

energy

HQ

energy HQ.world
October 2023
Vol. I
Issue 10



Openai Demos A Control Method For Superintelligent AI

p.29

Renewable Energy

World's Largest Floating Solar Power Plant Taking Shape On Hydropower Plant

p.08

Oil & Gas

PGS and TGS Move Closer to Combining Into One Energy Data Company

p. 12

Nuclear

Four Ways Heat Pumps Can Assist The World's Energy Transition

p. 14

Energy Saving Solution

Stainless Steel

NSF.

50 years
Experience!

Submersible Motors for Deepwell Pumps

Proven Reliability
Quality Construction
Excellent Performance
Friendliness



Electric Motor

Single Phase motor
High Efficiency
Low Vibration

3 Phase motor
High Performance
High Efficiency
Small Size
Light Weight
IE1, IE2 and IE3 available

Powerful Inverter

High Starting Torque
Network Compatibility
Environmental Friendliness

Easy
Operation



Hitachi Ltd., Middle East Branch

301 Al Gurg Tower 1, Baniyas Road, Deira
P.O. Box: 5561, Dubai, U.A.E.
Tel: +971 (4) 228 3617 Fax: +971 (4) 221 1783
Contact Person: Ghanem Hamed – General Manager
Email: inquiry.mena.da@hitachi.com

Hitachi Asia Ltd.

30 Pioneer Crescent, #10-15 West Park Bizcentral
Singapore 628560
Tel: +65 6304 7426 Fax: +65 305 7401
Contact Person: James Fong
Email: jfong@has.hitachi.com.sg
URL: <http://www.hitachi.com.sg/ice>

Hitachi Industrial Equipment Systems Co.,Ltd.

<http://www.hitachi-ies.co.jp/english/>

AKS Bldg.,3,Kanda Neribei-cho, Chiyoda-ku, Tokyo, 101-0022 Japan International Sales Dept (SX Dept)
Tel: +81 3 4345 6527 Fax: +81 3 4345 6914 Email: kondoh-shimpei@hitachi-ies.co.jp

The AI Symphony: Where Solar Panels, Lubricants, and Efficiency Dance



In the ever-shifting waltz of industrial innovation, three unlikely partners have taken to the floor, their synchronized movements promising a breathtaking performance of efficiency and sustainability. Solar panels, once content to bask on rooftops, now grace factory landscapes, their radiant energy feeding the hungry maw of intelligent machines. Data, once siloed in dusty databases, leaps into the digital fray, analyzed by AI conductors who orchestrate the flow of power with pinpoint precision. And finally, lubricants, the silent heroes of industry, shed their mundane cloak, empowered by super-intelligent algorithms to become alchemists of frictionless motion. This is not a futuristic fantasy; it's the rising crescendo of the AI symphony, a melody of cost savings, environmental harmony, and operational excellence.

Solar panels, no longer confined to rooftop serenades, now belt out their clean, renewable energy on dedicated industrial stages. These sun-kissed powerhouses slash dependence on volatile grids and fossil fuels, transforming energy bills from villainous monologues to soothing background hums. But simply generating solar energy is not enough. To truly capture its brilliance, we need the keen ear of AI-powered data analytics. These digital sleuths sift through mountains of data, unearthing hidden patterns and optimizing energy consumption. Imagine AI whispering insights, suggesting production schedule adjustments based on peak solar output, or even prompting maintenance interventions before breakdowns steal the show.

But the orchestra needs more than just clean power and insightful analysis. Enter lubricants, the unsung tenors of industrial efficiency. Friction, the silent thief, robs energy and productivity, its discordant notes marring the harmony. But super-intelligent AI is composing a new score. By analyzing machine data and operating conditions, AI tailors lubricants to each instrument, transforming them from mere grease into friction-fighting virtuosos. The result? Equipment sings at its peak, downtime becomes a forgotten melody, and cost savings dance across the balance sheet.

The conductor of this AI symphony? It's the super-intelligent mind itself. Analyzing real-time energy demands, predicting future needs, and adjusting operations in real-time, it ensures a harmonious performance. Imagine AI seamlessly switching to solar power when available, prioritizing energy-intensive tasks during peak sunshine, and even suggesting lubricant changes to keep the machinery humming.

The benefits of this AI-powered convergence are a chorus of sweet notes:

- Reduced energy costs: Solar power and AI-driven optimization turn energy bills from a harsh solo into a gentle duet with profitability.
- Improved equipment performance: AI's insights into machine health and energy usage keep equipment singing, minimizing downtime and maximizing productivity.
- Enhanced sustainability: By embracing clean energy and optimizing resource utilization, businesses become environmental heroes, harmonizing with the planet.
- Increased operational efficiency: AI automates tasks, streamlines processes, and makes informed decisions, leading to a symphony of efficiency and cost reduction.

This AI symphony is still in its early movements, but its crescendo promises a transformative future. Businesses that embrace this convergence will be the first chairs in the new industrial orchestra, their efficiency and sustainability a testament to the power of AI's harmonious score.

In This Issue!

energyHQ's October 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 Energy Data.
- Article on page 17 focuses on Generators.
- Article on page 29 sheds the light on Superintelligent AI.

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

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

Best wishes,
Hassan Mourtada
Editor-in-Chief / Content & Research Officer.
h.mourtada@1world.xyz

Issue Contents

Introduction

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



Renewable Energy

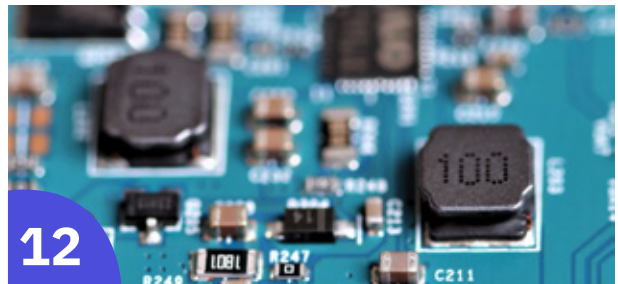
Solar Panels

- 08 World's Largest Floating Solar Power Plant Taking Shape On Hydropower Plant

Oil & Gas

Energy Data

- 12 PGS and TGS Move Closer to Combining Into One Energy Data Company



Nuclear

Pumps

- 14 Four Ways Heat Pumps Can Assist The World's Energy Transition

Electric

Generators

- 17 Hitachi Energy Unveils New Emission-Free Alternative To Diesel- Powered Generators



Issue Contents

Products

Lubricants

- 20 **The Unsung Heroes of Energy: Lubricants Powering Efficiency and Sustainability**



Services

Mechanical Power

- 26 **Import of Mechanical Power Transmission Equipment in May 2023 Increases to \$262M in the United States**

Cover Story

Superintelligent AI

- 29 **Openai Demos A Control Method For Superintelligent Ai**



Technology

Digitalization in Energy

- 32 **Digitalization's Impact on the Electricity Sector**

Country Reports

Germany, Turkey, AUE

- 36 **German Power Mix May Get Dirtier For 1st Non-Nuclear Winter**
- 37 **Türkiye To Invest \$200 Billion In Energy Until 2035**
- 38 **UAE Pioneers Responsible And Sustainable Energy Sector Transformation**



Services

- 41 **Buyer's Guide**
- 42 **Coming Events**

Info

- 43 **General Info**
- 44 **Closing Letter**

World Energy Digest



USA

Renewable Energy

Renewable energy is the world's fastest growing energy source and essential to getting the world to net zero.

Rapidly growing our renewables business is core to our strategy: by 2030, we aim to have developed around 50GW of net renewable generating capacity globally, up from 3.3GW in 2021. And it takes well-designed policy at the federal and state levels to get there.

Wind energy

bp's large and growing US wind energy business provides clean power, while developing and deploying new technologies to deliver that energy more efficiently.

With more than 10 years' experience in onshore wind energy in the US, we're now building our offshore wind business, leveraging our technical capability and partnering with others to deliver major wind projects offshore.

The Empire and Beacon Wind projects through our partnership with Equinor will generate up to 4.4 GW when fully developed – that's enough electricity to power more than 2 million homes.

And with the finalization of Purchase Sale Agreements with New York state and plans to develop an offshore wind hub, our projects are set to support thousands of jobs in the region.

It will take smart policies – like those that expand US transmission infrastructure and clarify siting and permitting – to accelerate US wind growth. We're engaging with federal and local stakeholders to make this happen.

China



China's 'involved' New-Energy Industry Is Awash With Overcapacity That Could Stall New Economic Driver

In the year since in-person trade fairs and expos resumed in China following its lifting of pandemic restrictions, exhibition halls across the country have been packed full of chatty sales managers from the new-energy supply chain.

From electric car batteries to solar panels, they peddle their wares to foreign businessmen and bigger industrial peers, handing out business cards and rattling off sales pitches.

However, the deluge of interest in the industry is having a negative knock-on effect of overcapacity. And in the words of industry insiders, it's become too "involved", or nei juan in Chinese – an anthropological term originally used to explain a process in which additional input cannot produce more output.

In recent years, the term has become synonymous in China with being locked in an endless cycle of self-defeating competition. And perhaps nowhere is that better embodied than new energy.

Indeed, the market price of lithium carbonate – a critical component in rechargeable batteries – has plunged more than 80 per cent from a peak of roughly 600,000 yuan (US\$83,500) per tonne a year ago to about 100,000 yuan (US\$14,000) in recent days.

At their annual tone-setting central economic work conference this week, China's top leaders acknowledged that "overcapacity in some industries" was one of the major economic challenges to tackle in 2024.



Qatar

QatarEnergy Is Beneficiary Of \$570 Mln Ruling Against Endesa

QatarEnergy is the company to which Spanish power utility Endesa (ELE.MC) will have to pay \$570 million following an arbitration ruling over a liquefied natural gas (LNG) contract dispute.

The Spanish firm said it would have to pay the sum to an unidentified LNG producer following a ruling by the International Court of Arbitration of the International Chamber of Commerce in a dispute over a retroactive price adjustment.

The opposing party was seeking around \$1.28 billion, Endesa said in its financial report in October.

State-owned QatarEnergy didn't immediately reply to a request for comment outside of usual office hours.

An Endesa spokesperson declined to comment. Earlier on Wednesday, Endesa Chief Executive Jose Bogas said the other party in the dispute was from Qatar, Nigeria or Algeria.

"We are still calculating the impact but I believe a big part of it - something around \$500 million - could be recouped with the new price mechanism on the same contract in two years and a half," Bogas said, speaking on the sidelines of an event of Endesa's parent company Enel (ENEI.MI).

Qatar is the world's leading LNG exporter at a time when competition for LNG has increased following the war in Ukraine. European countries in particular have rushed to offset dwindling pipeline imports from Russia with gas supplied by sea.

Thanks to its extensive LNG infrastructure, Spain has emerged a key European hub for Europe's LNG imports.

UK



Urgent Action Needed To Prevent UK's Energy Sector Being Left In The Cold, Warns Vysus Group Boss

The UK's energy sector is at a tipping point and risks an unprecedented exodus of skills and investment without a clear and aligned government strategy on the energy transition and greater industry collaboration, an industry leader has warned.

David Clark, chief executive officer of global engineering and technical consultancy Vysus Group, says his company - which employs circa 400 people with a permanent presence in 15 countries - has seen activity levels move away from the UK North Sea in favour of opportunities elsewhere including the Middle East, Europe, Scandinavia and the Americas, as renewables and transition energy projects accelerate ahead of the UK in large part due to the uncertainty over domestic energy policy and a failure to capitalise on Aberdeen and the wider UK's potential to become a world-leader in the energy transition.

The Aberdeenshire-headquartered firm, which provides technical and regulatory consultancy and technology solutions across the energy, complex process, grid and infrastructure sectors, has been going through its own transition since its launch three years ago following its carve-out from Lloyd's Register. A company-wide restructure, the divestment of non-core businesses, and an increased focus on the energy transition have seen Vysus reduce its reliance on oil and gas by gaining a greater marketing share across the renewables, low carbon, grid and complex process industries.

Egypt



From Dark to Light, to Dark? Egypt's Energy Sector in Times of Uncertainty

Amid a profound economic crisis, the power outages experienced by Egypt in recent months are becoming an evident sign of the fading promises of development made by President Abdel-Fattah el-Sisi almost ten years after he came into power. Indeed, since mid-July, heatwaves and increasing electricity consumption coupled with chronic dysfunctions of the energy sector have led to lengthy and repeated power cuts. In some areas, power cuts occurred multiple times per day and lasted for hours, disrupting industrial activities and citizens' daily lives.

In the context of the early presidential elections, a closer look at the Egyptian energy sector over the past years is crucial for two main reasons. First, it helps shed light on the country's ambition to emerge as a regional energy hub and implement the energy transition; second, it allows us to assess the latest decade of el-Sisi's power and to understand what the coming months may hold for the country.

The Return Of A Looming Energy Crisis

These days power cuts are a reminder of the last energy crisis that occurred in Egypt around ten years ago. Indeed, while episodes of power cuts and blackouts were also recurrent under Hosni Mubarak's regime, they became more frequent after the 2011 revolution, primarily caused by an inefficient and inadequate electricity grid and a chronic lack of investment in maintenance.

Japan

How Japan's Renewable Underestimates Are Impacting Asia's Energy Transition

Before the dust has even settled on key COP28 climate talks in the United Arab Emirates, Japan will host the first summit later this month on a zero carbon emission framework with Australia and Southeast Asian nations in Tokyo.

Taking place as Japan's Group of Seven presidency ends, it's perhaps a final opportunity for Prime Minister Fumio Kishida to demonstrate strong global leadership on climate and energy issues. The early indications show, however, that the discussion will focus not on expanding proven solutions like solar, wind and energy storage, but instead untested technologies being pushed by major Japanese companies.

For Asia, the continent now responsible for a majority of global greenhouse gas emissions due to rapid economic growth over the past two decades, achieving net zero likely means rapidly growing renewable energy and shifting away from fossil fuels. But, according to the Japanese government, much of the region lacks adequate solar and wind energy resources compared with Europe or North America, and Tokyo is instead pushing alternative - and in some cases, unproven - technologies such as carbon capture and storage (CCS), biomass and ammonia/hydrogen co-firing.

Independent projections paint a different picture, showing ample offshore wind potential, untapped geothermal possibilities and plenty of room for distributed solar to grow in both Japan and Southeast Asia, with the key issues being grid connectivity and transmission capacity, not renewable resources. Yet these analyses often fall on deaf ears partly due to policy - and financing - from Japan.

Renewable Energy

08 Solar Panels





+ KELLER

IoT STARTS WITH A SENSOR



keller-druck.com

World's Largest Floating Solar Power Plant Taking Shape On Hydropower Plant



Plans are already in the works to expand a new floating solar power plant in Indonesia, setting the stage for similar projects around the world.

The idea of floating solar panels on water has barely gotten off the ground and it is already catching on across the planet. In particular, decarbonizers are excited by the potential to use the large reservoirs at existing hydropower facilities for new solar arrays instead of using up precious land. That's a significant sustainability win-win, and a gigantic new Masdar-backed project in Indonesia could serve as a model for others to follow.

World's Largest Floating Solar Power Plant

The plans for the world's largest floating solar power plant illustrate how quickly the floating solar field can grow. The project is aimed at expanding an existing 145-megawatt (AC) floating solar array at the Cirata hydropower reservoir in West Java, Indonesia, to reach a total of up to 500 megawatts.

The existing array went online and was proclaimed successful just last month. Evidently Masdar and the state-owned Indonesian utility PLN (Nusantara Power) already liked what they saw, because they used the occasion of COP 28 to announce the new expansion on December 3.

If Masdar rings a bell, that would be the Abu Dhabi Future Energy Company, which bills itself as the United Arab Emirates's "clean energy champion and one of the fastest growing companies in the world, advancing the development and deployment of renewable energy and green hydrogen technologies to address global sustainability challenges."

Masdar launched in 2006 and CleanTechnica has

covered the company's renewable energy projects over the years, including an in-person visit to its Masdar City clean tech showcase back in 2016 during the Abu Dhabi Sustainability Week, featuring on-site solar power among many other energy transition tools (more recent CleanTechnica Masdar coverage is here).

At the same visit we took a brief note of Abu Dhabi's interest in nuclear energy, so it's no surprise to see nuclear energy playing a central role in COP 28, which is being hosted by the UAE.

For the record, Masdar is a joint project of the ADNOC (the Abu Dhabi National Oil Company (ADNOC)) along with the, Mubadala Investment Company (Mubadala), and Abu Dhabi National Energy Company.

Floating Solar Is More Complicated Than It Looks

Over its relatively brief lifespan, the floating solar field has already established a roster of substantial benefits over and above generating clean kilowatts.

The land conservation angle is the big one, but floating solar stakeholders also point out that shade from the solar panels helps reduce evaporation and conserve water. Solar-shaded reservoirs and irrigation canals may also be less susceptible to toxic algae blooms.

The benefits also circle back to impact solar cell conversion efficiency, which can be improved by the cooling effect of water.

On the power generation side, co-locating solar arrays at existing hydropower plants enables solar stakeholders to take advantage of existing power lines and ground transportation infrastructure.

Water has its downsides, though. The imperative to avoid corrosion is a big one overall, and the unique environment of hydropower reservoirs can complicate matters much farther as water levels rise and fall.

The Chinese floating solar firm Sungrow FPV constructed the existing solar array at Cirata, and they had plenty to say about the challenges of placing solar panels there.

The Cirata project is “the largest floating solar project in a hydropower reservoir with a water depth of 100 meters, water level fluctuation of 18 meters, and a 50-meter difference in water bottom elevation, the company observed in a press release last November. The company cited the “intricate underwater terrain” as posing a particular challenge for the anchoring system.

“The system solution team from Sungrow Floating PV has developed high-load-bearing anchor blocks tailored to the specific geological conditions of the project site,” Sungrow explained. “These innovative anchor blocks enhance load-bearing capacity, effectively addressing challenges such as block slippage and significantly improving construction efficiency.”

“Through precise and reliable computational simulations, each anchor block is meticulously validated, facilitating the overall anchoring system design for the entire project,” the company added, noting that the tailor-made approach provides for a more efficient use of the available surface.

The surface availability angle is an especially important consideration for hydropower reservoirs that double as nature habitats and recreation areas, as many do. Squeezing solar panels into the picture can be a challenge without running afoul of other stakeholders.

More Green Hydrogen, Too

As described in the November press release, Sungrow plans to “support the development of the clean energy industry in countries and regions participating in the Belt and Road Initiative.”

That covers a lot of territory. As of October, the sprawling China-led infrastructure development plan has reportedly gathered 152 countries and 32 international organizations onto its roster of projects. The application of lessons learned at Cirata could have widespread impact on other floating solar projects under the Belt and Road umbrella.

On their parts, Masdar and PLN are also not stopping at Cirata. In their joint December 3 announcement, the two companies also announced green hydrogen projects to go along with their floating solar plans.

“The companies also agreed to explore renewable energy options around the world and the prospect of developing green hydrogen, which has huge potential for decarbonizing hard-to-abate industries, including steelmaking, construction, transportation, and aviation,” Masdar and PLN state.

Floating Solar, Green Hydrogen, And The Energy-Water Nexus

“With abundant solar resources, the UAE and Indonesia are in prime position to become green hydrogen production hubs,” the two companies continued. That brings to mind some interesting opportunities in the floating solar field related to green hydrogen.

Green hydrogen can be produced from water and other renewable resources. Much of the activity today is focused on electrolysis, which pushes hydrogen gas from water with the help of an electrical current and a catalyst.

Photocatalysis (also called the “artificial leaf” or photoelectrochemical cell) is another approach gaining attention. Both systems typically require purified water to prevent fouling and damage to the equipment. As a near-term solution, the US Department of Energy is among those promoting the development of new low-cost water pre-treatment systems for green hydrogen.

Meanwhile, work is continuing apace on more sophisticated systems that can push hydrogen directly from seawater and other unpurified sources.

In the latest development on that score, in November a team of researchers at the University of Cambridge published their findings on a new floating photovoltaic device that produces purified water in addition to green hydrogen.

Their floating solar device deploys a water-repellent nanostructured carbon mesh to help keep the photovoltaic layer afloat, while also protecting it from any impurities in the water below.

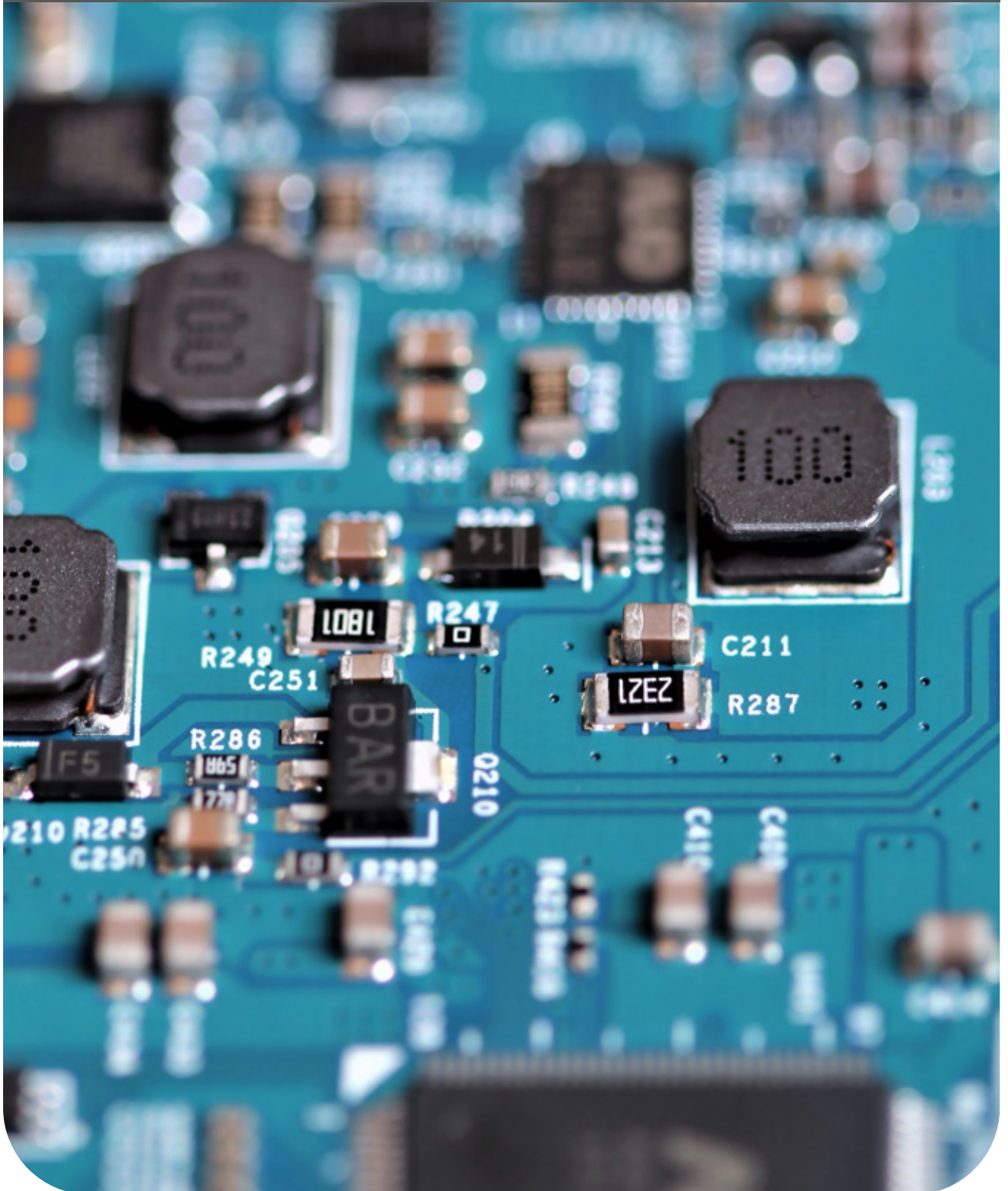
The PV part of the solar device is designed to absorb UV light, to power the electrolysis part of the operation. Meanwhile, other parts of the light spectrum pass through to the bottom layer, which produces pure vaporized water for electrolysis.

By: Tina Casey

<https://cleantecnica.com/>

Oil & Gas

12 Energy Data





“WORLD IS TOO SMALL... FOR US” SINCE 1977



For OIL&GAS, ENERGY, CONSTRUCTION and MINING Projects, we provide “Turnkey Camps” & “Prefabricated Buildings” such as;

- Accommodation
- Kitchen / Dining Halls
- Offices
- Industrial Buildings
- Dormitories
- Warehouses

“We Are Looking For Solution Partners”

info@tepeprefabrik.com.tr
www.tepeprefabrik.com.tr



PGS and TGS Move Closer to Combining Into One Energy Data Company

The combined firm aims to create a stronger and more diversified geophysical company and energy data provider.

Shareholders for TGS and PGS have agreed to combine the two companies to create one full-service energy data company. The plan was accepted at meetings at both companies on 1 December.

“We are very pleased that our shareholders have approved the merger plan and agree to the business rationale of merging PGS and TGS to establish the premier energy data company,” said Rune Olav Pedersen, CEO at PGS. “The combined company will be uniquely positioned to unlock substantial value for our shareholders, customers, and employees.”

According to a Reuters report, TGS said the multiclient business, where a company collects seismic data and sells it to oil and gas exploration and production companies, was long overcrowded but now fewer owners and vessels area available. TGS primarily had relied on chartered vessels to collect seismic data. The merger will result in TGS ownership of seven 3D data acquisition vessels and 30,000 mid-depth and deepwater nodes for ocean bottom node acquisition.

“Today marks a pivotal moment for TGS and PGS as we receive approval from our shareholders for the merger plan. This support reflects the shared vision of our stakeholders in establishing the combined entity as a leading diversified energy data and intelligence company with an enhanced industry offering,” said Kristian Johansen, CEO of TGS. “We strongly believe this merger will bring substantial value to our respective stakeholders, from shareholders and customers to the combined organization’s employees. As we move forward, we remain dedicated to navigating through the regulatory processes and meeting all closing conditions to ensure the successful completion of this transformative merger. Together, we are poised to deliver unparalleled energy data solutions to our global partners.”

Johansen and Sven Børre Larsen will continue as CEO and CFO, respectively.

“The seismic industry is changing whereby production seismic is becoming increasingly important alongside the traditional exploration seismic,” Pedersen said. “By combining TGS and PGS’ complementary resources, we create a fully integrated geophysical service provider well positioned to generate significant value for all stakeholders.”

The merger is supported by the board of directors of both companies.



“The transaction continues TGS’ strategic development from a pure multiclient seismic company to the leading acquirer and provider of geophysical data to both the oil and gas and new energy industries,” said Chris Finlayson, chairman of the board for TGS.

“Financial flexibility enables investments in attractive core activities as well as in the rapidly growing new energy business,” said Walter Qvam, chairman of the board for PGS. “The pioneering innovation cultures in both companies will contribute to a strong foundation for new product offerings and profitable growth.”

Following the completion of the transaction, TGS and PGS shareholders will own approximately two-thirds and one-third of the combined company, respectively, on the basis of the share capital of each of the companies as of 15 September 2023.

The transaction establishes the combined company as a full-service geophysical data company with a strong offering in all segments, including multiclient data, streamer data acquisition, ocean bottom node data acquisition, imaging, and new energy data. Moreover, the transaction is expected to help mitigate supply chain risks and add to economies of scale and efficiency.

The combined company is expected to have a combined fully diluted market cap of approximately \$2.616 billion and a net interest-bearing debt of \$649 million.

<https://jpt.spe.org/>

Nuclear

14 Pumps



Four Ways Heat Pumps Can Assist The World's Energy Transition



From using heat pumps in decommissioned power plants, to utilizing them for storage and carbon capture – scientists from China have listed the ways in which heat pumps can help the global energy transition move forward. They showed that their potential is beyond heat electrification.

China's Shanghai Jiao Tong University researchers have proposed four heat pump-assisted approaches to address four underlying challenges in the energy transition to the carbon-neutral era. Namely, those challenges are achieving heat electrification, utilizing decommissioned thermal power plants, meeting the demand for large-scale heat storage, and increasing the share of carbon capture.

"The importance and prevalence of heat pumps lie in that heat pumps can not only participate in the regulation of thermal energy between the supply and demand sides, aimed at the heating/cooling supply that accounts for 50% of the energy consumption for users but also address the bottleneck problem of energy consumption in carbon capture to tackle the last '10%' carbon emissions," they said.

Heat Electrification

As for the first of the listed challenges, the scientists said heat pumps are endowed with substantial potential for electricity utilization. According to their estimates, the requirements of building heating of up to 80 C and industrial heating below 150 C can be satisfied with a heat pump.

"It means that 100% of building heating and 50% industrial heating will be addressed," they emphasized. "If the penetration rate reaches 90%, a total 20% CO₂ reduction could be achieved by heat pumps."

Their higher initial costs, the researchers say, are affecting decision-makers for now – but this will change with breakthroughs in technologies and a more comprehensive usage scenario in the energy transition.

Decommissioned Plants

Regarding the challenge of utilizing decommissioned thermal power plants, the researchers propose transforming them into transit stations, storing energy in different forms. They suggest that 20% of the renewable energy will be held in electric batteries or high-temperature heat storage based on the Carnot battery concept, then transferred to the consumer via the grid. Another 30% chunk of the energy will be used to produce hydrogen and methane, which will then be stored and moved to the clients via pipeline.

The final 50% share will be utilized with heat pumps, working with a reverse cycle to store and then supply people with cooling and heating.

"The appropriate positioning of decommissioned thermal power plants in the future energy system will minimize equipment investment and, more importantly, mitigate the perceived threat of unemployment that undermines the political support for the energy transition," the research group said.

Heat Storage

As for large-scale heat storage, the scientists believe that a large part of the future capacity may be provided by heat pumps. That entails positioning one heat pump between the supply side and the storage facility and another one between the storage facility and the demand side.

“From the supply side to the heat storage side, thermal energy stored can be multiplied by heat pumps,” they further explained. “Taking the air source heat pump as an example, 1 kWh of electric energy can be utilized to generate threefold to sixfold thermal energy when deriving 2-5 kWh of free thermal energy from the environment. From the heat storage side to the demand side, if it is connected to the users with heat pumps as an intermediate system, the grade of thermal energy can be regulated according to the user’s needs.”

Carbon Capture

The final issue tackled by the scientific group is the hard-to-abate emissions that occur in industrial production and transportation. They say that in China, it will account for 20%, and while it is estimated that half could be captured by natural forests, the rest should be handled by carbon capture. Also for that, the research paper proposes a heat pump for help.

“Heat consumption for regeneration is estimated to account for 80% of the total direct air capture energy consumption,” they noted. “Therefore, carbon capture driven by natural or waste heat source heat pumps is prone to apply for urban carbon reduction. For example, the evaporator of the heat pump not only absorbs industrial waste heat but also couples with the adsorption tower and condenser in the DAC system, and the condenser of the heat pump can release heat to the desorption tower.”

The four approaches were presented in the study “Heat pump assists in energy transition: Challenges and approaches,” published in DeCarbon. “Challenges and opportunities coexist with each other, and it’s time to go further,” the scientists concluded.

By: Lior Kahana

<https://www.pv-magazine.com/>

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

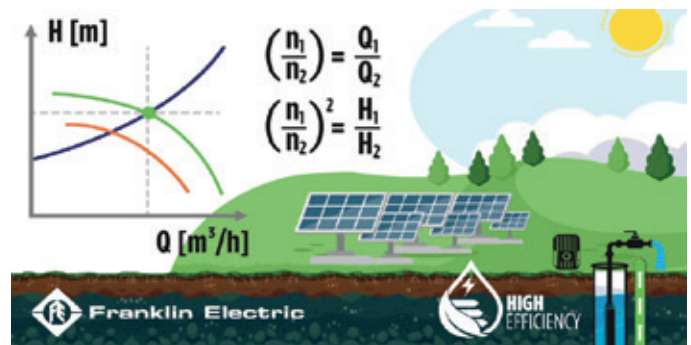
Superior efficiency through permanent magnet technology

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 Generators



Hitachi Energy Unveils New Emission-Free Alternative To Diesel- Powered Generators

Hydrogen-powered generator provides megawatts of power and heat for hard-to- decarbonize applications such as construction sites, remote venues, data centers, and hospitals.

ZURICH, SWITZERLAND, Nov 22, 2023 - (JCN Newswire) - Hitachi Energy, a global technology leader that is advancing a sustainable energy future for all, unveiled today the HyFlex™ demonstration unit, its Hydrogen Power Generator in Gothenburg, Sweden. During an event held with Hitachi Energy's



HyFlex™ demonstration unit

technology partner, PowerCell Group, around 100 senior representatives from companies in various industries took part in the demonstration.

This innovative solution is an integrated and scalable plug-and-play generator for temporary or permanent installation, where power grid connections are impractical, and diesel generators are not an option. The medium-power variant provides power for temporary installations and is designed for 400-600 kVA. The high-power variant caters to permanent installations and

will provide 1 MVA or more per unit and can be installed in parallel to meet the customer's specific power needs. HyFlex™ is completely emission-free, producing only AC power, usable heat, and water. In comparison, a 1 MVA diesel generator running at full load combusts roughly 225 kg of diesel and emits 720 kg of CO₂ emissions per hour.

Key applications include construction sites in remote locations or noise- and pollution-sensitive cities; mining sites to power the increasing number of electrically powered equipment like dump trucks

and excavators; data centers, hospitals, and hotels that require an emergency backup supply of power and/or heat; and shore-to-ship applications at ports to sustainably power ships at berth as an alternative to diesel generators.

“We are delighted to unveil this pioneering solution that decarbonizes hard-to-abate applications,” said Marco Berardi, Head of Grid & Power Quality Solutions and Service at Hitachi Energy. “As the transition to Net Zero progresses, more and more industries are looking for reliable ways to reduce their environmental impact and improve operational performance.”

Hitachi Energy is developing a Hydrogen Power Generator demonstration unit with Gothenburg-based fuel cell manufacturer PowerCell Group. PowerCell has provided the power modules and know-how in fuel cell integration and Hitachi Energy has the balance of plant and expertise in power electronics, batteries, cooling, intelligent control, and systems integration.

Hitachi Energy expects to launch a movable variant of this eco-friendly generator for temporary deployment in late 2024 and the permanently deployable variant in 2025.

With the unveiling of this breakthrough technology, Hitachi Energy now has a complete solutions portfolio across the green hydrogen value chain. In addition to hydrogen-to-power solutions, the portfolio includes power-to-hydrogen (or grid-to-stack) solutions for electrolyzer systems that optimize the entire power supply, from the high-voltage grid connection to the DC stack terminals of the electrolyzer.

Hitachi Energy has already provided a grid-to-stack solution for a 20 MW electrolyzer in Sweden and is providing a similar solution for a 20 MW project in Finland. As the hydrogen ecosystem is gearing up for gigawatt-scale projects, Hitachi Energy is well positioned as a partner of choice to provide optimal power supply systems that deliver the highest efficiency, reliability, and power quality.

About Hitachi Energy

Hitachi Energy is a global technology leader that is advancing a sustainable energy future for all. We serve customers in the utility, industry and

infrastructure sectors with innovative solutions and services across the value chain. Together with customers and partners, we pioneer technologies and enable the digital transformation required to accelerate the energy transition towards a carbon-neutral future. We are advancing the world’s energy system to become more sustainable, flexible and secure whilst balancing social, environmental and economic value. Hitachi Energy has a proven track record and unparalleled installed base in more than 140 countries. We integrate more than 150 GW of HVDC links into the power system, helping our customers enable more wind and solar. Headquartered in Switzerland, we employ more than 40,000 people in 90 countries and generate business volumes of over \$10 billion USD.

-<https://www.hitachienergy.com>

-<https://www.linkedin.com/company/hitachienergy>

-<https://twitter.com/HitachiEnergy>

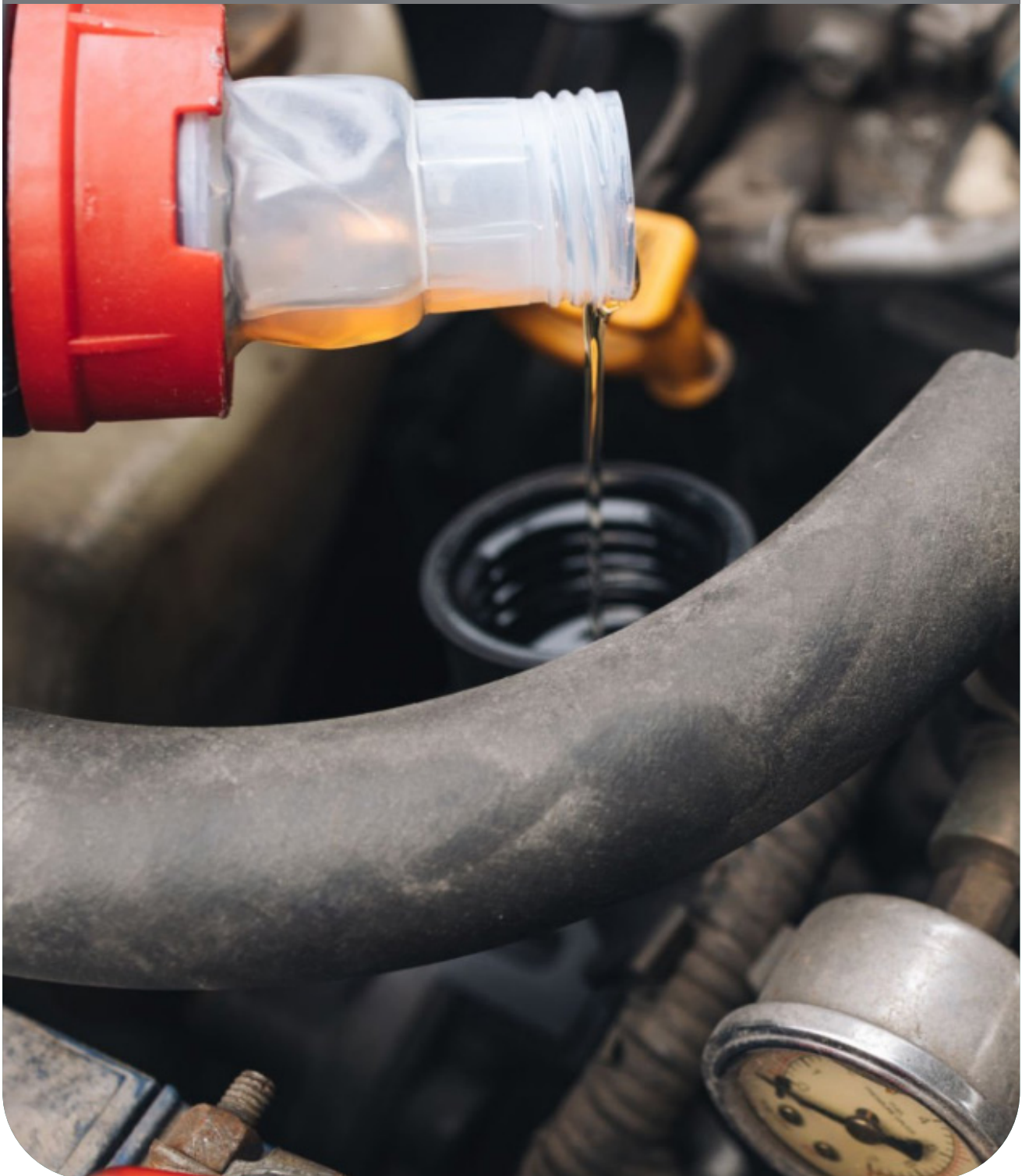
About Hitachi, Ltd.

Hitachi drives Social Innovation Business, creating a sustainable society through the use of data and technology. We solve customers’ and society’s challenges with Lumada solutions leveraging IT, OT (Operational Technology) and products. Hitachi operates under the business structure of “Digital Systems & Services” - supporting our customers’ digital transformation; “Green Energy & Mobility” - contributing to a decarbonized society through energy and railway systems, and “Connective Industries” - connecting products through digital technology to provide solutions in various industries. Driven by Digital, Green, and Innovation, we aim for growth through co-creation with our customers. The company’s consolidated revenues for fiscal year 2022 (ended March 31, 2023) totaled 10,881.1 billion yen, with 696 consolidated

subsidiaries and approximately 320,000 employees worldwide. For more information on Hitachi, please visit the company’s website at <https://www.hitachi.com>.

Products

20 Lubricants



The Unsung Heroes of Energy: Lubricants Powering Efficiency and Sustainability



Beneath the whirring blades of wind turbines and the colossal roar of power plants, a silent force whispers its efficiency secrets: lubricants. Often relegated to the background, these crucial fluids play a vital role in optimizing performance, minimizing downtime, and extending the lifespan of every cog and gear in the vast machinery of the energy sector. But their story goes beyond mere functionality, evolving into a saga of sustainability and innovation that's rewriting their role in the energy narrative.

Numbers paint a vivid picture:

- The global lubricant market is projected to reach \$227.8 billion by 2027, with the energy sector a major driving force. (Source: Grand View Research)
- Downtime in a power plant can cost \$1 million per hour on average. Lubricants play a key role in preventing breakdowns, saving millions. (Source: Energy Institute)

- A wind turbine gearbox failure can cost \$1 million to repair and cause months of downtime. Specialty lubricants can significantly reduce this risk. (Source: GE Renewable Energy)
- The bio-lubricant market is expected to grow at a CAGR of 10.2% between 2022 and 2030, driven by the rising tide of sustainability initiatives. (Source: Allied Market Research).

Innovation ignites the future:

- ExxonMobil's MobilSHC 630 synthetic compressor oil reduces gas leakage by 30%, saving millions in lost product and emissions.
- Shell's Naturelle series of bio-based lubricants for wind turbine gearboxes boast high performance while minimizing environmental impact.
- TotalEnergies' Quartz Bio lubricants, derived from renewable sources, offer increased drain intervals and reduced waste generation.
- SKF's in situ lubricant analysis utilizes sensor-equipped systems to monitor lubricant health in real-time, enabling predictive maintenance and preventing costly failures.

Studies illuminate the path:

- A 2022 study by the National Renewable Energy Laboratory found bio-based lubricants can significantly reduce the environmental impact of wind energy production.
- A 2023 report by McKinsey & Company highlighted the potential of predictive maintenance in the energy sector to save \$1 trillion by 2030, with lubrication playing a crucial role.

Beyond the lab, collaboration and policy fuel the movement:

- Industry collaboration: Initiatives like the Lubricants and Special Fluids Industry Council's «Sustainability Roadmap» are driving the development and adoption of eco-friendly lubricants.

- Government regulations: Policies like the EU's Ecodesign Directive encourage the use of sustainable lubricants in energy equipment.

A glimpse into the future of lubricants:

- Further advancements in bio-based and biodegradable lubricants will expand options and reduce environmental footprints.
- Digital twins and AI-powered predictive maintenance will become commonplace, optimizing lubricant use and preventing failures.
- Specialty lubricants tailored for specific energy sources and applications will unlock new levels of efficiency.
- Circular economy principles, such as lubricant recycling and reuse, will gain traction, minimizing waste and resource consumption.

As the energy landscape evolves, lubricants will continue to be the silent heroes, ensuring smooth operations and driving efficiency. By embracing innovation, prioritizing sustainability, and forging collaborative partnerships, these unsung heroes will remain at the heart of a cleaner, more efficient, and more resilient energy future.

By Hassan Mourtada

www.energyHQ.world

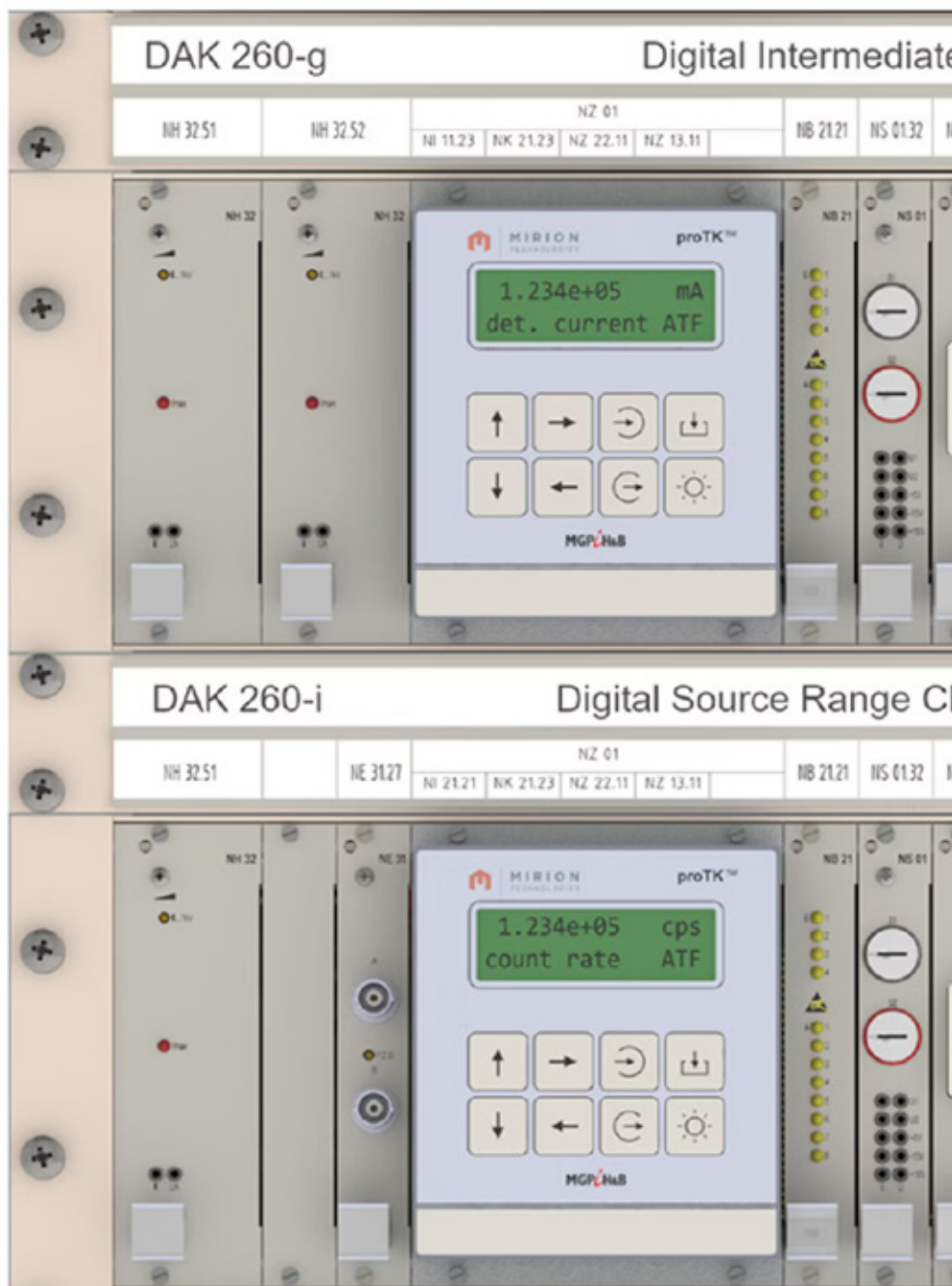
“

DAK 260™ Digital Start-up Channel

The DAK 260 digital start-up channel forms part of the proTK™ product line.

It is used for monitoring the neutron flux during reactor start-up in the source range with a pulse-type detector or in the intermediate and power range with a gamma-compensated neutron ionization chamber (CIC). With a gamma radiation detector, it can also be used in safety critical radiation or process monitoring applications.

Hardware and Software of the DAK 260 channel is designed and qualified for use at the level of the reactor protection system.



Range Channel

with CIC

NK 21.21	NB 28.16	NB 22.21	NR 31.11	NT 64.51	NT 64.51	NT 64.51		NI 53.21
----------	----------	----------	----------	----------	----------	----------	--	----------



Channel

with Proportional Counter

NK 21.21	NB 28.16			NT 64.51	NT 64.51	NT 64.51		NI 53.21
----------	----------	--	--	----------	----------	----------	--	----------



Services

26 Mechanical Power



water HQ

www.waterHQ.world

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

Import of Mechanical Power Transmission Equipment in May 2023 Increases to \$262M in the United States



U.S. Mechanical Power Transmission Equipment Imports

After two months of growth, purchases abroad of mechanical power transmission equipment decreased by -6.3% to 21K tons in May 2023. Overall, imports continue to indicate a slight reduction. The pace of growth appeared the most rapid in July 2022 when imports increased by 23% against the previous month. As a result, imports attained the peak of 34K tons. From August 2022 to May 2023, the growth of imports remained at a somewhat lower figure.

In value terms, mechanical power transmission equipment imports expanded markedly to \$262M (IndexBox estimates) in May 2023. Over the

period under review, imports continue to indicate a relatively flat trend pattern. The most prominent rate of growth was recorded in July 2022 when imports increased by 14% month-to-month. As a result, imports attained the peak of \$277M. From August 2022 to May 2023, the growth of imports failed to regain momentum.

Imports by Country

In May 2023, China (5.8K tons) constituted the largest supplier of mechanical power transmission equipment to the United States, accounting for a 28% share of total imports. Moreover,

mechanical power transmission equipment imports from China exceeded the figures recorded by the second-largest supplier, India (2.2K tons), threefold. South Korea (1.9K tons) ranked third in terms of total imports with a 9.3% share.

From May 2022 to May 2023, the average monthly growth rate of volume from China totaled -3.2%. The remaining supplying countries recorded the following average monthly rates of imports growth: India (-0.3% per month) and South Korea (-1.0% per month).

In value terms, the largest mechanical power transmission equipment suppliers to the United States were China (\$37M), Germany (\$36M) and Japan (\$31M), with a combined 40% share of total imports. Mexico, Canada, India and South Korea lagged somewhat behind, together comprising a further 32%.

Among the main suppliers, Mexico, with a CAGR of +3.5%, recorded the highest growth rate of the value of imports, over the period under review, while purchases for the other leaders experienced more modest paces of growth.

Imports by Country

In May 2023, the mechanical power transmission equipment price amounted to \$12,709 per ton (CIF, US), with an increase of 16% against the previous month. Over the period under review, import price indicated a modest expansion from May 2022 to May 2023: its price increased at an average monthly rate of +1.3% over the last twelve-month period.

The trend pattern, however, indicated some noticeable fluctuations being recorded throughout the analyzed period. Based on May 2023 figures, mechanical power transmission equipment import price decreased by -6.0% against January 2023 indices. The pace of growth was the most pronounced in January 2023 an increase of 24% against the previous month. As a result, import

price reached the peak level of \$13,523 per ton. From February 2023 to May 2023, the average import prices failed to regain momentum.

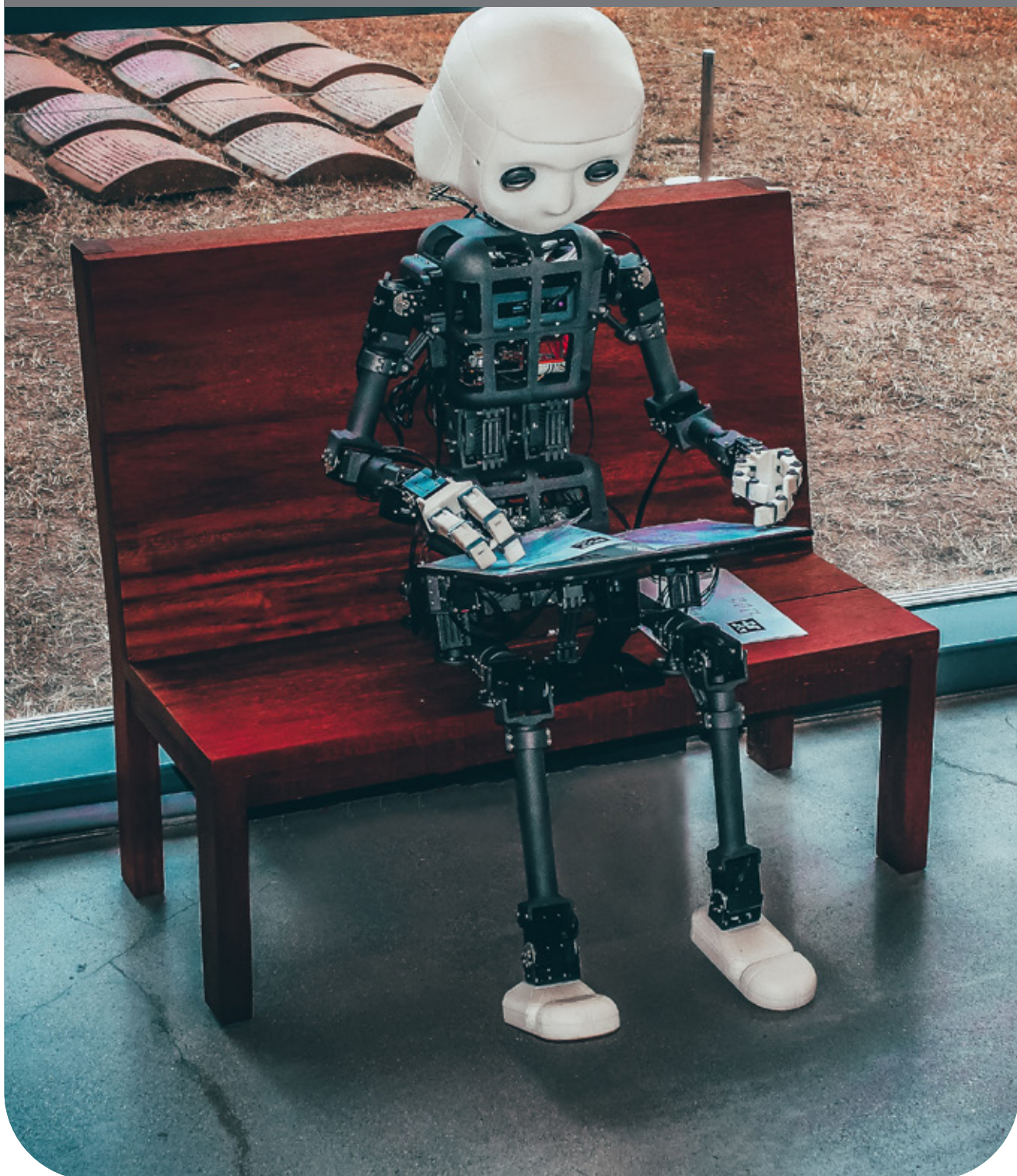
There were significant differences in the average prices amongst the major supplying countries. In May 2023, the country with the highest price was Germany (\$22,906 per ton), while the price for South Korea (\$5,283 per ton) was amongst the lowest.

From May 2022 to May 2023, the most notable rate of growth in terms of prices was attained by Germany (+2.5%), while the prices for the other major suppliers experienced more modest paces of growth.

Source: IndexBox Market Intelligence Platform
<https://www.globaltrademag.com/>

Cover Story

29 *Superintelligent AI*



Openai Demos A Control Method For Superintelligent AI The Researchers Asked Gpt-2 To Command The Much More Powerful Gpt-4



One day, the theory goes, we humans will create AI systems that outmatch us intellectually. That could be great if they solve problems that we've been thus far unable to crack (think cancer or climate change), or really bad if they begin to act in ways that are not in humanity's best interests, and we're not smart enough to stop them.

So earlier this year, OpenAI launched its superalignment program, an ambitious attempt to find technical means to control a superintelligent AI system, or "align" it with human goals. OpenAI is devoting 20 percent of its compute to this effort, and hopes to have solutions by 2027.

The biggest challenge for this project: "This is a future problem about future models that we don't even know how to design, and certainly don't have access to," says Collin Burns, a member of OpenAI's superalignment team. "This makes it very tricky to study—but I think we also have no choice."

The first preprint paper to come out from the

superalignment team showcases one way the researchers tried to get around that constraint. They used an analogy: Instead of seeing whether a human could adequately supervise a superintelligent AI, they tested a weak AI model's ability to supervise a strong one. In this case, GPT-2 was tasked with supervising the vastly more powerful GPT-4. Just how much more powerful is GPT-4? While GPT-2 has 1.5 billion parameters, GPT-4 is rumored to have 1.76 trillion parameters (OpenAI has never released the figures for the more powerful model).

It's an interesting approach, says Jacob Hilton of the Alignment Research Center; he was not involved with the current research, but is a former OpenAI employee. "It has been a long-standing challenge to develop good empirical testbeds for the problem of aligning the behavior of superhuman AI systems," he tells IEEE Spectrum. "This paper makes a promising step in that direction and I am excited to see where it leads."

The OpenAI team gave the GPT pair three types of tasks: chess puzzles, a set of natural language processing (NLP) benchmarks such as commonsense reasoning, and questions based on a dataset of ChatGPT responses, where the task was predicting which of multiple responses would be preferred by human users. In each case, GPT-2 was trained specifically on these tasks—but since it's not a very large or capable model, it didn't perform particularly well on them. Then its training was transferred over to a version of GPT-4 with only basic training and no fine-tuning for these specific tasks. But remember: GPT-4 with only basic training is still a much more capable model than GPT-2.

The researchers wondered whether GPT-4 would make the same mistakes as its supervisor, GPT-2, which had essentially given it instructions for how to do the tasks. Remarkably, the stronger model consistently outperformed its weak supervisor. The strong model did particularly well on the NLP tasks, achieving a level of accuracy comparable to GPT-3.5. Its results were less impressive with the other two tasks, but they were “signs of life” to encourage the group to keep trying with these tasks, says Leopold Aschenbrenner, another researcher on the superalignment team.

The researchers call this phenomenon weak-to-strong generalization; they say it shows that the strong model had implicit knowledge of how to perform the tasks, and could find that knowledge within itself even when given shoddy instructions.

In this first experiment, the approach worked best with the NLP tasks because they're fairly simple tasks with clear right and wrong answers, the team says. It did worst with the tasks from the ChatGPT database, in which it was asked to determine which responses humans would prefer, because the answers were less clear cut. “Some were subtly better, some were subtly worse,” says Aschenbrenner.

Could this alignment technique scale to superintelligent AI?

Burns gives an example of how a similar situation

might play out in a future with superintelligent AI. “If you ask it to code something, and it generates a million lines of extremely complicated code interacting in totally new ways that are qualitatively different from how humans program, you might not be able to tell: Is this doing what we ask it to do?” Humans might also give it a corollary instruction, such as: Don't cause catastrophic harm in the course of your coding work. If the model has benefitted from weak-to-strong generalization, it might understand what it means to cause catastrophic harm and see—better than its human supervisors can—whether its work is straying into dangerous territory.

Some might argue that these results are actually a bad sign for superalignment, because the stronger model deliberately ignored the (erroneous) instructions given to it and pursued its own agenda of getting the right answers. But Burns says that humanity doesn't want a superintelligent AI that follows incorrect instructions.

To encourage other researchers to chip away at such problems, OpenAI announced today that it's offering US \$10 million in grants for work on a wide variety of alignment approaches. “Historically, alignment has been more theoretical,” says Pavel Izmailov, another member of the superalignment team. “I think this is work that's available to academics, grad students, and the machine learning community.” Some of the grants are tailored for grad students and offer both a \$75,000 stipend and a \$75,000 compute budget.

By Eliza Strickland

Senior Editor at IEEE Spectrum

<https://spectrum.ieee.org/>

Technology

32 *Digitalization in Energy*



Digitalization's Impact on the Electricity Sector



Decarbonization and digitalization are set to shape the electricity market in the coming years. While the impacts of decarbonization and the rising share of renewables in power generation have been widely studied, the impacts of the digital transition have received less attention. This is surprising as digital technologies have the potential to bring about transformative changes in the electricity sector, not only enabling greater efficiency and reducing operational costs, but also creating new energy ecosystems and business models and accelerating the energy transition.

Most research on the impact of digitalization on the energy sector has primarily focused on efficiency, i.e. how digital technologies can improve operational efficiency and reduce production costs. But the impacts of digitalization on the electricity market are much broader; digitization can bring about new structures, actors, and regulatory practices and frameworks.

The traditional business model in the electric power sector is relatively straightforward. Utilities generate electricity and feed it into the grid, so that customers can consume it and pay for volume. In a stylized model, the organization of the electricity sector could be characterized around the following constraints: The industry structure is comprised of a small number of players with large assets; and a large proportion of these

assets remain idle for long periods of time. The challenge then becomes how to minimize operational costs by taking advantage of economies of scale.

Multiple Benefits

Digitalization can relax many of the above constraints. To start with, digitalization can reduce barriers to entry, allowing the participation of more players with smaller assets.

For example, digital platforms enable new markets by connecting smaller producers with buyers. Without the intermediation of these platforms, transaction costs would simply be too high for these actors to participate in such a market. This can transform the power sector into one based less on economies of scale, and more

on a modular structure that can be scaled up or down in granular and additive steps. This will enable smaller producers to enter the market as entry costs are lower. This could also lead to both fragmentation and aggregation in the electricity value chain.

Digitalization can also increase the flexibility of the entire system by enabling integration across its different parts, including supply and demand. Interoperability would allow the exchange of operational information in real time between equipment anywhere in the energy system, reducing inefficiencies, improving reliability and lowering costs. This enhanced flexibility allows consumers and producers to respond instantaneously to changing market conditions, increasing the utilization of existing capacity without putting operations at risk. This is important at a time when increasing physical capacity in terms of new transmission and distribution networks is becoming more difficult and costly.

Blurring Boundaries

Traditionally, the electricity sector has been organized upstream and downstream in segments of the value chain that follow the flow of power: generation, transmission, distribution and retail. The boundaries between these activities are clear. Digitalization can blur the physical boundaries of this value chain. New segments could arise, such as prosumers, while others could emerge, such as aggregators. But as digitalization also breaks down the boundaries of silos, for instance the boundaries between electricity and transport, which can lead to a new horizontal integration of firms, to take advantage of economies of scale.

Digitalization can also redefine the ultimate products of the electricity sector and launch new ones. Observations of the effects of digitalization on other industries show that the value proposition of some new firms is to take out some activities that can now be standardized due to digitalization. Unbundling of a firm's activities can lead to an electricity sector where new firms offer hyper-specialized products and services.

Digitalization can impact costs and pricing too. Digitalization shares the same cost structure with some renewables: large upfront costs and negligible marginal costs afterwards. How to deal with close to zero marginal costs is problematic in economic theory. For instance, it can break down the criteria of profit maximization, where prices are equal to marginal cost. Having prices equal to zero is an anomaly though, as the role of prices is to signal scarcity. The zero marginal cost structure of

digitalization is even more problematic. While the physical network is constrained by congestion, digital networks are not. The interaction between decarbonization and digitalization will push forward the need for alternative pricing. The zero marginal cost of renewables and the negligible marginal cost of digitalization suggest that pricing services using memberships and two-part tariffs may be more appropriate in the future.

Market Design

Understanding these aspects of digitalization and their impacts on the electricity market are key at a time when the world is accelerating its efforts to decarbonize. Also, 2022 saw extremely high prices in Europe linked to tight global gas markets. The high electricity prices accelerated a policy focus on issues of market design, flexibility, and capacity markets among other factors. The UK and EU are consulting on electricity market design. There are two broad opposing views regarding market design. One side argues that the microeconomics of the current electricity market design is adequate to address these policy issues, and all that is needed is to allow markets to perform their function, which means accepting periods of volatility and high price levels.

The problem does not reside in the economics of market design but in the politics. The other view takes a stance on completely redesigning the market, with some radical approaches such as creating two markets for electricity to decouple electricity prices from the price of gas. Regardless of the proposed reforms, these can't be designed in isolation from the potential impacts of digitalization on the electricity sector.

In conclusion, digitalization presents immense opportunities for the transformation of the electricity sector. Overall, the digital transition will lead to a more efficient and flexible electricity sector. Digital technologies will enable new energy ecosystems, help innovate business models, and accelerate the energy transition itself. But digitalization will also require careful consideration of its implications for the industry structure and pricing mechanisms. Also, there are certain industry structures and legacies in terms of regulation and infrastructure that could facilitate but also hinder digitalization.

By Rolando Fuentes

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

Country Reports

36 Germany

37 Turkey

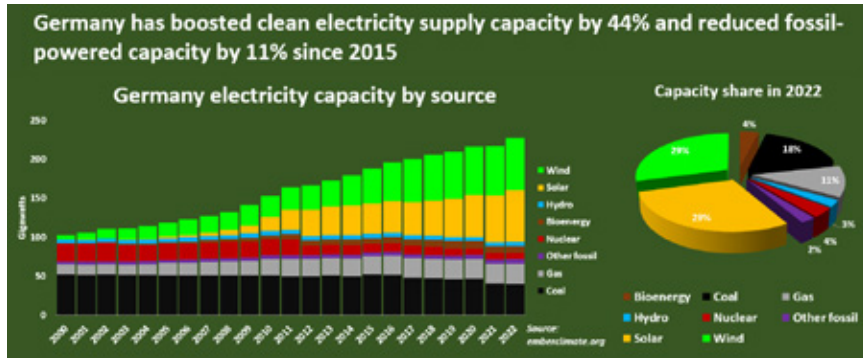
38 UAE



constructionHQ



German Power Mix May Get Dirtier For 1st Non-Nuclear Winter



Germany Electricity Capacity By Source

Germany's power producers are preparing for their first winter without nuclear power, after the country closed its last remaining reactors in early 2023 amid ongoing efforts to modernize its energy system.

German officials opted to shut the country's last remaining reactors in April, as although they generated steady volumes of power with little to no emissions, authorities preferred to expand supplies of renewable energy rather than make additional investments in the nuclear fleet.

Nuclear power has gradually lost share in Germany's electricity generation mix for years, with its contribution to the country's electricity total falling from over 14% in 2015 to around 6% in 2022 and virtually zero for 2023 as a whole.

On an annual basis, the roughly 8.1 gigawatts (GW) of nuclear capacity closed this year has been more than offset by increases in generation capacity from solar and wind sites, data from think tank Ember shows.

However, with generation from solar - Germany's second largest source of clean electricity behind wind - set to plunge this winter due to reduced daylight, Germany's total clean power generation looks set to decline just as energy consumption levels rise from higher demand for heating.

As a result, German power producers may be forced to boost generation from fossil fuels such as coal and natural gas, lifting power sector emissions in the process.

Clean & Fossil Output Down

Over the first nine months of 2023, German output of clean and fossil-powered electricity dropped from the same period in 2022, mainly due to stunted power demand from industry.

Clean electricity generation declined by 5.6% from the same period in 2022, while fossil fuel generation dropped by 21% to the lowest cumulative total for that period since at least 2017.

Persistently high wholesale power prices have been a key constraint on generation totals, as German industry has balked at paying wholesale rates that remain 160% above the 2019 average despite having dropped over 80% from the 2022 peak, LSEG data shows.

The impact of that reduced industrial energy consumption is evident from output data from key energy intensive sectors.

German output of chemicals and fertilizers - previously manufactured using abundant and cheap natural gas - have slumped to their lowest totals in over a decade in 2023 as producers throttled back production, data compiled by LSEG shows.

Production of cars, steel, batteries and turbines have also been pared back, resulting in an expected rare contraction in Europe's largest economy this year.

To try to support an industrial recovery, power firms are under pressure to drive power costs lower, and have taken steps to boost the production of cheap renewable energy to record levels this year.

However, total German solar electricity generation historically declines by over 80% from September to December, due to sharply reduced daylight hours.

As solar power accounted for over 20% of Germany's total electricity generation in each of the past five months, such a severe decline in clean power output is likely to tighten overall power supplies just as German households and businesses dial up demand for heat during the coldest months of the year.

To offset the lower solar output, utilities will look to maximise wind power generation, which picks up during the winter months due to higher wind speeds.

But to complement the intermittent nature of wind power, and ensure that overall electricity generation totals trend higher along with demand, power firms will likely also boost generation from coal and gas plants that can be throttled up and down at short notice to balance national power market needs.

Higher fossil fuel generation in turn will produce increased power emissions which may undermine Germany's efforts to cut pollution totals, but may be unavoidable given the absence of non-emitting clean power from the country's nuclear reactors.

By Gavin Maguire; Editing by Lincoln Feast

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

Türkiye To Invest \$200 Billion In Energy Until 2035



Energy and Natural Resources Minister Alparslan Bayraktar has outlined the framework of Türkiye's new investment and reform period in the energy sector, saying the government is preparing for 2035 with a \$200 billion project set.

"Until 2035, we have about \$200 billion worth of projects, some of which will be initiated and completed within this period, while for some, the preparations for the legal infrastructure will be made," Bayraktar said during a meeting with Ankara bureaus' chiefs of some newspapers.

"These projects include renewable energy, nuclear energy, natural gas-oil exploration, natural gas-oil and electricity infrastructure projects and interconnection projects," he added.

Bayraktar categorized the set of investments under five main headings: Renewable energy, energy efficiency, nuclear energy, oil and natural gas, and mining.

"Renewable energy is one such area that can help meet growing demand, reduce foreign dependency and reduce emissions," the minister noted.

"In renewables, we want to bring onshore and offshore wind into service. We have a target of 1,500 megawatts of wind projects per year. There is serious potential in the Sea of Marmara, Kiyıköy and around the Black Sea. In the next 12 years, Türkiye will reach 30,000 MW of installed wind capacity with an increase of about 18,000 MW."

"We have slightly more ambitious targets in solar. We need to bring at least 3,000 to 3,500 MW of new installed capacity online every year. We have set an additional target of around 40,000 MW by 2035." The Akkuyu Nuclear Power Plant will start production next year, and a second nuclear power plant will be built in

the Black Sea province of Sinop, Bayraktar noted.

"In addition to large-scale nuclear power plants, we are working closely with the United Kingdom and the United States on a new technology called small modular reactors, which can be produced in Türkiye with the possibility of localization," he said.

"By the 2050s, Türkiye will have over 20,000 MW of installed nuclear capacity. This is almost the size of four Akkuyu power plants."

The natural gas production Black Sea will also be a priority, the minister added.

"Our goal is to produce 10 million cubic meters per day or about 3.5 billion cubic meters per year," Bayraktar said.

"That is about 25 cubic meters of gas used in the kitchen and for hot water in homes. For 19 million natural gas subscribers, we aim to produce the gas used in hot water and kitchens from the gas in the Black Sea in one year. In the second phase, we want to increase this to 40 million cubic meters."

He also said that Türkiye aims to increase its crude oil production.

"We consume about 1 million barrels of crude oil a day, and the local oil production covers about 8 percent of that amount," Bayraktar added.

"With the Gabar discovery, we hope to increase production to 100,000 barrels per day this year, and the goal is to reach 200,000 barrels by the end of 2024. By then, Türkiye can meet 20 percent of its needs from its own resources."

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

UAE Pioneers Responsible And Sustainable Energy Sector Transformation



The UAE has established a unique model for practical and responsible transformation in the energy sector, launching numerous initiatives and supportive strategies to achieve its climate neutrality goals by 2050.

In 2017, the UAE launched its Energy Strategy 2050, the first unified energy strategy in the country that is based on supply and demand. In collaboration with all stakeholders, the strategy was updated following its first review to factor in the developments in the energy sector and ensure access to reliable, sustainable, and affordable energy.

The National Hydrogen Strategy, unveiled as part of this update, aims to support low-carbon local industries, contribute to achieving climate neutrality and enhance the UAE's position as one of the largest hydrogen producers by 2031.

The UAE Energy Strategy 2050 aims to triple the contribution of renewable energy and invest AED150 to AED200 billion by 2030 to meet the country's increasing demand for energy as a result of a rapidly growing economy.

It also aims to increase individual and institutional energy consumption, achieve financial savings of AED100 billion, create 50,000 new green jobs, and it aims to achieve a grid emission factor of 0.27 kg CO₂/kWh by 2030.

The National Hydrogen Strategy is a long-term plan to turn the UAE into a leading and reliable producer and supplier of low-carbon hydrogen by 2031. The strategy serves as a crucial tool to help the UAE achieve its commitment to net zero by 2050 and accelerate the global hydrogen economy.

This strategy emphasises the importance of economic growth and will help create thousands of jobs in the hydrogen sector by 2050, in addition to reducing emissions in hard-to-abate sectors, such as heavy industries, land transport, aviation, and

sea freight, by 25 percent by 2031.

Barakah Nuclear Power Plant plays a key role in producing energy and achieving sustainable development by generating ample carbon-free electricity for the UAE's power grid under an integrated approach to renewable energy sources. It has added significant amounts of clean electricity, with 75% coming from nuclear energy, making the UAE an ideal host for the «Net Zero Nuclear Summit» held during COP28.

In the same context, the Barakah plant is an important part of the UAE's efforts to diversify its energy sources, and will provide clean and efficient energy to homes, businesses and government facilities while reducing the nation's carbon footprint. When fully operational, the Barakah Nuclear Energy Plant is expected to prevent up to 22 million tons of carbon emissions every year, equivalent to removing 4.8 million cars from the roads.

The Abu Dhabi Future Energy Company «Masdar» has actively played a role in addressing climate change effects over 17 years. Its renewable energy projects and sustainable urban development investments positively contribute to achieving climate neutrality.

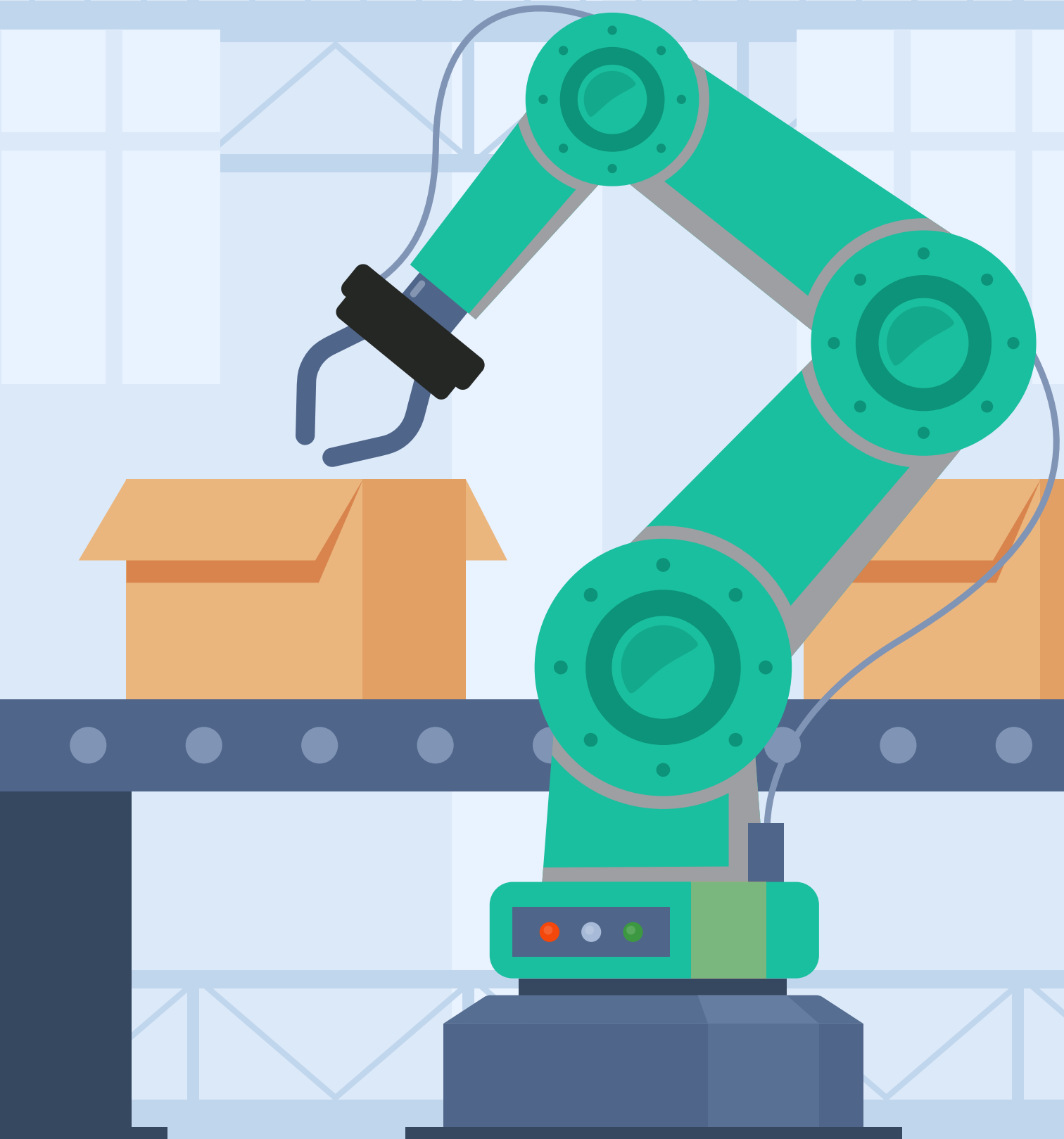
The company's current project portfolio produces more than 20 gigawatts (GW) in 40 countries across six continents and is valued at over AED110 billion. These projects contribute to reducing carbon emissions by 30 million tonnes annually, which is equivalent to powering 5.25 million homes or taking 6.5 million cars off the roads.

Masdar aims to consolidate its position as a leading global company in renewable energy and green hydrogen, as it is working to expand its portfolio to boost its total production capacity and exceed its 100GW by 2030 target, and double that going forward.

COP28 dedicated a day to «Energy, Industry and Just Transition» featuring high-level events reflecting the UAE's climate action efforts and those of relevant parties in the energy sector, aligning with global initiatives for emissions reduction acceleration.

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

food HQ



Services

41 Buyer's Guide

42 Coming Events





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...

Vibrant Green Energy Expo 2023

Mahatma Mandir, Gandhinagar, India
14 - 16 Dec 2023

<https://vgeexpo.com/>

VGEE is India's foremost B2B exhibition for solar energy, wind energy, bioenergy, energy storage, and hybrid vehicles. The upcoming Vibrant Green Energy Expo is expected to draw exhibitors...

Neckar-ALB Regenerative 2024

volksbankmesse Balingen, Balingen, Germany
09 - 10 Mar 2024

<https://www.neckar-alb-regenerativ.de/>

On the expert stage, experts from the energy, construction and mobility sectors will answer questions from the moderators and energy consultants from the Zollernalb Energy Agency. The experts will talk about current topics...

POWER TOOLEX 2024

Milan Mela, Kolkata, India
15 - 17 Mar 2024

<https://powertoolex.com/>

POWERTOOLEX is a pure B2B exhibition focusing on the fast-growing hand tools and power tools sector in India. The goal of the POWERTOOLEX is to bring buyers and sellers together in an interactive environment to conduct business...

Saudi Arabia Smart Grid Conference 2023

Hilton Riyadh Hotel & Residences, Saudi Arabia
18 - 20 Dec 2023

<https://saudi-sg.com/>

The Saudi Arabia Smart Grid Conference offers a chance to showcase products, services, ideas, and businesses to the regional governmental, scientific, business, and technological community. Topics covered include artificial...

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.

International Conference on Smart Grid Systems 2023

Barcelona, Spain
18 - 19 Dec 2023

<https://waset.org/smart-grid-systems-conference-in-december-2023-in-barcelona>

The International Conference on Smart Grid Systems intends to unite academic scientists, researchers, and scholars to exchange their experience...

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

General Promotional Offer (GPO)

From Bronze to Platinum Package ~One GPO To Rule Them All!

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

Subscription & Membership

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

Reprint Guidelines

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

Advertising / Promotional Queries

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

Content / Editorial Queries

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

One World (1W)* Team (Email domain is @1world.xyz)

*Parent company of **One Media (1M)**, publisher of energyHQ

Accounting & Finance (AF) •Taghreed Mahdi Accounting & Finance Officer t.mahdi@1world.xyz	Content & Research (CR) •Hassan Mourtada Content & Research Officer h.mourtada@1world.xyz	Graphic Design (GD) •Shadi Al Masri Design Director design@1world.xyz	Human Resources (HR) •Anwar Timani HR Officer hr@1world.xyz
Information Technology (IT) •Mohammad Ajeenah Network & System Admin / IT Officer m.ajeenah@1world.xyz	Legal (LE) •Ghassan Abi Haidar Legal Counsel legal@1world.xyz	Management (MA) •Taghreed Mahdi Administrative & Data Officer t.mahdi@1world.xyz •Mohamad Rabih Chatila CEO rabih@1world.xyz	Marketing & Sales (MS) •Ahmad Idriss Marketing & Sales Officer a.idriss@1world.xyz
About energyHQ magazine, established in 2023, is published monthly by One Media – a One World (1W) Division.	Courier Address Hamra, Commodore Area, Barouk Street (Facing Coral Suites Hotel), Chatila & Chehab Building, 2nd Floor. Beirut - Lebanon	Postal Address P. O. Box: 13-5300 Chouran Postal Code: 1102-2802 Beirut - Lebanon	Contact Us T: +961 (01) 748333 M: +961 (70) 100094 E: info@energyHQ.world

How The World Agreed To Move Away From Fossil Fuels At Cop28



The COP28 climate summit in Dubai started with all the ingredients for spectacular failure: It proposed an end to the fossil-fuel era at a conference situated in Arab oil country amid overt opposition from the powerful oil-producer group OPEC.

Landing a pact that all 196 countries could live with took deft maneuvering by the conference host, the United Arab Emirates, along with back-channel diplomacy from the United States' and China's top climate envoys.

The COP28's UAE presidency employed a strategy during the two-week summit of issuing deliberately provocative drafts for a deal designed to force negotiators to reveal the outer limits of their positions and find common ground, according to the sources.

The top envoys from the world's biggest climate polluters, the United States and China - relying on a personal relationship two decades in the making - together found the right words to describe the world's move away from oil, gas and coal and persuaded OPEC leaders to come along.

At the end of the conference, which spilled into overtime and was marked by moments of near-crisis, negotiators emerged with an accord that called for «transitioning» away from fossil fuels, marking the first time in history countries expressed a unified desire to end the oil age.

In a concession to oil producers, including OPEC members and their allies, the deal also provided an option for cleansing existing oil, gas and coal of their climate impact using technologies like carbon capture and sequestration, in which the greenhouse gas is kept from the atmosphere.

U.S. Special Climate Envoy John Kerry called the deal a victory for multilateralism, and the UAE's COP28 President Sultan Al Jaber called it «historic.»

Some delegates, including the Alliance of Small Island States, bemoaned the accord's loopholes for continued fossil-fuel use, but ultimately did not stand in its way.

Low To High

Ahead of the conference, Al Jaber - who also runs the UAE's state oil company ADNOC - was pilloried by environmental activists as an untrustworthy host for a climate negotiation.

But he did not want to oversee a failed conference. Before the summit, his office issued press releases pumping up an EU- and U.S.-led declaration by nations to triple renewable energy capacity by 2030, and a U.S.-China cooperation agreement in California in November.

Scores of countries had come to Dubai pressing for language in a final deal to «phase out» fossil fuels entirely, an option to which the Organization of the Petroleum Exporting Countries was particularly opposed.

OPEC, which controls 80% of the world's oil reserves, made that clear in a Dec. 6 letter to its members and allies rallying them to block an agreement targeting fossil fuels.

The letter sparked worries that the summit was doomed to fail.

Faced with entrenched positions, and with time running short, Al Jaber employed his provocative strategy to shake things up.

By Maha El Dahan
<https://www.reuters.com/>

POWER FOR RENT



PRAMAC produces, develops and distributes portable and industrial generators from 1 to 2600 KVA in standard and customized solutions, to follow the customers' needs from heavy duty activities to major power engineering projects.



Rental
Generators



Stationary
Generators



Lighting
Equipment



Portable
Generators



Material
Handling



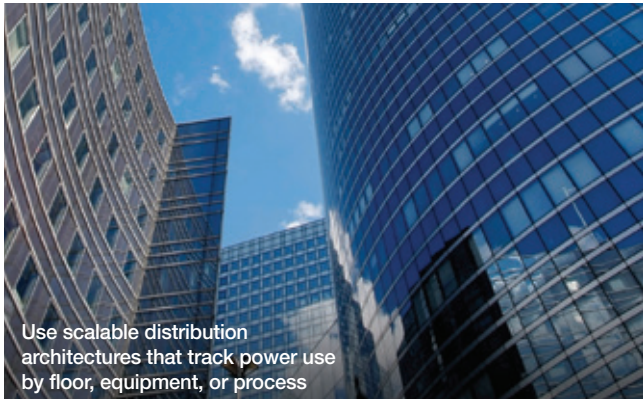
Racing
Team



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.

Services that leverage and protect your investment

Our worldwide network of energy experts and full range of services answers your needs throughout your installation life cycle, from audits and system diagnostics through installation and maintenance.

PowerStruxure

Tested, validated, and documented

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.



Visit <https://www.se.com>

Schneider Electric