It takes the brightest minds to be a technology leader

Careers for engineers

SIEMENS Gamesa
RENEWABLE ENERGY

About Siemens Gamesa Renewable Energy

Siemens Gamesa is a leading provider of wind power products and solutions to customers around the globe. The company has installed products and technology in more than 90 countries, with a total installed base of close to 83GW.

Siemens Gamesa offers one of the industry's broadest product portfolios, with both offshore and onshore technology as well as industry-leading service solutions, helping to make clean energy more affordable and reliable.

The united company was created in 2017. Previously, Siemens Wind Power's history in the wind industry extends back to the early 1980s, and Gamesa's to 1994.

When it comes to wind turbine technology, experience counts. Since Siemens Gamesa entered the wind power business, it has invented, developed, and designed high-quality components and systems that continue to set new industry standards. It's all about reliable performance.

Based in Denmark and Spain, but working from offices all around the world, the Technology organizations provide the product-related basis for Siemens Gamesa's market leadership.

As the demand for energy is higher than ever before, the world needs climate friendly, reliable, and clean power generation.

Siemens Gamesa has the answers.

Apply for a job at Siemens Gamesa Renewable Energy at:
www.siemensgamesa.com/en/human-capital/job-offers

Research and Development at Siemens Gamesa Renewable Energy

Siemens Gamesa Renewable Energy (SGRE) offers unrivaled experience and reliability in wind power both Onshore, Offshore and within Service. We have a proven track record in project delivery and reliable and efficient products.

"At Siemens Gamesa Renewable Energy, you can be part of advanced technical development at the forefront of a dynamic and fast-growing industry."

Morten Pilgaard Rasmussen, Head of Offshore Technology, Siemens Gamesa Renewable Energy

If you are motivated by designing and maintaining great wind turbines, understanding the system perspective of wind power and by working closely with some of the best in the industry, then SGRE is the place to be. We turn market requirements and market foresights into design specifications, break down solutions to module level, ensure reuse and application of modularization principles, and complete and deliver optimal products to the market.

We also create revolutionary technological developments based on innovation and advanced industrialization, bringing new key technologies forward.

Our Technology departments form the core of our technological leadership, and building on values like excellence, innovation and responsibility, the personal and professional development of our employees is essential to us.

"Making the control algorithms for wind turbines is extremely exiting. We are increasing the wind power output and reducing the loads by combining the big picture with the deepest details, the most advanced models, and algorithms with hands-on experience from the field."

Per Egedal, BSc, Electrical Engineering

Loads and controls

Wind turbine development requires precise knowledge of extreme loads and fatigue loads relevant to the structural design and mechanical design.

Load calculation is a fundamental aspect of any development projects, and also part of many sales projects. Work focuses on refinement of existing turbine and blade designs, development of turbine controls, and development and testing of new computation methods.

In offshore projects, load computations are important at an early stage in the design and sales work, thus providing opportunities to cooperate with customers and foundation designers throughout the course of the offshore project. Load computations normally approved by an impartial third party, to minimize the risk of failures.

Another central function of load calculations is to gain an overview of the inputs and postulates for simulations, and understand, control, and communicate results based on fundamental knowledge of dynamics and wind loads.

Work is performed individually, in groups, and in cross-organizational projects. Loads are primarily determined through dynamic time domain analyses carried out using our FEM-based aeroelastic program called BHawC. Models and computations are verified with the aid of full-scale measurements on prototype turbines. The simulation and computation software tools are all own-developed.

Grid connection

At SGRE, we design, develop, implement, and site test our portfolio of advanced power system wind turbines, wind power plant controls and their respective models for compliance verification with the turbine grid performance specifications and Market Unit specific grid code requirements.

Quality of our work is comprehensively documented through short-circuit, power quality and grid fault ride through reports performed and provided in accordance to international standards (IEC 61400-21 and FGW TR3), supported by measurement procedures and endorsed, documented by international certification bodies.

To improve LCOE and create state of the art grid capabilities through our research and technology development, we are continuously applying innovation to enhance grid performance and power system control features which are developed, tested, and introduced in the turbine technology road map and power system modeling packages. A number of different computational tools are used, such as PSSE, DigSilent, and PSCAD. These power system simulation tools are designed and tested to replicate the electrical properties of turbines in response to different types of electrical faults, voltage, and frequency switching events.

Project support is provided through general modeling support as well as advance time- and frequency-domain studies which determine conformance of SGRE turbine and control system equipped wind power plants in meeting the grid compliance requirements.

”Working as a structural engineer in Siemens Gamesa Renewable Energy really gives you the possibility to apply a lot of theory and methods in the product design phase. Afterwards you can gain a lot of practical experience by testing and validating the strength and functionality of the design.”

Martin Fogh Rasmussen, Structural Engineer

Structural design

Structural design of wind turbine components is an exciting challenge, on the frontier of engineering and manufacturing capabilities.

The challenge is to design the components for optimal strength while minimizing price and weight, and considering that the massive structures can actually be manufactured.

The structural components range from casted and forged iron to welded steel structures and composites. In all cases knowledge about the material and manufacturing processes are essential for the design of the product.

Tools used include a wide range of FEA and programming software in order to analyze various structural tasks such as non-linear quasi-static and dynamic states, buckling, contact problems as well as transient and modal analyses. In-house codes are also used to a great extent, e.g. for processing large time series. Our computation methods and in-house codes allow us to design all components precisely in relation to extreme loads and fatigue loads as well as the overall dynamics of the wind turbine.

"As a mechanical engineer, it is very inspiring to work with wind turbines, because a turbine, from a mechanical point of view, has everything you could want. Things never get too theoretical because the production and development workshop is right next to the engineering department. So you can perform practical tests and monitor prototype production."

David Seerup, Design Engineer

Mechanical design

Design of a wind turbine requires a wide range of skills in mechanical engineering from complex 3D design to rotating systems and the advanced design of a gearbox or a generator.

Mechanical design is one of the cornerstones of designing a wind turbine.

Design and specification within the areas listed below are all part of the challenges facing the mechanical engineer when designing a wind turbine:

- Drive train incl. bearings, gearboxes, generators, brakes, structural components etc.
- Hydraulic systems for pitching the blades
- Cooling systems for cooling gears and generator
- Direct Drive generators
- Yawing systems for turning the turbine up-wind
- Internal cranes and other auxiliary systems
- Structural parts, brackets, bolts, surface treatment etc.

A wind turbine consists of thousands of parts, components and systems, and these are all brought together in large, detailed 3D assemblies comprising all parts to the last detail.

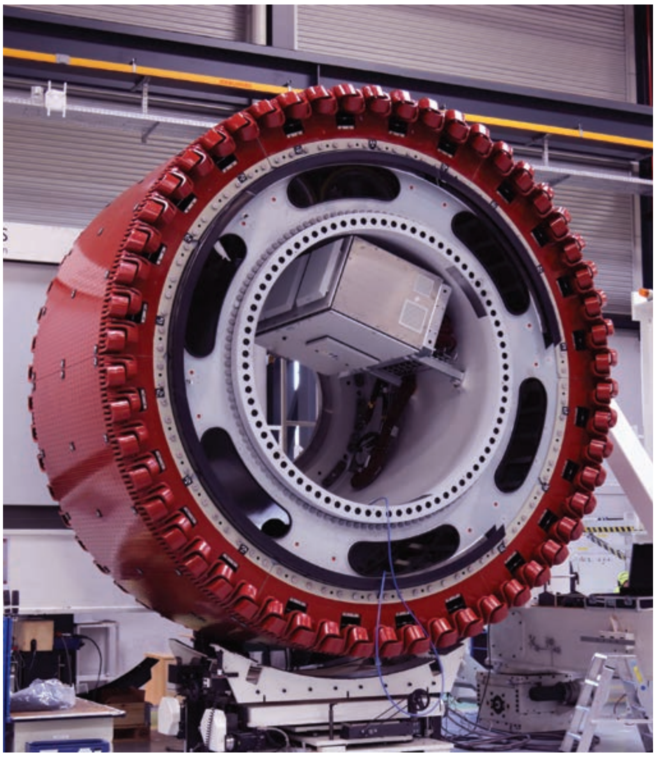
The high-end NX CAD system and an advanced PDM system are used during the design phase to manage the data.

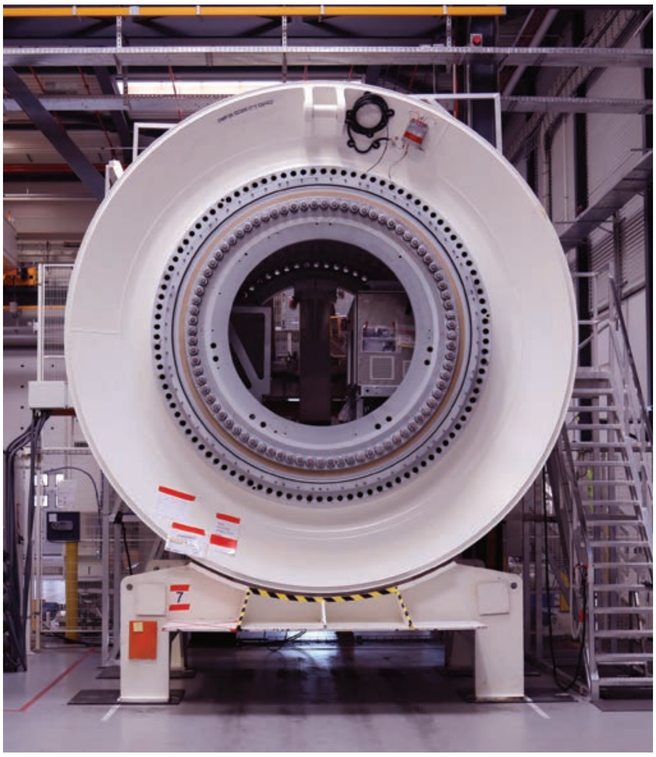
The work for the mechanical engineer is not only about calculations and 3D design – we also value putting on work clothes, safety gear and getting our fingers dirty, when that is needed.

The cooperation with the production, with suppliers, with the purchasing-, quality- and service colleagues is essential – not only for the daily operation, but also for getting the valuable understanding of how the business and the turbines work and perform in the field.

Electrical hardware

Design of electrical hardware components is a diverse area of responsibility.





The tasks involved encompass a wide range of technical aspects, such as controls, power electronics, and high voltage equipment.

The main components include generators, frequency converters, and transformers. These components are part of the power circuit of the wind turbine and play an important role in the conversion of rotating mechanical energy to electrical energy, which can then be supplied to the power grid.

All electrical components are functionally designed to withstand mechanical and electrical impacts, including external environmental impacts such as lightning.

Engineers execute thorough verification of individual electrical components. Extensive measurements and tests are performed before and after installation of the prototype wind turbines to validate interaction between the individual components.

Work is completed through cooperation with immediate colleagues, as well as interaction across the company. Close contact with sub-suppliers and the project execution is also necessary when specific customer requirements arise.

“There is something fascinating about making the control software for fully automated power plants that create energy from a sustainable source – and to be part of ensuring a more sustainable future for our children and grandchildren.”

Mik Grotkjaer Soerensen, MSc, Embedded Systems

Software

We develop our own software for operation of SGRE wind turbines.

Software development encompasses a wide spectrum of projects dealing with embedded systems and server systems. Embedded software development projects include development of control, regulation, and monitoring functions. The extent of projects varies between development and implementation of small changes in the control functions and development of advanced adaptive regulation systems with regards to minimization of loads, optimization of production, etc.

Other projects include development of central data collection servers, graphic presentations of trend curves, and reports.

An array of different platforms is in use including Windows, UNIX-like operating systems, .NET, C#, C++, HTML5, LabVIEW, WinCC oa, MS SQL Server, etc. The latest technologies in real-time operating systems, software development, and hardware platforms are applied.

All project phases are handled by our software experts. Software is developed for a wide range of target systems from embedded hardware platforms to virtualized server systems. Cyber security protection, unit testing and complete integration tests are an integrated part of all software development and new releases.

Software is developed using continuously improving processes based on Agile, SCRUM, and Lean. Projects are managed using a shared database of tasks and feature requests.

We work in self-managing teams. Teams co-operate with other teams both local and across the entire organization.

"Modern wind turbine blades are long enough to sweep an area equivalent to three football fields or more in a single turn. The design of a blade is a complex optimization task, involving a range of engineering disciplines like aerodynamics, loads, controls, and structures. The blade design process is constantly developing as new tools and technologies are matured and brought into the design cycle. Aerodynamic design is a field where innovation and creativity are the key words."

Buşra Akay, Computational Fluid Dynamics Expert

Aerodynamics

Aerodynamics is one of the company's core areas. Blade-related aerodynamics encompasses profile design, flow control devices, blade design, and analysis of load and power curve measurements.

In the aerodynamic design of new blades, advanced tools are applied to achieve the perfect design – new profiles are developed, the blade shape, twist, and thickness are optimized, and the RPM, pitch angles, and tip design are adjusted to obtain efficient and noiseless operation. To a large extent CFD computation, wind tunnel measurements, full scale field measurements, and custom-designed optimization tools are used for this task.

Aerodynamic design work is performed in a variety of projects, ranging from new technology development, to new blade design and upgrades of existing blades. Aerodynamics is part of multi-disciplinary blade design efforts, being closely linked to loads, structures, and controls. We ensure our position at the cutting edge of aerodynamics research by participating in various international research projects, attending conferences, and publishing in scientific journals. Wind tunnel testing and full-scale testing of operational turbines are implemented.

Blade development

Design and production of new blade types require focus on safety, quality, reliability, and cost in specifying materials and casting processes.

The aim of the blade design process is to obtain an ideal balance between optimum mechanical properties, weight, and cost. The structure is optimized for different load situations using advanced structural methods, including non-linear FE analysis (Ansys). Verification is achieved via static and dynamic testing of full-scale prototypes and field measurements. Production documentation and third party blade certification are important elements in the development of new blade types.

The qualification of blade materials and specification of processes used in production are essential tasks. Materials are developed for blade laminates in close cooperation with blade structure teams and sub-suppliers. Further development of the advanced casting concept used in production and surface treatment ensures technological leadership.

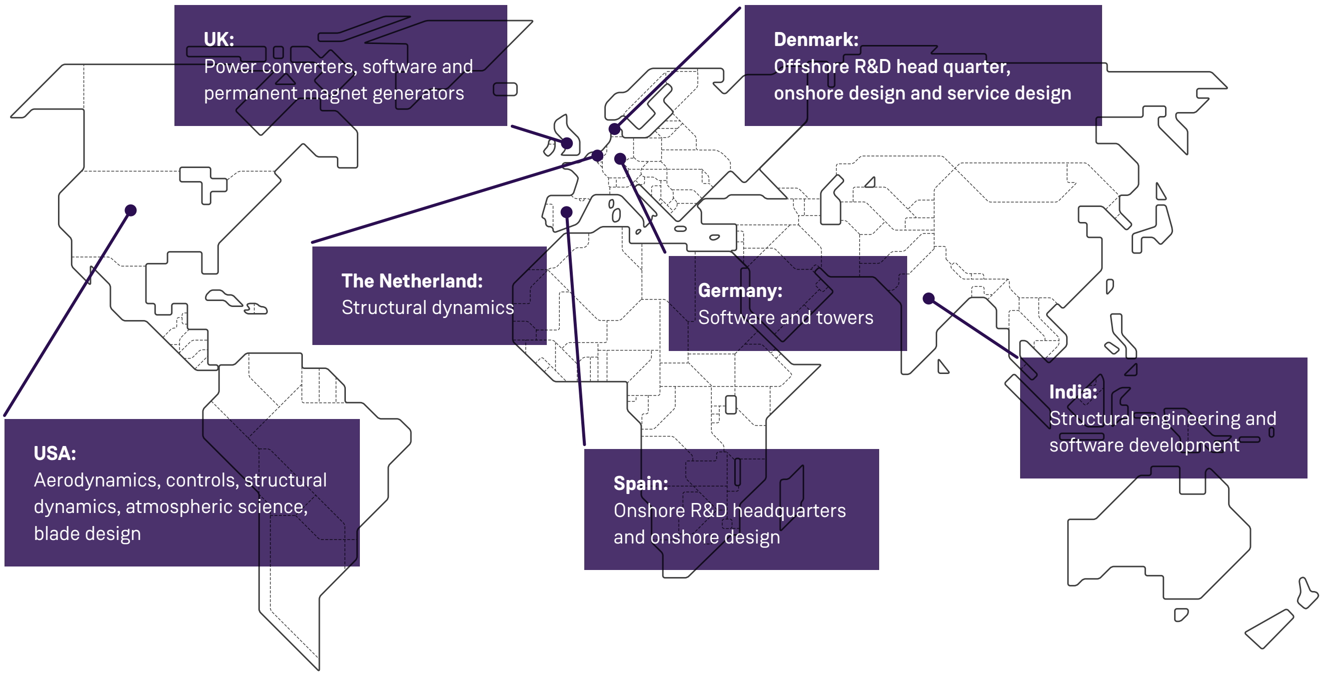
Daily work combines experimental and theoretical tools, such as lab testing of individual materials, advanced FEA simulations, sectional casting, and complete blade casting. The scope of design tasks ranges from components of a few grams to molding equipment of 50 tons. Part of the development of new blade types is the design and development of a variety of custom-made production tools, such as blade casting molds which generate external and internal blade geometries, and blade handling equipment used for the blade finishing processes.

Global research and development

Siemens Gamesa Renewable Energy looks for world class competencies.

Competence centers are an integral part of the technology and product development. SGRE has established a number of competence centers in Europe, the US, Asia-Pacific, and in universities or other research institutions with competencies in specific professional fields that are vital to SGRE.

A location in close proximity to a university or a research institution gives SGRE the opportunity to cooperate with external partners through research projects or PhD thesis.



Competence centers

Denmark: Brande, Aalborg and Ballerup

Brande: Offshore R&D headquarters and onshore design

Aalborg: Blade Design and testing

Ballerup: Design and validation of control features and implementation in products

Vejle: Design of Offshore Balance of Plant

Spain: Madrid, Pamplona, and Bilbao

Madrid: Onshore R&D and onshore design

Pamplona: Onshore R&D headquarters and onshore design

Bilbao: Onshore R&D and onshore design

Zamudio: Onshore R&D and onshore design

Sarriguren: Onshore R&D and onshore design

UK: Keele and Sheffield

Keele: Power converters, software

Sheffield: Permanent magnet generators

The Netherlands: The Hague

Structural dynamics competence centers

Germany: Hamburg

Software, Towers

USA: Boulder and Orlando

Boulder: Aerodynamics, controls, structural dynamics, atmospheric science, Blade Design

Orlando: Onshore R&D and onshore design

India: Delhi (Gurgaon) and Bangalore

Delhi (Gurgaon): Structural engineering

Bangalore: Software development

Testing and validation

Working with testing and validation requires close interfaces and cooperation between a wide variety of engineering disciplines, e.g. high power electronics, low power electronics, mechanics, metallurgy, chemical, software, and hydraulics.

Every phase of working with wind turbines involves measurements throughout the research, development, sales and project execution phases.

Early in the development projects, numerous laboratory tests are performed on key components. This allows for optimization of the product before even the first prototype is built.

Components are endurance tested to prove operational lifetime where big test stands are designed to create the stimuli in an accelerated manner. One of the more visible test stands is for full-scale blade testing. For this purpose several test stands are used to perform accelerated blade fatigue and extreme tests.

Structural, thermal, electrical measurements, noise and performance characteristics etc. are carried out on turbines in the field all over the world. Once a measurement has been commissioned and the equipment calibrated, it must continue to operate unmanned for up to several years at a time. This requires extremely robust equipment and software.

In the end, our comprehensive testing program on industry-leading technology is what ensures, type certificates and that our customers get new technology that is already tried and proven.

"My work offers exciting engineering challenges, and I am motivated by the fact that it contributes to the continuing development of environmentally friendly wind power. I care deeply about energy supplies and the environment, so I am proud of the solutions and results that we help produce."

Jan Thisted, Principal Key Expert, Offshore PPM

Platform and Portfolio Management and Project Management

The Platform and Portfolio Management function (PPM) provides the basis for all product-related decisions aimed at securing market leadership and a long term stable profitable product portfolio.

Platform and Portfolio Management is about creating and maintaining a product portfolio strategy, and making product decisions throughout a product's life cycle, which are based on relevant and up-to-date information about markets, competitors, and technologies. The PPM information are used for business cases to prioritize R&D activities, define target cost as well as monitor the performance, cost development and quality of the product portfolio.

Project managers take strategic product decisions into the real life, real wind turbines. If you are motivated by building great turbines, understanding the systems perspective of wind power and by working closely with some of the best in the industry worldwide, then Siemens Gamesa is the place to be!

Project managers turn product requirements into design specifications, break down the solutions to module level, ensure reuse and application of modularization principles and complete and deliver a product ready for sales and production. Last but not least, they ensure that the required documentation and legal certifications are in place.

Project engineering

Project Engineering delivers customer-specific engineering olutions – from requirements through design and execution.

Engineers in Siemens Gamesa Renewable Energy are not only employed to develop new wind turbine types. Within the Offshore and Onshore Business Units, special engineering units take care of project engineering.

The project engineering organizations adapt SGRE's standard turbine designs to any customer-specific requirements, and are engaged from sales through project execution and handover – setting the standard for the most value-creating project solutions for our customers and ensures that all project-specific certification requirements are met.

The project engineering organizations are home to a broad range of technical roles: the Technical Sales- and Technical Project managers are the responsible technical interfaces to the customer, as well as to our sales-, project management- and service organizations. Design engineers possess expertise in a wide range of disciplines, e.g. electrical-, mechanical- and structural engineering as well as software expertise.

Offshore

Siemens Gamesa Renewable Energy is number one in offshore with a proven track record in delivering offshore projects. SGRE installed the world's first offshore wind power plant in 1991, and are also the company behind the largest offshore wind power plant in operation today.

"My tasks as technical project manager span from highly technical discussions to commercial meetings and scheduling. Two workdays are never alike. During the project new challenges arise and you can never be certain what will happen next week. Through the development of new methods and the handling of ad hoc assignments, the job as technical project manager enables me to feel the pioneering spirit that initiated the wind turbine adventure years ago."

Thomas Mousten, MSc, Civil Engineering

The position as world leader can only be maintained if SGRE constantly improves and stays ahead of competition.

In rough numbers, the wind turbines only accounts for 25% of the total cost of the Balance of Plant (BoP). The BoP, including foundations and installation, accounts for 40%. SGRE therefore focuses on minimizing cost on the following BoP cost parts:

- Foundation design (monopiles, jackets, floaters, transition pieces, secondary steel).
- Lifting and handling equipment.
- · Cable design, Cable ploughing, and installation.
- Logistics & installation, Port & assembly, Marine operations, and Site executions

In Offshore, engineers provide design solutions, technical sales support, support in project management and advice on installation, operation, and maintenance. An engineering career in Offshore will give you a world of opportunities!

360° care, 365 days a year

Servicing wind power plants requires dedication to detail, and a commitment to care from day one, and for the lifetime of each turbine. When action is needed, logistics, diagnostic capabilities, and experience to respond smarter and quicker is brought to the table. Commitment to the safety of employees and colleagues is high.

Big data is a great opportunity that effectively can be used in planning and executing effective maintenance, turning big data into smart data. Operating offshore and onshore wind turbines in more than 30 countries on five continents gives the diagnostics team unrivaled experience and access to huge amounts of data on wind turbine performance, fleet operations, weather conditions, and much more.

Analyzing data gives insights that minimize risk, maximize safety, and optimize performance of wind power plant from day one. Using advanced modeling and analytics, limits service visits to an absolute minimum, without compromising plant reliability.

Next-generation offshore wind power plants are larger, more complex, and farther from shore, which demands ever more sophisticated and flexible service to maintain performance. By using a software simulation tool, the most efficient, long-term logistics solution for a given project can be designed. Individually tailored to local needs, it can combine several modes like helicopters or crew transfer vessels.

"I appreciate experiencing the synergy that arises when representatives of different technologies communicate and interact. And when the purpose of it all is creating green energy it is even better. R&D is a down-to-earth working environment with a great and positive energy."

Anne Wolsing, License Manager

We make a difference!

Energize your future with a job at Siemens Gamesa Renewable Energy.

We care about the climate, and wish to hand over the earth to our children in good shape. We need to have an effective response to climate change.

Wind turbines are a good tool to enable us to do so. The cost of electricity from wind turbines have dropped over the years. Recently, wind turbine developers have won projects without public subsidies. Renewable energy sources like wind and sun needs to be so cheap that we instead of asking ”How can we afford it?” we ask ”How can we afford not to do it?” for the benefit of the climate and the shape of the Earth we hand over to our children.

Do you want to help shape the future of sustainable energy? Drawing on Siemens Gamesa Renewable Energy's more than 35 years as a major innovation driver in the wind power industry, SGRE offers you the opportunity to make a difference and a good move for your career. A global career can become yours in a company where people, excellence, innovation, and responsibility are key.

As an engineer at SGRE, you have the opportunity to pursue more career paths like technical specialist, project management, and management. It's all up to you and your competences.

By contributing to the continuous development of reliable, cost-efficient wind turbines, you can really make a difference!

www.siemensgamesa.com/en/human-capital/job-offers

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