

## Siemens Gamesa Renewable Energy EU Research & Innovation Day

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# Company profile



### History

**Siemens Gamesa Renewable Energy** was created in April, 2017, with the merger of Gamesa Corporación Tecnológica and Siemens Wind Power under one roof: innovative spirit, dedication to technological excellence, and determination to provide real and lasting value to all stakeholders and customers.

**Today,** Siemens Gamesa Renewable Energy is a respected industry **leader committed to providing innovative and effective solutions** to the energy challenges of tomorrow.



**Gamesa's** history is marked by a spirit of innovation and successful expansion into new markets. What started as a small machining workshop in northern Spain quickly grew into a global company focused on new technology development.

In 1995, Gamesa expanded into wind power, installing its first wind turbine in Spain, and quickly grew into one of the leading manufacturers of wind turbines worldwide with production centers in the U.S., China, India, Brazil and Spain.



The history of **Siemens Wind Power** is equally impressive. The company has been directly involved in the wind power industry since 2004 when it acquired the Danish Bonus Energy, which provided turbines for the world's first offshore wind farm, located in Denmark.

Siemens Wind Power grew into the global market leader for offshore business, earning a reputation for technological leadership, strong customer service, and for offering fully integrated end-to-end energy solutions.



### **Key Facts**



\* Figures as of May 2017.





### **Ownership Structure**



## Free-float shares 33%

Siemens Gamesa is a company listed on the Spanish Stock Exchange.

The company is traded on the Madrid, Barcelona, Valencia and Bilbao exchanges, and is a member of Ibex 35.





### Activity



### Onshore

**70 GW** installed in 72 countries.**+9 GW** of wind farm developed in 14 countries.The perfect technological ally for your wind projects.



### Offshore

**+9.7 GW** installed worldwide since 1991. Most experienced offshore wind company with the most reliable product portfolio in the market.



#### Service

**+53 GW** maintained. Commitment beyond the supply of the wind turbine to achieve the profitability objectives of each project.

#### 公公 Three business units strongly positioned in the market



### The only manufacturer with a wide experience

Our wide experience in the whole value chain allow us to lead and advise our clients along the different phases of their wind projects:



公公 Optimized solutions for each project and in all markets





## **Onshore business**



### Geographic diversification allowing growth in emerging and mature markets





# SGRE with strong track record in Asia Pacific ~6GW in installations & ~1 GW in execution



山谷 Customer proximity, full process control and delivery optimization

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## Digitalization of Wind Turbines Dynamic Power Curves

November, 2017



# With digital technologies, customization and flexibility is not a necessarily a matter of customized hardware





# Wind turbine portfolios are traditionally designed around IEC classes, while every project and site has a unique context



• Allowable lifetime load consumption is based on maximum loading conditions

• Actual conditions are often below the maximum loading scenario



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# Multi-dimensional power curves requires flexible parameter turbine designs for better load consumption management

### Flexible management of multiple parameters, including

Wind speed

Temperature

Turbulence

- Grid connection requirements
- Noise regulations
- Site specific configurations require site specific analysis

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Early phase collaboration to ensure quality data collection and optimal project designs

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#### Intelligent turbine control for real-time power optimization

Decades of operational data are used to develop software algorithms that intelligently manage production closer to the allowable lifetime load design

#### **Commercial considerations enable technological advances**

- Flexibility also means flexible certification and documentation strategies
- Projects need to be financeable with predictable and controllable risk





Actual lifetime load consumption

Additional lifetime load consumption through time-dependent control strategy

### Result

- Improved asset utilization
- Load lifetime consumption still not fully utilized



# Future – Matching of load lifetime consumption with revenue for best returns – Digitalization allows us to integrate a time and value perspective





Our assets have a very high lifetime compared to a rather short design cycle. Software updates keeps physical assets current without having to change hardware



During the lifetime of a turbine, we continuously improve the way we design and operate turbines. Wouldn't it be great to be able to integrate these new capabilities also into the legacy fleet? This requires soft-coded functionalities rather than hardware-dependent implementations.





## Thank you

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