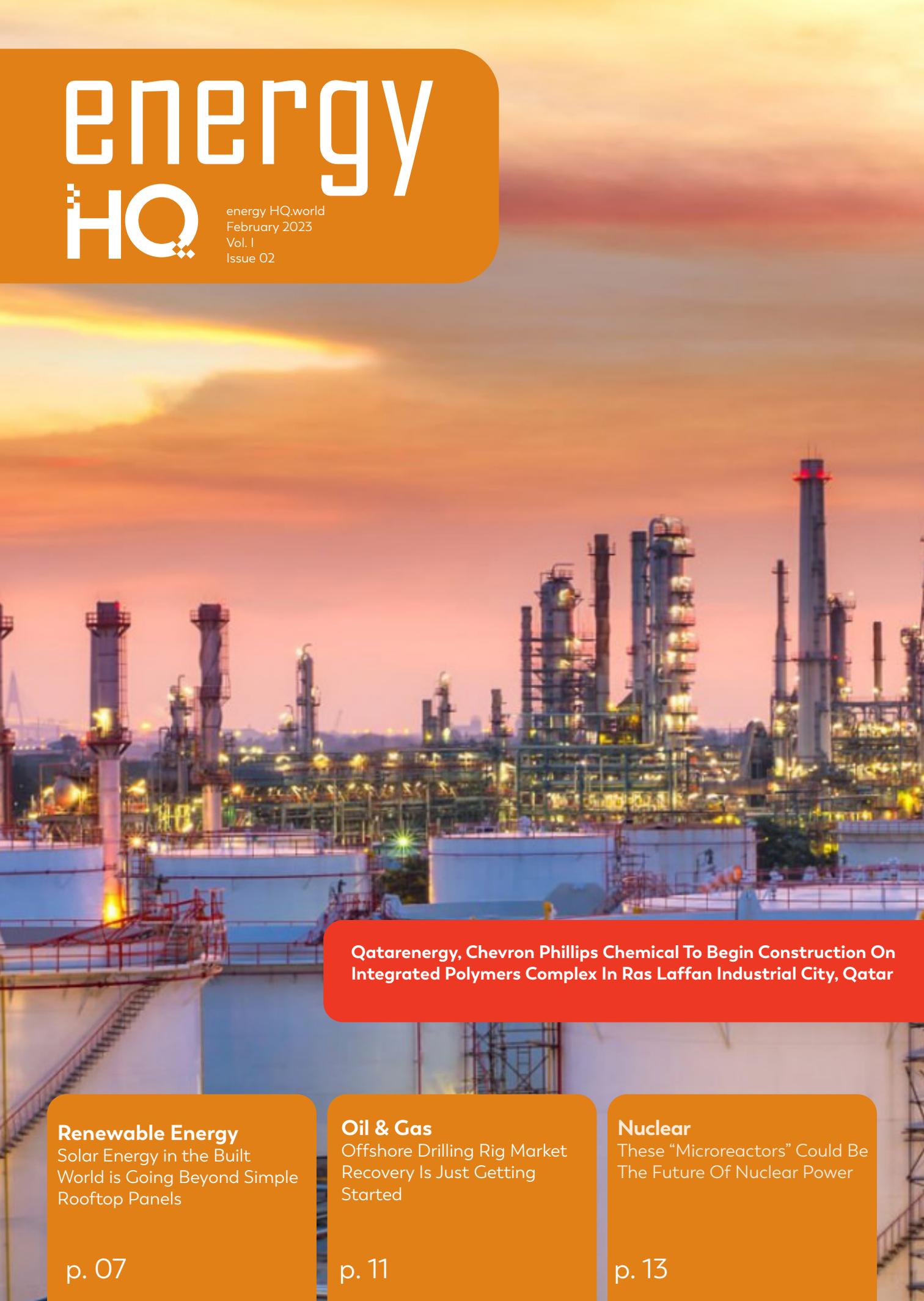


energy

HQ

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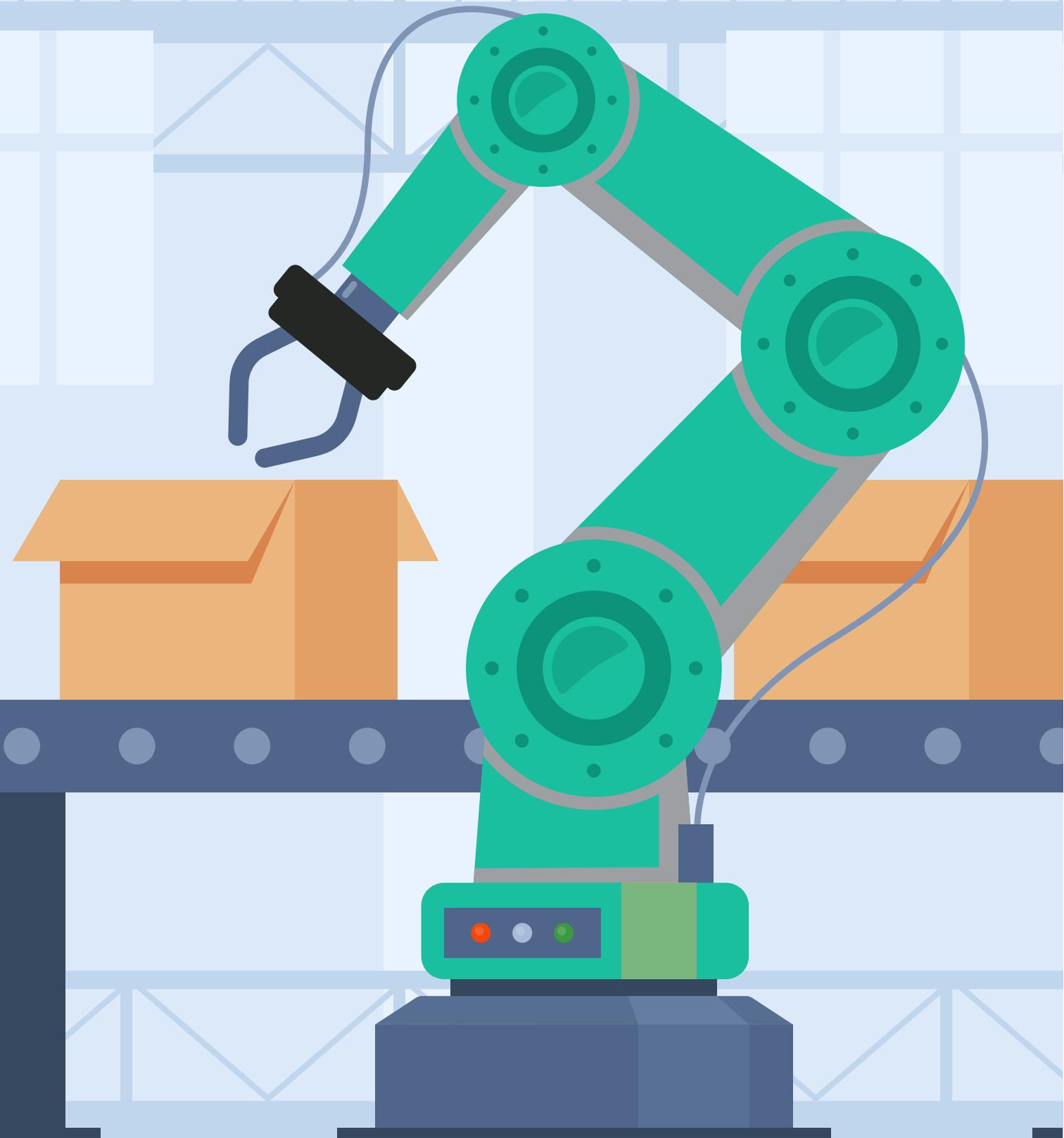
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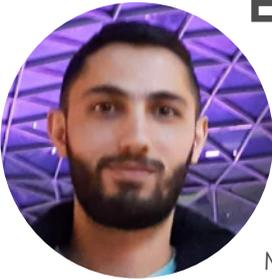
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Food HQ

Satisfying World Cravings!



S-Curves In The Driving Seat Of The Energy Transition



The energy transition may well be determined by the phenomenon of S-curves. This is because the future energy system will be characterized by manufacturing technology, not extractive fossil fuel projects.

The S-curve is a well-established phenomenon where a successful new technology reaches a certain catalytic tipping point (typically 5-10% market share), and then rapidly reaches a high market share (i.e. 50%+) within just a couple more years once past this tipping point.

Manufacturing technologies improve quickly by S-curves, scalable learning-by-doing techniques based on thousands and thousands of repeated parts and assembly. Extraction projects are almost the opposite: one-off large scale complex efforts that are difficult, potentially impossible, to replicate and improve.

The S-Curve of manufacturing represents the slow initial adoption of a new technology or innovation, followed by a period of rapid adoption and, later, a levelling-off as the technology or innovation becomes mature and reaches market domination (hence the 'S').

Many successful technologies tend to take-off spectacularly, on reaching a market share of 5-10%, to oust the incumbent technologies. Behind every successful S-Curve there has to be a successful learning curve. In a virtuous cycle, the successful technology will get cheaper the more it gets deployed and will get more deployed the cheaper it gets.

When applied to our energy industry analysis, we find the following:

Solar panels, wind turbines, and lithium-ion batteries have all followed such learning curves. Each technology has declined in cost by over 90% in the past two decades. And so their growth has followed an S-curve model.

And now that they are deployed at global scale, this theoretical insight has major real-world energy implications: wind and solar power generation is now 12% of the global total from less than 1% a decade ago, growing at 20% per year.

Thus S-Curves by their nature are disruptive and rapid. An energy transition driven by S-Curve technologies is unlikely to be smooth. As the adage goes: gradually, then suddenly.

This is even more important in the context of a primary energy system that is essentially flat, growing at a rate of about 1% per annum. When a new energy technology enters at a high rate of growth, the incumbent technology will eventually have to exit at a high rate too.

The benefits of S-Curve technologies are fairly obvious. Not only do they help sectors such as power and transport to align with the targets of the Paris Agreement, they also bring about major environmental and economic benefits to energy users.

As for S-Curves themselves, one of the key advantages of using them in energy forecasting is that they capture the non-linear nature of technology adoption and diffusion.

This is particularly useful in situations where the rate of adoption is influenced by a range of factors, such as the availability of financing, regulatory incentives, and consumer preferences.

As the energy system transitions towards deploying solar, wind, and electric vehicles (EVs) on a large scale, reducing its reliance on technologies extracting fossil fuels, the impact of learning rates and S-Curves will become significant tools to use, predict, and analyse the shape of future energy changes in various major sectors.

In This Issue!

energyHQ's February 2023 issue covers the most recent developments and events pertaining to the energy industry, as well as including valuable insights, details and spec sheets / peer reviews related to latest technologies, innovations, products, services, and projects of relevance to the industry and its audience. The article on page 7 talks about the solar panels, the article on page 16 sheds the light on Wire & Cable, and the article on page 19 focuses on Petrochemical. Additional content is also available covering the latest activities of manufacturers, importers, and exporters – worldwide! We hope you benefit from this issue's content and find it useful for your business, and welcome receiving your comments, suggestions, or feedback. Please send them to h.mourtada@1world.xyz.

Best wishes,
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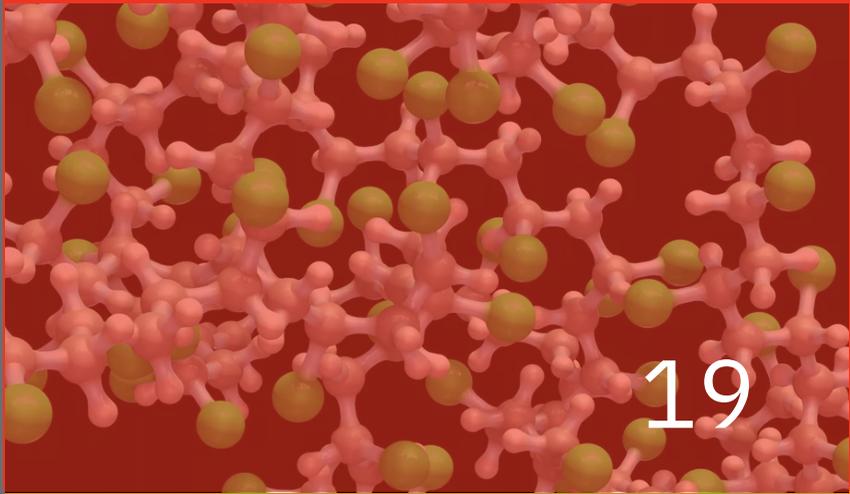
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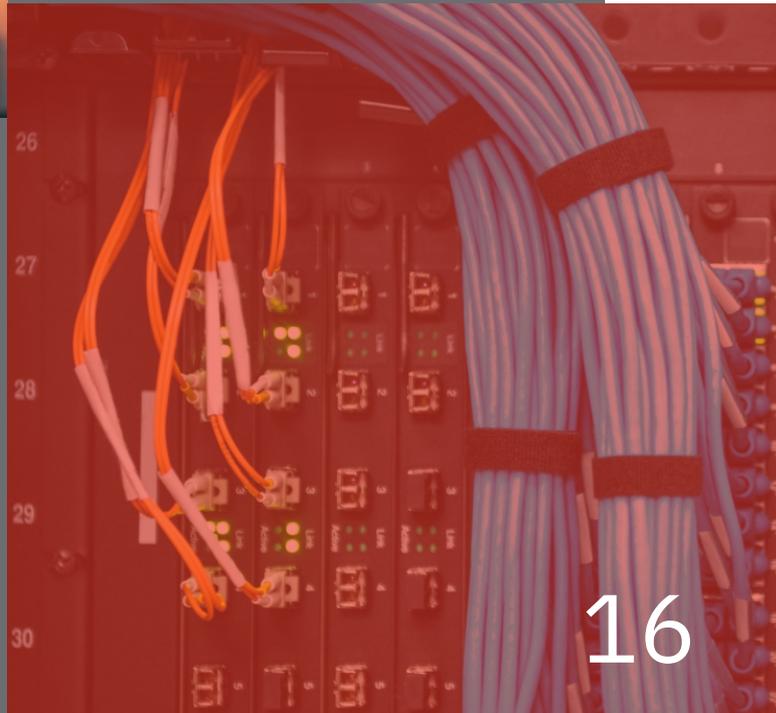
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Mexico seeks to solve differences on energy with the US and Canada

The Secretary of Economy, Raquel Buenrostro, in a talk with journalists, estimated this year, after the important rapprochements achieved to lead Mexico towards a more dynamic development in the production of renewable energy, such as solar energy, the most marked differences will be smoothed out.

He revealed that negotiations between Mexico and its counterparts within the T-MEC are progressing and a proposed solution is already in place for three of the four areas where there are differences: use of diesel, fuel storage and permits in this sector.

However, he admitted that the parties have not yet reached a solution regarding the dispatch of electric energy, especially that shared in the border area with the United States.

Buenrostro was confident that the differences with its trading partners, the United States and Canada, which are still unhappy with some aspects of Mexico's energy policy, can be overcome this year, although he did not define dates.

Mexico is destined to become one of the most important energy powers in the world because it has all the natural resources necessary to develop a multifaceted electricity industry, from thermal and hydroelectric to solar and wind power, including offshore.

The Secretary of Economy said that another of the issues within the T-MEC is that of transgenic corn, whose non-use in human food has already been decreed by the government of President Andrés Manuel López Obrador.

However, Buenrostro clarified that the doors are not closed, since it has other uses for which it would be useful.



Italian Energy Company Eni Makes Breakthrough In Wave Energy

Italian energy company Eni said Tuesday it marked a milestone in wave energy, making what it said was the world's first connection of an offshore device to the grid of an island.

A prototype development called the Inertial Sea Wave Energy Converter was connected to the grid on the Italian island of Pantelleria. The device has a peak capacity of 260 kilowatts of power, which is small -- about enough to power 260 average dishwashers -- though Eni is touting its potential.

"This experimental campaign, conducted under real operating conditions, will lead to useful results for developing the second-generation device currently under study," the company said.

Wave energy has been in development for years, with Scotland one of the early pioneers. German energy company RWE deployed a prototype for turbines that run on wave energy in the early 2010s.

In February, Scottish energy company SAE Renewables said a tidal energy array off the northern coast of Scotland is the first facility of its kind to generate 50 gigawatt-hours of electricity over its lifespan.

Construction for the first phase of the MeyGen project began in January 2015 with the installation of four tidal turbines boasting a peak capacity of 1.5 megawatts each. A second phase could start as early as 2027 and SAE is already in the planning stages for a 312 MW phase four.

Eni's device stores an energy conversion system utilizing gyroscopes inside a steel hull. Anchored to the sea floor, the entire system responds to weather and sea conditions, delivering the derived energy through an underwater electric cable.

The Italian company believes that water is an untapped energy resource that could theoretically produce "almost the same as the entire planet's demand for electricity."



Nuclear Power Revival Reaches Japan, Home Of The Last Meltdown

Twelve years after one of the worst nuclear disasters in history shook Japan and turned the public against atomic power, a global energy crisis is encouraging the country to switch its reactors back on.

Faced with rising heating bills this winter after a sweltering summer spent worrying about blackouts, more people are now reappraising the benefits of cheaper and more stable energy. Even some of those living near nuclear plants are looking beyond their fears of another radioactive disaster.

"The rising power bills are really painful. I've never seen anything like it," said Tsutomu Hirayama, a 56-year-old hotel owner in Tomioka, a coastal town between the now-decommissioned Fukushima No. 1 and its sister plant, Fukushima No. 2, both run by Tokyo Electric Power Company Holdings (Tepco). "Given the current economic downturn, rising prices and surge in fuel costs, I wonder if there's any choice but to use nuclear power in order to survive."

Prime Minister Fumio Kishida is one of several world leaders aiming to ramp up the use of nuclear power, with plans to restart more reactors that have been standing idle since the Fukushima crisis. The Great East Japan Earthquake and tsunami of March 2011 led to nuclear meltdowns at the Fukushima No. 1 power plant and brought all of the nation's reactors to a halt while the government checked them for safety. Most of them are still not in use, as successive governments avoided pushing for quick restarts amid strong public opposition.

Such resistance, however, is now waning. A survey by the Asahi Shimbun newspaper this month showed 51% of people supported the restart of reactors compared with 42% against, outweighing opponents for the first time since the national daily began polling on the topic after the disaster. An August poll by the mass-circulation Yomiuri Shimbun showed similar results.



Vital Kuwait Is Enjoying High Hydrocarbon Prices, But The Lack Of Reforms Weighs Heavily On The Oil-Rentier's Economic Outlook.

Late in January, Jassem Albudaiwi was appointed secretary general of the Gulf Cooperation Council (GCC). A former ambassador to the US, Albudaiwi is the second Kuwaiti in a row to assume leadership of this regional organization. He promises to shake it up, boosting, for example, AFAQ, the GCC's new cross-border payments system, which Kuwait joined in 2022.

Last year the Gulf monarchies were among the world's fastest-growing economies. High energy prices in 2022 pushed Kuwait's oil revenue up 85%, translating into 8.5% GDP growth and a 70% decrease in the fiscal deficit—the first drop in three years.

"While the world was faced with tensions due to the war in Ukraine and its impact on the global economic scene ... the operational backdrop in Kuwait was mainly positive, owing to the rising oil prices and to post-pandemic pent-up demand encouraging consumer spending," says Salah al-Fulajj, CEO of NBK-Kuwait, the country's largest bank, which saw its net profits increase 40.5% in 2022 from the prior year, to reach \$1.7 billion. Because it sits on the world's ninth-largest oil reserves, Kuwait is relatively sheltered from the looming global recession, soaring inflation and disrupted supply chains. Still, it faces strong challenges of its own.

The economy moves in sync with global barrel price charts. When oil prices dropped in 2014, the country recorded five years of budget deficit, which it covered with money from the General Reserve Fund—one of its two sovereign wealth funds. In 2020, when oil revenue got even thinner with the pandemic, GDP contracted 9.9% and Kuwait almost ran out of liquidity to pay civil servants' salaries.



South Africa's Minister Of Electricity: Can Ramokgopa End Load-Shedding?

South Africa's President Cyril Ramaphosa has appointed a minister of electricity - probably the least coveted job at the moment as the country is experiencing its worst-ever electricity crisis.

Millions of people are without lights every day - sometimes for up to 10 hours - in cities and towns across South Africa.

The power cuts, referred to as load-shedding, have caused much frustration, not least on the roads as traffic lights often do not work, causing gridlock.

Fortunately, some beggars and homeless people have seized the opportunity to kit themselves out in reflective vests - and to take responsibility for directing traffic.

I have been grateful for their intervention, especially when I have children in the car, worried that they are running late for school.

In return, the self-appointed traffic officers expect some money or food, which most motorists - except the most miserly - have no problem giving.

But it does make you wonder about the government. Why should homeless people have to direct traffic? Where are the hundreds of traffic officers, paid to do just that?

The worsening power cuts are a new reality for many of us, and are anxiety-inducing. There have been frequent reports of burglaries in homes and businesses, and car hijackings as criminals strike under the cover of darkness.

When the power is out mobile phone networks are also often down. This can be for hours, making communication difficult.



The Future Looks Bright for Solar Energy in Jordan: A 2023 Outlook

Jordan has been taking strides towards reducing its reliance on imported oil and gas and shifting towards renewable energy sources in recent years. One of the key renewable energy sources that Jordan has been focusing on is solar energy. The country has abundant solar resources, with an average of 300 days of sunshine per year, making it an ideal location for solar energy generation. In this article, we will discuss the outlook for solar energy in Jordan in 2023.

Jordan's GDP outlook for 2025 is positive, with the country expected to continue its economic growth trajectory in the coming years. According to the World Bank, Jordan's GDP is expected to grow at an average rate of 3.7% between 2020 and 2023, before accelerating to 4.3% in 2024 and 2025. This growth is expected to be driven by continued investment in infrastructure, including the development of new airports and seaports, as well as ongoing reforms to improve the business environment and attract foreign investment. However, there are also risks to this outlook, including the ongoing regional conflicts and the impact of the COVID-19 pandemic on the global economy.

Currently, solar energy accounts for around 5% of Jordan's electricity generation capacity. This is relatively low compared to other countries in the region, such as the United Arab Emirates and Saudi Arabia, which have made significant investments in solar energy. However, Jordan has been making progress in recent years and is expected to increase its solar energy capacity significantly in the coming years.

RENEWABLE ENERGY

07 Solar Panels



Solar Energy in the Built World is Going Beyond Simple Rooftop Panels



The rotor hub and nacelle of a new 18-MW offshore wind turbine from a subsidiary of China State Shipbuilding Corp. is shown at its factory. Source: CSSC Haizhuang

Solar energy is cheaper than ever, and its use is growing fast. A U.S. Department of Energy (DOE) report recently found that nearly half of America's solar generating capacity was installed in 2021. This is partly because prices have fallen so rapidly. Solar installation costs have dropped by more than 75 percent since 2010, and it's now often cheaper to build and operate a solar plant than buy fuel for an existing natural gas plant. The DOE's analysis was also performed before the Inflation Reduction Act passed, which contains several incentives that could supercharge solar energy's advantages even further.

While solar energy keeps growing, its use in residential and commercial buildings is surprisingly small for the time being. Only 3.7 percent of U.S. single-family homes generated electricity from small-scale solar in 2020, according to the Energy Information Administration. A similar report found that in 2018, the share of commercial buildings with small-scale solar was even tinier at 1.6 percent.

These numbers are somewhat surprising, given that solar rooftop installations aren't a new technology. Other reports show a higher share of commercial solar installations. The rate of solar adoption in buildings is proliferating, though. Residential solar installation increased by 34 percent from 2020 to 2021. Growth in commercial and industrial real estate has been slower recently because of supply chain disruptions.

Many expect the use of solar in the built world to continue rising in the coming years. And increasingly, some creative solar applications exist in buildings and other places. Most people think of rooftop panels in terms of solar, but there are also emerging uses like powering small consumer electronics. "Wearable solar" could make products like Fitbits and Apple Watches more appealing because they wouldn't need to be plugged in (as long as you go outside). Products like this may expand soon as the conversion efficiency of solar keeps improving.

Another new innovative method is transportation

powered by photovoltaic energy. Railroads, planes, cars, and even roads can be powered by solar. A new solar-power aircraft called the Solar Impulse 2 recently made news when it flew across the Pacific Ocean. Solar cars are also being unveiled, especially in Australia, where the SolarSpirit model has become popular.

The commercial real estate industry is also finding new ways to harness the sun's power. Windows that generate solar power are one new method, something that NEXT Energy Technologies installed recently at Patagonia's corporate headquarters.

Leveraging such an underutilized surface area like a building facade means solar windows have the potential to generate a significant share of onsite renewable power. The windows capture and convert infrared light, also lowering a property's heat load because of the shading qualities. Transforming glass into a solar energy generator is seen as a game-changer. Conventional silicon cells are too dense to do this, the idea required a breakthrough from a new organic thin film tech that's sprayed or painted onto surfaces. This nano-thin coating enables windows to let daylight pass through while still converting the sun's rays into electricity.

Another new solar-based technology that shows promise is Dutch-based IBIS Power's offering, the PowerNEST, which combines wind and solar in a rooftop system designed for medium- to high-rise buildings. The PowerNEST has wind turbines with spinning rotors below a grid of solar panels that sit on top like a canopy. Solar and wind boost each other's capabilities, and IBIS Power claims the technology can generate more than ten times the electricity of conventional rooftop solar panel installations.

The PowerNEST's unique modular design uses the Venturi Effect to significantly increase the wind speed through the 3-kilowatt turbines. The Venturi effect is the drop in wind pressure when it passes through a confined area. For example, this happens when high gusts of wind blow through walkways between two high-rise structures. The bi-facial solar canopy captures more sunlight at more angles above and below while being cooled by the air. The company says it can silently (that's a keyword with wind turbines on properties)

generate enough energy to fully power an entire 15-story residential building. A 550 square feet space is required for one modular unit, but the more roof space there is, the more energy the PowerNEST can provide with more units.

One of the system's advantages is that it can utilize 100 percent of the roof space because it rises 15 feet above roof level and allows room to access mechanical fixtures. A conventional solar panel array typically only takes up about 30 percent of roof space. Most of the company's focus has been on multifamily buildings, but they've generated interest from all asset classes, and it can work on most commercial properties as long as there's a flat roof.

Most of the company's installations are in northern Europe now, with five in the Netherlands.

We'll see if the PowerNEST can penetrate the U.S. commercial real estate market, though the system looks promising. Given that so few commercial properties even have conventional solar installations, probably only the most forward-thinking building owners will turn to a system like this for now. The system also isn't cheap. Installation is easy because of the modular design, but a recent Netherlands project cost €800,000 (\$827,570).

While commercial solar installations may not be as common as we think, they're accelerating. The benefits of solar energy are hard to deny at this point, and with prices falling so rapidly, we're bound to see more installations in the coming years. The uses of solar energy in commercial properties may also start looking different than what we're used to. From solar windows to innovative designs that combine solar with wind power, the commercial applications of this renewable energy source are changing fast.

benefits of solar energy are hard to deny at this point, and with prices falling so rapidly, we're bound to see more installations in the coming years. The uses of solar energy in commercial properties may also start looking different than what we're used to. From solar windows to innovative designs that combine solar with wind power, the commercial applications of this renewable energy source are changing fast.

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



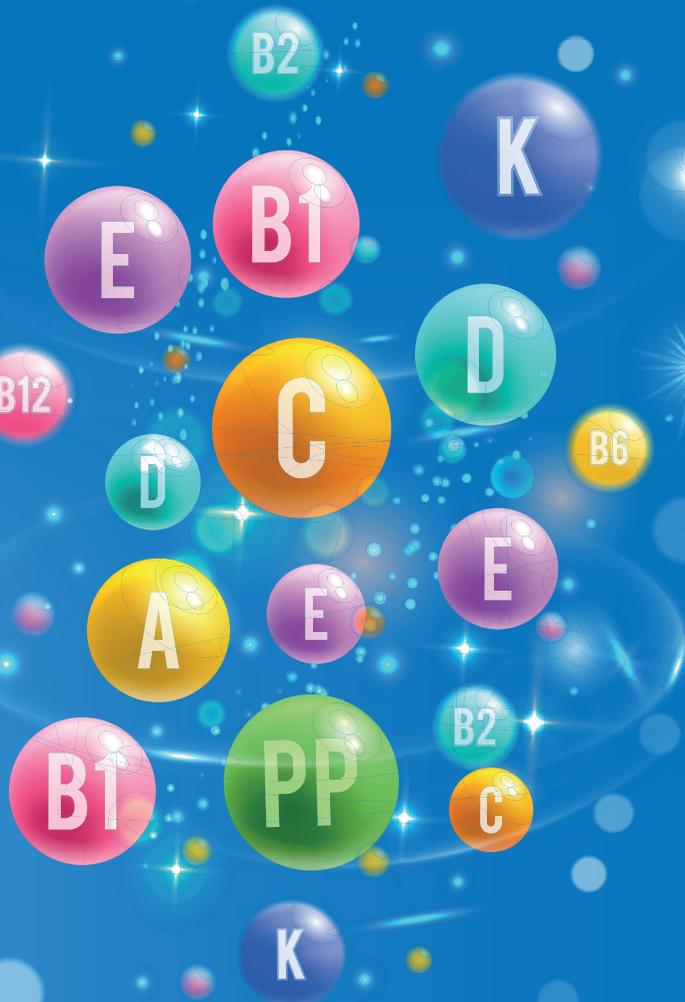
Each vitamin and mineral has its own set of physiological functions in your body



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.



OIL & GAS

11 Drilling Mast



Offshore Drilling Rig Market Recovery Is Just Getting Started



The recovery in the offshore drilling industry is just getting started, especially in the drillship and jack-up rig segments, according to market analysts.

The verdict is that the global fleet of drillships for ultra-deepwater operations is almost fully utilised, driven by activity levels in the “Golden Triangle” of the Gulf of Mexico, South America and West Africa. Esgian, the international rig market analyst, tells Upstream that drillships are “the most exciting sector right now” and that current utilisation rates “disguise how tight the offshore drilling rig market really is”.

Operators still planning to pick up a drillship this year may need to consider whether they can use a semi-submersible, as only a small handful of seventh-generation drillships have any availability remaining in 2023, and the sixth-generation drillship segment is also nearly sold out for 2023, Esgian adds.

Even looking into 2024, drillship availability is quickly filling up, meaning that only cold-stacked units and stranded newbuilds are possible.

“Esgian’s current estimate for reactivating a seventh-generation drillship is about a year or so, depending on how well the rig was maintained while it was stacked, at a cost range of about US\$80million to US\$100 million,” Esgian says.

The average ultra-deepwater dayrate has risen 58% since the start of 2022 to \$373,000 at the end of January 2023, but still 35% below the November 2013 peak, with drillships in the Golden Triangle increasingly being awarded rates of about \$450,000 per day, says market analyst Clarksons Research.

This trend could be seen in Brazil recently when Transocean’s fleet status report showed the drillships Deepwater Corcovado and Deepwater Orion renewing for long-term commitments in Brazil — three and four years respectively — for dayrates of up to \$417,000 and a new 910-day term in the same market for the Dhirubhai Deepwater KG2 earning \$439,000 per day.

“Our projections suggest that utilisation will improve in the coming years and that the market seems generally well set for further [day]rate progress,” Clarksons Research managing director Stephen Gordon says.

Similar dynamics for jack-ups

Optimistic: Clarksons Research managing director Stephen Gordon. Photo: JOERG BROCKSTEDT/SEESAW AGENCY

The global jack-up fleet is also reaching full capacity, driven by burgeoning demand in the Middle East, with solid requirements in other areas such as India, Southeast Asia and Mexico.

“Due to the increased drilling demand by national oil companies in the Middle East over the past year, 34 jack-ups have migrated from Asia, the Americas and Europe to the Middle East, and 15 more are still scheduled to migrate this year,” says Petrodata Rigs by S&P Global.

“That will be a total of 49 jack-ups being absorbed into the Middle East from the global jack-up market, with demand for more.”

Leading jack-up owner Borr Drilling expects the forecast marketed utilisation rate for the global modern jack-up fleet to exceed 95% in the coming quarters, based on expectations over near-term awards.

The stressed supply chain is also making it unlikely that the small number of jack-ups under construction “will be able to enter the marketed fleet in the near future”, Borr adds.

No new jack-ups have been ordered in the past two years, and Borr quotes Clarksons’ estimates that the newbuild cost for a high specification jack-up is currently \$260 million.

Semisub market is slower

The segment for semi-submersible drilling rigs, which operate in mid-water depths and deep water, is currently the weakest of the three main rig types, according to Esgian.

“This is due to softness in the North Sea market, notably off Norway and the UK, where recent charters have been of shorter durations than is typical of these markets.”

“As a result, some rigs from the North Sea market have found work in other regions, such as West Africa, while others continue to be bid outside the North Sea region,” Esgian says.

Analyst Westwood Energy says semisub usage will continue to be prominent in the North Sea, while noting that potential negative effects of the UK windfall tax could make operators of both semisubs and jack-ups decide not to pursue some drilling plans.

Russell Searancke

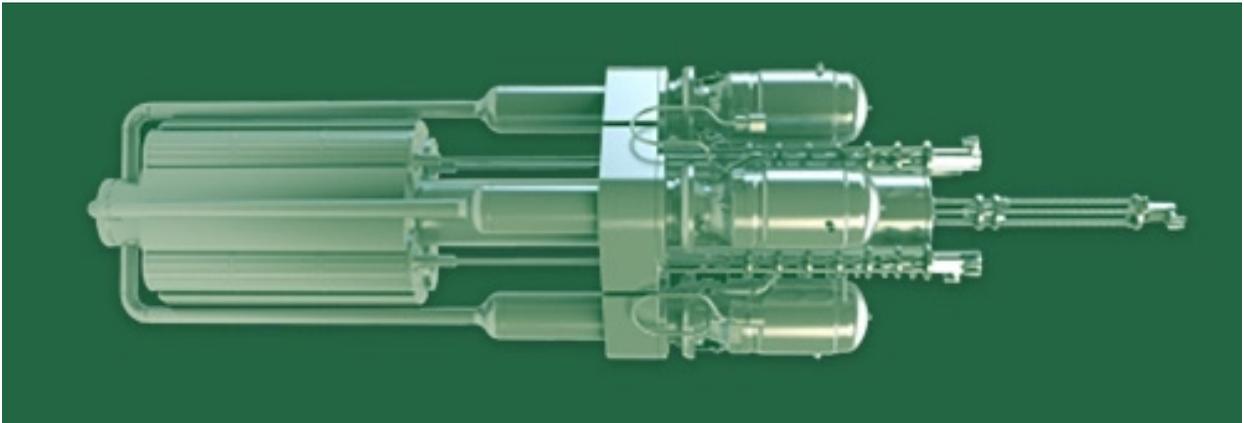
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NUCLEAR

13 Turbines



These “Microreactors” Could Be The Future Of Nuclear Power



Moxion startup aims to replace diesel generators with zero-emission electric batteries.

One of the best ways to scale up the use of clean nuclear energy in the future might be to scale down the tech, with “microreactors” that can be built and deployed in a fraction of the time required for traditional nuclear power plants. They’re being explored for use everywhere from university campuses to disaster zones and even bases on the moon.

The Nuclear Option

At nuclear power plants, atoms are split inside reactors. This process — nuclear fission — releases a tremendous amount of energy in the form of heat. That heat is then used to boil water, creating steam that spins electricity-generating turbines. Unlike the burning of coal or natural gas, nuclear fission doesn’t generate carbon emissions. It’s also more consistent than environmentally dependent sources of energy, such as solar and wind power, while taking up much less physical space than solar or wind farms.

Despite those benefits, only 10% of the world’s electricity is generated by nuclear power plants, and the power source is on the decline, with older plants closing faster than new ones are being built — and size is a major reason for this downturn.

Matters Of Size

Most nuclear power plants are massive affairs — in the US, the average facility takes up about a square mile of land and generates 1 gigawatt (GW) of power, which is about enough to power 750,000 homes.

Building such a plant today can cost upwards of \$10 billion and take 7 years, and that’s if everything

goes according to plan.

In Georgia, a project to add two 1.1 GW reactors to an existing nuclear power plant started construction in 2009 with an estimated cost of \$14 billion — the total cost of the project now exceeds \$30 billion, and construction still isn’t complete.

Rather than take on such a risky endeavor, clean energy investors are more likely to put their money into solar or wind farms, which are cheaper but require 75 and 360 times as much land, respectively, to generate the same amount of power as the steady 1 GW nuclear reactor.

“The biggest barrier to new nuclear construction is mobilising investment,” wrote the International Energy Agency in a 2019 report.

Microreactors

Rather than hoping investors will take a chance on building large nuclear power plants like the ones we already have, some experts are betting on “microreactors” as the future of nuclear energy. These in-development reactors are a 100th to 1,000th the size of traditional ones, and while they couldn’t meet the energy needs of a large city, they can be deployed in more places and could potentially power a small remote community, a military base, or even a college campus.

Because microreactors are designed to be built and assembled in factories and then shipped to a site for installation, their upfront cost is expected to be much lower. They can also be deployed quickly, which opens up their potential use in disaster relief.

“Having another option for restoring power quickly

following natural disasters would support faster restoration of critical services such as hospitals, communications, and the water supply to the local community,” wrote the US Government Accountability Office in 2020.

Looking Ahead

Microreactors are still a new technology, and the US’s Nuclear Regulatory Commission (NRC) has yet to approve a design for commercial use.

The NRC did recently approve its first small modular reactor — those are factory-made reactors larger than microreactors, but still far smaller than traditional designs — and microreactors could be next, as several groups plan to demonstrate their tech within the next five years or so.

Here are a few projects to keep your eye on:

Project Pele: In April 2022, the US Department of Defense announced that it was moving forward with Project Pele, an initiative to design, build, and demonstrate a prototype microreactor at the Idaho National Laboratory (INL).

This reactor will be in the range of 1-5 MW and is being built by nuclear energy company BWX Technologies as part of a \$300 million contract. BWXT is expected to deliver the microreactor to the INL in 2024, and the plan is for it to be operational within 72 hours of delivery.

INL will then run the microreactor for at least three years at full capacity. The US already envisions applying what it learns from the prototype to future military efforts, as well as space missions that will require us to provide power to astronauts on the moon.

Westinghouse’s eVinci: Pennsylvania’s Westinghouse Electric Company — a pioneer of nuclear power back in the 1950s, and the same company working on the expensive nuclear power project in Georgia — is developing its own microreactor: the eVinci.

This microreactor is designed to generate up to 5 MW of electricity or 13 MW of heat — essentially, rather than using the heat from fission to boil water, it can be used directly to warm homes and other buildings.

The eVinci is designed to take less than 30 days to install onsite, and while the first units are expected to cost \$90 million to \$120 million, Westinghouse believes the price could drop to about \$60 million as production increases.

The company has already begun submitting

documents needed for approval to the NRC. It hopes to have its tech licensed by 2027, and Penn State has already signed a memorandum of understanding with the company to install an eVinci on its main campus.

Radiant’s Kaleidos: In 2020, a team of former SpaceX engineers launched Radiant, a startup focused on the development of a 1.2 MW nuclear microreactor, called “Kaleidos,” that is designed to fit inside a shipping container and be installed overnight.

Radiant envisions Kaleidos replacing the diesel generators used by remote communities. The microreactor could also be installed at hospitals, data centers, and military bases to provide backup power in the event the main source of electricity fails.

Radiant hopes to have a fueled demonstration of the reactor ready by 2026, and while it hasn’t said what Kaleidos will cost, it says it expects it to be cheaper than diesel generators. For now, it will continue developing the system with researchers at the DoE’s Argonne National Laboratory.

“We plan to be the first new commercial reactor design to achieve a fueled test in more than 50 years,” said Radiant CEO Doug Bernauer.

The bottom line

While many microreactor designs are expected to be safer than full-sized plants, they still produce a small amount of radioactive waste that needs to be stored. Many also require high-assay low-enriched uranium, which is easier (although not easy) to make into nuclear weapons than the less enriched fuel used in traditional reactors.

Besides those limitations, it would also take a lot of microreactors to decarbonize the world — but that doesn’t mean the tech couldn’t be a key piece of the clean energy puzzle, along with its larger counterpart, the small modular reactor.

“While the role of large reactors continues to be important to our nation and others around the world, customers needs [sic] product choice and that is precisely what these smaller systems provide,” writes the DoE.

ELECTRIC

16 Wire & Cable



High Voltage Cable Global Market Report 2023

Global High Voltage Cable Market



The global high voltage cable market grew from \$40.34 billion in 2022 to \$49.46 billion in 2023 at a compound annual growth rate (CAGR) of 22.6%. The Russia-Ukraine war disrupted the chances of global economic recovery from the COVID-19 pandemic, at least in the short term. The war between these two countries has led to economic sanctions on multiple countries, a surge in commodity prices, and supply chain disruptions, causing inflation across goods and services, and affecting many markets across the globe. The high voltage cable market is expected to grow to \$130.05 billion in 2027 at a CAGR of 27.3%.

The high voltage cables market consists of sales of tape shielded, drain wire-shielded, general cable uni-shield, concentric neutral (CN), and jacketed concentric neutral (JCN). Values in this market are 'factory gate' values, that is the value of goods sold by the manufacturers or creators of the goods, whether to other entities (including downstream manufacturers, wholesalers, distributors, and retailers) or directly to end customers.

The value of goods in this market includes related services sold by the creators of the goods.

High voltage cables refer to a wire or cable that is rated for more than 1000 volts. These cables are also used at locations such as power production units, solar and wind energy production units, the instrument industry, and power transmission.

It is used for the transfer of electricity at high voltage and is used for various types of applications like direct power transmission, ignition systems, alternating currents, and other instruments.

North America was the largest region in the high voltage cables market in 2022. Asia-Pacific is expected to be the fastest-growing region in the forecast period.

The regions covered in the high voltage cables market report are Asia-Pacific, Western Europe, Eastern Europe, North America, South America, Middle East and Africa.

The main types of installations in the high voltage cable market are overhead, submarine and underground. A submarine refers to a

vessel that can be submerged and navigated underwater, usually built for warfare and armed with torpedoes or guided missiles. The voltages are 50kV-110kV, 115kV-330kV and >330kV. The end-users involved are utility and industrial.

The increase in electricity demand is expected to propel the growth of the high voltage cables market going forward. Electricity refers to a fundamental form of energy observable in positive and negative forms that will occur naturally (as in lightning) or is produced (as in a generator) and that has been expressed in terms of the movement and interaction of electrons.

High-voltage cables have been used in power transfer and distribution, national transfer network cabling, electric stations, and municipal networks. The rapid growth in electricity demand is expected to boost utilization of high voltage cables, as they are widely used in power distribution and industrial applications. For instance, in July 2022, according to a press release published by International Energy Agency, a Paris-based autonomous intergovernmental organisation, following the 2021, 6% increase in the electricity demand, the global electricity demand is projected to expand by 2.4% in 2022, matching its average growth rate over the five years preceding the COVID-19 pandemic. Therefore, the increasing consumption of electricity is expected to boost demand for high voltage cables during forecast period.

Strategic partnerships and collaborations are a key trend gaining popularity in the high voltage cables market. Companies operating in high voltage cable are undergoing partnerships to strengthen their position in the high voltage cable market.

For instance, in March 2022, Taihan Cable & Solution a south Korean company partnered with the Saudi company Mohammed Al-Ojaimi Group and entered into a joint venture for the establishment of a High voltage cables plant in Saudi Arabia. This collaboration hopes to capture the market in the region through localized production of the product.

Furthermore, in October 2021, Gulf Cable & Electrical Industries Company Co, a Kuwait-based manufacturer of electrical cables partnered with Riyadh Cables Group Company, a Saudi Arabia-based manufacturer of high voltage cables

for the establishment of high voltage cables production factory in Kuwait. This collaboration with Riyadh Cables group aims at achieving the maximum benefit from the market's capabilities by diversifying the company's products and its revenue sources in a way that serves shareholders' interests and goals.

In March 2022, Ravin Group, an India-based solutions provider in the area of cables, solar, EHV projects & power equipment, acquired Cable Corporation of India Ltd for an undisclosed amount. Through this acquisition, The Ravian Group will be able to enhance its manufacturing capacity from 250 V up to 400 V and manufacture different voltage of cables and extend the company's presence across the country.

The Cabel Corporation India is an India-based manufacturer of high voltage cables.

The countries covered in the high voltage cables market report are Australia, Brazil, China, France, Germany, India, Indonesia, Japan, Russia, South Korea, UK, and USA.

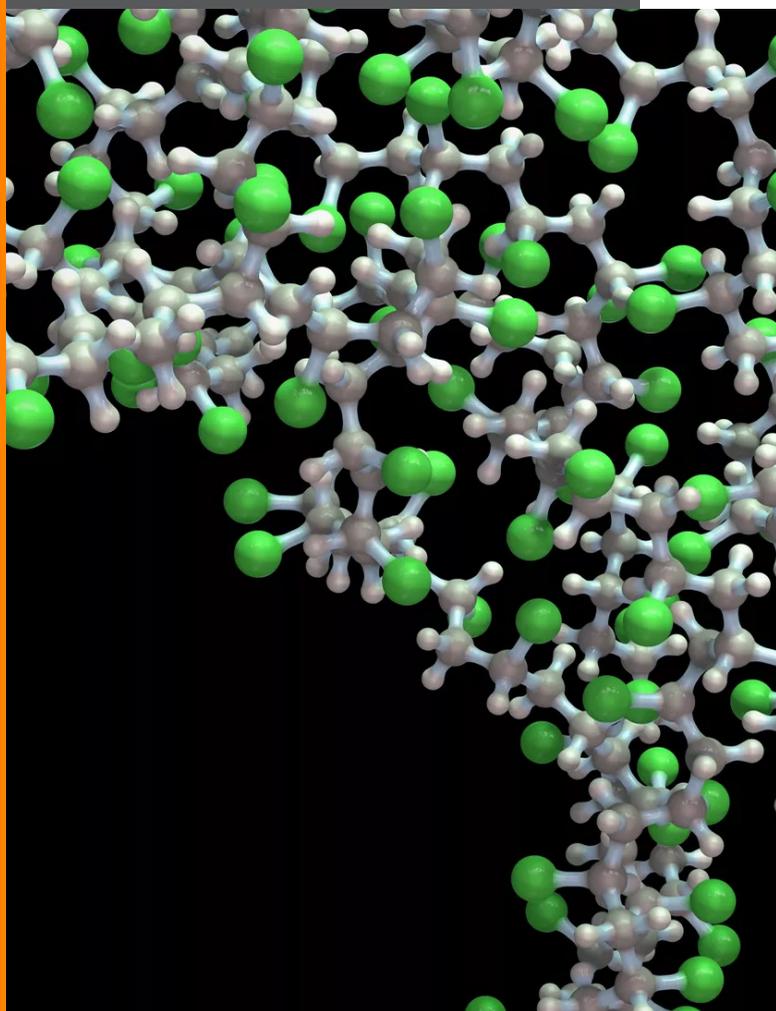
The market value is defined as the revenues that enterprises gain from the sale of goods and/or services within the specified market and geography through sales, grants, or donations in terms of the currency (in USD, unless otherwise specified).

The revenues for a specified geography are consumption values that are revenues generated by organizations in the specified geography within the market, irrespective of where they are produced. It does not include revenues from resales along the supply chain, either further along the supply chain or as part of other products.

The high voltage cable market research report is one of a series of new reports that provides high voltage cable market statistics, including high voltage cable industry global market size, regional shares, competitors with a high voltage cable market share, detailed high voltage cable market segments, market trends and opportunities, and any further data you may need to thrive in the high voltage cable industry. These high voltage cable market research report delivers a complete perspective of everything you need, with an in-depth analysis of the current and future scenario of the industry.

COVER STORY

19 Petrochemicals



Qatarenergy, Chevron Phillips Chemical To Begin Construction On Integrated Polymers Complex In Ras Laffan Industrial City, Qatar



An agreement marking the positive final investment decision for the project was signed by His Excellency Mr. Saad Sherida Al-Kaabi, the Minister of State for Energy Affairs, the President and CEO of QatarEnergy, and by Bruce Chinn, President and CEO of Chevron Phillips Chemical, at a ceremony in Doha. The companies created a joint venture, Ras Laffan Petrochemicals, in which QatarEnergy owns a 70% equity share and Chevron Phillips Chemical owns 30%.

The 435-acre project site will include an ethane cracker with a capacity of 2080 KTA of ethylene, making it the largest ethane cracker in the Middle East and one of the largest in the world. It will also include two high-density polyethylene derivative units with a total capacity of 1680 KTA.

Chevron Phillips Chemical will provide project management services. Construction began with early works at the site in June 2022, and startup is expected in late 2026. The engineering, procurement and construction of the ethane cracker will be executed by a joint venture between Samsung Engineering CO., Ltd. and CTCL Corporation. Tecnimont S.p.A. will execute engineering, procurement and construction for the polyethylene units.

The polyethylene units will use Chevron Phillips Chemical's MarTech™ loop slurry process to produce high-density polyethylene, which will

primarily be exported from the state of Qatar. Polyethylene is used in the production of durable goods like pipe for natural gas and water delivery and recreational products such as kayaks and coolers. It is also used in packaging applications to protect and preserve food and keep medical supplies sterile.

The facility will be constructed with modern, energy-saving technology and use ethane for feedstock, which along with other measures, is expected to result in lower greenhouse gas emissions than similar global facilities.

"At Chevron Phillips Chemical, we continue to grow our global asset base where there is access to reliable, affordable feedstock. This investment will help meet global demand for polyethylene products," Chinn said. "We are excited to expand on the long and successful history we have with QatarEnergy to safely construct and operate world-scale facilities."

Attending the signing ceremony were senior executives from QatarEnergy, Chevron Phillips Chemical and its owner companies, Chevron U.S.A. Inc. and Phillips 66.

Chevron Phillips Chemical and QatarEnergy operate joint ventures in Qatar and recently announced construction of a similar integrated polymers facility in Orange, Texas.

“

15,000 Watt GP15000E Portable Generator, 16.0 gal., Gasoline Portable Generator, Conventional, Gasoline, Generator Rated Watts 15,000 W, Surge Watts 22,500 W, 120/240V AC, Generator Amps 125/62.5, Generator Engine Brand Generac, Generator Starter Type Electric, Generator Outlets 12V DC 10A, 14-50R 120/240V AC 50A, 5-20R 120V AC 20A Duplex, 5-20R 120V AC 20A GFCI Duplex, L14-30R 120/240V AC 30A Locking, L5-30R 120V AC 30A Locking, CARB Compliant No, Circuit Breaker Yes, Brushless Engine Alternator, Engine Displacement 992 cc





GENERAC **GP15000E**
15000 WATT MAX. 22500 WATT SURGE

HOT

PRODUCTS

23 Electric Vehicles



Charging Into The Future: The Transition To Electric Vehicles



Ready to charge into the future? The market for electric vehicles (EVs) has grown rapidly in recent years and is expected to continue to grow at a fast pace over the coming decade. Electric car sales in the United States increased from a mere 0.2 percent of total car sales in 2011 to 4.6 percent in 2021.

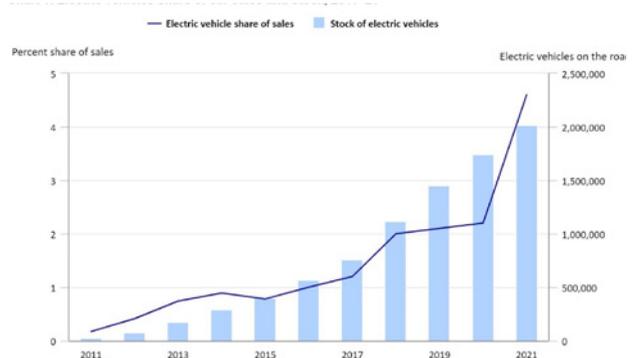
Although forecasts for the rate of EV adoption over the next decade vary widely given rapid changes in both government policies and the auto manufacturing industry in recent years—many forecasts expect a strong acceleration in EV adoption. S&P Global Mobility forecasts electric vehicle sales in the United States could reach 40 percent of total passenger car sales by 2030, and more optimistic projections foresee electric vehicle sales surpassing 50 percent by 2030.

Factors Contributing To A Growing Electric Vehicle Market

There are several factors contributing to the growing EV market such as increased consumer interest, government policies, and buy-in from the auto industry.

Factors Driving Up Consumer Demand

Consumer demand for EVs has risen significantly over the past few years. The number of EVs on the road jumped from about 22,000 to a little over 2 million over the 2011–21 decade.³ (See chart



1.) Several factors are expected to continue to drive consumer demand for EVs over the 2021–31 decade: environmental concerns, greater vehicle choice, improved battery capacity, and cost savings.

A YouGov poll of drivers shows that the top reason for considering buying an EV was to protect the environment. Similarly, a survey from CarMax found that most car owners were concerned about fuel emissions and perceived the main advantage of EVs to be that they are good for the environment.

In addition, consumers can now choose from a wider range of vehicles, as manufacturers have introduced a greater variety of EV models into the market, including the much-preferred large-

size vehicles. Up until recently, compact cars like sedans and hatchbacks were virtually the only EV options available, yet trucks and SUVs accounted for about 78 percent of new vehicle sales in the United States in 2021. Choice is only set to expand, with dozens of new models expected to debut by 2024.

Improved vehicle range is another factor that should encourage higher uptake of EVs. Range anxiety—the fear of running out of battery power before reaching a charging location—has long deterred consumers from purchasing an EV. However, battery capacity and range have greatly improved (from a median of 68 miles on a single charge in 2011 to 234 miles in 2021) and is expected to continue to increase with further advances in battery technology.

Furthermore, studies have found that switching to EVs saves consumers money, especially over the long run. For example, in addition to saving on fueling costs, EVs yield about \$8,000 to \$12,000 worth of savings on maintenance over the lifetime of the vehicle. Moreover, battery pack costs should continue to fall, bringing EV prices closer to those of conventional cars.

Government Policies Driving Demand For Electric Vehicles

The Infrastructure Investment and Jobs Act, signed into law in November 2021, allocated \$7.5 billion to building out a nationwide charging network. The funding has initially focused on installing fast chargers along the interstate highway system, which would help mitigate battery range fears and enable long-distance travel. The legislation also included large investments to upgrade the nation's power grid—key for accommodating rising electricity demand as EV adoption grows—and to expand domestic battery production and recycling capacity. On the consumer side, tax credits spur demand. For instance, the Inflation Reduction Act, signed into law in August 2022, extended a tax credit of up to \$7,500 for the purchase of new EVs until 2032 and provided, for the first time, that tax credits could be used for purchasing used EVs.

State government policies also offer incentives, such as rebates, to encourage EV ownership by helping offset the high upfront costs of EVs. A number of states have also implemented a

zero-emission vehicle (ZEV) program, which requires auto manufacturers to sell a set quota of battery-electric or plug-in hybrid-electric vehicles, and have passed laws that ban the sale of new gas-powered vehicles by 2035.

Automaker Commitments To Electric Vehicles

Automakers have unveiled strategies to speed up the electrification of new cars and trucks. Most major companies plan to roll out dozens of new electric vehicle models over the next decade, are implementing electric vehicle sales targets, and committing to eventually end fuel-powered vehicle production. To achieve their electrification goals, automakers plan to invest billions of dollars over the next decade in research and development and building new manufacturing plants, particularly for battery production.

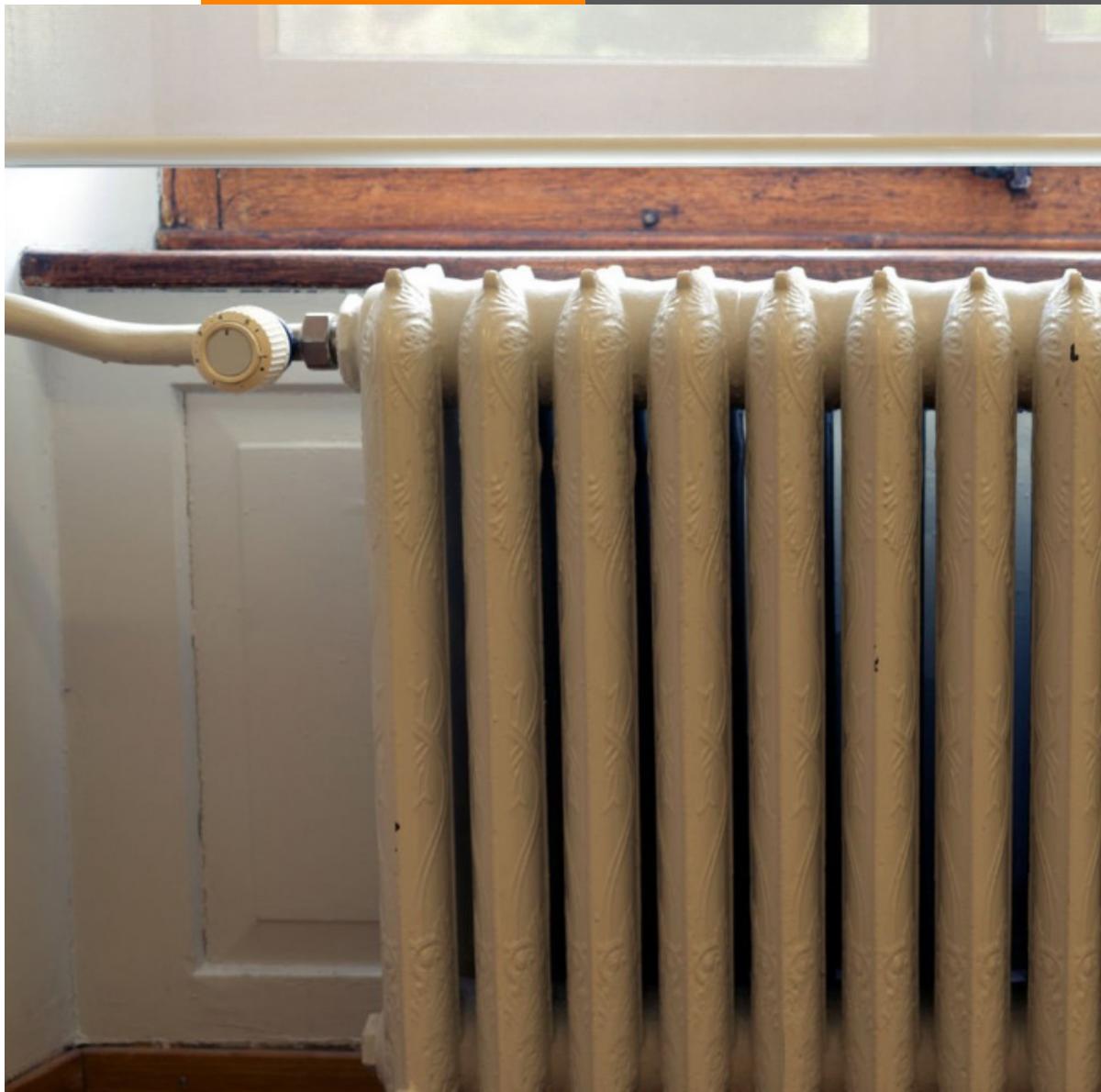
Occupations Involved In The Electric Vehicle Transition

The vehicle electrification trend is expected to generate demand for labor in three main areas: the design and development of electric vehicle models, the production of batteries that power them, and the installation and maintenance of charging infrastructure. Below is an overview of key occupations that will be involved in these activities. This is not intended to be an exhaustive list of occupations that will be impacted by the growing adoption of electric vehicles, but an overview of several important occupations that will contribute to the EV transition.

The employment projections presented for these occupations represent the total employment change for these workers across the economy. Since many of these occupations are employed by large sectors, such as manufacturing or construction, their employment outlook for the 2021–31 decade is not just influenced by the increase in electric vehicles. Other factors such as expected demand for various manufactured goods, increased automation in manufacturing, and future demand for new residential and nonresidential buildings, are likely to affect employment. Additionally, demand for occupations can vary across different industries and fields.

SERVICES

26 Space Heating



Low Exergy Concepts For The Heat Supply Of Existing Multifamily Houses



The heat pump hydraulics of the HEAVEN system exploits the synergies of air (availability, cost) and geothermal energy (temperatures, efficiency) and solves the problem of limited space in cities.

Heat pumps are a key technology for the heat transition, yet their implementation in existing multifamily buildings is a challenge. These buildings place special demands on the transfer systems for space heating and domestic hot water as well as on environmental heat utilization. In the joint project LowEx in the Building Stock, solutions for heat pump, heat transfer and ventilation systems in retrofitted multifamily homes were analyzed, developed and demonstrated.

In the final project report, the Fraunhofer Institute for Solar Energy Systems ISE, the Institute for Sustainable Systems Engineering INATECH of the University of Freiburg and the Karlsruhe Institute of Technology KIT present the resulting solutions and some exemplary demonstration objects.

A look at the building sector today makes it clear that the biggest lever for the heat transition are existing buildings: 62 percent of existing buildings were constructed before Germany's first Wärmeschutzverordnung (Thermal Insulation Regulation) in 1977, and these currently account for around two-thirds of the final energy consumption in the sector.

Heat pumps offer considerable potential for reducing CO₂ emissions if they are used in so-called LowEx, or low exergy, systems. Due to low temperature differences between the heating

medium and the useful heat, heat pumps can operate very efficiently.

While heat pumps are increasingly used in single and two-family homes in new and existing buildings, they are still not widespread in multi-story residential buildings. Fraunhofer ISE has been working for many years on this topic which has gained growing attention recently due to increasing energy prices.

"The challenges here lie both in the higher heat output required from the heat generator and in the building location that is often in densely built-up neighborhoods. In addition, radiators and domestic hot water systems in multifamily buildings often require high flow temperatures," explains Jeannette Wapler from Fraunhofer ISE. Therefore, the solutions in the project focused on the two topics of tapping environmental sources in the built environment and lowering system temperatures.

Holistic Analysis Of Heat Supply And Renovation

For the analysis, system concepts were allocated to different types of multifamily buildings by carrying out systematic investigations and evaluations. Here the user comfort, economic aspects and achievable reduction in CO₂ emissions were considered. The research team conducted a holistic analysis of the heat supply, from the low-temperature source up to the heat transfer to the rooms.

In the analysis, the potential of implementing solar components on the building envelope, the possible combinations of environmental heat sources and the use of hybrid systems were considered, among other things.

New Lowex Technologies For Multifamily Houses

The research team worked with industrial partners to develop new LowEx components and systems for multifamily houses in five subprojects. For example, a multi-source heat pump system was developed together with the heating manufacturer Viessmann in the HEAVEN project.

In city centers, there is often not enough space to drill bore-holes for geothermal probes. The use of outdoor air as a heat source is comparatively inefficient and has a higher noise emission. The multi-source heat pump system combines the advantages of the two heat sources: outside air and ground. With this combination, a smaller drilling area is achieved yet the high efficiency of a brine heat pump is still achievable.

“Decentralized indoor ventilation also plays an important role in the energy retrofit of existing multifamily houses. There is considerable energy-saving potential that is yet untapped in this area. Also, subsequent installation is significantly easier and more cost-effective,” explains Prof. Andreas Wagner from KIT. In the project, the control of decentralized ventilation systems was optimized and a method for evaluating these devices was developed.

To do this, an occupant-centered, self-learning controller for decentralized pendulum fans was developed at Fraunhofer ISE and successfully demonstrated in the KIT Energy Smart Home Lab.

Demonstrators Prove Feasibility Of Heat Pumps In Existing Buildings

The supply technologies developed in the singular sub-projects were demonstrated in three exemplary refurbishment projects. Detailed measurements and evaluations accompanied the installations in the multifamily houses. “The collaborations with the housing industry, the heat pump industry and the energy suppliers, who all contributed their different perspectives to the project, were very valuable,” explains group leader Dr. Constanze Bongs from Fraunhofer ISE.

The scientists analyzed both the performance of the low exergy systems installed as well as the energy retrofit process itself.

In cooperation with KES Karlsruher Energieservice GmbH, the team realized a complex energy supply concept for five existing apartment buildings with 160 apartments in Karlsruhe-Durlach. The new energy supply concepts are based on a smart combination of technologies: A photovoltaic system is installed on each of the five building roofs. For two of the buildings, heat pumps and a peak-load gas boiler were installed to supply heat.

To achieve low-CO₂ heat generation in these buildings, the heat pumps were designed to have the maximum possible coverage rate with the gas boiler operating correspondingly seldom. In one of these buildings, a heat pump system with a combined heat source (outside air, geothermal heat) which was developed in the HEAVEN project was installed. Another heat pump system uses hybrid PVT collectors as the only heat source.

The three other buildings are connected to a local heating network supplied by natural gas CHP units. The electricity generated from the systems is used to economically operate the decentralized heat pumps. The heat pumps, CHP units and PV systems are all interconnected and controlled by an energy management system in order that the heat pumps operate as economically as possible using locally generated electricity.

In the first six months of operation, the HEAVEN multi-source hydraulics achieved high source temperatures with an average value of 8 degrees Celsius, which contributed to a good annual performance factor of 3.2 during the first half year of operation (February—July 2022) in which the evaluations took place. The fact that the peak-load gas boiler accounted for 31 percent of the heat supplied is primarily due to the high temperature requirements for hygienic domestic hot water.

Overall, the system achieved CO₂ equivalent emission savings of 42 percent relative to the project start. If compared relative to the original uninsulated building construction in 1963, the emission savings are equivalent to 73 percent. Optimized operation with lower gas consumption, higher heat pump efficiency or using an electricity mix with less CO₂ intensity can further reduce CO₂ emissions in the future. The model energy concept can be transferred to other neighborhoods with existing multifamily buildings.

TECHNOLOGY

29 Sensors & Switches



Advanced Power Grid Sensors and Switches Reduce Downtime and Improve System Reliability



Modern society relies heavily on electricity. As such, it's a real drag when power is lost. The U.S. Energy Information Administration (EIA) reports that the average U.S. electricity customer experienced more than eight hours of electric power interruptions in 2020, the most since the agency began collecting electricity reliability data in 2013.

The numbers were inflated that year due to a bevy of hurricanes and major storms. When extenuating circumstances are excluded from the data, the average duration of interruptions customers experience is consistently about two hours annually. Many people would say that's still too high, so power companies are constantly looking for ways to reduce outages and their durations.

Smart Grid Technology

One company that has taken outage reduction seriously is PPL Electric Utilities, part of the PPL Corporation family of companies. PPL Electric delivers electricity to more than 1.4 million homes and businesses in eastern and central Pennsylvania. The company's roughly 2,000 employees serve customers in 29 counties, maintaining more than 50,000 miles of power lines.

Several years ago, PPL Electric embarked on a

grid modernization strategy to improve its power distribution system. The company partnered with GE's leading industrial software company, GE Digital, for much of the work. Among the smart grid technologies employed in PPL Electric's enhancement project was a module called Fault Isolation Service Restoration, or FISR, part of GE Digital's Advanced Distribution Management Solution (ADMS) software.

FISR is facilitated through the deployment of sensors and switches across the grid. These smart devices allow the segmenting of customers into smaller spans. If an outage happens, the system can automatically reroute power around trouble spots to get most customers restored within seconds, keeping the outage contained without any human intervention. PPL Electric was the first utility to centrally integrate GE Digital's FISR to automate restorations, and that network of smart devices, coupled with an advanced software system, has proven to be a solid investment, creating a self-healing grid that delivers improved reliability and stability.

A Streamlined Outage Restoration Process

Prior to the implementation of GE Digital's ADMS, PPL Electric managed outages through a variety of means. Its previous outage management

system utilized topology and paper maps. The fault locations were determined through either circuit patrols in the field or split-and-test processes. “Before building a self-healing system, our old process required our system operators to manually identify the proper switchings and then dispatch line crews to execute the transfers locally in the field. In addition to relying heavily on human intervention, it was a lengthy process to restore power to our customers,” Bashar Jarrah, manager of Operations Engineering and Energy Resource Management at PPL Electric, told POWER.

The new process provided more visibility on the fault locations for the operators, who are now able to identify the locations quickly and use the knowledge to make more intelligent operational decisions. Additionally, operators are now able to remotely execute the switching steps via telemetry, thus reducing the duration of restoration from an average of two hours to about two to three minutes with FISR. This also minimizes the number of customers impacted by outages.

Jarrah described how a possible real-life fault scenario might unfold. “If a feeder circuit breaker trips due to an equipment failure or a tree falling on a section of power line, the smart devices that exist between the circuit breaker and the fault location will sense a fault current. That information is sent back to ADMS. Additionally, the devices downstream of the fault indicate they did not sense a fault current, which is also relayed back to ADMS,” he explained. “Meanwhile, ADMS autonomously creates a plan to open the last device that sensed fault current and open the first device that did not, then close the feeder circuit breaker and a tie to the neighboring feeder. This reroute of power keeps as many customers in service as possible while we take care of the repairs.”

PPL Electric estimates the system has saved about 1.4 million customer outages since its deployment. It says customers today have 30% fewer outages than they did 10 years ago, and recent statistics are proving to be even better. PPL Electric said in 2021 it reduced the total number of outages by 34% compared to the average over the past five years, a further testament to the value of smart grid improvements.

A Long Road Worth Traveling

The multi-year smart grid execution process involved many tasks, including updating standards, developing and implementing asset optimization schemes, storm hardening, upgrading communications infrastructure, deploying advanced operations systems, and increasing the penetration of devices in a priority system that addressed largest impacts first. Three-phase devices, mid circuits, and at-the-tie locations were fundamental considerations in the plan.

To maximize benefits from its investments, PPL Electric focused on completing the bulk of its annual smart grid work before storm season each year. Furthermore, because several steps are often needed to accommodate installation, commissioning, and configuration of each device in the field, project managers and planners worked hard to develop innovative methods and streamlined processes to reduce many tasks into a single trip to the field. This led to improved efficiency and reduced costs.

“The biggest challenge was updating our infrastructure and getting all devices, including legacy equipment such as breakers and reclosers, to participate in the scheme alongside the advanced technology,” Jarrah said. In the end, however, the benefits have extended beyond simply minimizing unplanned outages. “Installing the devices in a strategic methodology allowed us to utilize the new sectionalizing devices during planned maintenance activities as well, which expedited restorations and improved process efficiency.”

PPL Electric’s smart grid is also improving data and analytics, bolstering other reliability efforts. The data helps PPL Electric make informed decisions about maintenance and investments. Other benefits include the ability to pinpoint issues, allowing the dispatch of crews to exact locations; a Distributed Energy Resource Management System (DERMS) that can monitor two-way power flow; and advanced meters that enable customers to see usage. PPL Electric is using its advanced technology to build the grid of the future, one that is likely unrecognizable to utility workers of past generations.

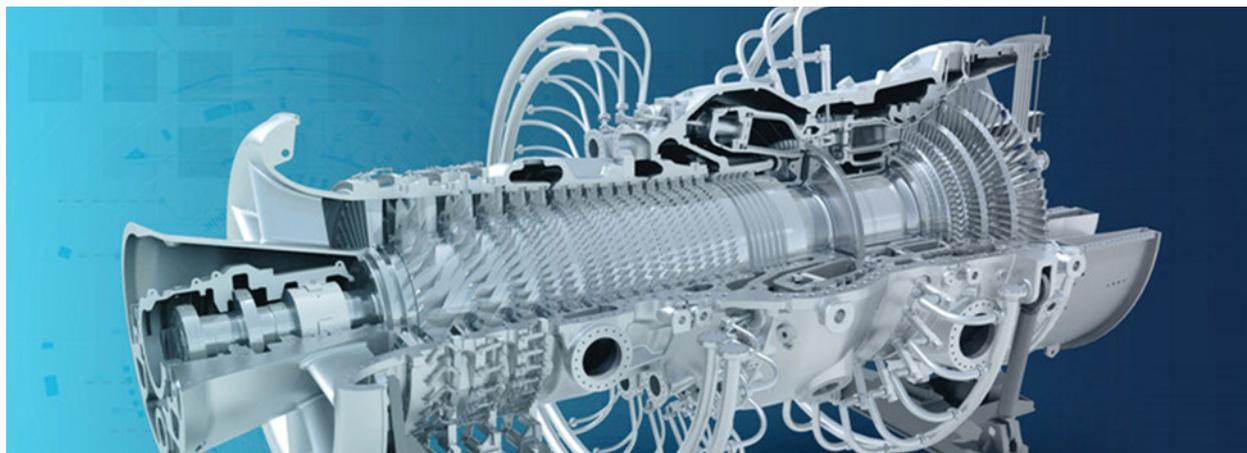


COUNTRY
REPORTS

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EnergyAustralia Modernizes Tallawarra A Power Plant to Support Energy Transition in Australia



EnergyAustralia Modernizes Tallawarra A Power Plant to Support Energy Transition in Australia

GE (NYSE: GE) today announced a new order for its first High-Efficiency (HE) upgrade for the GT26 fleet to be selected in Australia. In 2024, GE will modernize EnergyAustralia's Tallawarra A power plant, powered by a GT26 gas turbine installed nearly thirteen years ago, with the HE upgrade, a proven solution that was first introduced for the GT26 gas turbine in 2019. This solution aims to provide the Tallawarra A power plant, located in Yallah on the western shore of Lake Illawarra in the state of New South Wales (NSW), with a leap forward in efficiency and output, supporting the expected energy demand following the closure of the coal fired 1,680-megawatt Liddell plant in the Hunter Valley region.

NSW requires fast-start gas-fired generation to support renewables growth as coal plants phase out of operations. Before the Tallawarra gas-fired power station commenced operations in January 2009, the site was a 320MW coal-fired power station which operated between 1954 and 1989. Now, it is a combined cycle station with fast-start capability, which produces less carbon emissions than conventional coal-fired power stations. The gas-fired power station's generation capacity is 440 MW – which is the equivalent power to supply up to 200,000 Australian homes.

“We recognize the value of constantly evolving technology. With this innovative upgrade, Tallawarra A will benefit from improved efficiency and reduce carbon emitted per MWh, in line with

our goals to accelerate the clean energy transition” said Michael Heazlewood EnergyAustralia project leader for the HE Upgrade. “EnergyAustralia has a great relationship with GE. We are working with GE to construct the adjacent Tallawarra B plant that will operate as Australia's first peaking plant capable of using a blend of natural gas and hydrogen in its operations. In the future, we envisage the modernized asset powering Tallawarra A may also leverage the infrastructure and hydrogen supply powering the Tallawarra B plant and be able to operate on blends of hydrogen and natural gas as we transition to a lower-carbon energy future.”

GE's HE upgrade for the GT26 blends cutting-edge technology from GE's industry-leading F and H class fleets with additive manufactured parts and innovations in aerodynamics, material science and combustion dynamics. The significant performance improvement that the HE solution delivers is attributable to technology breakthroughs across every major component of the GT26 frame - turbine, compressor and combustor, that will help decrease fuel costs while increasing full-load output and extend maintenance intervals. In addition, Tallawarra A power plant maintenance intervals will be extended to 32000 weighted operating hours which translates to up to 44000 equivalent operating hours for a typical daily start and stop operating profile, among the longest interval in the industry for this platform.

Oman Floats Tender For Two Solar Projects With 1.1GW Combined Capacity



Noor Abu Dhabi solar plant

Oman Power and Water Procurement Co (OPWP), the sultanate's sole procurer of electricity and water, has invited proposals for developing two solar projects with a combined capacity of around 1.1GW.

In a bid to diversify the energy sources and to reduce dependence on natural gas for the production of electricity, the sultanate has decided to focus on solar power generation.

In a statement posted on its website OPWP said, 'In line with Oman's vision to diversify fuel sources through the use of clean energy for power generation and following the procurement of Ibri II solar PV, OPWP is planning to develop the second phase of the solar programme known as Manah Solar I IPP and Manah Solar II IPP with each having a capacity generation between 500MW to 600MW.'

Both the projects will be located at Manah, which is around 150km south west from Muscat. Each project will be developed as a private sector project by appropriately qualified developers. OPWP

is announcing the launch of the qualification process for the developers through the request for qualification (RfQ), the statement revealed.

As per the statement on the Oman Power and Water Procurement Co website, documents related to the tender can be purchased till July 29 and the interested parties have time till August 16 to submit their bids.

However, Oman Power and Water Procurement Co clarified, 'This RfQ is for developers and is not applicable to interested or potential engineering, construction and procurement (EPC) contractors.' Earlier this year, OPWP had announced that the country has set an ambitious goal of covering 30 per cent of its electricity demand with renewable energy projects by 2030.

OPWP, a member of Nama Group, is the single buyer of power and water capacities from all independent power and independent water projects within the sultanate.

Construction Contract Awarded for Belgium's Man-Made "Energy Island"



Energy island will take shape in the North Sea to bring wind power to shore and interconnect Europe's power grid (Elia)

The first phase of construction contracts has been awarded for the world's first man-made "energy island," to be built by Belgium as part of a plan to develop an integrated European offshore electricity grid. After a year-long process, the contract was awarded to a Belgian consortium between Jan de Nul and DEME that will utilize their specialized fleets and long-experience in offshore construction.

The concept for the island was detailed last October, 10 months after the bidding process had begun. Belgian transmission system operator Elia is spearheading the effort calling for the man-made island to be built nearly 30 miles off the coast near Belgium's Princess Elisabeth wind zone. The area on the island for the electrical infrastructure will be nearly 15 acres and the island will also include a small harbor for offshore service vessels as well as a helicopter platform used to bring maintenance personnel to the facility.

The concept is to provide a centralized location that will serve as the link between Belgium's new offshore wind farm zone and the onshore high-voltage grid. Plans call for the zone to generate up to 3.5 GW of high-voltage power. The electrical infrastructure on the island will gather the power and transform it to 220 kV for transport to the mainland. In detailing the project, Elia highlighted

the first-of-its-kind capability that combines both direct and alternating current saying the hybrid interconnects of the island would provide a more efficient transmission system.

The longer-term vision is for a broader interconnect system that would link hubs across various countries in northern Europe. Denmark proposed a similar artificial energy island in its plans while Belgium suggests there could also be connections with Great Britain.

"This project is a pioneering one for several reasons," says Chris Peeters, CEO at Elia Group. "It is the most cost-effective and reliable way to bring offshore wind to shore. It will be an island that provides options for the future. When we connect it to other countries, Princess Elisabeth Island will become the first offshore energy hub. After our construction of the first hybrid interconnector in the Baltic Sea, the island is another world first."

Now that the construction contract has been awarded, the plan calls for finalizing the design of the island. Construction is expected to begin in early 2024 and run till August 2026. The Belgian government has decided to award the island with a grant of approximately €100 million to support its construction.

According to the partnership between DEME and Jan De Nul known as TM Edition, the island will be built from concrete caissons filled with sand. They will be installed in 2024 and 2025 and they will form the contours of the island. With the caissons in place, the base of the island will be raised and prepared for the construction of the electrical infrastructure. Installation of the high-voltage equipment would start after August of 2026 as the second phase of the project.

To complete the project, it will also require reinforcement projects for the onshore power grids. Elia says it aims to ensure all the wind farms are connected to the mainland by 2030. They believe the island will be a vital step toward realizing Europe's goal to generate 300 GW of shore electricity by 2050.

SERVICES

*36 Career Center
37 Tenders
38 Coming Events*



CAREER CENTER

Al-Yamamah Trading and Contracting Company

Position Title:	Energy Tracking Specialist (LEED)
Application Deadline:	N/A
Location:	Dammam/Khobar/Eastern Province - Saudi Arabia
Requirements:	<ul style="list-style-type: none"> • Have a minimum of three (3) years' experience in implementing energy and environmental programs. • Have a Bachelor's degree in mechanical engineering, engineering technology, business or related field with emphasis on facilities management. • Have a Professional Accreditation under LEED..

AL ROSTAMANI GROUP LLC

Position Title:	Sales Engineer – Solar Energy
Application Deadline:	N/A
Location:	Dubai - United Arab Emirates
Requirements:	<ul style="list-style-type: none"> • Bachelor of Technology/Engineering(Energy). • 3- 8 Years of experience in the field or related fields. • Ability to smartly resolve different communication conflicts between customer reps and internal team.

Leminar Air Conditioning Company

Position Title:	Energy Auditor - HVAC
Application Deadline:	N/A
Location:	Dubai - United Arab Emirates
Requirements:	<ul style="list-style-type: none"> • Having technical knowledge /understanding on HVAC equipments , IAQ solutions, air compressors, energy efficient and value added solutions to residence, commercial buildings & industrial customers in HVAC retrofit segments. • Visually inspects buildings and related utilities including HVAC , mechanical, electrical to determine energy consumption in each area or system. • 5 – 8 years of related experience.

Saudi Aramco

Position Title:	Electrochemistry & Energy Storage Expert
Application Deadline:	N/A
Location:	Saudi Arabia
Requirements:	<ul style="list-style-type: none"> • Perform advanced diagnostic studies to probe key phenomena and reactions occurring, particularly the use of electron microscopic and synchrotron-related spectroscopic techniques. • Perform complex data analysis and interpret experimental results. 7 – 10 years of related experience.

TENDERS

TenderID	61407135
Tender Brief	Tenders Are Invited For Electrical/Electronics, Automation And Renewable Energy
Competition Type	ICB/NCB
Funded By	Self-Funded
Country	Indonesia
Tender Value	IDR 30,643,415,500
Tender Value In USD	2,010,003-
Last Date of Bid Submission	11 Apr 2023

TenderID	61306436
Tender Brief	Tenders Are Invited For Heat Networks - Bhive
Competition Type	ICB/NCB (Plz Refer Document)
Funded By	Self-Funded
Country	United Kingdom
Tender Value	GBP 15,000,000,000
Tender Value In USD	18,100,500,000-
Last Date of Bid Submission	31 Mar 2023

TenderID	22730780
Tender Brief	Tenders Are Invited for Services Related to The Oil And Gas Industry
Competition Type	ICB/NCB
Funded By	Self-Funded
Country	France
Tender Value	-
Tender Value In USD	-
Last Date of Bid Submission	09 Sep 2023

TenderID	59100621
Tender Brief	Tenders Are Invited for Construction Of Fuel Supply Facilities
Competition Type	ICB/NCB
Funded By	Self-Funded
Country	Cameroon
Tender Value	-
Tender Value In USD	-
Last Date of Bid Submission	09 May 2023

COMING EVENTS

International Engineering Sourcing Show

16 - 18 Mar 2023

Chennai Trade Centre, Chennai, India

<https://www.eepcindia.org/iess/>

International Engineering Sourcing Show with its unique concept, is aimed at reducing dependence on traditional markets, developing domestic markets, forging partnerships and joint ventures, strengthening commercial relations, and accelerating trade between India and the world.

Eastern Gas Compression Roundtable Conference & Expo

02 - 04 May 2023

David L. Lawrence Convention Center, Pittsburgh, USA

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

The EGCR, a non-profit organisation, has the primary goal of providing cost effective training programs to the Natural Gas Industry that focus on compressor and engine maintenance. Anyone can attend the Conference, which is held every year since 1973. EGCR membership does not need to be obtained.

Factory Facilities & Equipment Expo

12 - 14 Apr 2023

Port Messe Nagoya, Nagoya, Japan

<https://www.japan-mfg-nagoya.jp/en-gb/about/factex.html>

FacTex (Factory Facilities & Equipment Expo) is an exhibition of energy-saving products, logistics equipment, maintenance products, safety products and disaster prevention products for factories.

Many users from the manufacturing industry, such as factory management, manufacturing, production technology, maintenance, purchasing and logistics departments, visit the show and have active business discussions with the exhibitors.

International Battery Seminar & Exhibit

20 - 23 Mar 2023

Loews Royal Pacific Resort at Universal Orlando, Orlando, USA

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

Key thought leaders will assemble to not only provide broad perspectives, but also informed insights into significant advances in materials, product development, manufacturing, and application for all battery systems and enabling technologies. As the longest-running annual battery industry event in the world, this meeting has always been the preferred venue to announce significant developments, new products, and showcase the most advanced battery technology.

Middle East Energy

07 - 09 Mar 2023

Dubai World Trade Centre, Dubai, UAE

<https://www.middleeast-energy.com/en/home.html>

Middle East Energy has well established itself as the region's most reputable and comprehensive energy event in the MENA region, where global buyers and sellers connect to discover products and showcase solutions to deliver cleaner energy and supply sustainable power.

Ankara Power Africa Expo

10 - 13 Apr 2023

Congresium, Ankara, Turkey

<http://www.ankarapowerafrica.com/>

Ankara Power Africa Expo brings together finance, technology and resources which is set to become a key component for Africa's primary strategy to achieve sustainable development by scaling up and accelerating the deployment and funding of huge energy potential of the continent in a low carbon manner with less vulnerable to climate change.

US Power Africa Expo

15 - 18 May 2023

Jacob K. Javits Convention Center, New York, USA

<https://uspowerafrica.com/>

US Power Africa Expo brings together finance, technology and resources which is set to become a key component for Africa's primary strategy to achieve sustainable development by scaling up and accelerating the deployment and funding of huge energy potential of the continent in a low carbon manner with less vulnerable to climate change.

Solar Solutions International

14 - 16 Mar 2023

Expo Haarlemmermeer, Vijfhuizen, Netherlands

<https://www.solarsolutions.nl/>

Solar Solutions International is the largest trade fair for solar energy in Northwestern Europe and revolves around innovations and 100 practical seminars on the latest developments in energy storage, smart products, and an increasingly wide range of solar panels.

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*One World (1W) is parent company of CPH World Media (CPH), publisher of energyHQ

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The Real Reason Why Automakers Slashed EV Prices



The global electric vehicle (EV) market is reeling from one of the most dramatic collapses in monthly sales to date, with Rystad Energy research showing that only 672,000 units were sold in January, almost half of December 2022 sales and a mere 3% year-on-year increase over January 2022. The EV market share among all passenger car sales also tumbled to 14% in January, well down on the 23% seen in December.

EV sales have been on a relatively consistent upward trajectory in recent years – aside from periods impacted by Covid-19 pandemic-related supply chain issues – and a significant collapse in sales is worrying news for the industry. Tax credits and government subsidies have propped up the EV market to date as countries identify passenger car fleet electrification as a core tactic for meeting net-zero emissions goals, but the reduction or removal of these subsidies this year has dampened consumer sentiment. Automakers are now scrambling to reverse the downward spiral and salvage the market in 2023.

The automotive market is usually cyclical, with sales taking a hit after new subsidy rules come into effect at the start of each year, followed by a gradual recovery. However, the cuts in January this year hit harder than normal, triggering this dramatic collapse. The ramifications of this will be long-lasting and will impact sales through the first quarter of the year and potentially the rest of 2023.

EV subsidies in many European countries and mainland China were sliced at the start of the year, and a return of any significance is highly unlikely in the immediate future. One ray of hope for the global outlook is the US market, which is just beginning its electrification journey and rolling out tax credits thanks to the Inflation Reduction Act. The US was the only major market that saw an increase in both EV sales and market share year-on-year, although its contribution to the global total is still relatively minimal.

China, the largest EV market globally, experienced a near 50% cut in EV sales in January 2023 compared to the prior month, but the year-over-year change was relatively flat due to the affinity of consumers for cheaper domestic-made models. The Chinese Association of Automotive Manufacturers forecasts a slowing of sales momentum this year, predicting around 8 million EV sales this year. We expect slow sales to continue through the first quarter, but CATL's announcement of a price cut in battery cells for automotive offtakers will help boost sales again.

Although there was a marginal year-on-year growth in EV sales in Europe last month, market performance has been grim, with many countries showing a steep drop in EV sales from December 2022. With EV subsidies coming to an end, many consumers brought forward their purchases from the first quarter of 2023 to December 2022, leading to a massive spike in purchases before the end of the year. Widespread subsidy reductions will have a lasting impact on sales activity, but automakers will not tolerate this weakening for long – Tesla is already testing their pricing limits, offering a massive discount, triggering a large volume of pre-orders.

Germany have seen a steep falloff in sales and market share. Sales in Germany dropped about a third in January compared to 2022, totaling only 27,000 for the month. Market share in the country also fell off a cliff – after EVs accounted for 55% of all car sales in December 2022, the market share fell to just 15%. Elsewhere in Europe, the EV market share in the UK halved from about 40% to 20% month-to-month and from 50% to 24% in the Netherlands. This downward trend is replicated across much of Europe and will be giving automakers sleepless nights.

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