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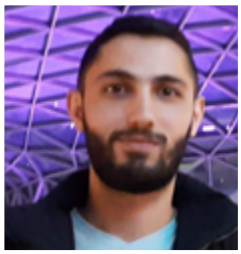
Redefining Industrial Energy: Breakthroughs in Sustainability and Efficiency



The energy sector is undergoing a significant transformation, driven by the imperative to adopt sustainable industrial solutions that enhance efficiency and reduce environmental impact. Recent advancements are paving the way for a more sustainable future, with a notable focus on green hydrogen production, energy-efficient technologies, and innovative energy storage solutions.

A landmark development in green hydrogen production has emerged from Finland, where P2X Solutions has commenced commercial operations at the country's first green hydrogen plant in Harjavalta. This facility, with a capacity of 20 MW, utilizes renewable energy sources, particularly wind power, to produce green hydrogen. The project received substantial financial backing, including a €26 million investment grant from the Finnish Ministry of Economic Affairs and Employment and a €10 million capital loan from the Finnish Climate Fund. This initiative not only marks Finland's entry into large-scale green hydrogen production but also sets a precedent for future projects aimed at scaling up sustainable energy solutions.

In the realm of energy efficiency, industries are increasingly adopting advanced technologies to optimize operations. The integration of smart sensors, energy-efficient motors, and waste heat recovery systems is transforming industrial processes. These innovations enable real-time monitoring and control, leading to significant reductions in energy consumption and operational costs. By embracing these technologies, industries are not only enhancing productivity but also contributing to global sustainability efforts.

Energy storage solutions are also witnessing significant advancements, particularly in the development of thermal energy storage systems. A notable example is the collaboration between Chevron and Australian start-up MGA Thermal. This partnership focuses on utilizing MGA Thermal's energy storage blocks to power a 5-megawatt-hour unit in the United States. The technology involves storing and processing heat, which can then be used to generate steam at temperatures up to 600°C. This innovative approach offers a cost-effective and scalable alternative to traditional battery storage, presenting new avenues for industrial decarbonization.

Beyond these specific innovations, the broader energy industry is experiencing a surge in sustainable practices. Companies are increasingly investing in renewable energy sources, such as solar and wind power, to meet their energy needs. The integration of digital technologies, including artificial intelligence and data analytics, is further enhancing energy management by enabling predictive maintenance and optimizing energy distribution. Additionally, policy frameworks and international collaborations are playing a crucial role in accelerating the adoption of sustainable solutions across the industry.

These developments underscore a collective commitment within the energy sector to embrace sustainable industrial solutions. By leveraging technological innovations and fostering collaborative efforts, the industry is poised to achieve significant strides toward a more sustainable and efficient future.

In This Issue!

energyHQ's February 2025 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 about Growth of Offshore & Onshore wind

- Article on page 16 focuses on Safety & Waste Management in Nuclear

- Article on page 24 sheds the light on Sustainable Industrial Solutions

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
Editor-in-Chief
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World Digest

Qatar

Qatar's LNG Expansion to Fuel the Global Transition

Qatar is rapidly expanding its annual LNG production capacity from 77 million (metric) tones (MT) in 2024 to 142 MT by 2030—an 85 percent increase. This growth is designed to establish Qatar as a leading player in the global LNG market, with the potential to control nearly 25 percent of the market by the decade's end. By outpacing competitors like the US and Australia, Qatar aims to strengthen its leadership and maintain a dominant role in the global LNG industry.

The anticipated surge in LNG production and exports is expected to remain a key driver of economic development in Qatar in the coming years. Alongside its LNG expansion, Qatar has strategically positioned itself within global climate change negotiations. Transitioning from its relatively quietist stance in the 2000s, it has consistently advocated for the increased use of natural gas as a low carbon transition fuel within a diversified energy mix.

Qatar has also committed to reducing its domestic reliance on hydrocarbons, but this goal must be viewed in context. Unlike Saudi Arabia and the UAE, which faced significant gas allocation challenges in the late 2000s and early 2010s due to demand-production imbalances, Qatar has consistently managed to meet both domestic needs and export demands through its robust natural gas production.

Italy

Italy Asks for Pragmatism in Energy Transition

Italy's prime minister Giorgia Meloni today called for pragmatism in approaching the "historic challenge" of energy transition.

The ambitious goals of tripling renewable energy capacity and doubling annual energy efficiency gains by 2030, agreed in the first global stocktake at the UN Cop 28 climate summit in the UAE, are far from being achieved, Meloni said at Abu Dhabi sustainability week, but "this must not frighten us or lead us to step back".

The IEA found in June last year that current renewable energy plans — the so-called nationally determined contributions (NDCs) — for 2030 fall short of the ambition set at Cop 28, and that most countries need to up their targets in new plans due to be submitted this year.

Meloni suggested countries should think in new ways, adding that decarbonisation plans cannot "come at the price of economic desertification." Ideology cannot stand in the way of methods that could help build a viable alternative to fossil fuels, she added. She also called for "overcoming the anachronistic division between developed nations and emerging ones, so as to share responsibilities".

"We need a balanced energy mix based on the technologies we have in place, those we are experimenting with and those yet to identify," she said, referring to renewables energies, such as wind and solar, green hydrogen but also biofuels, gas, carbon capture and nuclear fusion.

Malaysia

Malaysia aiming to become energy, chip making hub, PM says

Malaysia wants to leverage its location to become an energy and chip manufacturing hub this year, riding a recent jump in investments and a favourable outlook for the domestic economy, its premier and economic minister said on Thursday.

Malaysia is fast becoming a haven in Southeast Asia, with foreign investors returning as improving growth and a stable currency set it apart from peers grappling with political flux and economic uncertainty.

Prime Minister Anwar Ibrahim said Malaysia's economy rebounded dramatically last year, spurred by an influx of strategic investments, most substantially in renewable energy and artificial intelligence infrastructure. He added inflation and the ringgit were stable and the stock market was the region's top performer.

"In 2025, we want to double down on our geographical centrality, as a conduit for electricity, talent and supply chain diversification," he said at an economic forum.

Anwar said Malaysia will now aim to refine its expertise in oil and gas, semiconductors, and Islamic finance to become a global market leader in each field.

Economy minister Rafizi Ramli said Malaysia is looking to produce its own graphics processing unit chips as demand for artificial intelligence and data centres grows.

Morocco

Morocco aims for 20 % energy savings by 2030

Morocco's Minister of Energy Transition and Sustainable Development, Leila Benali, praised Morocco's efficiency approach, which will lead to 20 % energy savings by 2030. Benali mentioned that the approach considers several objectives set within the country's sustainable development strategy, as well as the recommendations of the new development model.

During a meeting of the Public Finance Control Committee in the House of Representatives, focused on the financial management of the Moroccan Agency for Energy Efficiency (AMEE), Benali stressed that the new outlook considers the objectives of the National Strategy for Sustainable Development (SNDD), as well as the suggestions of the New Development Model, and targets the transport, construction, industry, agriculture and lighting sectors.

Benali said that more than 2,000 megawatts (MW) of renewable energy projects have been authorised during the current government's tenure. These projects represent an investment of more than $1.8 billion and have already generated more than 300 direct jobs and thousands of indirect jobs.

The approach seeks to ensure that 'new investment projects comply with the principles of energy efficiency,' Benali explained, adding that it incorporates these measures 'in public spending and state-supported programmes'. He added that this makes 'energy efficiency an essential concern for professionals and citizens'.

Mexico

Mexico to Reshape Energy Market and Limit Private Sector's Role

Mexican President Claudia Sheinbaum plans to reshape the country's energy markets by prioritizing state control of the sector and reducing the role played by the private companies.

Sheinbaum and her ruling Morena party in October approved sweeping changes to Mexico's electricity and hydrocarbons industries by reclassifying state-owned enterprises Pemex and CFE from productive to public companies.

Market sources and observers said the change marks a partial reversal of energy reform implemented in 2013 by then-President Enrique Peña Nieto that was designed to foster greater competition between private and state-owned energy companies.

The new law also put the state in charge of designing and planning electric markets, while granting CFE preference over private competitors in electricity dispatch.

Valeria Vázquez, lead energy and resources partner at global consulting firm Deloitte, said that while it remains unclear how private companies will participate in hydrocarbons, statements from government officials suggest both CFE and Pemex will be given preference over private operators.

"The law now establishes Pemex and CFE as the main operators in the market with specific rules for private participation [that are] different from what we have today," Vázquez said.

Sheinbaum in November released her energy plan giving Pemex and CFE a preeminent role and offering some clues about the potential role of the private sector, she said.

New Zealand

Why Young Professionals Should Care About Energy Policy: Facts From New Zealand

Young professionals in New Zealand have unique opportunities to shape the future of the energy industry by driving innovation, influencing policy, and advancing a sustainable, low-carbon economy.

The impacts of energy policy touch every level of our lives, from our daily meals to international trade and the global economy. The decisions made by governments and organizations about how we produce, distribute, and consume energy impact everything from the price we pay for electricity and gas to the reliability of our power supply and, ultimately, if the lights are on in our homes at night.

Well-crafted and considered energy policies ensure the security of supply that households and businesses need to go about their daily lives without the thought of sudden power outages or unaffordable electricity prices.

Policies promoting new energy sources like wind and solar power create new jobs while policies supporting traditional fuels can help sustain jobs in existing industries. This balance is essential for economic stability and growth as the world transitions to a lower-carbon, more electrified future.

Young professionals considering their early career moves are well advised to keep the energy sector and its policies on their radar. The sector is constantly evolving and adapting to the changing needs of populations, technological advances, and the need to mitigate the effects of climate change.

Renewable Energy

07 Growth of Offshore & Onshore wind

Accelerator Opens To Increase Tribal Capacity for Engaging in Offshore Wind Energy

Offshore wind energy, which generates electricity from wind blowing across the sea, is growing on a global and national scale. As of May 31, 2024, there were 174 megawatts of U.S. offshore wind power in operation and approximately 25,116 megawatts under development, according to the National Renewable Energy Laboratory's (NREL's) Offshore Wind Market Report: 2024 Edition.

This growth, which has the potential to power millions of homes, may also affect marine ecosystems, Tribal communities, cultural resources, and economic opportunities. That is why it is critical that Tribal Nations have the capacity to ensure that their perspectives are represented during offshore wind planning efforts to elevate their needs, priorities, and challenges.

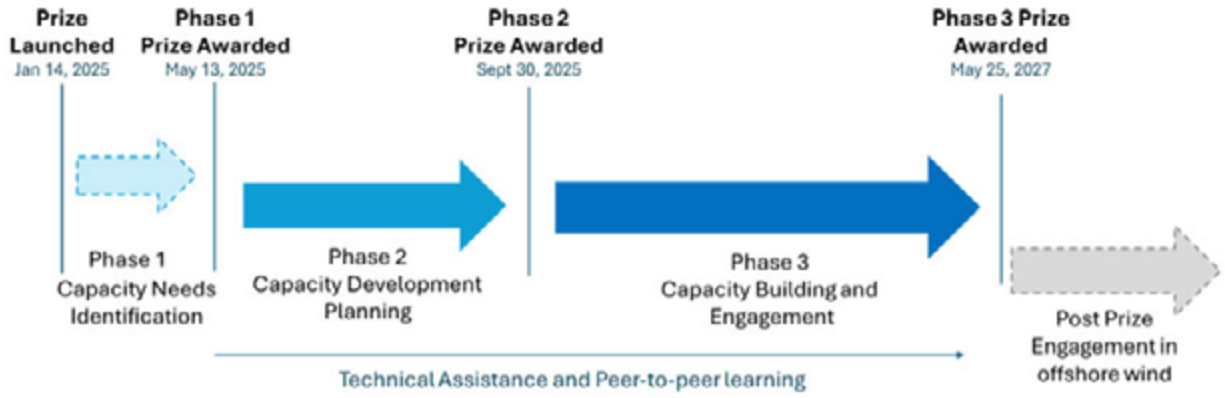
NREL, on behalf of the U.S. Department of Energy (DOE), has launched the Capacity Accelerator for Tribal Offshore Wind Engagement on Jan. 14, 2025, aimed at supporting the capacity of Tribal Nations to engage in decision-making processes and projects related to offshore wind energy.

This initiative offers $7.1 million in cash awards and technical assistance to support the engagement of Tribal Nations and Tribal

collaboratives with offshore wind activities across the country. Participation in the capacity accelerator is not an indication of support for offshore wind energy; rather, awardees are given an opportunity to build up their communities' resources and capabilities to engage in planning efforts.

To design a capacity accelerator that best meets the needs of Tribes, NREL sought feedback from Tribes, Tribal-supporting organizations, and organizations working with Tribes on offshore wind energy projects. Based on that input, the capacity accelerator is structured in three phases to allow Tribes and Tribal collaboratives to address specific community needs:

- **Phase 1—Capacity Needs:** Applicants outline their offshore wind engagement priorities and capacity-building plans. Selected participants will receive funding, technical assistance, and an invitation to Phase 2.
- **Phase 2—Capacity Development:** Applicants expand their plans, conduct assessments, engage with Tribal communities, and develop partnerships. Awardees receive additional funds and technical support to implement their plans and are invited to Phase 3.
- **Phase 3—Engagement:** Applicants carry out their plans, focusing on activities like economic development, workforce training, environmental monitoring, and incorporating traditional ecological knowledge into offshore wind energy processes. Final awards are based on the success and impact of these efforts.



This initiative welcomes applications from federally recognized Tribal Nations and Tribal collaboratives. Awards may be granted to individual Tribal or Tribal collaboratives, ensuring support for Tribes that may face geographic or priority-related isolation. At the same time, the program encourages broader collaboration among Tribes and other relevant organizations.

https://www.evwind.es/

Sustainability & Decarbonization

10 Decarbonizing Industrial Sectors

GCC energy companies must embrace product-level decarbonization to stay competitive globally

• Lower carbon intensity of GCC products presents unique opportunity in regulated markets

• Joint report by World Future Energy Summit and Strategy& Middle East recommends four strategic steps for GCC energy players to lead decarbonization efforts

Major energy players in the GCC are now obligated to report their overall carbon emissions - as part of national biennial carbon inventory submissions - under UNFCCC guidelines. However, national and regional carbon policies are evolving; and energy products often fall under the scrutiny of

Abu Dhabi, UAE - 20 January, 2025: As global policies tighten to reduce greenhouse gas emissions, energy companies face increasing pressure to transition from broad reduction targets to precise strategies which address the carbon footprint of individual products. This requires a complete rethink of how emissions are measured, reported, and mitigated.

For GCC energy companies, this presents both an opportunity and a challenge, as their relatively lower-carbon intense products offer a competitive edge to differentiate themselves in increasingly carbon-conscious global markets, according to a new report titled «Rethinking Corporate Decarbonization: From Enterprise Targets to Product Strategies,» a collaboration between the World Future Energy Summit, and Strategy& Middle East, part of the PwC network.

policies developed far beyond their country of production.

New carbon policies and regulatory frameworks are increasingly emphasizing the carbon footprint of products. With regulations such as the EU's Carbon Border Adjustment Mechanism (CBAM) mandating full carbon transparency at the product level, energy companies must rethink their strategies to stay competitive. This shift reflects demand for transparency regarding the emissions

associated with or embedded in individual products along their entire value chain, from extraction of raw materials, through processing, manufacturing, logistics and even end-of-life.

"This marks a pivotal moment for energy players. Setting broad corporate emissions targets is no longer sufficient. By adopting product-level decarbonization, GCC energy companies can transform regulatory pressures into growth opportunities, securing their position as leaders in the global energy transition," **said James Thomas, Partner at Strategy& Middle East.**

The report presents a 3D framework which represents a real-time view of the latest global policies impacting sectors and products. It enables GCC energy companies to align carbon accounting and emissions mitigation efforts with regulatory demands and market expectations. The approach helps companies respond dynamically to policy shifts and stakeholder demands, positioning them ahead of competitors who adhere to traditional enterprise-level emissions goals.

"GCC energy companies have a unique opportunity to lead by example, leveraging innovative decarbonization strategies to align with global demands. This transition will not only safeguard market access but also position them as pioneers in the low-carbon economy," **added Leen AlSebai, General Manager of RX Middle East and Head of the World Future Energy Summit.**

Carbon accounting as a source of competitive advantage

Shifting to product-level carbon accounting offers GCC energy players several strategic advantages, such as enabling tailored emissions reductions to meet market standards, improving compliance with global policies and enhancing product transparency to build customer trust and reputation. Additionally, it establishes flexibility for adapting to shifting policies and market dynamics, ensuring long-term resilience.

Key actions to transition to product-level carbon accounting

However, the report notes that implementing a product-level carbon accounting strategy is not without its challenges. Many GCC energy players have yet to fully codify and deploy carbon accounting policies at the corporate level, let alone for individual products.

Several GCC countries are still developing their regulatory and legislative agenda for carbon emissions. Additionally, robust methodologies and significant data management are needed to accurately allocate emissions from shared facilities, particularly in complex operations

To mitigate these challenges and seize opportunities, the report outlines four critical dimensions for energy companies to focus on. Specifically, GCC energy players must:

1. Develop, codify and deploy robust product-level carbon accounting frameworks that align with global regulations.

2. Invest in advanced automation and data management systems for accurate emissions reporting and real-time policy compliance.

3. Focus decarbonization efforts on products exported to high-regulation markets, ensuring compliance and competitive advantage.

4. Investing in capabilities to continuously track and respond to shifting carbon policies globally, ensuring adaptability and leadership.

The Path Forward

As the GCC continues to position itself as a global energy leader, transitioning to product-level decarbonization represents a pivotal opportunity to lead by example. By taking these steps now, GCC energy companies will be well-positioned to navigate future changes, fostering resilience and growth in a carbon-conscious world.

Strategy & Middle East

Oil & Gas

13 Innovation in Refining & Petrochemicals

Lootah Biofuels Calls for Greater Awareness of Sustainable Practices and Reducing Food Waste

Lootah Biofuels, a pioneer in circular economy solutions through the production of biodiesel from used cooking oil, has emphasised the importance of raising awareness about sustainable practices and reducing food waste, particularly during periods of high food consumption, such as the holy month of Ramadan.

Since its establishment in 2010, Lootah Biofuels has been producing biodiesel from used cooking oil. The company is now preparing to expand its network of suppliers to collect and recycle used cooking oil for biodiesel production. Currently, the company's top 10 institutional partners supply approximately 300,000 litres of used

cooking oil per month to Lootah Biofuels› production facility.

As part of its initiatives to promote sustainability, Lootah Biofuels plans to launch a smart app in the coming months. The app will encourage individuals, businesses, and organisations across the UAE to safely dispose of used cooking oil at designated collection points. This used oil will then be converted into biodiesel, contributing to environmental sustainability. The app will simplify the process of contacting Lootah Biofuels for oil collection, supporting recycling efforts, reducing pollution, conserving resources, and minimising the negative environmental impacts of discarding used cooking oil as waste.

Yousif Bin Saeed Lootah, Founder and CEO of Lootah Biofuels, said: «Our focus on sustainable solutions aligns with the UAE's vision and its leading initiatives to promote sustainability, the circular economy, and innovation. We are committed to raising awareness about the efficient use of resources and expanding our network to collect used cooking oil to produce eco-friendly and sustainable biofuel. We invite individuals and organisations to take advantage of the available channels to reduce food waste and recycle used oil to preserve our resources and support sustainable solutions.»

Lootah further highlighted the importance of learning from global best practices and encouraging individuals and families to actively participate in collecting used cooking oil. He added that Lootah Biofuels will continue to launch initiatives aimed at expanding its collection network and converting used oils into clean, environmentally friendly, and cost-effective biofuel.

Estimates from the UAE Food Bank reveal that food waste costs the UAE economy up to AED 13 billion annually. Food that ends up in landfills emits methane, a greenhouse gas significantly more harmful than carbon dioxide in driving global warming. According to recent studies, 38% of prepared food in Dubai is wasted, with the figure rising to 60% during Ramadan. Additionally, per capita food waste in the UAE increases from 2.7 kg per day to 4.5 kg daily during the holy month.

Lootah stressed the value of government and private sector initiatives aimed at reducing food waste and enhancing sustainable practices. He stated: «Recycling waste protects public health and prevents environmental pollution, aligning with the UN Sustainable Development Goals and the UAE's Net Zero by 2050 strategy. At Lootah Biofuels, we are increasing our efforts to raise awareness of sustainable initiatives and meet the objectives of the UAE's National Biofuel Policy by providing clean and sustainable energy sources."

Furthermore, Lootah Biofuels aims to support the percentage of recycling UCO to reach 80% in the coming years, up from the current level of less than 50%, which is largely sourced from restaurants and the hospitality sector.

The company is committed to advancing the use of biodiesel in transportation and supporting the National Biofuel Policy, developed by the Ministry of Energy and Infrastructure in coordination with strategic public and private sector partners. The policy aims to diversify energy sources and increase the share of biodiesel to 20% by 2050. Full reliance on biodiesel can reduce the carbon footprint of diesel-powered vehicles by 75%.

Notably, Lootah Biofuels produces biodiesel from used cooking oil, which offers the highest carbon reduction rate among all biodiesel feedstocks. The company currently exports biodiesel to European countries such as the Netherlands, Germany, and the UK, as well as India, and plans to expand exports to the Gulf states, and Asian markets amid rising global demand for biofuel.

Lootah Biofuels

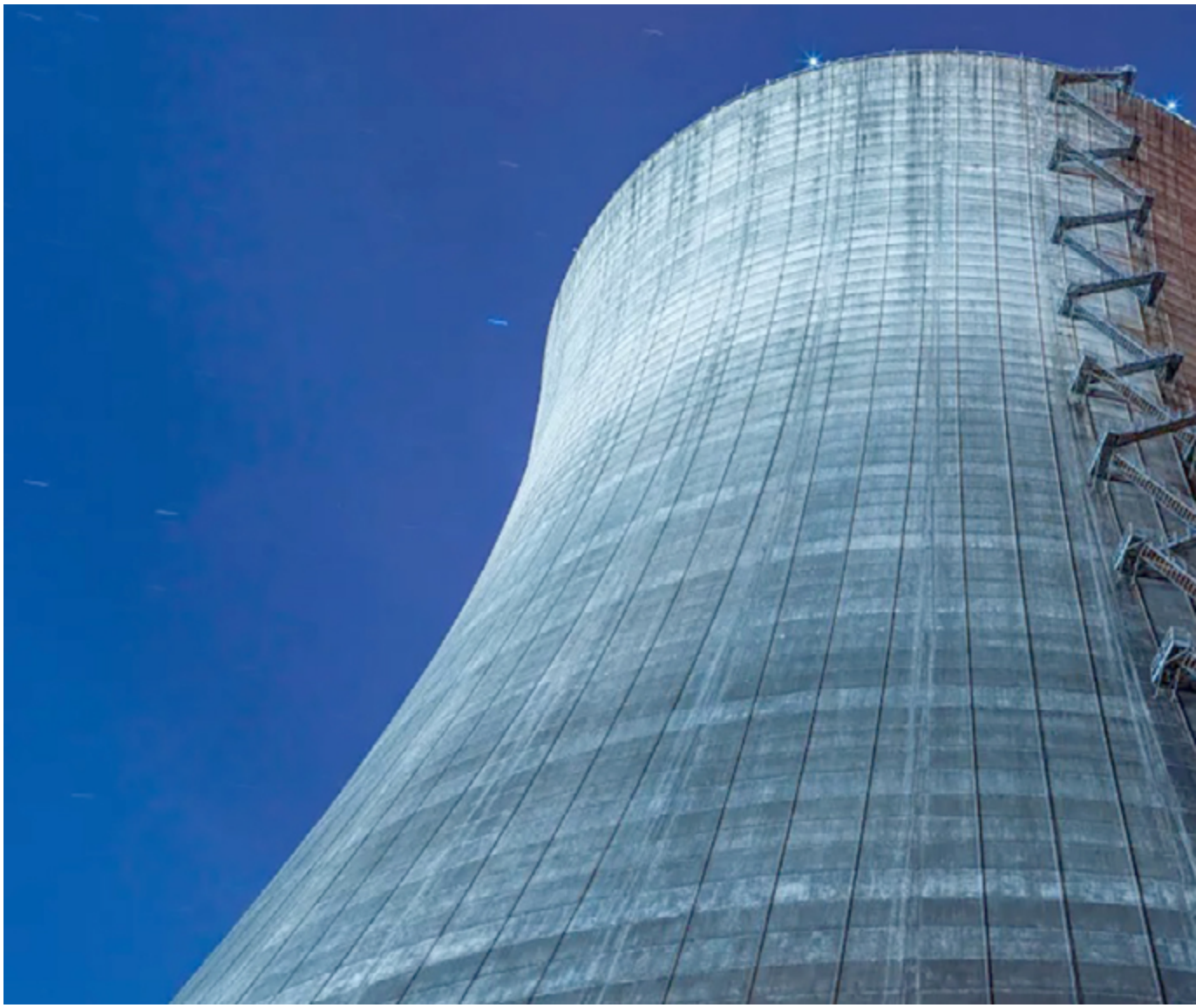
Nuclear

16 Safety & Waste Management in Nuclear

What's Next for Nuclear Power

Global shifts, advancing tech, and data center demand: Here's what's coming in 2025 and beyond.

For over 70 years, nuclear reactors have been a key player in global power generation. Today, the industry is on the brink of transformation as surging electricity demand—driven by electric vehicles, data centers, and broader electrification—sparks renewed interest in nuclear energy. Governments and industries worldwide are revisiting nuclear power, aiming to expand capacity, extend plant lifetimes, and even resurrect closed facilities. Moreover, 2025 will be pivotal for advanced reactors, transitioning from conceptual designs to actual construction.



A Global Commitment to Nuclear Expansion

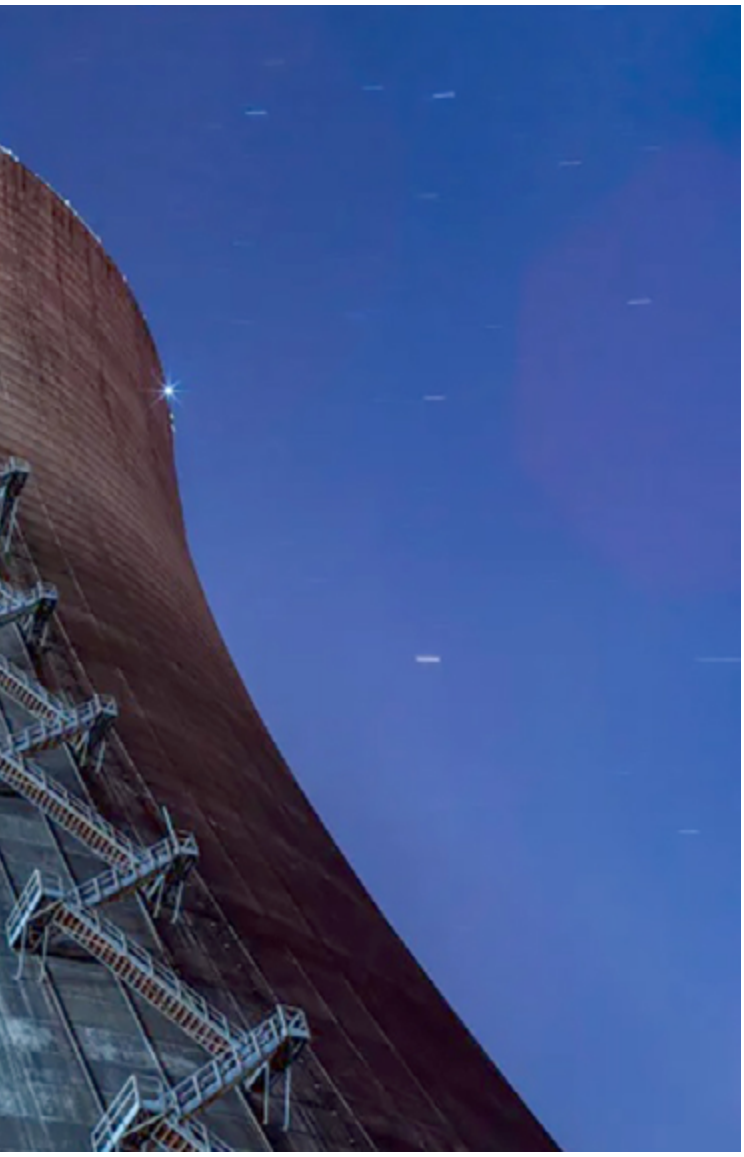
A new wave of global commitment to nuclear power includes a pledge from 31 countries at UN climate talks to triple nuclear capacity by 2050. However, progress varies by region. The United States, boasting the world's largest fleet of operational reactors, faces challenges. While the new Vogtle reactor in Georgia came online recently, no major projects are currently under construction or regulatory review.

In contrast, Asia leads the charge, with significant

growth in China, which now ranks third globally in reactor capacity after the U.S. and France. China is commissioning multiple reactors annually, with plans for more advanced designs in the pipeline. Meanwhile, countries like Bangladesh, Turkey, and Egypt are constructing their first nuclear facilities, signaling a growing global interest in the technology.

Advanced Reactors: The Next Generation

Traditional reactors rely on low-enriched uranium



and water cooling, but advanced designs aim to enhance safety and efficiency. These Generation IV reactors employ innovative technologies, including molten salt, lead, and high-temperature gas cooling. In the U.S., companies like Kairos Power and TerraPower are making strides with demonstration projects expected to be operational within the decade. Notably, Project Pele, a U.S. Department of Defense initiative, aims to deliver a transportable microreactor by 2026. China is also exploring advanced technologies, commissioning its first high-temperature gas-cooled reactor in 2023 and planning larger-scale projects.

Maximizing Existing Capacity

Amid long timelines for new projects, optimizing existing nuclear capacity is crucial. License extensions for aging plants are gaining traction. Many reactors originally licensed for 40 years have received extensions to operate for 60 or even 80 years, with countries like France and Spain adopting similar measures. Efforts to reopen shuttered plants, such as Michigan's Palisades Nuclear Plant, are also underway. However, challenges like equipment damage and high repair costs could hinder progress.

Big Tech's Nuclear Ambitions

The rise of AI and the energy demands of data centers have drawn tech giants to nuclear energy. Microsoft, for instance, has committed to purchasing power from the potential reopening of Pennsylvania's Three Mile Island reactor. Google has partnered with Kairos Power to develop up to 500 megawatts of capacity by 2035, while Amazon has directly invested in X-energy's small modular reactor projects. These collaborations could provide much-needed funding for both sustaining existing reactors and advancing new projects.

The Road Ahead

2024 marked a turning point for nuclear energy, with heightened interest and investment making it one of the industry's most dynamic years in decades. Yet, deploying nuclear power at the scale required to meet global energy demand remains a challenge. With growing support from governments, industries, and even tech giants, nuclear energy could play a transformative role in shaping the future energy landscape. As nuclear engineer Staffan Qvist aptly states, "There's a big world out there hungry for power."

By Casey Crownhart
https://www.technologyreview.com/

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JYM/LP Mini Digital Flow Meter with Pulser

JYM/X-1 series Oval Gear Meter is for controlling and measuring low, medium and high viscosity, such as fuel, lubrication oil with the advantages of high precision and low pressure loss, compact, light weight design and easy installation.

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JYM/P-1 Oval Gear Meter with pulse output, built-in reed switch, signal line output.

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Hydrogen

21 Hydrogen Storage & Transporation

Lignin-Based Jet Fuel Unlocks Hydrogen Storage Breakthrough

An innovative breakthrough in hydrogen storage technology could pave the way for a more sustainable future, thanks to an international team of scientists who have safely developed a method to store and release hydrogen using lignin-based jet fuel.

This cutting-edge discovery offers a potential solution to one of the most persistent challenges in renewable energy: finding efficient, safe, and cost-effective hydrogen storage and transportation methods.

A game-changing hydrogen storage solution

Hydrogen, often referred to as the fuel of the future, is a clean and high-energy carrier that holds immense promise for decarbonising industries and achieving zero-emission goals.

However, its low density and highly volatile nature make conventional storage methods, such as pressurised tanks, inefficient and expensive.

Researchers at Washington State University (WSU), in collaboration with Pacific Northwest National Laboratory, the University of New Haven, and Natural Resources Canada, have demonstrated a novel approach to storing hydrogen chemically in a stable liquid form.

The key lies in lignin-based jet fuel – an experimental fuel derived from lignin, a naturally occurring polymer found in plants. This innovative material allows hydrogen to bind chemically, enabling high-density storage without the need for cumbersome pressurised systems.

Harnessing the power of lignin-based jet fuel

The research highlights the dual potential of lignin-based jet fuel. Not only does it act as a sustainable aviation

fuel that enhances engine performance and reduces pollutants, but it also serves as a safe and efficient medium for hydrogen storage.

By chemically reacting lignin-based jet fuel with hydrogen, the research team was able to produce aromatic carbons and stabilise hydrogen molecules in a liquid state.

This dual function represents a significant advancement for hydrogen technologies, offering a practical and scalable solution for transportation and energy industries.

Moreover, the lignin-based jet fuel was developed through a process that utilises agricultural waste, making it a truly sustainable innovation.

Earlier studies from WSU have demonstrated the fuel's ability to boost engine efficiency and eliminate harmful aromatic compounds found in conventional fuels.

Hydrogen fuel: The future of clean energy

The potential of hydrogen as a clean energy source is immense. As a versatile energy carrier, hydrogen can be used to power vehicles, integrate renewable energy systems, and decarbonise industrial processes.

Unlike fossil fuels, hydrogen combustion produces only water as a byproduct, making it a zero-emission alternative for applications ranging from transportation to manufacturing.

In recent years, global efforts to transition to hydrogen-powered systems have gained momentum. However, challenges related to hydrogen storage, transport, and infrastructure compatibility have slowed widespread adoption.

The lignin-based jet fuel technology developed by WSU researchers offers a potential solution to these barriers, enabling hydrogen to be stored and transported more safely and efficiently while remaining compatible with existing energy infrastructure.

Scaling the technology

Looking to the future, WSU researchers are collaborating with the University of New Haven to enhance this technology further.

The team plans to develop an AI-driven catalyst that will optimise the chemical reactions involved, making the process even more efficient and cost-effective.

WSU's Professor Bin Yan explained: "This innovation offers promising opportunities for compatibility with existing infrastructure and economic viability for scalable production.

"It could help create a synergistic system that enhances the efficiency, safety, and ecological benefits of both sustainable aviation fuel and hydrogen technologies."

If successful, this approach could unlock a new era of clean energy solutions, enabling hydrogen to reach its full potential as a cornerstone of sustainable energy systems.

From powering zero-emission vehicles to providing a backup for renewable energy sources, hydrogen storage innovations like this one could play a critical role in meeting global climate goals.

https://www.innovationnewsnetwork.com/

Cover Story

24 Sustainable Industrial Solutions

WEG Supplies Integrated Drives for Major UAE Sustainability Project

WEG, a leading electric motor, variable frequency drives and gearbox manufacturer, will support a major UAE oil and gas organisation in reducing its onshore operations' environmental footprint. WEG's integrated drive solutions, including electric motors, variable speed drives (VSDs) and transformers, will help maximise efficiency, reliability and safety in critical water injection operations.

The $2.4 billion project will create a state-of-the-art seawater treatment facility and transportation network to enable more sustainable water injection operations. Water injection is a common procedure in upstream oil and gas applications — used to maintain pressure or to drive oil towards the well to increase production.

The new infrastructure will replace the existing high-salinity, deep aquifer water system, reducing energy consumption by up to 30 per cent during water injection procedures. Entirely powered by renewable energy, the project will deliver more than 110 million imperial gallons per day of nano-filtered seawater. The system operates through 75 kilometres of transportation and over 230 kilometres of distribution pipelines and two pumping stations.

WEG's solutions will drive the water injection pumps at the heart of the project. The company will supply 21 integrated drive packages, including WEG M-Line (Master Line) 6.6kV medium voltage motors with power ratings between 6.63MW and 11.97MW, medium voltage MVW01 VSDs and Oil Type phase-shifting transformers.

One of the highlights of WEG›s integrated solutions is an entirely new arc-resistant VSD developed specifically for this project. The drive is designed to absorb explosions caused by sudden electric arcs, protecting pump operators and maintenance personnel working on site. Other notable features include touchscreen HMI for easy programming and access to key parameters.

The motors are made to withstand the Arabian desert's harsh environmental conditions, including extreme heat of up to 55°C. In addition, the motors are IP55-certified against dust and water. The robust carbon steel frame delivers superior structural rigidity and low vibration levels for optimal reliability. In addition, high-quality materials combined with design optimisations minimise losses and maximise energy efficiency.

"We believe this project can play a major role in advancing sustainability in the region. We worked around the clock to secure our participation, including designing arc-resistant VSD product specifically for this project," commented Kiran Kumar, HVS Development Sales Manager for HVS Motors & Drives. "Our integrated solution team worked closely with all stakeholders to design a solution that met the required specifications. Our ability to deliver an integrated drive package and our timely delivery were decisive factors in the award of this project."

WEG expects to deliver the drive packages by September 2025.

www.weg.net

Energy Storage & Grids

27 Emerging Storage Innovations

Unleashing the Energy Revolution: How Storage Innovations are Powering a Greener Future

Exciting changes are reshaping the future of renewable energy, and the latest innovations in energy storage are front and center! The New York Power Authority's groundbreaking Battery Energy Storage System (BESS) is set to stabilize the power grid, ensuring a consistent flow of clean energy across the state. This initiative marks a significant leap toward resilience and sustainability in our energy landscape.

In Illinois, ComEd's trailblazing Vehicle-to-Grid (V2G) program is transforming electric vehicle (EV) ownership into a dynamic energy-sharing opportunity. Imagine charging your EV at home while simultaneously feeding excess energy back into the grid—this revolutionary exchange not only keeps the power supply stable but also saves money for environmentally-conscious drivers.

Furthermore, Optimiser Tyba's recent funding success highlights the surging interest in smarter energy solutions. Investors are rallying behind startups that focus on optimizing energy consumption and reducing costs, intensifying the race for innovative solutions that drive us toward sustainability.

As the demand for energy storage surges, advancements like solid-state batteries and microgrid systems promise to integrate seamlessly with renewable sources, laying the groundwork for a greener, more efficient economy. These innovations are not mere

trends; they represent vital components in our ongoing battle against climate change.

Key takeaway: With pioneering projects and passionate investment in sustainable technologies, the future of energy is indeed brighter. Embrace these developments as vital steps toward an eco-friendly tomorrow! Join the revolution and be part of the energy transformation that's reshaping our world.

Revolutionizing Renewable Energy: Innovations You Can't Ignore!

The renewable energy sector is experiencing an unprecedented shift, thanks to various groundbreaking innovations and initiatives. Central to this transformation are advancements in energy storage, vehicle-to-grid technology, and smart energy solutions that promise to create a sustainable future. Below, we explore key aspects of this evolving landscape and provide essential insights into what these changes mean for consumers and investors alike.

Key Innovations in Renewable Energy

1. Battery Energy Storage Systems (BESS)

– The New York Power Authority's BESS initiative is a gamechanger. It's designed to enhance the stability of the power grid, ensuring a reliable supply of clean energy. These systems store excess energy produced from renewables and release it during peak demand, optimizing distribution and minimizing waste.

2. Vehicle-to-Grid (V2G) Technology

– ComEd's V2G program in Illinois allows electric vehicle owners to not just charge their cars but also contribute energy back to the grid. This dynamic system transforms EV usage by enhancing grid stability while offering drivers potential savings.

3. Advancements in Energy Storage

– Innovations such as solid-state batteries are emerging as safer and more efficient alternatives to traditional lithium-ion technology. Similarly, microgrid systems are gaining traction, allowing localized energy production and consumption, further reducing reliance on fossil fuels.

4. Emerging Startups and Investment Trends

– Startups like Optimiser Tyba are attracting significant investments, underscoring the rising interest in smarter, efficient energy management solutions. The focus on optimizing energy consumption is crucial as companies look to balance cost, efficiency, and sustainability.

Essential Questions Answered

1. What are the main benefits of Battery Energy Storage Systems?

– Battery Energy Storage Systems enhance grid stability, reduce reliance on fossil fuels, and allow for better management of renewable energy sources. They facilitate energy availability during peak demand and support the integration of diverse energy resources.

2. How does Vehicle-to-Grid technology benefit EV owners?

– V2G technology enables EV owners to not only charge their vehicles but also sell excess energy back to the grid, creating an additional revenue stream while contributing to a more resilient energy system. This technology helps lower energy costs and supports grid reliability.

3. What future trends should investors be aware of in the renewable energy sector?

– Investors should keep an eye on innovations in energy storage technologies, the growth of microgrids, and advancements in smart grid solutions. There is a strong trend toward energy efficiency and sustainability which is driving more investment into startups focused on these areas.

www.weg.net

Country Reports

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UAE Leads Solar Energy Growth With Strategic Projects

A new report highlighted the UAE›s leadership in the regional solar energy sector, driven by initiatives like the Dubai Clean Energy Strategy 2050, targeting 75 percent clean energy by 2050, and Abu Dhabi Vision 2030, aiming for 30 percent renewable energy within five years.

The «Solar Outlook Report 2025» report, launched by the Middle East Solar Industry Association (MESIA) during the World Future Energy Summit 2025 in Abu Dhabi, outlines the rapid growth of solar energy in the Middle East and North Africa (MENA) region and the UAE's key role in this transformation.

Solar energy›s share in the regional energy mix grew significantly, with solar capacity in MENA rising 23 percent in 2023 to 32 gigawatts (GW) peak, and projected to exceed 180 GW peak by 2030. Growth is driven by technological advancements, government support, and private sector investment.

The report highlights the adoption of innovative technologies like digital twins and automated cleaning systems, which have enhanced solar plant performance, increased energy output, and reduced costs. Advances in energy storage and automated operations are addressing challenges in expanding solar portfolios.

Green hydrogen is identified as a fast-growing sector, with MENA's abundant solar and wind resources offering a competitive edge in production. Despite challenges such as funding and infrastructure, the region's commitment and market advancements are unlocking new opportunities.

Efforts to localise solar manufacturing and reduce reliance on external suppliers are essential for long-term success. Countries like Morocco, Egypt, and Tunisia are expanding their solar capacities to meet local needs and contribute to global clean energy goals.

Fazle Moyeen Quazi, MESIA President, noted that next-generation technologies enhance solar project efficiency and resilience, addressing issues like intermittency and grid stability.

The report emphasises that advanced solar cells, grid integration tools, and digital monitoring systems are boosting efficiency, while private sector investments, public-private partnerships, and innovative financing are accelerating adoption.

Leen AlSebai, Head of the World Future Energy Summit and General Manager of RX Middle East, highlighted the summit's role in fostering connections among global stakeholders, reinforcing the MENA region's position as a leading solar energy market.

https://www.wam.ae/

Power Moves: South Africa Sets the Pace in Renewable Energy Battery Storage

As Africa's largest economy, South Africa has become a regional leader in renewable energy, despite facing significant energy scarcity. By 2012, the country achieved an 84% electrification rate, but its high industrial demand made it the region›s top emitter of greenhouse gases, often outstripping electricity supply. South Africa's efforts to transition to a low-carbon economy led to groundbreaking green projects, such as the first concentrated solar power plants in Africa, and competitive procurement programs that halved the cost of solar and wind energy.

By 2015, the country had more variable clean energy than its grid could handle, leading to a need for 360 MW of additional storage. Testing by Eskom, the state-owned utility, confirmed that battery storage could accelerate renewable energy integration. However, battery storage on this scale had never been attempted in Sub-Saharan Africa, and private sector involvement required a catalytic investment, which came from CIF's Clean Technology Fund (CTF).

Since 2007, CIF has helped unlock South Africa's renewable potential by providing concessional finance to bridge high upfront costs and reduce risks. In 2012, CIF's $80 million investment, along with funding from other institutions, supported the development of concentrated solar plants. Another $43 million in 2015 helped fund the Sere Wind Power Plant, though a lack of storage led to the curtailment of wind energy.

In response, CIF helped launch the continent's first competitive tender for grid-scale battery storage in 2023. The $195 million project, funded by IBRD and AfDB, established a 360 MW battery storage system at six Eskom substation sites. The investments also enabled South Africa to procure an additional 445 MW of storage through private sector investment.

These efforts have increased clean energy's share in the grid, boosted peak-hour capacity, created jobs, and attracted further private investment. CIF's investments, totaling nearly $450 million, have mobilized $2 billion in co-financing, helping Eskom reduce CO_2 emissions and expand renewable energy. South Africa aims to reduce emissions by 30% by 2030, and renewable sources now generate over 8% of its electricity. This progress is expected to drive a regional clean energy surge, with South Africa contributing more than 60% of Sub-Saharan Africa's renewable capacity growth by 2027.

https://www.cif.org/

Trump Reshapes U.S. Energy with Focus on Oil and Gas

President Donald Trump speaks at Capital One Arena in Washington.Photographer: Anna Moneymaker/Getty Images/Bloomberg

On his first day, President Trump took steps to undo Biden-era policies aimed at reducing fossil fuel demand and combating climate change, though these changes will take time to implement. Many of these regulatory shifts will undergo a lengthy federal rulemaking process and likely face prolonged legal battles. However, Trump's actions reflect his commitment to unlocking America's energy potential and responding to the oil industry›s desire for more drilling opportunities.

Trump's efforts were praised by industry figures like Jeff Eshelman, president of the Independent Petroleum Association of America, who argued that the new administration aims to end «misguided» energy policies. In contrast, environmentalists criticized the actions as a giveaway to wealthy oil executives, accusing Trump of threatening jobs and public health.

Despite these initiatives, it remains unclear if they will significantly boost oil and gas production. U.S. fossil fuel companies have focused more on efficiency and returns to shareholders rather than increasing output. Trump based some of his directives on a declared national energy emergency, citing inadequate domestic energy supply and high prices, even though oil and gas production reached record highs under Biden.

Trump's orders could expedite permitting for certain energy projects, including pipelines, and assess the Department of Defense's energy infrastructure. He also aims to reduce energy costs by promoting fossil fuels and limiting wind power development, which could negatively impact job creation in the offshore wind sector.

Additionally, Trump ordered the elimination of the electric vehicle mandate, which could decrease domestic oil demand. He also moved to withdraw the U.S. from the Paris Agreement again, reversing Biden›s climate policies.

In Alaska, Trump seeks to boost oil and gas development in areas previously restricted under Biden, particularly in the National Petroleum Reserve. He also revoked Biden's bans on drilling rights along the East and West coasts.

Trump's actions reflect a broader push to promote consumer choice and reduce regulations on appliances. He also lifted a moratorium on LNG exports, benefiting multi-billion-dollar projects. Though some of these actions mirror those from his first term, the appointment of conservative judges may make them easier to implement. Trump's supporters view these steps as part of an effort to streamline energy development and reduce regulatory barriers.

By energyHQ Staff

Services

34 Coming Events

Coming Events

World Environmental, Social, and Governance Summit 2025
Riyadh, Saudi Arabia
10 - 11 Feb 2025
https://worldesgsummit.com/

After four successful editions, Gulf Xellence is building momentum in organizing the 5th Edition of the World ESG Summit in Riyadh on 10-11 Feb 2025. This premier gathering will...

Iraq International Energy Expo & Conference 2025
Baghdad International Exhibition, Baghdad, Iraq
10 - 12 Feb 2025
https://elec-fair.com/

In 2025 The 10th Iraq Energy Exhibition & Conference IEE The development the world is witnessing in the field of energy will make the Iraq Energy Exhibition and Conference...

International Conference on Solar Power Technology 2025
14 - 15 Feb 2025
Strasbourg, France
https://itrgroup.net/Conference/1620/ICSPT/

International Conference on Solar Power Technology aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and...

Egypt Energy Show 2025
17 - 19 Feb 2025
Egypt International Exhibition Center, Cairo, Egypt
https://www.egypes.com/

Egypt Energy Show theme will be Driving Energy Transition, Security, and Decarbonisation. It will engage in comprehensive discussions concerning worldwide energy dynamics...

Iraq International Energy Expo & Conference 2025
24 - 26 Feb 2025
Baghdad International Exhibition, Baghdad, Iraq
https://elec-fair.com/

The IEE exhibition and conference create a platform for small and medium-size enterprises to showcase their innovation, strength of their products and innovation to the world›s...

SOLAIRE EXPO MAROC 2025
25 - 27 Feb 2025
Casablanca, Morocco
https://solaireexpomaroc.com/

Solaire Expo Maroc is a B-to-B platform for showcasing technical innovations and trends in solar energy and energy efficiency, expanding international markets...

SolarEX Istanbul 2025
Bakırköy/Istanbul, Turkey
10 - 12 Apr 2025
https://solarexistanbul.com/

Solar Energy Technologies and Energy Storage Exhibition «SolarEX Istanbul» -our country›s first and only solar energy themed fair- is fair which provides a chance for Turkey to take...

ICSMARTGRID 2025
Glasgow/United Kingdom
27-29 May 2025
https://www.icsmartgrid.org/

The purpose of the International Conference on Smart Grid (icSmartGrid) is to bring together researchers, engineers, manufacturers, practitioners and customers from all over the world to share...

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Did DeepSeek end nuclear energy's AI comeback?

Just when it looked like the world was ramping up for a nuclear power renaissance, driven in part by AI›s insatiable appetite for energy, something unexpected happened: AI became more efficient.

At least that is the claim made by DeepSeek, the Chinese AI platform that purports to do as much as OpenAI›s ChatGPT with far less computing power and fewer data centres, and therefore less energy.

Those claims sent several energy companies› stock prices briefly careening, including Constellation Energy, which recently made the most of the energy requirements of AI to boost its nuclear power offerings to technology companies.

Just how intense was that need for more energy to propel AI data centres? Last September, Constellation Energy announced it would be restarting the Three Mile Island Unit 1 in Pennsylvania as part of a 20-year power purchase agreement with Microsoft.

Three Mile Island (TMI) was the site of the one of the biggest nuclear accidents in US history. In 1979, the core of Unit 2 was partially exposed, leading to a temporary evacuation of the nearby area and a lengthy clean-up.

The accident left a black mark on the US nuclear industry, one that remains to this day, although recent polling has suggested those concerns may be waning.

All that said, debates remain about the potential health effects stemming from the accident, and research is continuing.

During a recent interview at Microsoft›s headquarters in Redmond, Washington, Alistair Speirs, the company›s senior director of infrastructure, was asked by The National if the technology giant was taking a pronuclear energy stance with some of its recent moves to power its AI ambitions, particularly the agreement with Constellation Energy.

“Our stance is zero carbon energy,” he said. “We really look at that as the view, so the next question is where can we source zero carbon energy?”

He said Microsoft uses power purchase agreements (PPAs), which are long-term contracts committing to a set amount of energy usage from the grid. That way, Microsoft ensures that the energy provided is supplemental, and therefore not raising energy prices for consumers.

“We›re essentially sending a supply signal to the utility providers,” he said, referring to the deal with Constellation Energy›s Three Mile Island.

Mr Speirs said that other sources of energy such as hydrogen, solar and wind, depending on the location of data centres, are also in the mix for Microsoft.

The tech giant is not alone in its push to meet the energy needs of data centres. Alphabet, parent company of Google, along with Amazon, Oracle, OpenAI and others have recently expressed interest in using small modular nuclear reactors (SMRs) to help meet those needs.

Mr Speirs spoke to The National in January, before DeepSeek debuted. Some have suggested that increased AI efficiency will blunt and possibly put an end to efforts at bolstering nuclear energy.

That speculation was the main ingredient that led to a sudden drop in Constellation›s stock price in late January, along with other energy companies amid the rise of DeepSeek.

Maryam Salman, a senior consultant for Middle East markets at Qamar Energy, said that the situation is far more nuanced, and that DeepSeek›s emergence is hardly a death blow for a nuclear renaissance.

By Cody Combs
www.thenationalnews.com

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