analytics, boosting efficiency and reducing environmental impact. Sultan Abdulrauf, Chairman of Saudi-Pak Investment Company, and Farid Khan, Group Chief Corporate and Investment Banking at Bank of Punjab, provided insights into the financial structuring of the project by Brillanz Group and stressed the critical role of the finance sector in driving sustainable initiatives.



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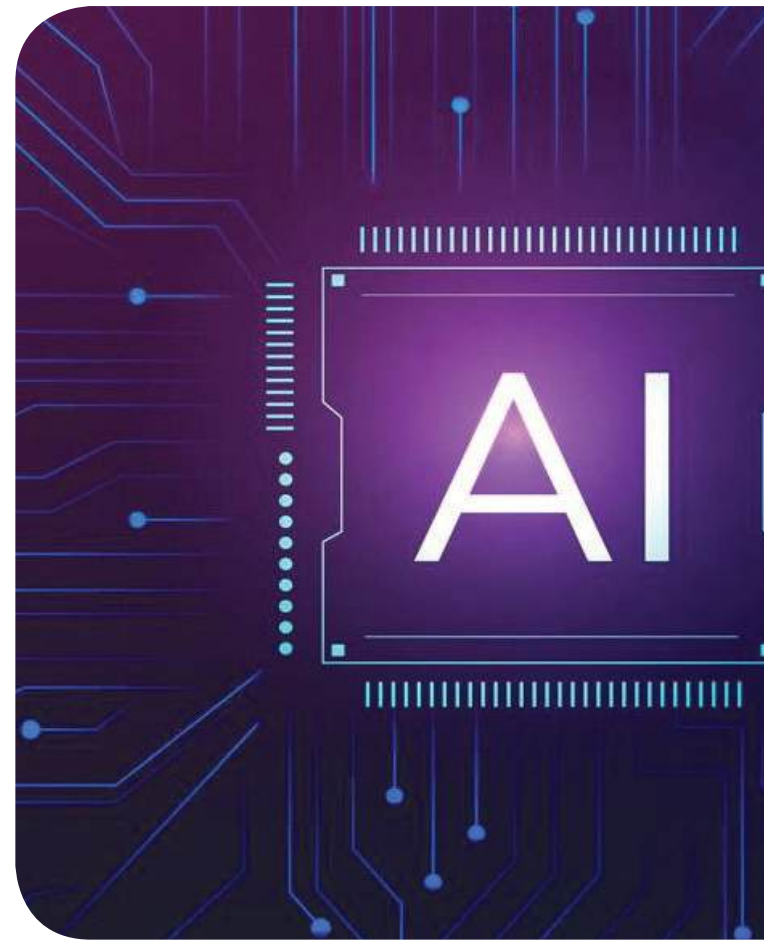
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How AI is revolutionizing solar farms

With artificial intelligence (AI) dominating the headlines over the past two years, a new concern is emerging: the strain these technologies place on our energy systems and grids. Data centers used to train and operate AI models require vast amounts of energy. The International Energy Agency (IEA) predicts that this demand will double by 2026, requiring approximately the same amount of electricity as the entire country of Japan.

Despite many tech companies' goals to reduce greenhouse gas emissions and achieve carbon neutrality, some have seen their emissions increase due to the growing AI demand in data centers. However, AI itself might offer a solution. Advancements in renewable energy, when paired with AI, could sustainably meet the increased energy demand. A promising approach is integrating AI into the expanding solar energy market,



which provides clean and affordable energy to grid systems. According to the IEA, power sector investment in solar photovoltaic (PV) technology is expected to surpass \$500 billion in 2024, exceeding all other generation sources combined. Moreover, Indigo Advisory has identified over 50 potential AI applications in energy, with more than 100 vendors already incorporating AI into their products, driving a \$13 billion investment in the sector.

Utilizing AI in solar energy applications presents a unique opportunity to overcome certain challenges facing solar energy. For instance, solar panels' dependence on sunlight makes them less reliable than nuclear or gas energy sources. Additionally, extreme weather events, such as heatwaves or sandstorms, which are becoming more frequent, can disrupt solar energy supply, while grid constraints limit the potential of



solar projects.

AI Deployment in Solar Farms

The challenges facing the solar industry are significant, but AI offers meaningful solutions to address them. Here are a few examples of how AI can help.

Weather and Solar Generation Forecasting
AI is revolutionizing weather and solar generation forecasting. AI algorithms analyze meteorological data to produce accurate forecasts, which maximize solar output and improve grid management. This capability allows solar operators to better plan and reduce the impact of intermittent energy supply. Additionally, cloud-imaging technology and sky cameras capture real-time data on cloud movement and atmospheric conditions, further enhancing the accuracy of solar power predictions.

Predictive Maintenance

Beyond forecasting, AI is transforming the predictive maintenance of solar panels. Advanced machine learning models continuously monitor and analyze data from solar installations, minimizing downtime and maintenance costs while extending the lifespan of solar equipment. These AI systems monitor variables such as temperature, irradiance, orientation, tilt angle, humidity, rainfall, dirt accumulation, power output, inverter efficiency, and operational loads to quickly identify anomalies. Predictive maintenance can boost productivity by 25%, decrease breakdowns by 70%, and reduce maintenance costs by 25%.

Data-driven analytics tools like Univers Solar Advanced Analytics provide data-driven recommendations for corrective actions in PV projects. After analyzing all corrective actions

throughout 2023 for a fleet of over 300 sites, 28,000 devices, and more than 11GW, Unifers identified distinct seasonal patterns in categories of corrective actions, including inverters, trackers, DC health, sensors, grid, and data availability.

AI also improves the speed and efficiency of reporting and data querying through advanced chat interfaces. Energy management platforms are integrating human-in-the-loop intelligence and natural language processing (NLP) into their systems. Sophisticated chatbots with NLP capabilities simplify technical complexities, making data more accessible and speeding up the process of obtaining critical information. Solar operators and consumers can quickly access information on energy output, system health and maintenance schedules, streamlining operations and ensuring proactive management of solar assets.

AI-Enabled Trading

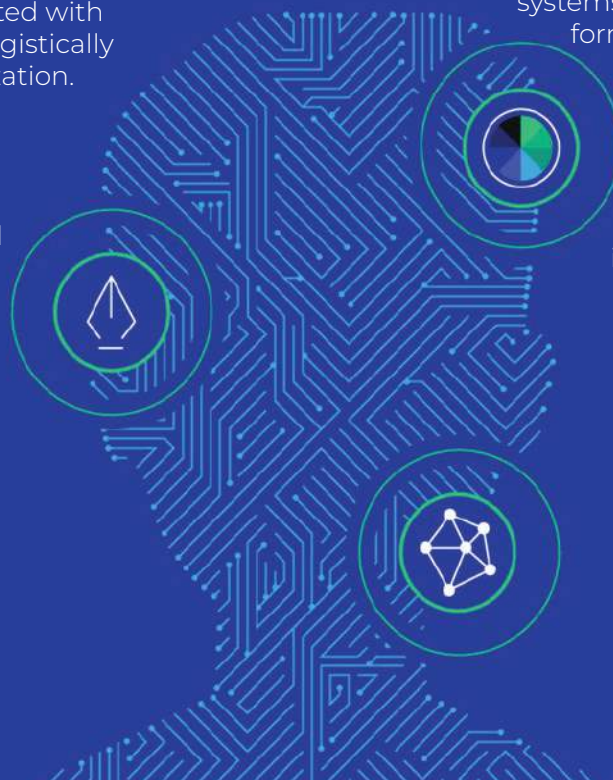
The integration of AI with battery storage systems transforms the timing of energy storage and release, allowing providers to respond to real-time market conditions and fluctuating energy demands. As the oversupply of renewable energy during certain times of the year is expected to increase, these battery storage systems can be co-located with solar installations, synergistically enhancing energy utilization. This dynamic trading capability improves the use of stored energy, maximizes profitability, and ensures a balanced supply and demand in the energy market.

Overcoming Risks and Challenges

AI holds significant potential to impact the renewable energy sector, but its broader implementation is not without challenges. One major risk associated with AI is the increased vulnerability of critical energy infrastructure to cyberattacks. A notable example is the 2015 power grid hack, believed to have been carried out by a foreign actor, which left 230,000 Ukrainians without power for six hours. This incident is particularly concerning, given the rising geopolitical tensions worldwide.

Another significant challenge is that energy data often comes from diverse sources and in varying formats. Inaccurate or incomplete data leads to erroneous insights and decisions, undermining the effectiveness of AI applications. AI compatibility with Internet of Things (IoT) data is essential for addressing challenges in solar energy. IoT devices collect real-time data on production, consumption, and environmental conditions. Integrating this data with AI enhances energy management analytics, providing accurate insights and reliable decision-making for energy providers.

Furthermore, traditional language models like LLMs are primarily trained on textual data, but sensor data from energy systems often comes in different formats (e.g., numerical, time-series), requiring the development of new models or adaptation of existing ones, such as Archetype AI, to ensure compatibility and accuracy in energy applications.



MORE JOBS AS HEXING ELECTRICAL INVESTS IN PAKISTAN



A prominent Chinese company has shown interest in investing in Pakistan's renewable energy sector by establishing an industry, according to an official statement released on Saturday. This move prompted a senior minister to note that it would create more employment opportunities and boost the country's exports.

Hexing Electrical, a well-known mid-sized Chinese company founded in 1992, is recognized for its global presence in the smart metering and energy management industry. The company has also ventured into the renewable energy sector, manufacturing technical equipment.

Liangzhang Zhou, the chairman of Hexing Electrical, met with Pakistan's Minister for Investment and Privatization, Abdul Aleem Khan, in Islamabad, along with his company's delegation. They discussed the possibility of setting up the first manufacturing unit in Pakistan dedicated to producing inverters and batteries. This development follows nearly two months after Prime Minister Shehbaz Sharif's five-day visit to China, during which he met with Chinese business leaders across various economic sectors, encouraging them to invest in Pakistan.

"The establishment of new factories will not only increase employment and exports but also rejuvenate the national economy," Khan was quoted as saying in a statement issued by the ministry after the meeting.

Khan emphasized the investment potential in Pakistan and assured the Chinese delegation of full cooperation. He also noted that setting up factories in the electrical sector with foreign investment would play a key role in the country's economic growth. The chairman of Hexing Electrical mentioned that his company operates in 90 countries with a workforce of 7,000, although it has established similar factories in only 20 countries worldwide.

The governments of Islamabad and Beijing are already collaborating on infrastructure development and regional connectivity projects under the multibillion-dollar China-Pakistan Economic Corridor (CPEC). Both countries hope that the private sector will take the lead in the next phase of CPEC, leveraging the planned industrial zones in Pakistan through business-to-business partnerships and investments.



SMALL DAMS IN SINDH

A Sustainable Solution for Climate Resilience and Water Security

By Taha Khokhar - Environment Officer

As climate change continues to disrupt weather patterns worldwide, regions like Sindh, Pakistan, face increasingly severe droughts and water scarcity. The Sindh province, particularly the arid zones of Nagarparkar and the Kohistan region, is highly vulnerable to these climate-induced challenges. However, infrastructure interventions, such as the construction of small dams, offer a beacon of hope. These dams not only address immediate water needs but also contribute to long-term sustainability and climate resilience, enhancing the socio-economic well-being of local communities.

Across Sindh, a series of 70 small dams have been constructed, focusing primarily on the regions of Kohistan and Nagarparkar. These

areas have historically suffered from acute water shortages, leaving communities highly dependent on unpredictable rainfall. The small dams are designed to harvest rainwater, recharge groundwater aquifers, and provide a sustainable water source for agriculture, livestock, and domestic use.

In the face of diminishing water resources, the construction of these dams is a critical step towards sustainable water management in Sindh. These dams capture and store rainwater, ensuring that water is available during dry spells and helping to mitigate the impact of droughts. By focusing on rainwater harvesting, these initiatives are addressing both immediate water needs and long-term sustainability, making these regions more resilient to the effects of climate change.

The project capitalizes on the natural topography of Sindh, which offers significant potential for rainwater harvesting. The dams, strategically located in areas prone to seasonal hill torrents and flash floods, channel water into storage facilities where it can be used throughout the year. This sustainable approach preserves water resources and supports the livelihoods of communities that rely on rainfed agriculture and livestock.

The construction of these 70 small dams has had a transformative effect on the socio-economic conditions of various villages in Sindh. Before the dams, these communities faced extreme water scarcity, which severely impacted their agriculture, livestock, and overall quality of life. The introduction of these dams has reversed this trend, enabling significant improvements in agricultural productivity and household incomes.

Agriculture, the backbone of these rural communities, has seen a revival with the availability of reliable water sources. The increase in groundwater levels has allowed farmers to expand their cultivated areas and diversify their crops. Traditionally dependent on hardy, low-yield crops like millet and sorghum, farmers can now grow higher-value crops such as onions, chilies, and tomatoes. This shift has led to a reported increase in agricultural income by 10-30% across different regions.

Livestock, another critical component of rural livelihoods, has also benefited from the improved water availability. Healthier livestock due to better water quality has resulted in increased milk production and higher market values, contributing to improved food security



and economic resilience. These small dams are not just a short-term solution; they are a strategic response to the long-term challenges posed by climate change. By recharging groundwater, these dams provide a buffer against erratic rainfall and prolonged droughts, conditions expected to worsen with ongoing climate change. The enhanced water security they provide is crucial for the resilience of local communities, ensuring that they can withstand and adapt to changing climatic conditions. Moreover, the dams help reduce



migration caused by water scarcity. There is a significant decrease in out-migration and an increase in in-migration to areas where the dams have been constructed. This stability is essential for maintaining community cohesion and fostering long-term socio-economic development.

The 70 small dams represent a sustainable and effective response to the water scarcity challenges exacerbated by climate change. By providing reliable water sources, enhancing agricultural productivity, and supporting livestock, these dams are fostering socio-economic development in some of the most vulnerable regions of Pakistan. As climate change continues to pose significant threats, the success of these dams highlights the importance of integrating sustainable water management practices into broader climate adaptation strategies. Ensuring the long-term functionality of these dams through proper maintenance and strategic planning will be crucial in sustaining the resilience and prosperity of Sindh's communities in the face of an uncertain climate future.



Why is Sustainability So Important?

Sustainability is more crucial today than ever before due to the escalating environmental, economic, and social challenges the world is facing. As climate change accelerates, resource depletion intensifies, and ecosystems collapse, it has become apparent that the way we live, consume, and produce must change to ensure a livable future for current and future generations. Sustainability offers a framework to address these interconnected crises, enabling humanity to meet its needs without compromising the ability of future generations to meet theirs.

First and foremost, the impact of climate change is undeniable. Rising global temperatures, extreme weather events, and sea level rise threaten not only ecosystems but also human health, infrastructure, and livelihoods. Sustainability initiatives focused on reducing greenhouse gas emissions, shifting to renewable energy sources, and promoting energy efficiency are critical in mitigating the worst impacts of climate change. These initiatives also drive innovation, providing new opportunities for clean energy technologies and green jobs, making sustainability not just an environmental concern but an economic imperative. In addition to the environmental benefits, sustainability promotes the efficient use of resources. Our current linear economic model—where products are made, used, and then discarded—wastes valuable

materials and contributes to pollution and landfill overflow. Sustainability emphasizes a circular economy, where products and materials are reused, repaired, and recycled, reducing waste and extending the lifecycle of resources. This shift conserves raw materials, reduces the strain on natural ecosystems, and diminishes pollution, all of which are essential for preserving biodiversity and maintaining ecosystem services that humans rely on.

Sustainability also addresses social issues such as inequality, access to clean water, food security, and health. The global population is expected to reach nearly 10 billion by 2050, straining resources like water, food, and energy. Sustainable practices in agriculture, urban planning, and industry can help balance these pressures, ensuring that basic needs are met in a way that promotes equity and social justice. Moreover, integrating sustainability into business practices has shown to enhance long-term profitability, customer loyalty, and brand reputation.

In conclusion, sustainability is no longer just a trend; it is a necessity. The interconnected nature of environmental degradation, resource depletion, and social inequity demands urgent and holistic action. By embracing sustainable practices now, we can ensure a healthier planet, a more resilient economy, and a fairer society for all.

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GERMAN GOVERNMENT ALLOCATES REDUCED BUDGET FOR CLIMATE ACTION IN 2025

The German coalition government is planning to reduce expenditures on key climate action measures next year, according to its draft plan for the Climate and Transformation Fund (CTF). The CTF serves as the country's special federal budget vehicle for programs such as household heating transition support and subsidies for green industries.

Of the total 34.5 billion euros allocated for 2025, 15.9 billion euros are designated to support the switch to climate-friendly heating, which is approximately 2 billion euros less than the current budget for 2024. The draft also shows reduced funding for compensation to electricity-intensive businesses, the expansion of the hydrogen economy, and natural climate action measures in the coming year.

This draft budget is now set to be debated in parliament, where it will be amended before receiving final approval later this year. The government's agreement follows months of difficult budget negotiations, which were complicated by a ruling from the constitutional court in November 2023. The court found the use of 60 billion euros in the Climate and Transformation Fund to be unlawful, as it violated debt limit rules. This ruling sparked disputes among the government coalition partners—the Social Democrats (SPD), the Green Party, and the Free Democrats (FDP)—over how to reorganize and reduce funding across various sectors.

The CTF is one of several special-purpose funds outside the regular state budget, which also includes funds for areas like defense spending. The CTF's resources are

intended to “promote measures that serve to achieve the climate targets” under the country’s climate legislation, particularly those advancing Germany’s transformation to a climate-neutral economy.

“RECKLESS AT BEST”

Experts have criticized the government for placing the 2025 plans on an unstable foundation: The CTF is funded by revenues from emissions trading, with the government projecting 22.2 billion euros from the national and EU systems next year, leaving a funding gap of around 12 billion euros.

Typically, by the end of a budget year, not all allocated funds are spent, often due to lower-than-expected participation in support programs or delays in climate measures. The draft suggests this could result in up to

9 billion euros in unspent funds next year, while revenues from emissions trading could exceed projections, potentially closing the gap.

However, one-third of the planned expenditures for 2025 (12 billion euros of the total 34.5 billion euros) is based on “optimistic assumptions without secure financing,” said Niklas Illenseer, a policy analyst at the Mercator Research Institute on Global Commons and Climate Change (MCC). He called this approach “reckless at best, yet by no means stable financial policy.”

On the 16 of August the government announced another deal on next year’s federal budget, following an initial agreement on 18 July. Advisors had expressed concerns about the initial plans, warning that they might violate constitutional checks on government spending.



NEW APPROACHES GOOGLE IS TAKING TO ADVANCE CLEAN ENERGY COMMITMENTS IN THE U.S.



As we pursue our ambitious goal of operating on 24/7 carbon-free energy (CFE) and meeting the growing demand for Google products and services, being a responsible grid participant remains a top priority. Today, we're excited to announce collaborations with Energix Renewables and Swift Current Energy to support the decarbonization of the electricity that powers our operations in Ohio and Virginia.

Bringing new CFE resources online in this

region has been challenging due to the supply of new transmission and clean energy resources lagging behind the region's rapid economic growth. A surge in clean energy projects and necessary transmission upgrades has created a backlog, delaying the generation of new CFE sources.

To address these challenges and ensure the delivery of 24/7 CFE to the grids where our data centers operate, we've partnered with Energix Renewables on an investment

framework. This allows us to invest in and purchase power from a 1.5 gigawatt (GW) portfolio of new solar projects across the Pennsylvania-New Jersey-Maryland (PJM) grid over the next three years. By providing both capital and energy offtake, we're accelerating the construction timeline, moving the start of 150 MW of projects from 2025 to 2024.

In partnership with Swift Current Energy, we're also advancing a 299 megawatt (MW) clean energy project within PJM, known as Black Diamond. This solar project was designed to minimize network upgrades, enabling faster CFE delivery compared to similar projects. Additionally, we're investing with Swift Current Energy in the 593 MW Double Black Diamond solar project, which will be the largest in the Midwest Independent System Operator (MISO) grid system.

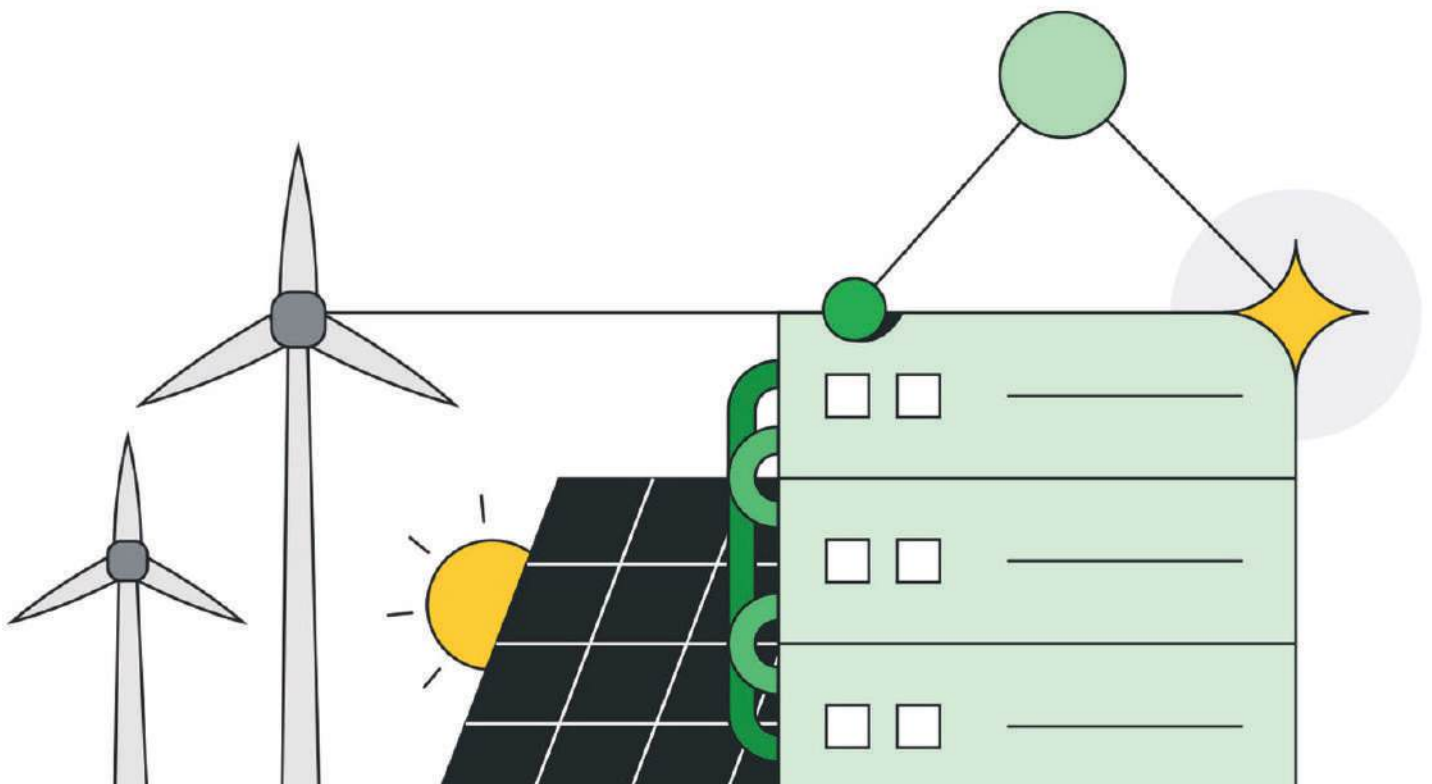
These efforts build on our existing partnership with EDPR NA Distributed Generation (EDPR NA DG), which we announced last year. Together, we're developing a 500 MW community-based solar energy portfolio, primarily in Ohio, to add new generation capacity to the grid. This collaboration also supports pre-weatherization initiatives, helping low- and

moderate-income households access energy efficiency programs and lower energy costs.

LOOKING AHEAD

Decarbonizing electricity is a complex, system-wide challenge that requires diverse solutions. We remain committed to working across the industry to develop innovative ways to bring new, clean energy to the grids where we operate — powering the digital products and services relied upon by businesses and individuals alike.

For more details on Google data centers, visit google.com/datacenters. For information about our sustainability efforts, visit sustainability.google.





PAKISTAN EMERGES AS ASIA'S LARGEST MARKET FOR CHINESE SOLAR MODULES: REPORT

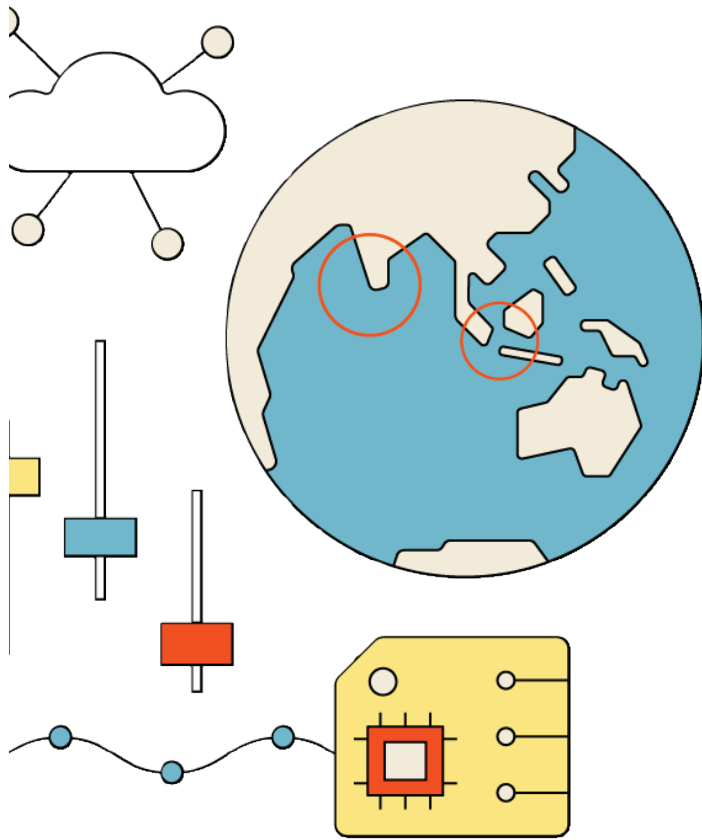
Pakistan emerged as Asia's largest single market for Chinese solar modules, accounting for 10,450 MW in the first half of 2024, according to Reuters.

China employed aggressive pricing strategies to export a record 120,427 megawatts (MW) of solar module capacity in the first half of 2024, maintaining its position as the leading solar supplier despite ongoing trade disputes in key markets. The first-half total increased by 6.3% year-on-year, approximately 7,150 MW above the previous record set in the first half of 2023. Since the beginning of 2020, China has exported nearly 720,000 MW of solar module capacity, as reported by the think

tank Ember.

A key factor in the strong export flow was a significant reduction in module prices, which averaged 13.7 cents per megawatt in the first half of 2024, compared to an average of 18 cents/MW throughout 2023. China's module prices have halved from their 2022 average and are currently the cheapest available globally for each megawatt of solar generation capacity. Europe was the primary destination for China's solar modules, accounting for 43% of the total, or 52,158 MW.

This total was down 20% from the same period in 2023 due to high interest rates,



economic growth concerns, and trade tensions with China, which dampened solar installation demand across the continent. Despite this decline, Europe's purchase total was the second-highest for a half-year period, following the first half of 2023. The Netherlands remained the top country market for China's modules, importing 23,421 MW of capacity in the first half of the year.

Although this total was 25% less than in the first half of 2023, the Netherlands' purchases were still more than double those of any other country in the first half of the year. Spain, Germany, and Italy were also significant buyers in Europe, although all recorded sharp year-on-year decreases in purchase volumes, according to Ember data. Brazil was China's second-largest market during the first half of the year, acquiring 10,511 MW of capacity.

This figure was up 10% from the same period in 2023 and contrasted with a slight decrease in imports by Latin America as a whole during the first half of the year. Asia was the second-largest regional destination for China's solar parts, with a record 32,109 MW of capacity, accounting for approximately 27% of the total.

This total was 86% more than during the first half of 2023, driven primarily by strong growth in South Asia. Pakistan was Asia's largest single market, accounting for 10,450 MW, while India acquired 8,324 MW. Both markets saw solar imports more than triple from the same period in 2023, marking them as key growth markets for China in the future.

The Middle East was another significant destination for China, with exports to the region exceeding 13,000 MW in the first half of the year, accounting for a record 11% share of China's total solar panel and parts exports. This compares to 6,228 MW during the first half of 2023 and was largely driven by strong purchases from Saudi Arabia (7,649 MW), the United Arab Emirates (1,892 MW), and Oman (1,396 MW).

Elsewhere, North America remained a small market for Chinese panels and parts due to ongoing trade tensions between China and the United States. Meanwhile, Africa's purchases decreased by about 9% from the first half of 2023, making up only 4.3% of China's total sales.

Overall, despite slower sales in Europe, the strong growth in exports to the Middle East and South Asia bodes well for China's export-driven solar sector, as these markets are poised for continued growth in the coming decades. China's significant cost reductions are also expected to challenge the production potential of solar modules in other regions, ensuring Beijing's continued dominance in the sector.



16TH INTERNATIONAL SOLAR PAKISTAN EXHIBITION OPENED IN MULTAN

Multan, July 26, 2024: The 16th edition of SOLAR PAKISTAN, the nation's premier solar energy exhibition, opened its doors on Friday at The Arena DHA, Multan. Organized by Fakt Exhibitions, Pakistan's leading exhibition organizer, the event is the country's largest and only dedicated solar energy showcase. Running from July 26 to 28, 2024, this year's exhibition is designed to play a pivotal role in transforming Pakistan's solar energy landscape and advancing the use of renewable energy sources.

The inauguration ceremony of SOLAR PAKISTAN was graced by Mr. Fuad Hashim Rabbani, Additional Chief Secretary of South Punjab, who served as the Chief Guest. He was accompanied by a distinguished panel, including Brig. Ahmad Rizwan Ghumman, Project Director of DHA Multan; Mian Rashid Iqbal, President of the Multan Chamber of Commerce & Industry; Mr. Muhammad Usman, Senior Vice President of the Vehari Chamber of Commerce & Industry; and Mr. Saleem Khan Tanoli, CEO of Fakt Exhibitions.

In his keynote address, Mr. Fuad Hashim Rabbani underscored the critical importance of initiatives like SOLAR PAKISTAN in paving the way for a greener, more sustainable future for the nation. He highlighted how events such as this one bring together industry leaders, government officials, and innovators to collaborate on addressing the pressing challenges of climate change. Mr. Rabbani emphasized that Pakistan must adopt practical and forward-thinking solutions to mitigate the adverse effects

of climate change, and solar energy offers a viable path to achieving that goal. He added that such platforms not only promote innovation but also provide an opportunity for key stakeholders to unite in finding practical solutions that would benefit the environment, economy, and society as a whole.

Mr. Saleem Khan Tanoli, CEO of Fakt Exhibitions, echoed these sentiments, praising the exhibition for its significant contribution to the growth of the solar energy sector in Pakistan. He pointed out that SOLAR PAKISTAN has been instrumental in introducing cutting-edge solar technologies and solutions to the country. The exhibition serves as a beacon of hope for Pakistan's energy future, providing a unique opportunity to accelerate the adoption of renewable energy and reduce the nation's reliance on non-renewable energy sources.

The primary objective of the three-day exhibition was to serve as a dynamic platform for networking, collaboration, and knowledge sharing. The event brought together more than 50 national and international companies, showcasing a diverse array of solar energy technologies. From efficient photovoltaic systems to energy storage solutions, the event demonstrated the potential for solar technology to revolutionize Pakistan's energy landscape.



IEA TO CONVENE MAJOR INTERNATIONAL ENERGY SECURITY SUMMIT IN LONDON, HOSTED BY UK GOVERNMENT

Leaders and decision-makers from across the globe will gather in the second quarter of 2025 to evaluate the evolving challenges of energy security and explore new strategies to address them. The International Energy Agency (IEA) will host an International Summit on the Future of Energy Security during this period, with the UK government hosting the event in London. The summit will focus on assessing current and future risks to the global energy system and identifying key solutions and opportunities to address these issues.

For 50 years, the IEA has been central to global energy security, playing a pivotal role in preventing, mitigating, and managing energy supply disruptions and crises. In recent years, the IEA has been active during the global energy crisis, including two releases of emergency oil reserves and the introduction of a 10-point plan to reduce Europe's dependence on Russian natural gas following Russia's invasion of Ukraine.

As global circumstances evolve, so do the challenges around energy security. While concerns over oil and natural gas supply remain, new risks are emerging that could jeopardize energy transitions and undermine the resilience of energy systems unless addressed swiftly. This calls for innovative and enhanced energy security measures that are designed for the challenges of today and the future, ensuring a continuous supply of affordable energy.

The summit will analyze the geopolitical, technological, and economic factors shaping energy security at both national and international levels. It will offer global decision-makers the chance to review trends reshaping energy security, such as shifts in energy demand, supply, and trade; the adoption of clean and efficient energy technologies; the availability of critical minerals and metals required for renewable technologies like wind turbines, solar panels, electric vehicles, and battery storage; and the allocation of investments during the transition from fossil fuels.



“The global energy crisis served as a stark reminder of the importance of energy security and its impact on economies worldwide,” stated IEA Executive Director Fatih Birol. “Since its inception 50 years ago, the IEA has been at the forefront of safeguarding energy security and anticipating emerging threats. As energy security continues to evolve in the face of new challenges, the IEA will remain committed to ensuring uninterrupted access to affordable energy while upholding global climate goals. I’m thankful to the UK government—under Prime Minister Keir Starmer and Secretary of State Ed Miliband—for hosting this summit, which will bring together global leaders and decision-makers to ensure we are taking the necessary steps today for stronger energy security in the future.”

UK Energy Secretary Ed Miliband added: “In an increasingly unstable world, the best way to ensure energy security and protect against volatile price spikes is to accelerate the shift from fossil fuels to clean, locally produced energy. Global energy security has become more critical than ever since Russia’s invasion of Ukraine. I am determined for the UK to take a global leadership role on clean energy, and I look forward to collaborating closely with the IEA as we host this vital Future of Energy Security summit next year. Together, we can drive international action for affordable, clean, and secure energy as we advance the global energy transition.”



INTERSOLAR SOUTH AMERICA HIGHLIGHTS BRAZIL'S SOLAR GROWTH AND TECHNOLOGICAL INNOVATION



The 2024 Intersolar South America, held in late August in São Paulo, highlighted the resilience and expansion of Brazil's photovoltaic (PV) market amid global challenges such as overcapacity, price pressures, and industry consolidation. This year's event saw a significant increase in scale, introducing two new pavilions focused on energy storage and electromobility.

"We had over 650 exhibitors, around 55,000 visitors, and about 2,500 conference attendees," said Florian Wessendorf, managing director of Solar Promotion International GmbH, the event's organizer, in an interview with **pv magazine**. "Last year, we had approximately 550 exhibitors, and this year we aimed to exceed 600."

Wessendorf also noted a rise in international participation among exhibitors, with 55% coming from abroad and 45% from Brazilian companies, marking a shift from the previous year when Brazilian companies dominated. He added that due to ongoing industry consolidation, this trend might reverse in the future.

The event's scale and success reflect Brazil's strong solar growth trajectory. In 2023, the country deployed around 10 GW of solar capacity, with expectations to add another 10 GW to 12 GW in 2024. The Brazilian Solar Association (ABSolar) initially forecasted 9 GW of new capacity for 2024 but has since raised its estimate to 11 GW. Despite this promising long-term outlook, the sector faces short-term challenges.

Since blackouts in August 2023, Brazil has experienced more frequent outages in centralized generation, with some generators losing up to 80% of their expected output. These outages typically occur during weekends when energy demand is lower. ABSolar estimates that grid operator-enforced outages have cost around BRL 300 million (\$53.3 million), while French company Voltalia predicts a €40 million (\$44.2 million) impact on its 2024 earnings before interest, taxes, depreciation, and amortization (EBITDA) due to renewable energy curtailments. Compensation for energy losses from transmission system constraints remains unresolved, with only a few cases likely to be reimbursed.

Ronaldo Koloszuk, a board director at ABSolar, stated that once these issues are addressed, energy consumption will rise due to the ongoing electrification of energy and economic decarbonization. However, distributed generation faces grid saturation problems, leading to denied connection requests when power flows reverse.

“Only four out of every 100 consumer units in Brazil are powered by solar energy. In Australia, that number is 30, so there is still considerable room for growth,” said Koloszuk.

Industry groups have criticized existing regulations as inadequate and are now supporting legislative changes. Bill 624/2023, an amendment to Law 14,300, would require energy distributors to present technical studies justifying any limitations on electricity injection from microgeneration systems (up to 75 kW). A coalition, including the National Confederation of Agribusiness and the Brazilian Micro and Small Business Support Service (SEBRAE), has formed to push for this proposal in Congress.

PUBLIC POLICY AND FUTURE OUTLOOK

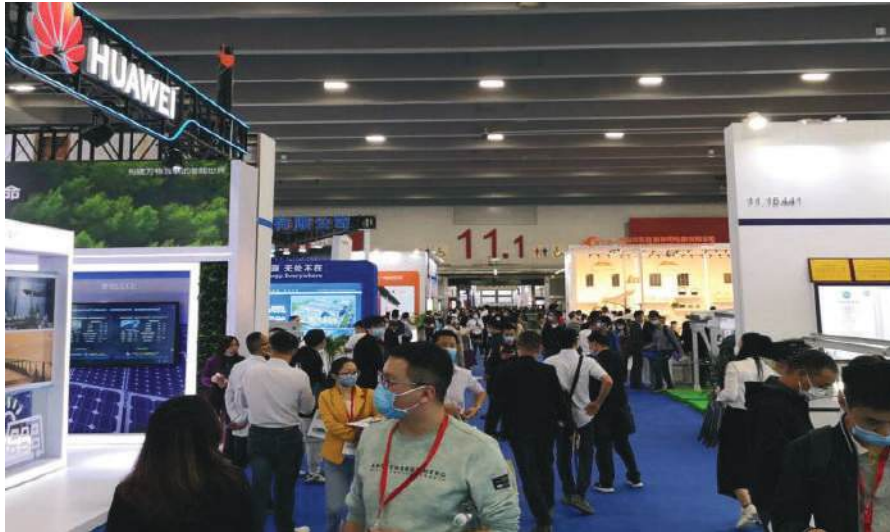
Despite challenges in connecting both centralized and distributed solar generation, Brazil's solar power sector continues to expand, keeping pace with global trends. By the end of 2023, worldwide solar capacity had reached 1,581 GW, with 407 GW added during the year. Projections indicate the sector could reach 2 TW in 2024, with 544 GW of new installations, and 5.1 TW by 2028.

This rapid growth is driven by the increasing competitiveness of PV technology across various applications, including floating solar farms and agrovoltaic systems. At the start of 2024, Brazil ranked sixth globally in total accumulated solar capacity and added 15.4 GW, making it the third-largest country in terms of new solar installations. However, Brazil still lacks specific renewable energy targets within its public policy framework.

Speaking at the opening of Intersolar 2024, ABSolar President Rodrigo Sauaia suggested that Brazil could achieve 100% renewable electricity by 2030 and should set broader goals to decarbonize its energy mix.

“We need to tip the scales and accelerate progress. As long as the public sector continues to support fossil fuels, they will maintain an advantage,” said Sauaia. “While incentives for renewables—both distributed generation and large projects—are legally set to expire, there is no such end in sight for fossil fuel subsidies.”

SOLAR PV & ENERGY STORAGE WORLD EXPO 2024 CONCLUDES



On August 10, 2024, the Solar PV & Energy Storage World Expo 2024 (referred to as PV Guangzhou 2024) successfully concluded. This three-day event provided a high-quality platform for communication and networking, connecting enterprises, traders, customers, and research organizations with key resources such as business partners, funding, and information.

World-Leading Companies Set the Trend

PV Guangzhou has consistently earned widespread recognition and positive feedback from the global solar photovoltaic and energy storage industry. The 2024 expo covered an area of approximately 100,000 square meters and featured over 1,500 exhibitors. The exhibition showcased a wide range of products, including photovoltaic production equipment, materials, batteries, components, inverters, mounting systems,

photovoltaic engineering and systems, energy storage products, and solar energy applications, spanning the entire photovoltaic industry chain. The event brought together experts from various sectors, making significant contributions to the steady growth of the industry.

Held for 16 consecutive years, PV Guangzhou has become a highly professional and international exhibition, serving as an essential trade platform for domestic photovoltaic and energy storage companies seeking to expand into overseas markets. With supportive policies and ongoing advancements in new technologies, China's rapidly growing photovoltaic market and production capabilities have garnered increased attention from the global industry. Compared to last year, the number of registered international visitors surged by more than 50%, reaching 12,025 attendees, primarily from Southeast Asia, South Asia, the Middle East, Europe, South America, and Africa.

PAKISTAN ENGAGES IN TALKS WITH INDEPENDENT POWER PRODUCERS TO RENEGOTIATE ENERGY CONTRACTS



Pakistan is currently in negotiations with independent power producers (IPPs) to reassess the terms of existing energy contracts. The country aims to lower electricity costs, which the Ministry of Energy considers excessively high, as the economy continues to shrink. The discussions are centered on revising clauses related to guaranteed returns and payments for unused energy in an effort to ease the strain on the economy.

Economic and Energy Background

Pakistan's high electricity tariffs have been a source of social unrest and have disrupted industrial activity. Consumer bills include fixed payments for excess capacity that is rarely utilized. These payments were originally introduced to attract foreign investment in the energy sector, but the current economic climate has made these agreements increasingly burdensome for both the government and consumers. Industry insiders confirm that the ongoing talks are focused on adjusting these contractual obligations. Proposals under consideration include reducing guaranteed returns and revising exchange rates within the contracts—steps necessary to create a more competitive electricity market that is less reliant on public subsidies.

Negotiations with Energy Producers

Awais Leghari, Minister in charge of the

Energy Division, stated that the government has not yet submitted any new formal proposals to the IPPs. He emphasized that any contract revisions must be mutually agreed upon and should not impose unfair conditions on investors. Leghari stressed the importance of maintaining a stable investment climate while adjusting contract terms that are currently weighing down the economy. This contract review is also part of Pakistan's discussions with the International Monetary Fund (IMF) under a \$7 billion financing program. The IMF has called for the restructuring of energy sector debt and the gradual removal of subsidies that distort the market.

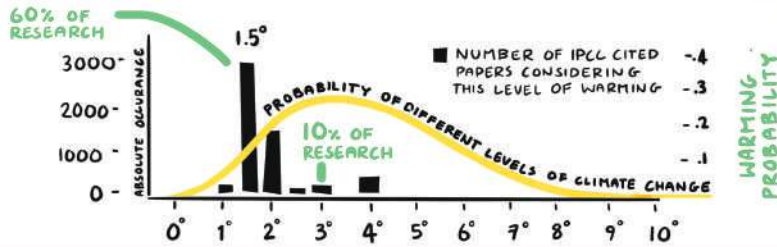
Impact on Tariffs and Competitiveness

Pakistan seeks to reduce electricity tariffs for commercial users to enhance competitiveness with other regional economies. Leghari mentioned the goal of bringing tariffs down to around 9 US cents per unit, from the current rate of 28 cents, to stimulate exports and support economic growth. The proposed changes are crucial for the industrial sector, which is losing competitiveness due to high energy costs. Successfully renegotiating contracts with the IPPs could help alleviate this pressure, but it will depend on the government's ability to strike a balance between cutting costs and meeting investor expectations.

"WE ARE RUNNING THE MOST DANGEROUS EXPERIMENT IN HISTORY RIGHT NOW, WHICH IS TO SEE HOW MUCH CARBON DIOXIDE THE ATMOSPHERE CAN HANDLE BEFORE THERE IS AN ENVIRONMENTAL CATASTROPHE." - ELON MUSK



CLIMATE CHANGE



ARE WE BETTING ON THE BEST CASE

THERE IS A 60% PROBABILITY CLIMATE CHANGE WILL EXCEED 3°C OF WARMING AND A 10% PROBABILITY IT WILL EXCEED 6°C.

YET ← 60% OF RESEARCH CITED BY THE IPCC CONSIDERS WARMING OF 1.5°C OR LESS, WHILE ONLY 10% CONSIDERS 3°C - AND NONE OF THIS RESEARCH USES COMPLEX RISK ANALYSIS

WHAT ARE THE WORST CASES?

RISKS FROM CLIMATE CHANGE INCLUDE

- CONFLICT
 - EXTREME WEATHER
 - AGRICULTURAL FAILURE
 - BIODIVERSITY LOSS
- (AS WELL AS PANDEMIC, EARTHQUAKES, AND MANY OTHERS)

THE MORE THE CLIMATE CHANGES THE WORSE THESE BECOME.

EVEN IF HOTTER TEMPERATURES AND RISING SEAS ONLY DIRECTLY KILLED MILLIONS, NOT BILLIONS, THESE INDIRECT AND CASCADING IMPACTS COULD KILL MANY MORE AND CONTRIBUTE TO REINFORCING FEEDBACK LOOPS LIKE THE ONE OPPOSITE.

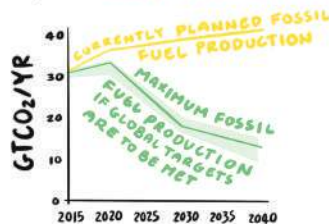


SOME PEOPLE THINK WE COULD USE CLIMATE ENGINEERING TO REDUCE THESE IMPACTS. HOWEVER, THIS IS ALSO RISKY, INVOLVING:

- DIRECT HARMS TO HUMANS AND NATURE
- FURTHER DESTABILIZING CRITICAL SYSTEMS
- INTERACTION WITH OTHER THREATS
- LATENT RISKS THAT COULD ACTIVATE LATER

HOW CAN WE LOWER THE RISK FROM CLIMATE CHANGE?

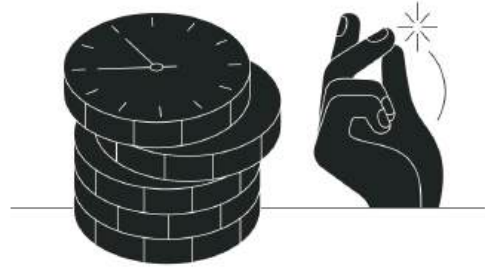
A SYSTEMIC APPROACH TO REDUCING CLIMATE CHANGE REQUIRES COORDINATED ACTION BY POLITICIANS (LAWS AND REGULATIONS), COMPANIES (PRODUCTS, SERVICES, AND INVESTMENTS), INTERNATIONAL BODIES (TO COORDINATE ACTION AND MAKE IT FAIR) AND INDIVIDUALS (AS AGENTS OF ACCOUNTABILITY AND CHANGE). GSR IDENTIFIES KEY LEVERAGE POINTS FOR INFLUENCING ALL THESE GROUPS, FROM LARGE ASSET OWNERS TO PROTEST MOVEMENTS



WE HAVE TO STOP EXTRACTING AND BURNING FOSSIL FUELS. YET A MODEST NUMBER OF COUNTRIES AND COMPANIES ACCOUNT FOR MOST EMISSIONS. WE MUST HALT EXPLORING FOR NEW FOSSIL FUEL RESOURCES AND BUILD NO NEW HIGH-EMISSIONS INFRASTRUCTURE THAT COULD LOCK IN EMISSIONS FOR DECADES.

HOW CAN WE ADAPT TO EXTREME CLIMATE CHANGE TO REDUCE VULNERABILITIES AND EXPOSURES? EMPOWERING NATURE CONSERVATORS AND REGENERATORS (ESPECIALLY INDIGENOUS COMMUNITIES), REDUCING INEQUALITY, PROMOTING RESILIENT AND DIVERSE FOOD SOURCES, RESOLVING CONFLICTS AND GEOPOLITICAL TENSIONS, AND MAKING GLOBAL MIGRATION EASIER AND FAIRER COULD ALL LIMIT CLIMATE CHANGE'S CATASTROPHIC POTENTIAL.

ECC reorders gas allocation priority, places CPPs last



The Economic Coordination Committee (ECC) approved a revised priority list for gas allocation as mandated by the International Monetary Fund (IMF). Under the new arrangement, the domestic, commercial, and industrial sectors, including essential roti tandors and processing units, are now given the highest priority.

The power and fertilizer sectors have been placed second, cement at fourth, while captive power plants (CPPs) and CNG are relegated to fifth, the lowest priority. Additionally, the gas tariff for CPPs has already been increased from Rs250 per MMBTU to Rs3,000, up from Rs2,750 per MMBTU. The IMF has set a January 1, 2025, deadline for the government to raise the gas tariff for CPPs to align with the ring-fenced cost of RLNG, currently at Rs3,700 per MMBTU. On that date, the government will raise CPP gas prices by Rs700 per MMBTU.

The IMF is also pressing the government to connect export-oriented industrial units to the national grid instead of allowing them to rely on gas-powered captive plants. However, the export industry has expressed concern over this move. The All Pakistan Textile Mills Association (APTMA), in a letter to Federal Minister for Petroleum Musadik Malik, criticized the government, warning that reducing or cutting off gas supply to CPPs would have serious consequences for the national economy, particularly for export-driven industries like textiles that depend on reliable and cost-efficient gas-fired captive generation.

APTMA argues that the national grid's high tariffs—over 15 cents/kWh compared to 6-9 cents/kWh in competing countries like India, Bangladesh, and Vietnam—place

unsustainable financial burdens on industries, making them uncompetitive in the global market. Forcing industries onto the grid, APTMA warns, would severely hurt Pakistan's export performance, something the economy cannot afford given the projected annual forex shortfall of over \$25 billion for the next five years. Moreover, the association points out that industries won't necessarily turn to the grid if gas is restricted; instead, they are likely to opt for alternatives such as biomass, coal, or furnace oil-based generation, as the grid is prohibitively expensive to install and maintain.

Due to high costs and poor quality of grid power, 78 out of 133 APTMA units in Punjab have cut their energy consumption by 25-50% year-on-year. Only a few large composite units have seen a slight rise in power consumption (5-10%). This indicates that most of the industry is in decline, with only a handful of large players surviving, according to APTMA. "Moreover, the current state of the grid is plagued by frequent outages, voltage fluctuations, brownouts, and blackouts, unlike the stable voltage and frequency provided by CPPs, which are crucial for textiles and apparel manufacturing, where production is highly sensitive to power disruptions."

Meanwhile, Federal Minister for Finance and Revenue Senator Muhammad Aurangzeb chaired the ECC meeting. The committee reviewed a summary from the Ministry of Communications concerning the "Kalkatak-Chitral 48 km (Section-III) Road Project (N-45) - Procurement of Civil Works" and authorized the Ministry of Communications and the National Highway Authority to proceed with procurement in line with Public Procurement Rule-5.

Dialogue.

In this edition, we feature Mr. Nasir Kasuri, a top name in the industry, discussing renewable energy.





AN INTERVIEW WITH INDUSTRY SPECIALIST NASSIR KASURI

How do you assess the current pace of energy reforms in Pakistan, particularly in the context of transitioning to renewable energy sources like solar and wind?

The introduction of net metering led the way for the adoption of solar energy in Pakistan, and so far has proved to be quite successful in encouraging individual homeowners and businesses to adopt solar. As a matter of fact, Pakistan has become one of the world's largest solar panel markets, importing about 13 GW of panels so far in this year alone.

In this sense, one would say that the current

energy policy has been successful. However, much more can be done to promote renewable energy, which is discussed in the following questions.

What are the biggest challenges Pakistan faces in scaling up its green energy infrastructure, and how can these be overcome to meet national energy targets?

Resistance from DISCO's is a major constraint. Under pressure to pay capacity charges to overpriced thermal IPP's, they often try to discourage adoption of solar as it hits the revenues they feel they need to meet these

obligations. This problem needs to be solved at the source, by renegotiating unreasonable capacity payments rather than by penalising solar investors.

Most of Pakistan's distribution network is obsolete and poorly maintained. In many cases, DISCO's stop accepting net metering applications from areas where the infrastructure doesn't support the inclusion of additional renewable. The installation of modern smart grids is essential for the quick and seamless deployment of these technologies.

How do you see the role of private sector investments in driving the growth of renewable energy projects in Pakistan? What policy reforms could further encourage such investments?

The private sector is central to the success of renewable energy projects in Pakistan. As a matter of fact, the private sector is solely responsible for Pakistan becoming one of the world's biggest solar markets. Even in the face of crippling inflation, businesses and homeowners alike have taken the plunge and invested their hard earned funds into these systems in the hopes of lower future energy costs.

Other than net metering, however, there is really little other incentive being provided by the government. At one time, highly subsidized loans were being provided for the purchase and installation of solar systems. This funding has not been available for many years now. With global ESG initiatives in overdrive, GOP should try to engage with foreign governments, businesses, and organizations to find a way to incentivize local investors to install clean energy systems. This can be in the form of subsidized loans, tax breaks, and the pass on of other ESG benefits to the end user.

With solar energy currently accounting for only 1% of Pakistan's energy mix, what strategies should be implemented to

significantly increase this share over the next decade?

The Pakistan Governments move to allow net metering was a major motivator for the adoption of Solar Energy in Pakistan. Firstly, I think it is imperative that the current net metering incentives stay in place. There has been talk about reducing the net metering ratio to increase billing from electricity customers in order to provide DISCO's with enough funds to pay thermal power capacity charges. The problem is not solar, but rather the excessively expensive cost plus tariffs agreed with these producers. The problem needs to be solved at its source by aggressively renominating these tariffs, which I am glad to hear the government has started doing.

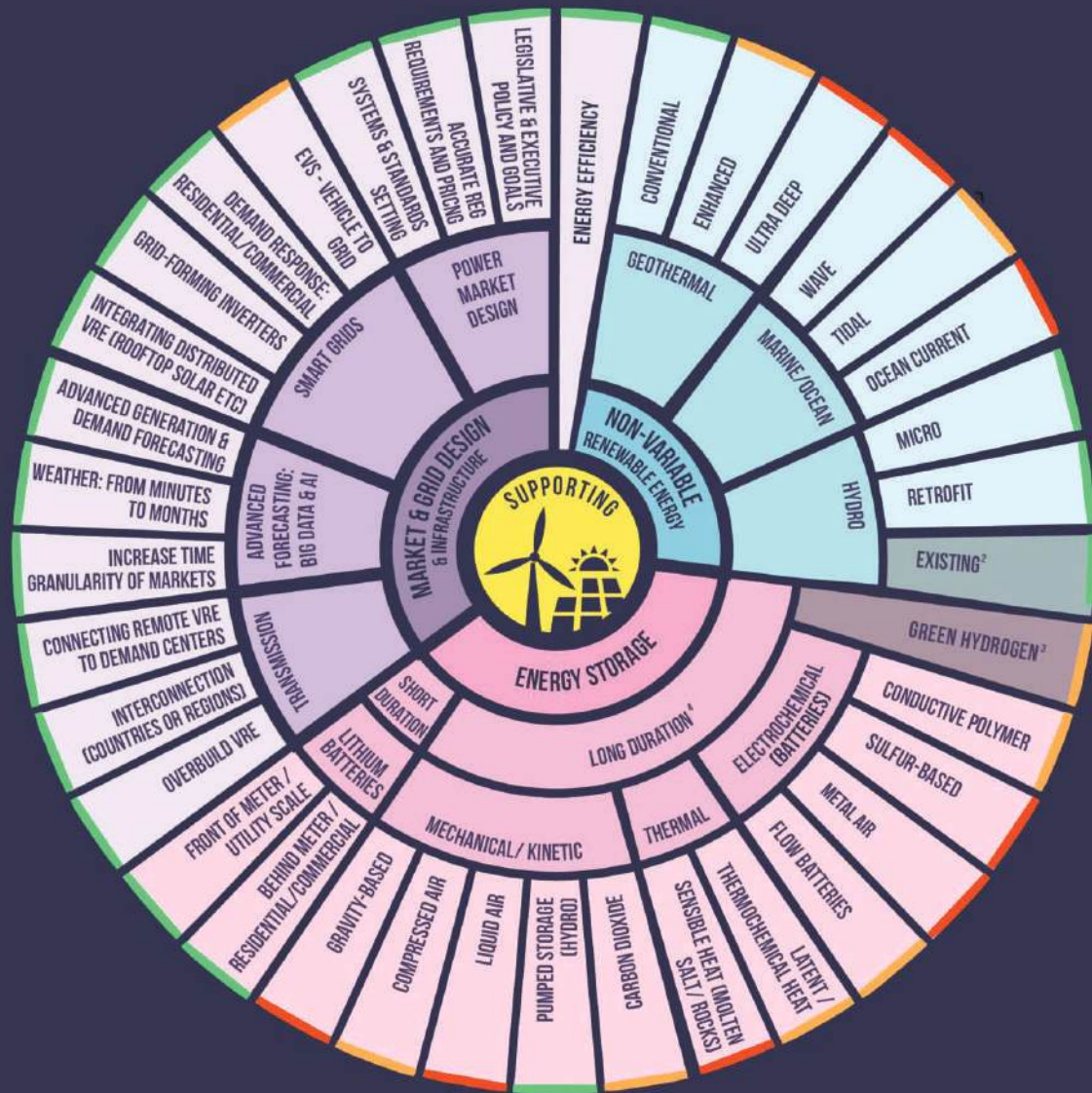
A robust wheeling system needs to be introduced that will allow bilateral agreements to be set up between producers and consumer using the relevant DISCO's network for transmission. Though the policy exists in theory, there is a lot of resistance from DISCO's. Actual implementation of wheeling in Pakistan would massively increase solar installation in the country, and let us use a lot of our otherwise non productive land for energy production.

In your opinion, how will the ongoing and upcoming green energy projects impact Pakistan's long-term energy security and its reliance on fossil fuel imports?

I think the green energy revolution couldn't have come at a better time for Pakistan. At a time when expensive imported fuel is crippling our economy, we have an abundant, indigenous, clean energy source which can allow our economy to become competitive again. There is a direct correlation between energy availability and economic growth. If we play our cards right, and address the actual problems facing our energy infrastructure (Capacity payments and obsolete grid), we can benefit from this clean, cheap, and endless energy source.

Achieving Fossil-Free Electricity¹

Policies, Tools and Technologies for Supporting Wind and Solar



Key: Market Readiness

- Commercial
- Newly Commercial
- Demo/Pilot

Footnotes:

1. Infographic shows the many choices available for supporting wind & solar to achieve reliable, dispatchable fossil-free energy. There is no one silver bullet. Not all are necessary, although most Market & Grid Design reforms are. List is not exhaustive.
2. No new large hydropower dams should be built. Existing projects should be operated in a way that minimizes impact on vulnerable communities.
3. Converting electricity to hydrogen and back again is inherently inefficient but may make sense in some contexts. Hydrogen should be manufactured, stored, and converted back to electricity, all at the same location, in order to limit inefficiencies and leakage risks.
4. Long Duration storage is mostly not needed until over 50% VRE penetration.

GLOBAL EVENTS



**PAKISTAN
SUSTAINABILITY
WEEK**

PSW

Date: 26 - 28 September, 2024

Venue: Karachi Expo Centre

معروض دبي للطاقة الشمسية 2023 ويتيكس
WETEX 2023 DUBAI SOLAR SHOW

WETEX & DSS

Date: 1 - 3 October, 2024

Venue: Dubai World Trade
Centre (DWTC)



**WORLD FUTURE
ENERGY SUMMIT**

WFES

Date: 14 - 16 January 2025

Venue: ADNEC, Abu Dhabi



**PAKISTAN
SUSTAINABILITY
WEEK**

PSW

Date: 21 - 23 February 2025

Venue: Lahore Expo Centre



Intersolar Europe Exhibition

Date: 7 - 9 May, 2025

Venue: Messe, München

Global Events



ASEAN Sustainable Energy
Week

Date: 2 - 4 July, 2025

Venue: Bangkok, Thailand



Solar PV & Energy Storage
World Expo

Date: 8 - 10 August, 2025

Venue: Guangzhou China



Intersolar South America

Date: 26-28 August, 2025

Venue: Expo Center Norte,
Sao Paulo



RE+

Date: 8 - 11 September 2025

Venue: Las Vegas, NV



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**PAKISTAN
SUSTAINABILITY
WEEK**

#PSW

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