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HOW FALLING COSTS ARE POWERING A GREENER FUTURE

THE ROAD TO 100% HYDROGEN

TRANSFORMING WASTE TO WEALTH: INSIGHTS FROM KINETIC BIOFUEL'S EXPERTISE

DELIVERING CRITICAL COMMUNICATIONS TO THE OFFSHORE WIND INDUSTRY

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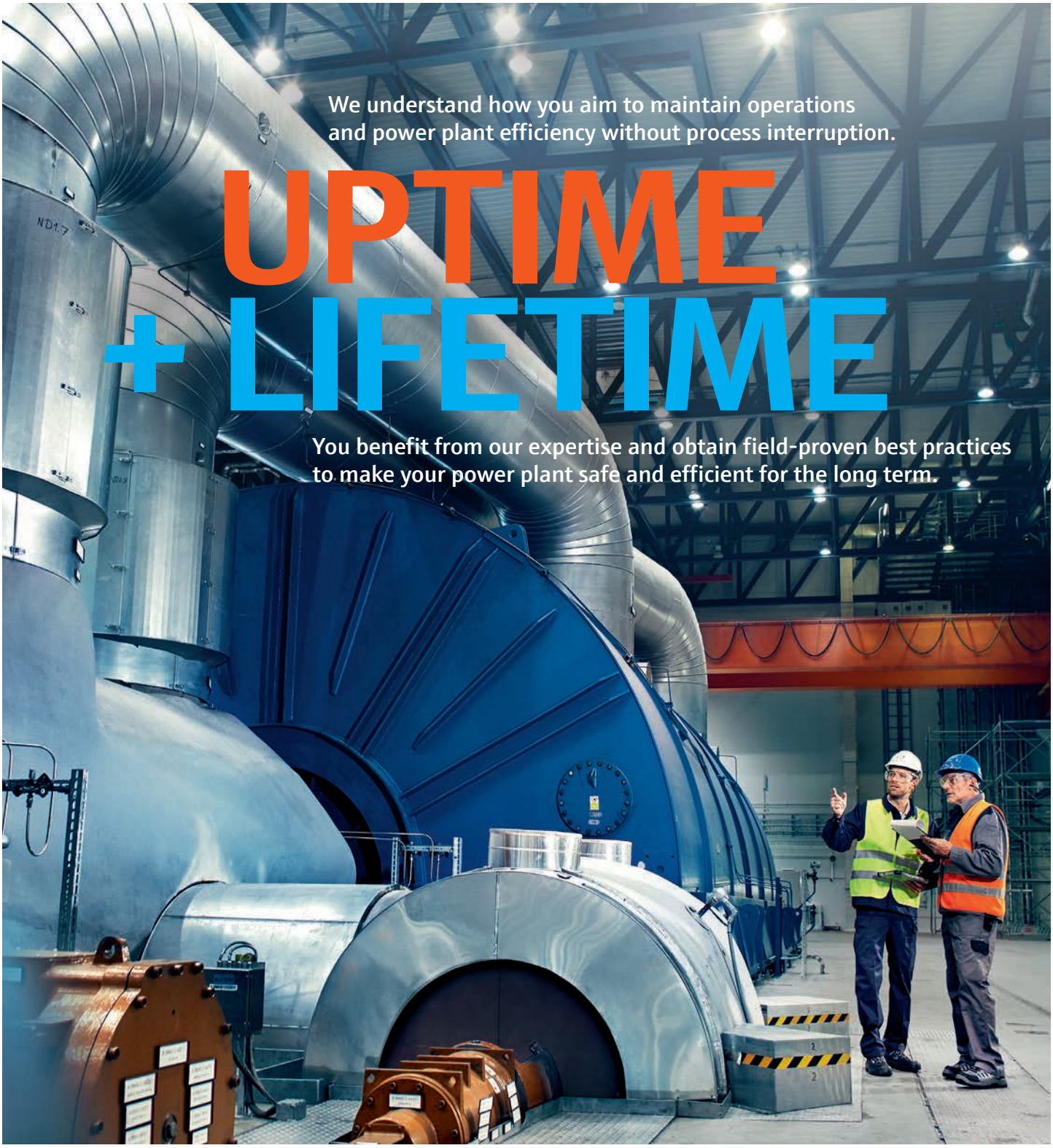

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The Renewable Revolution: How Falling Costs are Powering a Greener Future

The global energy landscape is undergoing a significant transformation, with renewable energy sources such as wind, solar, and biofuels taking center stage. These technologies, once considered niche and expensive, are now becoming increasingly cost-competitive with traditional fossil fuels. This shift is driven by technological advancements, economies of scale, and supportive policy frameworks, leading to a dramatic reduction in the costs of renewable energy. This article explores the factors contributing to the declining costs of wind, solar, and biofuels, highlighting the implications for the energy sector and the broader economy.

The global energy landscape is undergoing a significant transformation, with renewable energy sources such as wind, solar, and biofuels taking center stage. These technologies, once considered niche and expensive, are now becoming increasingly cost-competitive with traditional fossil fuels. This shift is driven by technological advancements, economies of scale, and supportive policy frameworks, leading to a dramatic reduction in the costs of renewable energy. This article explores the factors contributing to the declining costs of wind, solar, and biofuels, highlighting the implications for the energy sector and the broader economy.

Wind energy has emerged as one of the most cost-effective renewable energy sources. Over the past decade, the cost of wind power has plummeted, making it competitive with, and in some cases cheaper than, coal and natural gas.

Improvements in turbine technology have played a crucial role in reducing wind energy costs. Modern wind turbines are more efficient, larger, and capable of generating more power. Innovations such as taller towers, longer blades, and advanced materials have significantly increased the capacity and efficiency of wind farms.

The expansion of the wind energy market has led to economies of scale, reducing the cost per unit of electricity generated. As more wind farms are constructed, the costs associated with manufacturing, installation, and maintenance have decreased.

Government policies, such as tax incentives, subsidies, and renewable energy mandates, have spurred investment in wind energy. Additionally, competitive bidding processes for wind power projects have driven down prices, as developers vie to offer the lowest cost of electricity.

Offshore wind farms, although initially more expensive than onshore projects, are also seeing cost reductions. Technological innovations, larger turbines, and increased experience in offshore construction have contributed to the declining costs of offshore wind energy.

According to the International Renewable Energy Agency (IRENA), the global weighted average cost of electricity from onshore wind fell by 39% between 2010 and 2020. Offshore wind saw a cost reduction of 29% over the same period. These trends are expected to continue, further enhancing the competitiveness of wind energy.

The Solar Energy Revolution

Solar energy has experienced perhaps the most dramatic cost reductions of any renewable energy source. The cost of solar photovoltaic (PV) panels has dropped significantly, driven by several key factors.

Technological innovations have led to more efficient and cost-effective solar panels. Improvements in materials, manufacturing processes, and panel design have increased the efficiency of solar cells, enabling them to convert more sunlight into electricity.

The rapid expansion of the solar industry has resulted in significant economies of scale. Large-scale manufacturing facilities, particularly in countries like China, have driven down the cost of solar panels. Increased production volumes have also led to lower

costs for raw materials and components.

Soft costs, including installation, permitting, and financing, have also decreased. Streamlined permitting processes, improved installation techniques, and innovative financing models have made solar energy more affordable for consumers and businesses.

The development of a robust global supply chain for solar components has further contributed to cost reductions. The international trade of solar panels and related technologies has increased competition and lowered prices.

IRENA reports that the global weighted average cost of electricity from utility-scale solar PV fell by 85% between 2010 and 2020. The levelized cost of electricity (LCOE) for solar PV is now below that of many conventional energy sources, making it an attractive option for new power generation projects.

The Emergence of Cost-Effective Biofuels

Biofuels, derived from organic materials such as plants and waste, offer a renewable alternative to fossil fuels for transportation and industrial applications. The cost of biofuels has been declining due to advances in production technologies and feedstock availability.

Advances in biofuel production technologies, including improved conversion processes and genetically engineered feedstocks, have increased yields and reduced costs. Innovations such as cellulosic ethanol production and algae-based biofuels hold promise for further cost reductions.

The availability of sustainable feedstocks is critical for the cost-effectiveness of biofuels. The use of non-food crops, agricultural residues, and waste materials has reduced competition with food production and lowered feedstock costs.

Government policies, such as renewable fuel standards, tax credits, and grants, have supported the development and deployment of biofuels. These policies have incentivized investment in biofuel production facilities and infrastructure.

The growth of the biofuel market has led to increased competition and efficiencies in production and distribution. As the market matures, economies of scale and improved logistics are driving down costs.

According to a report by the U.S. Department of Energy, the production cost of cellulosic ethanol, a second-generation biofuel, has decreased by over 50% since 2007. Continued research and development are expected to further reduce the costs of biofuels, making them a viable alternative to traditional fuels.

The declining costs of renewable energies have profound implications for the global energy sector. As wind, solar, and biofuels become more competitive, they are increasingly displacing fossil fuels in power generation, transportation, and other applications. This transition has several key implications:

The shift to renewable energy sources is crucial for reducing greenhouse gas emissions and combating climate change. The falling costs of renewables make it economically feasible to replace coal, oil, and natural gas with cleaner alternatives.

Renewables enhance energy security by diversifying the energy mix and reducing dependence on imported fossil fuels. Countries with abundant renewable resources can achieve greater energy independence.

The growth of the renewable energy sector creates new economic opportunities, including job creation, investment, and innovation. The expansion of wind, solar, and biofuel industries stimulates local economies and drives technological advancements.

The integration of renewable energy into the power grid requires modernization and innovation. Advances in grid management, energy storage, and smart technologies are essential for accommodating the variable nature of wind and solar power.

The declining costs of renewables can improve energy access and affordability, particularly in developing regions. Off-grid solar solutions and decentralized energy systems offer sustainable energy options for remote and underserved communities.

While the falling costs of renewable energies are promising, several challenges remain. The intermittent nature of wind and solar power requires effective energy storage solutions and grid management. Investment in infrastructure and research is needed to address these challenges and ensure the reliable integration of renewables into the energy system.

Additionally, policy support and international cooperation are critical for sustaining the momentum of renewable energy deployment. Governments must continue to provide favorable policy frameworks, incentives, and funding for research and development.

Looking ahead, the future of renewable energy is bright. Continued technological advancements, market dynamics, and supportive policies are expected to drive further cost reductions and expand the adoption of wind, solar, and biofuels. As the world transitions to a sustainable energy future, renewable energies will play a central role in powering economies, protecting the environment, and enhancing global energy security.

The falling costs of renewable energies such as wind, solar, and biofuels represent a transformative shift in the global energy landscape. Technological advancements, economies of scale, supportive policies, and market dynamics have driven significant cost reductions, making renewables increasingly competitive with traditional fossil fuels. This transition holds profound implications for decarbonizing the energy sector, enhancing energy security, and creating economic opportunities. As the world continues to embrace renewable energy, the path toward a sustainable and resilient energy future becomes ever more attainable. •

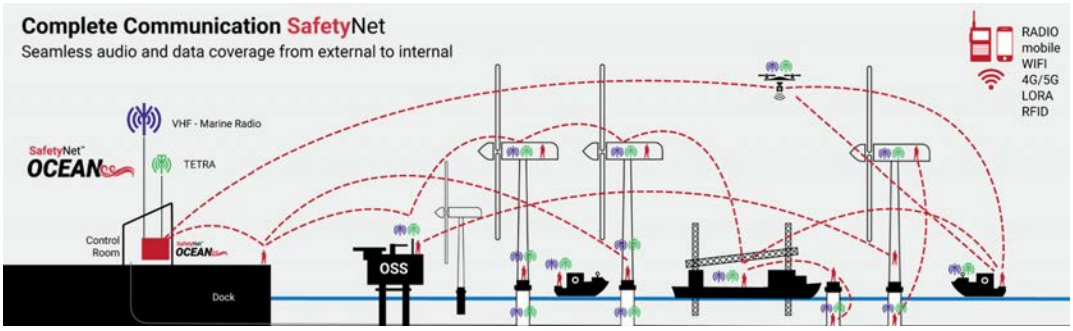
PMR SafetyNet Ocean: Delivering Critical Communications to the Offshore Wind Industry

The offshore wind industry is rapidly evolving, and increased and more advanced telecommunications are key to enabling this growth.

Ensuring you have the right communications package in place is essential and few companies lead the way like PMR SafetyNet. With an irrefutable reputation built on cutting-edge technology and an unwavering commitment to safeguarding workforce, PMR SafetyNet has consistently delivered innovative solutions to address the unique communications challenges faced by the offshore wind industry.

Unmatched Expertise

PMR SafetyNet has established itself as a leader in safety solutions for remote and high-risk environments. The company's expertise spans developing robust, reliable, and user-friendly critical communication systems designed to protect workers and enhance operational efficiency. With an ever increasing portfolio working with many leading companies within the industry, PMR SafetyNet's credentials are impeccable, making them a trusted partner in the field. Their innovative solutions are not just about technology but also about understanding and mitigating the inherent risks of offshore operations.



Enhancing Operational Efficiency & Safety

Among its groundbreaking products, SafetyNet Ocean is reshaping how we approach lone worker safety and data transfer and communications in offshore settings, merging these critical areas into one seamless, efficient system.

PMR SafetyNet Ocean is more than just a safety and communication system; it is a comprehensive solution that integrates safety, communication, and data collection into a single, cohesive platform. Its impact on the offshore wind industry is profound, offering enhanced safety for lone workers, improved operational efficiency, and valuable data for system monitoring.

SafetyNet Ocean stands as a testament to PMR SafetyNet's dedication to innovation. Whether for construction, maintenance, personnel, crew transfer, offshore oil rig personnel, or environmental monitoring, SafetyNet Ocean provides a seamless method of communication. The system's design addresses the unique challenges of offshore environments, combining robust hardware with sophisticated software to ensure constant, reliable communication and data transmission.

The importance of SafetyNet Ocean for lone worker safety cannot be overstated. Offshore wind farm environments are inherently hazardous, with risks ranging from harsh weather conditions to operational accidents. For lone workers, these risks are exacerbated by isolation. SafetyNet Ocean addresses these safety issues by offering real-time monitoring, automated alerts, and communication capabilities. SafetyNet Ocean includes features such as GPS tracking, man-down alerts, and emergency communication channels, ensuring that help is always within reach. This not only enhances the safety of individuals but also provides peace of mind to employers and families alike.

The recent G+ Global Offshore Health and Safety Wind Organisation 2023 incident report (published June 2024) shows an incredible rise in reported incidents and recommends the industry's need for vigilance in this area with the huge growth of the sector. There has never been a more crucial time to invest in critical communications systems.

The importance of Data

Beyond safety, SafetyNet Ocean plays a crucial role in the transfer of data, thanks to its advanced telemetry capabilities. The system's integrated sensors and telemetry systems allow for comprehensive data transfer and collection. The telemetry system enables real-time data transmission to centralised databases, facilitating immediate analysis and decision-

making. This data is invaluable for operational decision-making and more efficient offshore wind farm operations.

Data is not only used for immediate operational purposes but also contributes to long-term research and environmental monitoring efforts. For instance, weather data collected in real-time can improve the accuracy of weather forecasts, directly impacting the safety and efficiency of offshore wind farm operations.

The more data that can be accessed from every turbine, the more beneficial it is to the cost of operation. This data is not only for operators but for the maintenance team. High availability telecommunications enable autonomous operations and allow for a more secure facility. It is costly to send personnel to offshore assets, therefore the greater the visibility to the events and equipment condition or status from onshore, the fewer trips will be required for inspection. When maintenance or inspection is required, an engineer is better prepared, having been able to access the instrumented asset data on the platform in advance.

Bespoke Systems

Systems can be designed to each projects specific requirements, PMR has the expertise to design systems, continuously reviewing and innovating methods of enabling data and communication.

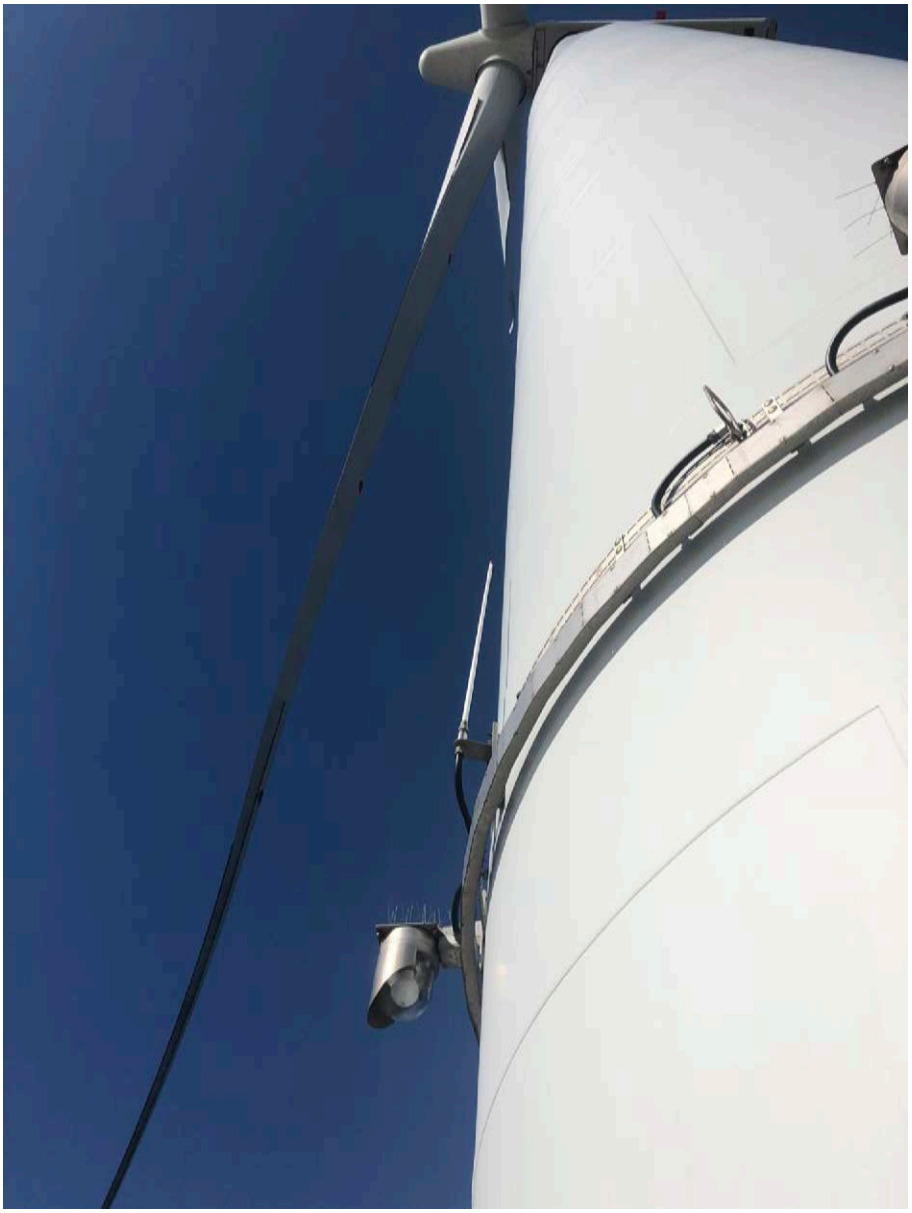
SafetyNet Ocean is designed to be a multi-user system. Engineers from one company can communicate with engineers from another, visitors can be location monitored, and safety can be prioritised. This interconnectedness ensures that all personnel, regardless of their employer, can benefit from the enhanced safety measures and communication capabilities of the system.

Develop as your project grows

One of the standout features of SafetyNet Ocean is its scalability, allowing the system to grow and adapt as the project evolves. This flexibility means that organisations can start with a basic setup and expand the system incrementally, spreading out the costs over time rather than facing a large, upfront capital expenditure.

Turbine from waterline.

External Antenna and blades.



SafetyNet Ocean's design is inherently modular, which allows organisations to expand the system piece by piece according to their needs. Whether the requirement is for additional sensors, enhanced communication capabilities, or more extensive data collection and storage, components can be added without disrupting existing operations. This scalability ensures that the system remains aligned with the project's goals and the organisation's budget, and crucially means minimal downtime for maintenance.

Organisations can adopt SafetyNet Ocean with confidence, knowing that it will continue to meet their needs both now and in the future.

Through its groundbreaking SafetyNet Ocean system, PMR SafetyNet is setting new standards in offshore wind safety and data collection. PMR SafetyNet Ocean represents a revolutionary step forward in combining personnel safety and data collection in the offshore wind industry. Its advanced technology, real-time communication capabilities, comprehensive data collection, scalability, and cost efficiency make it an indispensable tool for modern offshore operations.

As the offshore wind industry continues to expand, the demand for reliable and sophisticated safety and communication systems will only grow. PMR SafetyNet is well positioned to meet this demand, providing solutions that not only address current challenges but also anticipate future needs. By leveraging innovative technology and a deep understanding of the offshore environment, PMR SafetyNet is paving the way for safer and more efficient offshore wind operations, demonstrating a clear commitment to innovation, safety, and sustainability. •

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Transforming Waste to Wealth: Insights from Kinetic Biofuel's Expertise

In this interview, Kinetic Biofuel A/S showcases its extensive expertise and innovative approach in the energy sector, specifically in the realm of biofuels. The company, a collaboration between C.F. Nielsen A/S and BioFuel Technology A/S, leverages over a century of combined experience to provide cutting-edge solutions in biomass briquetting and biofuel technologies. Their patented second-generation technology using straw as raw material highlights their commitment to sustainable energy solutions.

Jesper Stecher Madsen, Managing Director, Kinetic Biofuel

NEI: Could you start by explaining Kinetic Biofuel A/S' credentials and experience in terms of your products and services for the energy sector? Could you tell our readers the breadth of your experience, how long the company has been active, and its reach?

Madsen: Kinetic Biofuel is a partnership of 2 companies and is based on many years' experiences with biomass briquetting technology and biofuel technology. The companies are C.F. Nielsen A/S and BioFuel Technology A/S of Denmark.

The name and logo of the company is based on the partners combined know-how within kinetic energy (briquetting) and biofuel (biogas and bioethanol). (see www.kineticbiofuel.com)

The company offers a new patented 2nd Generation technology using straw as raw material to produce briquettes enabling biogas and bio ethanol producers to get a high yield in existing and new biogas and bioethanol plants.

We have been active for more than 10 years and have delivered production lines for supplying briquetted straw to biogas plants in Denmark, Bulgaria, Germany, Poland and U.K.

Several other plants have been quoted to be supplied in other countries. (India, Australia, USA and Canada among others)

NEI: Can you explain to our readers the concept of waste to fuel technology?

Madsen: The waste to fuel technology is two-fold. It begins with the actual sourcing, pre-processing and briquetting of the lignocellulosic feedstock. During the process, the inhomogeneous, low density, and impure feedstock is converted to homogeneous, clean, and high-density briquettes. These are effectively stored and transported without loss of carbon to any central biofuel facility, be it an incineration plant, a biogas or biofuel facility.

The briquetting is key to sourcing large quantities of lignocellulosic feedstock for use as biofuel. It is also key to effective conversion to any liquid or gaseous biofuel at large industrial plants, where in fact it is possible to benefit from economy of scale and industrial processes and technologies.

In brief, we claim to enable the green transition in an effective and competitive way. We provide the carbon-based green fuels that are necessary in any energy mix across the world.

NEI: What is the nature of your collaboration with your partners C.F. Nielsen A/S and Biofuel Technology A/S?

Madsen: Kinetic Biofuel is the vehicle by which the marketing of the entire briquetting solution is presented to the global market.

C.F. Nielsen is a company more than 135 years old, and has manufactured mechanical briquette presses for more than 70 years (see www.C.F.Nielsen.com)

Biofuel Technology develops, engineers and delivers equipment to any biofuel plant be it a cellulosic ethanol plant, a biogas plant or a

A 5 presses installation at a larger producer of briquetted straw for bedding and biogas plants.

Briquettes made from wheat straw.

plant for production of Sustainable Aviation Fuel, methanol, synthetic diesel or any other fuel. (see www.Biofueltechnology.com)

NEI: Would you explain to our readers the process of using straw-based briquettes as fuel in both biogas and bioethanol plants?

Madsen: The briquetting of straw is a 3-in-1 solution. It is a logistic solution, a managerial solution and a pre-treatment solution. Because it is also a pre-treatment solution, the finished briquettes can be injected directly into any bioreactor and here effectively be converted to any biofuel. The conversion to biofuel is not in any way simple but it is rendered effective and economical by the initial briquetting.

NEI: What are some of the advantages of this method for plant owners?

Madsen: The advantages include:

- Security of feedstock supply at cost, in time, and in quantity!
- The supply of homogeneous and cleaned feedstock prepared for production of any biofuel.
- The possible sourcing and supply of feedstock from long distance locations, ensuring the actual supply and the price competitiveness of the supply.
- The option of situating the central biofuel facility at or near harbors so feedstock can be sourced from both sea and land and so that products can be shipped via both land and sea to end consumers.
- The further possibility of situating the central biofuel facility at or near industrial clusters where infrastructure is available for production and shipment of biofuels, such as refineries, transport centers and similar areas.

NEI: Can you talk about how you work with clients and you customized solutions?

Madsen: The presentation of products and technologies beginning with the briquetting solutions to the final central biofuel facility is complex and time consuming. Because the technology is conceptual new in its entirety, it is a major task to explain investors, such as energy companies, oil majors, refineries, pension funds, renewable energy companies, and other stakeholders the potential and perspectives.

For instance, we have the technology to supply all Europe with all the renewable natural gas it needs at competitive prices. It should be an easy sale, but it is not.

NEI: Finally, could you enlighten our readers of a case study where you helped a client with your solutions?

Madsen: We have installed a briquetting solution at the biogas plant at Sheppey Island UK. Here, straw briquettes are produced at the biogas plant, and more or less injected directly into the fermenters resulting in a doubling of the biogas output and an economic operation.

NEI: Thank you for your time.

Kinetic Biofuel's waste-to-fuel technology offers a transformative approach to converting lignocellulosic feedstock into high-density, homogeneous briquettes, facilitating efficient storage, transportation, and conversion into biofuels. This process not only supports the green transition but also ensures the supply of carbon-based green fuels essential for a balanced energy mix globally.

Kinetic Biofuel's customized solutions are tailored to meet the unique needs of clients, ranging from energy companies to refineries. Despite the complexities of the technology, their commitment to educating stakeholders about its potential and economic viability remains steadfast.

To learn more about the topics discussed in this article or if you are interested in Kinetic Biofuel's solutions please contact them at:

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Kinetic Biofuel facility in Denmark.

Greening the Energy Landscape: The Role of Biofuels Today

The biofuels market has experienced significant evolution and growth in recent years, driven by increasing environmental concerns, advancements in technology, and supportive government policies. As the world grapples with the urgent need to reduce greenhouse gas emissions and find sustainable alternatives to fossil fuels, biofuels have emerged as a viable solution that bridges the gap between current energy demands and the quest for a cleaner future.

Biofuels, primarily ethanol and biodiesel, are derived from organic materials such as crops, agricultural residues, and even algae. Ethanol, typically produced from corn or sugarcane, is blended with gasoline to create a cleaner-burning fuel. Biodiesel, on the other hand, is made from vegetable oils, animal fats, or recycled cooking oils and can be used in diesel engines. These biofuels offer a renewable energy source that can significantly cut carbon emissions compared to conventional petroleum-based fuels.

One of the key drivers of the biofuels market is the global push for renewable energy sources. Governments worldwide are implementing policies and incentives to promote the production and use of biofuels. For example, the Renewable Fuel Standard (RFS) in the United States mandates the blending of renewable fuels into the transportation fuel supply, providing a stable market for biofuel producers. Similarly, the European Union's Renewable Energy Directive sets targets for the use of renewable energy in transportation, further boosting the demand for biofuels.

Technological advancements have also played a crucial role in the growth of the biofuels market. Innovations in feedstock processing and conversion technologies have improved the efficiency and cost-effectiveness of biofuel production. Second-generation biofuels, made from non-food feedstocks such as agricultural waste and lignocellulosic biomass, have addressed some of the criticisms of first-generation biofuels, which competed with food supply and caused deforestation. Third-generation biofuels, derived from algae, hold promise for even greater sustainability and higher yields.

Despite these advancements, the biofuels market faces several challenges. The competition with food production remains a contentious issue, particularly for first-generation biofuels. Land use and water consumption are significant concerns, as biofuel crops require substantial resources that could otherwise be used for food cultivation. Additionally, the economic viability of biofuels is closely tied to the price of oil. When oil prices are low, biofuels struggle to compete on cost, which can stifle investment and innovation in the sector.

Another challenge is the infrastructure required for biofuel distribution and consumption. While blending biofuels with conventional fuels is relatively straightforward, the development of dedicated biofuel infrastructure, such as fueling stations and pipelines, requires significant investment. This is particularly true for advanced biofuels that may not be compatible with existing fuel systems.

The international landscape of biofuels is diverse, with different regions focusing on various aspects of production and utilization. In the United States, ethanol from corn is the predominant biofuel, while Brazil is a leader in sugarcane ethanol production. The European Union has been a major player in biodiesel, leveraging its agricultural sector and waste materials for production. Asia, particularly China and India, is increasingly investing in biofuels to reduce reliance on imported oil and address environmental concerns.

Looking ahead, the biofuels market is poised for continued growth as technology advances and sustainability becomes an even more critical global priority. The integration of biofuels into the broader energy transition strategy will require balancing economic, environmental, and social factors. Policymakers, industry stakeholders, and researchers must collaborate to address the challenges and unlock the full potential of biofuels.

In conclusion, the current biofuels market is characterized by robust growth, driven by the need for sustainable energy solutions and supported by technological innovations and government policies. However, it faces challenges related to resource competition, economic viability, and infrastructure development. As the world continues to seek ways to mitigate climate change and reduce dependency on fossil fuels, biofuels are set to play an increasingly important role in the global energy landscape.

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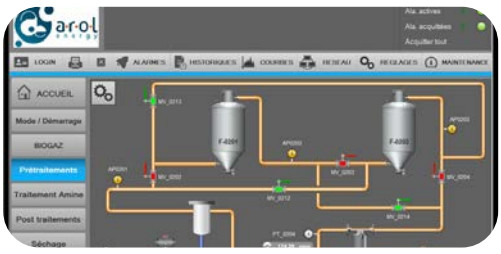

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Viking Wind – The Future of Small Wind Turbines

Viking Wind ApS is a Danish company specializing in designing, manufacturing, and installing small and medium-sized wind turbines.

Viking Wind has been operational for over 15 years and is recognized for its contributions to the renewable energy sector, particularly in wind energy.

The company is based in Denmark, a country known for its leadership in wind energy technology and sustainability practices.

Viking Wind offers wind turbines designed for small and medium-scale energy production. These turbines are suitable for residential, agricultural, and small industrial applications.

The company's flagship, the Viking VS wind turbine is a variable-speed small wind turbine with a rated power of 10kw to 25kw. This variable-speed small wind turbine is based on its proven and reliable predecessor, the Viking 25 introduced back in 2009. Since then, it has been tested with the largest number of operating turbines in Denmark, making it the best-tested small wind turbine in its class.

All the great features of the Viking 25 are reused in Viking VS, but the Viking VS has a more efficient performance and is more flexible than its predecessor. Viking VS small wind turbine has a variable effect of either 10kw, 20kw, or even up to 25 kW.

All Viking turbines are known for a robust and aesthetic design, efficiency, and reliability. They incorporate advanced technology to maximize energy output and minimize maintenance needs.

Sustainability

Viking Wind emphasizes environmentally friendly practices, aiming to reduce the carbon footprint of energy production through renewable sources. Viking Wind is committed to promoting renewable energy solutions and contributing to global sustainability goals. They actively participate in initiatives and projects aimed at increasing the adoption of wind energy and hybrid solutions with various energy sources.

Viking Wind's wind turbines fulfill UN SDG goals 7, 9 and 13.

Market and reach

While based in Denmark, Viking Wind also has a global presence, with installations in various countries. The products are popular in regions with suitable wind conditions for energy production and in rural areas. The customer base includes individual homeowners, farmers, small businesses, and community projects focused on sustainable energy solutions.

Benefits of Viking VS wind turbines

- The wind turbine is easy to handle for transportation, installation and service
- 3 complete turbines can fit in a 40-foot container - this includes tower and blades
- The heaviest lift is 1 ton, which makes it easy to install
- All service and maintenance take place on ground level which makes it very cost-effective
- The turbine can be raised/lowered in 15 minutes
- The electric winch is fastened on the turbine's foundation
- Complies with applicable regulations

Viking Wind hybrid solution

Viking Wind's hybrid solution is a renewable energy system that integrates multiple sources of renewable energy to provide a stable and sustainable power supply. Here are the key components and features of the hybrid solution:

- Wind turbines: Viking Wind is known for its robust and efficient wind turbines. These turbines are designed to harness wind energy effectively, converting it into electricity. They are typically installed in areas with consistent wind patterns.
- Solar Panels: In addition to wind turbines, Viking Wind's hybrid solution incorporates solar panels. Solar panels capture sunlight and convert it into electrical energy, complementing wind energy production, especially during periods of low wind.
- Energy Storage: To address the intermittent nature of wind and solar power, Viking Wind's hybrid system includes energy storage solutions such as batteries. These batteries store excess energy produced during peak generation times and release it when production is low, ensuring a continuous power supply.
- Control Systems: The hybrid solution employs advanced control systems to

optimize the integration of wind, solar, and storage components. These systems monitor and manage energy production, storage, and distribution, maximizing efficiency and reliability.

- Grid Integration: Viking Wind's hybrid solution is designed for seamless integration with the existing power grid. This ensures that the generated renewable energy can be effectively distributed and utilized, reducing reliance on fossil fuels.
- Sustainability and Environmental Impact: By combining wind and solar energy with efficient storage solutions, Viking Wind's hybrid system significantly reduces carbon emissions and minimizes environmental impact compared to conventional energy sources.
- Cost-Effectiveness: Over time, the hybrid solution can lead to cost savings by reducing dependence on non-renewable energy sources and lowering operational costs through efficient energy management.

Overall, Viking Wind's hybrid solution represents a comprehensive approach to renewable energy, leveraging the strengths of both wind and solar power, backed by energy storage and advanced control systems to provide a reliable and sustainable energy source.

Off grid solutions

Viking Wind turbines are designed to operate efficiently both as part of the grid and off-grid settings, making them versatile for various applications, including remote and isolated areas where electricity access is limited.

The Viking VS is particularly notable for its off-grid capabilities. It can deliver electricity directly to independent units without needing to be connected to the electrical grid. This makes it ideal for stand-alone energy systems.

Viking Wind has successfully delivered 3 small wind turbines for a stand-alone project in Chorriaca, Argentina. The project aims to provide vital and renewable energy to Patagonia - the most southern and isolated region in Argentina.

Today, the Viking Wind turbines supply the small village with electricity around the clock, all year round. This is a necessity if the small town is to survive in the future. Electricity plays a crucial role in the population's ability to cultivate the land, keep livestock and maintain communication with the outside world continuously.

The project is part of The Argentina Patagonia Renewable Energy Projects, developed and run by the organization "Global sustainable Electricity Partnership".

The Vejroe project - a green Danish adventure

The Viking Wind Vejroe project is a notable initiative focused on sustainable energy and eco-friendly living. Vejroe, a small Danish Island, is the site for this innovative project. Here's a detailed overview:

Sustainability Focus

The project aims to create a self-sufficient, eco-friendly community. It utilizes renewable energy sources, primarily wind and solar power with batteries for storage.

Wind Energy

Viking Wind has installed two wind turbines on the island. These turbines generate clean electricity, reducing dependence on fossil fuels.

Solar Energy

Solar panels complement the wind turbines, providing additional renewable energy.

This combination ensures a stable and reliable energy supply throughout the year.

Energy Storage

Advanced battery systems are used to store excess energy produced by wind and solar installations. Stored energy can be used during periods when renewable energy generation is low.

Eco-Friendly Infrastructure

Buildings and infrastructure on Vejroe are designed to be energy efficient.

Sustainable materials and construction techniques are employed to minimize environmental impact.

Tourism and Education

Vejroe serves as a model for sustainable living, attracting eco-tourists and sustainability.

Impact and Goals

Environmental Impact:

Significant reduction in carbon footprint due to reliance on renewable energy sources.

Preservation of the natural beauty and biodiversity of Vejroe.

Economic Impact:

Being self-sufficient with energy is a major issue since Vejroe is not connected to the mainland by cables or regular transportation. The previous diesel-based energy supply required thousands of liters of diesel to be transported to Vejroe to power the diesel generators. It was both expensive and impractical.

Conclusion

The Vejroe project is an example of how renewable energy and sustainable practices can transform a community. By leveraging wind and solar power, the project reduces environmental impact and promotes economic growth and educational opportunities. It serves as a blueprint for future sustainable development projects worldwide.

Viking Wind - an innovative and responsible company

Viking Wind has not only its focus on sustainability and renewable energy solutions and a future with minimized carbon footprint of energy production.

It is also a company with a big focus on its social responsibilities in society, even though it is a small company with under 10 employees -it has employees in flexible jobs with reduced work hours and special considerations.

They also employ trainees with a focus on the future workforce, providing aid and guidance during the trainee period.

Viking Wind has a flat company structure with room for diversity and freedom with responsibility and most employees have a long period of employment. •

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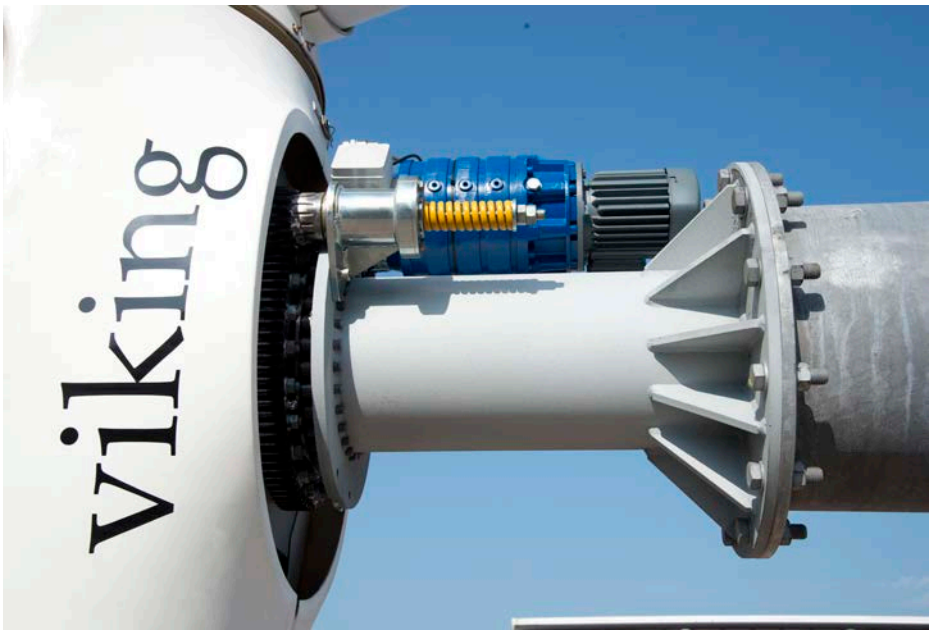

Purchase of Lahstedt wind farm: ENOVA further expands partnership with WindStrom

Hamburg – With the acquisition of the Lahstedt Wind Farm in the district of Peine, Lower Saxony, the ENOVA Group continues to strengthen its partnership with the project developer WindStrom. Together, the two companies aim to future-proof the wind farm through repowering.

The Lahstedt Wind Farm, which has been operated by Danish private individuals since its completion in 2006, comprises a total of five Vestas V80 turbines, each with a capacity of 2 MW. As part of the planned repowering, they will be replaced by up to five new wind turbines, each with a capacity of 6.8 MW. Lahstedt is already the third repowering project where ENOVA and WindStrom have collaborated, following the Hänigsen and Schacht-Konrad wind farms.

"Lahstedt is a good example of how our strategy – expanding partnerships and leveraging existing potential through the repowering of old wind farms – works. We are delighted that we could build on the already existing partnership and have WindStrom, a local partner, by our side to jointly realize the project," said René Meyer, Head of Investment & Asset Management at ENOVA.

"It is great that we have been able to develop a promising repowering concept together with ENOVA in Lahstedt and thereby combine the strengths of WindStrom and ENOVA in another project. This allows the Lahstedt Wind Farm, approved by WindStrom in 2005, to transition to the next generation of turbines and supply many additional households with green electricity in the future," added Christoph Schramke, Managing Director at WindStrom.

Schunk Group acquires majority stake in MS Ultrasonic Technology Group

The Schunk Group has acquired a majority stake in the MS Ultrasonic Technology Group (UTG). UTG is a leading technology provider in the field of ultrasonic welding of plastics. With its subsidiary Schunk Sonosystems, Schunk is a global leader in the ultrasonic welding of metals.

"Schunk Sonosystems and the MS Ultrasonic Technology Group will combine their expertise in the field of ultrasonic welding of metal and plastic under the umbrella of the Schunk Group. This is in line with our strategic goal of expanding Schunk's portfolio to include plastic welding, and will give us access to markets such as the packaging, medical and textile industries," says Peter R. Manolopoulos, CEO of the Schunk Group.

"We have been working on expanding UTG into a full-service provider of ultrasonic technology for some time now, and in Schunk Sonosystems we have found the ideal, complementary partner. This merger will sustainably strengthen our locations in Spaichingen, Ettlingen and Howell, USA. In addition, we will benefit enormously from the global presence, network and expertise of the entire Schunk Group," says Armin Distel, CEO of MS Industrie AG. "This gives the MS Ultrasonic Technology Group a good starting position for further global growth and long-term development. Our customers will also benefit from this."

"The two companies complement each other perfectly in terms of technology," says Dr. Petra Schmidt, COO of the Schunk Group and responsible for the technology group's mechanical engineering business. "Schunk has a great deal of expertise in the ultrasonic welding of metal, while the MS Ultrasonic Technology Group specializes in the ultrasonic welding of plastic," Dr. Schmidt continues. The aim is to leverage these and other synergies, for example in procurement, as well as in technologies, components and the associated software. "This will make our Business Unit Sonosystems a strong partner for our customers in all solutions related to welding both plastic and metal. In addition, we will open up further growth potential for the Business Unit."

Ultrasonic welding of metal and plastic

UTG is a full-service provider of ultrasonic joining solutions for plastics (special-purpose machines, series machines, systems and components) and generates sales of over 80 million euros. The company has a total of around 500 employees at five locations in Germany, the USA, Brazil and China. The MS Ultrasonic Technology Group primarily serves the automotive, medical technology, packaging and hygiene industries.

Schunk Sonosystems is the world market leader in machines and systems for ultrasonic metal welding and is represented at seven locations in Germany, the USA, China, Morocco, Mexico, South Korea and Japan. The company offers customized solutions for joining metals in various industries, such as the automotive, electrical, solar and battery industries.

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Qualitas Energy installs the 33.6 MW Nachtsheim-Luxem wind farm in in Rhineland-Palatinate via DunoAir Windpark Planung GmbH

- Advanced construction phase of the German 33.6 MW Nachtsheim-Luxem wind farm for the environmentally friendly energy supply of more than 29,000 households
- Commitment to clean energy and sustainable development. Qualitas Energy Group becomes an accelerator of the energy transition with a 1.4 GW wind development portfolio in the region

Berlin (renewablepress) - Qualitas Energy, a global investment and management platform focused on renewable energy, energy transition, and sustainable infrastructure investment, is currently at an advanced stage of construction with the German 33.6 MW Nachtsheim Luxem wind farm, 50 kilometers west of Koblenz.

DunoAir Windpark Planung GmbH, a member of the Qualitas Energy Group, has navigated through various challenges during the project planning phase, including adjustments in land use planning, and addressing nature conservation concerns. The wind farm with its five Enercon E-138 turbines is currently under construction and the installation of three further turbines will follow in the next phase.

"Our commitment is rooted in upholding the highest quality, safety and environmental protection standards," confirms Gerd Stephani, Project Manager Construction at DunoAir Windpark Planung GmbH in Trier. "Together, we are efficiently realizing the Nachtsheim-Luxem wind farm, aiming to enable significant progress in the regional energy supply."

Commissioning of the first five turbines is planned for August this year, while the further three turbines are expected to go into operation in autumn next year.

Once completed, the plant is expected to produce over 92 million kilowatt hours of sustainable wind power per year. Enough to supply around 29,000 households, which would correspond to more than 20% of the 215,000 inhabitants of the district of Mayen-Koblenz. At the same time, a CO2 reduction of around 49,000 tons will be achieved compared to fossil energy production.

The Nachtsheim-Luxem project exemplifies the unwavering dedication of the Qualitas Energy Group to clean energy and sustainable development. Together with a local, experienced, and skilled team, the company is spearheading a 1.4 GW wind development portfolio in the region, driving forward the local energy transition.

Marc Wiemann, Head of Project Development at Dunoair Windpark Planung GmbH, adds: "We are consistently pursuing our vision of an environmentally friendly energy supply and will continue to ambitiously advance our renewable energy projects in order to speed up the transition to a greener future."

DunoAir Windpark Planung GmbH, based in Trier, is a full-service company with an experienced and competent team specializing in the planning and construction of wind turbines, primarily in western Germany. In April 2023, the German portfolio of DunoAir's 1.4 GW onshore wind development business was acquired by Qualitas Energy.

Qualitas Energy Deutschland GmbH is part of the Qualitas Energy Group, which is committed to the transition to a decarbonized economy and focuses on the acquisition, financing, project development, construction, and operation of onshore wind turbines with a team of more than 250 employees in Berlin, Hamburg, Wiesbaden, Trier, Cologne, and Stuttgart.

PNE AG has been successful in onshore wind energy tenders for 91.5 MW

- Four new projects approved
- Successful tender results of the PNE Group already add up to 117.9 MW this year

Cuxhaven (renewablepress) - In May, the PNE Group has once again scored successes in the tender round for onshore wind turbines of the Federal Network Agency. All four wind farms submitted were awarded the contract. The wind energy projects "Lütau", "Wulfsdorf", "Willerstedt" and "Kuhstedt III" have passed the current tender round.

In Schleswig-Holstein, the wind farms "Lütau" with 5 wind turbines and a total output of 28.5 megawatts (MW) and "Wulfsdorf" with 7 wind turbines and 43 MW will be constructed. In Thuringia, PNE Group will build the "Willerstedt" wind farm with 2 wind turbines and a total output of 9 MW, and in "Kuhstedt" in Lower Saxony, the existing wind farm will be expanded by 2 wind turbines with 5.5 MW each. Together, the wind farms will have an output of 91.5 MW. All four wind farms are scheduled to go under construction or into operation over the course of the next year.

Together with the February tender, seven PNE Group wind farms with a total capacity of 117.9 MW were awarded this year.

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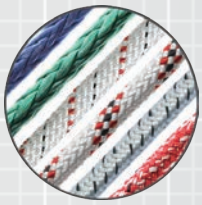

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NextWind and VSB Group Into Cooperation for 115.2 MW Wind Farm in Saxony-Anhalt

At the end of June, VSB and NeXtWind invited owners to a joint event to inform them about the cooperation between the two project developers on the Zörbig repowering project. The future pooling of shared resources and the great expertise of both companies - and not least the strong support from local politicians - will ensure efficient project implementation with high quality standards.

This cooperation is a model for the entire industry, as it impressively shows that close cooperation between several project developers creates great added value for everyone involved and thus for the entire energy transition. Significant synergies can be created, particularly when the available space is used as effectively as possible.

In the Zörbig repowering project, a total of 27 old turbines (total installed capacity: 40.5 MW) will be replaced by 16 modern and powerful Vestas V172 turbines, which will generate a total output of 115.2 MW - almost a tripling of the electricity yield despite significantly fewer turbines. This means that, after the planned commissioning of the new wind farm in 2027, 80,000 households can be supplied with cleanly produced electricity.

"Due to its dimensions, the Zörbig repowering project is another important step towards the green energy landscape of tomorrow. The interaction between citizens, politicians, authorities and project developers in this joint project is extremely positive and constructive. With a strong partner like NeXtWind, we can now move quickly into implementation," says Thomas Winkler, Managing Director of VSB Germany.

"For the success of the energy transition, the city of Zörbig has maintained a trusting and productive collaboration with renewable energy project developers for many years - including with VSB and NeXtWind. As mayor of Zörbig, I fully support the cooperation between these two companies in the repowering project "Wind Farm Zörbig" because it generates added value exactly where the energy transition is being lived: locally. I am looking forward to another successful project," emphasizes Matthias Egert, mayor of the city of Zörbig.

Prof. Werner Süss, Co-CEO of NeXtWind, confirms: "We are now quickly implementing the construction of the new wind turbines in Zörbig together with our partner VSB. The close and trusting cooperation between VSB and NeXtwind in this project brings advantages for all parties: It is a good day for the city of Zörbig, the property owners and the energy transition."

"In order to achieve the ambitious German and European climate targets, we must always make full use of the potential available to us. Repowering projects such as Zörbig support this transformation process in the long term, because through the consistent use of the latest technologies and compliance with the highest environmental and quality standards, we are impressively increasing the efficiency of the wind farms," explains Dr. Felix Grolman, CEO of the VSB Group .

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25 Years of Innovation

Innovations in Coupling Solutions and Hydrogen Fueling

NEI Magazine sits down with Gerhard Kopplin, Technical Director, MannTek, a leading innovator in providing advanced coupling solutions across multiple industries, with a prominent focus on the oil and gas sector. For many years, MannTek has been at the forefront of developing products that are integral to applications in fuel handling, aviation, military, marine, and offshore installations. We discuss many topics including their LH2 (liquid hydrogen) fueling technology, playing a pivotal role in pioneering projects such as the world's first sLH2 refueling station.

Gerhard Kopplin, Technical Director, MannTek

Let's start by explaining MannTek's credentials and experience in terms of its products and services for the oil and gas sector. Additionally, we will discuss the breadth of the company's experience, how long it has been active, and its reach.

"MannTek has established itself as a leader in providing innovative and reliable coupling solutions for a variety of industries, including the oil and gas sector," says Gerhard Kopplin. MannTek's products play a crucial role in diverse applications such as fuel handling, aviation, military, marine, and offshore installations. Nearly two decades ago, the company expanded its product range to include gas handling solutions and extended its expertise to cryogenic gases over ten years ago. Kopplin highlights, "Our commitment to excellence is evident in our customized product offerings, tailored to meet the specific needs of our customers." MannTek's global presence is bolstered by a network of distributors and OEMs, ensuring proximity to customers and the ability to provide superior service. "Our dedication to service and training is unmatched, and we pride ourselves on our ability to adapt and respond to the unique challenges of the oil and gas industry," notes Kopplin. With a history spanning over 20 years, MannTek has a proven track record of delivering the quality and performance that clients rely on.

Delving into the diverse range of couplings MannTek provides across various industries, showcasing their unique purposes and applications, Kopplin continues.

"MannTek offers a diverse range of couplings designed to meet the specific needs of various industries, ensuring safety, efficiency, and reliability, Among these, the Dry Disconnect Couplings are a standout, primarily utilized in the chemical and petrochemical sectors, MannTek's largest market segment." Kopplin notes, "These couplings facilitate secure and quick connections, minimizing spillage during transfer processes."

Safety Breakaway Couplings serve as essential emergency release systems, safeguarding hoses in drive-away incidents. "This feature is crucial for preventing hazardous spills and ensuring operational safety," Kopplin emphasizes.

Dry Gas Couplings, predominantly used for LPG distribution, are standard equipment for loading and unloading gas rail tankers and filling gas road tankers, adhering to European EN standards.

For handling cryogenic liquefied gases, MannTek has developed Dry Cryogenic Couplings. "These are instrumental in the 'bunkering' process, where ships are fueled with Liquefied Natural Gas (LNG)," Kopplin explains. The push for new international regulations aimed at reducing greenhouse gas emissions in the shipping industry has led to the creation of this new market segment.

Lastly, MannTek's Full-Flow Ball Valves cater to a niche market. "These lightweight aluminum ball valves are ideal for road tankers delivering fuel to stations, reducing the overall weight of the truck and contributing to increased fuel efficiency," says Kopplin. Each coupling type is engineered with precision to ensure optimal performance and address the unique challenges presented by different applications within the industry.

NEI Magazine: What are the primary applications of liquid hydrogen in various industries?

"Liquid hydrogen is currently being explored for its potential applications across various industries, particularly for medium to long-range distances," Says Kopplin. This exploration extends to the transportation sector, encompassing trucks, ships, and aerial vehicles. The industry's interest in liquid hydrogen is driven by its ability to store energy compactly, making it advantageous for both mobile and stationary applications. "In the context of fueling stations, liquid hydrogen can serve as an efficient storage medium, potentially revolutionizing the refueling infrastructure for vehicles that run on this clean energy source," Kopplin notes.

For energy-intensive industries, such as steel production and foundries, liquid hydrogen offers a sustainable alternative for processes requiring high temperatures, which are traditionally reliant on fossil fuels. Additionally, liquid hydrogen is being considered for its role in decarbonizing various sectors, contributing to the reduction of greenhouse gas emissions. "Its application in industries that demand a consistent and reliable energy source for heating purposes is also under evaluation, highlighting its versatility and potential as a future energy carrier."

NEI Magazine: How far along are MannTek LH2 solutions? For example, are they already available for field testing?

"MannTek is at the forefront of LH2 technology, actively participating as a development partner in several pioneering LH2 projects," says Kopplin. The company is currently conducting field tests focused on truck fueling and ship bunkering applications. "The initial results have been promising, demonstrating the anticipated performance and efficiency of our solutions," Kopplin notes, adding that this success has sparked considerable interest, leading to numerous inquiries and requests.

Additionally, other market stakeholders have initiated their own trials, and the potential for airborne applications of liquid hydrogen is being explored, assessing its handling and utility. MannTek's contribution extends beyond couplings to include the implementation of complete transfer lines. "Our automated solutions are designed to facilitate operation with minimal manual intervention, enhancing safety and efficiency," says Kopplin.

MannTek's commitment to innovation is evident in its approach to LH2 solutions. "We are not only developing cutting-edge technology but also supporting its integration into the existing infrastructure, ensuring a seamless transition to cleaner energy sources."

In recent years, significant advancements in technology have been made to improve the efficiency and cost-effectiveness of liquid hydrogen production and use.

"Advancements in liquid hydrogen technology are primarily focused on ensuring safe handling and improving the efficiency and cost-effectiveness of its production and use," says Kopplin. While the components are currently expensive due to low production quantities, Kopplin notes that the construction of efficient dispensing systems requires surprisingly few components, as validated by field tests indicating that liquid hydrogen solutions are indeed competitive.

Looking ahead, the anticipated increase in demand for liquid hydrogen is expected to drive up production volumes, both of the fuel and the necessary components. "This scale of production is likely to result in a significant reduction in the cost of components, making liquid hydrogen an increasingly attractive option for various industries," Kopplin explains.

In addition to economies of scale, technological innovations are being pursued to optimize the production process of liquid hydrogen. These include developing more efficient electrolyzers, improving insulation materials to reduce boil-off during storage and transport, and integrating renewable energy sources to lower the carbon footprint of hydrogen production. "Furthermore," Kopplin adds, "the industry is working on enhancing the infrastructure for liquid hydrogen, such as developing more robust pipelines and storage facilities, to support its wider adoption." These advancements collectively contribute to the growing feasibility of liquid hydrogen as a sustainable and cost-effective energy solution.

LH2 coupling for truck fueling

"LH2 couplings for truck fueling are designed with the highest safety standards to accommodate the unique challenges of handling cryogenic gases at -253 degrees Celsius," explains Kopplin. Emphasizing the importance of intuitive and safe operation, noting that truck drivers, typically not specialists in cryogenic gases, must be able to operate the coupling effortlessly. "The coupling is automated and controlled by the dispenser system, requiring minimal interaction from the driver," says Kopplin. The driver's role is simplified to paying at the terminal and securely connecting the coupling to the tank. Some systems may include an optional push button for added safety or operational control, but this varies depending on the dispenser builder's specifications for the fueling process.

Kopplin highlights that this approach to design prioritizes user safety and ease of use, ensuring that the fueling process is as straightforward as possible. "By automating the operation of the coupling, we mitigate the potential risks associated with manual handling of liquid hydrogen, providing a seamless and secure refueling experience," he concludes. This strategic focus on automation not only enhances safety but also ensures a more efficient refueling operation for trucks.

The World's First sLH2 Refueling Station.

Hydrogen pneumatic truck nozzle.

NEI Magazine: Can you talk about Manntek's role in the building of the worlds first sLH2 refueling station?

"MannTek played a pivotal role in the development of the world's first sLH2 refueling station, partnering with Daimler Truck to create a specialized coupling for liquid hydrogen fueling," states Kopplin. Drawing on extensive experience with cryogenic couplings, MannTek was able to quickly adapt and understand the specific requirements for handling hydrogen. "Our proactive approach and ability to rapidly prototype and test our designs in-house were key factors in our success," Kopplin emphasizes.

The project's success also stemmed from effective collaboration and open communication with all project partners. "Through joint efforts, we were able to demonstrate that LH2 truck fueling is a viable and safe alternative for long-haul applications, meeting the project's goals within the estimated timeline."

MannTek's contribution, though one part of a larger effort, was crucial in this groundbreaking achievement. "We are honored to have been part of this significant step towards a carbon-neutral, net-zero future, contributing to the development of alternative fuel infrastructures," Kopplin concludes, underscoring the importance of their role in advancing sustainable transportation solutions.

NEI Magazine: Finally, could you enlighten our readers of a case study where you helped a client with your solutions?

"MannTek has a rich history of successful case studies where our solutions have greatly benefited our clients," Highlighting a notable example from about ten years ago: "Our involvement in the first LNG fueled passenger ferry and the first LNG bunker vessel in the world were pioneering steps in the maritime industry's shift towards cleaner energy sources." More recently, MannTek has shifted focus to net-zero solutions, such as methanol bunkering and carbon capture projects. Emphasizing the company's commitment, "Our dedication to innovation and sustainability has been a driving force in helping our clients achieve their goals for a carbon-neutral future." He concludes by noting that MannTek's solutions are not just products but are part of a larger movement towards environmental responsibility and energy efficiency, demonstrating the company's pivotal role in advancing sustainable technologies.

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Bergen Engines and the Road to 100% Hydrogen

Solutions for a Sustainable Future

In the journey toward cleaner energy, hydrogen has emerged as a promising fuel for both land and marine applications. Its renewable nature and versatility make it an attractive alternative to traditional fuels, offering high energy density and efficient performance for weight-sensitive applications. Decentralized hydrogen production also reduces reliance on transportation infrastructure, enhancing its appeal.

Globally, hydrogen production is scaling rapidly and is set to play a crucial role in decarbonizing energy-intensive industries. By 2050, hydrogen is projected to become a central pillar of the energy system, significantly contributing to carbon emission reductions.

Bergen Engines, based in Western Norway, aims to maintain its leadership as a manufacturer of medium-speed engines by developing a market-first 100% hydrogen-fueled medium-speed engine. The company is known in the industry for their reliability and efficiency, and recent announcements in their future fuel development program have been met with a positive reaction in the market. Currently celebrating over 80 years of innovation as an engine manufacturer, the company shows no signs of slowing down.

The Power of Medium Speed

Hydrogen presents significant advantages for Bergen and the wider market medium-speed engines. Its high energy content facilitates efficient combustion and power generation, while its combustion process releases only water vapor, eliminating harmful emissions like carbon dioxide. This aligns with global efforts to transition to cleaner energy sources, making hydrogen an attractive option across various sectors.

Hydrogen can be produced using methods such as electrolysis powered by renewable energy sources, integrating seamlessly into a sustainable energy ecosystem. Its adaptability to existing engine technologies allows for relatively easy integration into current infrastructure. As industries strive to reduce their carbon footprint and adhere to stringent environmental regulations, hydrogen provides a practical and scalable solution for medium-speed engines like Bergen's, paving the way for cleaner and more sustainable operations.

Ongoing Developments

Looking ahead, Bergen Engines is currently on-track with their development of a 100% hydrogen-fueled engine and the target completion date of December 2024.

Committed to sustainable solutions on land and at sea, Bergen Engines became the first medium-speed engine manufacturer to test a 30% hydrogen blend at 100% load during field testing in Caseda, Spain last year. These tests, in collaboration with long-standing customer Viscofan, marked a crucial step toward realizing the company's vision and ensuring the new fuel meets performance standards in real-world conditions.

Bergen Engines recently announced the commercialization of a 25% hydrogen blend across their entire natural gas engine range without modification. This improvement from the previous 15% offering demonstrates Bergen's commitment to providing cleaner and more efficient energy solutions for land and marine applications, as well as scaling their blended offering after extensive tests to ensure the same dependability the company is known for today.

"Our commitment to innovation and sustainability drives us to continually improve our engine technologies," said Jon Erik Røv, Managing Director of Bergen Engines. "The ready-to-sell offering of a 25% hydrogen blend engine is a testament to our dedication to providing cleaner and more efficient energy solutions. We are proud to offer our customers engines that not only meet their performance needs but also contribute to a greener future

for our industry."

Unlocking Hydrogen's Full Potential

For widespread hydrogen adoption, challenges such as cost, infrastructure development, and production efficiency must be addressed. Ongoing research and development efforts globally focus on overcoming these hurdles to unlock hydrogen's full potential in contributing to a cleaner and more sustainable energy future.

Recognizing that 100% hydrogen operation isn't yet a reality for most customers, Bergen Engines promotes hydrogen blending within their natural gas engine range. This approach helps reduce emissions immediately and can evolve alongside the development of policies and infrastructure to support higher hydrogen percentages as they become locally available.

Key benefits of hydrogen blending for power generation include:

Reduced Emissions

Hydrogen blending significantly lowers CO2 emissions, aiding global efforts to combat climate change and helping customers meet stringent environmental regulations.

Enhanced Efficiency

Higher hydrogen content improves combustion efficiency, resulting in better fuel economy and optimal performance without compromising power output.

Fuel Flexibility

Bergen's engines operate seamlessly with the new hydrogen blend, providing versatility and reliability in various operational settings, from land-based power generation to marine propulsion.

Sustainable Transition

Increasing the hydrogen content in the fuel mix facilitates a smoother transition for industries adopting hydrogen as a primary fuel source, supporting long-term sustainability goals.

Bergen Engines: Committed to Solutions for a Sustainable Future

As the world focuses on flexible and sustainable energy solutions, Bergen Engines strives to be a catalyst for change. The company conducts innovative studies on low-carbon future fuel options and explores new applications to meet the demands of tomorrow. Recognizing that different applications or geographical locations may require other fuel sources due to availability, Bergen Engines is also researching methanol, ammonia, and biofuels.

Future fuel options are crucial for the green transition, addressing challenges associated with traditional fossil fuels and contributing to a more sustainable energy landscape. Bergen Engines ensures its technology is adaptable, regardless of the fuel source chosen by its customers.

Understanding the importance of low-carbon operations, Bergen Engines focuses on sustainability efforts. Customers make long-term investments when planning their projects, facing uncertainties regarding future fuel availability, costs, and regulatory landscapes, including potential CO2 taxes. The company's modular engine design prioritizes fuel flexibility, enabling customers to navigate these uncertainties confidently. This flexibility ensures reliability and top efficiency ratings for their engines, providing peace of mind and longevity to their investments.

Bergen Engines' pioneering efforts in hydrogen technology, alongside their commitment to fuel flexibility and innovation, position them at the forefront of the green energy transition. By addressing challenges and leveraging advancements in hydrogen production, storage, and blending, Bergen Engines is meeting current demands for cleaner energy and paving the way for a more sustainable and environmentally conscious future. Their dedication ensures that no matter the chosen fuel source, their customers can confidently invest in a greener tomorrow, supported by reliable and efficient engine technology.

To stay updated with Bergen's developments and to learn more about the benefits of hydrogen fuel in power generation, visit http://www.BergenEngines.com/sustainability.

Bergen Engines

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Advancing the Energy Transition the Alleima Way

The energy transition will depend on a range of energy solutions as the world gets closer to its 2050 net zero targets. Accelerating the use of hydrogen, biofuels and carbon capture and storage (CCS) will be critical in determining the pace of the transition and reducing greenhouse gas emissions.

Hydrogen – a crucial piece in the energy puzzle

With global electricity consumption growing at record rates, hydrogen is not only one of the future leading options for storing energy – it can also be used with oxygen directly as fuel or to generate electricity.

Current estimates by the International Energy Agency (IEA) suggest global electricity consumption could double over the next decade, as more and more industries transition to fossil-free production. This will require both a rapid expansion of the overall electricity production capacity and better utilization of the surplus electricity generated by renewable energy sources.

Hydrogen is an efficient energy carrier

Hydrogen can play a key role in balancing electricity supply. It's the most abundant element in the universe and can be used to store, transport, and provide energy.

Electrolyzers are critical to producing hydrogen from renewable electricity. Surplus electricity can be converted into hydrogen and stored, thus enabling the excess solar power generated during the summer to be utilized in winter, for example. Potentially, when gasified or liquified, hydrogen can be transported over long distances via pipelines or by truck to where it is needed most. Ammonia is an excellent hydrogen carrier.

Applications across sectors

Hydrogen has a wide range of applications from mobility to heavy industry. It can be used directly as a combustion fuel to generate electricity, or as backup power – thereby helping to decarbonize transportation and industries.

Hydrogen-powered fuel cells convert the chemical energy from hydrogen and oxygen forming water to electrical energy. This is a clean form of energy with electricity, heat, and water being the only products and by-products. There is great potential to use hydrogen fuel cell technology for heavy-duty vehicles. There is also increasing interest from the steel industry and other large CO_2 emitters such as cement and aluminum. However, there are challenges around how to produce enough hydrogen, lowering high production costs and efficient distribution.

Alleima and hydrogen

Alleima provides materials, products, and solutions for hydrogen production, distribution, and usage like in fuel cells and electrolyzers. The company has extensive experience in materials technology, and in-house R&D and testing capabilities. It works together with customers to recommend the optimum alloy for the hydrogen application and to explain how alloys behave in different environments.

Hydrogen embrittlement can occur in materials with certain microstructures, chemical compositions, impurities, or surface finish. The materials need to be able to withstand challenging environments characterized by high pressure and/or corrosiveness.

While heat exchanger tubing and hollow bars play a key role in hydrogen production, medium and high-pressure tubes support its distribution. High-pressure tubes can be delivered as fixed lengths or as coils. Furthermore, we offer customized solutions such as high-pressure heat exchangers, bent tubes, and end-finished tubes, all produced by Alleima Engineering.

For setting up hydrogen refueling stations, Alleima offers a digitally connected on-site mobile tubing container that can be used to straighten and cut coiled tubing matched to specific customer requirements. Alleima also offers a portfolio of pre-coated steel strips,

which are critical components in the hydrogen fuel cell stack and in electrolyzers.

Advancing the biofuels industry

As a leading manufacturer of stainless steels and special alloys, with roots dating back to 1862 in Sandviken, Sweden, Alleima combines extensive experience and a diverse product range with a vision to advance the entire biofuels industry in a safe and cost-effective manner.

Selecting the right material for heat exchanger tubing in a biorefinery can extend equipment lifetime and enhance safety. Whether producing biodiesel, fully refined and cracked renewable diesel, or sustainable aviation fuel, there is always a risk of corrosion, cracks, or leaks due to aggressive conditions in the feed, effluent, or reactor. These can cause unscheduled maintenance, fires, or explosions.

Safe and efficient hydroprocessing

Some asset owners are already using 100% renewable feedstock, such as vegetable oil, used cooking oil, and animal fat, to reduce greenhouse gas emissions by up to 75-95% compared to fossil-based fuels. Alleima assists them in identifying the optimal corrosion-resistant materials for the various types of heat exchangers used in hydroprocessing plants. The company's product portfolio covers all types of tubular heat exchangers – feed/effluent, reactor effluent air cooler (REAC), water-cooled, and fractionator – for most hydroprocessing steps.

Many biorefineries use expensive Alloy 625 or Alloy 825 (or duplexes) to safeguard against corrosion. However, the Alleima grade Sanicro® 35 bridges the gaps between standard stainless grades and nickel alloys and is a cost-effective solution for corrosion reduction. The grade, which is among 900 active alloys in the Alleima portfolio, matches the pitting resistance of Alloy 625 and outperforms this nickel alloy in other areas.

CCS – accelerating a reduction in CO_2 emissions

Carbon capture and storage is seen as important for reducing carbon in the air as well as direct capture from emission sources.

According to the Global CCUS Institute, CCS has grown by 44% over the last year and CO2 capture capacity has grown to 244 Mtpa.

Industries like steel, cement, blue hydrogen, and conventional oil and gas production are exploring possibilities to retrofit carbon capture units and reduce their emissions. This is also being incentivized by various governments that have developed policies to meet their net zero emissions targets.

Storing CO_2 in geological formations like depleted oil and gas reservoirs or saline aquifers is seen as a viable solution because they allow safe storage for a very long time. Storing CO_2 underground requires it to be injected as a supercritical fluid at high pressure. This means the tubing for the injection must be able to withstand harsh conditions during periods of injection and in a steady state.

Alleima manufactures high-quality corrosion-resistant alloys that can resist CO_2 environments. The company has extensive experience in providing advanced materials that can withstand corrosion and high temperatures. It works closely with several companies on the testing of alloys for CCS applications and has supported a major CCS project in the North Sea.

Quality and sustainability

The Alleima fully integrated manufacturing process ensures full traceability from R&D to end-product, and the company holds most quality certificates. Alleima uses over 80% recycled material and more than 93% fossil-free energy at its production sites, among other initiatives.

Engineering the energy transition

Advancing the energy transition to meet net zero targets requires innovation, acceleration, and collaboration. By using engineering as a force for sustainable good, Alleima works together with its customers to accelerate innovative changes that bring about the biggest difference. High-integrity grades and products from Alleima are enabling the development of new technologies and applications for hydrogen, bioenergy, CCS, concentrated solar power, offshore wind, and geothermal energy.

Alleima materials make the difference. Its expertise makes it work, view our website for further product details:

https://www.alleima.com/en/

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China's Huizhou CHP Plant starts commercial operation, powered by GE Vernova's hydrogen-ready H-Class equipment

- GE Vernova and Harbin Electric Corporation provided two hydrogen-ready 9HA.01 combined-cycle units for Guangdong Huizhou combined heat and power plant operated by the Guangdong Energy Group Co. Ltd
- New power plant is expected to deliver up to 1.34 gigawatts (GW) to the grid and steam for the industrial process of the chemical complex present in Huizhou
- Project marks first GE 9HA.01 gas turbine manufactured by the GE Harbin Electric HDGT Joint Venture in Qinhuangdao

HUIZHOU, GUANGDONG PROVINCE, CHINA – GE Vernova Inc. today announced that Guangdong Huizhou Combined Heat and Power (CHP) plant powered by two GE Vernova hydrogen- ready 9HA.01 combined-cycle power generation equipment achieved the successfully commercial operation. The Chinese state-owned power utility Guangdong Energy Group Co., Ltd.'s CHP plant is expected to inject up to 1.34 gigawatts (GW) of electricity into the grid and steam for the industrial process of the chemical complex present in Huizhou, a city in southeast Guangdong Province, China, north of Hong Kong. GE Vernova's gas turbines are expected to burn up to 10 percent by volume of hydrogen blended with natural gas within the next two years.

"Hydrogen energy will play an important role in the future energy system in Guandong Province, an agglomeration of cities aiming to strengthen international cooperation and promote lower-carbon, inclusive, coordinated and more sustainable development," said a representative from Guangdong Energy Group. "GE Vernova has long been our company of choice when transitioning our power plants from coal to natural gas, and we trust GE Vernova advanced H-Class gas turbines will help promote the use of hydrogen blending in power generation across other provinces, as aligned to China's Medium and Long-term Plan for the Development of Hydrogen Energy Industry (2021–2035) objectives."

Although hydrogen supply in Guangdong Province is still highly dependent on the gray hydrogen production method, which is mainly based on the production of hydrogen from industrial byproducts and coal power, the national and provincial energy plans encourage the development of renewable energy for hydrogen production.

"GE Vernova believes that the Guangdong Huizhou project could serve as a model to develop hydrogen-blended H-class natural gas power generation across other provinces" said Xu Xin, President of GE Vernova China Gas Power Services. "In Guangdong, we focus on helping to address the growing electricity and steam needs while reducing carbon emissions. China's Medium and Long-term Plan for the Development of Hydrogen Energy Industry proposes an accelerated conversion towards efficient hydrogen production from renewable energy, and we are proud Huizhou plant is expected to become the first hydrogen-blended natural gas facility to use GE Vernova's gas turbines in China."

GE Vernova has over 120 units worldwide that have run fully or partially on hydrogen and accumulated over 8.5 million operating hours.

Guangdong Huizhou project marks the first localized 9HA.01 manufactured by General Harbin Electric Gas Turbine (Qinhuangdao) Co., Ltd. in China. This joint venture was formed in 2019 between GE and Harbin Electric as a joint effort to focus on heavy duty gas turbine localization, aiming to deliver more efficient and reliable support for China gas power plants, including those that operate on blends of natural gas and hydrogen. Harbin Electric also provided steam turbine, generator and balance-of-plant equipment for the power plant.

GE and Harbin Electric have been suppliers for Guangdong Energy Group ("GEG") for many years. GEG selected two GE Vernova 9F.05 gas turbines for Xinhui Power Plant, which achieved the successful commercial operation in 2018. Additionally, GE Vernova is currently supporting the plant operator's transition from coal-to-gas at its Dongguan Ningzhou power plant. GEG selected three GE Vernova 9HA.02 gas turbines and Harbin Electric's steam turbines, generators and other auxiliary equipment for the Dongguan Ningzhou combined cycle power plant in Guangdong province, also in the Greater Bay Area.

Operating in China for over 40 years, GE Vernova has been delivering innovative products and services that create significant value for its power generation customers, and now helps power plant operators in addressing the energy transition challenge. GE Vernova serves around 110 customers and more than 240 gas turbines in China, with an installed power capacity of 50 gigawatts (GW).

Tesla Share Climbs: Tesla Production Declines in The Second Quarter of 2024 - Rising Deliveries Exceed Expectations

Austin, USA - The US electric vehicle manufacturer Tesla has published its production and delivery figures for the second quarter of 2024.

Tesla produced a total of 410,831 vehicles in Q2 2024. This means that production is 5.2 per cent lower than in the previous quarter Q1 24 (433,371 vehicles). In addition, the current Q2 figure is the lowest production result since the third quarter of 2022 (Q3 22: 365,923 vehicles).

In contrast, Tesla's deliveries increased significantly in the second quarter. At 443,956 vehicles, deliveries were 14.8 per cent higher than in the previous quarter. Tesla also exceeded analysts' expectations with this result. On average, they had expected around 438,000 vehicles to be delivered. The rising demand is supported by price reductions and purchase incentives.

Tesla shares topped the RENIXX yesterday with a gain of 9.8 percent to €214.60 (closing price, 2 July 2024, Stuttgart Stock Exchange). Compared to the price at the turn of the year, the share is currently down 6.8 percent.

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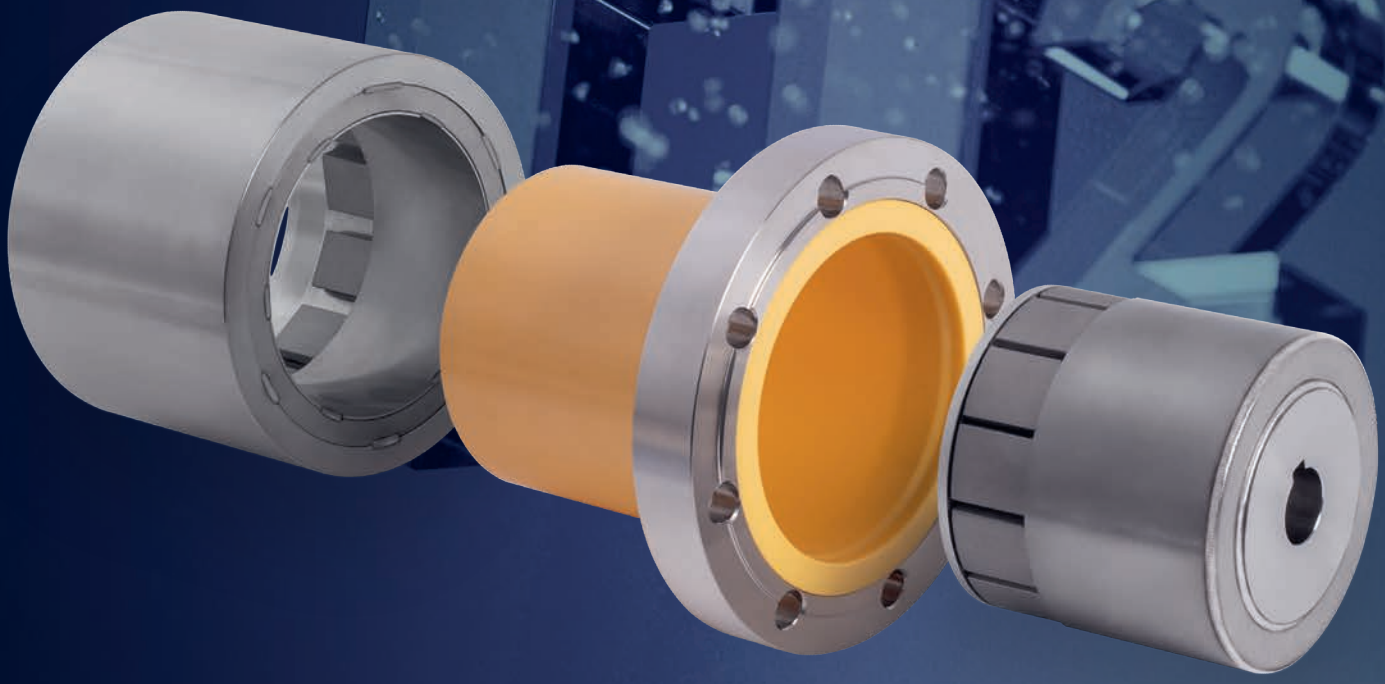

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Successful Overseas: Two Solar Projects in Colorado to US Energy Supplier Tri-State

PV projects have a combined installed capacity of 327 megawatts (DC) / Another JUWI project with 179 megawatts (DC) in Colorado already half built New successes for the international project developer JUWI from Wörrstadt: In the US state of Colorado, where the US branch of JUWI Inc. is also located, JUWI is currently building three photovoltaic projects with a total output of more than 500 megawatts (DC).

While the "Spanish Peaks" project has been under construction since the end of last year, negotiations have now been concluded on the sale of two further PV projects to the Colorado-based energy supplier Tri-State. Construction will now begin there shortly, too.

Axial Basin Solar is a 186 megawatt (DC) project (MW) in Moffat County in the White River Electric Association's service area, about 250 miles northwest of Denver. Dolores Canyon Solar is a 141 MW (DC) project in Dolores County in the Empire Electric Association's service area, about 400 miles southwest of Denver. JUWI CEO Carsten Bovenschen is delighted with the success: " Both projects show once again how our 30 years of expertise contributes to climate protection worldwide and thus to greater sustainability ."

The purchase of the two projects is a first for the US non-profit wholesale electricity supplier: For the first time, the Tri-State Generation and Transmission Association has acquired renewable energy projects to supply its cooperative members with clean energy.

Both solar projects are scheduled to begin supplying electricity to Tri-State members by the end of 2025, thus reaching an important milestone: 50% renewable energy in the Tri-State members' service area. " Our members now have ownership of solar systems at competitive costs ," says Duane Highley, CEO of Tri-State. " We greatly appreciate JUWI's cooperation with our team in completing this transaction to purchase these two solar projects. "

Steve Ihnot, CFO of JUWI Inc., emphasizes: " We look forward to creating added value for customers through the projects based on our shared values of safety and quality and in close coordination with the local communities ." Stephan Hansen, COO responsible for JUWI's international business, adds: " With these two projects, we will once again demonstrate our strong expertise in project development and implementation. They are also proof of our unique market position in Colorado ."

For background, with the passage of the Inflation Reduction Act (IRA) of 2022, nonprofit electric cooperatives will be able to receive a direct payment of federal renewable energy tax credits, enabling cooperatives to invest directly in the ownership of renewable resources. Prior to the passage of the IRA, Tri-State and electric cooperatives generally could not directly benefit from the federal renewable energy tax incentives available to for-profit, investor-owned utilities and independent power producers.

" I have worked for years to enable rural electric cooperatives like Tri-State to access federal clean energy tax credits. The passage of the historic Inflation Reduction Act made

this possible for the first time and finally allowed them to own their own renewable energy projects ," says U.S. Sen. Michael Bennet, D-Colo. " This progress will help Tri-State deliver tremendous benefits to the rural communities it serves and support Colorado's continued leadership in our nation's transition to a clean energy economy. "

In addition to the projects Tri-State is purchasing, Tri-State is expanding its resource portfolio with three additional PPAs for solar projects that will be completed by the end of 2024. This includes the "Spanish Peaks" solar park that JUWI is currently building in southern Colorado, about 200 miles south of Denver. The capacity is 179 megawatts (DC), and about 50 percent of the construction has already been completed.

By the end of 2025, Tri-State will be able to supply its members with 870 MW (DC) / 680 MW (AC) of solar energy from eight facilities, with solar energy meeting the equivalent needs of nearly 200,000 homes.

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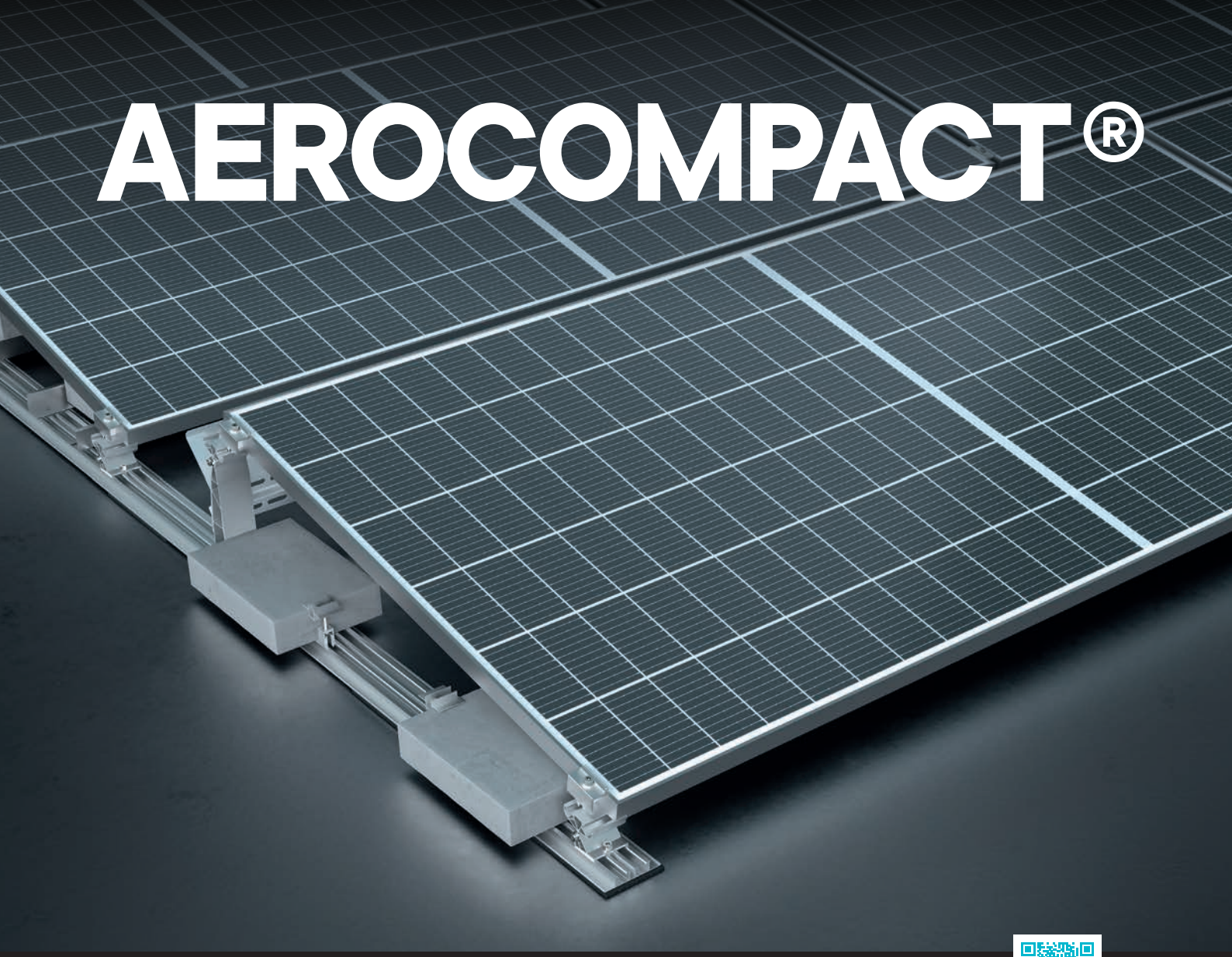

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Intersolar 2024: JUWI Exceeds 4,000 Megawatt Threshold and Starts Further Major Projects

In the run-up to Intersolar 2024, JUWI can announce a new record and the start of further major projects: With the completion of the 223.6 megawatt solar park "Pike Solar" in the US state of Colorado, the specialist for renewable energies has increased its installed solar capacity to over 4,000 megawatts. The company also announced the start of further major projects in the range of over 100 megawatts. At the world's leading trade fair for the solar industry in Munich from June 19 to 21, JUWI will be presenting its complete range of project development and operational management for solar and hybrid projects at a joint stand with its sister company MVV Trading in Hall A4 at Stand 550.

One of the main topics of the JUWI stand is the direct supply of solar power to industrial companies. JUWI is currently building a ten-megawatt solar park for SPIES Packaging in Melle, Lower Saxony, which supplies electricity to the factory of the manufacturer of injection-molded plastic packaging via a direct line. Revamping is also one of this year's key topics at the JUWI stand. For a good year now, the Renewable Energy Sources Act has opened up new options for operators when replacing modules within the EEG term. Other core topics of the JUWI stand are the purchase of project rights, the topic of cybersecurity and electricity marketing by JUWI's sister company MVV Trading, as well as JUWI's new employer branding.

"We have a well-filled project pipeline with a number of large-scale projects with which we are already targeting the 5,000 megawatt threshold in installed solar power. In Germany in particular, we are also planning more projects in which the supply of green electricity to industrial customers and the combination with storage technologies play a central role," explains Carsten Bovenschen, CEO of JUWI GmbH. The company is currently preparing to build additional large solar parks with an output of over 100 megawatts each in the USA. In the US state of Colorado, where the company's US branch is also located, JUWI is currently building three photovoltaic projects with a total output of more than 500 megawatts (DC). While the "Spanish Peaks" project has been under construction since the end of last year, the sale of two further PV projects to the Colorado-based energy supplier Tri-State was sealed at the beginning of June. Axial Basin Solar is a 186-megawatt (DC) project in Moffat County, approximately 250 miles northwest of Denver. Dolores Canyon Solar is a 141-MW (DC) project in Dolores County, approximately 400 miles southwest of Denver. JUWI will begin construction on both projects shortly.

Revamping and cybersecurity

Another important part of JUWI's presence in Munich is the company's operational management offering: In addition to the operational management of solar parks, their maintenance and 24/7 remote monitoring, JUWI also offers a range of special services. This includes the secure connection of solar and wind parks to the data network with the Secure Connect solution.

Revamping solar parks - i.e. replacing modules in existing systems - is also playing an increasingly important role. This is how operators react to module degradation, which is on average 0.5 to 1 percent of the output. Over the past seven years, JUWI's operations management department has replaced around 720,000 modules with a total output of around 119 megawatts in 18 solar parks. In addition to insurance claims, the possibilities of the EEG 2023 are also playing an increasingly important role. For around a year and a half, older modules in existing parks can be replaced even if they are not defective, without losing the EEG subsidy.

New employer brand

Just in time for the start of Intersolar in Munich, JUWI will present its newly designed brand image as an employer. In view of the upcoming major projects and a continuing growth market, the company is planning additional new hires in the coming months. "With the slogan 'Our We Work' we are attracting both experienced specialists and young talent," Bovenschen continues. The pioneer in renewable energies, which has been established for almost 30 years, is thereby emphasizing its cooperative company culture and underscoring its sustainable business model.

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2024 IMPORTANT EVENTS CALENDAR

RE+ 2024
Event Location: Anaheim Convention Center, Anaheim, California, USA
Event Date: September 9-12, 2024

2024 Maryland Clean Energy Summit
Event Location: College Park Marriott Hotel & Conference Center, Hyattsville, Maryland, USA
Event Date: October 7-8, 2024

Offshore Wind North East (OWNE) 2024
Event Location: Beacon of Light, Sunderland, United Kingdom
Event Date: November 6-7, 2024

International Renewable Energy Conference (IREC) 2024
Event Location: Manila, Philippines
Event Date: December 3-5, 2024

World Hydrogen Week
30.09.2024 - 04.10.2024
Copenhagen
https://www.worldhydrogenweek.com

World Hydrogen Mobility
10.12.2024 - 12.12.2024
Stuttgart
https://t.ly/Z1xH4

2024 World Battery & Energy Storage Industry Expo (WBE)
Event Date : 08/08/2024
Event Venue : Guangzhou, China
Website : https://en.battery-expo.com/

WindEnergy Hamburg
Event Date : 24/09/2024
Event End Date : 27/09/2024
Website : https://www.windenergyhamburg.com/

Carbon Capture Technology Conference & Expo – Europe 2024
23/10/2024 -24/10/2024
Event Venue : Hamburg
Website : https://www.carboncapture-expo.com/

HESE – Hydrogen Energy Summit & Expo 2024
Event Date : 09/10/2024 - 11/10/2024
Event Venue : Bologna, Italy
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