

energy

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World's Biggest Experimental Nuclear Fusion Reactor Launched In Japan
p.29

Renewable Energy

Solar Energy Storage Breakthrough Could Make European Households Self-Sufficient

p.08

Oil & Gas

Mediterranean SOx ECA, and heavy fuel oil ban in the Arctic

p. 12

Nuclear

Radiation Shielding and the Utilization of Glass

p. 14

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Pioneering the Energy Revolution: Unveiling Innovations for a Sustainable Tomorrow



In the ever-evolving realm of energy, this month's magazine serves as a compass navigating the currents of transformative technologies. From harnessing solar power through cutting-edge battery storage to grappling with the complexities of heavy fuel oil, our exploration transcends boundaries, weaving a narrative of sustainability and efficiency.

At the forefront of this journey is the radiant promise of solar battery storage. Beyond capturing sunlight, these systems redefine energy utilization. The ability to store surplus energy ensures a reliable power supply, addressing the intermittent nature of solar energy and marking a crucial step towards a sustainable future.

Concurrently, we confront the persistent presence of heavy fuel oil, dissecting the challenges associated with its usage. In the dynamic landscape of energy, heavy fuel oil becomes a focal point, demanding a nuanced understanding as we strive to transition towards cleaner alternatives.

Beneath the surface of our energy infrastructure lie shielded cells, sensors, and switches — unsung heroes optimizing systems and enhancing efficiency. In this intricate dance of technology, these elements illustrate the vital role innovation plays in steering us towards a more sustainable and resilient energy future.

Our journey extends to the responsible disposal of batteries, uncovering the processes that give used power cells a second life. Battery recycling emerges as a cornerstone, offering tangible solutions to minimize environmental impact while conserving valuable resources in the pursuit of a circular energy economy.

Heat processing technologies take center stage in our exploration, showcasing the value extracted from excess heat. From industrial applications to novel approaches, heat processing underscores our commitment to energy efficiency and resource optimization, embodying the ethos of a sustainable energy paradigm.

The crescendo of our journey resonates in the realm of green hydrogen energy, where hydrogen emerges as a clean energy carrier of unparalleled potential. Propelled to the forefront, green hydrogen stands as a beacon in our collective endeavor to forge a cleaner, sustainable energy future.

In this enlightening journey into the core of innovation, where solar brilliance, recycling initiatives, and technological guardians converge, we invite you to envision the intricate tapestry that shapes our energy landscape. As we navigate the currents of change, let these insights serve as beacons of knowledge, igniting your curiosity and inspiring a shared commitment to shaping a greener, more resilient energy future. Together, let's pioneer the energy revolution that defines a sustainable tomorrow.

In This Issue!

energyHQ's September 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.

Article on page 12 talks about Heavy Fuel oil.

Article on page 17 focuses on Sensors & Switches.

Article on page 29 sheds the light on Nuclear Fusion Reactors.

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

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

Best wishes,
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Issue Contents

Introduction

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



Renewable Energy

Solar Battery Storage

- 08 Solar Energy Storage Breakthrough Could Make European Households Self-Sufficient

Oil & Gas

Heavy Fuel Oil

- 12 Mediterranean SOx ECA, and heavy fuel oil ban in the Arctic



Nuclear

Shielded Cell

- 14 Radiation Shielding and the Utilization of Glass

Electric

Sensors & Switches

- 17 MDT Introduces Upgraded TMR Switch Sensors for Industrial, Medical and Automotive Applications



Issue Contents

Products

Battery Recycling

- 20 ORNL Develops Environmentally Friendly Lithium-Ion Battery Recycling Process



Services

Heat Processing

- 26 What is Laser Heat Treatment?

Cover Story

Nuclear Fusion Reactors

- 29 World's Biggest Experimental Nuclear Fusion Reactor Launched In Japan



Technology

Green Hydrogen Energy

- 32 GCC Countries Work To Lead the Green Hydrogen Economy

Country Reports

China, Qatar, USA

- 35 Arab League participates in Arab-Chinese energy cooperation conference
- 36 The Virtue Of Green Choice For Qatar
- 37 New Map Shows Where Clean Energy Investments are Being Made in USA



Services

- 41 Buyer's Guide
- 42 Coming Events

Info

- 43 General Inquiries
- 44 Closing Letter

Energy World Digest



Brazil



Leading Sub-Sectors and Opportunities Hydropower Generation

Hydropower has been the leading Brazilian energy source for electricity generation for several decades. This is due to its economic competitiveness and its potential at the national level. Brazil has a generating system with installed capacity of more than 150 GW, with most of the energy coming from hydro, due to Brazil's abundance of powerful rivers. The Brazilian hydroelectric potential is estimated at 172 GW, of which more than 60% has been developed. Approximately 70% of the untapped potential is in more remote, protected areas of the country including the Amazon.

Thermal Power Generation

Thermoelectric power generation can use different fuels: natural gas, biomass, coal, nuclear, fuel oil and others. Depending on the type of fuel and the generation technology, they can fulfill different roles, from base-load generation to back-up generation for renewables or serving peak demand. Considering the relevance of hydropower in Brazil, thermal power plants have been operating significantly during periods of critical hydrological conditions. Besides that, with the increasing importance of wind and solar power plants in the power system, it is more likely that thermal power plants will act to compensate the generation variability of these sources in the short-term. In the case of bioelectricity, Brazil is the second largest producer globally of ethanol from sugarcane.

Wind Energy Generation

Wind power generation in Brazil is expected to reach 29 GW by the end of 2023, according to the Brazilian Wind Power Association (ABEEOLICA). Brazil has 890 wind farms operating across 12 Brazilian states. Of these, 85 percent are in the country's Northeast region. By 2028, Brazil is expected to have over 44 GW of installed wind power capacity, accounting for 13.2 percent of the Brazilian electricity matrix.

Ethiopia

Ethiopia's Renewable Energy Sector Hit By Range Of Issues

Poor planning, overambitious projects and "weak" human and institutional expertise are just some problems plaguing the Ethiopian government's best efforts to procure renewable energy projects, according to a new study.

Renewable energy academic Seife Ayele told pv magazine that some of the issues afflicting the Ethiopian government's quest for procuring non-hydropower renewable energy projects include poor planning, unrealistic projects and "weak" human and institutional knowledge. Incomplete electricity sector improvements, "significant" project risks and a "weak" domestic private sector are also barriers, he said.

pv magazine asked the Ministry of Water and Energy to comment on these critiques but did not get a response.

Ayele, a research fellow at the Institute of Development Studies in the United Kingdom, and three other academics came to this conclusion after researching the Ethiopian government's handling of non-hydro renewable energy procurements.

Culminated in a recently published research paper, the team conducted literary research, held workshops and interviewed over 40 non-government and government stakeholders, "informants" and CEOs of independent power producers (IPP) to try and understand the government's process. The researchers were inspired after the government's best efforts to ramp up the industry, which peaked in 2018 with the implementation of transparent auctions, failed, according to the paper.

The researchers used five renewable energy projects – three solar and two geothermal – as case studies and found "challenges and fault lines," applicable to the whole sector, Ayele said. "Firstly, the projects that the government came up with were almost too ambitious in size.



Norway

Norway Throws Importance Of Oil & Gas For Europe's Energy Security Into Stark Relief

In the wake of the Ukraine crisis, Europe went into a tailspin, scrambling to strengthen its energy security and diversify its supply mix to avoid a gas crunch. One of the top oil and gas exporters, which stepped in to help alleviate Europe's energy woes, was Norway. This enabled the country to become the continent's largest gas supplier. The Norwegian government is adamant that additional investments in oil and gas are needed to keep bolstering Europe's energy security.

Following the Ukraine crisis, the EU made a move to reduce dependence on Russian fossil fuel imports last year, by phasing out all Russian oil imports. During this turbulent time, Norway stepped up when Russian gas supplies were cut off, becoming Europe's largest supplier of gas. Norway is also among the continent's top three oil suppliers. Other main suppliers are the U.S., Saudi Arabia, Brazil, and Angola.

The director general of the Norwegian Petroleum Directorate (NPD) emphasised at the roundtable conference in Molde that Norway would be able to remain a stable supplier of oil and gas while contributing to Europe's energy security over the coming years if it continues to develop the Norwegian Continental Shelf (NCS).

The 2023 Roundtable conference, organised by Energiknutepunkt Nyhamna (energy hub) in cooperation with the chambers of commerce in Aukra and Molde, looked at the geopolitical situation and the importance of Norwegian gas supplies to Europe.



Iran

Iran Is Saving Money By Investing In Solar Electricity And Reducing Its Dependence On Imported Oil And Gas

Iran has plenty of solar and wind electricity. In recent years, the Iranian government has committed to exploiting these resources to become a regional leader in renewable energy.

Iranian renewable energy efforts are driven by the desire to diversify its energy mix. Over 90% of Iran's energy comes from fossil fuels. Iran's fossil fuel dependence makes it vulnerable to price shocks and supply interruptions. Renewable energy can help Iran secure its energy and minimise its fossil fuel dependence.

Climate change is another reason Iran is pushing renewable energy. Iran is one of the most susceptible nations to climate change, and the administration recognises that renewable energy can mitigate its effects.

Iran has promoted renewable energy production in several ways. In 2017, the government pledged to generate 10% of its electricity from renewable sources by 2025. The government has also supported renewable energy production with financial incentives, legislation, and regulations.

Due to these efforts, Iran has advanced its renewable energy sector. Iran installed over 1 GW of solar and wind power in 2021, boosting its total renewable energy capacity to above 4 GW. Iran produces the 12th most solar electricity in the world and the 6th most wind power in the Middle East.

Iran's solar power potential is huge. The country offers some of the strongest solar radiation in the world, with 300 days of sunshine per year. Iran is perfect for solar power development.



Tunisia

Tunisia's Energy Sector: A Just Transition Analysis

Two main narratives are currently influencing decisions in the Tunisian energy sector. The first dominant discourse draws on neoliberal practices of green extractivism, where natural resources are exploited for export purposes, whereas the second opposing discourse calls for justice, democracy, and community ownership of energy projects. This article engages with these competing energy transition narratives in Tunisia to gauge the country's progress on just transition principles.

As the transition towards low-carbon energy moves to the forefront of global policy agendas, states have gradually scaled up their commitments to reduce greenhouse gas emissions and shift towards renewable energy sources. Beyond technological and clean energy ambitions, decarbonization transitions entail deep structural changes across systems with broad socio-economic implications.

More importantly, some countries' decarbonization pathways are reproducing patterns of global injustices, such as dispossession; unequal distribution of benefits and burdens; the disappearance, emergence, and transformation of jobs; a lack of inclusive decision-making process; and the exacerbation of existing vulnerabilities.

However, when managed carefully, energy transitions can also be powerful transformative tools for creating regenerative economies and net social benefits. Such transitions are known as Just Transitions, or ones that engender "thriving economies that provide dignified, productive, and ecologically sustainable livelihoods; democratic governance and ecological resilience." Just transition is largely intersectional at its core, addressing current and historic issues pertaining to gender, race, class, and other forms of oppression.



Spain

Spain's Renewable Generation To Top 50% In 2023, Surpassing Neighbors

Spain is on track to generate more than half of its power from renewable sources this year, becoming the first of the top five European countries by power demand to accomplish this feat, according to Rystad Energy forecasts on Wednesday. The country's renewable-sourced generation is expected to surpass the 50% average in 2023, beating France, Germany, Italy and the UK. 'Spain's renewable energy achievements come as no surprise given its history of strategic investments and early adoption,' Fabian Ronningen, senior renewables and power analyst at Rystad Energy said. Spain holds the second position in onshore wind installations in Europe, following Germany. Onshore wind technology currently accounts for more than 20% of Spain's power generation, along with hydropower, which used to be Spain's largest source of renewable energy, at 10%.

In a bid to transition towards cleaner energy sources, Spain made significant strides in reducing its reliance on fossil fuels. Spain has made notable progress in phasing out coal-fired generation. Also, the country's nuclear power plants continue to provide a stable baseload, with a planned phase-out scheduled for 2035.

The decline in exports and domestic power demand in 2023, along with a reduction in gas-fired generation in Spain, will further boost the role of renewables in the energy mix.

Renewable Energy

08 Solar Battery Storage





 KELLER

IoT STARTS WITH A SENSOR



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Solar Energy Storage Breakthrough Could Make European Households Self-Sufficient



Norwegian startup Photoncycle says it can store solar energy from summer to winter cheaper than batteries

One of the biggest issues with solar energy is that it is inconsistent over days and over seasons. Many startups have focused on trying to smooth energy supply over the day — saving up energy during the day for use during the night-time or outside peak hours.

But few have tackled interseasonal storage of solar energy. What if homes could save abundant solar energy created in sunny months to be used for heat and electricity in winter?

So far, this vision has been impossible to achieve. Batteries are too expensive and have short lifespans, and high costs and poor efficiency have crossed hydrogen, which does not emit greenhouse gases when burned, off the list of solutions.

Now, one startup from Norway — a country in a region that probably hopes it could save a little sunlight for cold winters — says it could bring a solution to market in the next couple of years, using solid hydrogen.

The hydrogen lab

The startup, Photoncycle, has a space in the basement of an accelerator in the Oslo Science

Park. It's more lab than office; on the floor is a chair-size copper cylinder with a thick styrofoam wrapping around it. This is Photoncycle's breakthrough technology.

The company wants to install a larger model of the cylinder — about three cubic meters large — in the ground a few yards from residential properties. The cylinder contains a patented solution of solid hydrogen, which has more efficient storage capabilities than batteries or liquid hydrogen.

Solar panels on the roofs of the nearby buildings will feed the system with energy to be stored in the unit. Excess energy will be sold to the grid.

A lack of storage for solar power generated in the summer creates a “significant mismatch” between when electricity is produced and when it is consumed: “This is one of the big challenges around how to get the renewable energy system to work properly,” says Photoncycle's founder, Bjørn Brandtzaeg.

Houses are currently likely to only use about 50% of what is produced, he says.

“The other 50% increasingly has no value, because when it's produced it's basically going to be dumped or curtailed. If you can store that surplus, and then release it during the winter or when you actually have demand for energy, then you have a real possibility to make a difference.”

Partnering with academia

Brandtzaeg is a seasoned infrastructure entrepreneur. The previous two companies he founded were large — one was an energy infrastructure company in Georgia, the other is Norwegian renewable energy company Clean Energy Group. In contrast, Photoncycle has just nine employees and has been financed with Brandtzaeg's own capital and funding from Startup Lab for the last two years.

The idea for the company began when Brandtzaeg was a visiting fellow at MIT in the US, and part of the team looking at the future of energy storage and how to balance an energy grid made up of 100% renewable energy. The entrepreneur, who does not have a technical background, has partnered with people in academia to come up with a non-flammable solution that doesn't lose a lot of energy in the conversion process.

Brandtzaeg holds up a chalk-looking substance: "With this, you can store electricity 20 times as densely as in a lithium battery."

"We're locking up the hydrogen molecules in a solid to basically fix them. We're using a reversible, high-temperature fuel cell, so we're assisting a fuel cell which both can produce hydrogen and electricity in the same cell," he says.

That means no need to cool the hydrogen down, making it non-flammable and giving it a higher density than an ion-lithium battery.

The energy losses used for heating

No storage solution is 100% energy efficient, and neither is Photoncycle's system.

"Everyone knows that when you're turning hydrogen in and out of this fuel cell, there will be losses. In our system, the losses are effectively heat," Brandtzaeg says.

Photoncycle wants to capture this heat and use it to heat houses.

"You can actually use the surplus heat to effectively provide energy to the household — and 70% of energy needs in the household are heating related," he says.

The system, including solar panels, is connected straight to the existing infrastructure and can then replace natural gas with renewable energy in a combined heat and power system. Brandtzaeg says it takes about one day to install.

Denmark as a test market

One would assume a Norwegian company would start off with testing the product in Norway. However, with Norway being one of the cheapest countries in Europe when it comes to energy — it's not going to have the same cost-saving effects on users.

Instead, Brandtzaeg has picked neighbouring country Denmark, which has some of the highest energy prices in Europe, to roll out the tech first.

"Denmark is a suitable launch market with around 400k households that use natural gas and oil for heating," he says.

Denmark has also decided that gas heating is to be phased out by 2030, which gives people an incentive to find a new heating source, according to Brandtzaeg.

Consumers will be offered the fully integrated power station on a subscription model for a fixed monthly fee — an equivalent of an energy cost of less than €0.10 per kilowatt hour. As for the energy produced and sold on the grid, Photoncycle has set up a profit-sharing scheme with the consumers, which will entitle them to half of the income of energy sold.

With enough units set up and connected, Brandtzaeg says it could become a virtual power plant that can start trading energy on the European energy markets.

"Then you can both be selling energy as a service to the customer but also you can become a very big energy player in the energy markets."

The founder wants to triple the team with the goal of selling 10k units in Denmark in 2025, and to have them installed in 2027.

So why has no one done it before?

According to Brandtzaeg, the idea of using solid hydrogen for energy storage emerged a few years ago, but companies have not been using it for residential purposes.

"The solid oxide fuel cells that we use, they're just about to be commercialised. So people have used them mainly for larger applications, industrial applications."

With the EU Solar Energy Strategy, installation of rooftop solar panels is likely to increase further in the region. The plan is to make it compulsory for all existing public and commercial buildings larger than 250 m² by 2027, and all new residential buildings by 2029 — a strong tailwind for Photoncycle.

"What Elon Musk understood was that in order to beat the gasoline car, you need to put in something which is more attractive for people as a replacement. I think that's the fundamental thing you also need to think about around renewable energy," he says.

Mimi Billing

Mimi Billing is a senior reporter at Sifted. She covers the Nordics and Healthtech.

Oil & Gas

12 Heavy Fuel Oil





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Mediterranean SOx ECA, and heavy fuel oil ban in the Arctic



Two new MARPOL regulations dictating fuel properties are due to take effect in 2024 and 2025. This includes the Mediterranean Sea becoming an ECA for SO_x in 2025, and the Arctic banning the use and carriage for use of HFO, which will take effect in 2024.

Mediterranean Sea – new ECA for Sox

As of 1 May 2025, the Mediterranean Sea will effectively become an Emission Control Area (ECA) for sulphur oxides (SO_x) under MARPOL Annex VI Regulation 14. This implies that from then on when operating in the Mediterranean Sea, the sulphur content of the fuel used on board shall not exceed 0.10%, unless using an exhaust gas cleaning system (EGCS) ensuring an equivalent SO_x emission level. This is believed to significantly reduce ambient levels of air pollution in the Mediterranean Sea and in the Mediterranean coastal states, providing benefits to human health and the environment.

At present, the other SO_x ECAs under MARPOL are the Baltic Sea, the North Sea, the North American and the United States Caribbean Sea ECAs. In the future, we may see the designation of other SO_x ECAs as well. One candidate may be a North-East Atlantic Ocean ECA linking the existing ECAs in the Baltic Sea and North Sea with the Mediterranean ECA.

Arctic waters – prohibition on the use and carriage for use of HFO

From 1 July 2024, heavy fuel oil (HFO) may no longer be used or carried as domestic fuel in bunker tanks when in Arctic waters, with some exceptions:

- Ships engaged in securing the safety of ships, search and rescue operations, or dedicated to oil spill preparedness and response are exempted.
 - Ships subject to Regulation 12A of MARPOL Annex I (oil fuel tank protection) or Regulation 1.2.1* of Part II-A of the Polar Code may use and carry HFO until 1 July 2029.
 - when operating in domestic waters under the sovereignty or jurisdiction of their flag state may be temporarily waived until 1 July 2029.
- HFO in this context implies fuel oil having a density at 15°C higher than 900 kg/m³ or a kinematic viscosity at 50°C higher than 180 mm²/s. It has been discussed whether to also include the pour point as an additional qualifier in the future, but this has not yet been concluded.

The cleaning or flushing of bunker tanks or pipelines is not required after using HFO to prepare for operation within Arctic waters. HFO carried as cargo on tankers is not affected by this regulation.

Recommendations

To stay compliant, it is important to ensure that sufficient fuel with the appropriate sulphur content is available and that proper fuel changeover procedures are in place and implemented before entering the Mediterranean Sea. For ships entering Arctic waters, it is essential to ensure that any remaining HFO is disposed of before entering unless the ship is exempted.

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

Nuclear

14 Shielded Cell



Radiation Shielding and the Utilization of Glass



Image Credit: Mo-Sci Corp.

Particular types of glass are crucial for applications in medicine and the nuclear industry as they offer exceptional shielding against various types of radiation. This paper details some of the most frequently used applications of radiation-shielding glass and the ways in which glass can be adapted to shield against radiation.

History of glass radiation shielding

Roentgen's discovery of X-rays in 1895 was followed by a considerable burst of research: within a single year, approximately 1000 X-ray research papers were published.

Yet, the scientists of the time were late in identifying that X-rays had the potential to damage living tissue. By the end of 1896, multiple cases of X-ray dermatitis and more serious conditions were communicated across the scientific community.¹ Though it was difficult for the community to accept the risks of radiation exposure, the development of radiation shielding equipment began as early as 1896. Several of these early interventions used lead glass for radiation absorption: These included lead glass backings for fluorescent screens and thick lead glass goggles to protect against cataracts.

Glass as a radiation shield

Today, specialized glasses, including lead glass, are considered crucial materials for protection against radiation exposure. As well as presenting tunable mechanical, chemical and optical properties,

glasses that include lead can substantially absorb gamma, X-ray and neutron radiation.

This special set of properties makes glass an indispensable radiation shield for applications where line-of-sight is necessary, including nuclear fuel processing and medical radiography.

In several of these applications, radiation-shielding glass finds are employed in the form of containers known as gloveboxes and hot cells. Both kinds of shielding containers incorporate radiation-proof glass viewing windows, used for storing and manipulating radioactive materials safely.

Hot cells are heavy-duty containers that are shielded more completely, making them appropriate for handling high intensity radiation sources such as exhausted nuclear fuel rods. Gloveboxes are employed in lower intensity radiation situations, including the handling of certain radiopharmaceuticals.

In other fields, windows and screens fabricated using radiation-shielding glass safeguard healthcare workers and researchers from X-ray sources such as spectrometers and computed tomography (CT) scanners.

Heavy metal oxide glass modifiers

Generally, glasses used for radiation-shielding applications include heavy metal oxides (HMO) modifiers such as lead oxide (PbO) and bismuth oxide (Bi₂O₃). These chemicals can transform basic silicate glass into transparent radiation shields

with the capacity to effectively absorb neutrons, gamma rays and X-rays.

The resulting glasses have the potential to attenuate radiation at levels comparable to concrete and other conventional shielding materials while enabling visible light to pass through.² Importantly, HMO glasses experience relatively little optical or mechanical degradation when exposed to radiation.

Glasses comprised of lead oxide are in frequent use, yet, increasing the lead content leads to a reduction in both the hardness and melting point of the glass.² This, in combination with environmental concerns of lead use, has prompted research into alternative HMO glasses for radiation shielding applications.

These include oxides of barium, boron, tellurium and silicon.^{3,4} Some research indicates that these glasses may replace traditional concretes as gamma-ray shielding materials.

Nuclear

Effective radiation shielding is of critical importance across the entire nuclear industry. Nuclear reactors spent fuel rods and fission byproducts all generate a multitude of harmful radiation in significant quantities.

Some of these types of radiation can be shielded more easily than others: for instance, alpha and beta radiation are shielded by simply applying a thin layer of aluminum or acrylic. However, to protect against other radiation types such as gamma, X-ray and neutron emission, a greater challenge is faced.

Generally, thick concrete shielding attenuates these types of radiation. However, in waste reprocessing and laboratory applications, windows of radiation-shielding glass can be fitted to allow workers to view radioactive materials safely during processing.

By by Mo-Sci Corp.

<https://www.news-medical.net/>

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

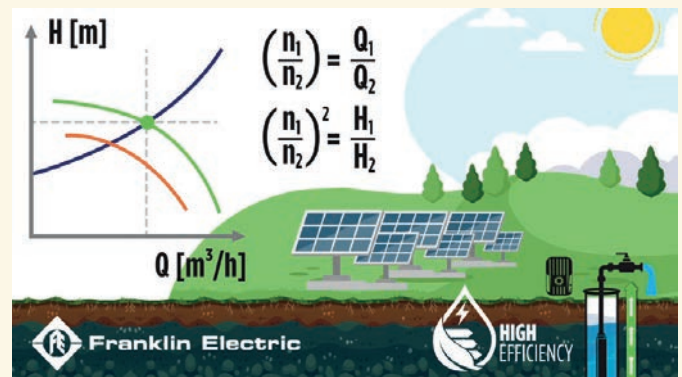
Superior efficiency through permanent magnet technology

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

17 Sensors & Switches



MDT Introduces Upgraded TMR Switch Sensors for Industrial, Medical and Automotive Applications

MDT Expands TMR Magnetic Sensor Portfolios from Self-owned Automotive-qualified -8inch Sensor Fab



MultiDimension Technology Co., Ltd. (MDT) stands at the forefront as a prominent supplier of magnetic sensors, specializing in cutting-edge Tunneling Magnetoresistance (TMR) technology. This innovative company has recently unveiled a range of TMR switch sensors, each designed to cater to specific industry needs and technological advancements. In this extended version, we will delve into the highlights of MDT's latest offerings, emphasizing the significance and diverse applications of these magnetic sensors.

Among the standout products in MDT's recent release are the TMR1222 and TMR1228 bipolar switches. These dual-axis quadrature-waveform switches are tailored for applications such as flow meters and rotary encoders, where precision and reliability are paramount. Their utilization of Tunneling Magnetoresistance technology

underscores MDT's commitment to delivering state-of-the-art solutions with enhanced performance.

Addressing the ever-evolving landscape of portable medical devices, MDT introduces the TMR1367, a 1.2V ultra-low voltage nanoAmpere wake-up switch. This device is specifically crafted for battery-powered medical instruments, providing a delicate balance between energy efficiency and responsiveness. The TMR1367 exemplifies MDT's focus on contributing to advancements in healthcare technology through specialized sensor solutions.

Expanding its omnipolar series, MDT introduces the TMR1363 and TMR1365, both operating at an impressively low 200nanoAmpere power consumption. These sensors bring versatility to various applications, with a particular emphasis on their utility in scenarios where power efficiency is critical. This series showcases MDT's dedication to offering a comprehensive lineup to meet the diverse needs of industries relying on magnetic sensing technology.

In the automotive sector, MDT introduces the TMR1148 and TMR1348 series, designed for level-sensing applications. Leveraging the advancements in TMR technology, these sensors contribute to the automotive industry's pursuit of higher performance and cost-effectiveness. MDT's commitment to automotive applications is evident in its continuous process upgrades, aiming for superior performance and efficiency.

MDT's TMR switch sensors boast advanced features, including ultra-low power consumption, high sensitivity, and high-speed operation. The

always-active series operates at a minimal 1.5microAmpere current consumption, ensuring constant monitoring without unduly draining power resources. Simultaneously, the 200nanoAmpere series, featuring 50Hz power cycling, caters to applications with intermittent power requirements. The flexibility of MDT's sensors is a key selling point. These sensors support various configurations, including unipolar, bipolar, and omnipolar functionality. Output options include CMOS/open-drain, and they can operate within a wide supply voltage range of 1.85.5V or 340V. The programmable TMR13Dx series allows for factory-preset switching sensitivities, ensuring adaptability to diverse application requirements.

Empowered by its state-of-the-art 8-inch fabrication facility in full production with IATF-

the boundaries of magnetic sensing technology. From precision instruments in medical devices to critical applications in automotive systems, MDT's TMR switch sensors demonstrate a convergence of innovation, reliability, and adaptability. As industries continue to evolve, MDT remains a reliable partner, driving advancements in magnetic sensing solutions and contributing to the success of its diverse customer base.

Key features and parameters of new products in this release:

About MDT

MultiDimension Technology was founded in 2010 in Zhangjiagang, Jiangsu Province, China, with branch offices in Beijing, Shanghai, Chengdu, and Ningbo in China, Tokyo, Japan, and San Jose, Calif., USA. MDT has developed a unique intellectual property

Part Number	Key Features	Supply Voltage (V)	Supply Current (µA)	Switching Sensitivity (Gauss)	Package	Applications
TMR1222/TMR1228	2D bipolar switch in one package; 1kHz frequency response; quadrature waveform output	1.8-5.5	1.5	±17 and ±5	DFN8L 3*3*0.75mm	flow meters, rotary encoders
TMR1367	1.2V ultra-low voltage, 200nA ultra-low power	1.2-3.0	0.2	20/16	LGA4L 2*1.5*0.63mm	wake-up switch for battery-powered medical devices
TMR1148/TMR1348	unipolar and omnipolar open-drain with 10Ohm conducting resistance; AECQ100-grade1, MSL1 moisture-sensitivity-level	1.8-5.5	1.5	15/10 and 14/10	SOT23-3	Liquid level sensors
TMR1363/TMR1365	200nA ultra-low power; extending TMR1362 / TMR1366 series with wider sensitivity ranges	1.8-5.5	0.2	30/23 and 45/35	SOT23-3	Flow meters, proximity switches

16949 qualification, MDT reinforces its position as a leading manufacturer of magnetic sensors. The commitment to stringent quality standards aligns with the automotive industry's requirements, instilling confidence in customers regarding the reliability and performance of MDT's products.

MDT's dedication goes beyond product development. The company is fully committed to collaborating closely with customers, ensuring accelerated time-to-market for their projects. By offering an extensive range of magnetic sensing solutions, MDT aims to meet the growing needs of industries relying on these advanced technologies. In conclusion, MDT's recent product releases showcase the company's commitment to pushing

portfolio, and state-of-the-art manufacturing capabilities that can support volume production of high-performance, low-cost AMR and TMR magnetic sensors to satisfy the most demanding application needs.

Led by its core management team of elite experts and veterans in magnetic sensor technology and engineering services, MDT is committed to creating added value for its customers and ensuring their success. For more information about MDT please visit <http://www.multidimensiontech.com>.

MultiDimension Technology Co., Ltd.

<https://en.prnasia.com/>

Products

20 Battery Recycling



ORNL Develops Environmentally Friendly Lithium-Ion Battery Recycling Process

Discarded lithium-ion batteries originating from cell phones, laptops, and the increasing prevalence of electric vehicles are accumulating rapidly. However, viable recycling solutions for these batteries are largely confined to either burning them or chemically dissolving shredded batteries.



Presently, these state-of-the-art methods come with potential environmental implications and are proving to be challenging to implement economically on an industrial scale.

The traditional method for recycling lithium-ion batteries yields only a small portion of the battery materials and heavily depends on corrosive, inorganic acids and hazardous chemicals, potentially introducing impurities into the process. Furthermore, it involves complex procedures for separating and precipitating the crucial metals. Yet, reclaiming metals like cobalt and lithium holds promise for reducing pollution and lessening dependence on foreign sources and constrained supply chains.

Scientists at the Department of Energy's Oak Ridge National Laboratory have made advancements in methods involving the dissolution of batteries in a liquid solution. Their improvements aim to curtail the use of hazardous chemicals within the recycling process.

ORNL researchers have devised a straightforward, effective, and eco-conscious remedy that surpasses prior challenges encountered by earlier methods.

They immerse the used battery in a solution containing organic citric acid, derived naturally from citrus fruits, dissolved in ethylene glycol—an antifreeze agent found in various consumer items such as paint and cosmetics. Citric acid, sourced sustainably, proves significantly safer to manage compared to inorganic acids. This environmentally-friendly solution demonstrates an impressively efficient technique for separating and retrieving metals from the positively-charged electrode, known as the cathode, within the battery.

Quote:

Because the cathode contains the critical materials, it is the most expensive part of any battery, contributing more than 30% of the cost. Our approach could reduce the cost of batteries over time. The research was conducted in ORNL's Battery Manufacturing Facility, the country's largest open-access battery manufacturing

“ Because the cathode contains the critical materials, it is the most expensive part of any battery, contributing more than 30% of the cost. Our approach could reduce the cost of batteries over time. The research was conducted in ORNL’s Battery Manufacturing Facility, the country’s largest open-access battery manufacturing research and development center.

Yaocai Bai, Member, Battery Research Team, ORNL

research and development center.

Yaocai Bai, Member, Battery Research Team, ORNL
Make it look something like this:

Their recycling method successfully extracted close to 100% of the cobalt and lithium from the cathode without introducing any impurities. Additionally, it facilitated a streamlined separation of the metal solution from other residues. Notably, it served a dual purpose by swiftly recovering over 96% of the cobalt within hours, eliminating the customary need to add additional chemicals to manually regulate acid levels—a typically intricate step in the process.

Eradicating the requirement for additional chemicals lowers costs and prevents the generation

of byproducts or secondary wastes.

Traditional methods employing inorganic acids are slower due to the inclusion of water, which imposes limitations on the reaction temperature because of its boiling point.

This study was funded as a project of the Advanced Battery Recycling Consortium, or ReCell, a program of the Vehicle Technologies Office within DOE’s Office of Energy Efficiency and Renewable Energy. Yu, Bai, Belharouak, and scientists Rachid Essehli and Anuj Bisht donated to the research, which used the DOE’s Center for Nanophase Materials Science at ORNL.

<https://www.ornl.gov/>



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The NGM 216S monitor from the RAMSYS™ product line has been developed to continuously measure beta volumetric activity of radioactive gaseous sample.

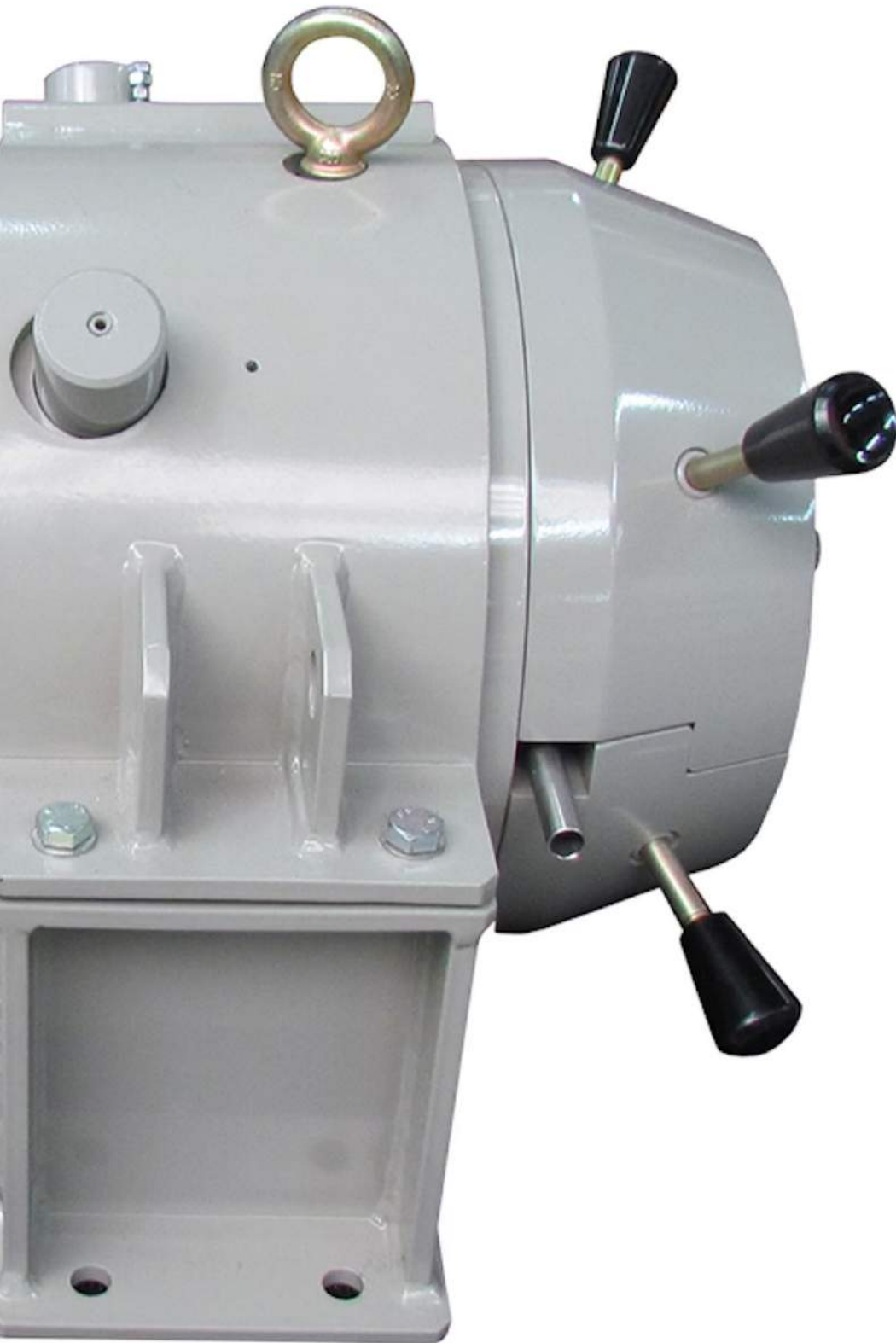
- Compact and reliable
 - Calculation of the total released activity through a stack flow rate signal provided
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energy

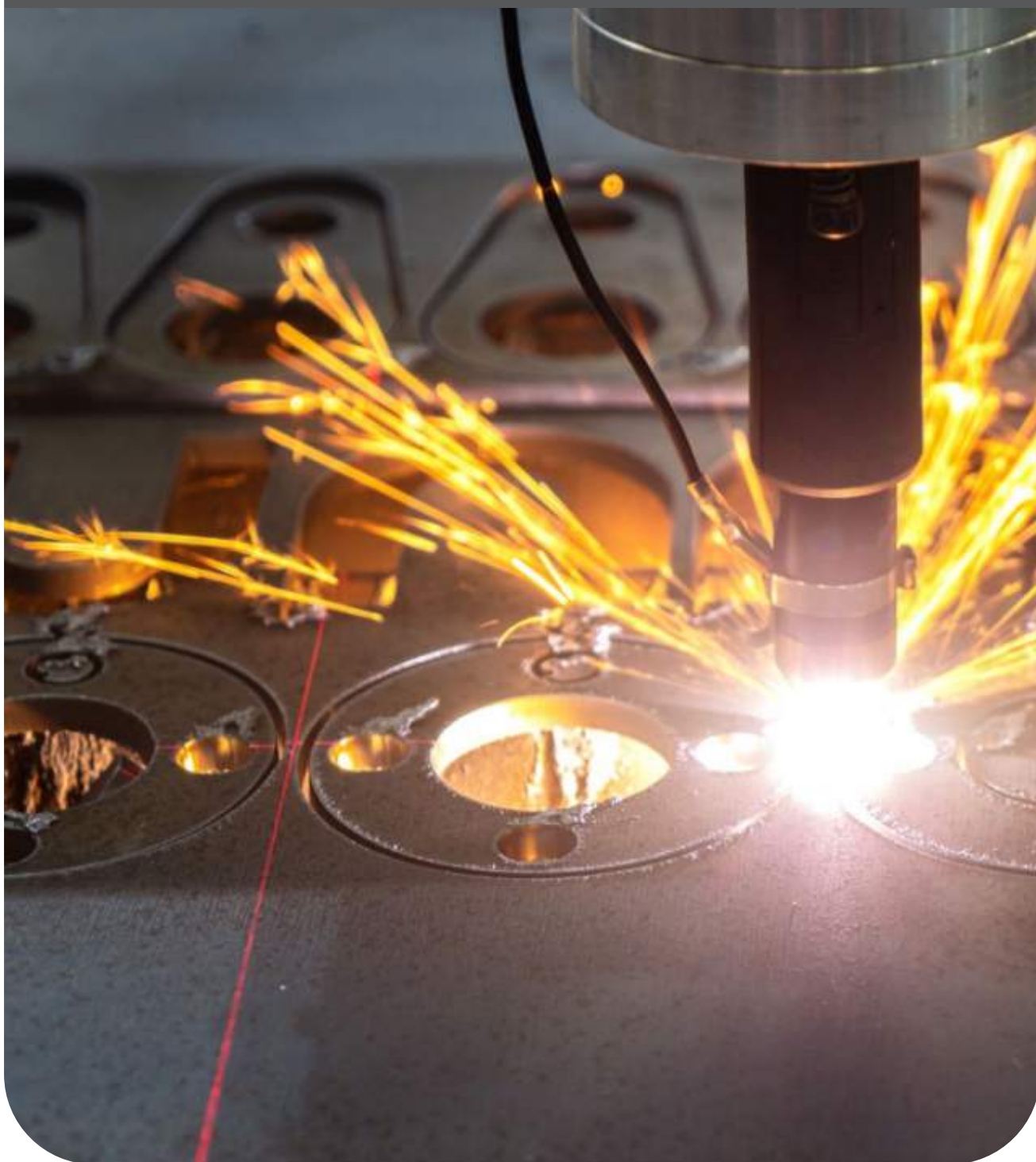
HQ

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Services

26 Heat Processing



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40,069

Total Brand
Readership

84%

of readers are
decision makers
or influence
purchasing
decisions.

16,379

Print Readership
(Multiplier 3.17)

23,690

Digital
Circulation

What is Laser Heat Treatment?



Laser heat treatment selectively modifies the surface of a material, using rapid heating and controlled self-quenching to induce microstructural enhancements while preserving its structural integrity. This article provides an overview of laser heat treatment, how it works, the various across industries, and the future outlook for this rapidly evolving technology.

Laser Heat Treatment: An Overview

Laser heat treatment is a surface engineering technique that uses high-power laser beams to selectively modify metal surfaces' composition, structure, and properties. It is commonly applied to steel and cast iron materials that require enhanced wear, fatigue, and corrosion resistance.

In contrast to conventional heat treating techniques, laser heat treatment offers the unique capability of precisely targeting specific areas for property improvements while preserving the integrity of the underlying material. This pinpoint accuracy results in surface modifications without the risk of warping or cracking, making laser heat treatment a highly precise and versatile method suitable for various parts and products in different industries.

How Does Laser Heat Treatment Work?

The process begins by directing focused laser energy onto the metal's surface, where it is predominantly absorbed. This absorption triggers the excitation of electrons within the metal, resulting in collisions between electrons and the metal's lattice structure. As a result, heat is rapidly transferred from the surface to the interior of the metal, creating a high cooling rate, a critical factor for achieving surface hardening.

What sets laser heat treatment apart is its high power density, meaning a substantial amount of energy is concentrated in a small area, allowing

the treated area to swiftly reach the necessary temperature. After laser heating, most of the workpiece remains at a lower temperature, facilitating controlled self-quenching through heat conduction within the metal.

This induces microstructural changes, such as phase transitions, carbide dissolution, and grain refinement, culminating in a surface layer with enhanced properties, all while preserving the bulk integrity of the component.

Primary Laser Heat Treatment Processes

Laser heat treatment technology is employed in the following three different methods:

Transformation Hardening

Laser transformation hardening is the most common laser heat treatment process that uses high-power lasers to rapidly heat a shallow surface layer of ferrous alloys past the austenitizing temperature. This erases microstructural banding and diffuses carbon, producing a uniform martensitic or bainitic structure. The depth of hardening is controlled by laser power and interaction time.

This method improves extreme hardness while minimizing distortion, benefiting components like engine parts, cutting tools, dies, and bearings with significantly extended lifespans.

Laser Annealing

Laser annealing uses lower-power lasers to heat metals enough to relieve stresses, restore ductility, and remove the effects of cold working - all without melting. Although less common than transformation hardening, laser annealing finds applications in improving the fatigue strength of wires for steel-belted radial tires and for repairing cast aluminum housings with misplaced holes.

Laser Surface Melting

Laser surface melting involves using a high-power laser to melt a thin layer of metal on the surface, which subsequently self-quenches. This process refines the microstructure and composition of the surface. It can also homogenize alloys and dissolve harmful inclusions, improving corrosion resistance in aluminum, nickel, and bronze ship propellers.

Although melting may initially induce roughness, the enhanced properties often justify additional smoothing steps. For example, remelting the lobes of cast iron camshafts creates a uniform, wear-resistant martensitic case.

Industrial Applications of Laser Heat Treatment

Laser heat treatment is now widely embraced in industries demanding high wear resistance.

Laser Heat Treatment in the Automobile Industry

In the automobile industry, laser heat treatment is applied to key engine components, including cylinder blocks, liners, and crankshafts. For example, General Motors uses high-power CO₂ lasers to partially harden the inner surface of the commutator shell, leading to a significant four-fold increase in work efficiency, with a daily production output of 30,000 sets.

Laser Heat Treatment in Locomotive Manufacturing

Laser heat treatment is being increasingly adopted in the large locomotive manufacturing industry to enhance the durability of locomotives. It involves treating critical components like crankshafts, cylinder liners, and main springs of locomotive diesel engines. In addition to manufacturing, laser heat treatment of mold surfaces is gaining recognition in the complex, high-precision mold manufacturing process used in locomotive production. This technique

can double the lifespan of molds without being constrained by shape or size.

Laser Heat Treatment in the Steel Industry

Laser heat treatment in the steel industry offers versatile hardening options for wear-resistant steel parts like stamping dies. It helps achieve surface hardness levels exceeding 60 HRC for cast iron and 70 HRC for medium and high carbon steel. This enhances wear, fatigue, corrosion, and oxidation resistance without inducing brittleness.

The Future of Laser Heat Treatment

Ongoing advancements in laser technology, such as high-power lasers, robotic automation, and innovative hybrid processes, will enable faster and more flexible laser heat treatment. Industry 4.0 connectivity and data analytics will optimize laser systems, while specialized alloys tailored for laser treatment will improve material performance. This transformative manufacturing process is expected to see wider adoption across industries, contributing to the manufacturing of high-performance products.

Owais Ali

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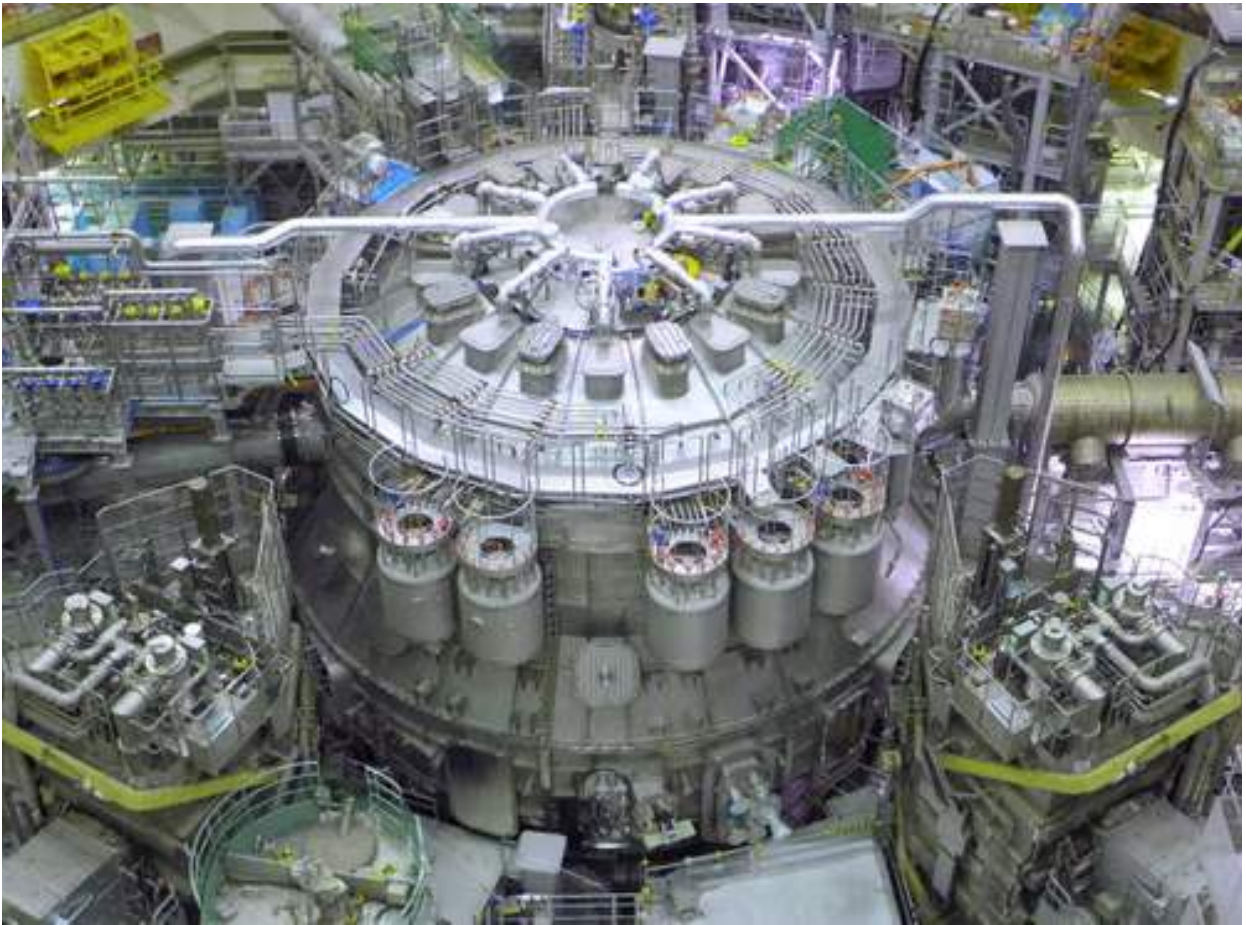
Cover Story

29 Nuclear Fusion Reactors



World's Biggest Experimental Nuclear Fusion Reactor Launched In Japan

Joint project with EU involves more than 500 scientists and engineers and more than 70 companies



The JT-60SA in Naka aims to harness nuclear fusion, the same process that powers the sun. Photograph: National Institutes for Quantum Science and Technology (QST)/AFP/Getty Images

In a momentous stride towards a sustainable energy future, Japan has officially inaugurated the world's most extensive operational experimental nuclear fusion reactor in Naka, situated north of Tokyo. The JT-60SA reactor, a collaborative endeavor between the European Union and Japan, signifies a transformative breakthrough in the pursuit of a clean, secure, and abundant energy source. Standing six stories tall within a hangar, this state-of-the-art machine boasts a doughnut-shaped «tokamak» vessel engineered to contain swirling plasma heated to a staggering 200 million degrees Celsius.

Diverging from the conventional nuclear power plants reliant on fission, fusion represents a paradigm shift, involving the fusion of two atomic nuclei instead of splitting one. The primary objective of the JT-60SA reactor is to probe the feasibility of fusion as a large-scale, carbon-free, and secure source of net energy—generating more energy than is invested in the production process. This cutting-edge technology holds the promise of addressing humanity's future energy needs in a sustainable manner, potentially mitigating the impact of climate change and reducing reliance on fossil fuels.

The JT-60SA stands as a precursor to the ambitious International Thermonuclear Experimental Reactor (ITER), currently under construction in France. Both projects share the ultimate goal of inducing hydrogen nuclei to fuse into a heavier element, helium, thereby releasing energy in the form of light and heat. This emulation of the natural process occurring within the sun holds the potential for a revolutionary breakthrough in clean energy production.

Sam Davis, the deputy project leader for the JT-60SA, expressed profound optimism about the device's potential impact, noting that it would «bring us closer to fusion energy.» This collaborative effort engaged over 500 scientists and engineers from Europe and Japan, alongside the participation of more than 70 companies. The recent inauguration ceremony marked a significant milestone in the timeline of fusion research, symbolizing the culmination of years of dedicated work and collaboration.

EU Energy Commissioner Kadri Simson lauded the JT-60SA as «the most advanced tokamak in the world» and celebrated the commencement of operations as «a milestone for fusion history.» Simson emphasized the potential role of fusion in the energy mix of the latter half of the century, envisioning its substantial contribution to a cleaner and more sustainable future.

Nuclear fusion's holy grail lies in achieving «net energy gain,» a milestone purportedly accomplished at the National Ignition Facility at Lawrence Livermore National Laboratory in the US in December of the preceding year. This facility, housing the world's most powerful laser, employs a distinct method called inertial confinement fusion. Here, high-energy lasers are directed simultaneously into a thimble-sized cylinder containing hydrogen, marking a groundbreaking

achievement in the relentless pursuit of unlimited, clean power.

While ITER, the esteemed sibling of JT-60SA, has encountered challenges such as budget overruns, delays, and technical obstacles, researchers remain steadfast in their optimism about its potential to achieve net energy. Proponents of fusion argue that, in stark contrast to fission, fusion poses no risk of catastrophic nuclear accidents, such as the Fukushima disaster in 2011. Moreover, fusion produces significantly less radioactive waste than current nuclear power plants, addressing pressing concerns related to environmental impact and long-term storage.

The successful initiation of the JT-60SA reactor symbolizes a new era in the global quest for fusion energy. As nations collaborate and invest in research and development, the dream of harnessing the power of the sun on Earth inches closer to reality. The potential benefits of nuclear fusion—clean energy, reduced environmental impact, and minimized geopolitical challenges associated with fossil fuels—underscore its significance as a transformative technology poised to shape the future of energy production for generations to come. In embracing the fusion revolution, humanity stands on the precipice of a cleaner, brighter, and more sustainable energy future.

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

Technology

32 Green Hydrogen Energy



GCC Countries Work To Lead the Green Hydrogen Economy



With abundant low-cost solar energy, Gulf nations are well-placed to produce and export green hydrogen and help limit global warming. The UAE, Qatar, Saudi Arabia and Oman all aim to become part of the green hydrogen supply chain.

Countries around the Arabian Gulf have been working to become part of the green hydrogen supply chain, that is, hydrogen produced using renewable electricity, which aims to lower greenhouse gas emissions and limit global warming.

The United Arab Emirates, for example, has established the Dubai Hydrogen Alliance to

accelerate its transition to a green economy and support the Hydrogen Council's global initiatives.

Qatar has signed several memorandums of understanding with Asian countries to explore hydrogen cooperation and investment opportunities.

Saudi Arabia has set a target of producing 2.9 million tons of hydrogen per year by 2030 and 4 million tons per year before 2035.

In a report titled "Renewable Hydrogen from Oman: A Producer Economy in Transition," the International Energy Agency said, "Oman's high-quality renewable energy resources and vast tracts of available land make it well-placed to produce

large quantities of low-emissions hydrogen, a fledgling industry today that can attract investment to diversify and expand the country's export revenues."

The main markets for green hydrogen exports from the GCC are Asian and European markets.

"The expectations are high, especially within Europe, as Oman is seen as a major potential source not only for green hydrogen but also for green ammonia," Cyril Widdershoven, an analyst at Hilltower Resource Advisers, told The Media Line.

"The IEA states that according to the official strategy of Oman, which is to produce around 1 million tons per year of hydrogen by 2030, 3.75 million tons by 2040, and 8.5 million tons per year in 2050, it could be a major source," he said.

The Dutch port of Rotterdam has targeted 3 million to 4 million tons of hydrogen by 2030, which is not expected to be reached.

Therefore, Europe is looking to the GCC for green hydrogen. Oman is in a good position, as it does not need to send exports via the Strait of Hormuz, has the available land, is stable, and has good relations with Europe.

"For the rest of the GCC, the Omani approach is no threat at all," Widdershoven said. He added that it could even be seen "as another major opportunity" for companies to join in integrating Oman's overall regional hydrogen strategy and pushing for major investments into Oman from the other Arab countries.

However, care needs to be taken so that an increase in world demand for green hydrogen from the GCC does not create a shortage in the producing countries, Dr. Aseel A. Takshe, an associate professor in the Communications, Arts and Sciences Faculty at the Canadian University Dubai, told The Media Line.

"There needs to be a national or GCC Regional Hydrogen Strategy where countries in the region get to identify the amounts they plan to produce,

the amount and type of support needed, and even a framework for private entities to invest in green hydrogen," she said.

"Overall, there is a need for a strong and tight master plan in order for all the steps to fall into place at the right time."

The GCC already has an existing infrastructure for port logistics and methanol and ammonia plants and industries, which will be beneficial in the transition into a green fuel hub.

According to a PricewaterhouseCoopers report, over the next three to five years, the GCC countries must focus on "areas such as developing a national strategy, establishing the business case, launching pilot projects, and creating a supportive policy, regulatory, and investment framework," to gain advantages in all stages of green energy production. Other analysts say the GCC countries must also create consumer awareness about hydrogen products.

"The movement toward hydrogen-based energy allows the GCC to play a significant role in an emerging industry. Green hydrogen will become vital in a carbon-free future, and the GCC is well-positioned to enter the market due to its plentiful solar energy," Dr. Umud Shokri, a Washington-based senior energy analyst, wrote in an article published by the Emirates Policy Center.

"However, the problem lies in transportation, as moving green hydrogen to East Asia and Europe is costly. Therefore, capturing the market must be done through the supply chain. GCC producers should look at producing green ammonia from green hydrogen. This ammonia could then extract the hydrogen on arrival at the export location."

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Country Reports

36 China

37 Qatar

38 USA



constructionHQ



Arab League participates in Arab-Chinese energy cooperation conference



Foreign Ministers of Arab League Countries during an emergency meeting of the Arab League Council, requested by Egypt and Jordan, in Cairo.

The Arab League recently played an active role in the Arab-Chinese Cooperation Conference on Energy. The event took place from September 19-21, 2023, under the theme «Launching a Golden Age of Arab-Chinese Energy Cooperation: Committing to Quality and Sustainability.»

A delegation from the Arab League's General Secretariat, led by Ambassador Ali Ibrahim Al-Maliki, assistant secretary-general and head of Economic Affairs, took part in this significant event which came as part of the Arab-Chinese Cooperation Forum. This year marked the seventh edition of the conference.

The Ministerial Council's Secretariat for Electricity was responsible for organizing and preparing for this iteration, in coordination with various Arab institutions that operate in the energy and electricity sectors. Their aim was to reinforce Arab participation in the conference.

Al-Maliki underscored the need to continue building upon the successes achieved in Arab-Chinese collaboration. He lauded the forum as one of the most significant platforms for Arab cooperation with global nations and blocs.

The ambassador also highlighted both parties' ambition to form a robust partnership, filled with potential to shape the future trajectory of the energy sector.

The Arab League and its member states remain committed to paving the way for more investment opportunities between the Arabs and the Chinese

in various energy-related fields.

Conference participants deliberated on investment opportunities and potential challenges facing both the Arab countries and China in energy sectors. They also discussed potential collaboration in this vital sector.

Mutual views on future bilateral cooperation in areas like oil, natural gas, electrical energy storage, renewable energy, hydrogen, and peaceful applications of nuclear energy were also exchanged. Director of the Energy Department at the Arab League Jameela Matar emphasized the significance of close collaboration between the Arab League, its member states, and China at various levels. This cooperation aims to bolster the exchange of knowledge and expertise in the energy sector.

Matar also stressed the importance of amplifying participation in the Arab-Chinese Cooperation Conference on Energy, with a nod to the concerted efforts exerted so far. She revealed that the eighth edition of the conference will be hosted by one of the Arab countries and praised the positive outcomes of this year's conference.

The seventh conference concluded with a final statement highlighting the discussions and outcomes shared between participants, speakers, and attendees this year.

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

The Virtue Of Green Choice For Qatar



Qatar aims to boost LNG production by 63% by 2027 and reduce greenhouse gas emissions by 25% by 2030, potentially establishing a dual role as a gas exporter and green-energy powerhouse, despite previous attempts at diversification.

Qatar's ambitious development has been driven by its gas reserves since 1972, making it a wealthy and ambitious state. The country's budget surplus of \$24 billion last year, likely to increase due to the Ukraine-Russia Crisis, could be used to build electric grids capable of transitioning to clean energy. This would spread the cost of climate change, ensuring a hydrocarbon-free economy, fewer emissions, and lowering the risk of flooding and extreme heat. Qatar could power its growth using renewable grids, replacing those powered by hydrocarbons. Additionally, Qatar's high solar potential could be utilized to develop solar energy projects, creating thousands of megawatts of solar generation capacity.

As the country expands its domestic production capacity by \$30 billion to swell further gas revenues, pumping these surpluses into renewable grids would elevate Qatar to a much higher level of success toward reaching NetZero emissions. This necessitates a pledge to invest continuously in green development projects that can reduce emissions and spur carbon-free economic growth. Such an aim can be achieved

via proper carbon pricing and international emissions trading to persuade the private sector to join forces for Qatar's decarbonizing efforts. Government aids and loans can follow with green strings to incentivize the private sector to contribute to cutting emissions and converting hydrocarbon-powered consumption to a green one.

Qatar's gas production expansion could lead to a virtuous cycle of hydrocarbon proceeds and clean-economy growth, boosting its competitiveness in the non-hydrocarbon economy. This could lead to increased investment and trade, improving living standards and boosting prosperity for its population. The gas bonanza could finance essential infrastructure and desalination projects, helping Qatar's cities stay habitable amid rising temperatures. Qatar's revenues can be used to fund social spending, schools, healthcare, and public services, while directing the remaining budget towards green economy projects. These projects could bring Qatar closer to COP national climate targets and shield it from regional and global crises. By acting now, Qatar can avoid the tradeoff between climate and development, focusing on a diversified economy aimed at lowering environmental risks and building infrastructure for social and environmental sustainability.

Dr. Yassine Talaoui
<https://thepeninsulaqatar.com/>

New Map Shows Where Clean Energy Investments are Being Made in USA



The Department of Energy is putting new clean energy investments on display through a new interactive map detailing where these investments are occurring across the United States.

The map is intended to be a resource for tracking the industrialized revitalization and transition to clean energy. The U.S. is currently seeing billions of dollars invested in clean energy thanks in part to the Biden administration’s Investing in America agenda. In addition, the Inflation Reduction Act created new incentives and programs for renewable energy, driving more projects and investments.

According to the DOE, 450 facilities have made or planned more than \$160 billion in investments across the private and public sectors into solar; electric vehicle assembly, components, and chargers; battery; and offshore wind manufacturing. That includes more than 500 planned investments.

“President Biden’s Investing in America agenda has sparked a clean energy boom in every corner of America, bringing with it good-paying, union jobs and new economic opportunity,” John Podesta, senior advisor to the president for clean energy innovation and implementation, said in a statement. “This new interactive map from the Department of Energy is a great resource for

understanding the widespread and important impact this boom is having on communities all across our nation.”

California leads the nation with 52 new clean energy investments, over \$5 billion. Michigan, Georgia, New York, Texas, North Carolina, Tennessee, and Ohio also have billions of investments and over 20 clean energy manufacturing projects.

The DOE noted that many of the plans don’t yet have dollar amounts attached to them, meaning the investment dollars are likely to “significantly” grow over time.

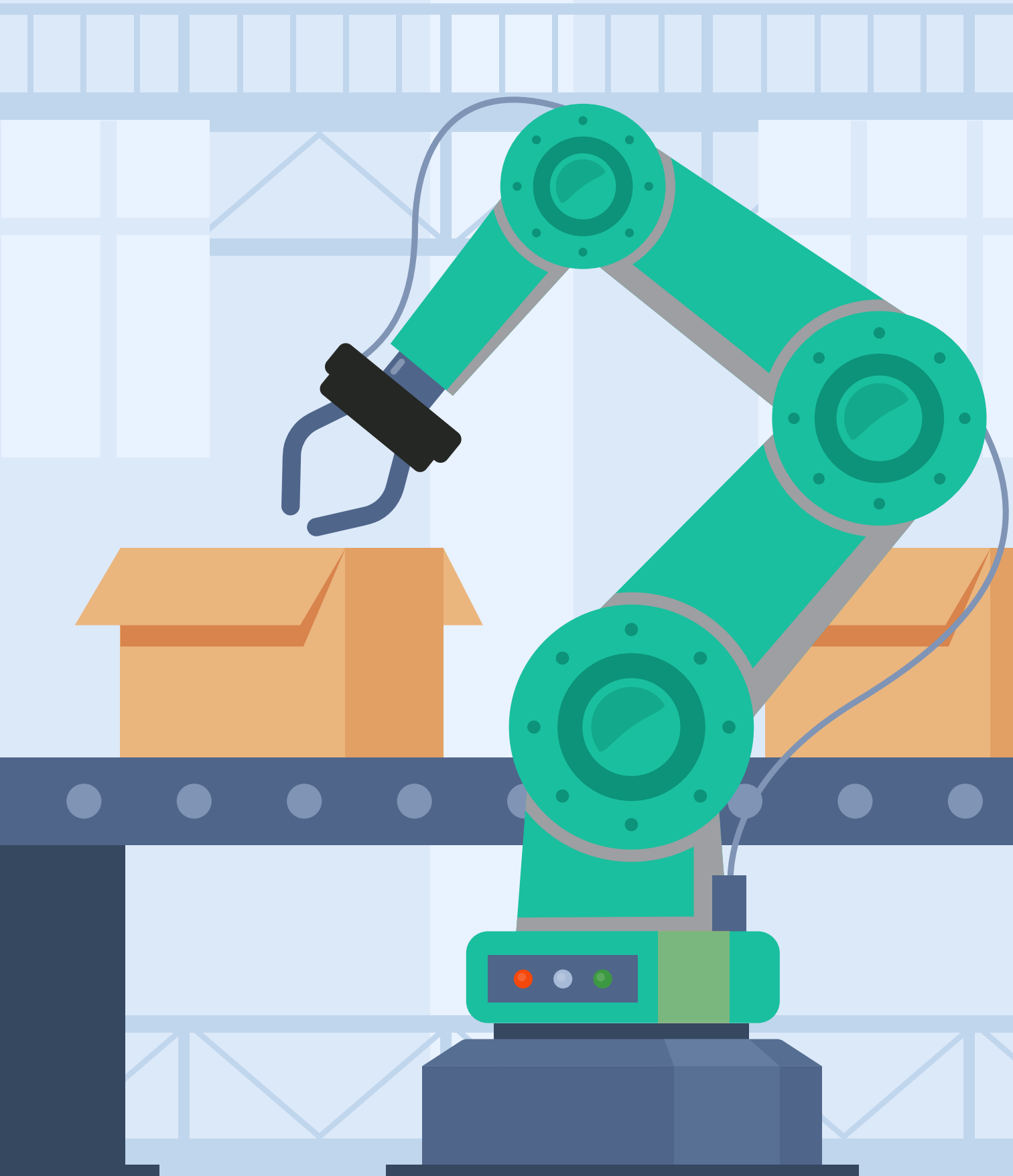
Despite all the investments targeting clean energy in the United States, one analysis recently revealed the country will still only see 25% of its power generated by renewables by 2050. The total representation of renewable energy will jump from 13% of all energy generated in the U.S. in 2022 to just 25% by 2050, according to a report from The Motley Fool.

Compared to neighboring Canada, that’s not a very high figure. Canada’s power grid is already 84% powered by non-emitting sources like hydro, nuclear, and wind. Plus, the country has plans to decarbonize the rest of its energy grid by 2050.

By: Amy Baxter

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

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Services

41 Buyer's Guide

42 Coming Events



health HQ

Nurturing Healthier world!

Vitamins and minerals make up essential parts of your diet



Vitamins and minerals work together to support the cellular metabolism



Vitamins and minerals also offer health benefits because of their ability to maintain tissue strength



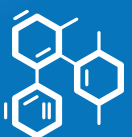
Each vitamin and mineral has its own set of physiological functions in your body



There are a total of 13 vitamins that are divided into two categories based on how your body absorbs them.



Vitamin A, K and E are stored in your liver and vitamin D is stored in your fat and muscle tissues.



Coming Events

7th Caribbean Infrastructure Forum

RITZ-CARLTON COCONUT GROVE, MIAMI FLORIDA
18 - 19 Sep 2023

<https://newenergyevents.com/>

At CARIF 2023, we will present and explore a multi-sectoral view of the opportunities to invest in and develop resilient and sustainable infrastructure. What are the infrastructure priorities of island governments and are they being effectively implemented? Is there sufficient incentive and access for private sector sponsors and financiers to support the project pipeline?

Energy, Fuels and Decarbonisation Expo (EFD)

Birmingham, UK
13 - 14 Sep 2023

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

EFD's two-day trade show will cover energy from secondary materials, technologies, energy management and decarbonisation....

European Battery Raw Materials 2023

Amsterdam, Netherlands
18 - 20 Sept 2023

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

Fastmarkets European Battery Raw Materials Conference gives you a front-row seat to access insights and analysis of the battery raw materials market from the leaders and innovators shaping the industry.

Accelerating the transition to a better energy future

P&J Live, Aberdeen, Scotland
05 - 08 Sep 2023

<https://www.offshore-europe.co.uk/>

SPE Offshore Europe is the energy industry's platform for navigating towards a better energy future. Our 50th anniversary event will create a space for collaboration and learning in order to drive the oil and gas sector forward, bringing together the entire energy value chain back to business, face to face.

Women in Hydrogen: Scaling up Clean Energy

United States, FTI Consulting 1166 6th Avenue 15th Floor New York, NY 10036
18 Sept 2023 4:00 pm - 6:00 pm

<https://www.energypolicy.columbia.edu/>

The momentum for clean hydrogen has never been greater. With a landmark U.S. national strategy, policy and funding support in place, what's needed next to ensure the technology's potential is fully realized and meaningful climate, economic and community benefits are delivered?

World Hydropower Congress

Bali
31 Oct - 02 Nov 2023

<https://10times.com/>

The World Hydropower Congress gathers top leaders, innovators, and decision-makers for a virtual summit to prioritize hydropower development. Speakers will emphasize the importance of investing in sustainable...

Minnesota Sustainability Tour

Minnesota (In person & virtual)
07 - 08 Oct 2023

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

The Minnesota Sustainability Tour, hosted by Minnesota Renewable Energy Society, showcases homes and businesses that feature solar installations, energy storage solutions, water-saving landscapes and much more.

Tanzania Energy Congress

Dar es Salaam, Tanzania
20 - 21 Sept 2023

<https://africa-eu-energy-partnership.org/>

The Tanzania Energy Congress, which is held under the patronage of His Excellency January Makamba, Minister for Energy of the United Republic of Tanzania, will highlight the plans and priorities of the Ministry of Energy with regards to the next strategic steps in both the energy and hydrocarbons sector in Tanzania

General Queries & Contact Info

Launched in 2023, **energyHQ** has rapidly transformed from a B2B publication into a dynamic energy industry platform. Our comprehensive multimedia outlets—magazine, website, services, events, reports, newsletters, and online presence—cater to a global audience. Actively participating in key energy events worldwide, we offer partners unmatched exposure at exhibitions, tradeshow, and conferences. Join energyHQ as we illuminate the path forward in the evolving energy landscape!

Media Kit 2023

Everything about energyHQ ~ Here!

https://www.energyhq.world/energyHQ_Media%20Kit_2023.pdf

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<https://www.energyhq.world/GPO%20-%20Copy.html>

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Physical copies of energyHQ magazine issues can be received monthly by subscription. For more details, please contact Ms. Taghreed Mahdi (Administrative & Data Officer) via phone: +961-1-748333 x or email: subscriptions@energyHQ.world

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Reprints of energyHQ magazine issue(s) are available for a minimum order of 10 copies. Customization options are available for establishments at a minimum order of 100 copies. For more details or to receive a quotation, please contact Ms. Taghreed Mahdi (Administrative & Data Officer) via phone: +961-1-748333 x or email: info@energyHQ.world

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To receive a Customized Promotional Offer (CPO) or for all your advertising & promotional queries, please contact Mr. Ahmad Idriss, Marketing & Sales Officer, via phone: +961-1-748333 or email: marketing@energyHQ.world

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To submit your content / editorial material (for possible publishing – priority publishing of editorial material is provided to our promotional partners), or for all your content & editorial inquiries, please contact Mr. Hassan Mourtada, Content & Research Officer, via phone: +961-1-748333 or email: content@energyHQ.world

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Energy Efficiency Could Offer Major Climate Wins. But What Is It?



What if the world could quickly slash climate-warming emissions, without having to build so much new renewable energy capacity?

That's exactly what some experts say needs to happen, by improving the efficiency of appliances and electricity grids through efforts like plugging leaks and stopping so-called «vampire loads» from devices that pull power from wall sockets even when switched off.

By lowering the amount of power needed to perform the same tasks, the world could burn fewer fossil fuels and spend less on expanding solar or wind capacity.

At least 118 countries at the COP28 climate summit in Dubai have backed a pledge to improve energy efficiency rates by 4% each year until 2030. That would be a doubling of the 2% improvement in efficiency rates seen in 2022.

How Can Energy Become More Efficient?

The International Energy Agency (IEA) has called efficiency the «first fuel» of the energy transition and one of the fastest and most cost-effective ways to cut greenhouse gas emissions. In its simplest form, energy efficiency can simply mean using appliances, technology, or electronics that are designed to consume less energy, such as heat pumps or LED lighting. At a larger scale, buildings can be designed with better insulation to lessen the need for air conditioning or heating. Factories or cities can improve wiring to get rid of leakages. As more industries including transport seek to power up from the electric grid, rather than through burning fossil fuels, demands on the grid will rise steeply.

How Much Energy And Money Can Be Saved?

Doubling the global average efficiency rate could provide half of all necessary emissions reductions in 2030, according to the IEA's Net Zero Roadmap. For the European Union and Britain, it would mean an overall reduction in CO₂ emissions of 40 million metric tonnes each year by 2030. That translates to annual cost savings of about 10.5 billion euros (\$11.43 billion), Danfoss estimated in a November 2023 white paper. Industries worldwide could save \$437 billion per year by 2030 with improved energy efficiency, according to an October 2023 industry collective report by the Energy Efficiency Movement.

What Offers The Biggest Energy Savings?

Switching to electric vehicles or heat pumps can offer significant energy savings if plugging into grids that increasingly draw on renewable power sources. Electric vehicles also waste less of their energy reserve than combustion-engine vehicles powered by gasoline.

The U.S. Department of Energy estimates that EVs currently use 77% of their battery energy for power at the wheels. Gasoline vehicles can only harness about 12% to 30% of the energy from gas in their tanks.

Heat pumps can be up to five times more efficient than gas boilers, the IEA says. In developing countries, including India and parts of Africa, the same logic applies to shifting to electric cookstoves instead of burning cow dung or firewood to cook.

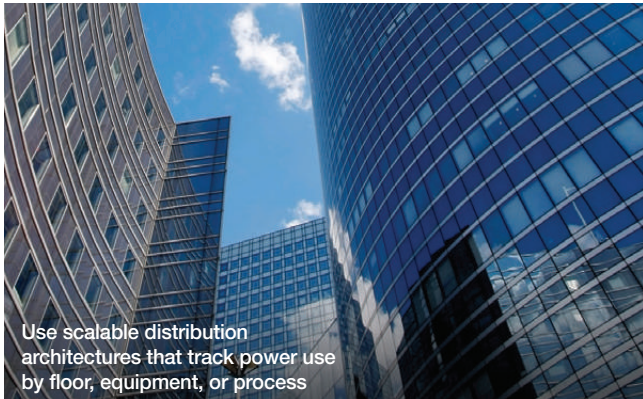
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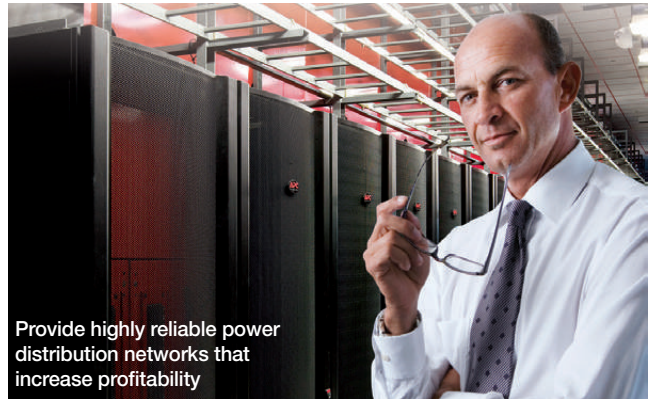
Create a safer, more efficient, more productive facility



Exact efficiency measures that enhance productivity and business goals



Use scalable distribution architectures that track power use by floor, equipment, or process



Provide highly reliable power distribution networks that increase profitability

Even the best run enterprise can improve power reliability and find new energy savings

Introducing integrated solutions for end-to-end monitoring, control, and analysis of your entire power distribution system

Manage the delicate balance between efficiency and productivity

Business runs on electricity. It's not as simple as it sounds. Power-sensitive processes require high availability and reliability, but this can raise costs and jeopardise profits. Unplanned outages, emissions regulations, and energy price volatility add more complexity. Solutions must unite the entire enterprise and solve the energy challenge.

PowerStruxure exceeds traditional power management

Building on our years of innovation in electrical distribution, PowerStruxure™ is an advanced family of integrated solutions that allow you to monitor, analyse, and control your entire power distribution network and act quickly to make effective decisions. As part of our EcoStruxure™ offer that delivers optimised systems across your enterprise to bring up to 30% energy savings, PowerStruxure brings clarity to your power networks to help you improve reliability and save money.

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PowerStruxure

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Every solution is tested and approved by certified internal labs and documented by our technical experts.

Leading power monitoring and control software

Our StruxureWare™ suite includes power management systems designed to stay on top of real-time conditions and control loads.



Communication devices and protocols

At the heart of your solution, devices and protocols link the software with your power network hardware.



World-class hardware

A wide range of products including intelligent metering devices, switchgear, circuit breakers, protection relays, power factor correction equipment.



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