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energy HQ.world
June 2023
Vol. 1
Issue 06



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Green Hydrogen: Pioneering the Sustainable Energy Revolution



Green hydrogen, a cutting-edge technology, has emerged as a promising solution to tackle the challenges of climate change and meet the world's increasing energy demands sustainably. Utilizing renewable energy to produce hydrogen, green hydrogen offers an eco-friendly alternative to conventional fossil fuels. In this article, we will explore the latest information and updates on green hydrogen, its production methods, and its potential to revolutionize the energy landscape.

Hydrogen, an abundant element, can be a versatile and clean energy carrier. However, the traditional method of producing hydrogen from natural gas releases carbon dioxide, contributing to greenhouse gas emissions. Green hydrogen, on the other hand, is produced through electrolysis, which involves splitting water molecules into hydrogen and oxygen using renewable energy sources like wind, solar, or hydro power. This process leaves no harmful emissions, making green hydrogen a net-zero carbon fuel.

The rapid advancements in renewable energy technologies have driven down the cost of green hydrogen production significantly. As of the latest data, the cost of green hydrogen has decreased by nearly 50% in the past five years, making it increasingly competitive compared to traditional hydrogen production methods. This cost reduction has encouraged governments, industries, and investors to scale up their green hydrogen initiatives.

Countries worldwide are recognizing the immense potential of green hydrogen as a vital component of their sustainable energy strategies. Several countries have unveiled ambitious green hydrogen roadmaps and investment plans. For instance, Australia has set a target to become a major green hydrogen exporter by 2030, aiming to capitalize on its abundant renewable resources. Similarly, Germany and Japan have announced substantial funding to support green hydrogen projects, aiming to integrate hydrogen into their industrial sectors and transport systems.

Green hydrogen represents a game-changing technology that has the capacity to revolutionize the energy landscape and combat climate change. With the latest advancements in production technologies and global efforts to adopt sustainable energy solutions, green hydrogen is inching closer to becoming a mainstream reality. By investing in research, development, and infrastructure, we can unlock the full potential of green hydrogen and create a cleaner, greener, and more sustainable future for generations to come. As governments, industries, and individuals come together to support this innovative solution, we move closer to a world powered by clean and renewable energy.

In This Issue!

energyHQ's June 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 8 talks about Solar Monitoring System, the article on page 13 Sheds the light on Reactor Fuel, and the article on page 19 focuses on Green Hydrogen. 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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World Energy Digest



Algeria

TotalEnergies and Sonatrach sign energy cooperation agreements

French energy major TotalEnergies and Algerian government-backed oil company Sonatrach have signed a series of deals to boost their cooperation in the energy sector.

The agreements cover Algeria's natural gas production, the export of liquefied natural gas (LNG) to Europe, and the growth of renewable energy sources in Algeria.

As per the first agreement, the companies will convert the production contracts for the Tin Fouyé Tabankort II (TFTII) and Tin Fouyé Tabankort Sud (TFT sud) fields to be in accordance with the new Algerian Petroleum Law implemented in December 2019.

The deal, which is subject to approval from Algerian regulators, will see TotalEnergies and Sonatrach upgrade the existing facilities and drill additional wells to boost production from the fields.

Located in Southern Algeria, Sonatrach has a controlling 51% stake in the TFTII and TFT sud fields and TotalEnergies holds the remaining 49% stake.

By 2026, it is anticipated that the total output of the two fields will reach 100,000 barrels of oil equivalent per day (boepd), up from a level of about 60,000boepd in 2022.

Under the second agreement, the companies have agreed to extend the LNG supply deal for 2024, which will see Sonatrach supply two million tonnes of LNG annually to TotalEnergies at the port of Fos-Cavaou, near Marseille, France.



Finland



Finland aims to become green hydrogen leader

The Finnish government has set out a new strategy to become "a powerhouse of clean energy" based on a hydrogen economy.

According to the strategy, Finland's grid electricity is clean and the price is competitive in Europe; there is a favourable ratio of wind and solar power; and there is immense potential for developing both.

By 2030, the country could produce over 14% of emission-free hydrogen in the EU, the report states.

A hydrogen economy will contribute to Finland's well-being by reducing dependence on imports in various industrial sectors, thereby strengthening self-sufficiency and energy security, the report adds.

Additionally, a hydrogen economy has the potential to create up to 115,000 new jobs by 2035.

The strategy has been developed in collaboration with officials, industry unions, and companies involved in the entire hydrogen value chain.

Achieving the set goals requires seamless and agile cooperation across industries, according to the government.

It also defines practical measures to achieve the set objectives.

Minister of the Environment and Climate Kai Mykkänen states the newly formed government also intends to promote hydrogen economy in practise by expediting and streamlining permitting processes, creating incentives for diverse electricity production growth.

It is also aiming for rapid and comprehensive adoption of carbon capture and utilization by the mid-2030s.



Singapore

Singapore's Clean Energy Sector Poised for 80% Workforce Growth, and Sees New Grant for Energy Storage Solutions

As Singapore's energy transition gains momentum, the clean energy industry is poised to experience significant workforce growth over the next decade.

Results from the Energy Market Authority's (EMA) Energy Sector Manpower Survey (ESMS) 2022 show that Singapore's clean energy workforce is projected to increase by 80% by 2032, reaching around 2,700 workers. The power sector is also expected to expand by 800 workers during the same period. Job functions such as electricity transmission and distribution solutions, low-carbon alternatives, solar energy, and smart grids are expected to experience significant growth.

The ESMS revealed that Singapore residents currently make up 83% of the clean energy workforce, with engineers comprising the majority of the technical workforce. The projected workforce growth thus augurs well for the job opportunities that will be available to Singapore residents.

In addition, workforce expansion into digital and Industry 4.0 job functions like data analytics and Operational Technology cybersecurity is also anticipated. Workers in these areas will need skills in data management, data engineering, and security solutions implementation, highlighting the importance of equipping the workforce for the evolving clean energy industry and a digitalised future.

As part of efforts to further advance the Singapore Energy Transition, EMA is stepping up research and development (R&D) efforts in clean energy solutions.



Morocco

Power Sector Transition in Morocco

Morocco is put in an increasingly precarious position by climate change, becoming a "global warming hotspot" with the potential for rainfall declining 20-30% by end of the century. Reliance on imported fossil fuels (which meet 90% of Morocco's energy needs) is starting to dwindle in the face of massive renewables projects. However, projects like the world's largest CSP solar plant, the 5000 MW Ouarzazate Noor Complex, can also dry out critical dams and displace thousands of people.

Since the mid 2000's Morocco has been pushing for enormous renewable projects, boasting year-round sunshine for solar projects. This rapid growth in the renewable energy sector has given the country more energy independence and brought prosperity to some in rural and remote areas.

Generations of conflict still shape Morocco and its energy policy, from both French and Spanish conquest and more recent disputes over the Western Sahara region.

One project is announced at 67 MW, two were cancelled totaling 225 MW, three are under construction totaling 834 MW, with Noor Midlet making up 800 of that, nine solar plants are operating at 740 MW, 18 are in the pre-construction phase totaling 12,637 MW, and two projects were put on hold totaling 230 MW.

One wind farm is announced, the 5000 MW Total Eren-Guelmim-Oued Noun wind farm. The only offshore wind farm in Morocco, Tangier 2, is 3500 MW and in pre-construction, along with four other onshore units. Seven wind farms are under construction totaling 813 MW, and 13 are operating at 1165 MW total.



Turkiye


Zimbabwe

Zimbabwe's Energy Market: A Comparison with Regional Counterparts

Zimbabwe's energy market has been facing significant challenges in recent years, with frequent power outages and a heavy reliance on imported electricity. The country's energy sector has struggled to keep up with the growing demand for power, leading to an increased focus on the development of renewable energy sources and improvements in energy efficiency. In this article, we will compare Zimbabwe's energy market with those of its regional counterparts, highlighting the similarities and differences in their energy policies, generation capacities, and renewable energy potentials.

Zimbabwe's energy sector is predominantly powered by hydroelectric and thermal power plants, with the Kariba Dam and Hwange Thermal Power Station being the primary sources of electricity generation. However, these facilities have been plagued by maintenance issues and a lack of investment, resulting in frequent power outages and a reliance on electricity imports from neighboring countries such as South Africa and Mozambique. In 2019, Zimbabwe experienced its worst power crisis in over a decade, with daily power cuts lasting up to 18 hours. This has had a significant impact on the country's economy, with businesses and industries struggling to operate efficiently.

In contrast, South Africa, the region's largest economy, has a more diversified energy mix, with coal, nuclear, and renewable energy sources contributing to its electricity generation. Despite facing its own challenges, such as an aging power infrastructure and a struggling state-owned utility, South Africa has made significant strides in the development of renewable energy.



Turkey Achieved Breakthrough in Energy Liberalisation - but now the Environment needs Attention

The new book Energy Policies of IEA Countries – Turkey – 2001 notes that Turkey has made repeated efforts to increase foreign investment in its power industry. Turkey's energy demand is growing at 8 per cent a year, one of the highest rates in the world. But investment has lagged far behind what is required to ensure reliable supply. Investors have not been given sufficient control over their investment. Until 1999, privatisation was prohibited under the constitution.

The Electricity Market Law adopted in February 2001 calls for opening of the power industry to competition in early 2003 for customers consuming 9 GWh or more per year. A regulator for the electricity and gas industry is to be established. It will be charged with determining the pace of further market opening, enforcing open access, and regulating prices for grid services. In 2000, TEAS was split into three parts covering transmission, generation and wholesale trading. The split became effective in October 2001.

"Going beyond the Build-Operate-Transfer programme and allowing privatisation represents a breakthrough in the government's attempts to liberalise the electricity market", said Robert Priddle, Executive Director of the IEA. "There is now a real possibility that supply will cover long-term demand and that reliability will improve." The new legislation should be implemented fully and without delay. It is essential to establish the independent regulator and independent system operator as soon as possible.

Renewable Energy

08 Solar Monitoring System



water HQ

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40,069

Total Brand
Readership

84%

of readers are
decision makers
or influence
purchasing
decisions.

16,379

Print Readership
(Multiplier 3.11)

23,690

Digital
Circulation

Solar Monitoring Systems Exposed: Secure Your Devices



Ocean Sun

Researchers who go looking for devices exposed to the Internet report “tens of thousands” of solar photovoltaic (PV) monitoring and diagnostic systems can be found on the web. The systems are used for everything from system optimization to performance monitoring and troubleshooting.

No fewer than 134,000 products from an assortment of vendors were found to be exposed, though as Bleeping Computer notes, this does not necessarily mean they’re all vulnerable right now.

However, new vulnerabilities are discovered all the time and anything that’s attached to the Internet when a vulnerability is discovered represents a serious risk (and at least some of the products on display have been impacted by vulnerabilities in the past.) Devices left exposed online can lead to all manner of other issues too. Whether people poking around to get an idea of how your systems work, or directly tampering, it’s almost never good. While many of the currently discovered devices may not be vulnerable to a remote takeover, there may be enough information to hand to figure out some of the workings of the systems in question. Indeed, the research highlights that around 7,000 devices belonging to one particular brand are in the list. A separate report linked by Bleeping Computer found 425 examples of said device making use of a firmware version known to be vulnerable to attack.

As per said report, which cleverly makes use of a copyright string on the product’s landing page to work out which versions are vulnerable: It turns out that less than one third of the internet-facing SolarView series systems are patched

against CVE-2022-29303.

This, in addition to mention of other issues affecting this brand of device like being able to upload PHP web shells (allowing for remote access), does not make for great reading. Especially when we consider that this is just one product, while the products left exposed include:

Solar-Log, Danfoss Solar Web Server, SolarView Contec, SMA SunnyWebbox, SMA Cluster Controller, SMA Power Reducer Box, Kaco New Energy & Web, Fronis Datamanager, Saj Solar Inverter, and ABB Solar Inverter Web GUI.

Exposed devices can end up being a pretty serious issue. Even in cases where the device isn’t exposed online, things can still go awry. A few years back, Australia’s early warning network was compromised (most likely by a targeted phishing attack) and messages galore were fired out by SMS, email, and phone announcing that the service had been hacked.

Road signs and other forms of public communication are often found wanting in the security stakes. It’s such a problem that it’s not unusual to see the Department of Homeland Security issuing warnings about the need to update Emergency Warning Systems. Last August, FEMA was similarly banging the drum for the swift application of software updates.

By Christopher Boyd

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

Oil & Gas

10 BOP Stack



Advancements in BOP Stack Technology: Enhancing Safety in the Oil and Gas Industry



The Blowout Preventer (BOP) Stack is a critical piece of equipment used in the oil and gas industry to prevent uncontrolled blowouts during drilling operations. Over the years, significant advancements have been made in BOP stack technology to enhance safety and operational efficiency. This article explores the most important inventions and updates in BOP stack technology, showcasing how these advancements have revolutionized drilling practices and improved industry-wide safety standards.

One of the most significant milestones in BOP stack technology was the introduction of hydraulic systems. By replacing manual controls with hydraulics, BOP stacks became more responsive and precise. Hydraulic-controlled BOPs allowed for faster activation of the preventers, reducing the time it takes to shut down the well in case of a blowout. This crucial advancement significantly improved the industry's ability to manage emergencies and mitigate potential hazards.

The incorporation of annular preventers marked a major leap forward in BOP stack design. These preventers feature a flexible rubber seal that can conform to various sizes of drill pipes, casing, or tubing. Unlike traditional ram-type preventers, annular preventers provide a more versatile solution for sealing the wellbore. This innovation ensures a reliable and consistent seal, minimizing the risk of leaks and offering better control over well pressure during drilling and completion operations.

The integration of digital technology into BOP stacks has transformed the way drilling operations are conducted. Real-time monitoring and data analysis capabilities allow operators to gain valuable insights into the well's condition and BOP stack performance. Automated control systems enable faster response times, reducing the potential for human errors during critical moments. The use of digital technology has

become instrumental in ensuring safer drilling practices and enhancing overall operational efficiency.

With the expansion of drilling operations into deeper and more challenging offshore environments, the industry adopted double and triple BOP stack configurations. These setups involve multiple sets of BOPs stacked on top of each other, creating redundant layers of protection. In the event of a failure in one BOP, the additional preventers act as backups, significantly improving the overall reliability and safety of the drilling process.

Shear blind rams are a groundbreaking innovation in BOP stack technology. These specialized preventers can cut through and seal off the wellbore even when drill pipe or casing is not correctly centered. The incorporation of shear blind rams adds an extra layer of safety, as they can effectively handle emergency situations where conventional preventers might struggle. This advancement ensures more comprehensive well control, reducing the risks associated with well control incidents.

The evolution of BOP stack technology has been instrumental in enhancing safety and operational efficiency in the oil and gas industry. From the introduction of hydraulics and annular preventers to the integration of digital technology and shear blind rams, each innovation has contributed significantly to preventing blowouts and safeguarding drilling operations. As the industry continues to innovate, BOP stack technology will undoubtedly play a crucial role in ensuring safe and sustainable exploration and production of oil and gas resources.

Hassan Mourtada

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Nuclear

13 Reactor Fuel



Nuclear Reactor



Principles of operation

Nuclear reactors operate on the principle of nuclear fission, the process in which a heavy atomic nucleus splits into two smaller fragments. The nuclear fragments are in very excited states and emit neutrons, other subatomic particles, and photons. The emitted neutrons may then cause new fissions, which in turn yield more neutrons, and so forth. Such a continuous self-sustaining series of fissions constitutes a fission chain reaction. A large amount of energy is released in this process, and this energy is the basis of nuclear power systems.

In an atomic bomb the chain reaction is designed to increase in intensity until much of the material has fissioned. This increase is very rapid and produces the extremely prompt, tremendously energetic explosions characteristic of such bombs. In a nuclear reactor the chain reaction is maintained at a controlled, nearly constant level. Nuclear reactors are so designed that they cannot explode like atomic bombs.

Most of the energy of fission—approximately 85 percent of it—is released within a very short time after the process has occurred. The remainder of the energy produced as a result of a fission event comes from the radioactive decay of fission products, which are fission fragments after they have emitted neutrons. Radioactive decay is the process by which an atom reaches a more stable state; the decay process continues even after fissioning has ceased, and its energy must be dealt with in any proper reactor design.

Chain Reaction And Criticality

The course of a chain reaction is determined by the probability that a neutron released in fission will cause a subsequent fission. If the neutron population in a reactor decreases over a given period of time, the rate of fission will decrease and ultimately drop to zero. In this case the reactor will be in what is known as a subcritical state. If over the course of time the neutron population is sustained at a constant rate, the fission rate will remain steady, and the reactor will be in what is called a critical state. Finally, if the neutron population increases over time, the fission rate and power will increase, and the reactor will be in a supercritical state.

Before a reactor is started up, the neutron population is near zero. During reactor start-up, operators remove control rods from the core in order to promote fissioning in the reactor core, effectively putting the reactor temporarily into a supercritical state. When the reactor approaches its nominal power level, the operators partially reinsert the control rods, balancing out the neutron population over time. At this point the reactor is maintained in a critical state, or what is known as steady-state operation. When a reactor is to be shut down, operators fully insert the control rods, inhibiting fission from occurring and forcing the reactor to go into a subcritical state.

Saving energy up to 21 % with Solar High Efficiency borehole pumping systems

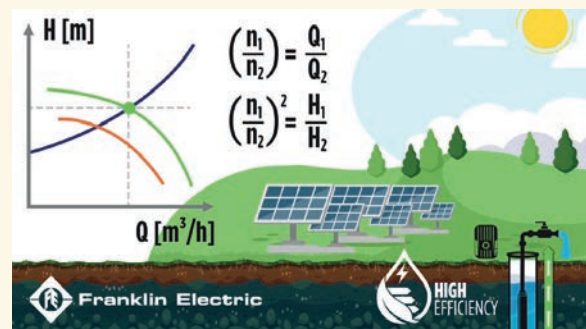
Superior efficiency through permanent magnet technology

In times of rising energy costs, new systems put more and more emphasis on the best possible efficiency. Here, Franklin Electric has set a new benchmark with its High Efficiency borehole systems (HES). Compared to standard asynchronous motors, energy savings of up to 21 % have been achieved in numerous systems installed worldwide. The key factor for energy savings and superior efficiency is the permanent magnet technology of the motor. Instead of a short-circuit induction type rotor, the high efficiency motor contains a permanent magnet rotor design with buried magnets. The system can be operated with grid or solar supply. The variable frequency drive (VFD) offered by Franklin Electric can be controlled remotely by using the Franklin Electric mobile app and a smart device. This not only allows operator monitoring, but also assistance from the Franklin Electric Service team to support the customer during commissioning, system setup, readjustment of parameters and application settings, or troubleshooting.

Voltage Speed Head

When operating a pump with solar energy, it is important to generate sufficient electrical power, but even more important is sufficient voltage. The pump speed and thus the system performance is determined by the electrical voltage. To generate enough voltage, you need to connect enough solar panels in series. This will generate the voltage level needed to operate at full speed. But if weather conditions change, the voltage can drop, causing the system to immediately reduce pump speed to keep running. This reduces the amount of water pumped, but not just linearly. Due to pump affinity laws, the pump head or pressure is reduced squared, which then leads to a further reduction in water flow as you run at a different pump operating point. If the solar system has not sized carefully, or if less efficient components are used, then the risk of running the pump in a dead-head situation increases. In such case, the pump is still operating, but it's not generating

enough head to overcome a certain level, and the result is that water flow stops. With the lower energy consumption of the High Efficiency System, you have an additional safety reserve that allows you to pump more water, or longer.



Advanced Solar Voltage boost

Franklin Electric has further enhanced its Solar systems and provides an advanced voltage boost function. The voltage boost feature makes it possible to size your system based on power rather than voltage, saving you up to 50% on solar panels compared to a standard system without the voltage boost feature. This further reduces the required number of solar pv-panel, initial investment and installation cost.

So the High Efficiency Borehole system has superior efficiencies to save energy and reduce operating costs by up to 21%. For solar applications, you can also significantly reduce the number of solar panels. You save even more money and have more water available for a longer time period.

Read more success stories of Solar applications on franklinwater.eu.

Electric

14 Temporary Solar Power



The Future Of Safe Automation



A chemical recycling pyrolysis technology plant

Pilz CEO Thomas Pilz discusses the developments and issues impacting on the machinery safety landscape, and what they mean for the future of safe automation. The standards and laws for safety in an industrial environment are currently facing upheaval. This is being driven by the issues of security and Artificial Intelligence (AI). For industry in general and for mechanical engineering, there are three new or upcoming legal requirements for security that are relevant: EU Directive NIS 2, the new Machinery Regulation and the Cyber Resilience Act.

NIS (Network and Information Security) is a European Union Directive aimed at strengthening cybersecurity. This directive has been in existence since 2016 and, so far, has applied to critical infrastructure providers, including energy, traffic, banks and finances, health, supply and distribution of drinking water and digital infrastructure. Providers in these sectors have had to implement "appropriate security safeguards" and report any serious cybersecurity incidents.

The successor is NIS 2, which came into force at the beginning of 2023 and must be adopted into national law by EU member states by autumn 2024. Now, the directive also applies within the engineering and automotive sectors, among others, for companies with over 50 employees or an annual turnover of more than 10 million Euro.

According to the German Mechanical Engineering Industry Association VDMA, this will affect around 9,000 companies across Europe. In future these companies will need to prove that they have taken technical, operational and organisational measures to protect against security incidents.

Firstly this will include a risk analysis of existing systems,

including in production environments, in other words OT (Operations Technology). This will be followed by the development and implementation of specific processes and measures such as password protection or encryption, as well as continuing education and training for employees.

Cybersecurity incidents must be reported to the relevant authorities within 24 hours. The explicit inclusion of supply chains is also new. To summarise, NIS 2 now affects more companies, extends the obligations and provides for stricter sanctions. Companies that fail to take measures are threatened with severe penalties.

Security for the whole product lifecycle

In September 2022, the European Commission submitted a draft for a regulation intended to increase the cybersecurity of products. This Cyber Resilience Act is directed toward manufacturers of products with digital elements. The regulation refers to both consumer products as well as products for industrial applications, such as machine controllers for example.

In accordance with the Cyber Resilience Act, only products that guarantee an appropriate level of cybersecurity may be placed on the market. Manufacturers are also obliged to inform customers of security vulnerabilities and close them as quickly as possible. Thus, the regulation applies to the whole of a product's lifecycle. This means that manufacturers must now offer software updates beyond the usual warranty period, so that future threats are also repelled. We assume that the regulation will be adopted at the end of 2024.

By Mark Simms

<https://www.machinebuilding.net/>

“

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SORTIE GAZ



Cover Story

19 *Green Hydrogen*



Saudi Crown Prince MBS Is Building The World's Biggest Green Hydrogen Plant



Artist's impression of an Air-gen device.

Saudi crown prince MBS is building the world's biggest green hydrogen plant to power 'Oxagon' the world's largest floating structure – The \$8.4 billion facility will produce 600 tons of hydrogen every day which will save 5 million tons of Co2 every year.

Saudi Arabia's visionary Neom City has taken a big step towards actualizing the sustainable project. A total investment value of \$8.4 billion will breathe clean air into Neom and its residents. Neom Green Hydrogen Company (NGHC), 23 local, regional, and international banks and investment firms signed financial documents on the green hydrogen production facility. The address of the plant is the port and logistics hub, Oxagon, the world's largest floating structure.

The plant, too, will be the largest commercial-scale green hydrogen production facility in the world. It will boast an initial production of up to 600 tonnes of green hydrogen per day, which eventually saves an insane 5 million tonnes of CO2 annually. Crown Prince Mohammed bin Salman, MBS's dream of sustainable regional development in northwest Saudi Arabia doesn't look like a distant dream anymore. The National Development Fund (NDF) will contribute to financing the world's largest green hydrogen project through its supervised entities.

What is Oxagon?

This octagonal floating port city in Neom, 455 times bigger than Manhattan, is the pulse of the region. The first of its kind, fully automated port, and integrated logistics hub that takes advantage of shipping traveling through the Suez Canal. The eight-pronged development will be divided between land and a large section protruding into the Red Sea.

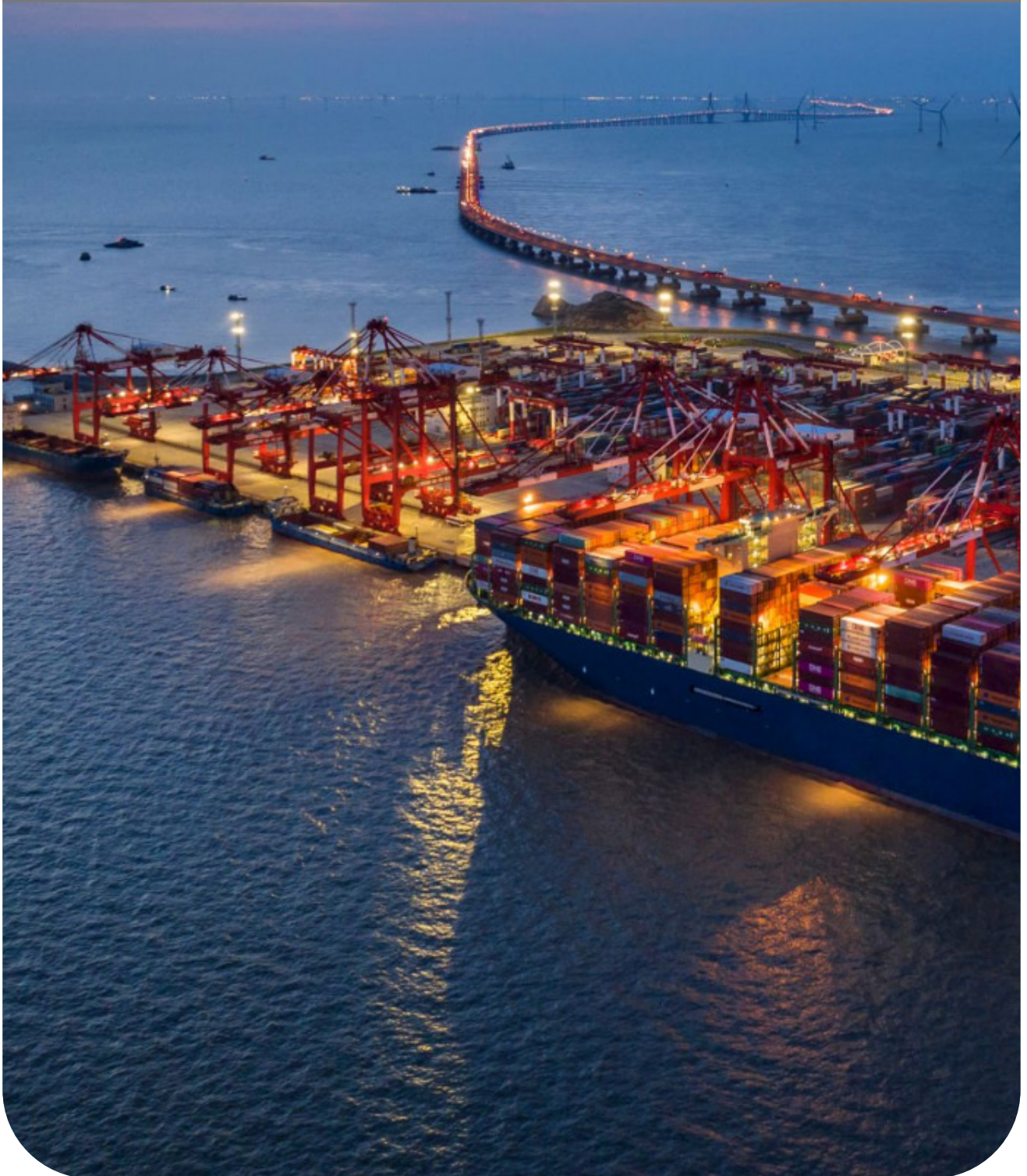
Oxagon will be a net-zero city using robots and AI for operations that will be entirely powered by clean energy, which we now know is not a myth but an \$8.4 billion reality. "Oxagon will be the catalyst for economic growth and diversity in Neom and the kingdom, further meeting our ambitions under Vision 2030," said Crown Prince Mohammed. "It will contribute to Saudi Arabia's regional trade and commerce and support creating a new focal point for global trade flows. I am pleased to see that."

By Neha Tandon Sharma

<https://luxurylaunches.com>

Products

21 Renewable Energy Products



Kore Infrastructure Partners with Tule River to Establish Forest Biomass to Biofuels Project



Kore Infrastructure has unveiled more details about its partnership with the Tule River Economic Development Corporation with support from the California Department of Conservation to develop a modular, forest biomass to carbon-negative biofuels facility in Porterville, California. The project will help solve two major challenges in California: reducing the risk of catastrophic wildfires and decarbonizing transportation.

These challenges will be mitigated by removing the dead, dying, and diseased trees that can become fuel for forest fires, and converting it into carbon-negative UltraGreen Hydrogen™ and biocarbon using Kore's proprietary technology.

The California Department of Conservation has awarded Kore a \$500,000 grant under the Forest Biomass to Carbon-Negative Biofuels Pilot Program to develop the project.

Stantec is leading the development of the Conceptual Engineering, to be followed by the Front End Engineering Design, the last quarter of this year. Construction is expected to begin by early-2024, with commercialization achieved by the second half of 2025.

Unfortunately, wildfires have become all too common in California, propelled by a changing climate and insufficient forest management practices. The frequency and magnitude of wildfires has caused two of the largest insurance companies in the country to discontinue writing policies in California.

This project is a step in the right direction to improve the health of California forests, reduce wildfires, and decarbonize transportation by implementing Kore's innovative solution.

"Given the recent record-breaking global temperatures, innovative solutions to ease the effect of climate change are crucial," said Cornelius Shields,

Founder and CEO, Kore Infrastructure.

"We are proud to partner with the Indigenous leaders at Tule River Economic Development Corporation to introduce our unique technology that can mitigate wildfire risk and restore the health of Sierra Nevada forests, enhance climate resiliency, encourage energy independence, and help decarbonize transportation in the state of California."

The project will remove and process 48 tons per day of non-merchantable dead, dying, and diseased trees, which will help reduce wildfire risk. The Tule River Economic Development Corporation currently manages 57,000 acres of Sierra Nevada Forest and is entering into a joint stewardship agreement with the US Forest Service to manage another 325,000 acres.

Orchard wood waste from the Central Valley will provide Kore's facility with supplemental feedstock when forest access is unavailable due to weather or other adverse conditions.

Dennis Ickes, CEO of Tule River Economic Development Corporation said, "We are thrilled to collaborate with Kore Infrastructure to support and scale the vision of our renewable energy campus with the production of carbon-negative hydrogen that sustains our local economy. This project will improve the health of the forests we manage, generate renewable energy, and help enhance the economic independence of our community."

The project will generate two metric tons of fuel cell quality hydrogen (99.999% purity) per day. Kore's commercial partner intends to use this hydrogen to decarbonize shipping container handling equipment at the ports of Los Angeles and Long Beach by converting diesel-powered equipment into fuel cell electric.

The hydrogen may also be available to local users as demand for fuel cell quality hydrogen expands geographically. Fuel cell electric vehicles (FCEV) are also being considered for feedstock, hydrogen, and biocarbon transport to further reduce the project's carbon intensity.

The project will also produce about 10 tons of biocarbon daily – an elemental carbon co-product with multiple benefits. As a soil amendment, biocarbon increases plant yield while reducing irrigation and fertilizer needs. Biocarbon also sequesters about three tons of carbon dioxide for every ton incorporated into the soil.

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

Services

23 Air Conditioning



Why Air Conditioners Can Be A Problematic Solution To Extreme Heat



The problems with air conditioning

A study published in *The Lancet* in 2021, led by Ollie Jay, a professor of heat and health at the University of Sydney in Australia, described air conditioning as a «widespread but unsustainable cooling solution.»

«It's unsustainable if we want to air condition everybody,» Jennifer Vanos, associate professor in the School of Sustainability at Arizona State University and one of the study's co-authors, said in an interview with CBC News. The study cited a number of reasons for that.

It heats up cities and the Earth in a few different ways.

Firstly, air conditioners are heat pumps that move heat from the inside to the outside of a building. Bonada said that means heat from thousands of homes «is being pumped back out into the city, which is already hotter than surrounding areas.»

Many air conditioners contain refrigerants called HFCs or hydrofluorocarbons, which can cause far more global warming per kilogram than carbon dioxide.

However, most of their global warming impact comes from the amount of electricity they use in places with fossil fuel-powered generation. According to the International Energy Agency (IEA), indirect emissions from space cooling have tripled between 1990 and 2021 to more than a gigatonne.

It's not very accessible to those who need it most.

The cost of buying and running air conditioners tends to make them unaffordable to the most vulnerable.

The Statistics Canada study this week said that while air conditioners were in 61.1 per cent of Canadian homes in 2017, people were far less likely to have them if they had less than a high school education, lived alone or did not own their own homes.

The *Lancet* study found even bigger disparities in countries like China, especially among those older than 65 and living in rural areas.

Air conditioning also doesn't work outdoors, where people are often at higher risk of heat-related illness and death.

It can strain the grid, leading to deadly blackouts during extreme heat.

The lead author of a 2021 study published in the journal *Environmental Science & Technology* suggested that «a widespread blackout during an intense heat wave may be the deadliest climate-related event we can imagine» and an «increasingly likely» scenario.

Air conditioners can use a lot of power, and when that power demand exceeds the capacity of the grid, it has already led to deadly outages, such as in Pakistan in 2015 and 2018, the *Lancet* study noted.

In Canada, that's happened on a small scale — with increased air conditioning use being blamed for a hydro outage in Ottawa's west end last month.

And in British Columbia, some landlords have recently warned tenants against installing air conditioners, saying older buildings don't have the electrical capacity to handle them.

JUWI Renewable Energies, a leading global solar, wind, and hybrid project developer, engineering, procurement & construction (EPC) and operations and maintenance company, recently announced that it now has 400 MW of EPC projects in advanced stages of development for mines in South Africa.

The news follows the financial close of the 89 MW Castle Wind project by the African Infrastructure Investment Managers (AIIM) Consortium for Sibanye-Stillwater's mining operations, a project initially developed by JUWI for the South African government's Renewable Energy Independent Power Producers' Programme (REI4P). The AIIM Consortium included African Clean Energy Developments as developer and Reatile as investment partner. An improved regulatory environment has allowed the 89 MW Castle Wind project, initially developed by JUWI for the South African Government's REIPPP Programme (REI4P), to be pivoted to remotely power Sibanye-Stillwater's mining operations.

The 400 MW will add to South Africa's growing share of renewables in a country where the grid is mostly powered by coal. Coal-powered plants have traditionally had well over 90% of the share in South Africa, but now both utility-scale wind and solar projects developed by the likes of JUWI, as well as large commercial & industrial (C&I) solar projects, are adding a significant amount of renewables to South Africa's energy mix.

JUWI South Africa is part of the international JUWI. JUWI employs more than 1,200 people worldwide and is present with projects on all continents. To date, JUWI has implemented more than 1,200 wind energy plants with a capacity of more than 2,900 megawatts at around 200 locations worldwide in the wind segment. In the solar segment, there are around 2,000 PV plants with a total capacity of around 3,800 megawatts. JUWI's operations management services wind energy and PV plants with a capacity of more than 4,100 megawatts.

«We're seeing a wave of formal requests for renewable energy projects from South African mines, largely driven by the energy crisis, commercial considerations and decarbonisation targets,» said Richard Doyle, Managing Director, JUWI SA.

«The right regulation has been needed to translate this demand into actual projects for mines. The amendments to the licence-exemption threshold and ability to wheel electricity are now allowing us to pivot projects initially developed for REI4P, such as the Castle Wind project, into the private sector, making them a reality. This is a significant milestone for our team of experts who work tirelessly to advance the renewable energy transition in Africa.»

Wheeling is the act of transporting electricity from a generator to a remotely located end-user through the grid. With most large mines and energy users in South Africa lacking land for large-scale wind and solar projects, the ability to wheel electricity is essential for self-generation.

According to Chris Bellingham, Head of Project Development, JUWI, «the ability to wheel power through the network combined with the far lower electricity tariffs of solar and wind projects, incentivises mines to either remotely generate their own electricity or purchase it from remote independent power producers (IPPs), thereby sourcing generation from sites where the resource is stronger. This is a real win for mines, allowing them to save costs, reduce greenhouse gas emissions, and when used in combination with backup technologies, avoid load shedding.»

By Emily Chung

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

Technology

25 Advanced Engineering in Renewables



JUWI South Africa Now Has 400 MW EPC Projects In Advanced Stages Of Development For Mines In South Africa



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By Remeredzai Joseph Kuhudzai
<https://cleantechnica.com>

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Saudi Arabia, Japan Establish Lighthouse Initiative For Clean Energy Cooperation

The initiative will serve as a beacon for other countries and regions



JEDDAH — Saudi Arabia and Japan have decided to establish the KSA-Japan Lighthouse Initiative for Clean Energy Cooperation.

Crown Prince and Prime Minister Mohammed bin Salman and Prime Minister of Japan Kishida Fumio decided to establish the Initiative after holding extensive talks and a bilateral meeting in Jeddah on Sunday.

The initiative will serve as a beacon for other countries and regions as they develop their strategies and roadmaps toward their net zero ambitions, a joint statement read.

Saudi Arabia has a strong ambition to decarbonize and reach net zero emissions by 2060, and benefit from its globally low cost of renewable and clean hydrogen as well as the country's strategic location on trade routes for energy products across the world.

Japan too has strong decarbonization ambitions as it aims to achieve net zero by 2050. Tokyo is a global pioneer in clean energy technology solutions. The Lighthouse Initiative aims at showcasing Saudi Arabia and Japan's leadership in clean energy projects and sustainable advanced materials, as well ensuring the resiliency of the supply chain to ensure sustainable and secure supplies. The initiative will support the ongoing efforts that Saudi Arabia is undertaking to become a hub for clean energy, mineral resources and energy components supply chains.

The initiative encompasses several sustainable materials. The efforts will facilitate the participation of leading companies from Saudi Arabia and Japan, and expand on their ongoing collaboration, which will yield the production of multiple components in the energy supply chain that will enable the development of the Lighthouse projects, such as components for renewable energy.

The partnership will develop Lighthouse projects that guide clean energy transition, focusing on areas such as hydrogen and ammonia, e-fuel, Circular Carbon Economy/Carbon Recycling, Direct Air Capture, critical minerals required for the energy sector and supply chain resilience, sustainable advanced materials, and research and knowledge exchange.

In order to empower the Lighthouse Initiative, both countries affirmed their collaboration in clean energies and mineral resources supply chains by combining the advantages, ambitions and leading companies and institutions in both countries to contribute to expanding the market for clean energy to lower the cost and making supply chains more resilient.

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

Winter Is Coming And The U.S. Grid Remains Vulnerable To Power Plant Failure



From winter storms to sweltering summer heat, there's a consensus among experts that increasing extreme weather, a shifting electric generation mix, delays in getting new power generation projects connected and the difficulties in getting new transmission lines and other infrastructure built all pose an increasing risk to the grid.

At U.S. Senate committee hearings as well as Federal Energy Regulatory Commission meetings, there have been plentiful warnings over the past few months about a coming reliability crisis.

Much of the debate has centered on what U.S. Sen. John Barasso, a Wyoming Republican, characterized at a hearing last month as "reckless policies" aimed at limiting pollution from existing power plants, retiring older fossil fuel generation facilities and speeding the transition to cleaner sources of energy to mitigate the consequences of climate change.

But there's been less sound and fury about one of the biggest factors in recent severe weather blackouts, like those across parts of the South during Winter Storm Elliott, when large numbers of fossil fuel plants, particularly those fired by natural gas, tripped offline because of freezing equipment, inability to secure fuel and other failures.

"The overwhelming threat to reliability right now is fossil plants failing to perform in the winter," said Tom Rutigliano, a senior advocate at the Natural Resources Defense Council's Sustainable FERC program.

And though FERC approved new power plant

winterization standards in February, one commissioner flatly said they don't go far enough and pointed out that they don't become enforceable until 2027.

Winter might seem far off right now with much of the country in the grips of a punishing heat wave, but as it approaches, the grid is still very much vulnerable to severe storms like Elliott and Winter Storm Uri, which caused a catastrophic collapse of the Texas electric grid in 2021 that killed an estimated 246 people.

"Nothing really has fundamentally changed since last winter," said Michael Goggin, vice president of Grid Strategies, a consulting firm focused on clean energy integration. "It's just a question of do we get lucky and avoid another cold snap."

'Implement these recommendations now'

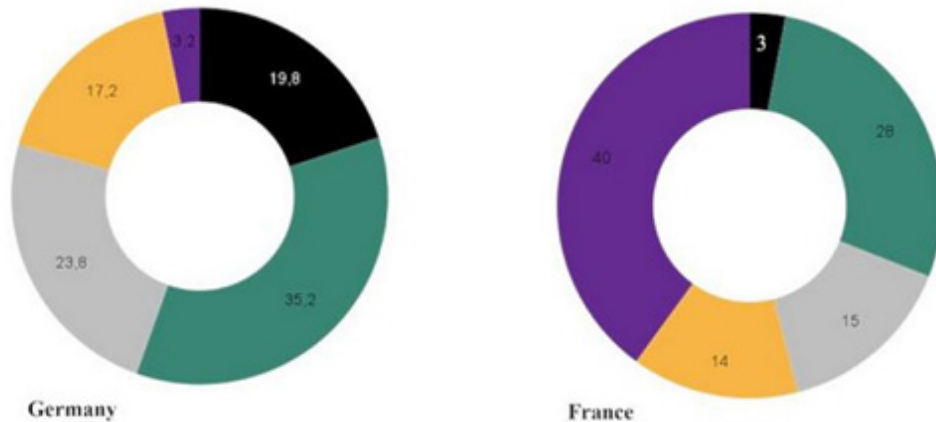
During Elliott, which brought rapidly plummeting temperatures to many parts of the country over the Christmas weekend, rolling blackouts were instituted by the Tennessee Valley Authority, which provides electricity for 153 local power companies serving 10 million people in Tennessee and parts of six surrounding states, Duke Energy in the Carolinas and several utilities in Kentucky, cutting power to hundreds of thousands of customers. PJM, the nation's biggest regional transmission organization, coordinating electric flow for 65 million people in parts of 13 states and the District of Columbia, urged its customers to cut usage and avoided blackouts despite losing about 47,000 megawatts of capacity.

By Robert Zullo
<https://indianacapitalchronicle.com/>

Does Nuclear Slow Down The Scale-Up Of Wind And Solar? France And Germany Can't Agree

Share of energy sources in primary energy consumption.

Data: SDES 2021, AG Energiebilanzen 2022.



France and Germany lead the camps in disagreeing on the future of nuclear in Europe. Camille Lafrance and Benjamin Wehrmann at CLEW take a deep dive into the reasons why, quoting experts and politicians. Germany's vision of a fully renewables-based EU is at odds with France's unwavering support for low-carbon nuclear energy.

European-wide agreement on targets matter because they drive future investment in the targeted technologies and the design of Europe's grid, markets, policies, budgets and all the rest. A nuclear-light renewables-heavy Europe will look very different from one where nuclear baseload sits robustly within the cross-border market. And a major concern is that more nuclear means less renewables, at a time when wind and solar need all the scale they can get. Yet nuclear is fossil-free too, and France has the lowest emissions per head of any rich country. If agreement cannot be met, can Europe meet its decarbonisation goals? Time is running out.

The role of nuclear power in Europe's transition away from fossil fuels has been a point of contention between French and German governments for a long time. In the year 2000, Germany decided to phase out nuclear energy and, despite temporarily backtracking on its decision before the Fukushima nuclear disaster in 2011, ultimately completed its

nuclear exit in April 2023.

France, on the other hand, has the highest share of nuclear in the energy mix of any country in the world and, despite temporarily considering to radically cut its reliance on nuclear power after Fukushima, has committed to building many new reactors as part of its bid to meet European climate targets and net-zero emissions by 2050.

Despite the stark differences in the energy strategy of the EU's two most influential member states, consecutive governments in Paris and Berlin long agreed to disagree. In line with national prerogatives for EU member states to decide on their own energy mix, both countries quietly traded electricity without asking whether traded electrons were generated with nuclear reactors, renewables or fossil fuels.

Yet, the 2022 European energy crisis and the increasing need to formulate strategy to meet sustainability targets in the EU's Green Deal eventually undermined this arrangement. It also showed that disputes about nuclear energy between France and Germany come with major implications for the strategic positioning on energy and climate policy of the whole EU.

By Camille Lafrance And Benjamin Wehrmann
<https://energypost.eu>

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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The Challenges and Solutions for Waste in the Renewable Energy Industry



The campaign against renewable energies bears striking resemblance to the campaign against natural gas in the 1960s. Coal producers spread news about the health hazards and risks associated with gas, just as critics now claim that renewable energy technologies are scarce and generate unmanageable mountains of waste.

While there are legitimate concerns about the potential dangers of renewable energy industry, similar risks have been successfully managed in the natural gas sector. Safety measures have been implemented to limit health and environmental risks, with natural gas proving to have fewer negative impacts on human health and climate change compared to coal.

It is true that the production of solar panels and wind turbines requires large quantities of raw materials, including rare minerals, which are often extracted in developing countries without strict environmental regulations. Late efforts have been made to establish proper waste treatment facilities for end-of-life renewable energy hardware.

However, public relations firms exploit these challenges, using selective information and fake news to highlight the risks while ignoring the potential solutions. This has led to misinformation and baseless attacks on the industry.

Thankfully, the renewable energy sector has made progress in addressing waste management. It has been discovered that there are sufficient reserves of raw materials that can be safely and sustainably mined. Alternatives to precious metals, such as using salt from seawater for batteries, have also been identified.

While some solar panels and wind turbines do need to be replaced after 25-30 years of use, there are already solutions within reach. Initiatives to collect and dismantle old PV panels for reuse and recycling have been launched, although the pace needs to accelerate. A French company has even developed technologies that can recycle panels and reuse 99 percent of their components, including precious metals.

It is important to note that while the amount of waste from solar panels is estimated to increase in the coming years, it is still manageable compared to other forms of waste, such as plastic. Successful recycling solutions are being implemented, although more needs to be done.

The emergence of the world's first large-scale solar recycling plant, which extracts and reuses components from expired PV panels to manufacture new ones, shows promise for reducing waste and reusing precious materials. Some governments, like the Dutch government, have also imposed fees on the replacement of old solar panels to contribute to recycling costs, a practice that may be adopted by other countries.

While challenges remain, the renewable energy industry is actively working towards addressing waste and finding sustainable solutions. By focusing on the facts and promoting responsible practices, we can ensure that renewable energies continue to play a crucial role in a cleaner and more sustainable future.

By Daniel Hall

<https://www.energyportal.eu/>

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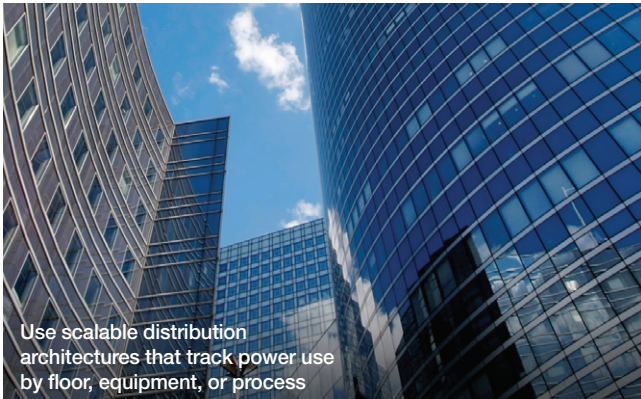
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