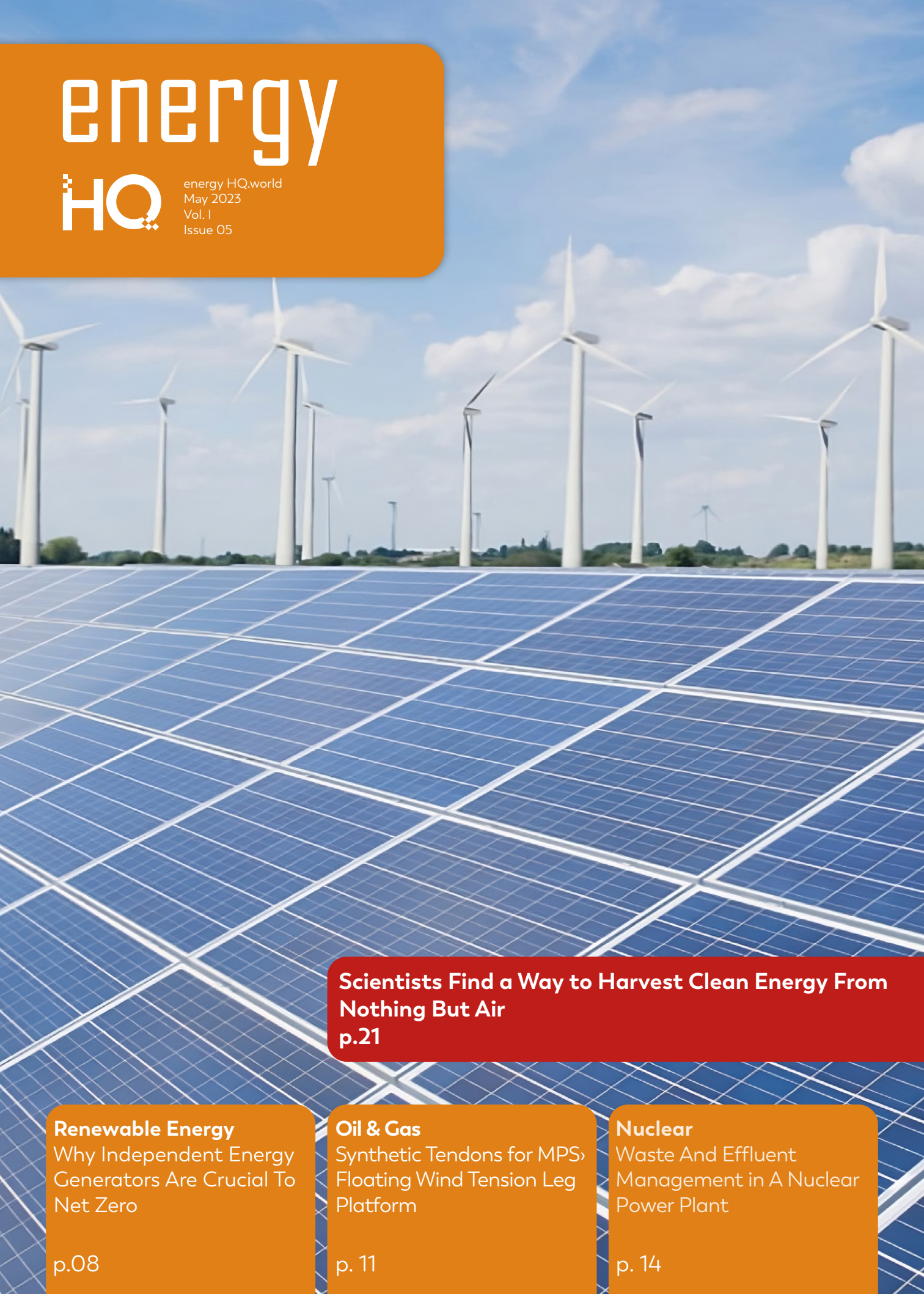
energy HQ

energy HQ.world
May 2023
Vol. I
Issue 05



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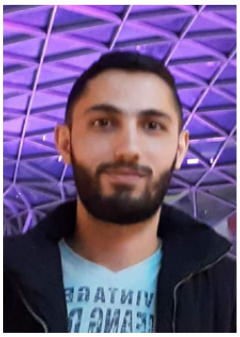
The Significance of Energy: Powering the Modern World



Energy is the lifeblood of modern society. It fuels our homes, powers our vehicles, and drives our industries. From the moment we wake up until we go to bed, energy plays an indispensable role in our daily lives. In this article, we will explore the significance of energy and its profound impact on the world we live in.

At its core, energy is the capacity to do work. It exists in various forms, such as thermal, electrical, mechanical, and chemical energy. The ability to harness and utilize these forms of energy has revolutionized the way we live and transformed our societies. The discovery of fire by early humans marked the beginning of our relationship with energy, enabling warmth, cooking, and protection. However, it wasn't until the Industrial Revolution that energy consumption soared, triggering a series of advancements and challenges.

Today, our dependence on energy is greater than ever before. Fossil fuels, such as coal, oil, and natural gas, have long been the dominant sources of energy. However, their extraction and combustion have severe environmental consequences, including air pollution and greenhouse gas emissions. In response, the world is shifting towards renewable energy sources, such as solar, wind, hydro, and geothermal power. These sources offer cleaner alternatives, reducing our carbon footprint and mitigating climate change.

The importance of energy extends beyond environmental concerns. Economic development hinges on a reliable and affordable energy supply. Industries require energy to power machinery, facilitate production processes, and transport goods. Energy-intensive sectors, such as manufacturing and transportation, rely heavily on efficient energy systems. Likewise, small businesses and entrepreneurs benefit from access to affordable energy, which fuels their operations and fosters growth.

In conclusion, energy is an indispensable force that powers our modern world. From powering our homes and industries to driving economic growth and enabling technological advancements, it underpins nearly every aspect of our lives. As we navigate the path towards a sustainable future, harnessing renewable energy sources and promoting energy efficiency will be pivotal in ensuring a prosperous and environmentally conscious society.

In This Issue!

energyHQ's May 2023 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. The article on page 11 talks about Tension Leg Platform, the article on page 14 Sheds the light on Scanning & Storage Systems, and the article on page 21 focuses on Clean Energy. 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 for your business, and welcome receiving your comments, suggestions, or feedback. Please send them to h.mourtada@1world.xyz.

Best wishes,
Hassan Mourtada
Editor-in-Chief / Content & Research Officer.
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Issue Contents

World Energy Digest

Denmark

Exploring the Success of Denmark's Renewable Energy Market

Denmark has long been a pioneer in the renewable energy sector, and its commitment to sustainable energy sources has positioned the country as a global leader in the field. With a combination of innovative technologies, supportive government policies, and a strong focus on environmental responsibility, Denmark has successfully transitioned from a reliance on fossil fuels to a diverse and sustainable energy market. This success story offers valuable insights for other countries looking to follow in Denmark's footsteps and invest in renewable energy. One of the key factors behind Denmark's renewable energy success is its early adoption of wind power. The country's flat terrain and strong coastal winds make it an ideal location for wind farms, and Denmark has been harnessing this natural resource since the 1970s. Today, wind power accounts for more than 40% of the country's electricity production, making Denmark the world leader in wind energy per capita. This impressive figure is set to increase even further, with ambitious plans to expand offshore wind capacity and reach 100% renewable energy by 2030. Denmark's commitment to renewable energy is not limited to wind power, however. The country has also made significant investments in solar power, biomass, and other sustainable energy sources. This diverse energy mix has allowed Denmark to maintain a stable and reliable energy supply, even as it reduces its dependence on fossil fuels.

Indonesia

USTDA Advances Indonesia's Power Sector Transition

The U.S. Trade and Development Agency awarded a grant to PT Medco Power Indonesia (Medco), a private Indonesian energy developer, for a feasibility study to help develop an estimated 111-megawatt wind power plant in West Sumbawa, in Indonesia's West Nusa Tenggara province. The project will facilitate the replacement of high-polluting sources of power with clean, renewable energy. "USTDA's partnership with Medco will advance Indonesia's clean energy transition and offer communities in West Sumbawa a renewable source of power," said Enoh T. Ebong, USTDA's Director. "We anticipate strong interest by U.S. industry to partner with Medco on the implementation of this priority project and believe that the flexibility and relevance of our project preparation tools to Indonesia's infrastructure needs makes us natural partners."

USTDA's study will provide Medco with a detailed wind resource assessment, a preliminary geotechnical analysis, a power plant and interconnection system design, a grid integration study, a preliminary environmental and social impact assessment, a risk assessment, a cost and economic analysis, and an implementation plan.

"As one of the leading clean and renewable power companies in Indonesia, Medco Power continues to support the Indonesian Government's commitment to climate change mitigation and targets towards emissions reduction and net zero goals," said Eka Satria, President Director of PT Medco Power Indonesia. "This signing is also part of our climate change strategy in developing the electricity portfolio from renewable energy."

Philippines

Philippine Energy Sector Still Faces Stubborn Challenges

Efforts to change the Philippine energy sector are hitting obstacles, possibly jeopardizing the country's goal to diversify its power sector and reduce its energy sector emissions.

Amid a scramble to diversify the Philippine energy mix, including a major gas drive, it is becoming evident that the transition is more convoluted than energy planners in the country first envisioned.

According to a new Reuters report, things could become even more strained for Philippine energy plans.

Developments come as the Philippines' Malampaya offshore natural gas field is expected to be depleted sometime next year. Malampaya provides around 33% of Luzon's power generation needs. Luzon is the country's largest island, and includes metro-Manila's 15 million residents. The project has been the Philippines' only source of gas since its operations began around 20 years ago.

The Philippine Department of Energy (DOE), for its part, has a two-pronged approach to both meet the impending loss of Malampaya gas and to replace coal-fired power generation, a growing point of contention among Philippine environmental groups and a growing segment of the population.

Their strategy relies on more LNG import terminal development (including plans to become a regional LNG hub) as well as significant investment in renewable energy — mostly solar and onshore and offshore wind power. The DOE has earmarked that renewables make up some 35% of the Philippines' energy mix by 2030.

Switzerland

Vietnam's Renewable Energy Future

A carbon-neutral and independent Swiss energy system in 2050 is theoretically achievable using the currently untapped local renewable energy resources. This system would even be cheaper than the country's 2020 energy system modeled with the same assumptions, with up to 30-32% cost reductions. Such are the findings of an extensive study led at EPFL and HES-SO Valais, that have the potential to pave the way for a reinforced plan towards more domestic investment in clean energy.

Though theoretically possible, the total independence of the Swiss energy system is not a goal per se. The carbon-neutral constraint by 2050, however, is aligned with the text of the Federal Act on Climate Protection Objectives (submitted to the Swiss vote in June 2023).

The scientists decided nevertheless to use their model, the multi-energy and multi-sector modeling framework EnergyScope, to push Switzerland into a fully energy-independent state in order to theoretically guarantee the security of supply and later calculate the impacts of the imports and exports. The model generated cost-optimal investment options that satisfy the demands of Swiss society defined as households, transportation, and industry and focus on the role of the existing or reinforced infrastructure.

The researchers from the EPFL School of Engineering's Industrial Process and Energy Systems Engineering group (IPESE), led by François Maréchal, found that to meet the aforementioned goals, Switzerland should boost the generation of photovoltaic (PV) and wind electricity and that an economic optimum could be achieved by covering 60% of Switzerland's roof area with PV systems.

Sudan

Nilepet to Become an Energy Operator by 2027, Says Director General (DG) During South Sudan Oil and Power (SSOP) 2023

The national oil company (NOC) of South Sudan, Nilepet, will be an energy operator by 2027 as part of the company's growth strategy, stated Stanslaus Tombe, Director General – Upstream of Nilepet, during a panel discussion on the first day of South Sudan Oil & Power (SSOP) 2023 Conference & Exhibition which is organized by Energy Capital & Power (www.EnergyCapitalPower.com) in partnership with the Ministry of Petroleum.

During the panel, "African Producers: The Evolving Onshore E&P Environment in Africa and the Middle East," Tombe stated that Nilepet seeks to play a greater role in the development and maximization of South Sudan's hydrocarbon resources as part of the firm's Vision 2027.

According to Tombe, Nilepet plans operate 70% of the country's total production capacity and fields, with the remaining 30% operated by international firms. He said that this will enable Nilepet to become a competitive international energy player, adding that the NOC is investing heavily in the growth of its nine subsidiaries to be able to achieve the target.

Commenting on the role of the oil and gas industry on the South Sudanese economy, Tombe stated that 90% of the country's revenue is sourced from the industry, bearing significant impacts on GDP growth and socioeconomic developments in the East African country, with the majority of infrastructure development projects being funded by oil revenues.

Syria

Energy Security in Post-Conflict Syria: Challenges and Solutions

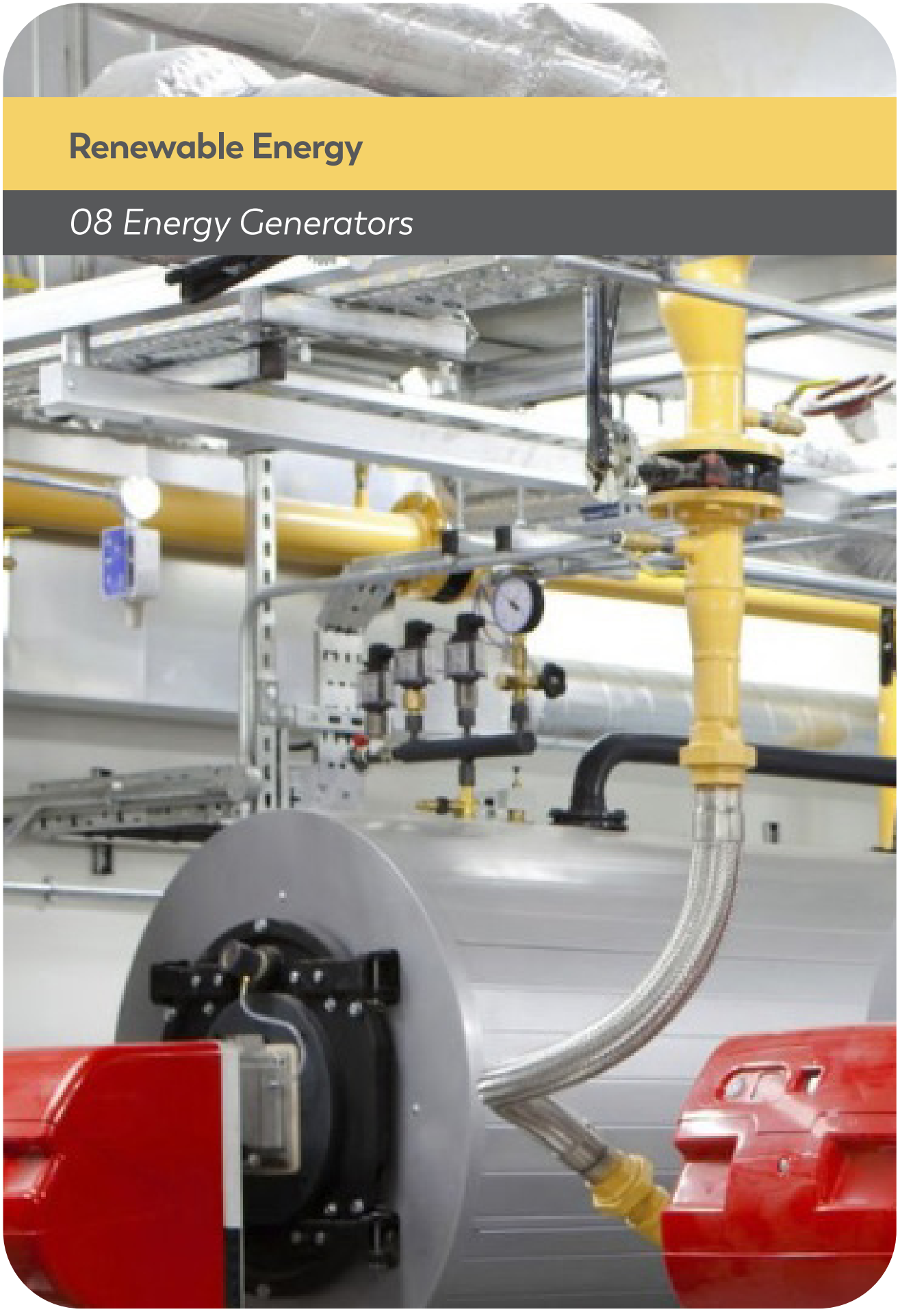
Energy security in post-conflict Syria has emerged as a critical issue, with the nation's infrastructure and economy in shambles after years of civil war. The Syrian government, backed by its allies, has regained control over most of the country, but the challenge of rebuilding and ensuring energy security remains daunting. The situation is further complicated by the presence of various regional and international actors with competing interests, as well as ongoing instability in the region. In this context, it is essential to explore the challenges and potential solutions to Syria's energy security dilemma.

One of the primary challenges facing Syria's energy sector is the extensive damage to its infrastructure. Years of conflict have left the nation's oil and gas facilities, power plants, and transmission lines in ruins. According to the World Bank, the cost of rebuilding Syria's energy infrastructure could be as high as $27 billion. This massive financial burden will be difficult for the cash-strapped Syrian government to bear, especially given the reluctance of many international donors to provide assistance due to ongoing political concerns.

Another challenge is the loss of Syria's oil and gas resources to various armed groups during the conflict. At the height of the war, the Islamic State (ISIS) controlled a significant portion of Syria's oil fields, using the revenues to fund its operations.

Renewable Energy

08 Energy Generators

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Why Independent Energy Generators Are Crucial To Net Zero

Ocean Sun

Vish Sharma, Head of Power Purchase Agreements at npower Business Solutions, explains why independent energy generators are key for reaching net zero

Independent energy generators have an important role to play in helping the UK to achieve net zero, as well as improving energy stability and affordability for businesses, says Vish Sharma, Head of Power Purchase Agreements at npower Business Solutions.

In its latest Net Zero Progress report to the UK Parliament, the Climate Change Committee found that current plans and policy are unlikely to achieve the legally binding target of reaching net zero by 2050. In addition, the Net Zero Review, which was led by Chris Skidmore MP and published in January 2023, included several recommendations to accelerate progress, such as ways to incentivise businesses and targets for deploying more homegrown clean energy.

The UK Government's recent response - badged by many commentators as 'Green Day' - on 30 March 2023 saw the publication of 'Powering Up Britain'. The extensive document sets out a number of pledges, including a plan to accelerate the deployment of renewables. More specifically, it outlined its intention to support the generation of up to 50 GW of offshore wind by 2030 and quintupling solar photovoltaic (PV) power by 2035. The good news is that 2022 was widely reported to have been a record breaking year for renewable energy generation in the UK, so we are already making significant strides towards reducing our reliance on fossil fuels.

As such, the opportunities for independent energy generators are extensive, not just to assist the country in reaching net zero and increase energy security, but also to supply corporate energy buyers with a reliable, sustainable and affordable power - a top priority for many organisations in today's uncertain times.

The role of the independent energy generator

Independent energy generators are most commonly privately held facilities, corporations or cooperatives with sustainable energy generation technology on their premises.

This power, whether generated on agricultural land, data centres or through solar PV at a warehouse and logistics site, for example, is then sold and distributed to meet demand, including supplying businesses - usually via a Power Purchase Agreement (PPA).

Embedding independent energy generation into the UK's wider energy infrastructure ultimately improves the reliability of our renewable energy supply and contributes to a wider energy resilience by reducing draw down from the grid.

Many businesses are showing a significant interest in installing on-site generation. Our most recent Business Energy Tracker report revealed that, in 2022, just over one in four (27%) businesses said this was in their plans. 2023 saw this rise to over a third (36%), with solar PV proving to be the most popular solution.

At the same time, we are also responding to an understandable increase in customer demand for a renewable, sustainable energy supply. As such, there is a natural fit between independent generators who want to sell their power via a PPA, and meeting the demand from corporate buyers.

Independent energy generation & the path to net zero

Without question, independent energy generators have the potential to make a hugely significant contribution to getting the UK to net zero. We just need to pick up the pace if we are to hit targets in time.

The newly formed Department for Energy Security & Net Zero (DESNZ), which replaced the Department for Business, Energy and Industrial Strategy (BEIS), recently published its first Energy Trends report, which found that overall energy production from renewable technologies hit an all time high of 41.4% last year, largely due to wind and solar PV generation.

This is a strong foundation on which to further develop the UK's renewable energy output. In 'Powering Up Britain', the UK Government also pledged to reform planning to facilitate the faster deployment of much needed renewable energy projects. Streamlining the planning process and empowering local planning authorities to make their decisions more quickly will hopefully unlock further opportunities for current and future generation projects.

As a result, independent energy generators will undoubtedly play an important part in both supporting the growth of homegrown clean energy and helping businesses procure their power from renewable sources.

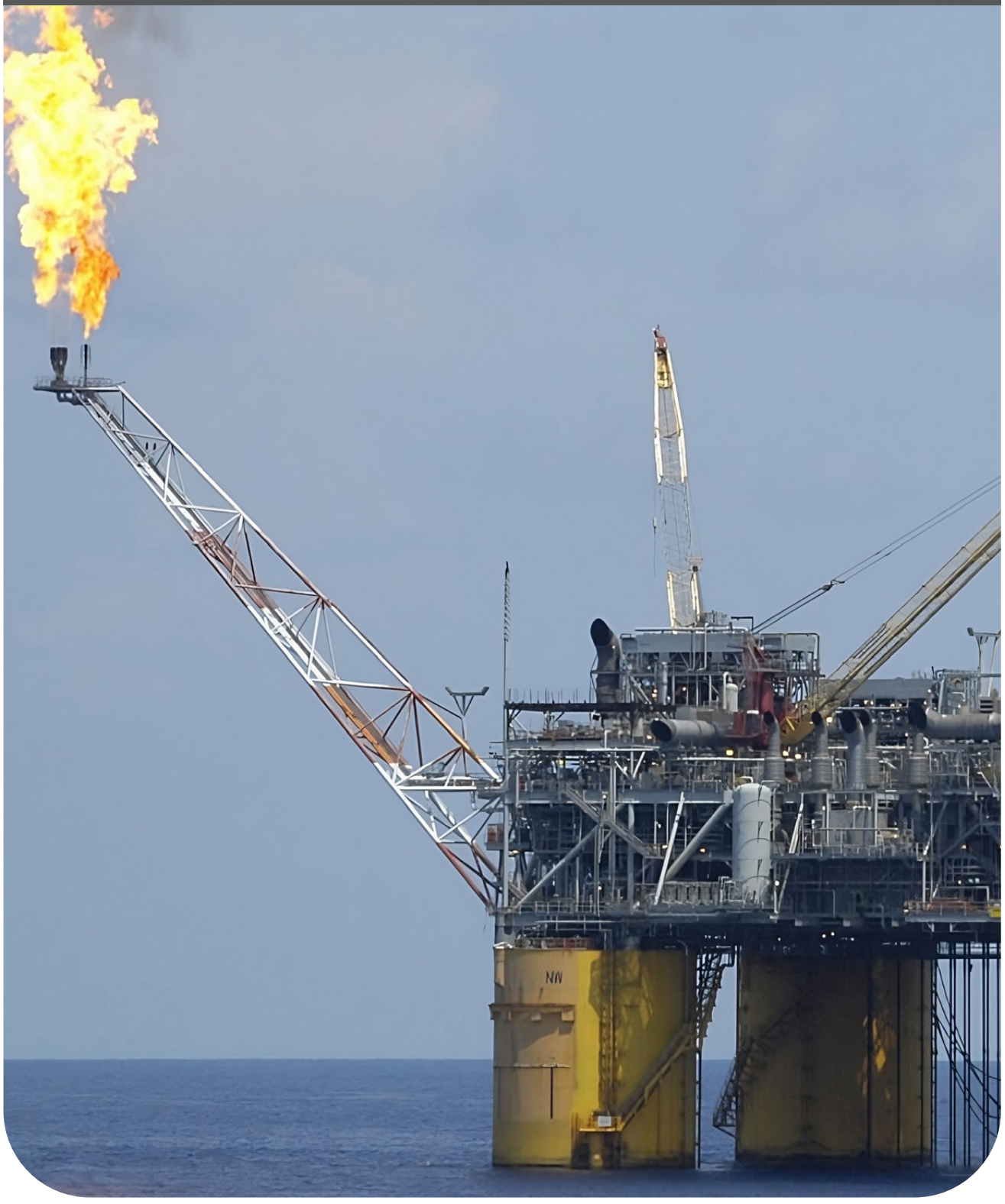
With more organisations looking for cleaner, greener and more stable energy solutions, the role of independent power generators will be critical to the provision of sustainable and affordable energy both now and in the future.

By Vish Sharma

https://cordis.europa.eu/

Oil & Gas

11 tension Leg Platform



Synthetic Tendons for MPS Floating Wind Tension Leg Platform

Marine Power Systems is collaborating with cable manufacturer FibreMax to provide integrated floating foundation and tendon solutions to the growing floating offshore wind sector.

The tendon solution will be used in the anchoring and moorings of Marine Power Systems tension leg platform (TLP), PelaFlex, to deliver the "highest system stability and zero tilt."

According to MPS, this will be the world's first tension leg platform with FibreMax tendons, made with Twaron fiber from Teijin, a company specializing in aramid fibers.

Compared to traditional steel moorings, synthetic cable offers a much better strength-to-weight ratio, longer operational life and lower levels of maintenance, MPS said.

"FibreMax, based in the Netherlands, have been producing the world's strongest synthetic cables and supplying them to the offshore renewables industry since 2009. Their unique and proprietary process uses endless winding technology to continuously wind parallel strands of fibres until the right cable strength and length is reached. This creates cables with the highest breaking load, very low stretch and lowest diameter possible," MPS said.

Gareth Stockman, CEO at MPS said: "We see our partners and suppliers as very much part our team, and with the addition of FibreMax we are benefiting from the very best expertise in the industry and developing an extremely credible floating offshore wind delivery solution for the global market."

Marine Power Systems claims that its floating offshore platform technology offers best in class cost compared with its peers due to the significantly reduced system mass.

Moreover, the company says its modular and flexible design, enables optimum local content delivery through a decentralised logistics model.

Sander van Helvoort, Director Renewable Energy at FibreMax commented, "We're proud to be part of the Marine Power Systems team and delivering our unique tendons for the world's first TLP with synthetic tendons. This brings together two unique and innovative technologies, the PelaFlex floating platform and the FibreMax tendons made with circular Twaron (Aramid) fibres made by Teijin. While working with Marine Power Systems we've developed an excellent relationship which is now formalised and will allow both MPS and FibreMax to further expand, support and develop our relationship to deliver successful projects."

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Nuclear

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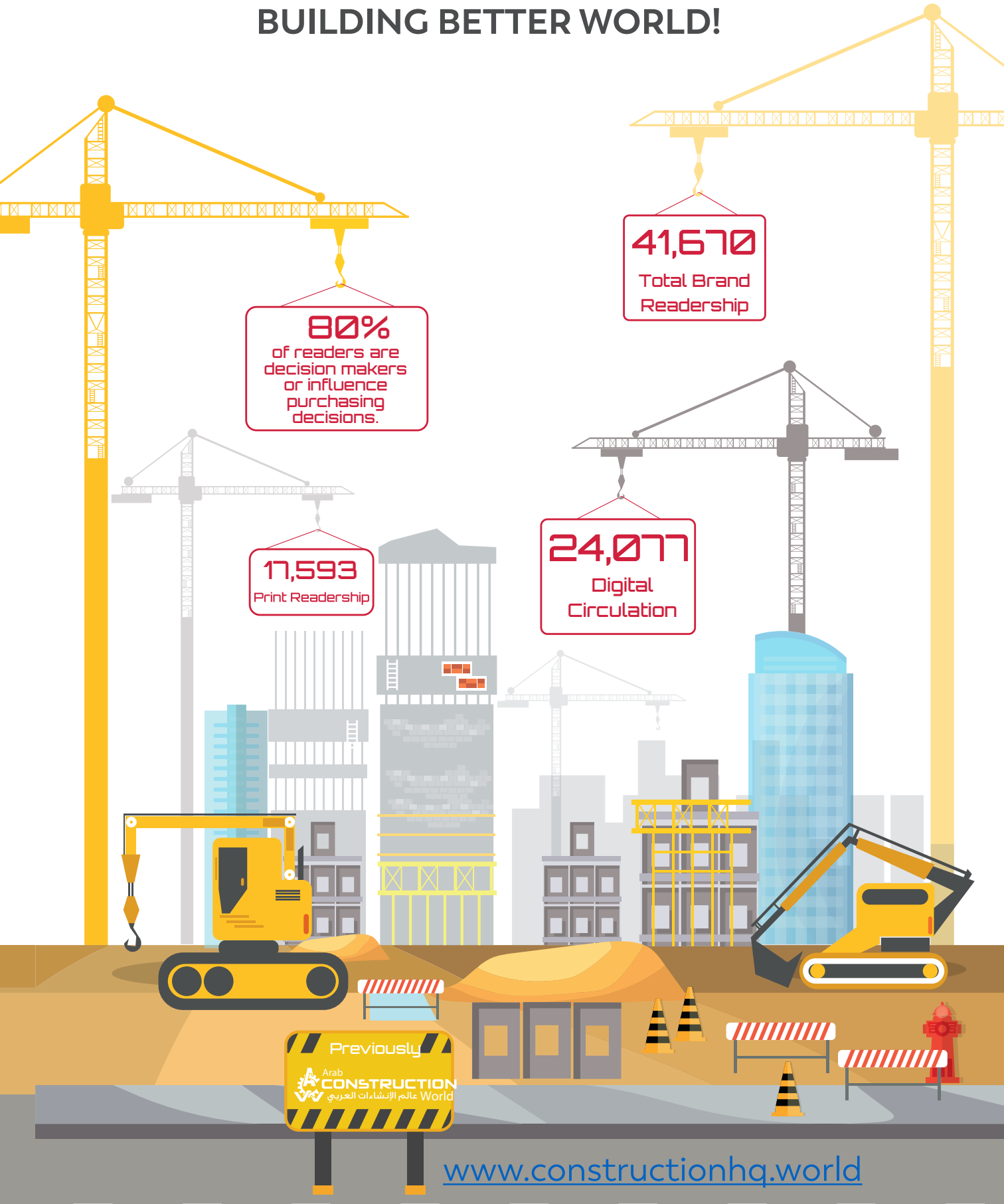

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Waste And Effluent Management in A Nuclear Power Plant

Low and intermediate level radioactive waste canisters

In a nuclear power plant, as in any industrial facility, along with the product obtained (in this case, electricity), there is a series of wastes and effluents. High-level radioactive waste, basically fuel assemblies that have already been in the reactor core for one or more production cycles, are stored underwater in the spent fuel pools at the plant itself so that after the appropriate decay time they can be disposed of in metal containers.

As regards the rest of the wastes (low and intermediate levels), which are radioactive liquids and gases, solids, resins and contaminated sludges (from filtration, purification, and treatment equipment), tools, overalls, and work clothes, etc., the operating philosophy of the plants is reduction, decontamination, declassification, etc.

The products from the fuel assemblies, together with corrosion and activation products and fission products in the free uranium, are released in the core coolant, which, depending on their state, are removed by means of purification systems, drains and collectors and decontamination in the spent fuel storage pools:

- **Solids**: They are placed in containers and conditioned for final storage.
- **Liquids**: They are sent to a treatment system that separates the solid part that they may contain for storage, the liquid part to a discharge channel that is released into the environment, and the gaseous part to a gas treatment system that leads to a chimney that is also released into the environment.
- **Gaseous**: They are sent to a gas treatment system leading to a stack which is released to the environment.

Then there is always an environmental monitoring system to check that everything is correct.

The discharge of liquid and gaseous effluents to the exterior is carried out after rigorous chemical and radiological analyses and the activity to be discharged is regulated by the regulatory body.

https://rinconeeducativo.org/

Electric

Temporary Solar Power

The Rise of Waste-To-Energy and The Perception Transition

A chemical recycling pyrolysis technology plant

Smruthi Nadig speaks to waste-based fuel expert and CEO of Stellar3, a waste transformation technology provider and developer company, to understand waste-to-energy technologies› transition and environmental benefits.

Aside from its environmental benefits, the energy transition promises to move power generation from using costly feedstocks with complex logistics chains toward using the natural, sustainable resources available everywhere. The economics of generation shift further when using a fuel with a negative cost, where generators are paid to solve a problem. This is the promise of waste-to-energy generation.

Some reports suggest that the value of the waste-to-energy market will surpass $70bn by 2030. However, this growth will depend on regulatory bodies and regional governments making significant pushes towards use waste-to-energy technologies.

The UAE has already made this push: the country's first plant will turn 300,000 tonnes of non-recyclable waste into 30MW of energy. Following this, a consortium will develop a $1.1bn plant on a former landfill site, processing 1.9 million tonnes of waste per year for approximately 200MW of power. This would make the facility one of the largest in the world, although its power generation capacity remains small compared to other developments in a similar investment tier. Still, technology proliferates, as waste-to-energy represents perhaps the only type of generation where plants receive payment for accepting their fuel.

Dan Nienhauser, founder, and CEO of US-based

waste-to energy company Stellar3, tells us that the industry could become a multi-trillion-dollar market by 2050, but that first, some perceptions must change.

Smruthi Nadig: How difficult would it be to implement energy generation through waste at scale?

Dan Nienhauser: Change is never "easy," and we have been a fossil fuel-focused world for many decades. But using waste to generate energy is easily achievable, and in the past 1-2 years, it has emerged as a reliable and profitable opportunity. In addition to being profitable and environmentally friendly, waste-to-energy methods also improve waste management.

Among the most prominent current waste transformation methods [are] pyrolysis, which uses waste materials such as plastics or biomass. In pyrolysis, these are thermally broken down in the absence of oxygen. Alternatively, gasification involves converting waste materials into synthetic gas [syngas] through chemical reactions. Syngas can be used to generate electricity or for the production of chemicals and fuels. Although gasification is more environmentally friendly than incineration, it requires advanced infrastructure and expertise.

The ease of implementation, however, varies according to the method, scale, and local conditions. While some methods, like landfill gas capture, are relatively simple to implement, others, like gasification and pyrolysis, require more advanced infrastructure.

Emerging technologies and concepts offer promising alternatives, but scalability, cost, and efficiency remain challenges.

SN: What kind of investments would the waste-to-energy market need to grow by 2030?

DN: Several factors are expected to drive significant growth in the waste-to-energy market in the coming years, including increased waste generation, public shareholder consideration, the need for sustainable waste management solutions, stringent environmental regulations, and the global push to reduce greenhouse gas emissions and use renewable energy. Through 2025-2030, many reports anticipate a compound annual growth rate of around 4-6% for the waste-to-energy market. The waste transformation [can] become a global multi-trillion dollar market by 2050.

For the construction and operation of waste-to-energy facilities, substantial capital investment is required. The development and deployment of waste-to-energy projects can be supported by public and private funding, such as grants, loans, and equity investments.

A clear and supportive policy framework and favourable regulations are essential for promoting waste-to-energy projects. Among these are waste management regulations [prioritising] waste-to-energy over landfilling, renewable energy targets that recognise waste-to-energy as a viable, renewable energy source, and emissions standards that encourage cleaner technologies.

Stakeholder engagement and public awareness campaigns can address potential concerns related to health, safety, and environmental impacts. To track the performance, environmental impact, and return on investment of waste-to-energy projects, monitoring and evaluation systems must be established. As a result, future projects can be informed [of this data], policy development can be enhanced and supported, and further investment can be attracted.

SN: How can industries reduce emissions by transitioning to waste-to-energy technologies?

DN: Major industries can and should adopt waste-to-energy technologies. Producing energy from the waste streams from large-scale industries can provide multiple benefits, such as reduced disposal costs, lower greenhouse gas emissions, and a more sustainable energy supply.

An industrial symbiosis occurs when waste or byproducts from one industry become resources for another. As a result, waste-to-energy technologies can be used more efficiently, and a circular economy can be created. The excess heat from an industrial process can be used to generate electricity or to heat another facility. Tax breaks, grants, and low-interest loans are often available to industries as incentives for adopting cleaner technologies.

By Smruthi Nadig
https://www.power-technology.com/

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Alpha Beta Air Monitor

The iCAM monitor measures airborne alpha and beta particulate activity with dynamic radon/thoron alpha and beta background compensation.

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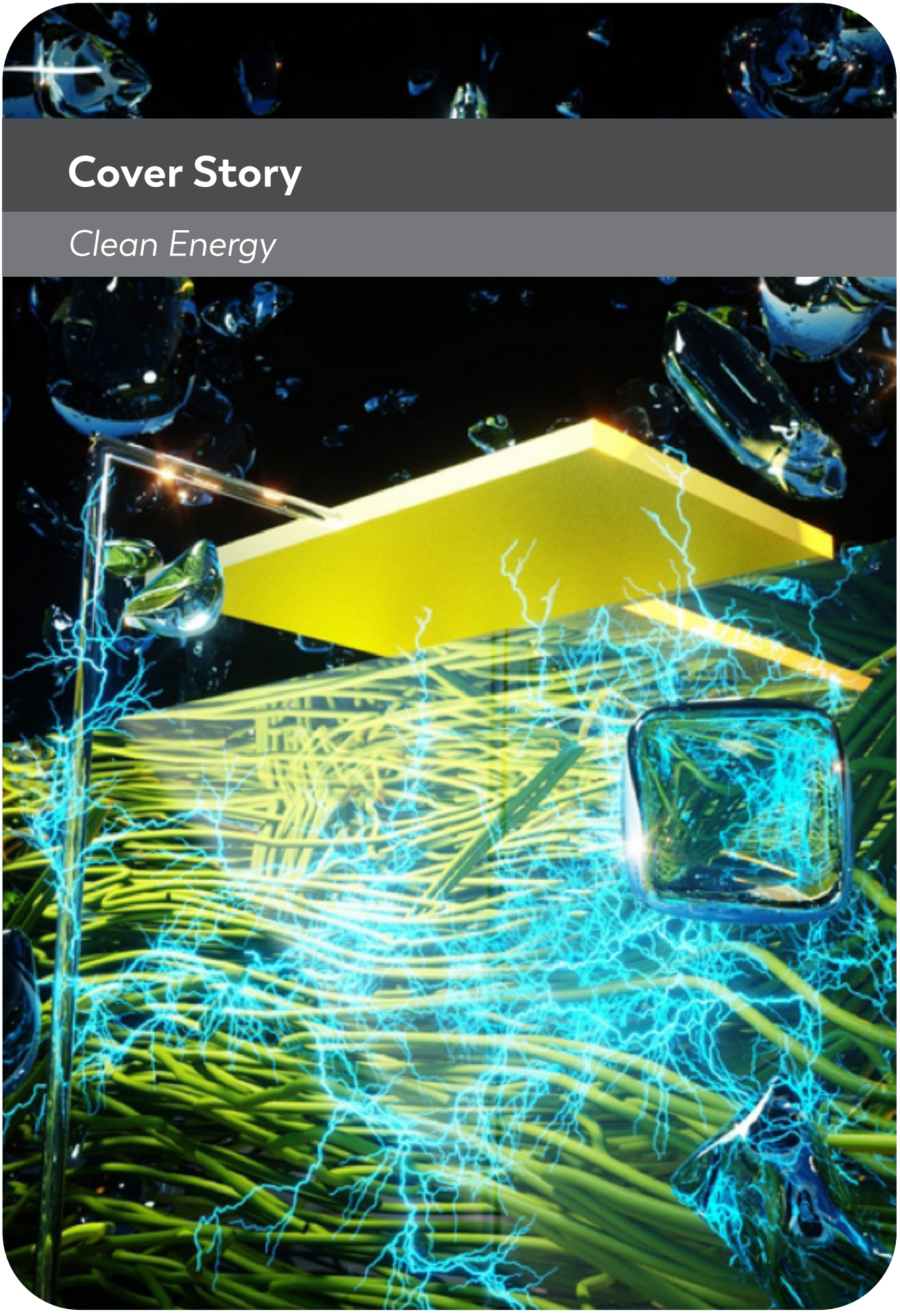
May 2023
Vol. I
Issue 05

Cover Story

Clean Energy



Scientists Find a Way to Harvest Clean Energy From Nothing But Air

Artist›s impression of an Air-gen device.

Engineers have demonstrated something marvelous. Almost any material can be used to create a device that continuously harvests energy from humid air.

It›s not a development that›s ready for practical application, but it does, its creators say, transcend some of the limitations of other harvesters. All the material needs is to be pocked with nanopores less than 100 nanometers in diameter. That›s around a thousandth of the width of a human hair, so easier said than done but far simpler than expected.

Such material can harvest the electricity generated by microscopic water droplets in humid air, according to a team led by engineer Xiaomeng Liu of the University of Massachusetts Amherst.

They have called their discovery the «generic Air-gen effect».

«The air contains an enormous amount of electricity,» says engineer Jun Yao of UMass Amherst.

«Think of a cloud, which is nothing more than a mass of water droplets. Each of those droplets contains a charge, and when conditions are right, the cloud can produce a lightning bolt – but we don›t know how to reliably capture electricity from lightning. What we›ve done is to create a human-built, small-scale cloud that produces electricity for us predictably and continuously so that we can harvest it.»

If Air-gen sounds familiar, it›s because the team previously developed an air energy harvester. However, their earlier device relied upon protein nanowires grown by a bacterium called Geobacter sulfurreducens.

Well, as it turns out, the bacterium isn›t necessary.

«What we realized after making the Geobacter discovery is that the ability to generate electricity from the air – what we then called the ‹Air-gen effect› – turns out to be generic: literally any kind of material can harvest electricity from air, as long as it has a certain property,» Yao explains.

That property is the nanopores, and their size is predicated on the free mean path of water molecules in humid air. That›s the distance a water molecule can travel in the air before it collides with another water molecule.

The generic Air-gen device is made from a thin film of material, such as cellulose, silk protein, or graphene oxide. Water molecules in the air can easily enter the nanopores and travel from the top of the film to the bottom, but they run into the sides of the pore as they travel.

These transfers charge to the material, producing a buildup, and because more water molecules run into the top of the film, a charge imbalance occurs between the two sides.

This produces an effect similar to what we see in lightning-producing clouds: rising air creates more collisions between water droplets at the top of a cloud, resulting in an excess of positive charge in higher clouds and an excess of negative charge in lower ones.

In this case, the charge could potentially be redirected to power small devices or stored in a battery of some kind.

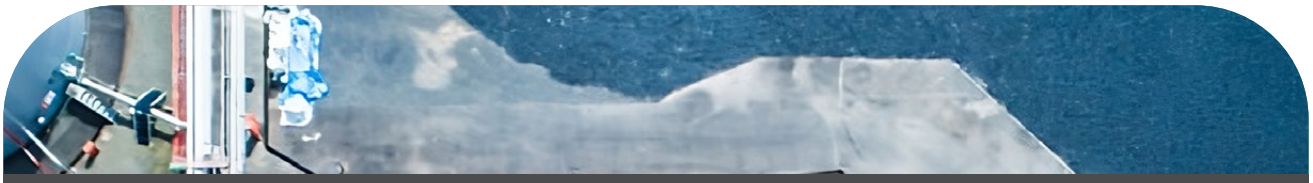
At the moment, it›s still in the early stages. The cellulose film the team tested had a spontaneous voltage output of 260 millivolts in the ambient environment, whereas a mobile phone requires a voltage output of around 5 volts. But the thinness of the films means they could be stacked to scale the Air-gen devices to make them more practically applicable.

And the fact that they can be made out of different materials means that the devices could be adapted for the environment where they are to be used, the researchers say.

«The idea is simple, but it›s never been discovered before, and it opens all kinds of possibilities,» Yao says. «You could imagine harvesters made of one kind of material for rainforest environments, and another for more arid regions.»

The next step would be to test the devices in different environments and also work on scaling them up. But the generic Air-gen effect is real, and the possibilities it represents are hopeful.

By Peter Dockrill
https://www.sciencealert.com/



Products

Petrol

Searcher Begins 3D Survey Acquisition Offshore Papua New Guinea

The 3D seismic survey is expected to enhance the geological understanding of the sparsely explored offshore Gulf of Papua.

The work is being carried out in cooperation with Papua New Guinea's Department of Petroleum and Energy and Larus Energy.

Geoscience data company Searcher Seismic has started a new 1,919km² multi-client 3D (MC3D) seismic survey offshore Papua New Guinea.

The work, which is being carried out in partnership with Papua New Guinea's Department of Petroleum and Energy and Larus Energy, aims to assess and de-risk several prospective plays identified within the Mesozoic and Tertiary intervals.

It also aims to improve imaging of secondary play types as well as resolve the subsurface velocity contrasts.

The 3D seismic survey is expected to enhance the geological understanding of the sparsely explored offshore of the Gulf of Papua. It will also help in developing drill-ready prospects.

Searcher managing director Alan Hopping said: "We are thrilled to expand our presence in Papua New Guinea with the Nanamarope 3D survey, which will directly facilitate the next level of exploration in this rapidly developing global hotspot.

"Employing advanced technologies in acquisition and processing, we are delivering high-quality data which empowers the industry to optimise exploration and development strategies. Fast-track deliverables for the Nanamarope 3D will be available by late Q3 2023, ensuring timely access for stakeholders and industry evaluation."

The company said it has built a library of regional seismic, geochemical, and airborne data across the Gulf of Papua.

The comprehensive data library of Searcher has "revolutionised the understanding of the tectonostratigraphic evolution of the region, unveiling numerous play types with vast untapped hydrocarbon potential including a new Mid-Miocene turbidite play", the company noted.

Last year, Searcher Seismic secured approval from the Government of the Republic of Trinidad and Tobago for the 6,500km² Tobago Trough 3D acquisition project.

https://www.offshore-technology.com/

Services

Electricity

Breakthrough In Clean Energy: New Solar Energy System Generates Power 24 Hours A Day

Researchers developed a new type of solar energy harvesting system that breaks the efficiency record of all existing technologies

The great inventor Thomas Edison once said, "So long as the sun shines, man will be able to develop power in abundance." His wasn't the first great mind to marvel at the notion of harnessing the power of the sun; for centuries inventors have been pondering and perfecting the way to harvest solar energy.

They've done an amazing job with photovoltaic cells which convert sunlight directly into energy. And still, with all the research, history and science behind it, there are limits to how much solar power can be harvested and used – as its generation is restricted only to the daytime.

A University of Houston professor is continuing the historic quest, reporting on a new type of solar energy harvesting system that breaks the efficiency record of all existing technologies. And no less important, it clears the way to use solar power 24/7.

«With our architecture, the solar energy harvesting efficiency can be improved to the thermodynamic limit," reports Bo Zhao, Kalsi Assistant Professor of mechanical engineering and his doctoral student Sina Jafari Ghalekohneh in the journal Physical Review Applied. The thermodynamic limit is the absolute maximum theoretically possible conversion efficiency of sunlight into electricity.

Finding more efficient ways to harness solar energy is critical to transitioning to a carbon-free electric grid. According to a recent study by the U.S. Department of Energy Solar Energy Technologies Office and the National Renewable Energy Laboratory, solar could account for as much as 40% of the nation's electricity supply by 2035 and 45% by 2050, pending aggressive cost reductions, supportive policies and large-scale electrification.

How Does it Work?

Traditional solar thermophotovoltaics (STPV) rely on an intermediate layer to tailor sunlight for better efficiency. The front side of the intermediate layer (the side facing the sun) is designed to absorb all photons coming from the sun. In this way, solar energy is converted to thermal energy of the intermediate layer and elevates the temperature of the intermediate layer.

But the thermodynamic efficiency limit of STPVs, which has long been understood to be the blackbody limit (85.4%), is still far lower than the Landsberg limit (93.3%), the ultimate efficiency limit for solar energy harvesting.

"In this work, we show that the efficiency deficit is caused by the inevitable back emission of the intermediate layer towards the sun resulting from the reciprocity of the system. We propose nonreciprocal STPV systems that utilize an intermediate layer with nonreciprocal radiative properties," said Zhao. "Such a nonreciprocal intermediate layer can substantially suppress its back emission to the sun and funnel more photon flux towards the cell.»

We show that, with such improvement, the nonreciprocal STPV system can reach the Landsberg limit, and practical STPV systems with single-junction photovoltaic cells can also experience a significant efficiency boost."

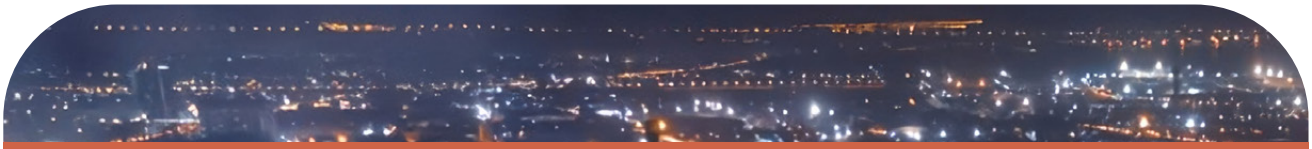
Besides improved efficiency, STPVs promise compactness and dispatchability (electricity that can be programmed on demand based on market needs).

In one important application scenario, STPVs can be coupled with an economical thermal energy storage unit to generate electricity 24/7.

Researchers showed that the NSTPV system they developed can reach the Landsberg limit, and practical NSTPV systems with single-junction photovoltaic cells can also experience a significant efficiency boost.

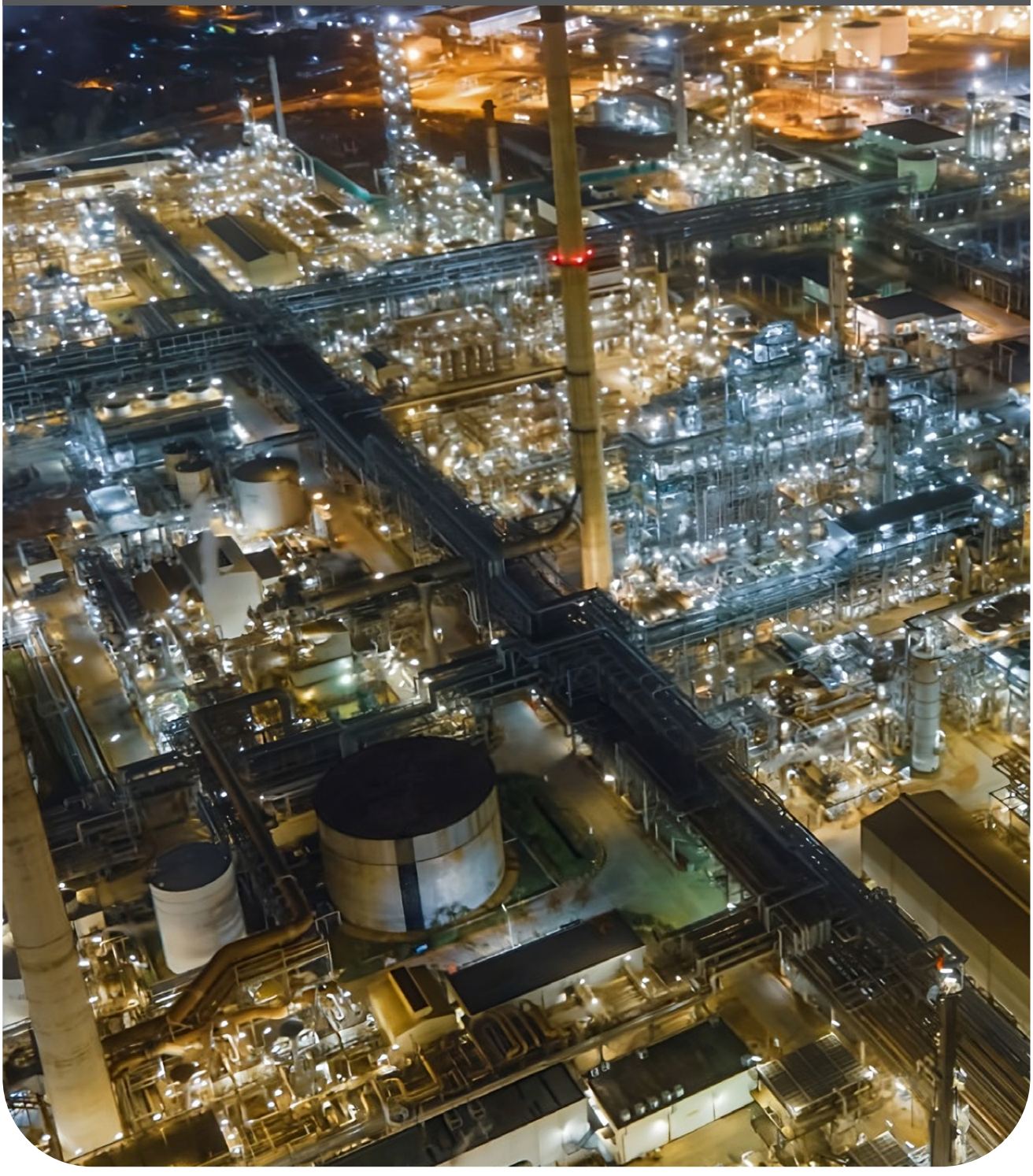
"Our work highlights the great potential of nonreciprocal thermal photonic components in energy applications. The proposed system offers a new pathway to improve the performance of STPV systems significantly. It may pave the way for nonreciprocal systems to be implemented in practical STPV systems currently used in power plants," said Zhao.

By Laurie Fickman
University Of Houston
https://www.thebrighterside.news/



Technology

Ai In The Energy Sector



How Artificial Intelligence is Driving the Renewable Energy Revolution

What are the ways in which AI is driving the renewable energy revolution? And what are some of the key applications and impacts of this emerging technology?

Artificial intelligence (AI) is transforming many aspects of our lives, and the renewable energy sector is no exception. AI algorithms are revolutionizing the way we generate, distribute, and consume energy from renewable sources such as solar, wind, and hydro.

By harnessing the power of big data, machine learning, and predictive analytics, AI is unlocking new opportunities for improved energy efficiency, cost savings, and sustainability.

What are the ways in which AI is driving the renewable energy revolution? And what are some of the key applications and impacts of this emerging technology?

Integration into existing systems

The renewable energy sector is a critical part of the global effort to reduce greenhouse gas emissions and combat climate change. Renewable energy sources such as solar, wind, and hydropower are becoming increasingly cost-competitive with fossil fuels, and many countries are setting ambitious targets to increase their share of renewable energy in the overall energy mix.

However, the integration of renewable energy sources into existing energy systems can be complex and challenging, requiring sophisticated technology and innovative approaches to overcome technical, economic, and regulatory barriers.

This is where AI comes in. AI algorithms can analyze vast amounts of data from sensors, weather forecasts, and other sources to optimize the performance of renewable energy systems.

For example, it can predict wind patterns and adjust the pitch of wind turbine blades to maximize energy production. Similarly, it can analyze solar radiation data and adjust the angle and orientation of solar panels to capture more energy from the sun. By fine-tuning these systems and optimizing their performance, AI can improve the efficiency of renewable energy production and reduce costs.

Energy storage and efficiency

AI can also help improve energy storage and management, which is critical for ensuring the reliability and stability of renewable energy systems. By predicting energy demand and supply, algorithms can optimize the use of energy storage systems such as batteries to ensure that renewable energy sources are used efficiently and effectively.

This can help reduce energy costs and increase the use of renewable energy sources in the overall energy mix.

In addition to these applications, AI can also be used to improve energy efficiency in buildings and other structures. Smart building systems that use AI can optimize heating, cooling, and lighting systems to reduce energy consumption and costs. AI can also be used to monitor energy use patterns and identify opportunities for further efficiency improvements.

Challenges and limitations

However, there are also some challenges and limitations to the use of AI in renewable energy. For example, the availability and quality of data can be a limiting factor in the effectiveness of algorithms.

Additionally, there may be concerns around data privacy and cybersecurity that need to be addressed to ensure the safe and secure use of AI in renewable energy systems.

Another challenge lies in the availability and quality of data.

AI algorithms rely on large amounts of data to make accurate predictions and optimize system performance. However, in some cases, data may be limited or incomplete, making it difficult for AI algorithms to function effectively.

For example, in remote or rural areas, data on weather patterns or energy demands may be scarce or unreliable, which can limit the ability of AI algorithms to optimize renewable energy systems in these areas. Addressing data availability and quality issues will be critical for realizing the full potential of AI in renewable energy.

The need for specialized expertise in both fields of AI and renewable energy poses another challenge. Developing and implementing algorithms requires specialized knowledge and skills, and there may be a shortage of experts with this combination of expertise.

This can make it difficult for smaller companies or organizations to fully leverage the benefits of AI in renewables. Addressing this challenge will require investment in education and training programs that can help build the necessary skills and expertise

Finally, concerns around data privacy and cybersecurity need to be addressed when using AI in renewable energy systems.

The collection and analysis of large amounts of data can raise privacy concerns, particularly if the data contains sensitive or personally identifiable information. Additionally, there is a risk of cyberattacks on such advanced renewable energy systems, which could have serious consequences for their security and reliability.

Addressing these concerns will require robust data protection and cybersecurity measures that ensure the safe and secure use of AI in renewable energy systems.

Addressing these challenges will require continued research and collaboration among industry professionals, policymakers, and academics.

Despite the challenges, the benefits of using AI in renewable energy are too significant to ignore. With continued investment and innovation, AI can help us to achieve a more sustainable energy future that benefits both the environment and society as a whole.

As we continue to transition from fossil fuels to renewable energy sources, we must leverage the power of AI to ensure that we are optimizing our energy systems and creating a better world for future generations.

By kaoutar Lahmadi
https://www.moroccoworldnews.com/

Caption: AI in the Energy Sector

Country Reports

Policy On Local Energy Market Will Spur UAE's Sustainable Plan

The new policy will contribute to the UAE's GDP and help achieve financial gains amounting to Dhs21.5 billion by 2050.

Suhail bin Mohammed Faraj Faris Al Mazrouei, Minister of Energy and Infrastructure, on Tuesday revealed the details of the policy regulating the market of energy services providers in the UAE that was approved earlier by the Cabinet.

Developed by the Ministry of Energy and Infrastructure (MoEI), the policy provides guidelines for the contractual framework amongst energy stakeholders and the various contracting mechanisms to consolidate the mechanisms of doing business, financing, and partnerships between the public and private sectors. This will encourage energy service providers and private sector companies to invest in government projects, with the goal of reducing energy and water consumption, carbon footprint, and operational costs in buildings.

Al Mazrouei said, "While drafting the policy, we were keen to integrate the objectives of the National Water and Energy Demand Management Programme 2050 - a main enabler of achieving the UAE Energy Strategy 2050 and the UAE Water Security Strategy 2036. The policy has set objectives for the next five years, including reducing water use by 23 per cent, cutting down operational costs by 20 percent in federal buildings, contributing to clean energy by 5 per cent, promoting the sustainability of buildings by an approximate 5-10 percent, and raising awareness of energy and water conservation and the importance of behavioural change. On the long term, the policy is projected to decrease the demand of energy in the building sector by 51 percent by 2050, contributing to the UAE's sustainable development."

The Minister added: "The new policy will contribute to the UAE's GDP and help achieve financial returns that amount to Dhs21.5 billion by 2050, resulting from retrofitting federal buildings as part of the National Water and Energy Demand Management Program 2050, helping establish a local market of energy services and products, creating opportunities for the private sector to invest in energy efficiency systems and renewables projects, improving productivity, and lowering operational costs. As a result, the UAE's global competitiveness will improve."

He noted that regulating the energy providers market is a major step towards developing the country's energy infrastructure and enhancing environmental sustainability. It reflects the wise leadership's keenness on ramping up investments in the energy sector, encouraging innovation, and developing modern technologies that will provide long-term economic and environmental benefits.

https://www.gulftoday.ae/

Renewable Energy Should Not Be The Next Semiconductor In US-China Competition

The Inflation Reduction Act (IRA) is America's biggest and most significant national policy geared toward combating climate change. The legislation provides an estimated amount of $300 billion worth of subsidies over the next decade to stimulate a low-carbon transition and to onshore renewable energy manufacturing. While it is a significant achievement to bring renewable energy manufacturing back to American soil, it is unclear whether this goal can be achieved without disrupting the global supply chain in which China is a major player. The question on the horizon for both Washington and Beijing is whether to leave room for collaboration to facilitate the low-carbon transition or to decouple for the sake of strategic competition. Blind dependence creates energy security risks while overt decoupling slows green technological deployment and endangers the global climate agenda. Having witnessed the disruptive decoupling of the semiconductor industry, it is critical that both countries weigh the costs and benefits before making decisions driven by geopolitical impetus regarding renewable energy manufacturing.

Growing Concern About Energy Security And Its Critique

The concentration of clean tech manufacturing capacity in China has sounded an alarm in Western capitals about energy security. According to Figure 1, China commands a much bigger lead in renewable energy manufacturing capacity than OPEC does in oil, where 13 separate states control roughly 40% of global oil production. China also produces over 50% of lithium and nickel, as well as roughly 70% of cobalt — minerals critical for renewable energy manufacturing — extending China's lead upstream. Additionally, Russia's recent weaponization of energy dependence has exacerbated the anxiety among Western leaders over China's dominance in renewable energy and its potential national security implications.

However, the analogy between dependence on fossil fuels and renewable energy is imperfect at best. Unlike fossil fuels, which depend heavily on the natural endowment of a given country or region, renewable energy can be generated almost anywhere on Earth, significantly decreasing an energy exporter's leverage. Additionally, fossil fuels are consumables that can be disrupted anytime because of political conflicts. Renewable energy technologies, on the other hand, produce energy constantly once deployed, meaning a U.S.-China conflict today will not stop American solar panels installed yesterday from producing electricity, regardless of where the panels were made.

The Biden administration's ambition to accelerate America's low-carbon transformation while minimizing national security threats calls for a delicate balancing act. Responsible policymakers in both countries need to identify specific economic and security risks associated with renewable energy collaboration and develop mitigation plans through consulting with both the public and private sectors. As U.S. Energy Secretary Jennifer Granholm recently said, "We want to be able to have our own energy security here. At the same time, the administration has taken some steps that would allow Chinese companies and Chinese goods to enter the market." One may argue that while technologies may have a country of origin, the effects of carbon emissions are not confined to a single country. The global renewable energy transformation depends not on who builds more manufacturing capacity, but rather on how fast the planet can reduce its carbon footprint.

Reporting by Vera Eckert, editing by Miranda Murray, Kirsten Donova
Edited by Hassan Mourtada
https://www.reuters.com

Energy Generators' Soaring Revenues Highlight Deep Problems in The Way Britain Prices Its Electricity

Twenty-nine billion pounds is a lot of money. It's how much we estimate the total annual revenue to British electricity generating stations increased as a result of last year's energy crisis – from £20.5 billion before COVID (in 2018 and 2019) to £49.5 billion in 2022. The indications are that these revenues increased by about twice as much as overall generation costs.

Getting at the numbers is not easy. Britain has a competitive market for "wholesale" electricity, the bulk electricity sold by major generating companies from fossil fuel (overwhelmingly gas), nuclear and renewable energy power stations.

The price is set in an auction between the electricity consumers (large industries or electricity suppliers that purchase electricity for their clients) and its generators. Consumers submit the demand they are expecting during the next day, and generators offer a block of electricity to meet this demand for a certain price. The price in this "day-ahead" market reflects the cost of the highest-priced block needed to match demand.

Renewables and nuclear plants are relatively cheap to operate. But fossil fuels, although more expensive, are still required to meet demand nearly all the time. This means that gas largely sets the day-ahead price, with a margin. In 2021, the electricity price followed gas prices 98% of the time in Britain, despite gas generating only 40% of the country's electricity.

But this is just the beginning of the pricing complexities. In practice, much gas and electricity is traded through forward contracts. Your electricity suppliers need to know they can buy the electricity their customers will demand, so they "buy forward" from generators on contracts ranging from months to more than a year ahead – usually at prices reflecting conditions at the time of contracting.

On purely day-ahead prices, the total revenue in 2022 would have soared by almost £40 billion. Our best estimate of forward-contract structures brings this down to the £29 billion indicated for last year.

However, this likely means some of the huge day-ahead prices in 2022 have been shifted forward into this year, whatever happens to gas generation costs (in reality, gas prices fell slightly during the first half of 2023).

Furthermore, gas-powered electricity generators buy their gas in advance, to be sure they have the fuel to generate – so a lot of their generation this year could reflect last year's gas prices.

Our first conclusion: whatever happens to gas prices, don't expect electricity prices to drop fast.

https://www.theconversation.com/

Services

34 Coming Events

Coming Events

Energy and Mines Australia Summit
Optus Stadium, Perth, Australia
14 - 15 Jun 2023
https://australia.energyandmines.com/

Now in its 7th year, the Energy and Mines Australia Summit is the annual event for miners to get the latest updates on the strategies and technologies for realizing net-zero targets and to network with mining peers and global decarbonization experts....

BlueSky-Incorep Conference
Hilton Sorrento Palace, Sorrento, Italy
12 - 16 Jun 2023
https://www.bluesky-incorep.org/

The first BlueSky/Incorep Polyolefin Conference will be held on 12-16 June 2023 in Sorrento (Italy), at the Hilton Sorrento Palace Conference Center. The scientific program from Monday June 12 until Friday June 16 will focus on the latest...

HRSG Forum
Renaissance Atlanta Waverly Hotel & Convention Center, Atlanta, USA
12 - 15 Jun 2023
https://hrsgforum.com/

Owner/Operators, Vendors, and Consultants present and discuss HRSG case studies, field trials, and best practices to ensure reliable and effective operation of your CCGT plants...

Sabah Oil, Gas & Energy Conference & Exhibition
Sabah International Convention Centre, Kota Kinabalu, Sabah, Kota Kinabalu, Malaysia
08 - 09 Jun 2023
https://www.sabahoilandgas.com.my/

SOGCE is the only oil, gas & energy conference and exhibition aimed at providing an industry platform for oil, gas & energy companies meet and discuss pivotal industry issues to help grow and explore...

Electrical Energy Storage South America
Expo Center Norte, São Paulo, Brazil
29 - 31 Aug 2023
https://www.ees-southamerica.com/home

With the well-known trade fair and conference Intersolar South America, and two new energy trade fairs, such as the ees South America, Eletrotec+EM-Power South America and the Special Exhibition Power2Drive, The smarter...

Annual International Hydrogen & Fuel Cell Event
Vancouver, Canada
05 - 07 Jun 2023
https://www.globalhydrogenreview.com/

The Annual International Hydrogen and Fuel Cell Event is Canada's premier platform for professionals to meet, discuss and promote the latest developments in technology, policy and applications of for both hydrogen and fuel cells. The intriguing...

Renewable Energy Cyber Security Forum
Schönefeld, Germany
06 - 07 Jun 2023
https://www.leadventgrp.com/

The Renewable Energy Cyber Security Forum aims to prepare utilities and other energy providers for coping with cyber security risks in the real world. Critical precautions and supporting technology are thoroughly studied in order to better prepare energy...

Solar Energy Systems Conference
University of Texas A & M at Qatar, Doha, Qatar
22 - 24 May 2023
https://www.aiche.org/cei/conferences/

AIChE invites representatives from academia, industry, and policy making and government organizations to participate. The conference will provide a forum for the exposure & exchange of ideas and methods & results in solar energy...

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energyHQ magazine, established since 1983, is published monthly by **One Media (1M) – a One World (1W) Division**

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Hamra, Commodore Area, Barouk St., Chatila & Chehab Bldg, 2nd Fl. Beirut - Lebanon	P.O.Box: 13-5121 Chouran Postal Code: 1102 2802 Beirut-Lebanon	T: +961 (01) 748333 M: +961 (70) 100094 E: info@1world.xyz W: www.energyHQ.world

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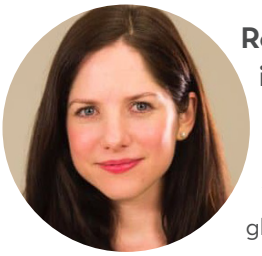
Greenhouse Gas Emissions From Global Energy Industry Still Rising



Researchers say 'urgent action' needed as rise in renewables is eclipsed by increase in world's total energy consumption

Greenhouse gas emissions from the energy industry continued to rise to new highs last year despite record growth in wind and solar power, according to a comprehensive review of global energy data.

The report, undertaken by the Energy Institute, found that fossil fuels continued to make up 82% of the world's total energy consumption in 2022, in line with the year before, causing greenhouse gas emissions to climb by 0.8% as the world used more energy overall.

Global energy consumption is expected to rise further in the year ahead, potentially bringing higher greenhouse gas emissions, after China ended its strict Covid restrictions on travel this year that had previously kept a lid on jet fuel consumption.

Juliet Davenport, the Energy Institute's president, said: "Despite further strong growth in wind and solar in the power sector, overall global energy-related greenhouse gas emissions increased again. We are still heading in the opposite direction to that required by the Paris agreement."

The report, which is published in partnership with KPMG and the consultancy Kearney, found that renewable energy sources – excluding hydro power – met just 7.5% of the world's energy demand last year. This represents an increase of nearly 1% over the previous year, driven by record growth in wind and solar energy. Solar generation climbed by 25% in 2022 while wind power output grew by 13.5% compared with the year before.

However, the renewable energy boom was eclipsed by a modest rise in global energy consumption of 1.1% last year – compared to a 5.5% increase in 2021 – which meant more oil and coal was burnt to meet demand, the report found. Simon Virley, the head of energy and natural resources at KPMG, said: "Despite record growth in renewables, the share of world energy still coming from fossil fuels remains stubbornly stuck at 82%, which should act as a clarion call for governments to inject more urgency into the energy transition."

Global oil demand rose by 2.9m barrels a day last year to reach an average of 97.3m bpd for 2022, in part due to the return of global economic activity after the Covid pandemic, according to the Energy Institute.
At the same time, demand for coal climbed to highs not seen since 2014, rising 0.6% compared with 2021, driven by demand in India and China, the report said. The appetite for coal power increased in line with record high prices for gas in Europe and Asia following Russia's invasion of Ukraine. Gas made up 24% of the world's energy use last year, down from 25% the year before, but gas production remained relatively steady.

Jillian Ambrose
https://www.theguardian.com/

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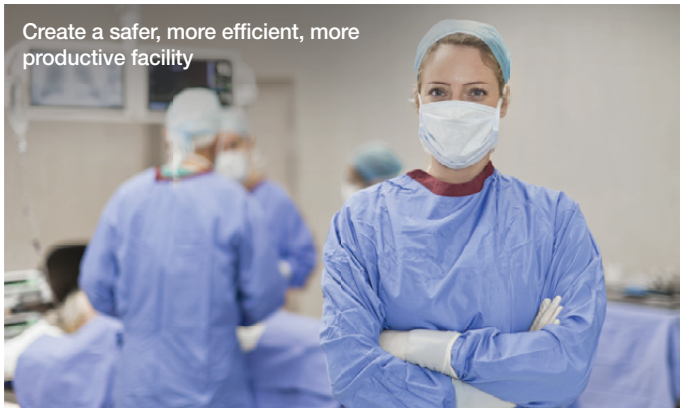

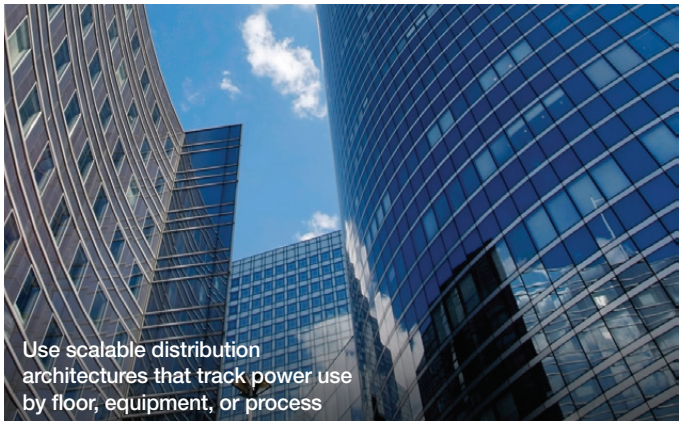

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