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Driven to Be More Energy Efficient, Distribution Transformers Are More than Meets the Eye p.24

Renewable Energy

IRA Incentives for Clean Energy from Idle Oil Wells

p.07

Oil & Gas

APPEC: Asian Oil Market Growing Numb to Geopolitics As Demand, Margins Eclipse Supply Woes

p. 13

Nuclear

The Worrying Nuclearization of Northeast Asia

p. 16



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Innovation and Efficiency: Key Trends in the Energy Industry



The energy industry is undergoing a period of significant transformation, driven by the dual imperatives of technological advancement and sustainability. Companies across the sector are embracing new solutions to enhance efficiency, reduce emissions, and improve the reliability of energy distribution. Among these, the development of efficient transformers is playing a crucial role, though it is only one part of a larger wave of innovations reshaping the industry.

Efficient transformers have garnered attention for their ability to minimize energy losses during transmission and distribution. Unlike traditional models, which can lose significant amounts of power as heat, the latest generation of transformers is designed to operate with far greater efficiency. This is achieved through the use of advanced materials, such as high-performance magnetic cores, and improved winding techniques that reduce losses. Additionally, smart features enable real-time monitoring and optimization, ensuring that transformers can adapt to varying load conditions, thereby enhancing performance and reliability.

These advancements have made efficient transformers integral to modern power systems, especially as the industry looks to reduce operational costs and meet global sustainability goals. With a focus on minimizing energy wastage, efficient transformers contribute to lowering carbon emissions, thus supporting broader environmental initiatives. Their ability to seamlessly integrate with renewable energy sources also makes them essential in the transition to a cleaner, greener grid.

While efficient transformers represent a significant step forward, the broader energy sector is witnessing other key developments. One of the most prominent is the ongoing expansion of renewable energy. As more countries adopt ambitious renewable energy targets, the need for reliable infrastructure to support wind, solar, and hydropower continues to grow. Projects across the world are exploring ways to scale up the deployment of these technologies, with grid improvements ensuring that renewable energy can be distributed efficiently and reliably to meet demand.

Moreover, digitalization is revolutionizing how energy is managed. The adoption of smart grids, powered by artificial intelligence and data analytics, is enabling more precise monitoring and control of energy flow. These digital tools are helping utilities predict demand, optimize energy distribution, and detect faults before they lead to major issues. This shift toward smarter, more responsive grid management is essential for maintaining stability as more variable renewable energy sources come online.

The energy industry's focus on innovation and sustainability reflects a commitment to building a more resilient, efficient, and environmentally friendly energy landscape. Efficient transformers, digital tools, and the growth of renewables are just a few elements of this broader transformation. Together, they signal a promising future where technology and sustainability converge to meet the energy needs of a changing world.

In This Issue!

energyHQ's October 2024 issue covers the most recent developments and events pertaining to the energy industry, as well as including valuable insights, details and spec sheets / peer reviews related to latest technologies, innovations, products, services, and projects of relevance to the industry and its audience.

- Article on page 7 talks Policy & Incentives for Renewables
- Article on page 16 focuses on Nuclear Proliferation & Security Concerns
- Article on page 24 sheds the light on Efficient Transformers

Additional content is also available covering the latest activities of manufacturers, importers, and exporters – worldwide!

We hope you benefit from this issue's content and find it useful & actionable for your business. For any comments, suggestions, or feedback please don't hesitate to contact me.

Best wishes,
Hassan Mourtada
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Issue Contents

Introduction

- 01 Opening Letter
- 02 Issue Contents
- 04 World Digest



Renewable Energy

Policy & Incentives for Renewables

- 07 IRA Incentives for Clean Energy from Idle Oil Wells

Sustainability & Decarbonization

Global Collaboration for Climate Action

- 10 SID Countries Empowered with Big Earth Data Tech to Combat Climate Change Via Training In Beijing



Oil & Gas

The Geopolitics of Oil & Gas

- 13 APPEC: Asian Oil Market Growing Numb to Geopolitics As Demand, Margins Eclipse Supply Woes

Nuclear

Nuclear Proliferation & Security Concerns

- 16 The Worrying Nuclearization of Northeast Asia



Hydrogen

Public Perception & Social Acceptance

- 21 Secretive Hydrogen Hub Talks Test Energy Agency Community Plans

Issue Contents

Cover Story

Efficient Transformers

- 24 **Driven to Be More Energy Efficient, Distribution Transformers Are More than Meets the Eye**



Energy Storage & Grids

The Future of Energy Storage

- 27 **Li-ion BESS Market: Jumps in Demand and Key Trends**

Country Reports

Egypt, Russia, France

- 30 **Egypt's Petroleum Minister Stresses Collaboration in Global Energy Market at Gastech**
- 31 **Good Gas Agreements Made with Russia, Turkmenistan**
- 32 **France To Stick with Wind Power Development Targets**



Services

- 34 **Coming Events**

Info

- 35 **General Inquiries**

- 36 **Closing Letter**

World Digest



Italy

Italy added 25% more energy storage systems in Q2

Trade body Italia Solare has processed data from electricity transmission system operator (TSO) Terna which shows standalone storage is the biggest new market development.

Italy had 650,007 grid-connected energy storage systems at the end of June 2024, according to Italian PV association Italia Solare, with a total of 4.5 GW of rated power.

“During the first half of 2024, 126,916 storage systems were connected in Italy, with a total power of 1.05 GW and a capacity of 2.63 GWh,” wrote Italia Solare, commenting on data from TSO Terna.

The data show the number of storage systems rose by 24.6% during the first half of 2024 while their total rated power rose 30.4%, indicating systems are becoming larger.

Some 58%, or 1.55 GWh, of the energy storage capacity connected in the first half of 2024 “is attributable to storage facilities with a capacity of less than 50 kWh associated with photovoltaic systems,” wrote Italia Solare, adding, “Approximately 2% (48 MWh) is attributable to storage facilities with a capacity of more than 50 kWh associated with photovoltaic systems and, this is the novelty, 39% (1.04 GWh) is instead related to six standalone storage facilities of which 35% is attributable to a single 200 MW (805 MWh) system connected in Piacenza.”

Malaysia



Malaysia’s Corporate Renewable Energy Supply Scheme (CRESS): A Step Forward but with Challenges

A new Malaysian scheme aimed at selling renewable energy to large corporate customers is a step in the right direction. But more can be done.

Malaysia’s recent announcement of the Corporate Renewable Energy Supply Scheme (CRESS) marks a significant milestone in the nation’s efforts to transition towards a more sustainable energy future. There are, however, concerns about the scheme that warrant attention.

Launched in September 2024, CRESS will enable large corporate consumers to purchase renewable energy directly from independent power producers (IPPs). This will support Malaysia’s ambitious target of achieving 31 per cent renewable energy capacity by 2025, 40 per cent by 2035 and 70 per cent by 2050.

By targeting corporations with significant energy demands, the scheme aims to leverage their capacity to invest in long-term power purchase agreements (PPAs) and drive the development of renewable energy projects. The criterion ensures that CRESS targets the most significant energy consumers and reinforces the scheme’s focus on large-scale operations.

On the flip side, CRESS will limit the broader participation of small- and medium-sized enterprises (SMEs), which make up over 97 per cent of businesses in Malaysia and employ nearly 70 per cent of the workforce.



Oman

\$172.5mIn contracts to boost local content in Oman's energy sector

Ministry of Energy and Minerals launched the Majd Local Content Programme on Sunday aimed at increasing local content in the sultanate's energy and minerals sectors. The initiative, which focuses on engaging local businesses and talent, saw 12 agreements worth more than US\$172.5mn signed at its launch.

The event was attended by senior officials, including H E Dr Said bin Mohammed al Saqri, Minister of Economy, and H E Salim bin Nasser al Aufi, Minister of Energy and Minerals. Representatives of major oil, gas, renewable energy and mining companies were also present, alongside key figures from the public and private sectors.

H E Saqri highlighted the government's strategic push towards national industries and economic diversification. He informed that in 2023, 16% of the oil and gas sector's spending was directed towards small and medium enterprises, reinforcing the importance of local businesses in driving growth.

One of the key messages at the launch was the focus on creating jobs for Omani youth. "We are committed to localising industries and nurturing national talent through the Majd Local Content Programme," said H E Aufi.

He added that since its inception in 2013, the local content initiative in energy and minerals has contributed over US\$33bn to Oman's economy, created over 3,000 jobs and supported more than 100 industrial facilities.

Australia



Achievements And Challenges In Australia's Renewable Energy Transition

The Clean Energy Regulator's (CER) second Quarterly Carbon Market Report (QCMR) for 2023 shows continued strong growth in consumer-led small-scale renewables but it was a quiet first half of the year for new large-scale investment commitments.

Households and businesses continue to invest in energy efficiency technology. Rooftop solar is tracking to add more than 3 GW of new installed capacity to the grid in 2023, with 1.4 GW of capacity from almost 160,000 systems already installed this year.

The CER CEO and Chair David Parker said it was clear that consumers are preparing for an electric future and taking control of their energy usage to save money and reduce their carbon footprint at the same time.

'Australia has among the best solar resources in the world and households and businesses continue to install rooftop solar at world leading rates.'

The increased capacity saw the share of renewable electricity rise to over 36% of demand in the National Electricity Market. This is expected to grow to 40% by December.

In addition, an estimated 60,000 new air source heat pumps have been installed so far this year – up 70% compared to the first half of 2022.

Egypt aims to restore normal output at gas fields by summer 2025

Egypt aims to restore normal production at its natural gas fields by next summer, Prime Minister Mostafa Madbouly said on Thursday, signalling the government is moving to settle its arrears with production companies.

Madbouly told a news conference that production had fallen because of the arrears, but did not say how much the government owed nor when it might be repaid.

Sources told Reuters in March that the government had set aside up to \$1.5 billion for payments to foreign oil and gas companies operating in the country. The arrears built up during a long-running foreign currency shortage that has since eased.

Egypt has been grappling with power shortages amid high demand for cooling systems in the summer. The country generates most of its electricity from burning natural gas.

The government halted so-called load-shedding power cuts in July after some natural gas shipments arrived.

"Electricity load-shedding cuts won't return again," Madbouly said, adding the government had set aside \$2.5 billion to ensure that.



Switzerland

Energy Transition in Switzerland

Renewable energy sources are forecast to account for 90% of the total electricity generation capacity in Switzerland by 2035, compared with 85% in 2023, according to GlobalData's power capacity and generation database. GlobalData uses proprietary data and analytics to provide a complete picture of Switzerland's renewable energy market in its Switzerland Power Market Outlook to 2035 report. Buy the report here.

Of all renewable energy sources, the share of hydro power generation capacity is forecasted to change from 63% in 2023 to 45% in 2035.

The share of solar PV power is expected to reach 1% in 2035, compared with a 0.33% share in 2023. Biopower is forecast to account for 0.80% share of Switzerland's total electricity generation capacity, in 2035, as against 0.95% share in 2023. The share of geothermal is expected to change from a 0.00% share in 2023 to a 0.01% share in 2035.

In terms of capacity additions, the total renewable energy capacity is expected to see 11458.85 MW of additions in Switzerland during the forecast period while the non-renewable energy segment is likely to see reduction of 250 MW.

CAGR growth of key renewables in Switzerland

Renewable generation capacity in Switzerland is expected to reach 18GW in 2035 at a CAGR of 4% during 2023-2035.

Wind power is expected to record highest growth rate of 13.10% by 2035, followed by solar PV with 10%. Other renewable energy sources such as biopower and hydro are estimated to have growth rates of 2% and 0.19% respectively.

Renewable Energy

07 Policy & Incentives for Renewables



IRA Incentives for Clean Energy from Idle Oil Wells



IRA incentives for thermal storage in idle oil wells IMAGE©Geo2Watts

Climate policy in the US Inflation Reduction Act (IRA) provides powerful incentives to generate renewable energy and phase out fossil fuel production. Oil and gas companies are already required to cap boreholes when an oil well is depleted, to meet Asset Retirement Obligations (ARO). But if the borehole is instead repurposed to generate zero emission electricity, Investment Tax Credits (ITC) in the IRA would repay up to 50% of the capital recovery.

Cut ARO costs by repurposing boreholes for clean power

The entrepreneurial founders of Geo2Watts leverage new long-term Investment Tax Credits within the IRA to reduce the investment cost of a clean energy technology that puts idle oil

wells to a new use, clean energy generation.

The firm's patented Borehole Battery would repurpose idle oil well bores as thermal storage heated by solar thermal energy, and delivered through a Organic Rankine Cycle (ORC) geothermal energy generator.

Unlike the similar but large-scale solar thermal energy storage being built within an entire depleted oil reservoir in California, the Geo2Watts conversion would repurpose only the metal bores left in the ground when idle oil wells are depleted, simplifying permitting.

Once a well is converted to thermal energy storage and is generating electricity, it would qualify for the 30% base ITC for generating zero-emission electricity, and an additional 10% for meeting domestic content. And

because it would be sited in an oil-producing region, it would get another 10% for being in an “energy community”.

Geo2Watts Co-founder Bill Bartling brings oil industry experience on the policy side with decades in the energy industry, most recently as the former Chief Deputy at CalGEM, California’s oil, gas, and geothermal energy regulator. This has given him an inside view of the opportunity in the legislation.

“It’s as much work to plug a well with all that cement from bottom to top as it is to put sand in it from bottom to top,” he pointed out.

“The ARO requires that you seal off the bottom of your well, set a plug a certain depth above the highest oil level, and perform a casing integrity test to pressurize it to ensure no leaks. Then you pour in heavy drilling mud that dries like Adobe up to about 110 feet below the earth’s surface. Then, set a second cement plug at least 100 feet deep and cut the casing off 10 feet below the surface. You weld a plate on top of that and then bury it in dirt.”

Converting a well to thermal energy storage could enable companies without enough ARO reserves to abandon their wells to fully meet mandatory ARO requirements at up to half the cost.

Co-founder Phil Cruver is a serial entrepreneur in renewable energy projects who served as Principal Investigator for over \$1.2 million of federally funded R&D projects. His former projects include a 500-turbine wind farm in Palm Springs contracted with SCE. He summarized the financial opportunity in the IRA.

“To plug and abandon a well costs \$100,000 to \$150,000, depending on the well. You’re just pouring boxes of money into a hole,” he said.

“But the owner can recover half of that money with the IRA. In California, there are 49,000 idle wells on record, and abandoning all of those will be in the \$3 billion range. So, this now allows operators to do the right thing, responsibly close the wells, shut off the actual or potential methane leaks, and convert it into

energy storage for producing clean electricity.”

The IRA has now made the ITC more resilient

In the US, the ITC has been the primary driver of renewable energy growth. However, this tax credit has often been halted prematurely, risking investments each time Congress changed hands. As a result, clean energy investment has until now not had the tax benefit certainty of fossil energy investment, discouraging potential investors and bankrupting developers.

But that era of uncertainty for renewable investment could be at an end, as Cruver explains. The IRA has for the first time put in law a decade-long sunset date of 2035 for the ITC, giving it for the first time something more like the permanence and certainty that fossil energy tax benefits have enjoyed since the 1920s. With a decade of opportunities, that’s now likely to develop the bipartisan support needed for the energy transition.

“With the IRA, the Biden administration is now pumping clean energy money into red states like Texas as fast they can,” Cruver said.

“Goldman Sachs says the IRA will generate over \$3 trillion of US clean energy investment. And as of two weeks ago in Texas alone, 1,500 clean energy projects were in the pipeline representing nearly half a trillion dollars.”

And now there is an added inducement, making these tax credits transferable, Cruver noted.

“The big change with the IRA is now you can sell these tax credits on the open market,” he explained.

“Previously, you had to go through a complicated formula of building partnerships with various companies that could use the credits. Not anymore. Now, once you earn the tax credit, you can sell it on websites like Cruxclimate, and for big deals, \$100 million or so, you can sell the tax credits for 100% on the dollar.”

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Sustainability & Decarbonization

10 Global Collaboration for Climate Action





SID Countries Empowered with Big Earth Data Tech to Combat Climate Change Via Training In Beijing

Carbon Neutral: Strategies for A Commitment

The Small Island Developing States Capacity Building Workshop on Utilizing Big Earth Data for SDGs in Beijing Photo: Courtesy of CBAS

Small Island Developing States (SIDS) are harnessing global cooperation and advanced technologies to strengthen climate resilience and promote sustainable development.

A training course, the Small Island Developing States Capacity Building Workshop on Utilizing Big Earth Data for Sustainable Development Goals (SDGs), was launched in Beijing in early September.

Nearly 20 representatives from SIDS participated in the training program, which aims to enhance the digital innovation capabilities of young scholars from SIDS and promote the application and dissemination of relevant technological capacities.

Co-hosted by the International Research Center of Big Data for Sustainable Development Goals (CBAS) and the United Nations Department of Economic and Social Affairs (UN DESA), the eight-day training aims to improve SIDS' capacity for monitoring SDGs through Big Earth Data technology, focusing on disaster risk management and AI-powered decision support systems.

These efforts are expected to equip SIDS with knowledge to be able to tackle climate change and achieve their SDGs.

China has long been committed to addressing global climate change and promoting sustainable development through technological innovation and international cooperation. This training program has garnered significant attention, attracting active participation from government officials and scholars from various island nations who shared their experiences and hopes for the future.

A practical training

The eight-day training course covers key topics closely related to sustainable development and climate change response. The core objective is to enhance the ability of SIDS to monitor and evaluate their SDGs through Big Earth Data technology.

The workshop combines theoretical lectures, technical operations, and case studies to ensure participants can thoroughly understand and master the application of Big Data in the field of sustainable development.

Participants from various island nations praised the training.



of Zero Emissions

Chandranee Bhujoo Rughoobur from Mauritius found the courses highly inspiring and left with great expectations for applying the knowledge gained in her country's sustainable development efforts.

She told the *Global Times* with excitement that "I am from Mauritius. I work for the statistics department. We are responsible for compiling and analyzing SDG indicators, and this training provides the tools and methodologies we need to monitor progress and address climate change."

She added that this real-time data analysis capability could significantly enhance her country's decision-making in response to climate change and environmental management.

Similarly, Pero Lawrence Duguman from the Department of National Planning and Monitoring in Papua New Guinea expresses gratitude for the Chinese government's support and the opportunity to learn and scale the use of technology, particularly Big Data, which can help visualize important sectors like climate, forests, oceans, towns, and cities.

According to the CBAS, the workshop included hands-on technical sessions, social events, and

online practice for simulation result analysis and visualization. Highlights include policies and governance for SDGs, knowledge lectures, applications of images from the SDGSAT-1 satellite, data resources and online platforms for SDGs, and interdisciplinary methods for SDGs monitoring and evaluation.

The goal is to strengthen national research capacities for informed decision-making on various aspects of the SDGs, providing Alliance of Small Island States (AOSIS) participants with practical guidance to mitigate threats to the physical and economic security of small islands, the *Global Times* learned from the CBAS.

Apart from the CBAS and the UN DESA, the workshop is also co-hosted by the United Nations Global Geospatial Knowledge and Innovation Centre (UN-GGKIC), Aerospace Information Research Institute (AIR, CAS), CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM), and the International Society for Digital Earth (ISDE).

By Shan Jie and Wang Yong
<https://www.globaltimes.cn/>

Oil & Gas

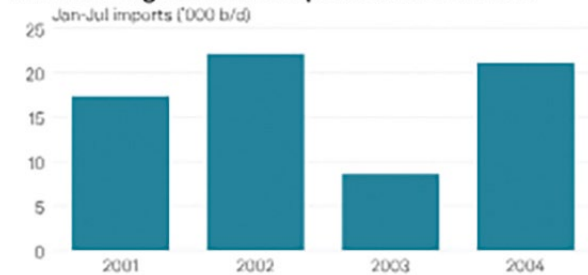
13 The Geopolitics of Oil & Gas



APPEC: Asian Oil Market Growing Numb to Geopolitics As Demand, Margins Eclipse Supply Woes



Thailand's Nigerian crude imports rebound in 2024



Geopolitical issues no longer sharply influence oil prices and trade flows in Asia amid ample supply options, industry participants at the Asia Pacific Petroleum Conference said, while cautioning that fragile demand and tepid margins may dictate the market trend in the short term.

Regardless of geopolitical conflicts involving Russia, Ukraine, Iran and Israel, on top of

numerous international sanctions, there were no significant crude supply hiccups and hardly any major disruption to physical trade flow. Asian refining industry and the global oil market overall tend to quickly find ways to adapt to any changes in market dynamics, industry executives said at S&P Global Commodity Insights' APPEC event over Sept. 9-10.

"The oil market is like a swimming pool... [geopolitical issues and sanctions] can shift [supply-demand dynamics] from one side to another but the actual swimming pool itself is still there," said FGE Chairman Fereidun Fesharaki.

"The oil market has shown a remarkable resilience and adaptability... 7 million b/d of Russian oil has simply rewired across the

globe... [despite the Red Sea attacks] ships have simply rerouted rather smoothly... at the end of the day the oil is reaching the market,” said Vandana Hari, founder of Vanda Insights, adding that dark fleets have played an important part in rebalancing the supply-demand dynamics and trade flows.

Supply-side issues are not much of a concern and despite the OPEC+ group’s recent decision to postpone plans to start unwinding their additional voluntary cuts, the supply may eventually come back and whatever the OPEC+ decides on their supply control measures, there would be less and less impact on the market, according to Pongpun Amornvivat, senior executive vice president of International Trading Business Unit at Thailand’s state-run PTT. He added that plentiful stream of new crude supply options and new grades are emerging lately.

Reflecting Asia’s new supply options, China has been actively purchasing Canada’s Access Western Blend, or AWB, crude cargoes since the start of the TMX pipeline, while Nigerian National Petroleum Company, or NNPC, and its JV partners were actively marketing their new Nembe crude in the Asian market.

Nembe crude is a medium sweet crude with an API gravity of 29 and 0.17% sulfur content. It’s a niche and high quality version of Bonny Light, which many Asian refiners are already familiar with. The Nembe crude production is expected to reach up to 150,000 b/d in the near term and the international trades would be conducted on Platts Dated Brent basis, according to Benedict Peters, chairman & CEO at Aiteo Group and Maryamu Idris, executive director of Commercial Trading at NNPC.

Meanwhile, feedstock managers and downstream operation managers at Japanese, Thai, South Korean and Malaysian refiners attending the APPEC conference and workshops also agreed that crude supply has hardly been a concern as highly sensitive Russian barrels have mostly shifted to India and China, easing the competition for Middle Eastern crude for other key Asian importers.

“We are not particularly paying much attention to Russia-Ukraine and Iran-Israel news these days... feedstock crude procurement has

always been stable,” said a middle distillate production and marketing manager at a Japanese refiner on the sidelines of APPEC.

Short-term demand concerns

Although long-term outlook on broader Asian economy and oil demand is positive, the key market focus is the weak near-term economic activity and fragile oil demand pressuring refining margins, as well as higher freight costs amid expensive shipping insurance fees and tight tanker supplies, industry executives and refinery sources said.

“The key driver of oil prices, in my opinion, would be more on the demand side, especially with economy and oil demand in China somewhat struggling,” Amornvivat said.

PTT’s Amornvivat and middle distillate marketers at South Korean and Japanese refiners indicated that China, as well as many other East Asian economies are witnessing a significant slowdown in the real estate and construction sectors, while industrial and manufacturing activities have also been lagging in 2024, consistently putting pressure on gasoil/diesel margins.

Platts, part of Commodity Insights, assessed the second-month Singapore gasoil swap crack against Dubai crude swaps at an average of \$18.55/b so far this year, compared to the 2023 average of \$22.82/b.

Asian gasoil crack in a long downtrend



Source: S&P Global Commodity Insights

China has been contributing around half of the global oil demand growth over the past 25 years and the market needs better Chinese economic picture for prices to rebound, said Francisco Blanch, managing director and head of global commodities at Bank of America during a panel discussion at the APPEC.

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Nuclear

16 Nuclear Proliferation & Security Concerns



The Worrying Nuclearization of Northeast Asia



Despite tensions, the region has been free of state conflict for decades, but a realignment of the security architecture puts that hard-won peace at risk.

The non-proliferation environment of Northeast Asia is changing as Russia's war with Ukraine continues into its third year and the Korean Peninsula becomes more hostile. As discussions on the nuclearization of the Korean Peninsula have re-emerged, developments will not only alter the current status quo – which has kept the region free of direct conflict – but also has the potential to change the architecture of the non-proliferation treaty (NPT) and negatively impact the economy.

Northeast Asian state actors – including Russia, Mongolia, China, Japan, North Korea, and South Korea – have been free of direct conflicts with each other since the end of the Cold War. The region's experience in World War II and the Cold War is reflected in each country's defense, security, and foreign policy concepts and working mechanisms.

However, Russia's war with Ukraine and its security alliance with North Korea changed certain dynamics of Northeast Asia's security architecture.

The resulting insecurities are forcing regional and global actors to seek alternatives, such as increasing defense spending and military exercises, and even withdrawing from the NPT to acquire nuclear weapons. North Korea made the latter choice in the early 2000s, and South Korea is increasingly tempted to do the same. Understandably, Seoul's possible pursuit of nuclear weapons may be for defense purposes; however, nuclearization can create a domino effect, which ultimately changes the architecture of the NPT and how member states respond to security threats.

Moreover, these moves do not support nor help global commitment to peace and security.

Instead, such choices will further reduce conflict mitigation and de-escalation efforts by non-nuclear states like Mongolia.

In 1992, Mongolia declared itself to be a nuclear-weapons-free zone. The declaration itself was an indication of Mongolia's peaceful foreign policy, which has been presented in continued efforts to advance peace on the Korean Peninsula.

In a June 2024 report to the United Nations' Office for Disarmament Affairs, Mongolia's government highlighted its "its commitment to maintaining international peace and security," not only by upholding its NPT commitment, signed in 1969, but also by its leading contribution to U.N. Peacekeeping missions.

"Mongolia has made considerable efforts to strengthen international peace and security and achieved success in the past 32 years since it declared its territory a nuclear-weapon-free zone," the report began. Mongolia also joined the Treaty on the Prohibition of Nuclear Weapons in 2022, which its government said demonstrated Mongolia's "firm commitment to the nuclear-weapon-free world."

Mongolia has pledged to maintain its status as a non-nuclear weapons state of the NPT. As part of its multi-pillared foreign policy, Ulaanbaatar persistently pushes for soft power, peaceful negotiations, and dialogues between conflicting parties. The rising security concerns and uncertainties, both in its immediate region and around the world, position Ulaanbaatar in an even more difficult position geopolitically. Nuclearization will make it difficult for any peace negotiations to take place.

The nuclearization of Northeast Asia also poses a major issue for the international community, particularly concerning the NPT itself.

As security experts at the Center for Arms Control and Non-Proliferation noted, "From Bill Clinton to Joe Biden, no American president has successfully brought about a limitation or reduction in nuclear weapons on the Korean peninsula." Despite U.S. efforts to pursue denuclearization of the Korean Peninsula, things have progressed in the opposite

direction, with North Korea continuously advancing its nuclear program and South Korea openly discussing acquiring nuclear weapons.

At this point, regional actors such as Japan, South Korea, and China may take things into their own hands. This will increase the arms trade and the use of hard-power approaches.

If Seoul pursues nuclear armament, it will need to first withdraw from the NPT. This could lead to not only international sanctions but also harm South Korea's economic partnerships in the region and globally.

Moreover, these changes will reshape political, economic, and security dynamics not just for the region but globally. Already, China is rapidly expanding its nuclear arsenal and Japan is pursuing an offensive "counter-strike" capability for the first time since World War II.

The peace and security of Northeast Asia has a ripple effect on the Asia-Pacific and each state's economic ties to the rest of the world. The Asian continent is projected to account for more than 50 percent of global gross domestic product by 2040. As trade-dependent economies such as Japan and South Korea want to continue the upward trend, changes in the status quo will harm the global economy.

In light of increasing talks about the nuclearization of the Korean Peninsula, global powers, especially regional actors, must carefully consider the ways in which nuclearization can impact the region's overall stability. While North Korea's nuclear threat continues to be an issue, cementing nuclearization of the Korean Peninsula may not be the best solution.

The increasing tensions in Northeast Asia will force regional states to proliferate. This disturbing trend has the potential to change the underlying principles and concepts to which many of the regional and international community adhere, especially when it comes to nuclear weapons.

By Bolor Lkhaajav

<https://thediplomat.com/>

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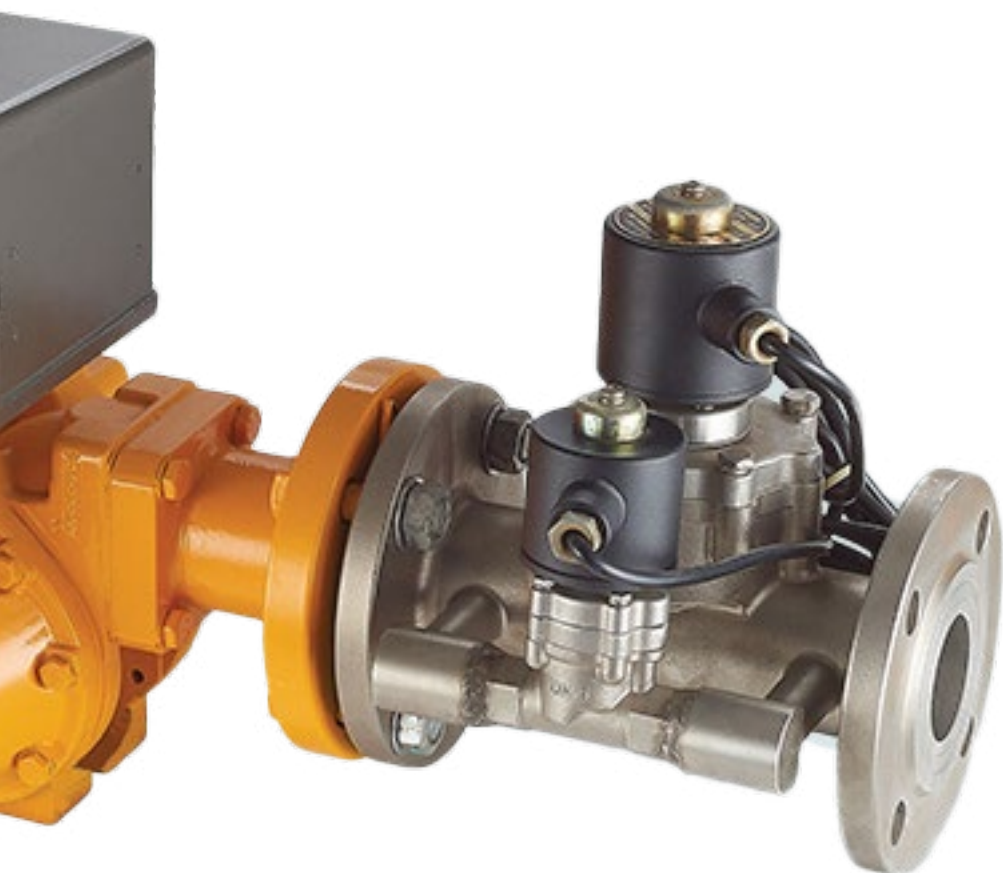
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Hydrogen

21 Public Perception & Social Acceptance



Secretive Hydrogen Hub Talks Test Energy Agency Community Plans



An electrolyzer stack at the Plug Power facility in Concord, Mass. (Photographer: Adam Glanzman/Bloomberg)

The Biden administration is negotiating with hydrogen industry leaders on legally binding commitments involving tens of thousands of new jobs and lower emissions, a pledge crucial to winning community support and achieving US environmental justice goals.

But the secrecy of those negotiations has emerged as an early sticking point in the Energy Department's strategy to engage those communities hosting infrastructure spurred by its \$8 billion hydrogen hub program, environmental justice advocates said and

department officials acknowledged.

The department's negotiations with seven regional hydrogen hubs have been playing out in private since the selections were announced in October. The department and hub leaders have declined to publish their applications, citing confidential business information and saying details are subject to change. They say they will share more publicly when the details of each regional hub are finalized in coming months.

The hubs are among the most closely watched

federal clean energy programs, generating intense interest across the country from oil and gas majors, utilities, transportation fleets, and manufacturers. The industry is still digesting Treasury Department guidance proposed Dec. 22, which included strict green requirements and effectively disqualifies nuclear power plants from powering hydrogen production—potentially upending plans in at least three of the hubs.

But for the communities that could host a range of infrastructure unknown to most of the country, information has been dribbling out. Communities and environmental justice advocates said they feel they've been sidelined since the hubs were established by the bipartisan infrastructure law in November 2021 and the department launched the program in September 2022.

"The DOE is just paying lip service to environmental justice," said Juan Jhong-Chung, climate justice director for the Michigan Environmental Justice Coalition. "Unfortunately, I think it's going to be a long and hard fight."

Public Perception Risk

Hydrogen is posing a major test for the DOE's main vehicle for building local support and putting guardrails on industry: the community benefits plan.

Under the Biden administration, the department has required all applicants for competitive funding to file a plan that explains how they will help residents and conduct meaningful meetings with them. The plans emphasize workforce commitments and showing progress toward meeting the Biden administration's Justice40 goals, which dictate that at least 40% of the benefits of federal spending go to disadvantaged communities.

But concerns over the hub's lack of transparency and shifting scope has created a thorny issue for hydrogen proponents.

The DOE sees negative public perception as a real risk, said a department official who was granted permission to candidly discuss the

program.

But the community benefits plan provides an opportunity to shape a potentially contentious industry by placing guardrails on what benefits a community must receive from the buildout, the official said.

US demand for hydrogen could reach 50 million metric tons by 2050, spurred in large part by the hubs, according to a DOE report published in June. The DOE estimates hydrogen has the potential to add 100,000 net new direct and indirect jobs by 2030.

The hubs alone will also reduce 25 million metric tons of carbon dioxide (CO₂) emissions annually from energy-intensive end-uses such as heavy-duty trucking, shipping, cement, steel, and agriculture, the DOE said in October. That's roughly equivalent to combined annual emissions of 5.5 million gasoline-powered cars.

The hydrogen hub model is complicated and ambitious. The department intends to demonstrate technologies and build infrastructure to produce, transport, and consume hydrogen—all within a region of the country. The seven hubs are geographically and politically diverse, and span from the Pacific Northwest, California, and the Upper Midwest to the Great Lakes, Gulf Coast, Appalachia, and the Mid-Atlantic.

It will be crucial to get an accurate measurement of benefits and harms—and make those public, said Lauren Piette, a senior associate attorney with Earthjustice.

"Is DOE going to be providing clear guidance on how you're supposed to measure benefits?" Piette said. "Having a uniform and credible approach to measuring harms and benefits and tracking them seems like it would be a prudent course of action."

The DOE official said they agency acknowledges the community concerns and understands the frustration.

By Daniel Moore

<https://news.bloomberglaw.com/>

Cover Story

24 Efficient Transformers





Driven to Be More Energy Efficient, Distribution

Most of the time, electricity is there when we need it. A flip of a switch and the lights turn on. A click of a remote control and the television starts up. A press of a button and your bread starts toasting. Now consider everything that has to work for electricity to be taken for granted. While it is a miracle of the modern world, nothing about this is magic: it takes a lot of physics, engineering, and innovation for the electric grid to be safe, reliable, and resilient. Remove any of those qualities, and it only takes a nanosecond before we notice its absence.

Decarbonized and affordable are two other qualities that will only become more important in the race to reduce greenhouse gas emissions by 50 percent by 2030, in accordance with the Paris Agreement. And as the built environment and transportation sector rely less and less on fossil fuels over time, investments in the electric grid will need to keep pace with increased demand. Renewable energy, which keeps getting cheaper to install than polluting sources, will continue to account for most new generation added to the grid.

But the cleanest—and cheapest—energy of all is that which is never produced or consumed to

begin with, which puts energy efficiency at the top of the list of climate solutions. While energy efficiency may be most commonly considered in the context of buildings, the electric grid can be made more energy efficient as well. Among the scores of products covered by appliance and equipment standards developed and promulgated by the U.S. Department of Energy (DOE) are distribution transformers. Transformers are essential for a functional grid. Before electric power coursing through transmission lines can be delivered to a home, a distribution transformer is needed to lower its voltage. There are more than 50 million distribution transformers across the U.S. electric grid, and about 70 percent of them have been in service for 25 years or more.

Even more transformers will be needed as the grid grows up to three times larger to support decarbonization at scale. Modern equipment—mostly made with cores of grain-oriented electrical steel—already fares pretty well: less than two percent of all electricity generated is lost due to distribution transformer inefficiency. But to the extent each new distribution transformer is more energy efficient, even by a little, savings in the aggregate will be significant



Transformers Are More than Meets the Eye

over time. Increasing transformer efficiency will require new technologies and materials, which are at the center of the latest DOE proposal to update standards for this workhorse piece of equipment.

In late 2022, DOE proposed new standards for three categories of distribution transformers that would save more than 10 quadrillion British thermal units (quads) of energy (for comparison, the United States used about 100 quads in 2022) and \$15 billion over 30 years, as well as lower carbon dioxide emissions by 340 million metric tons (the equivalent of closing 90 coal-fired power plants). Greater use of amorphous steel, in addition to grain-oriented electrical steel, would make such savings possible. About 22 million distribution transformers with amorphous steel cores are already in widespread use in Canada and in parts of Europe and Asia.

This brings us to Metglas, Inc., based in Conway, South Carolina. If the proposed energy efficiency standard is finalized, Metglas would be the source of a lot of the amorphous steel necessary for the next generation of distribution transformers. “Simply put, we offer the most energy-efficient, environmentally-

friendly transformer core materials, which are found in transformers around the world,” said Metglas Chief Executive Officer Rob Reed. To meet future U.S. demand driven by updated standards, Metglas is in the process of a massive scale-up operation to increase manufacturing capacity to 45,000 metric tons of amorphous steel over the next two years, with more room to grow.

Amorphous steel was invented in the 1970s for use in distribution transformers and provides at least 60 percent reduction in no-load loss compared to conventional materials. Metglas estimates that installing one of their 750 kilovolt-amp, three-phase transformers (capable of serving up to 10 electric vehicle charging stations) would deliver 6,600 kilowatt-hours of energy savings per year, which is enough to power an average U.S. home for seven months. Multiply these energy efficiency gains by the number of transformers that need to be replaced or installed in the next few decades, and the climate benefits start to add up to very big numbers.

Author: Daniel Bresette

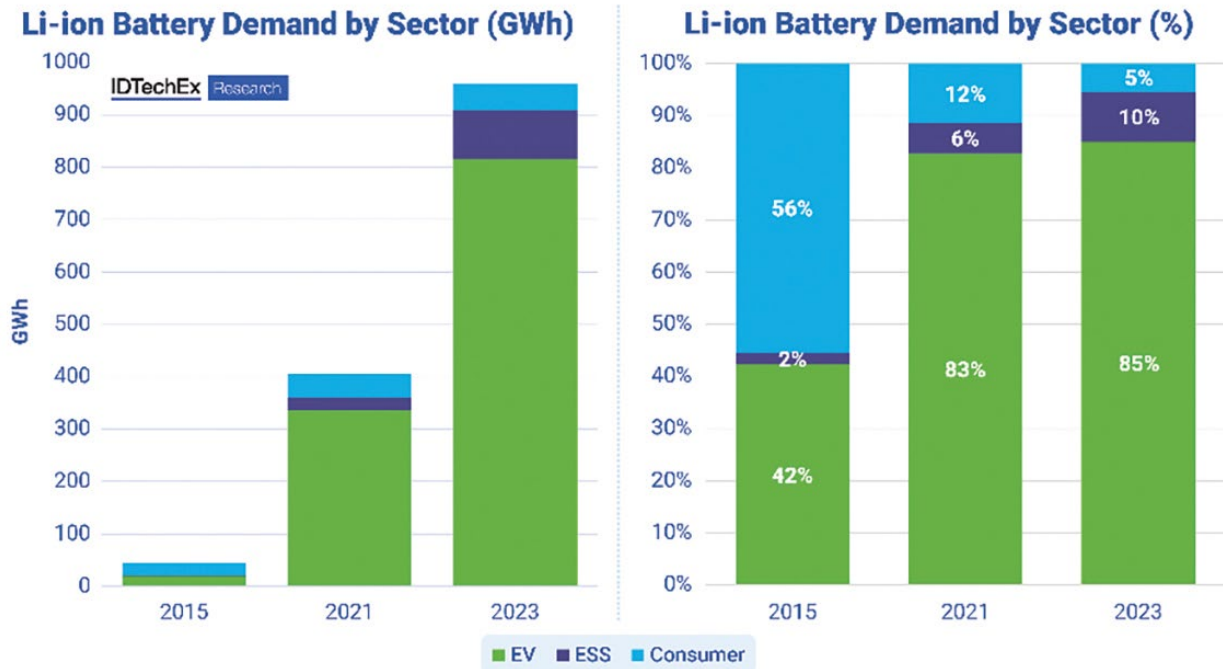
<https://www.eesi.org/>

Energy Storage & Grids

27 *The Future of Energy Storage*



Li-ion BESS Market: Jumps in Demand and Key Trends



Li-ion Battery Demand by Sector (GWh) (left) and (%) (right). Source: IDTechEx

Demand for battery energy storage systems (BESS) will continue to increase over the coming decade across key countries as the volume of renewable energy sources (RES) penetrating electricity grids continues to increase. Governments have continued to announce incentives and schemes to promote the growth of BESS, as well as announce and increase targets for both RES and battery and energy storage. As shown in IDTechEx's newly updated market report, "Batteries for Stationary Energy Storage 2025-2035: Markets, Forecasts, Players, and Technologies", the Li-ion BESS market will reach US\$109B in value by 2035.

Li-ion battery demand by sector

The EV sector has dominated Li-ion battery demand for the last few years. The rapid adoption and increased demand for Li-ion batteries in this sector have led to its improved performance, continued development, and rapid cost reduction. This has also benefited the energy storage system (ESS) market and helped to facilitate its growth. In 2023, ~960 GWh of Li-ion batteries were in demand

globally across EV, ESS, and consumer electronics sectors. While the EV market dominated, the ESS sector saw 10% of this demand, up from 6% in 2021 and only 2% in 2015. While the EV sector will continue to form the majority of global Li-ion battery demand, the annual volumes in demand, by GWh, are to increase significantly in both EV and ESS sectors.

Li-ion BESS demand by country

IDTechEx estimates a 4x increase in Li-ion BESS installations made globally from 2021 to 2023. This is equivalent to 23.1 GWh made in 2021 and 92.3 GWh made in 2023. Chinese and US installations represented 49% and 22% of the installations made in 2023, respectively, emphasizing the continued market activity of players in these countries. Other countries are expected to continue contributing to the global BESS market, and demand will grow here too. Incentives and schemes being established will be key in driving growth in other countries, such as the UK, Italy, Germany, Australia, India, and Chile. For example, the Capacity Investment Scheme



(CIS) in Australia will provide investment in renewable capacity and clean dispatchable capacity such as battery storage. In 2024, the first tender for Western Australia's wholesale energy market was announced via the Scheme, with an initial target of 500 MW / 2 GWh of "clean dispatchable energy". This will be key to growing Australia's grid-scale BESS market in the short term. For more information on regional developments, schemes, incentives, and global battery storage market data, please refer to IDTechEx's report.

Future technology and players' outlook

While Chinese players have contributed to significant growth of their domestic BESS market, they have continued to offer BESS at lower costs. This has given rise to a price war on Li-ion BESS in China, making domestic competition fierce. This is a key driver causing Chinese BESS integrators to start shifting some focus on playing more in overseas markets. Therefore, integrators in these markets are likely to face increasing competition over the coming years. Moreover, several Chinese BESS manufacturers have launched new and larger Li-ion BESS, reaching capacities of 5 MWh or greater for a single 20ft 'containerized' system. This has been achieved by using cells with larger form factors, which typically have a higher energy density, while also utilizing more of the space within containers. Offering Li-ion BESS with higher energy densities is

likely to become more important for BESS manufacturers, especially with the global Li-ion BESS market now being dominated by LFP cells, which exhibit lower energy densities than NMC cells. Moreover, higher energy density BESS could offer cost reductions for customers at both transportation and project levels, given that fewer systems would be needed for a given project capacity.

In the past, the difference in BESS cost and other performance characteristics were more extreme between technologies using LFP rather than NMC cells. This allowed companies selling these systems to more easily express the advantages of their technology. Today, the majority of players are adopting LFP cells in their BESS technologies, and thus, it is becoming more challenging for players to differentiate or express their technologies' advantages. Therefore, more players outside China are slowly starting to launch their own 5+ MWh BESS technologies to at least stay in line with higher energy density technologies being offered by Chinese players. IDTechEx's market report benchmarks Li-ion BESS players' technologies and provides thorough analysis and discussion on Li-ion BESS technology trends related to chemistry, safety, cost and energy density.

Author: Conrad Nichols, Senior Technology Analyst at IDTechEx

Country Reports

30 Egypt

31 Russia

32 France



Egypt's Petroleum Minister Stresses Collaboration in Global Energy Market at Gastech



Egypt's Minister of Petroleum and Mineral Resources, Karim Badawi, stressed the importance of collaboration in the global energy market. This came during his participation in the opening of the Gastech 2024 conference and exhibition in Houston, Texas, highlighting the country's role as a crucial player in global energy markets.

Badawi served as a keynote speaker at the inaugural ministerial session, titled "From Mitigation to Adaptation: Navigating Geopolitical Volatility in a Fragmented Global Order." He was joined by a panel of fellow energy ministers from India, Turkey, the United States, and Nigeria.

Badawi underscored Egypt's strategic position as a gateway for natural gas and hydrogen trade between the East, West, and North. He pointed to the country's robust infrastructure, abundant natural resources, and the growing role of renewable energy sources such as solar and wind power. He stressed the need for strong international collaboration to optimise the use of these resources.

"Cooperation and combined efforts are essential for optimal utilisation of these resources," Badawi said.

He further emphasised the importance of creating a conducive economic environment to attract investments in the petroleum sector, secure the necessary funding for carbon reduction initiatives, and maximise the contribution of renewable energy sources in Egypt's energy mix. He stated that Egypt aims to increase the share of renewable energy to 42% by 2030, aligning with its comprehensive

and sustainable energy strategy. Badawi also highlighted the significance of ensuring sufficient natural gas supplies for value-added projects.

Badawi also addressed the role of technology in maximising production from existing fields and leveraging it to accelerate exploration and discovery processes. He underlined the need to collaborate with regional partners to utilise Egypt's infrastructure for receiving gas from the Eastern Mediterranean region, allowing for liquefaction and re-export to European markets. He also highlighted the importance of leveraging Egypt's extensive infrastructure in petrochemicals and refineries to create added value.

The minister emphasised the vital role of the energy sector in the Egyptian economy and the new government's commitment to accelerating investment attraction and fostering continuous cooperation between private sector companies and government agencies. He reiterated his dedication to continuing the sector's progress, achieving successes, and maximising the value of Egypt's natural resources in alignment with the country's vision for maximising value-added contributions.

The Gastech 2024 conference, which is taking place from September 17 to 20, 2024, brought together a distinguished group of energy ministers and CEOs from global energy companies.

<https://www.dailynewsegypt.com/>

Good Gas Agreements Made with Russia, Turkmenistan



“We seek to turn the agreements into contracts,” Saeed Tavakkoli has stated.

In terms of the gas agreement with Russia, he expressed hope that the agreement can be taken into operation as he said that it is one of the most important and most strategic agreements in the gas area which he believed could turn Iran into an energy hub.

In mid-May, energy officials from Iran and Russia emphasized expanding and developing bilateral cooperation in the field of gas technologies.

Director of the Corporate Planning of the National Iranian Gas Company (NIGC) Hossein-Ali Mohammad Hosseini in a meeting with the energy officials of the Russian Federation stressed the need to enhance bilateral cooperation between the two countries in the gas industry.

He said the two sides should identify the capacities and opportunities for more cooperation and coordination in the field.

Mohammad Hosseini pointed to the willingness of Iran to expand relations with Russia in the energy sector and said the country welcomes the suggestion of Russia’s

Ministry of Energy on setting up a specialized panel discussion in the fields of digitization, monitoring, and analyzing data in the Russia Energy Week and also in Energy Congress in St. Petersburg.

Elsewhere in his remarks, the NIGC director emphasized the need for sharing common experiences in areas such as reducing the amount of gas loss and improving gas installations’ safety against sabotages and terrorist attacks and added that Iran enjoys significant capacities for exporting, importing, refining and transmitting gas and is ready to enhance its cooperation with Russia in this field.

The representatives and authorities of the Russian Federation emphasized the need to identify capacities and opportunities for more coordination.

Setting up a joint research center in the gas sector and also a gas hub in northern Iran as well as trading in gas and electricity sectors were among the other topics discussed by the two sides at the meeting.

<https://www.tehrantimes.com/>

France To Stick with Wind Power Development Targets



A view shows a power-generating windmill turbine at a wind park in Ligne near Nantes, France, September 23, 2024.

France is aiming for a target growth rate of 1.5 gigawatts (GW) per year in onshore wind power, Energy minister Olga Givernet said on Wednesday, which would be in line with the previous government's renewable energy policy goals.

In the run up to parliamentary elections in the summer, the far-right National Rally (RN) made stopping wind power a feature of their election campaign, and also promised to "gradually dismantle" existing wind parks. The RN suffered a setback in the vote, with a leftist alliance taking the top spot, but no group getting a majority.

New Prime Minister Michel Barnier said on Wednesday that the government intended to pursue nuclear power and renewable energy development, while better measuring all their impacts - particularly in wind power - saying that planning work would resume immediately.

Givernet said the government would target having 45 GW of offshore wind power in service by 2050, and said a map of priority areas for its development would be announced soon, with a call for tenders by early 2025.

France produces nearly 70% of its electricity supply from nuclear reactors, and lags other European countries in renewable supply development due to difficult permit processes.

The wind power development plan sticks to the goals announced by the previous government, whose multi-year energy plan was hampered by a lack of an absolute majority in France's National Assembly. It was previously planned for 2023.

The previous iteration of the plan aimed for an onshore wind supply development rate of 1.5 GW per year, with a "more balanced distribution" and an installed capacity of 33 to 35 GW by 2030, up from 22 GW at the end of 2023.

<https://www.reuters.com/>

Services

34 Coming Events



Coming Events

COMEXPO Kenya 2024

Nairobi, Kenya
03 - 05 Oct 2024

<https://smartexpos.in/comexpo/kenya>

COMEXPO Kenya is a trade exhibition that focuses on the general manufacturing and light engineering industries. The event brings together manufacturers, suppliers, distributors...

Li-ion Battery Europe 2024

The Egg, Brussels, Belgium
08 - 10 Oct 2024

<https://li-ion-battery-europe.metal.com/>

LiBE 2024, a leading global platform that unites the full Li-ion Battery value chain, gathering 1000+ leading Scientists, Investors, Project Developers, Financiers, Technology...

Enlit Asia

Kuala Lumpur, Malaysia
08 - 10 Oct 2024

<https://www.enlit-asia.com/>

Enlit Asia is an annual conference and exhibition comprising two events in the energy sector: POWERGEN Asia and Asian Utility Week. It attracts 12,000 attendees...

Oil and Gas Automation and Digitalisation Congress 2024

Neuss, Germany
14 - 16 Oct 2024

<https://automacongress.com/>

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Laser World of Photonics South China 2024

Shenzhen, China
14 - 16 Oct 2024

<https://world-of-photonics.com/de/>

Laser World of Photonics South China focuses on the laser application market in South China and aims to provide personalized products and industry solutions to potential users of laser technology in South China to meet users' stringent...

International Conference on Power and Energy Applications 2024

Taiyuan University League, Taiyuan, China
18 - 20 Oct 2024

<https://www.icpea.org/>

The field of Power and Energy Applications is undergoing rapid and significant changes in response to the growing demand for sustainable, efficient, and reliable energy solutions worldwide...

ASEAN Clean Energy Week

Manila, Philippines
21 - 22 November 2024

<https://www.aseancleanenergyweek.com/>

In November the SMX Convention Center Manila will host the 7th edition of ASEAN Clean Energy Week. 5000 attendees, of which 1,500 are C-suite executives will come together to discuss how to expedite the green transition in Southeast Asia...

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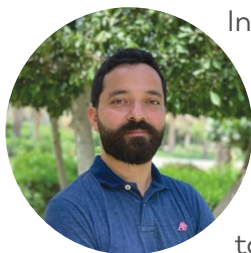
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Renewable Energy Investment ‘Must Triple To \$1.5tn by 2030’ To Achieve Global Goals



International investment in renewable energy must triple to \$1.5 trillion annually by 2030 to meet the global goal of tripling renewables, the International Renewable Energy Agency has said.

Despite record spending of \$570 billion last year, current national plans are set to deliver only half of the required renewable power growth, the Abu Dhabi-based Irena said in a report released on Friday after the pre-Cop29 talks in Azerbaijan.

This huge funding gap threatens the global objectives of tripling the renewable capacity and doubling energy efficiency by 2030, which are critical for maintaining the 1.5°C threshold established in the Paris Agreement in 2015, a treaty in which 195 nations pledged to tackle climate change.

The world needs to “think bigger, act bolder-and collectively move faster on our energy transition journey”, Dr Sultan Al Jaber, Cop28 President, said.

“The opportunity is there but we need more nations to step up to the plate by including specific renewable energy and infrastructure targets in their upcoming NDCs [Nationally Determined Contributions], incentivising private investment, and making it easier to develop and deploy projects,” said Dr Al Jaber, who is also UAE Minister of Industry and Advanced Technology.

NDCs are climate action plans that individual countries develop and submit to outline their commitments to reduce greenhouse gas emissions and adapt to climate impacts.

Irena’s report followed Dr Al Jaber’s comments at Global Renewables Summit in New York City in September, where he emphasised global investment in renewable energy must more than triple in the next six years to meet the 11,000-terawatt capacity target by 2030 needed to keep 1.5°C within reach.

The UAE Cop28 presidency has signed a partnership with the hosts of the next two climate conferences, Azerbaijan and Brazil, to help keep the crucial global climate goal within reach.

The Cop presidencies troika aims to boost co-operation and ensure continuity between the hosts of the annual climate talks in what is being called “mission 1.5°C”.

To deliver the UAE consensus goals on the ground, “significant advances” will be required across the key sectors of energy transition, including infrastructure and system operation, policy and regulation, supply chains, skills and capacities, finance and international collaboration, the Irena report said.

To meet the global goals, installed renewable capacity needs to reach 11.2 terawatt by 2030 from the current levels of 3.9TW. However, the current national plans are projected to leave a global collective gap of 3.8TW by 2030, falling short of the goal by 34 per cent, the report revealed.

The annual energy intensity improvement rate must increase to 4 per cent on a yearly basis, as well by the end of the decade, from 2 per cent in 2022. This will require faster progress in efficiency measures and electrification across multiple sectors, including transport, building and industry.

Alkesh Sharma

<https://www.thenationalnews.com/>

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