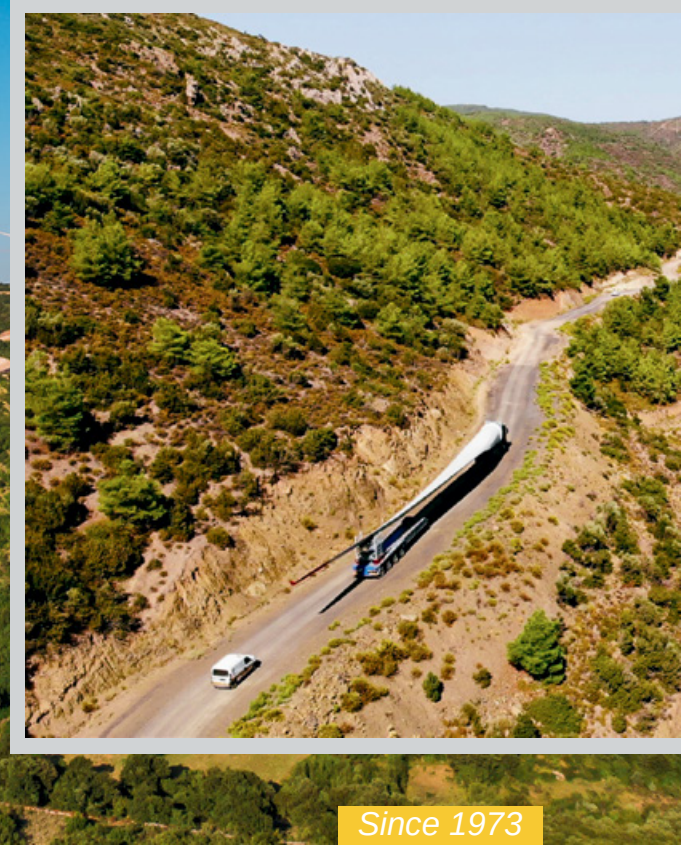


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...details in page 32



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SoyutWind, with a 15,000 square meter indoor and 120,000 square meter outdoor factory complex, is the only company in the region that manufactures direct drive wind turbines and is Türkiye's first and only domestic wind turbine manufacturer. It has completed its 50th year in the industry and 24th year in the wind energy sector. It engages in design, production, and implementation with its technology evolving in Türkiye.



soyutwind.com

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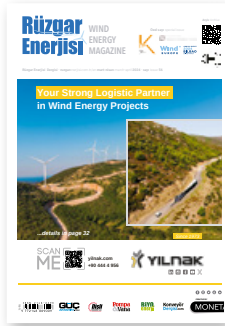


Editör / Editor



Mesut Kul

Yayıncıdan



Hello,

For a sustainable future, the world keeps taking determined steps. Within the scope of the 28th Conference of the Parties (COP28) under the United Nations Framework Convention for Climate Change, launched in December 2023, 118 countries signed the Global Decarbonization Acceleration initiative, which aims to triple renewable energy capacity and double the rate of progress in energy efficiency by 2030. The reports and analyses published by various respected institutions after the decision taken at COP28 demonstrate that the commitment and advancing technology can meet the figures promised. It is estimated that 95% of these decisions for increases, one of the main driving forces of the industry, will take place in solar and wind energy.

In the meantime, reinforcing commitment to boost clean technology produced in Europe via support packages and action plans, the EU broke a new record by constructing 17 GW of new wind farms, of which 14 GW onshore and 3 GW offshore, according to data announced by WindEurope.

The Turkish wind energy industry, which is ranked 12th in the world and 5th in Europe with an installed wind capacity of 12 GW, keeps growing stronger day by day. The Turkish wind energy sector declared 2024 as a year of mobilization by concentrating on issues such as permissions, financing and sustainable growth of the wind industry, and is now speeding up its steps for the 5 GW offshore wind capacity goal. In line with the 5 GW goal declared at the beginning of 2023, Turkey decided on the areas where power plants will be built in the last year and it is expected that technical works for its first offshore wind power plant will begin this year.

Just like Turkey connecting Asia and Europe, Wind Energy Magazine (Rüzgar Enerjisi Dergisi) is involved in all the activities and developments in the wind industry from Japan to Germany, creating a bridge to the industry, and we fly to Italy first and then to Spain with this publication.

We hope to see you in Italy at KEY ENERGY Fair and in Spain at WindEurope Bilbao Annual Event...

Künye / Publisher

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MATURE CAPITAL

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For Wind Project Transactions:

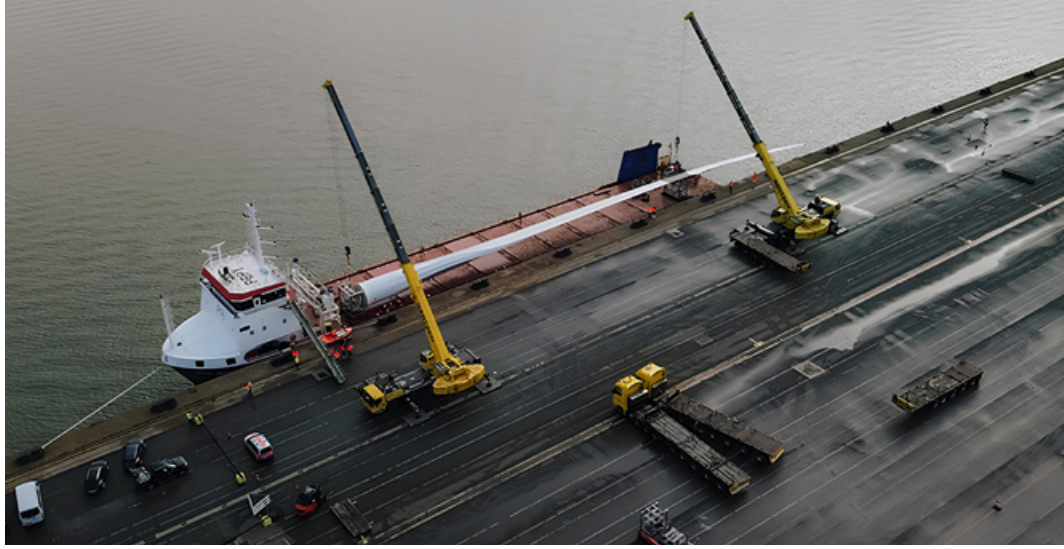
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E-175 EP5 rotor blade arrives at test stand

Arrival of the E-175 rotor blade from Viana do Castelo (Portugal) in Wilhelmshaven (Germany).



ENERCON has reached another milestone in the prototype program for the new E-175 EP5. After a journey of several days by ship and heavy transport, a prototype rotor blade of ENERCON's new top model arrived at the test stand in Aurich this week. There, the 86 meter long component is now being prepared for extensive test series under the leadership of ENERCON Research and Development.

The first E-175 blade transport has already been used to validate the transport concept.



The rotor blade was produced at the ENERCON blade factory in Viana do Castelo/Portugal. There it was loaded onto the cargo ship 'Peak Bergen' and transported by sea to the deep sea port in Wilhelmshaven. It was then transported by road to the test stand at the company headquarters in Aurich.

Research & Development, Equipment Design and Logistics already used the first E-175 EP5 blade transport for a series of measurements to validate the transport concept. The test blade was equipped with various measurement technology before transportation. Among other things, sensors determine the loads acting on the component during trans-

portation. The measurement data should provide information on whether the new transport frames, blade clamps and trailing systems developed for the E-175 EP5 blade meet their requirements.

The practicability of the transport concept was also under particular scrutiny. 'The dimensions of the new blade are the biggest challenge for logistics,' says Lukas Freericks from Technical Engineering & Support at ENERCON Logistics. 'The enormous total transport length with vehicle combination requires comprehensive testing and planning of the transport route and the route expansion requirements prior to delivery to the construction site.' During the development process, Logistics therefore simulated and tested examples of critical infrastructure such as highway junctions and carried out an analysis of suitable ship types and means of transport. The transport concept for the E-175 EP5 blade has now passed its first test.



Night-time arrival at the ENERCON R&D test stand in Aurich (Germany).

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Nordex Group: preliminary annual figures for 2023 confirm guidance



The Nordex Group (ISIN: DE000A0D6554) today published preliminary results for fiscal year 2023 and confirms its guidance for the year. According to these preliminary results, the Company recorded increased consolidated sales of EUR 6.5 billion (previous year: EUR 5.7 billion) and exceeded the upper end of the forecast range of EUR 5.6 to 6.1 billion. Earnings before interest, taxes, depreciation, and amortization (EBITDA) reached break-even on a full-year basis at EUR 2.0 million (previous year: minus EUR 244 million). This corresponds to an EBITDA margin of zero percent (previous year: minus 4.3 percent) and is broadly in the middle of the guidance range of minus 2 to plus 3 percent.

The Nordex Group has improved its working capital ratio in relation to consolidated sales to minus 11.5 percent (previous year: minus 10.2 percent). Thus, the ratio is again clearly below the guided minus nine percent.

Investments in 2023 amounted to around EUR 131 million (previous year: EUR 205 million) and are therefore well below the forecast figure of around EUR 200 million.

Nordex ended the year with a solid order intake of 7.4 GW (previous year: 6.3 GW) while maintaining stable prices with a promising order outlook.

"2023 was a transition year with a step-up in the right direction. Looking back, business performance has developed as assumed at the beginning of the year. After a weak start, as expected, we gradually improved each quarter with a stronger second half of the year. Overall, we reached break-even in terms of profitability and now have laid a good foundation for our further business development," explains José Luis Blanco, CEO of the Nordex Group.

The figures announced with this press release are preliminary. The Nordex Group will publish final and audited results for fiscal year 2023 together with guidance for 2024 on 29 February 2024.





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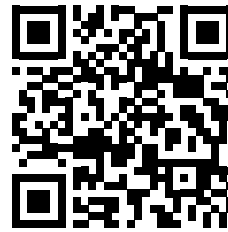
Mature Capital: Only Wind Energy!

Mature Capital founded in September in 2022 based in İstanbul. The company's main focus is Merger & Acquisition Advisory services in Wind Energy in Türkiye. Mature Capital is founded by Habib Babacan, who has 20 years of work experience in wind business in Türkiye, and held various C level, executive and managerial positions in Nordex Group, and Turcas Petrol (investor), and extensive network at every level in Turkish wind business.

In wind transactions, Mature Capital works with its partners for different due diligence works, wind site, micro siting, environmental, permits and legal assessments of the projects, and build the team and working partners according to the client requests. These working partners are both local experts in Türkiye, aswell as the representation and local offices of international consulting companies.

In its first year, Mature Capital successfully completed a 25 MW operational wind farm acquisition transaction in 2023. In this transaction, the company facilitated all relations between buyer and seller, direct negotiations and gave technical due diligence services, and conducted and organized various site visits, before and after the transaction. In 2024, the company is working on four different transaction projects at different levels, and targets to successfully complete them.

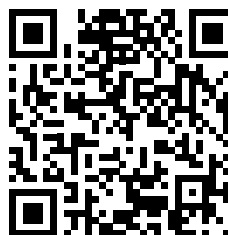
Mature Capital has a deep expertise in wind market structure, knows how to construct operational, greenfield or brown field portfolio, and has an asset, the company has a direct reach to shareholders of investors, and portfolio owners. Turkish wind market is a fragmented market of 12 GW operational wind farms with an around 200 different investors, and 80 GW of new pipeline of early phase greenfield wind projects with storage. With this market structure, Turkish wind market has an attraction for international investors, and Mature Capital is ready to give services for international investors for their growth in Türkiye.



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Sancak Energy continues its investments in renewable energy



Established in 2007, Sancak Energy has been taking significant steps towards meeting Türkiye's energy demands and increasing employment opportunities. The company aims to be a leader in the country's energy sector transformation by focusing on renewable energy sources.

Operating under the slogan "Sustainable Energy for the Future," Sancak Energy aims to meet Türkiye's energy demand sustainably and environmentally friendly by focusing on clean energy sources such as wind and solar. The investments made in this regard play a crucial role not only in meeting energy demand but also in reducing dependency on external sources for energy production.

Sancak Energy is making significant progress towards a sustainable future in Türkiye's energy sector and plays a leading role as a key player. With its emphasis on renewable energy sources and strategic investments, the company plays a critical role in the country's energy transition.

With completed investments, we continue to provide sustainable and environmentally friendly energy to Türkiye, reaching a total installed capacity of 338 MW by 2024. With investments continuing until 2025, we plan to increase our installed capacity to 366.5 MW. We will continue to grow, serve our country, and meet Türkiye's growing energy demand with future investments.

In 2024, our company achieved significant growth with completed energy investments. With additional capacities obtained within the scope of the Ardıçlı RES project in Konya, an investment of 24 MW with 5 wind turbines has increased the plant's installed capacity to 86.7 MW. Another plant located in Konya, the Bağlar RES project, has integrated a 26 MW Solar Power Plant thanks to additional auxiliary capacity, transforming the plant into a hybrid one. Additionally, the Yahyalı RES plant in Kayseri has been made more efficient through the integration of a 16 MW Solar Power Plant with the help of additional auxiliary capacity.

Sancak Energy continues to invest under the motto of sustainability and aims to achieve greater success in the renewable energy sector. Achieving success in the renewable energy sector and contributing to the clean energy transition are important goals not only for the company's own growth but also to contribute to the development of global sustainability and environmental awareness, both domestically and internationally. Sancak Energy aims to contribute to clean energy production by focusing on innovative projects both domestically and abroad, in line with sustainability and environmental consciousness.



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SANCAK



Katwind Energy: Leading the Way in Wind Energy Services for over 15 Years



Katwind Energy continues to supply services without slowing down with more than 15 years of experience in the wind energy industry. Katwind Energy, which has added a man-basket crane to its inventory in addition to the two rope access platforms it has acquired in recent years, offers its customers a wide range of service-supply opportunities with its rope access capabilities. "We are increasingly seeing the effects of global warming, which is on our agenda day by day" stresses the service operation manager of Katwind, Burak Turan. "The year 2023 welcomed us with an unusual seasonal pattern, and Katwind Enerji, which contributed to the energy production of 784.75 MW in Türkiye and 118.5 MW abroad in 2023 with its services, will continue to operate efficiently despite the changing conditions with its strong position in the market and its team capabilities" added in his evaluation of the last year, 2022.

Katwind Energy, which has a vision of prioritizing occupational safety, has managed to complete the entire year without any accidents. At the same time, corrective and preventive actions were taken for all nonconformities that emerged due to frequent quality inspections involving the entire team and its customers. To ensure continuous education is not disrupted, Katwind Energy has frequently informed its staff working in different regions of the country/world through online meetings, without waiting to come together to -eliminate the probable inconveniences

Katwind Energy introduced an ERP system in 2023. After six months of coworking with consultants, it has been developed throughout the year to respond to its workers' and customers' requests immediately, and the first phase of the ERP system has been implemented. Katwind Enerji, which decided to invest in the second phase of this system in 2024, has already started on this development work. At the same time, our entire team has been trained to adapt to online platforms to respond to the requests coming from our customers who want to digitalize manually prepared printouts of the work done in the field, too.



Taking advantage of the decrease in field operations during the winter period, a training week was organized at the beginning of 2024 to broaden Katwind staff knowledge on technical accomplishments and on occupational safety. Our training aims to refresh the repair knowledge of the personnel with the blade repair training prepared by our experts, together with the occupational health and safety training that should be renewed annually. Mankiewicz being a trusted chemical of Katwind has also provided a theoretical and practical training hosted by Katwind Energy İzmir facility to get to know Mankiewicz company's products better and experience its new products. Mankiewicz's sales engineers provided training and it was beneficial training at which Katwind personnel also gave their feedback from the field to improve the product utilization towards the end of the week, Katwind Enerji also held its year-end dinner organization.

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Significant Contribution to the Clean Energy Future by Eksim Enerji

Eksim Enerji, rapidly advancing towards becoming one of Türkiye's largest renewable energy producers, continues to increase its capacity while providing service with 8 wind power plant-totaling 466.6 MW installed capacity and 3 hydroelectric power plants with a total installed capacity of 162 MW. The company continues its renewable energy investment efforts, which will come into operation in the years 2024-2025, with a capacity of 570 MW.

Eksim Enerji, a subsidiary of Eksim Holding, is among Türkiye's leading holding companies, operates particularly in the renewable energy sector with its domestic and international clean energy portfolio. The company makes significant contributions to Türkiye's clean energy reservoir through its 8 wind power plant with an installed capacity of 466,6 MW. Moreover by supporting its green energy portfolio through hydroelectric power plants as well, Eksim Enerji operates three hydroelectric power plants with a combined installed capacity of 162 MW, including one with a capacity of 63 MW in Türkiye and two reaching a total capacity of 99 MW in Georgia.

Arkin Akbay, Eksim Enerji CEO, announced that they produced 4% of the electricity generated from wind energy in Türkiye in 2022 and stated, "Throughout the past year, we have continued to expand our production portfolio in our energy sources. While Eksim Enerji was listed in the ISO 500, Eksim Enerji and Eksim Elektrik took their places in the Capital 500 List. In 2023, our energy production group produced approximately 1.8 billion kWh of electric energy and prevented the emission of 1,2 million tons of carbon via our sustainable investments."

Expansion of Clean Energy Portfolio Through New Investments Emphasizing their rapid progress towards becoming one of Türkiye's largest renewable energy producers, Akbay stated "Our investment of 570 MW, scheduled to be operational in 2024-2025, continues. We are planning to complete the permission, licensing, and authorization processes for the projects we have developed for the upcoming period and to implement them effectively. In this context, we aim to commission a capacity rise of 98 MW through 14 wind turbines at Geyve Plant within 2024. Similarly, we plan to commission our Viranşehir YEKA GES-4 plant with a capacity of 191,2 MWp/150 MW within the year. Our 8 wind turbines in Silivri WPP will contribute to the strength of our portfolio for 56 MW next year. We are advancing towards a capacity increase project in total 63 MW via 2 turbines with 14 MW in Silivri WPP; 2 turbines with



Arkin Akbay
Eksim Enerji CEO

14 MW in Hasanbeyli WPP; and one turbine each in Killik WPP, Kayadüzü WPP, Ovacık WPP, Seferihisar WPP and Susurluk WPP (totaling 5 turbines with 35 MW)."

Empowering Sustainability through Decade-long Progress in R&D Initiatives

Akbay emphasized their significant contribution to R&D efforts over the past decade aimed at increasing the efficiency of production resources and capacity utilization. He stated, "Within the scope of these efforts, we have continued to work on projects focusing on sustainable biofuel production from biomass sources such as wood chips and forest residues. In this sense, we have commissioned a power group consisting of an engine and alternator capable of producing 1.2 MW of electricity using the produced biofuel. We also continue our technology center-supported efforts for the production of value-added fuel."

Turkish Entrepreneurs Embrace Global Investment Opportunities

Arkin Akbay emphasized that many investors operating in Türkiye will accelerate both domestic and international project development efforts in 2024. He stated that "Since we started project development at Eksim Enerji a long time ago, we will contribute to consumer supply security with energy produced from our cost-effective renewable energy plants starting from the second half of 2024, when growth resumes."

TOWARDS A BRIGHTER FUTURE WITH CLEAN ENERGY

Dedicated to sustainability, Eksim Enerji is committed to making strides towards a cleaner future across Türkiye. Through our investments in 100% clean energy sources, we're ready to build a healthier environment for generations to come.



EKSİM
enerji

With its innovative wind solutions, TUİZ Wind reshapes the future

TUİZ Wind, which was founded in 2021 in order to provide services for installation, maintenance and service projects, which are essential parts of the wind energy industry, provides innovative wind solutions and reshapes the future of the industry with the experience of its founders and employees in the energy industry for many years. With its experience in many installation, maintenance and service projects in different locations around the world, TUİZ has made a considerable contribution to the industry and keeps a close eye on new technologies to ensure a higher standard of service that is open to development and to contribute to the advancement of the industry. The company aims to become a pioneer in the global energy industry by reshaping the wind energy future, and to this end, it offers solutions with cutting-edge technology and engineering. With customer satisfaction and trust at the core of its solutions, the references of TUİZ include industry-leading organizations like Borusan Logistics, Enercon, SOWI, Vestas, Sarılar Group, General Electric, Kalyon, Nordex, Siemens Gamesa, Goldwind, Senvion and LEITWIND.

Specialist TUİZ solutions

Installation: TUİZ, which provides installation services with a dedicated team with more than 15 years of experience in Enercon, Vestas, Siemens, GE and Nordex wind turbines, carries out the installation of all types and models of wind turbines and undertakes project management from scratch.

Service maintenance: In order to identify damages or problems in the early stages and reduce the time for repair and downtime to a bare minimum, it is necessary to conduct repeated inspections and maintenance of all components of a wind turbine. In this area, TUİZ provides a premium level of service and carries out all the maintenance in line with the manufacturer's maintenance guidelines.

Network connection service: TUİZ, ensures that all operations such as in-turbine cable connections, cable installation, panel connections, transformer connections, and other operations are conducted securely and in a high-quality manner with its specialized team of technical experts.



Main Component Replacement: The turbines' key parts such as the generator, gearbox, rotor blade, powertrain, yaw/pitch system, transformer, and top tower parts must be upgraded during their lifetime. TUİZ's highly experienced upgrade team quickly and efficiently performs this demanding task.

Technical support: During the project duration of the wind farm, the company provides support to its customers through its supervisors.

Disposal: The specialized TUİZ technical team also provides solutions for the recycling of the blades.

Port and site operations: TUİZ conducts loading/unloading activities on project sites, production plants and port plants in a safe manner with the sling and pointer training certificates of the technical crew.

Turbine supervision: The inspection of turbines is performed through unplanned interim checks, observations before and after maintenance, and reports are shared with clients.

Service elevator installation: The specialized TUİZ technical team also offers installation services for service elevators and conducts annual inspections.

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DNV updates standard used for marine operations for offshore wind, subsea cables and oil and gas assets

DNV-ST-N001 upgraded to meet changing needs of the marine sector. DNV has published a substantial revision to the 'go-to standard', DNV-ST-N001, for the design and planning of marine operations for the transport, installation and removal of offshore wind farms, subsea cables and oil and gas assets.

The new major changes reflect the changing nature of the offshore industry in line with its support of the energy transition, ensuring that the standard remains relevant and supports the development of cost-effective marine operations during a fast-evolving energy transition. DNV estimates that offshore wind will rise globally from 8% of total wind production in 2020 to 34% in 2050, totalling almost 2000 GW.

Through continuous engagement with industry, DNV-ST-N001 has been regularly updated and enhanced since it was initially created in 2016. This latest revision – the first in five years - follows an external hearing exercise, during which over 400 comments from the industry were received, of which over 350 were technical in nature. The standard first came about after DNV and Noble Denton legacy standards from the 1970s and 80s were combined into one substantial and comprehensive document.

The standard can be applied to all marine operations and all key engineering requirements relevant to load-out, construction afloat, voyages, and installation, as well as the loads that should be addressed in the design of these marine operations. It also lays out the requirements from the perspective of the Marine Warranty Surveyor, who reviews the marine operations.

Lucy Craig, Director, Growth, Innovation & Digitalization, Energy Systems at DNV stated "Following a high level of engagement from the industry, the latest revision of DNV-ST-N001 further reinforces its position as the de-facto standard used to safely undertake marine operations all over the world providing the needed assurance in the implementation of the energy transition.



Lucy Craig, Director, Growth, Innovation & Digitalization, Energy Systems at DNV

"Since the standard was first established, it has been vital that it has remained at the forefront of changes to the industry and these updates will ensure that our customers continue to receive the highest possible standard of assurance."

Industry engagement drove DNV to update a body of work that spans almost 800 pages, with collaboration spanning across the organization's global network of marine operations and marine warranty survey experts, working in DNV's Noble Denton marine services area.



Ankor Raithatha, Global Service Area Leader for Noble Denton marine services at DNV

Ankor Raithatha, Global Service Area Leader for Noble Denton marine services at DNV said, "It was particularly encouraging to note the number of industry comments stemming from developers and contractors engaged in offshore wind farm construction activities, which demonstrates the importance of the standard to the industry and also influenced updates to numerous areas of the standard."

By using DNV-ST-N001, organizations are using a widely accepted standard for the planning and execution of their marine operations at all stages of project development. This allows for a consistency in approach regardless of the parties involved.

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Bringing down the cost of capital is key to unlocking clean energy growth in emerging economies

Clean energy investment in emerging and developing economies outside China needs to rise more than sixfold in next 10 years, but securing affordable financing is a major hurdle



Many emerging and developing economies are missing out on the wave of global clean energy investment as the high cost of capital for new projects is deterring developers and stifling opportunities in the new energy economy, particularly for some of the world's poorest countries, a new IEA report finds.

Global clean energy investment has risen by 40% since 2020, reaching an estimated USD 1.8 trillion in 2023, but almost all the recent growth has been in advanced economies and in China. By contrast, other emerging and developing economies account for less than 15% of total investment, despite being home to 65% of the world's population and generating about a third of global gross domestic product. Capital flows to clean energy projects in many emerging and developing economies remain worryingly low.

To get on track for limiting global warming to 1.5 °C, clean energy investment in emerging and developing economies outside China needs to increase more than sixfold, from

USD 270 billion today to USD 1.6 trillion by the early 2030s. The availability of concessional finance – primarily from international development finance institutions – would also need to triple within this timeframe. Investments are needed across a range of different sectors, but three areas stand out, according to the report. Almost half of the total clean energy investment over the next ten years in emerging and developing economies outside China needs to go to utility-scale solar and wind projects, electricity networks and spending on more energy-efficient building designs and appliances.

Some clean energy technologies such as solar PV and onshore wind are already cheaper than fossil fuel alternatives in many parts of the world. But the report highlights that the cost of capital, defined as the minimum expected financial return to justify an investment, for utility-scale solar PV projects in emerging and developing economies was more than twice that in advanced econo-



mies. The report finds that narrowing the gap in the cost of capital between emerging and developing economies, on the one hand, and advanced economies, on the other, by 1% could reduce these financing costs for clean energy by USD 150 billion annually.

“There are huge, cost-effective opportunities for emerging and developing economies to meet their rising energy needs with clean technologies, but financing has to be affordable as well,” said IEA Executive Director Fatih Birol. “Reducing risk through clear and timely regulation is a first step to attract investment. This needs to be underpinned by a significant increase in financial and technical support from the international community. We have to build new bridges between investors looking for clean energy opportunities and the markets where this investment is most needed.”

While capital flows for clean energy projects in emerging and developing economies need to increase sharply in the coming years, almost all the required investments are in mature technologies and in sectors where there are tried and tested policy formulas for success. Only about 5% of the total clean energy investment needs through 2035 are in sectors that depend on nascent technologies like low-emissions hydrogen, hydrogen-based fuels, or carbon capture, utilisation and storage.

The IEA was tasked by the Paris Summit on a New Global Financing Pact in June 2023 to make recommendations on how to bring down the cost of capital for clean energy investment in emerging and developing economies. The new report builds on previous IEA analysis and provides data collected from a new survey for the IEA’s Cost of Capital Observatory. In addition to the Observatory’s five focus countries – Brazil, India, Indonesia, Mexico and South Africa – the IEA collected data for Kenya, Peru, Senegal and Viet Nam. This report provides detailed insights into the risk factors that affect financing costs across seven clean energy sectors in EMDEs and recommendations of what can be done to address them, based on case studies and best practices from countries across Africa, Asia and Latin America.



Independent engineering and consulting services of wind energy



Üçyel Energy, which was founded in Ankara in 2011 by its founders with more than 20 years of engineering work experience in energy, especially renewable energy, provides specialized engineering and consultancy services on all stages of energy production using renewable energy sources, from source to operation and maintenance. Having a good understanding of all related fields for project developments, investments, financial institutions, public and private sector institutions in renewable energy sources, mainly wind, Üçyel Energy provides independent engineering and consultancy services including but not limited to resource evaluation and selection of areas, energy measurements, data collection, data analysis, pre-feasibility report, feasibility report, facility design, project management, facility installation, operation and maintenance with its technical ability.

Üçyel provides wind measurement equipment including 60 meters tubular tower, 60 meters lattice tower and 80 meters lattice tower with anemometer, wind vane, temperature, humidity sensor and pressure sensor and station installation, periodic station maintenance, data collection, monitoring, data analysis, preparation of license application file.

Crucial solutions for complicated sites

Üçyel Energy, which also provides solutions for reliable wind resource studies, which are crucial for wind turbines, particularly in complicated areas, delivers a high level of success even in complicated terrains for wind resource assessment, power plant design, site compatibility analysis and energy optimization calculations of wind energy project sites with the Meteodyn WT CFD software used in this field.

Wind energy consultancy services of Üçyel Energy:

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- Wind measurement campaign
- Feasibility report
- Wind speed data analysis
- Preparation of license application file based on dedicated official regulations including technical and administrative document.
- Project analysis

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Üçyel provides high quality independent engineering consultancy services to enable development of reliable renewable energy systems, especially wind and solar energy from resource to operation level. Our technical solutions and services include resource analysis and site studies, on site measurement, data collection, data analysis, pre feasibility report, feasibility report, system design, project management, installation and operation and maintenance.

Meteodyn WT RG

The CFD software to create a wind resource WRG format even in complex terrain.

Meteodyn WT

The CFD software for wind resource and production assessment of wind farms in complex terrain.

Wind Energy Services
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Renewatt's Insight: Navigating Türkiye's Wind Energy Future with Battery Storage and YEKA Projects



Abdullah Onur Kısar
Founder

In the second issue of our wind energy magazine 2024, we had an interview with electrical engineer Abdullah Onur Kısar, the founder of Renewatt Energy.

Mr. Kısar told Rüzgar Enerjisi about the services that Renewatt offers in the sector and his predictions for the coming years, saying that they foresee that the most important topic in the sector in the coming years will be battery storage Wind and YEKA projects.

Can you tell us about Renewatt?

Renewatt is a company that was established in Izmir in 2017 to provide engineering and consultancy services in renewable energy projects.

As Renewatt, we provide services in many sub-sectors of renewable energy projects, but our expertise is concentrated in the wind energy sector.

Who are Renewatt's wind energy clients?

Renewatt can provide wind energy consultancy to both investors and lenders.

However, the most important issue for Renewatt when providing these services is to avoid any conflict of interest.

Which countries Renewatt has provided services?

As Renewatt, we mainly provide services in Türkiye. However, we have references spread over a wide geographical area. For example, we have provided and are providing engineering and consultancy services in countries such as Spain, Italy, Romania, Afghanistan, Greece, Georgia, Libya and Sudan.

Can you tell us more about your scope of services?

In fact, we offer a wide range of services, from the site selection of a wind project to the operational phase.

To elaborate, we can list them as follows;

Licensed and non-licensed project development and project area relocation

- Lenders technical advisory
- Merger & acquisition advice
- Project management and site supervision
- Advice to the buyer on turbine supply and maintenance contracts
- Turbine inspection
- Asset management
- Regulatory consulting





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Do you have any collaborations in the energy sector?

There are projects where we work with some of the companies in the sector as a subcontractor.

For example, we have been working with TRACTEBEL for many years as a subcontractor in national and international renewable energy projects.

We have also been co-working with Talary Energy for many years.

Could you tell us about some of your completed or ongoing projects that you would like to highlight?

We developed more than 1,000 MW of battery storage wind projects on behalf of the Investors. Subsequently, we have managed and continue to manage approximately 3,000 MW of battery storage wind and solar projects within different scopes of work.

The call letter for the first 5.1.h unlicensed wind project in Turkey has been received under our consultancy. The turbine commissioning works of this project have been completed and the acceptance by TEDAŞ is scheduled for March 2024.

We continue to provide lenders technical advisory services for YEKA GES-1 which is the largest renewable energy financing project in Türkiye.

In the last 3 years, we have acted as advisor in 75% (in terms of installed capacity) of the mergers and acquisitions of operating wind power plants.

In addition, we have provided numerous advisory and negotiation services on European and Chinese based manufacturer wind turbine supply and maintenance contracts.

What kind of developments do you see for wind energy projects in Türkiye in the coming period?

In this regard, battery storage wind farms and YEKA projects will be the first headings of the agenda. However, the major constraint foreseen for the completion of battery storage wind energy projects within the legal timeframe will be permits. For this reason, the realization of the projects without moving away from the targeted feasibility will only be possible with the sites developed through detailed constraint analysis.

Another critical issue is the collection of the necessary wind measurement data of sufficient length and quality for project development. Given the current state of turbine sizing, it is almost impossible to obtain compliance from turbine manufacturers without sufficient measurement data. As a result, it is not possible to achieve the power generation levels envisaged at the feasibility stage.

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Graebener® supplies Haizea Wind Group for new monopile production facility

Haizea Wind Group (Haizea), which was founded in 2017, has been working with Graebener® right from the start. In 2018 Graebener® already supplied a 55kW longitudinal seam milling machine and two 55kW circumferential seam milling machines for Haizea's wind tower production in Bilbao. Haizea is now entering the monopile market and is once again relying on two further milling machines for weld seam preparation from the custom machine builder from Germany - this time with a recently developed pipe turning device for turning and positioning cylindrical and conical pipes, which is used to align the pipes above the longitudinal seam milling machine for seam processing. The pipe weight can be up to 125 tons.



Haizea is a global player in the onshore and offshore industry. The company has been manufacturing giant wind towers in the port of Bilbao since 2018. By entering into monopile production, the company is expanding this facility by adding another hall segment. Production is scheduled to start in the second quarter of this year.

Graebener® supplied a 55kW longitudinal seam milling machine including an innovative pipe turning device, which is designed for turning and positioning cones. The scope of supply further includes a 55kW circumferential seam milling machine with a special height adapter and a substructure that enables the circ seam milling machine to be positioned and aligned quickly to the circumferential seams of the monopile sections to be processed by means of a self-propelled modular transporter (SPMT). The machines are designed to prepare the connecting seams of the huge cones and cylinders that make up the monopiles for the submerged arc welding process.

Monopiles, in turn, are foundations for offshore wind farms - large steel columns with a wall thickness of up to 150mm, diameters of up to 15m, lengths of up to 100m and unit weights of up to 2,500t.

Optimum conditions for economical weld seam preparation with large wall thicknesses

Monopiles consist of a large number of steel rings (pipe sections) that are welded together. Due to their huge diameters of up to 15m, the sections are made from several individual plates. This production method results in both longitudinal and circumferential seams: Longitudinal seams during the production of the shells, circumferential seams when joining the sections together. Both inside and outside edges must be precisely beveled prior to welding the individual parts together. The more precise the bevels, the more resilient the weld seams and therefore the complete monopile will be.



The Graebener® seam milling process provides a uniform joint width and depth over the entire circumference of the pipe. Further, the precisely milled joints allow an uncomplicated visual inspection of the internal root of the weld seam without prior cleaning, enabling the quality of the internal weld seam to be visually inspected directly. This means that weld seam defects can be reduced to 0%. Last but not least, automatic seam preparation is a necessary requirement for an automatic multi-wire submerged arc welding process, given the fact that the seam detection sensor requires clean joint edges.

Another advantage of Graebener® seam milling machines is the cost savings of at least 62% compared to conventional methods such as carbon-rod joints or grinding. The reason for this is the geometry of the milled seam preparation: the much smaller joint width - a milled joint has an opening angle of 16°, whereas a conventional joint has an opening angle of approx. 60° - results in less heat input, less welding material being used, energy being saved, and the welding time being significantly reduced. Furthermore, at up to 1.2 m/minute, mechanical milling is ten times faster than conventional processes.

Efficient handling of large diameter cones

Graebener® is the global market leader with its circumferential and longitudinal seam milling machines for many years. Both types of machines are able to process large pipe diameters with very thick material. Haizea is receiving two further developments:

One special feature is the innovation developed by Graebener® in 2022 for its longitudinal seam milling machines: the integrated pipe turning device, which allows even conical pipe sections to be positioned more securely without crane handling and without lateral drift. On a milling machine, each longitudinal seam of a pipe section (up to three pieces depending on the diameter) have to be rotated into an exact 6 o'clock milling position for processing. This is usually achieved by means of cranes. However, an integrated device facilitates the positioning of the pipe sections significantly, allowing the turning process to be carried out with considerable time savings. Using the turning device, the cylindrical and conical sections are safely lifted, turned and lowered in a defined man-

ner - even sections with very large diameters, cone angles of up to 6° and a unit weight of up to 150 tons.

As turning conical pipe sections geometrically causes a drift in the longitudinal direction of the pipe, Graebener® has developed special rollers that turn the pipe section and prevent the longitudinal drift altogether. The rollers are positioned by means of electro-motive servo drives so that the conical pipe sections only roll on the largest and smallest pipe diameters on the surface line. The rotation speeds are automatically adjusted to prevent drift in the longitudinal direction of the pipe.

The second innovation - a special height adapter - enables the customer to process pipe diameters of very different sizes on the circumferential seam milling machine. To assemble sections of cylindrical and conical sections, these have to be positioned on a constant horizontal center line. As a result, the different diameters of the cones cause different working heights for the circumferential seam milling machine. With a specially developed adapter, the milling machine can be positioned at two different heights on the pipe sections. A substructure placed underneath allows the milling machine including adapter to be moved with the help of a self-propelled modular transporter.

Just like over 200 customers from the vessel, large-diameter pipe, wind and offshore sectors worldwide, Haizea Wind Group has been relying on the proven Graebener® technology for years. With these new machines, the company is equipped for future monopile production.





YILNAK: Your Strong Logistic Partner in Wind Energy Projects



Yılınak stands as a pioneering logistics and heavy haulage service provider in the wind energy sector, accompanying projects from inception to completion. Established in 1973, our company, Yılınak, specializes in logistics and transportation, a critical stage in installing wind turbines. Our extensive and modern fleet ensures the safe and efficient transportation of all wind turbine components, from blades and nacelles to tower sections and other heavy and bulky equipment

Wind energy projects demand specialized expertise due to complex logistic needs and challenging transportation conditions. At Yılınak, we possess the capacity and technology to transport heavy loads even under harsh terrain conditions. We offer tailored solutions to complete your projects on time, safely, and efficiently in light of your needs.

Yılınak's services include:

- Project Logistics:** Planning and managing all logistic processes within the project scope.
- Heavy Haulage:** Specialized equipment and expertise for the transportation of heavy and bulky wind turbine components.
- Route Analysis and Permits:** Determining the most effective transportation route and obtaining all necessary permits.

•**Assembly and Installation Support:** Safe delivery of turbine components to the assembly site and providing assembly support if needed.

• **Customs-Bonded and Free Storage:** Offering customs-bonded and free storage services to accommodate your project materials safely and securely until they are ready for deployment.

We aim to contribute to a sustainable energy future and be a reliable partner at every stage of your wind energy projects worldwide.

Yılınak is committed to offering innovative and practical solutions to add value to our customers and ensure the considerable success of their projects.

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Clean energy technologies in İzmir

"Wenergy Expo - Clean Energy Technologies Fair and Conference" which we will organize for the second time between 9-11 May 2024, with the theme of "The Capital of Clean Energy İzmir" in cooperation with the İzmir Chamber of Commerce, İzmir Metropolitan Municipality and with the strategic partnership of the Energy Industrialists and Businessmen Association (ENSIA) will be held at fuarizmir.

At the congress which will be held simultaneously with Wenergy Expo; energy transfer, the use of renewable energy in the industry, climate change, electric vehicles and many other headline topics will be presented. There will be 25 sessions within the scope of the congress, where 71 academicians, business people and representatives of the energy world which are selected amongst the leading figures of the sector, will take part in with their speech. Wenergy Expo - 2nd Clean Energy Technologies Fair and Congress, organized for the 2nd time in cooperation with İZFAŞ, BİFAŞ and EFOR Fuarçılık, will be held at Fuarizmir between 9-11 May 2024 with the participation of more than 300 national and international companies.

At the fair organized with international participation; manufacturers companies from a selected range of products which led by the energy equipment suppliers, engineering and R&D companies, the automotive industry, charging equipment, energy storage companies, e-mobility organizations and logistics companies will mark their presence. A plan was made on to accommodate in excess of 20,000 professional visitors on average with the purchasing delegations participating from abroad at "WENERGY EXPO."

Wenergy Expo, which will bring into showcase the collections, trends and new products in the sector and bring together expert professionals in their own specialization from all over the world under the central theme of technology and trade, will be the new meeting spot and center of attraction for local and foreign investors with B2B meeting area, round table meetings and Innovation Centre.

Özgener: "The Greatest Heritage Leaving to Future Generations"

Mahmut Özgener, Chairman of the Board of Directors of İzmir Chamber of Commerce, one of the key supporters of Wenergy Expo - 2nd Clean Energy Technologies Fair and Congress, said the following; "I insisted on that it has been one of the most exclusive fairs of

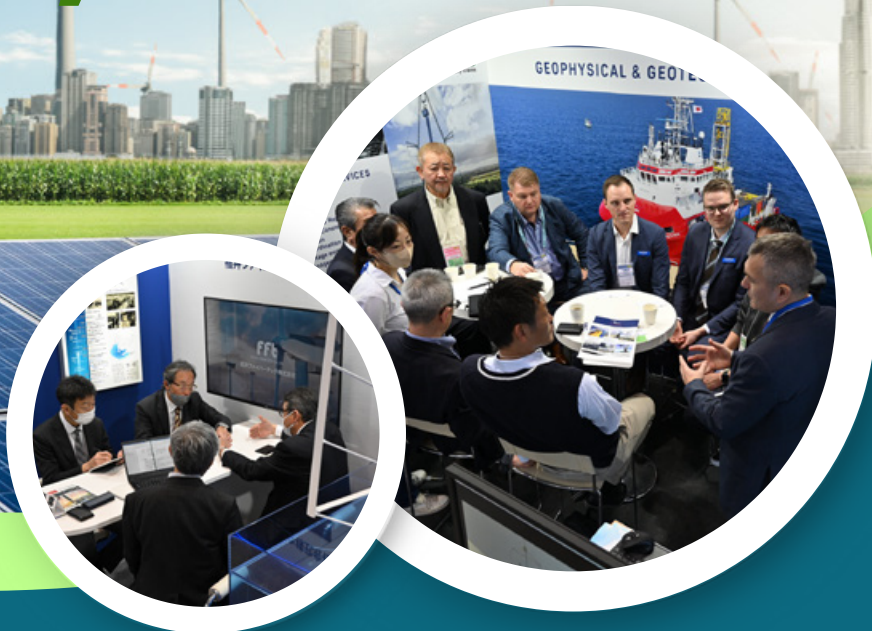


our city; because this fair is a great organization which apply the life model we seek for a more livable and sustainable world, which is the most valuable inheritance which we can pass on to future generations. When our high potential in clean energy combined with İzmir's power in the field of fairs, the stage was made ready for our first energy fair" and emphasized on the 80 million liras worth of financial support which will be made available for the fair sector in 2024.

Eskinazi: "We Must Achieve Immediately"

Aegean Exporters' Association Coordinator Chairman Jak Eskinazi said, "As Turkey, we have to achieve clean energy investments as soon as possible. In this way, we will be more competitive than our competitors and will leave a better world to the next generations. The Aegean Region is a leader in clean energy and equipment production. I hope that Wenergy Fair will provide greater support to the endeavors of the clean energy sector."

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ABOUT

Japan's Largest Exhibition Specialised in Wind Energy - WIND EXPO is organised by RX Japan Ltd., will be held from February 28 (Wed) - March 1 (Fri), 2024 at Tokyo Big Sight, Japan under SMART ENERGY WEEK – World's leading exhibition for renewable energy tech.

Wind power is expected to play a greater role in achieving carbon neutrality by 2050 as one of the main power sources. WIND EXPO gathers a wide range of technologies for wind power generation including wind turbines to wind farm construction, maintenance and operation, and offshore wind technologies, etc. As a well-established business platform of the latest technologies, information, and people, the show contributes to the development of the wind energy industry.

Co-organised by: Japan Wind Power Association (JWPA)

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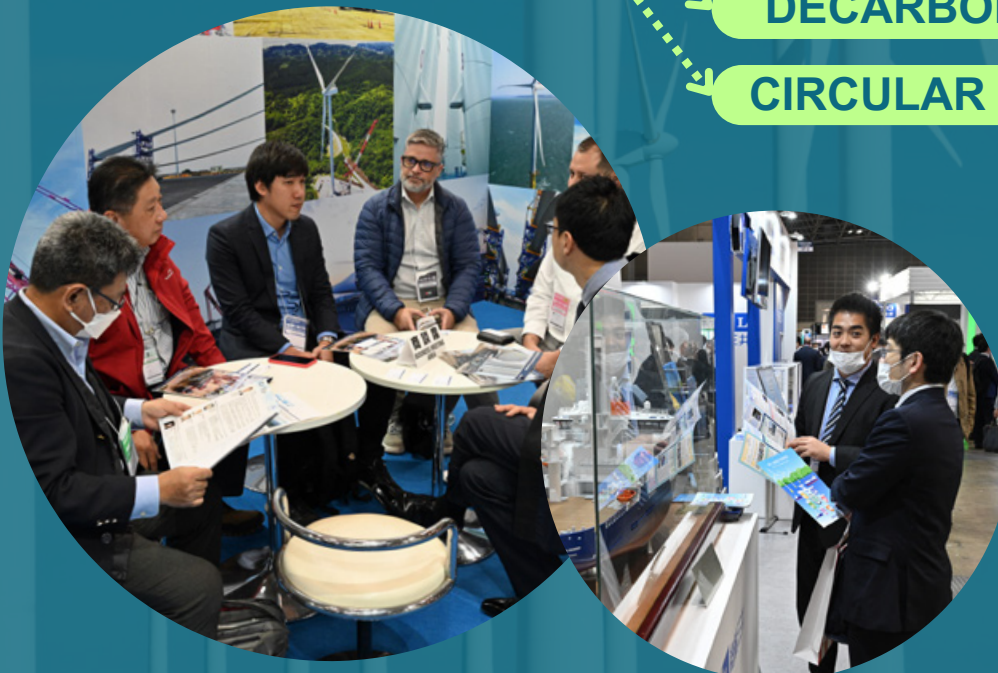
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On this journey, we move forward with a competent engineering philosophy and a principle of sustainability, committing to leave a greener world for future generations.

OUR VALUES:

Priority of R&D: By pursuing innovative ideas, we aim to surpass the limits of wind energy technology. We invest significantly in our R&D activities and closely follow the latest technological advancements in the sector.

Sustainable Development: We adopt the principles of sustainable development in production to reduce our environmental impact and enhance our performance.

Knowledge Sharing and Collaboration: In our R&D and innovation processes, we work in collaboration with academic institutions, research centers, and industry partners.

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Decades of Experience

It has completed its 50th year in the industry and 24th year in the wind energy sector. Soyut Energy was established in 1974 as a subsidiary of Çolak Holding Inc., operating in manufacturing, energy, finance and commerce.

Pioneer Company

The R&D studies of the first manufactured wind turbine in Türkiye was started in the year 2000 by SoyutWind and installed in 2004 with a capacity of 250 kW.



The first wind turbine export from Türkiye was made by SoyutWind to the East Africa region as part of a United Nations project.

100% Domestic Manufacturing

SoyutWind manufactures the blades, towers, nacelle, and control systems of wind turbines with high technology at its factory in Ankara-Temelli, which has a 15,000 m² indoor area and a 120,000 m² outdoor area.

Residential Self Assembly Off-Grid Turbines

With the motto "Generate Your Own Energy", SoyutWind wind turbines, ranging from 1 kW to 50 kW, are designed to meet the energy needs of home life efficiently, even at low wind speeds.

Soyut WindMill for Agricultural Irrigation

Under the Soyut WindMill brand, it produces wind water pumps by combining the power of wind with water. Soyut WindMill, within the framework of quality management, holds the ISO 9001 certificate and is the only Turkish company with CE Certification for its products.

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Türkiye's wind power surge: EBC's ambitious targets propel renewable energy agenda



Six years after signing the Paris Agreement, Türkiye ratified the agreement in 2021, and the parliament's decision was followed by the announcement of a net zero target. There exists a consensus between all different scenarios that Türkiye reaches at least 29,6 GW total wind power capacity by 2035. However, EBC is an outlier from the rest, projecting 42 GW wind capacity by 2030. The higher wind power target results from EBC's ambitious coal phase out plan by 2030 and the fact that it does not allow significant capacity additions other than wind and solar. The results of other scenarios are therefore taken as the basis of the wind capacity target in this analysis. According to the modeled projections, Türkiye needs to reach at least 30 GW total wind power capacity by 2035.

Türkiye has reached an installed capacity of approximately 12 GW in wind energy and meets 11% of its total annual electricity production from wind power, thanks to the investments made in the last 20 years. There are approximately 8.500 MW of wind projects under development and construction through capacity allocation and 20.000 MW of wind projects with storage that have reached the evaluation and pre-licensing stage. Electricity production from wind energy with zero fuel cost greatly contributes to reducing electricity prices, reducing national carbon emissions through the replacement of thermal power plants with wind turbines, and reducing our country's energy imports and dependence on foreign sources.

Energy Industrialists and Business Association (ENSiA) was established in 2016 to

strengthen the capacity of the companies and create a cluster in the clean energy field. It has 130 corporate members and with the academics and individual members it has more than 170 members. The number of employees of its member companies is more than 51.000 and ENSiA head office is located in İzmir city, the capital city of wind energy in Türkiye.

ENSiA has been implementing international and national projects to build a network between the companies working in the field of wind, solar, biomass, geothermal, green hydrogen, hydroelectric and energy efficiency, strengthen their capacities, increase the competitiveness of them in the international field. ENSiA aims to increase the share of domestic production in meeting the needs of the clean energy sector, the mission is to carry our innovative projects, together with national and international stakeholders, to develop the clean energy and clean technology value chain in Türkiye. ENSiA is the biggest clean energy cluster in Türkiye, be the member of WindEurope, European Cluster Collaboration Platform and has a Bronze Label from the European Secretariat for Cluster Analysis (ESCA).





Turkish offshore wind: current status and outlook

Murat Durak, PhD

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1. Introduction

Türkiye current total installed capacity is approx. 106 GW of which wind power has a share of 10%. Wind installed capacity has reached approximately 13 MW at the end of January 2024. In terms of onshore wind power, it is a mature market and many experienced contractors can be found within Türkiye for transport, installation, civil scope, etc. The local production of wind turbine components is promoted through the provision of a surplus additional feed-in rate for the wind farm operator. Turbine manufacturers without local manufacturing must overcome this disadvantage with price discounts on the turbine price. The Ministry of Energy and Natural Resources has published the National Energy Plan of Türkiye covering the period 2020-2035. In the scenario prepared by the Ministry, in the period 2020 – 2035, primary energy consumption will reach 205.3 Mtep (Million tons of oil equivalent), electricity consumption will reach 510.4 TWh (Terawatt Hours), while the electricity installed capacity will reach 189.7 GW in total. Offshore wind target is 5 GW till 2035. World Bank report concluded that Türkiye has nearly 75 gigawatts (GW) of technical potential for offshore wind. The report detailed Türkiye's technical potential for offshore wind. The most attractive areas for offshore wind lie in the northwest in the Aegean Sea where wind speeds rise to 9 meters per second (m/s) the report said. The "Offshore Wind Energy Turkey Roadmap" Report, in which Turkey's offshore wind energy potential is analyzed and the road map to be followed for the development of this field is stated, was shared with the sector by Turkish Offshore Wind Energy Association (DURED). Moreover, the "Offshore Wind Energy Sector Inventory" Report, which involves all stakeholders of offshore wind energy in Türkiye, was also presented.

2. Offshore Wind Power in Türkiye

There are numerous studies related to offshore wind power potential of the country. Amongst, World Bank Group report mentioning that Türkiye has nearly 75 gigawatts

(GW) of technical potential for offshore wind. The report also detailed Türkiye's technical potential for offshore wind. "The most attractive areas for offshore wind lie in the northwest in the Aegean Sea where wind speeds rise to 9 meters per second (m/s)," the report said.

Postponed 1200 MW Offshore Wind Farm Tender

Türkiye has begun a new chapter in its long-term policy on renewable energy with the Regulation on Renewable Energy Resource Areas ("RERA"), which came in force in October 2016. RERA establishes another set of incentives designed to encourage the effective and efficient use of renewable energy resources on state- and treasury-owned as well as privately owned sites in Türkiye. A central plank of the policy on renewables is the recently announced RERA Offshore Wind Power Farm project – Türkiye's first and the world's largest offshore wind farm, which is expected to yield investment of USD 3 billion. The wind farm should start generating electricity in 2023 – coinciding with the 100-year jubilee of the Republic of Türkiye – with a total capacity of 1,200 MW.

General Information on Postponed Tender

The tender announcement for the RERA Offshore Wind Power Farm was published in the Official Gazette in Türkiye on June 21, 2018. Saros (Edirne-Enez, Keşan), Kiyıköy (Kılkaleli-Vize) and Gelibolu-Şarköy (Çanakale-Tekirdağ) are among the nominee regions for the project. See figure below on 100m wind power potential atlas with circles.

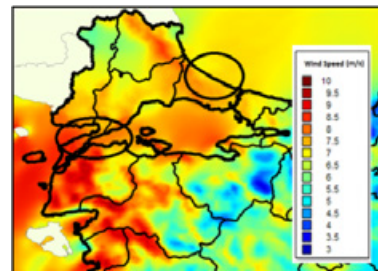


Figure 1. Offshore wind farm postponed tender locations.



Dr. Murat Durak

Chairman of the Board of the Offshore Wind Energy Association (DURED)





Postponed Offshore Tender Details

The investors contracted for the project will establish the offshore wind power plant by choosing either two (2) of the listed areas or two (2) other areas it has selected itself, provided it carries out the necessary measurements and surveys. The investor must first start work on an 840-MW power plant and then continue with the remaining part to reach a total of 1,200 MW. The investors will be able to use the remaining capacity as long as they:

- notify the Ministry of Energy and Natural Resources, General Directorate of Renewable Energy in writing within forty-two (42) months following the signing of the agreement;
- complete the installation within seventy-two (72) months.

Postponed Tender Qualifications

As for the tender qualifications, legal entities or partnerships formed from multiple legal entities or consortia are allowed to apply for the tender. In order to obtain the tender specifications, groups must pay twenty thousand Turkish Lira (app. EUR 3,700). The amount has to be deposited in the bank account determined in the Official Gazette.

In addition, a partially or completely cash convertible definite letter of guarantee of one (1) year amounting USD 20,000,000 should also be submitted to the Administration.

The winning party will be obliged to submit a letter of guarantee of ten (10) years amounting to USD 100,000,000 to the Administration prior to the execution of the energy sales agreement.

The Official Gazette indicates that the ceiling price for electricity produced at the country's first offshore wind farm will be set at US Cent 8 (eight)/KWh and that the tender will be carried out through an auction by underbidding. The investor who submits the lowest bid will execute an agreement, including the first 50 TWh of electricity production starting from the temporary admission.

The tender location, date and time will be announced by the Administration.

3. Outlook for Offshore Wind Power Market in Türkiye

Based on Türkiye's success in onshore wind, the Turkish Government announced plans in early 2018 to expand into offshore wind which is postponed. Offshore wind is experiencing global and increasing pressure to deliver energy at lower and lower costs. At the same time, the countries where the wind farms are being installed are increasingly aiming to profit from the manufacturing and installation of the wind farms, as well as the lower energy cost. In 2022, it is expected that 1500 MW capacity tender to be announced by Energy Ministry.

National Energy Plan of Türkiye

The Ministry of Energy and Natural Resources has published the National Energy Plan of Türkiye covering the period 2020-2035. In the scenario prepared by the Ministry, in the period 2020 – 2035, primary energy consumption will reach 205.3 Mtep (Million tons of oil equivalent), electricity consumption will reach 510.4 TWh (Terawatt Hours), while the electricity installed capacity will reach 189.7 GW in total.

Installed power planning in the field of energy for 2035

Wind energy: 24.6 GW onshore + 5 GW offshore total 29.6 GW

Solar energy: 52.9 GW

Hydroelectric power: 35.1 GW

Other renewable energy: 5.1 GW

Nuclear power: 7.2 GW

Conventional sources: 59.8 GW

Electrolyzer capacity: 5 GW

4. Power Purchase Tariff for Offshore Wind

The Turkish Republic Presidency has published a decree (Decree no. 7189) dated May 1, 2023 and announced new 10-year feed-in tariffs and 5-year domestic production incentives for renewable power projects commissioned between 1 July 2021 and 31 December 2030 under the new renewable energy support mechanism (YEKDEM). The feed-in tariff levels are determined in Turkish lira and will be subject to a quarterly escalation mechanism, based on the producer price index, consumer price index, US dollars purchase rates and euro purchase rates; FiTs in US dollars will be subject to a cap.



Renewable Energy Resources		Yekdem Tariff (Turkish Lira/kWh)	Term (Years)	YEKDEM base price (USDc/kWh)	YEKDEM cap price (USDc/kWh)	Domestic Component (local content) (Turkish Lira/kWh)	Domestic Component Term (Years)
Hydro power plants	With reservoir	144,00	10	6,75	8,25	28,80	5
	River type (without reservoir)	135,00	10	6,30	7,70	28,80	5
Wind power plants	Onshore	106,00	10	4,95	6,05	28,80	5
	Offshore	144,00	10	6,75	8,25	38,45	5
Geothermal		202,00	10	9,45	11,55	28,80	5
Biomass	Landfill gas or by-products	106,00	15	4,95	6,05	28,80	5
	Biomethanization	173,00	10	8,10	9,90	28,80	5
	Thermal disposal in biomass-based	134,90	10	5,75	8,00	21,58	5
Solar		106,00	10	4,95	6,05	28,80	5
Wind / solar including storage systems		125,00	10	5,85	7,15	38,45	10
Pumped Hydro Storage		202,00	15	9,45	11,55	38,45	10
Wave and tidal forces		135,00	10	6,30	7,70	38,45	10

5. MetOcean and Wind Measurement Site Investigation in Türkiye

The Ministry of Energy and Natural Resources (MENR) has received a grant from the European Union toward the cost of the EU Instrument for Pre-Accession (IPA) Energy Sector Program Phase IV Project, and intends to apply part of the proceeds for Consulting Services. The Consulting Services ("the Services") include the conduction of meteorological and oceanographic analysis and measurements at specific offshore sites to be selected by MENR. The studies include:

1. Analysis, measurement and survey activities informed through the application of meteorological and oceanographic measurement systems,
2. Acquirement of high-quality and reliable meteorological and oceanographic data,
3. Preparation of meteorological and oceanographic measurement system application and data analysis reports,
4. Preparation of geological, geophysical and geotechnical seabed survey reports and assessment of all survey outputs, and other relevant activities. (Geological, geophysical and geotechnical measurements will be carried out under a separate contract while the data obtained from the relevant measurements will be assessed under this assignment.) IPA Sites selected in Marmara Sea.

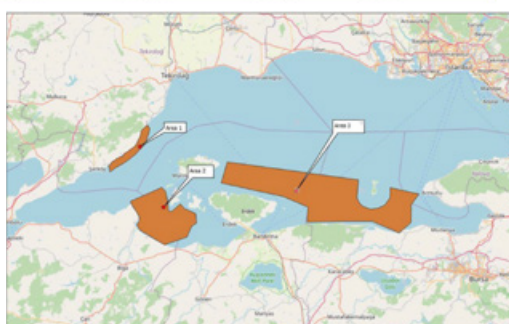


Figure 2. IPA Sites selected by the MENR.

6. Environment and Social Commitment Plan for Offshore Wind Support Project

The Republic of Türkiye (the Recipient) will implement the EU Instrument for Pre-Accession (IPA) Energy Sector Program Phase IV–Offshore Wind Support Project (the Project), through the Ministry of Energy and Natural Resources (MENR). The International Bank for Reconstruction and Development (the Bank), acting as administrator of the European Union Instrument for Pre-Accession Trust Fund, has agreed to provide financing for the Project, as set out in the referred agreement. The Recipient through MENR shall ensure that the Project is carried out in accordance with the Environmental and Social Standards (ESSs) and this Environmental and Social Commitment Plan (ESCP), in a manner acceptable to the Bank. The ESCP is a part of the Grant Agreement. Without limitation to the foregoing, this ESCP sets out materi-





» al measures and actions that the Recipient shall carry out or cause to be carried out, including, as applicable, the timeframes of the actions and measures, institutional, staffing, training, monitoring and reporting arrangements, and grievance management. The ESCP also sets out the environmental and social (E&S) instruments that shall be adopted and implemented under the Project, all of which shall be subject to prior consultation and disclosure, consistent with the ESSs, and in form and substance, and in a manner acceptable to the Bank. Once adopted, said E&S instruments may be revised from time to time with prior written agreement by the Bank. As agreed by the Bank and the Recipient, through MENR, this ESCP shall be revised from time to time if necessary, during Project implementation, to reflect adaptive management of Project changes and unforeseen circumstances or in response to Project performance. In such circumstances, the Recipient, through the MENR, and the Bank agree to update the ESCP to reflect these changes through an exchange of letters signed between the Bank and the Recipient, through MENR. The Recipient, through MENR shall promptly disclose the updated ESCP.

7. RERA Offshore Wind Project Sites

Within the scope of the Renewable Energy

Resource Zone (REZ) Regulation; Ministry of Energy and Natural Resources announced four Offshore WPP Candidate REZ.

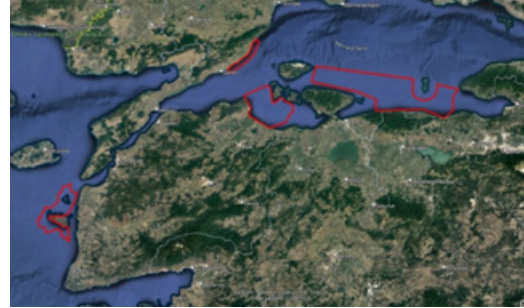


Figure 3. RERA Offshore wind project sites selected by the MENR.

References:

Turkish Offshore Wind Energy Association, Denizüstü Rüzgar Enerjisi Derneği (DÜRED).
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Cookhouse wind farm (Cookhouse)



The Company

- Company: Cookhouse Wind Farm (Cookhouse)
- Region: Africa
- Country: South Africa
- Sector: Renewable energy
- Technology: Onshore wind
- Investor: AIIM, Apollo, IDEAS, Cookhouse Community Trust
- Investment: Equity

Cookhouse's story

Cookhouse Wind Farm (Cookhouse) is South Africa's largest wind farm. Situated in the Eastern Cape Province, Cookhouse comprises 66 Suzlon S88 wind turbines with a capacity of 139MW and generates approximately 341 000 MWh of clean renewable energy every year. That is enough green electricity to power around 43 000 medium-income South African homes for a year, preventing around 384 000 tonnes of carbon emissions from traditional fossil fuel power plants.

In 2011, it was the largest wind farm to be bid into the first round of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPP) — a government initiative to increase the country's renewable energy production, and channel private investment and expertise into the sector.

In 2014, Cookhouse became the first wind farm to be connected to the transmission system, supplying renewable energy under a 20-year Power Purchase Agreement with South Africa's power public utility, Eskom.



Impact highlights

Cookhouse received Environmental Authorisation for the construction of 200 wind turbines in May 2010, construction commenced in June 2012 and commercial operation was achieved in November 2014.

In 2011, the Cookhouse Community Trust was established with 3 beneficiary trustees appointed by the local communities to represent the 45,000 beneficiaries from the surrounding towns.

In 2016, Cookhouse launched its Early Childhood Development (ECD) Flagship programme with the objective of ensuring that the beneficiary ECD centres were in a position to provide quality childcare and education for children from age 0 to 6.

Over 2 500 children have benefitted from the Early Childhood Development since it was launched in July 2016.

The company view

"The AIIM directors have brought vast industry knowledge, operational expertise and in-



vestment experience to the table. The ability to access this multi-sector experience allows us to execute on specific strategic projects whilst maintaining a lean staffing structure focused on the day-to-day operations. They act as our strategic sounding board, supporting us to steer the business to growth.

AIIM has interests in, and exposure to a wide array of infrastructure projects across Africa. It is this vision that allows them to contribute experience and high-level thinking of value to a business like Cookhouse. AIIM are hands-on and active, but they are not micro-managers.”

The role played by private equity

African Infrastructure Investment Managers (AIIM), part of Old Mutual Alternative Investments and Africa’s largest and most experienced infrastructure equity fund manager, identified the strong investment opportunity presented by the REIPPP programme. The South African government launched the REIPPP programme in 2012 with the first bidding round of a planned 7 000MW programme. Now in its fourth bidding round, REIPPP has procured 6 422MW from 112 Independent Power Producers, bringing investment of ZAR 201 billion. The recent signing of 27 new projects brings R56bn investment alone, with AIIM’s managed funds representing one of the largest investors in the programme with more than ZAR7 billion committed across 26 projects.

The Cookhouse project was developed by African Clean Energy Developments, an AIIM group company, and offered a compelling investment within the REIPPP programme – the site had direct access to a vital transmission line reducing its construction costs, the development team had previous international experience and as a result of an extended period of wind measurements its energy yield could be estimated with a high level of confidence. The investment, which was financed through AIIM’s African Infrastructure Investment Fund 2 (AIIF2), Apollo and IDEAS funds, provided the funds with strong risk adjusted returns through a contractually robust investment structure with experienced international partners.

One of the first measures implemented by AIIM, following investment, was to leverage its extensive industry networks to source

a world-class management team to lead Cookhouse. In addition to formalising best practice governance procedures and internal controls, the team also drove the establishment of the Cookhouse Community Trust – a platform to ensure long-term alignment of interests between the project and its host communities.

Indeed, AIIM’s innovative deal structuring enabled 25% ownership of Cookhouse to be held by the local community through the Cookhouse Community Trust. This is five times the governmental target for local community ownership. Cookhouse’s community liaison platform and activities have been publicly recognised by the South African government, which has referred to them as a benchmark for similar programs, demonstrating progressive approaches and initiatives.

A force for good

A key focus for Cookhouse is the sustainable socio-economic development of its host communities. It aims to achieve this through capacity building, skills transfer and funding of Socio-Economic Development (SED) programmes that address local needs. Cookhouse’s initial analysis and consultation with surrounding communities revealed that education and, in particular, early childhood development was a pressing priority in the area.

Since inception, Cookhouse has supported a range of NGOs in the education sector and, in 2016, launched its own Early Childhood Development (ECD) Flagship programme for children aged 0-6 years. The ECD programme is designed to improve the overall functionality and resources of ECD centres in Adelaide, Bedford, Cookhouse and Somerset East – improving access to quality education for the local children.

Direct funding from Cookhouse has supported 28 ECD centres, training of 47 ECD practitioners, building and renovation costs, furniture and appliances, educational equipment, nutrition and the purchase of vital resources.

The ECD programme encapsulates Cookhouses’ long-term approach to socio-economic development – ensuring that its impact and legacy extend beyond the wind farm’s life-span.

Wind energy permitting is improving but Governments still have work to do

Permitting remains a bottleneck to the expansion of wind energy in Europe. However, things are improving. Europe approved significantly more permits for new onshore wind farms in 2023 than in previous years. This is largely thanks to the new EU rules on renewables permitting. That said, Europe is still not permitting enough new wind farms to meet its ambitious 2030 targets. Governments need to continue to simplify and speed up their permitting.



Europe has turned a corner on the permitting of new onshore wind farms. In 2023 it awarded more permits than the years before.

Germany permitted 7.5 GW, marking a 70% increase from the previous year. The contrast is even more significant when compared to 2017-2019 when less than 2 GW of permits for new projects were handed out on a yearly basis. This puts Germany on a promising trajectory to have sufficient permitted projects in the pipeline to bid into the upcoming auctions for a total of 10 GW in 2025 alone.

Spain has shown a similar trend with permits for over 3 GW granted in 2023, again a 70% surge on 2022. Before 2022 permitting volumes were consistently below 1 GW.

In France, there was a 12% increase in permits, reaching 2.2 GW last year. And the United Kingdom saw a 10% rise approving just over 1 GW of onshore projects. But permitting improvements aren't limited to just the biggest markets. The number of permits were also up in for example Greece and Belgium.

This is mainly thanks to the new EU rules.

Two things have happened. There was the Emergency Regulation on Permitting and then the new rules on permitting that were agreed as part of the Revised Renewable Energy (RED III). Governments have to transpose the permitting provisions from RED III by 1 July.

A key element in the new rules is Overriding Public Interest (OPI) which applies when projects get challenged in court. Crucially, it re-confirms and clearly defines which permits need to be provided within the 2-year deadline. It requires Governments to digitalise their permitting procedures. And for impacts on biodiversity, developers now have to take the whole population of a species into consideration instead of individual animals.

"Permitting of wind farms improved a lot last year, especially in Germany – but there's still 'way to go'. The EU needs to build 30 GW of new wind a year to reach its 2030 goals. Current permitting volumes are not enough for that. All national Governments need to implement the new EU rules and keep making their processes simpler, faster and more digital." says WindEurope CEO Giles Dickson.



Improved permitting rules

Germany has done an especially good job, rigorously implementing these new rules. The application of the concept of “Overriding Public Interest” (OPI) has already proven effective in expediting several projects entangled in legal disputes. Projects are winning court cases they used to lose. France, Portugal, and Austria have followed suit by incorporating OPI into their legal frameworks. Other countries must do the same.

Other new regulations have played a role all across Europe to speed up permitting. One good example is Spain. Their notable increase can be primarily linked to more permitting staff. And Poland made a significant change by getting rid of its contentious 10H distance rule. Poland now requires turbines to have minimum distance of 700 metres from settlements. Before it was ten times their own height, making it almost impossible to develop new onshore wind projects in Poland with state-of-the art wind turbines. The new Polish Government should reduce this further to 500 metres. This change will increase the area available for onshore wind farms in Poland by 100%. The 200-metre difference increases the area of the country open to potential investments from 2% to 4%.

Other countries have started identifying Renewables Acceleration Areas or setting stricter deadlines on certain steps of the permitting procedure. Overall, Governments have started the transposition and implementation of the revised RED III. WindEurope is now tracking the implementation of the RED and other national permitting requirements in the Wind Energy Permitting Insights (WEPI) Tool. This will enable a comparison of the situations in different markets and highlights areas where each Member States should make efforts to improve. Access to the WEPI tool is open to WindEurope Members (Category C2 and higher) can access.

In the Wind Power Package the European Commission proposed to set up a digital permitting platform to support Member States with the digitalisation of permitting processes. Digitalisation is a key area of improvement in many countries. It remains commonplace for developers to be required to print the entire permit application – and send the physical copies to several public

permitting authorities. This leads to substantial costs – often tens of thousands of Euros – and contributes to inefficiencies and delays in the overall process.

WindEurope, AWS and Accenture have been working on a software that can contribute to the solution: EasyPermits can help public administration and local communities to embrace and speed up the whole permitting process. It has been tested successfully in Denmark and Poland already. First results show: the tool helps permitting agents to work on three times as many files simultaneously. After the test period EasyPermits could be one of the digital solutions applied to streamline permitting in Europe and elsewhere.

Global climate targets under threat without a secure wind energy supply chain

New report outlines route for global supply chain resilience and growth, based on industry and government cooperation



Bottlenecks in the global wind industry supply chain could leave the world with only three-quarters of the wind energy installations needed for a 1.5°C pathway by 2030, i.e. a 650 GW gap to meet climate targets. The supply chains in the wind sector for minerals, components and key enabling infrastructure like ports and platforms are not fit-for-purpose for a net zero world, where today's global installed wind fleet must scale up by roughly three times by the end of the decade.

Solutions exist, but require stronger collaboration between government and industry, as well as among supply chain actors themselves, according to a new report "Mission Critical: Building the global wind energy supply chain for a 1.5°C world" from the Global Wind Energy Council, in partnership with Boston Consulting Group. The report assesses the implications for energy transition policy across four future macroeconomic scenarios by 2030, and how broader global developments like rising inflation and open-door trade versus increased trade barriers will impact the wind supply chain landscape, market size and sustainability of industry returns.

The first-of-its-kind comprehensive analysis across key components and materials in

the sector finds that the wind supply chain is highly globalised, with a strong focus in China for rare earth element refining and component manufacturing in particular. A resetting of political priorities towards industrial resilience and security in many areas of the world, including Europe and the US, in addition to increasing market volatility, poses risks for creating a competitive and sufficiently scaled-up global supply chain. Policy and regulatory issues around permitting, grids, investment certainty and localisation are also holding back volume in the wind pipeline, which could otherwise send positive demand signals for supply chains to scale.

"This is a watershed moment for getting trade and industrial policy in shape for a 1.5°C world. Wind energy will form the backbone of the future energy system based on renewables, but in order to enable a tripling of the world's wind installations by 2030 we require a globalised, secure and competitive supply chain. Governments must work with the industry - and the industry must work together - to ensure the sector meets the enormous demand for clean and secure energy within this decade. Investment in supply chains has seen setbacks in many regions of the world,



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largely caused by challenges in policy, regulation and market design while industry itself needs to step up to the climate emergency by embracing standardisation with more global and modular technology design. Everyone has a role to play in this mission to create stronger and more resilient supply chains for the energy transition."

Ben Backwell, Global Wind Energy Council CEO

"The wind industry manufacturing footprint must be able to do two very different things at the same time, deliver on the projected industry output (ramping up to 190 GW in 2030) and prepare to support the 1.5° transition which would require 70% more capacity (320 GW in 2030)."

Lars Holm, Partner and Director at BCG's Centre for Energy Impact

The report explores the impact of four different macroeconomic scenarios, and how the wind industry can best navigate uncertainty and change in the global market. An 'Open Door' approach would yield the highest net-positive impact in wind growth to reach climate goals, but the report anticipates the 'Increased Barriers' scenario as the most likely to materialise in this decade.

1)An Open Door scenario with growing regional collaboration on both supply and demand.

2)An Increased Barriers scenario where markets increase trade barriers and turn attention towards domestic investment.

3)Economic Downturn where investments dry up and attention focuses towards low-cost rather than low-emission technology.

4)Global Escalation where increasing cross-border conflict reduces trade and shifts energy focus from decarbonisation towards availability.

The report outlines six key action areas that would set the conditions for large-scale wind supply chain growth and security:

- Address basic barriers to wind industry growth in land, grids and permitting to increase volume and predictability
- The wind industry must standardise and industrialise
- Regionalisation will be needed to sup-

port growth and resilience, while maintaining a globalised supply chain

- The market must provide clear and bankable demand signals
- Trade policy should aim to build competitive industries, not push higher costs onto end users
- Fundamental reform of the power market reform underpins further wind growth

Through a coordinated global effort from industry and policymakers, challenges in the global wind supply chain can be resolved over the course of this decade. Actions taken now in these six areas will help to foster a highly resilient and cost-efficient wind industry to decarbonise the world.

About GWEC

GWEC is a member-based organisation that represents the entire wind energy sector. The members of GWEC represent over 1,500 companies, organisations and institutions in more than 80 countries, including manufacturers, developers, component suppliers, research institutes, national wind and renewables associations, electricity providers, finance and insurance companies.

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Vattenfall connects Danish offshore wind farm to the grid

Vattenfall has now completed 100 per cent of the offshore wind farm Vesterhav Syd. This means Vattenfall is delivering fossil free energy to 170.000 Danish households.



Every single turbine at the offshore windfarm Vesterhav Syd has now supplied the first power and the offshore wind farm is now completely connected to the Danish power grid. The milestone is the culmination of almost seven years' work on the offshore wind farm.

"At Vattenfall, we are always happy when we finish an offshore wind farm and thereby contribute to fossil freedom. This time, we allow ourselves to be even more happy, since there is a cold winter in Denmark and Northern Europe where fossil-free and reliable electricity is of the essence," says Mathilde Damsgaard, project director for Vesterhav Syd and Nord at Vattenfall.

Vesterhav Syd's 20 wind turbines were erected from July to September last year. On 10 November 2023, Vattenfall delivered the farm's first power. Since then, the turbines have been connected to the grid one by one and the wind farm is now 100 per cent completed.

In 2016, Vattenfall won the tender for Vesterhav Syd with a historically low strike price of 47.5 Danish øre per kWh.

Vattenfall is also operating Vesterhav Nord offshore wind farm approximately 80 kilometers from the southern twin. Vattenfall ex-

pects to connect Vesterhav North to the grid during the first quarter this year. Combined, the Vesterhav Syd and Vesterhav Nord offshore wind farms will generate fossil-free electricity equivalent to the consumption of more than 350.000 Danish households.

Facts about Vesterhav Syd and Vesterhav Nord:

- Total installed capacity of 344 MW–168 MW at Vesterhav Syd and 176 MW at Vesterhav Nord.
- The offshore wind farms will consist of 20 and 21 turbines, respectively, with a capacity of 8.4 MW each.
- Electricity production can cover the annual consumption of more than 350,000 Danish households.

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Large construction site for the energy transition: RWE modernises two wind farms and increases power generation



Ground frost, gusts of wind, cold – the RWE team braved the adverse conditions. Over the next few weeks, a total of around 100 employees and experts from RWE and its partner companies will be working on two wind farms to dismantle 17 older wind turbines and replace them with 11 new, more powerful ones. By repowering the wind farms in this way, RWE can significantly increase electricity production despite using fewer turbines. This is due to the larger rotor blades being able to capture more wind and produce green electricity even when the wind is weak. At the Lesse and Barbecke sites, the company will increase capacity from 30.6 to 61.8 megawatts (MW).

Katja Wünschel, CEO RWE Renewables Europe & Australia: “43,500 is the number of the day. Once operational, the wind farms will be able to supply the equivalent of 43,500 households with green electricity. Electricity production at both sites will more than triple. Repowering is therefore making an important contribution to the success of the energy transition. But it is not only the

climate that benefits, since we voluntarily pay an RWE climate bonus of 0.2 cents per kilowatt hour produced to the local communities. The town of Salzgitter and the municipalities of Lengede, Burgdorf and Söhlde can look forward to a total annual income of up to €280,000, which will be distributed among the municipalities.”

RWE opts for established wind sites in Lesse and Barbecke

The local conditions make the area suitable for wind power, with sufficient distance from the nearest villages and good wind conditions. In Lesse, RWE will replace eleven turbines of the oldest generation (total capacity 19.8 MW) with eight modern turbines with a total capacity of 44.7 MW.

In Barbecke, RWE will replace six existing turbines (total capacity 10.8 MW) with three turbines with an installed capacity of 5.7 MW each (total capacity 17.1 MW). The team has started to set up the construction site and carry out initial road works.



Any repowering project is a logistical challenge. In parallel with the new construction, the old turbines need to remain connected to the grid for as long as possible in order to continue generating green electricity.

Jens Meyer, Project manager at RWE: "We really have our hands full. While we have already laid the first foundation with a diameter of more than 26 metres for the new wind farm in Lesse, we were able to start dismantling the old plant at the same time. We are doing this in the most environmentally-friendly and resource-efficient way possible. We are leaving areas that are no longer required in such a way that they can be used without restriction after dismantling. We also reuse some of the gravel removed from roads and crane pads in the new wind farm."

How communities benefit from wind power

RWE operates around 90 onshore wind farms in its home market. Involving citizens and local authorities in renewable energy projects is a key element in driving forward the energy transition. It promotes local acceptance. In Germany, the company gives all municipalities with an RWE wind farm a share of the profits. As the RWE climate bonus is paid per kilowatt hour of electricity generated, communities where high-capacity plants are based benefit the most. This creates an additional incentive to replace older plants

with modern ones. In Lesse and Barbecke, electricity production will more than triple after repowering. Municipalities can expect to receive up to €280,000 per year of wind farm operation, up from up to €80,000. The additional income can be used, for example, to financially support local facilities such as day-care centres for children, schools and fire brigades. RWE plans to commission all new plants this coming winter.





TotalEnergies Awarded a 20-year Contract to Supply 1.3 GW+ of Renewable Electricity to New Jersey

TotalEnergies and its partner Corio Generation (Corio) announce that the State of New Jersey selected their Attentive Energy Two offshore wind project for a 20-year contract to supply 1.34 GW of renewable electricity to the state. The project will deliver renewable power to over 650,000 homes.

Attentive Energy Two, a joint venture between TotalEnergies (70%) and Corio (30%), received the award in the State's third competitive OREC (Offshore Renewable Energy Credits) solicitation, organized by the New Jersey Board of Public Utilities (NJBPUB). The development of the project is expected to provide up to \$105 million in community investments across the state, and the partners are aiming for commissioning in 2031.

The profitability of the project is ensured by the guaranteed level of OREC revenue, with a first year set price of \$131 per MWh after the start of commercial operations, inflated yearly by 3%, and the benefit of a 30% IRA tax credit. The contract awarded by the NJBPUB also includes a one-time inflation adjustment mechanism to compensate for changes in construction costs environment until the final investment decision.

"We are honored that the State of New Jersey chose Attentive Energy Two to deliver reliable green electricity to New Jersey residents while contributing to the local economy and offshore wind supply chain. This is another success for us in the US electricity business, following the provisional award in October 2023 of a 25-year supply contract by the State of New York to our Attentive Energy One project," said Vincent Stoquart, Senior Vice President Renewables at TotalEnergies. "Both Attentive Energy One and Two will support our operations in the attractive US power market, where we are developing a portfolio of more than 25 GW of flexible and renewable projects. They will also help us achieve our profitability target for this business segment of 12% ROACE by 2028, as well as our ambition of delivering more than 100 TWh of power generation by 2030."



"The award of this long-term contract is a great achievement for Attentive Energy and great news for the people of New Jersey," said Jonathan Cole, CEO of Corio Generation. "The Attentive Energy Two project will deliver clean, green energy to hundreds of thousands of New Jersey residents and stimulate billions of dollars of regional investment."

In February 2022, TotalEnergies secured maritime lease OCS-A 0538 at the New York Bight auction. It then partnered with New York-based electricity producer Rise and global offshore wind developer Corio to join forces in the development of the Attentive Energy offshore wind projects. In addition to the Attentive Energy Two project in New Jersey, the lease's 3 GW capacity will serve the Attentive Energy One project in New York, which was provisionally awarded a 25-year contract to supply 1.4 GW of renewable electricity to New York in October 2023. These two projects aim to provide green electricity to more than a million homes across both states.



Joint Open letter: Delivering a Net Zero Industry Act that is strategic, targeted and impactful

The world is entering a new era of cleantech competition. According to the IEA, well-designed industrial strategy is key. China, the USA and Japan are all moving quickly to ensure they capture their share of a cleantech market likely to reach \$650 billion by 2030, delivering long-term competitiveness for their economies, green jobs for their citizens, support for their climate goals, and energy security amidst unstable geopolitics.

The European Union has been the world's first-mover on climate change. Now, it needs to move faster and more assertively if it is to stay in the cleantech race. The proposed Net-Zero Industry Act (NZIA) is an initial step that could deliver the stable, predictable regulatory environment needed to attract investors and build up European cleantech manufacturing. Listening to the current political debate in Brussels, however, there is clearly a risk that Europe will miss this opportunity to develop the industries of the 21st century by overly focusing on those of the 20th.

The original scope of the Act, with eight strategic cleantech sectors, arose from one insight: the economies of the future will be ones powered by, and dependent on, cleantech, production of which is largely concentrated in locations which face significant geopolitical risk. Therefore, increasing cleantech manufacturing capacity at home creates a massive economic opportunity while bolstering Europe's energy security.

Widening the scope of the NZIA too much undermines this strategic focus. By employing the EU taxonomy definition (from Art. 10.1) of net-zero industries, and including provisions which cover the whole economy, the NZIA would lose sight of what should remain its focus: building a new EU cleantech manufacturing base that can serve rapidly growing domestic and global markets. A strategic industrial policy requires focus – if everything is a priority, nothing is.

Moreover, the broadening of scope in the current draft European Parliament report, when coupled with the proposal that ETS revenues be used to support the goals of



the NZIA, risks that some of these revenues become available to companies who already receive free allocation under the ETS. This would put innovators outside of the EU ETS (in other words, those not emitting CO2 or equivalents) at a significant disadvantage. Instead of securing funding for cleantech businesses, this introduces uncertainty and risks reproducing the issues of the Innovation Fund first calls, whereby most money went to big corporations and the cleantech innovators in Europe were left out of the grants awardee list, for reasons which had to do with their early innovators status (i.e., not meeting financial maturity criteria). Finally, there is a legal contradiction in using ETS revenues to possibly support fossil fuel investments, which could be the case with a whole-economy scope approach, as well raising the risk of WTO-level challenges for CBAM if the same industries are subsidised twice – first through free allocation, and second through revenues which should have been ring-fenced for cleantech.

The proposal to utilise member state ETS revenues to invest in cleantech projects is warmly welcomed. Yet, this good idea can become counterproductive if the NZIA scope becomes too broad. A wide definition of net-zero technologies, provisions for EU funding for carbon storage and a vague concept of net-zero industry valleys could all serve, de facto, to channel public money meant for decarbonisation toward polluting incumbents and away from green innovators.

An NZIA that does not prioritise strategic cleantech sectors because of an overly widened scope leaves the EU vulnerable to geopolitical shocks, misses the opportunity to create thousands of quality jobs and endangers Europe's competitiveness in the growth markets of the future.



All the Pretty Workhorses: Giant Wind Farm Comes to New Mexico, Featuring GE Vernova's 3.6-154 Turbines



A worker on one of the GE Vernova 3-MW wind turbines at another installation in the Southwest. Images credit: GE Vernova

Getting renewable electricity to big population centers is a growing challenge in the United States, but in the high desert of central New Mexico a plan is coming together. There, near the tiny town of Corona, GE Vernova will deploy 674 of its new “workhorse” 3.6-154 wind turbines* for the SunZia project and its developer, Pattern Energy. When completed in 2026, this colossus of a project will weigh in at a total 3,500 MW, making it the largest wind farm — and in fact the largest renewables project — in the Western Hemisphere, providing enough power for some 3 million people.

Spread out over a million acres, SunZia’s ambitious scope has been compared to the Hoover Dam. But it has a leg up on that landmark project: Back in the 1930s, the U.S. didn’t have access to the fast transmission technology available today. SunZia will send its wind-generated electricity through high-voltage direct current cable (HVDC) to Phoenix, where the power can be sent onward to markets in Arizona and California. “This is just the kind of project,” says Steve Swift, chief commercial officer at GE Vernova’s Onshore Wind business, “needed to really decarbonize the U.S. and stay on the path to climate goals.”

To bring a project like this to fruition requires complex coordination. One of the biggest challenges in the burgeoning renewables space is the supply chain. Manufactured parts and materials like steel have to converge at the right points, at the right time, and must fit onto trains or ships. If you build your components so that they fit nicely with standard construction equipment, you’ll reach the finish line much faster. GE Vernova, which is providing 74% of the turbine capacity of SunZia, has contracted to manufacture some of the turbine towers in Belen, New Mexico, near the project site, saving time and costs. (Facilities in Pueblo, Colorado, and Amarillo, Texas, will also manufacture towers.) The hubs that enable the turbine blades to spin, as well as the big rectangular box that holds the electronics, gears, and motor, known as the nacelle, will be manufactured by GE Vernova in Pensacola, Florida.

Putting it all together in a sparsely populated part of New Mexico is not easy, but the reduced complexity of the workhorse turbine makes the project and logistics execution much simpler. Not nearly as large as an offshore giant like GE Vernova’s 14-MW Haliade-X, the 3.6-154 turbine possesses what Kevin Siwik, director of North American sales at GE Vernova Onshore Wind, calls an efficient “logistics and construction envelope.”



This is a machine that can be delivered and installed at rapid scale compared with much larger machines, where you might trade logistics and construction efficiencies for larger nameplates — i.e., higher maximum outputs — “but won’t install at the same pace,” he says. “So this really is intended to be logistically friendly, in a quick time frame.” Siwik points out, for example, that the fleet of commercially available construction cranes in the region are the right fit for GE Vernova’s more compact workhorse, and wouldn’t be able to handle larger turbines. And as with any construction project, time is money: The faster the turbines are erected, the faster the return on investment.

Modeling the Landscape

SunZia is spread out over a million acres, on a rectangle of land roughly 80 by 30 miles, with GE’s turbine array covering a 45-by-25-mile portion of the whole. According to Matt Lynch, commercial director for North America at GE Vernova Onshore Wind, the site itself is challenging, because at that scale you have a lot of variance in topography. Computer modeling is used to find exactly the right spot for each of GE Vernova’s 674 turbines. “From the engineering perspective, having one single product fitting all those locations is a challenge,” says Soner Ozkan, senior account manager for Pattern Energy at GE Vernova Onshore Wind. Moreover, to send renewable electricity over the highly efficient HVDC cable, which prevents the kind of line losses typical of older wires, the new wind power will have to be converted to direct current (DC) on-site before being converted back to alternating current (AC) in Phoenix.

That’s where another wing of GE Vernova steps in: Financial Services and Consulting Services. Regarding Consulting Services’ support, Ozkan says, “They have all the PhDs and the modeling capabilities. And we have weekly discussions with them.” While Hitachi Energy is handling the HVDC part of the construction project, Ozkan, Siwik, and Lynch stress that ongoing cooperation is needed to make sure all the technology works together.

GE Vernova’s services are integrated into the product development cycle, and for SunZia this meant providing customized software to the turbines, enabling them to work more efficiently with the long-distance HVDC

line. In a region known for lightning strikes, for example, turbines and the mini-grid in which they’re nested are vulnerable to power spikes. But the system is designed to be able to respond to those surges within 50 milliseconds, ensuring that equipment is protected.

In addition, Financial Services assisted SunZia in reaching financial close with a sizable commitment to finance the monetization of future tax credits. In this way, GE Vernova offers a unique set of full-stack solutions, from modeling to financing, differentiating it from competitors that are unable to offer the same type of one-stop-shop approach.

Lynch says that sequencing a mega-project like SunZia is also crucial so that each completion goal is reached at the right time, in the right order: “What’s the best execution plan? What’s the best project cycle — not trying to make too aggressive a schedule, where neither party would succeed? What are the milestones? What’s the commercial operation date?”

Just one of the major tasks that needs to be addressed at a project like SunZia is establishing road access, a delicate operation required not only for building a pad for each turbine but for maintenance later on. The developer, Pattern Energy, has worked closely with the National Audubon Society to address the multiple environmental challenges involved in building such a big infrastructure project on healthy rangeland, as well as the impact of the route taken by its 550-mile transmission line across two states.

This is not the first time Pattern Energy and GE Vernova have danced together in the desert. The collaboration on SunZia grew out of the very successful 1,050-MW Western Spirit wind project, a nearby series of four clusters that is now operational after completion early last year. Western Spirit itself was a breakthrough. “That was the largest single-phase installation to happen in the United States at one time, truly ushering in a new era of large-scale projects,” Siwik says. The workhorse turbine used in much of the Western Spirit project was a 2.7-MW machine with a rotor diameter of 127 meters (416 feet). Today’s workhorse, the 3.6-154 unit for SunZia, will have a rotor diameter of 154 meters (505 feet).



"Our outstanding performance in Western Spirit is really what led us here," says Swift. "That project was built by the same parties — built on schedule, and on budget. Some call it one of the best executions through the pandemic they've ever seen." By the time SunZia is completed, the Pattern Energy and GE Vernova teams will have together delivered a whopping 4.3 gigawatts of new renewable power across the western United States. Western Spirit has historically worked with other suppliers but is increasingly turning to GE as a favored project partner.

"SunZia is an investment in America's energy future that will pay strong dividends, including more than \$20 billion in expected economic impact, over 2,000 new jobs, and clean power for 3 million Americans," says Hunter Armistead, CEO of Pattern Energy. "SunZia demonstrates that working toward a sustainable future can also create meaningful economic value and a lasting positive impact on local communities. We're proud that SunZia is the result of many years of collaboration with communities, local residents, landowners, environmental groups, and government agencies. We look forward to bringing these benefits to fruition."



Credits Where They're Due

Recognizing that decarbonization needs to go even faster, the U.S. government has once again stepped up its policy support. For many years, solar and wind projects have benefited from the basic production and investment tax credits, which have been extended multiple times by Congress in the past. But the passage of the Inflation Reduction Act (IRA) not only provides the long-term certainty of those PTC and ITC, it also has other bonuses, and one job that GE Vernova takes on is helping developers hit the targets

required to qualify for those bonuses. Two in particular are in play in the SunZia project, according to Chrissy Borskey, GE Vernova's executive director of global government affairs and policy.

First, the government identifies areas of the country that have seen job losses in mining and energy production, which makes them the perfect settings to award developer bonuses. While Borskey cautions that more clarification is needed from the U.S. Treasury and the Internal Revenue Service, much of New Mexico lies within this "energy community" designation. And there is no question that the SunZia project is expected to inject billions into the local economy and create more than 2,000 construction jobs during peak construction.

The second bonus comes through meeting the IRA's U.S. manufacturing and sourcing rules. GE Vernova's decision to produce nacelles and hubs in Florida while also delivering towers with U.S.-made steel are aimed directly at meeting the targets required by the legislation. "More projects similar to this can quickly move forward as the administration works diligently to finalize the rules and regulations related to the IRA," Borskey says. While the details are still being worked out, GE Vernova is moving ahead and has invested \$20 million in its Pensacola facility.

The U.S. has made great strides in decarbonizing its power grid in the past decade, shuttering coal plants and building so much new wind and solar that by the end of 2022 they accounted for nearly 15% of U.S. electricity, according to the Energy Information Administration. But to decarbonize effectively, the U.S. will need more projects of similar scale. SunZia's size will more or less break the ceiling on large-scale projects, and should set an important precedent.

Pattern Energy and GE Vernova now seem to have optimized such projects to a fine-tuned science, or what Swift calls top-shelf "execution performance." This bodes well for a future of further renewable energy deployment. Says Siwik, "I think that the message should come across as: If you have a large-scale single-phase project, you ought to be looking at GE Vernova technology."

*GE's 3.6-MW turbine with a 154-meter rotor is referred to as the 3.6-154 turbine.



Launch of Commercial Operations at Ishikari Bay New Port Offshore Wind Farm

On 1 January 2024, JERA Co., Inc. ("JERA") and Green Power Investment Corporation ("GPI") began operations at the Ishikari Bay New Port Offshore Wind Farm—the largest commercial wind farm in Japan and the first in Japan to adopt large 8,000 kW wind turbines—which they own through Green Power Ishikari GK, a special-purpose corporation (SPC).



Located in Hokkaido's Ishikari Bay New Port, the wind farm has installed 14 wind turbines manufactured by Siemens Gamesa Renewable Energy that each have an output of 8,000 kW for a total output of 112,000 kW. Onshore construction was carried out by Kajima Corporation and offshore construction by a joint venture between Shimizu Corporation and Nippon Steel Engineering Co., Ltd.

All electricity generated will be supplied to Hokkaido Electric Power Network, Inc. ("HEPN") after being routed through a project transformer substation with 180,000 kWh of battery storage capacity—a distinguishing feature of the wind farm—and then through HEPN's Nishi Sapporo Substation. Bringing the project to completion was possible because of the tremendous cooperation and understanding extended by regional communities and government administrations including Hokkaido Prefecture, Ishikari City, and Otaru City during the project's development and construction.

JERA and GPI are committed to envisioning the region's future together through the promotion of renewable energy projects. Going forward, we plan to work together with the people of Ishikari City, Otaru City, and the region to ensure both stable management of the project and regional development.

Project Overview

Developer Green Power Ishikari GK

Power Generation Facility Location: Harbor Area, Ishikari Bay New Port, Hokkaido

Facility Capacity: 8,000 kW × 14 units = 112,000 kW (Connection capacity: 99,990 kW)

Power Purchaser: Hokkaido Electric Power Network, Inc.

Power Purchase Period: 20 years

Jera

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28 Şubat - 1 Mart 2024
KEY - The Energy Transition Expo
Rimini Expo Centre, Italy
<https://en.key-expo.com>



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17-19 Nisan 2024
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23-16 Mayıs 2024
AUTOMECHANIKA İSTANBUL
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<https://automechanika-istanbul.tr.messefrankfurt.com/istanbul/tr.html>



17-20 Nisan 2024
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29-31 Mayıs 2024
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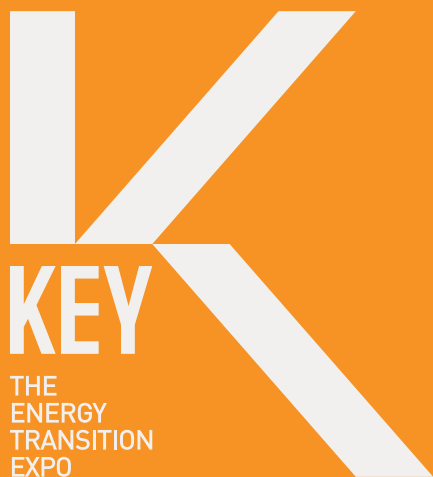
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