

# energy HQ

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A photograph of a wind farm at sunset. The sun is low on the horizon, creating a warm orange and yellow glow. Several wind turbines are visible, their silhouettes against the bright sky. The foreground is dark, suggesting a field or grassland.

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# Advancing Global Energy Transformation: Innovations Shaping the Industry



Global energy systems are entering a new era, shaped by groundbreaking technologies and shifting priorities toward sustainability and resilience. As nations intensify their focus on achieving ambitious climate targets, the push for innovative solutions to address complex energy challenges is gaining momentum. At the heart of this transformation is the convergence of advanced technologies, strategic policies, and collaborative efforts that redefine how energy is produced, distributed, and consumed.

One area commanding significant attention is renewable energy integration. Solar and wind power continue to dominate, with technologies such as bifacial solar panels and floating offshore wind farms enhancing energy capture and efficiency. Advances in energy storage, including next-generation batteries and long-duration solutions, bolster the stability of renewable energy systems, ensuring a more reliable supply and overcoming the intermittency challenges traditionally associated with renewables.

Within this transformation, 45% of the focus centers on cutting-edge innovations driving global energy transformation. Digitalization plays a pivotal role, with AI and machine learning optimizing energy systems across production, distribution, and consumption. Smart grids, capable of real-time data analysis and demand-response management, enable seamless integration of diverse energy sources while improving grid resilience.

Moreover, hydrogen technology is gaining traction as a cornerstone of energy transformation. Green hydrogen, produced via electrolysis powered by renewable energy, offers a zero-carbon alternative for hard-to-abate sectors such as heavy industry and transportation. Emerging partnerships and pilot projects in hydrogen economies highlight its potential to reshape the global energy mix.

In parallel, efforts to modernize existing infrastructure continue to gain momentum. Retrofitting conventional power plants with carbon capture and storage (CCS) technologies reduces emissions, while distributed energy resources (DERs) empower consumers to generate and share energy locally. These systems revolutionize energy access in remote areas, promoting equity in energy distribution.

Beyond technological advancements, policy frameworks and international collaborations play a vital role. Governments worldwide are implementing ambitious targets to accelerate the energy transition, backed by significant investments in research and development. Initiatives such as cross-border energy grids and global emission trading systems reflect the cooperative spirit required to achieve large-scale transformation.

While innovations driving global energy transformation take a prominent share of the spotlight, the industry's broader advancements in policy, infrastructure, and renewables demonstrate collective momentum. Together, these efforts are charting a sustainable and inclusive future for energy, paving the way for long-term resilience and prosperity.

## In This Issue!

**energyHQ's** January 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 Advances in Solar & Wind Energy
- Article on page 16 focuses on Advances in Nuclear Technology
- Article on page 24 sheds the light on Global Energy Transformation

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,  
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# World Digest



UAE



## UAE leads region as fastest-growing clean energy market: Suhail Al Mazrouei

ABU DHABI, 13th January, 2025 (WAM) -- Suhail bin Mohammed Al Mazrouei, Minister of Energy and Infrastructure, highlighted the UAE's leading position in clean and renewable energy, emphasising its crucial role in stabilising global energy markets and driving sustainable development through significant domestic energy investments.

He noted that the UAE's energy strategy prioritises a balanced approach, integrating traditional and clean energy sources, a cornerstone of both the UAE Energy Strategy 2050 and the National Hydrogen Strategy 2050.

In statements to the Emirates News Agency (WAM) on the occasion of Abu Dhabi Sustainability Week, Al Mazrouei reiterated the UAE's unwavering commitment to achieving its Net Zero 2050 Strategy by advancing ambitious renewable energy projects. He underscored the nation's continued efforts to ensure a sustainable and diversified energy sector, fostering long-term growth and innovation.

Addressing the expansion of electric vehicle infrastructure, Al Mazrouei explained the implementation of a national policy to encourage the adoption of electric and hybrid vehicles. This policy includes a strategic pricing framework for fast and regular charging services, incentivising investments in the necessary infrastructure.

Al Mazrouei also highlighted the UAE's remarkable achievements in global energy competitiveness indicators. Under the leadership's guidance, the UAE secured top rankings in seven key indicators in 2024.



Spain

## The climate transition of Spain's economic sectors

In Spain, greenhouse gas emissions are highly concentrated in the manufacturing, energy, transport, and agriculture, forestry and fishing sectors. The decarbonisation of these energy-intensive sectors is taking place at very different rates: while the energy and manufacturing sectors have reduced their emissions significantly through the use of renewable energies and efficiency gains, transport and the agriculture, forestry and fishing sector show limited progress.

Despite the fact that electrification and the adoption of sustainable practices and clean technologies are essential for accelerating their climate transition, the execution of funds under the National Recovery and Resilience Plan is also uneven: investments in rail transport are making progress, but certain key programmes for the electrification of transport and the decarbonisation of industry are behind schedule. To achieve the decarbonisation targets set for 2030 and 2050, it is crucial to improve the implementation of public policies and accelerate the execution of funds in these sectors.

The structure of emissions in Spain

In the Spanish economy, greenhouse gas emissions are highly concentrated in just a handful of sectors: according to data for 2022, manufacturing, the energy sector, transport and the agriculture, forestry and fishing sector accounted for 92.2% of the total emissions generated by the production sectors. This figures is far higher than their contribution to the GVA of the economy as a whole (21.6%). Specifically, manufacturing contributed 11.1% of the economy's GVA and 31.6% of all emissions.



## South Africa

### IKI contributes to the just energy transition in South Africa

Several projects in the International Climate Initiative (IKI) are working with the Just Energy Transition Partnership (JETP) in South Africa to achieve the country's targets on climate action.

South Africa has one of the most carbon-intensive economies in the world, since the country is dependent on fossil fuels in the electricity, industry and transport sectors. The industrial sectors of the country, including the mining, metal and automotive industries, have developed in close collaboration with the fossil energy sector, leading to complex mutual dependencies.

Despite various intervention measures, the supply of energy with predominantly old coal-fired power stations is not assured. Entire municipal districts have had to be regularly disconnected from the power grid for several hours to prevent a complete collapse of the grid. This measure is referred to as 'load shedding'. The consequences for the population and for the economy as a whole is tremendous. In 2023, plans were laid to open up the electricity markets to the private sector and expand rooftop solar capacity. This has produced some initial benefits, as there has been no further load shedding since March 2024. The energy supply is still neither fully secured nor stable, however. As a result, there have been calls to postpone the planned decommissioning of various coal-fired power stations by up to 6 years – to 2030.



## Australia

### Rich in resources, but Australia's energy costs have tripled and manufacturers are hurting

Australia has a wealth of coal and gas resources as well as renewable energy, so why are energy costs so high — especially for manufacturers?

Orica is the world's largest provider of explosives and chemicals for mining as well as fertilisers for farming.

Gas is a critical raw material for the production of fertilisers, but rising costs on the volatile wholesale gas market are making it unattractive for the Australian company to continue production here.

Orica employs 15,000 people across more than 100 countries, and Mr Gandhi says his company is threatening to increase investment in the United States if energy prices do not come down in Australia.

The company recently acquired assets there worth \$1.5 billion.

"[The US is] pro-manufacturing, they've got cheap energy, they've got good gas supply and reserves. It's one of the most attractive markets to invest today," he said.

Mr Gandhi said one solution to the problem in Australia is to increase the supply of gas.

But it is already too late for many Australian manufacturers.

"If you start investing today it takes three to 10 years to bring on new gas resources ... [and] manufacturers won't survive [that long]," he said.

## Japan



### Japan Targets 40-50% Power Supply From Renewables By 2040

Japan wants renewable energy to account for up to 50% of its electricity mix by fiscal year 2040 with nuclear power taking up another 20%, according to a draft of its revised basic energy policy, as it makes a clean energy push while meeting rising power demand.

As the world's second-largest importer of liquefied natural gas and a major consumer of Middle Eastern oil, Japan and its basic energy plans are drawing global attention from oil, gas and coal producers.

While the previous energy plan's primary focus was decarbonisation, it has shifted greater attention to energy security given heightened geopolitical risks, including the Russia-Ukraine war.

The industry ministry's policy draft, unveiled on Tuesday, proposes increasing renewables to between 40% and 50% of power supplies in the 2040 fiscal year, roughly doubling the 22.9% share in the 2023 fiscal year and exceeding the 2030 target of between 36% and 38%.

Thermal power usage, particularly from inefficient coal-fired power plants, is set to decrease to between 30% and 40% of the mix by 2040 from 68.6% in 2023, although the draft energy policy does not specify the breakdown of coal, gas and oil.

Mika Ohbayashi, a director at the Renewable Energy Institute, also pointed to the small target share for wind power, between 4% and 8%, compared with 20% for nuclear.

## Brazil



### Advancing Energy Storage Regulation in Brazil

The Brazilian National Electric Energy Agency (ANEEL) is entering a new phase of dialogue on energy storage regulation. On December 10, 2024, ANEEL presented the results of the first phase of Public Consultation (CP) No. 39/2023 and announced the opening of a second phase for further contributions. Stakeholders can provide feedback from December 12, 2024, to January 30, 2025.

This initiative forms part of ANEEL's 2025–2026 Regulatory Agenda, which seeks to modernize Brazil's energy framework by incorporating energy storage systems (SAE), including reversible power plants, to support sustainable energy transitions.

#### Key Insights from the First Phase

The initial phase, held from October 19 to December 18, 2023, garnered 831 contributions from a diverse array of stakeholders, including consumer associations, energy generators, and regulatory experts. This engagement informed significant adjustments to proposed regulations across several normative and non-normative solutions (SN and SNN).

#### Highlighted Normative Proposals:

1. Transmission and Distribution System Usage (MUST/D): ANEEL supports including SAE capacity within contracted power ranges and proposes a flexible approach for existing installations. Peak-shaving measures will also be considered.

## Renewable Energy

### *07 Advances in Solar & Wind Energy*





# Solar Innovations Propel MENA's Energy Transformation



Photo: Earth Science and Remote Sensing Unit, NASA Johnson Space Center

With its exceptional solar resources, the MENA region holds a pivotal position in shaping the future of the global clean energy market.

The Middle East and North Africa (MENA) region, historically reliant on fossil fuels, is under growing pressure to diversify its energy portfolio. Solar energy, while cost-effective, faces challenges linked to sociopolitical dynamics and economic constraints.

The region's energy consumption remains dominated by oil and gas, accounting for approximately 97% of the total. In many MENA countries, over 60% of government revenue depends on hydrocarbons, leaving them vulnerable to the volatility of fossil fuel prices.

## The Shift to Clean Energy

Commitments to sustainable development and adherence to the Paris Agreement are

accelerating the adoption of renewables. Wealthier nations like Saudi Arabia, the United Arab Emirates (UAE), and Kuwait are leveraging sovereign wealth funds to support clean energy initiatives. However, robust policies and public-private collaborations are essential to scale adoption. Meanwhile, nations with limited oil reserves, such as Jordan, rely on international assistance to advance their renewable energy agendas.

## Solar Power: A Natural Fit

MENA's abundant deserts and high solar irradiation—ranging from 2 to 2.5 MWh/m<sup>2</sup> annually—make it a prime location for photovoltaic (PV) systems. Falling installation costs, driven by economies of scale and technological innovation, coupled with tax incentives and competitive labor costs, enhance the appeal of solar projects, particularly in Gulf



### **Cooperation Council (GCC) countries.**

Success stories like Egypt's 1.65 GW Benban Solar Park showcase the region's potential. This flagship project exemplifies how nations can integrate solar into their energy strategies, with Egypt aiming to generate 20% of its electricity from renewables.

**Policy and Infrastructure:** The Building Blocks Governments across MENA are gradually implementing reforms, such as reducing fossil fuel subsidies and setting ambitious renewable energy targets. The UAE and Saudi Arabia, through initiatives like Saudi Vision 2030, are fostering regulatory frameworks that promote solar adoption. Tools like feed-in tariffs and auction-based project allocation provide predictability and attract investments.

However, challenges persist. Securing investments is difficult for countries with lower credit ratings, while administrative inefficiencies and weak regulatory frameworks hinder large-

scale deployment. Limited grid infrastructure and the need for advanced energy storage solutions also pose significant obstacles.

### **A Path to Energy Security**

As renewables capacity in the region is projected to triple by 2027, solar energy could redefine MENA's role in the global energy market. Projects like the EU's energy corridor initiatives envision MENA as a renewable powerhouse, capable of exporting clean energy to Europe.

By addressing financial, technical, and institutional barriers, the region can unlock its solar potential, ensuring energy security and aligning with global sustainability goals. A combination of strategic investments and international cooperation is key to making MENA a leader in clean energy innovation.

**By energyHQ Staff**



## Sustainability & Decarbonization

### *10 Energy Efficiency in Buildings & Infrastructure*

# Grandweld Shipyards becomes first shipbuilding company in Middel East to use solar energy to meet its energy requirements

Phase One of the solar project has been successfully completed and has a production capacity of 569 kWp.

has become the first shipbuilding company in the Middle East to harness solar energy on a large scale to meet its energy requirements.



Grandweld aims to achieve its ambitious goal of becoming a 100 % green shipyard by the end of next year by meeting 100 % of its energy needs through renewable sources (Solar Energy).

Phase Two to generate a total power capacity of 1.3 Mega Watts by next year

UAE, December 17, 2024: Grandweld Shipyards, a leading fully integrated shipyard within the maritime and offshore industries,

The company currently generates 50 % of its energy needs through renewable sources following the successful completion of Phase One of its ambitious solar panel project, underscoring its commitment to the Dubai Clean Energy Strategy 2050 and the Dubai Net Zero Emissions Strategy 2050.

This project, which aligns seamlessly with the Dubai Electricity and Water Authority's (DEWA) vision for clean energy, has solidified

the company's status as a leader in driving sustainability in the region's maritime sector. With a current production capacity of 569 kWp, the solar project meets half of the total energy requirements for the company's office building and construction processes through solar power.

Grandweld is well-positioned to achieve its ambitious goal of becoming a 100 % green shipyard by the end of next year by meeting



100 % of its energy needs through renewable sources, setting a new benchmark for sustainability in the shipbuilding industry.

Jamal Abki, General Manager of Grandweld Shipyards, commented: "We prioritise sustainability in every aspect of our operations. In alignment with the UAE's vision to shift towards clean and renewable energy, this solar energy initiative highlights our unwavering commitment to sustainability and innovation.

As the first shipbuilding company in the Middle East to adopt renewable energy on this large scale, we are pleased to lead the change in creating a cleaner, greener future for the maritime industry. We encourage other companies in the industry to follow us and contribute to a sustainable world."

In the next phase of this innovative project, Grandweld plans to exceed its internal energy requirements and contribute energy to support the UAE's commitment to building a sustainable future.

Grandweld's commitment to sustainability extends beyond solar energy. The company's shipyard incorporates advanced energy-efficient features, such as light-sensitive building systems, to minimise its environmental impact, and adheres to eco-friendly construction principles. This dedication to sustainable practices was recognised in 2012 when Grandweld achieved the Leed Gold Membership from the U.S. Green Building Council.

By pioneering sustainable initiatives and setting new industry standards, Grandweld Shipyards is shaping the future of the maritime industry and contributing to a more sustainable world. With Phase Two of the solar project currently underway, the company aims to improve sustainability in shipbuilding and support the UAE's larger objectives for environmental preservation and the use of renewable energy. By the end of Phase Two, expected to conclude next year, the project will achieve a milestone by generating a total power capacity of 1.3 Mega Watts, further reinforcing its commitment to green energy initiatives.

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# Oil & Gas

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# Honeywell Opens New Center to Strengthen Saudi Arabia's Industrial Cybersecurity



Honeywell Himaya Center to support Saudi Arabia's localization goals and IKTVA program through cutting-edge cybersecurity solutions

DHAHRAN, Saudi Arabia, January 13, 2025 -- Honeywell (NASDAQ: HON) has launched a new center in Jubail, Saudi Arabia to provide localized cybersecurity services for critical industrial sectors in the Kingdom. The center was announced at IKTVA Forum and Exhibition in Dhahran.

The Honeywell Himaya Center, located in the company's Jubail office, underscores the alignment of Honeywell's portfolio to three compelling megatrends including automation. It is designed to strengthen industrial cybersecurity capabilities in the Kingdom by offering more robust Operational Technology (OT) security solutions to address today's evolving threats, while helping businesses maintain regulatory compliance.

The center will provide in-country Managed Security Services (MSS) to key sectors including energy, manufacturing and utilities. This includes Honeywell's flagship Cyber Insight and Cyber Watch software solutions, which help businesses maintain continuous compliance with the National Cybersecurity

Authority (NCA) OT Cybersecurity Controls (OTCC) regulations, and aim to support the use of automation and artificial intelligence (AI)-enabled technologies.

"The launch of the Honeywell Himaya Center is a testament to our dedication to supporting Saudi Arabia's localization and industrial transformation objectives, and the ambitious vision set forth by the IKTVA program," said Abdullah Al-Juffali, president, Honeywell Saudi Arabia and Bahrain. "The new center will bring critical local cybersecurity capabilities to the Kingdom, and support the growth of a resilient and self-reliant industrial ecosystem."

Saudi Arabia's cybersecurity market is expected to grow from \$3.6 billion today to \$10.5 billion by 2032. This growth is driven by digital transformation, rising cyber threats, and initiatives like Vision 2030. The increasing reliance on cloud technologies and focus on data protection are fueling demand for advanced security solutions across key industries.

"Industrial automation and AI are pivotal in driving operational efficiency and business resilience across critical industries," said George Bou Mitri, president, Honeywell



Industrial Automation for the Middle East, Turkey, Africa, and Central Asia. “The target of the Honeywell Himaya Center is to provide unparalleled support to businesses, helping them navigate the complexities of industrial cybersecurity and leverage the benefits of advanced automation technologies.”

Honeywell is at the global forefront of driving the future of OT cybersecurity by enabling secure, compliant and resilient operations across the industrial sector. The launch of the Honeywell Himaya Center is a significant step toward supporting the Kingdom’s digital transformation and strengthening its position as a key player in the global cybersecurity market.

Honeywell has been present in Saudi Arabia for over 70 years, delivering cutting-edge solutions and actively contributing to the government’s vision to advance technology adoption and advance sustainability efforts. Honeywell runs training programs to help transform Saudi Arabia into a knowledge-based economy, equipping Saudi nationals

with essential technical skills in various sectors including energy, automation, and aviation.

#### About Honeywell

Honeywell is an integrated operating company serving a broad range of industries and geographies around the world. Our business is aligned with three powerful megatrends – automation, the future of aviation and energy transition – underpinned by our Honeywell Accelerator operating system and Honeywell Forge IoT platform. As a trusted partner, we help organizations solve the world’s toughest, most complex challenges, providing actionable solutions and innovations through our Aerospace Technologies, Industrial Automation, Building Automation and Energy and Sustainability Solutions business segments that help make the world smarter, safer, more secure and sustainable. For more news and information on Honeywell, please visit [www.honeywell.com/newsroom](http://www.honeywell.com/newsroom)

[www.honeywell.com/newsroom](http://www.honeywell.com/newsroom)



# Nuclear

## *16 Advances in Nuclear Technology*



# 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

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



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,

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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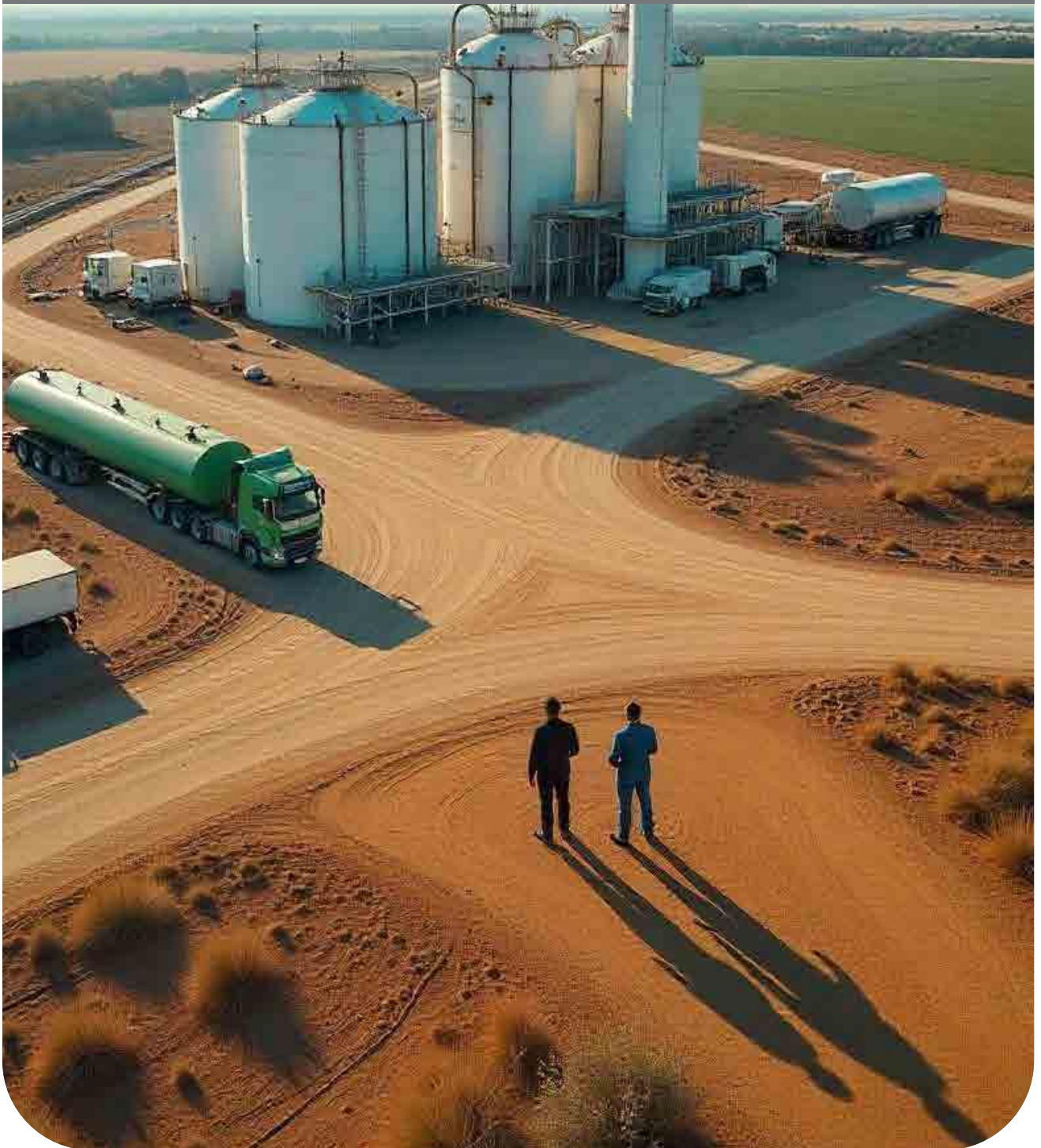
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# Hydrogen

## *21 Hydrogen Production & Supply chain*



# Emarat And Lootah Biofuels Sign MoU to Enhance Cooperation in Renewable Energy



MoU to expand the collection network of used cooking oils through the retail stations network of Emarat

Plans to explore manufacturing of sustainable aviation fuel (SAF), and provide biodiesel to vessels in certain ports.

Dubai- United Arab Emirates- 24 December 2024:

The Emarat Petroleum Company (Emarat), the pioneering petroleum company, and Lootah Biofuels, a pioneer in the circular economy producing biofuels from used cooking oils, have signed a Memorandum of Understanding (MoU) to enhance cooperation in line with the UAE plans to develop renewable energy sources and enhance sustainability.

The MoU aims to establish a framework for cooperation between the two parties

to achieve a set of common goals that contribute to reducing greenhouse gas emissions and other pollutants associated with traditional fossil fuels, contributing to improved air quality and environmental sustainability in line with the directives of Ministry of Energy and Infrastructure (MoEI) and efforts to promote clean and sustainable energy, achieving the goals of the National Biofuels Policy and the UAE Net Zero 2050 strategy.

The MoU, signed by H.E. Ali Khalifa Al Shamsi, Chief Executive Office of Emarat Petroleum Company – Emarat and Mr Yousif Saeed Lootah, Founder and CEO of Lootah Biofuels, in the presence of a number of senior officials from both sides, focuses on strengthening cooperation in order to expand the collection network of used cooking oils through the retail

stations network of Emarat, including biodiesel in their offering, exploring manufacturing of sustainable aviation fuel (SAF), and providing biodiesel to vessels in certain ports.

According to the memorandum of understanding, the two parties will study and develop a mechanism for collecting used cooking oils through the retail stations network of Emarat for Lootah biofuels, which contributes to expanding the network of partners to provide it with used cooking oils for recycling and biofuel production as an innovative and practical solution that contributes to reducing the burden on the environment. The parties will develop a mechanism that identifies the collection equipment, process, customer relationship, financial reconciliation and any other items required to solidify the process.

Emarat will also be looking actively to include biodiesel produced by Lootah Biofuels in their offering in the retail stations in line with the guidelines of Ministry of Energy and Infrastructure (MoEI). It is expected to start offering biodiesel B5 and improve according to the timelines in MoEI's guidelines.

In line with the UAE's efforts to support sustainable transport and provide more sustainable fuel for the aviation sector, the two parties will cooperate to develop feasibility studies and investment mechanisms to build a plant to manufacture sustainable aviation fuel (SAF) to serve the aviation sector in the UAE and the region. Additionally, both parties will look in potential collaboration on selling biodiesel to vessels in certain ports, which will contribute to supporting the sustainable maritime transport sector and strengthening the UAE's position as a global maritime and logistics hub.

H.E. Mr. Ali Khalifa Al Shamsi, Chief Executive Office of Emarat Petroleum Company (Emarat) said: "At Emarat, we are committed to providing innovative and sustainable energy solutions that keep pace with the UAE's

vision on clean and sustainable environment. This cooperation with Lootah Biofuels is an important step towards achieving our goals of adopting biofuels within our network of stations",

Mr Yousif Saeed Lootah, Founder and CEO of Lootah Biofuels, said: "We are proud of our partnership with Emarat, a leader in the energy sector, as this cooperation represents an effective model of partnership between the government and private sectors to support national initiatives related to sustainable energy. We look forward to achieving tangible achievements through this cooperation, both in the collection of used cooking oils and the development of biofuels and sustainable aviation, in line with the country's efforts to promote sustainability",

Emarat and Lootah Biofuels reaffirmed their commitment to enhance collaboration on all ongoing and future projects related to biodiesel as a renewable energy source to support the UAE's continued drive towards economic diversification and sustainable development by increasing usage of biofuels.

The signing of this MoU is a significant step within the framework of the parties' commitment to keep pace with the global transformation towards clean energy and support the sustainability goals in the UAE.

Since 2010, Lootah Biofuels has been producing biofuels from used cooking oils, which have the highest carbon reduction among all available raw materials for the production of biodiesel. The company exports biofuels to European countries, most notably the Netherlands, Germany, UK, in addition to India, and is working on an expansion plan to export to many Gulf and Asian countries during the coming period in light of the growing demand for biofuels globally.

**By Jennifer L**

<https://carboncredits.com/>



# Cover Story

*24 Global Energy Transformation*



# China's Booming New-Energy Industry Fuels Growth, Opportunity Abroad

This photo taken on Sept. 11, 2024 shows the pavilion of Tesla at the China National Convention Center in Beijing, capital of China. (Xinhua/Ju Huanzong)

China's fast-growing new-energy sector is not only a domestic success story, but also serves as a global game-changer, offering collaboration dividends across the entire industrial chain and providing a fresh boost to the global economy.

This global impact is evident in the Thai government's backing for Chinese automakers to build an electric vehicle supply chain in the country, a move that Surasit Thanadtang, director of the Thai-Chinese Strategic Research Center under the National Research Council of Thailand, deems a smart strategy.

Already, several Chinese car manufacturers have established factories in Thailand, including SAIC, Great Wall, BYD and Chery. This influx of Chinese electric vehicles is not only attracting further investment but also inspiring Chinese automotive supply chain companies to expand their presence there.

Firms like Gotion High-Tech and SVOLT Energy Technology have set up battery production bases, while electronics manufacturers such as Ningbo Sunrise Elc Technology and Changzhou Aohong Electronics have announced new investments in Thailand.

Thailand is tapping into China's knowledge and technical expertise to bolster its own electric vehicle sector, drive technological advancements, and generate employment opportunities, Surasit said.

China's foray into the new-energy sector is not an isolated endeavor. It is an open-door policy aimed at fostering growth. This approach has led to an increasing number of multinationals

aligning with China's new-energy sector to capitalize on the opportunities it presents.



Tesla's rapid development serves as a fitting example. Since the launch of its Shanghai plant in 2019, the facility has leveraged China's comprehensive supply chain system and top-tier intelligent manufacturing capabilities to become the most efficient vehicle factory within Tesla's global network.

With the ability to produce a car in less than 40 seconds, the factory has emerged as

Tesla's primary global export center. In 2023, it delivered 947,000 vehicles, accounting for more than half of Tesla's global deliveries last year.

In April, Mercedes-Benz announced an upgrade to its Shanghai R&D hub to expedite intelligent innovation in China, and Volkswagen Group China declared a 2.5-billion-euro investment



to expand its production and innovation center in Hefei, Anhui Province. BMW's production base in Shenyang, northeast China's Liaoning Province, has seen cumulative investments nearing 100 billion yuan (about 13.91 billion U.S. dollars) since 2010.

These investments are not just about growth in China but also about leveraging China's expertise to enhance their global

competitiveness.

"In the past, it was often said that China needs Bosch and its innovative technologies for the development of the country's automotive industry. But today, the narrative has shifted: Bosch also needs China," Xu Daquan, president of Bosch China, said at the second China International Supply Chain Expo in November.

China's new-energy industry also helps forge a win-win model for green and low-carbon energy transitions. For instance, the De Aar Wind Farm in South Africa, the first wind power project financed, constructed and operated by a Chinese company in Africa, has eased the local electricity crunch. While in Kenya, the Garissa Solar Power Plant, also built by a Chinese company, has started operations, lifting tens of thousands of households out of energy poverty.

China is ready to fulfill its responsibilities as a major developing country by collaborating with others to enhance clean energy industries and supply chains, share knowledge and experience, promote the shift to green and low-carbon energy, and contribute to global sustainable energy development, according to the white paper titled "China's Energy Transition," published in August.

Currently, China is collaborating on green energy projects with over 100 countries and regions. According to the International Renewable Energy Agency, the average global cost per megawatt-hour for wind and solar power has plummeted by over 60 percent and 80 percent, respectively, over the last decade.

A substantial portion of these savings is credited to Chinese innovation, manufacturing prowess, and engineering excellence, which are driving down costs and making renewable energy more accessible worldwide, experts say.

<https://english.news.cn/>

# Energy Storage & Grids

27 Energy Storage Technologies & Solutions



# The Alternative Fuel Cell Technologies are Competing for Market Share

## Alternative Fuel Cell Technologies are Competing for Market Share

The stationary fuel cell market is dominated by SOFC and PEMFC technology, **but alternative fuel cell types are set to compete and will account for over 10% of the total annual demand by 2035**, equating to almost 750 MW. IDTechEx finds that growth of the alternative fuel cell market will remain for specific and niche usage cases, with different outlooks for the AFC, DMFC, MCFC and PAFC markets.

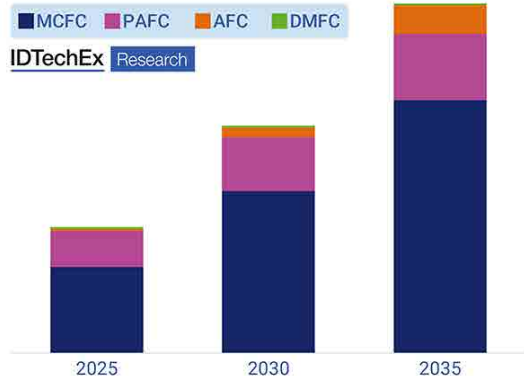
High temperature operation and fuel flexibility drives growth of MCFCs, with unique opportunity for decarbonization of industry through simultaneous power generation and carbon-capture.

PAFC market growth is anticipated to tail off as dominant market players begin to transition away from the technology - towards PEMFCs and SOFCs.

AFC low temperature operation and rapid start-up time, makes them particularly useful for back-up power applications.

DMFCs typically possess lower power densities and power outputs compared to PEMFCs. Uptake is anticipated to be primarily restricted to niche use cases, limiting global growth.

### Annual alternative stationary FC demand (MW)



See the full study in IDTechEx's report "**Stationary Fuel Cell Markets 2025-2035: Technologies, Players & Forecasts**" - [www.IDTechEx.com/StationaryFC](http://www.IDTechEx.com/StationaryFC)

With growing interest into the integration of fuel cells for stationary power, many commercial players have chosen to adopt either proton exchange membrane (PEM) or solid oxide fuel cells (SOFC). However, alternative fuel cell technologies like alkaline fuel cells (AFCs), molten carbonate fuel cells (MCFCs), phosphoric acid fuel cells (PAFCs), and direct methanol fuel cells (DMFCs) still compete for market share. In its latest report, IDTechEx explores not only the PEMFC and SOFC markets but analyses the viability of alternative FC types as stationary power generation technologies, finding the technologies will account for over 10% of annual demand by 2035, with a cumulative market share of over US\$676 million.

The IDTechEx report, "Stationary Fuel Cells 2025-2035: Technologies, Markets & Players", provides a comprehensive review of all stationary fuel cell technologies as well as an assessment of the market players and

trends anticipated for each respective sector. Granular ten-year forecasts provide an in-depth breakdown of the market by technology type and application area.

### Outline of the alternative fuel cell technologies and the key market findings. Source: IDTechEx

Alternative fuel cell technologies can be broken down into high and low-temperature operations. High-operating temperature FCs are generally utilized for continuous power generation, whereas low-temperature operation results in quick start-up times for backup power use. The high-temperature operation of MCFCs (above 650°C) makes them a particular competitor to SOFCs. With a similar ability to operate on hydrogen carrier fuels via internal reforming, MCFCs can also be used for continuous, high-power generation. Isolation of the thermal exhaust, through operation in a combined heat and power mode (CHP) for general heating

purposes, increases their efficiency to over 80% from typically around 60%. MCFCs require carbon dioxide (CO<sub>2</sub>) as well as oxygen and hydrogen fuel to operate, meaning they have been considered for carbon capture applications alongside power generation, particularly for the industrial sector, where an added value stream incentivizes market uptake. Their uptake is generally found to be for industries where a CO<sub>2</sub> exhaust gas stream is available for fuel cell operation, with market growth primarily in application areas such as wastewater plants and chemical refineries.

Low-temperature alternatives, such as AFCs and PAFCs, have proven technological legacies dating back to the NASA space missions. PAFCs, despite being one of the earliest commercially available FCs, have seen more limited growth uptake, with key manufacturers choosing to transition into the development of PEMFC or SOFC technologies. PAFCs operate at medium temperature ranges, typically 150-200°C. This allows for reasonably fast ramp-up times (<hour) to deliver maximum power outputs, and for the cogeneration of heat and electricity, again increasing efficiencies to over 80%. However, their acidic and liquid operating environment presents significant safety risks requiring regular maintenance and monitoring, so far limiting commercial opportunities and market uptake.

AFCs were one of the original FC technologies tested for NASA space missions. By operating at temperatures typically around 20-200°C, the technology can rapidly respond to power demand changes. The large-scale development of AFCs continued primarily until the emergence of proton exchange membrane fuel cells (PEMFCs), with many manufacturers and research teams choosing to develop this technology instead. Their ability to operate using non-noble metal catalysts, such as nickel metal, has led to increased interest in their uptake, as a lower-cost alternative to PEMFCs. AFCs are now considered a backup

power competitor to PEMFCs, with the technology considered a durable and high-efficiency alternative.

As a specification variation of PEMFCs, DMFCs are a low temperature alternative, able to operate using methanol fuel. DMFCs utilize a proton-exchange membrane and operate at temperatures typically 50-120°C. This again allows for rapid response times to power demand changes, with DMFCs typically used for backup power applications, particularly for remote monitoring and telecoms. Their ability to operate using low-cost and widely available methanol fuel has helped to drive use cases; however, limitations to their power densities again hinder widespread uptake. IDTechEx finds that the DMFC market will be restricted to more specific and niche use cases.

The spread of fuel cell technologies available within the market provides customers with access to a variety of systems designed for their specific power requirements. However, comprehensive analysis of the market and players finds that many manufacturers of alternative FC technologies have begun to transition to the production of PEMFCs or SOFCs; the exception, however, is AFCs. Despite this period of transition, many market players continue to manufacture alternative FC technologies, with IDTechEx finding that the combined MCFC, PAFC, AFC, and DMFC market demand is anticipated to rise to 750 MW annually by 2035.

For more details on the varying types of fuel cells available on the market and how adoption is anticipated to change over the coming decade, see IDTechEx's market report "Stationary Fuel Cell Markets 2025-2035: Technologies, Players & Forecasts".

For more information on this report, please visit [www.IDTechEx.com/StationaryFC](http://www.IDTechEx.com/StationaryFC)

# Country Reports

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## Saudi Arabia and Italy Sign Energy Cooperation Deal



Italy and Saudi Arabia on Tuesday signed a cooperation agreement in the energy sector, with an emphasis on renewable energy, hydrogen, and carbon capture, Italian Energy and Environment Minister, Gilberto Pichetto Fratin, said while on a visit to Riyadh.

Italy's minister signed the agreement with Saudi Energy Minister Abdulaziz Bin Salman Al Saud on the sidelines of the Future Minerals Forum in Riyadh.

The five-year cooperation agreement includes boosting bilateral cooperation in hydrogen production, renewables, and carbon capture and storage (CCS).

The new cooperation deal will focus on clean energy and clean tech, including low-carbon hydrogen and green ammonia, according to the Italian government.

Despite industry-wide challenges to green hydrogen, Saudi Arabia's sovereign wealth fund, the Public Investment Fund (PIF) is reportedly planning to invest \$10 billion in green hydrogen.

"Italy could be an energy hub on the Middle East to Europe route, thanks to its location in the Mediterranean and its interconnections with the rest of Europe," the Italian minister said during the meeting with his Saudi

counterpart.

"We know well Saudi Arabia's capability in the reduction of renewable hydrogen and low-carbon derivatives such as ammonia," Pichetto added.

The cooperation agreement is the starting point for developing concrete projects and boost relations between Italy and Saudi Arabia, he noted.

The two countries have also discussed in the past possible partnerships and joint investments in the oil and gas and mining sectors.

At the end of 2023, Italy and Saudi Arabia discussed potential partnerships and joint investments in the energy sector, especially in critical raw materials, in Italy, Saudi Arabia, and third countries, such as those in Africa, Italian Industry Minister Adolfo Urso said after meeting with Saudi officials in Riyadh.

The officials also discussed investments in Italy and Saudi Arabia in industrial sectors, including oil and gas, automotive, defense, green technologies, hydrogen, and aerospace, Minister Urso said at the time.

**By Charles Kennedy**  
for [Oilprice.com](https://www.oilprice.com)



## India Emerging as Renewable Energy Powerhouse



Photo via Ministry of New and Renewable Energy

The country added 2.3 GW of new renewables in November 2024 alone.

India expressed confidence that it is becoming one of the world's leaders when it comes to the deployment of renewable energy.

“What India does in renewable energy is not only keenly watched by the world, but also adopted by several countries,” said Union Minister for New and Renewable Energy Pralhad Joshi.

The official said that between April and November this year, India added nearly 15 gigawatts (GW) of renewable energy capacity, almost double the 7.54 GW added last year. Last month alone, 2.3 GW of new capacity was added which was a four-fold increase from the 566 megawatts last year.

India's total installed capacity in the non-fossil fuel energy sector has also reached 214 GW, up 14% compared to the same period last year.

Joshi reiterated the government's commitment to achieving 500 GW of non-fossil fuel-based capacity by 2030. Despite having one of the largest coal resources globally, India maintains one of the lowest per capita emissions, at one-third of the global average.

The minister also outlined several key steps taken by the Union Government to boost the growth of renewable energy sector in India such as the introduction of the Production-Linked Incentive (PLI) scheme, with an outlay of INR 24,000 crore. There is also an ongoing initiative to establish 50 solar parks, with a cumulative capacity of 38 GW by 2025 to 2026.

Additionally, the PM Surya Ghar Muft Bijli Yojana scheme is targeting 1 crore installations by 2026 to 2027, with an outlay of INR 75,021 crore.

<https://asian-power.com/>

# German Solar Panel Industry Struggles with Declining Demand



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Germany's solar panel sector is facing significant challenges due to dampened consumer and investor sentiment, primarily driven by the ongoing cost of living crisis and high interest rates, which have hindered installations. The residential solar market is seeing a sharp decline, with many solar panel installation and distribution companies facing layoffs, bankruptcies, and takeovers. In response, companies have had to quickly adapt their strategies to cope with these tough conditions.

This decrease in demand has resulted in a drop in solar panel prices and an oversupply in the market, raising concerns about the long-term impact on the EU's climate goals and investor sentiment. Other European countries, such as Belgium and the Netherlands, are also experiencing reduced interest in solar power.

Germany saw a surge in solar demand during the Russia-Ukraine war, driven by concerns over rising energy prices and the need for energy security. In the first nine months of

2024, over 11 gigawatts of solar power were installed, a 3% increase from the previous year. Government subsidies had fueled this rise, aimed at reducing dependence on Russian energy. However, the residential sector is now seeing a correction due to the ongoing cost of living crisis and high financing costs, compounded by falling energy prices.

In mid-2024, the German government announced plans to reduce renewable energy subsidies, further impacting the market. Additionally, increased competition from cheaper Chinese solar panel providers has added pressure on domestic companies, leading to consolidations and fewer new investments. Despite these setbacks, Germany has seen growth in smaller-scale photovoltaic systems as some consumers continue their green energy journey on a smaller scale.

**By Indrabati Lahiri**

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

# Services

*34 Coming Events*



## Coming Events

### International Conference on Solar Power Technology 2025

03 - 04 Jan 2025  
Dubai, UAE

<https://itrgroup.net/Conference/1356/ICSPT/>

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

### World Renewable Energy Congress 2025

13 - 16 Jan 2025  
Crowne Plaza Bahrain, Bahrain  
<https://www.wrenuk.co.uk/>

Murdoch University and WREN are jointly organizing the Sixth World Renewable Energy Congress, which focuses on advancements in renewable energy. The event also includes the Mediterranean...

### World Future Energy Summit 2025

14 - 16 Jan 2025  
Abu Dhabi, UAE

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

The World Future Energy Summit is a prominent global event that promotes sustainability and clean energy transition. It brings together leaders, innovators and thinkers to share ideas and create...

### Southern African Coal Conference 2025

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Cape Town, South Africa

<https://www.opisnet.com/southern-african-coal-conference/>

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Baghdad International Exhibition, Baghdad, Iraq  
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### Iraq International Energy Expo & Conference 2025

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Baghdad International Exhibition, Baghdad, Iraq

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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...

### 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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# AI Energy Demand Sparks Nuclear Revival Amid Controversy



Artificial intelligence's surging energy needs have thrust nuclear power back into the spotlight, marking what some are calling a "nuclear renaissance." While AI's transformative potential is universally acknowledged, its energy-intensive operations, particularly in training large language models like ChatGPT, are fueling renewed interest in nuclear power, especially in the United States.

A single AI query can consume up to ten times more energy than a standard Google search. Data centers supporting AI operations already account for 1% of global electricity consumption, and projections from Goldman Sachs suggest this could rise to 8% in the US by 2030. This steep demand is prompting a shift towards nuclear power as a carbon-free, reliable energy source.

Microsoft's recent agreement to purchase energy from Pennsylvania's Three Mile Island Unit 1 underscores this shift. The reactor, decommissioned in 2019, is set to restart in 2028 as part of a 20-year power purchase agreement with Constellation Energy, making headlines as the largest deal of its kind. Pennsylvania Governor Josh Shapiro supports the move, highlighting the nuclear industry's role in providing safe, reliable electricity while reducing emissions.

## Nuclear Energy: A Divisive Solution

Despite its advantages, nuclear energy remains controversial. Three Mile Island was the site of one of the worst nuclear accidents in US history in 1979, when a partial meltdown at Unit 2 raised safety concerns that persist today. Critics, like Eric Epstein of the grassroots group Three Mile Island Alert, argue that nuclear power is an "economic fiction," heavily reliant on subsidies. Epstein highlights ongoing safety risks, including flooding vulnerabilities and radioactive waste management challenges at the site.

The push for nuclear power is gaining momentum among tech giants like Google, Amazon, and OpenAI, which are exploring small modular reactors (SMRs) to meet their data centers' energy demands. Advocates argue that nuclear plants provide a steady, carbon-free power supply and can run for years without refueling, making them a key player in addressing both the climate crisis and the energy demands of the digital economy.

## Balancing Benefits and Risks

Proponents view nuclear energy as cleaner and more efficient than fossil fuels, with potential economic benefits for local communities. However, critics emphasize the lingering fears of catastrophic accidents, citing historical disasters like Chernobyl, Fukushima, and Three Mile Island as reminders of the risks.

Constellation's rebranding of the facility as the Crane Clean Energy Center has drawn additional criticism from opponents, who see it as an attempt to downplay the site's troubled history. Epstein remains skeptical, pointing out that energy generated by Three Mile Island will benefit distant data centers rather than local residents, who will bear the costs and risks.

As AI's energy appetite grows, nuclear power's role in the energy mix continues to polarize public opinion. While its potential to support AI-driven innovation and reduce carbon emissions is undeniable, the debate over its safety and economic viability ensures that the conversation will remain heated.

Pending regulatory approval, the restart of Three Mile Island Unit 1 is slated for 2028, signaling a pivotal moment in the intersection of AI, energy, and the future of nuclear power.

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