



|   |                               |    |
|---|-------------------------------|----|
| ❶ | General Standard Disclosures  | 6  |
| ❷ | Specific Standard Disclosures | 32 |
| ❸ | Annexes                       | 72 |



**GRI** Renewable  
Industries

**Sustainability**  
Report 2018



# Specific Standard Disclosures

|                         |    |
|-------------------------|----|
| Economic Dimension      | 34 |
| Social Dimension        | 46 |
| People                  | 46 |
| Health and Safety       | 54 |
| Local Community         | 60 |
| Environmental Dimension | 63 |

103-1, 103-2 AND 103-3

## Momentum of the wind industry

Mitigating climate change is a key challenge of the XXI century. Its achievement is partly contingent on an effective energy transition, where energy efficiency and the increase of renewable energies play a fundamental role.

Despite expectations that global CO<sub>2</sub> emissions will be reduced in the long-term, the energy demand continues to increase. The International Energy Agency (IEA) estimates that global energy demand will have increased by 30% by 2040, with an estimated 3.4% annual growth in the global economy and a population increase from 7.4 billion to more than 9 billion by 2040, making it difficult to meet the objectives of the Paris Agreement.

### Our sector

The Global Wind Energy Council (GWEC) shows a mature wind industry competing successfully in the market, with remarkable growth from 2019 onwards, surpassing the 60 GW milestone in 2020, to reach a total of 840 GW in 2022.

- In North America (Canada and USA), Central America and South America installed 11.9 GW of new capacity. This represents an increase of 10.8% for North America and 18.7% in Latin America, compared to 2017 (Source: GWEC).
- In Europe, 2.6 GW in new offshore wind energy was installed, representing an 18% increase in installed capacity. The United Kingdom and Germany accounted for 85% of this increase. At present, this amounts to a total of 18.5 GW in offshore

## Our growth

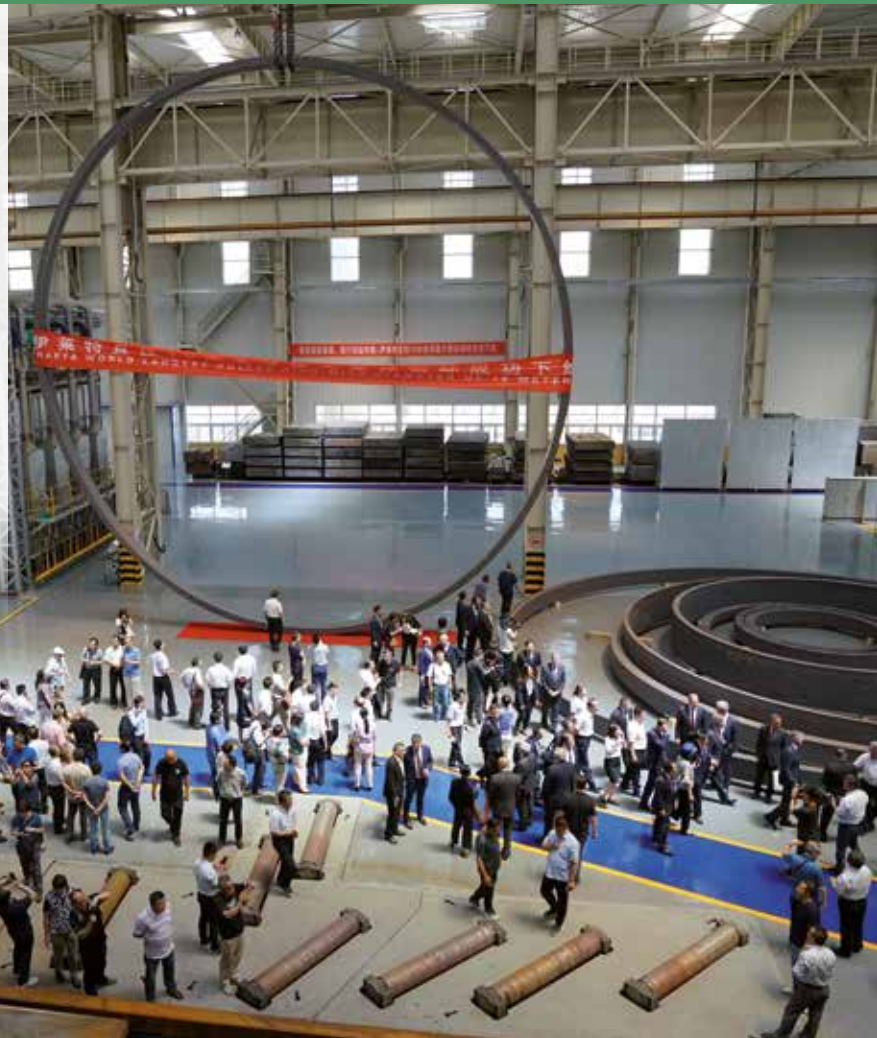
At GRI Renewable Industries, we work to be a reference in the sector, and for this reason we have a global presence in countries such as Argentina, Brazil, USA, South Africa, Spain, Turkey,

India and China. In 2018 we have strengthened our presence in China and India, where two new plants came into operation: GRI Flanges China IV and GRI Towers India II.

### GRI Flanges China IV

This plant began production in mid 2018. Located in the Shandong province, it will manufacture 16-metre diameter flanges (tower junctions) from various materials such as stainless steel, copper alloys and aluminium, etc. and counts with 200 employees.

It is currently negotiating with leading customers worldwide, in various sectors such as nuclear energy, renewable energy (offshore towers) and the aerospace market, among others.



capacity, which is 10% of the total installed wind capacity, as the remaining 90% was installed on land. (Source: Wind Europe).

It is estimated that the wind energy capacity in Europe will grow by an average of 17 GW per year until 2022, when it will reach an installed capacity of 258 GW. Most of the new installations will be on land: 70.4 GW versus 16.5 GW offshore.

- In the Asian-Pacific region, the total installed wind energy is now 256 GW. The new facilities in 2018 continue to be led by China (21.2 GW), followed by India (2.2 GW). The forecast is that this region will continue growing and more than 145 GW additional capacity will be installed by 2023, amounting to a total of 400 GW (Source: GWEC).

Favourable energy policies, together with new innovations, play a fundamental role in this growth, in which offshore wind energy plays an increasingly important role.

The development of turbines which are more powerful, reliable, autonomous and versatile in the different wind conditions, together with more modern and solid installations and structures, with new materials and designs, serve to reduce the cost and significantly improve the performance of these installations.

GRI Renewable Industries is in a prominent position in the wind sector, having a presence in 8 countries, contributing to a new renewable and sustainable energy model, developing modern, innovative and high-quality wind energy components, primarily towers and flanges.

In this way, we contribute to the development of the communities where we operate, through improvement and reduction of the contamination and the accessibility of electricity.

## GRI Towers India II

At the closing of the year, the GRI Towers India II project in Nellore (Andhra Pradesh), with a production capacity of 200 towers, was finished. The plant will formally start operating at the beginning of 2019. It is estimated to have an initial staff of 150 employees, which will increase to 300.



# Balance sheet

201-1

In recent years, GRI Renewable Industries has made an extraordinary investment effort totalling close to 500 million euros since its creation. The consolidation of the plants started up in recent years and the beginning of operations in other new plants are foreseen within the fiscal year 2019.

The company's key economic figures are outlined below:

**Economic Value Generated (EVG)** with a total of 391,351 thousand euros, distributed as follows:

| Economic Value Generated |                |                |
|--------------------------|----------------|----------------|
| Thousand euros           | 2017           | 2018           |
| Turnover                 | 383,916        | 386,364        |
| Financial revenue        | 3,463          | 3,142          |
| Other revenue            | 6,118          | 1,845          |
| <b>Total EVG</b>         | <b>393,497</b> | <b>391,351</b> |

**Economic Value Distributed (EVD)** amounting to a total of 444,945 thousand euros, distributed as follows:

| Economic Value Distributed   |                |                |
|------------------------------|----------------|----------------|
| Thousand euros               | 2017           | 2018           |
| Operational costs            | 282,700        | 306,688        |
| CAPEX                        | 99,019         | 59,604         |
| Payment to capital providers | 6,522          | 7,185          |
| Taxes                        | 21,628         | 7,638          |
| Personnel                    | 65,468         | 63,816         |
| Investments in the community | 207            | 14             |
| <b>Total EVD</b>             | <b>475,544</b> | <b>444,945</b> |

**Economic Value Retained (EVR)** with a total of -53,594 thousand euros.

The locations where GRI Renewable Industries is present received a total of 7,638 thousand euros through business rates, taxes and levies, which contribute to improving the quality of life and the services available to the local population. Its distribution per country is given below:

| Countries    | Taxes and levies<br>Thousand euros |
|--------------|------------------------------------|
| Brazil       | 1,182                              |
| China        | 5,253                              |
| Spain        | 3,978                              |
| India        | -1,083                             |
| Turkey       | -171                               |
| USA          | -382                               |
| South Africa | -1,666                             |
| Others (UK)  | 528                                |

The Net worth of the company is 277,887 thousand euros.

The company received 1,312 thousand euros (201-4) in the form of tax incentives by public administrations as shown below:

| Tax Benefits                |              |              |
|-----------------------------|--------------|--------------|
| Thousand euros              | 2017         | 2018         |
| Tax reliefs and tax credits | 1,029        | 486          |
| Subvention                  | 243          | 212          |
| R&D                         | 558          | 319          |
| Financial Benefits          | 3,617        | 295          |
| <b>Total</b>                | <b>5,447</b> | <b>1,312</b> |

As for other accounting obligations, the companies that make up the GRI Renewable Industries Group are, for the most part, obliged to prepare annual audit reports on their individual annual accounts regarding the total volume of their assets, turnover and average workforce. There are no exceptions to those reports.

Following approval by the corresponding body, these reports are presented, in due time and form, to the Mercantile Register for each financial accounting year, with the legalization of the Official Records and the filing of the Annual Accounts. Furthermore, the companies of the group have no outstanding Social Security, General Treasury or tax payments.



## Supply Chain

102-9

GRI Renewable Industries' suppliers are an indispensable asset within the value chain, both for their importance in project planning and for the company's cost competitiveness.

Therefore, our purchasing model aims to have the best suppliers, managed through procedures that ensure transparency, fair conditions and long-term relationships.

Purchase management is centralized in the corporate "Supply Chain" division, which integrates the following areas:



### Procurement

This is the first link in the chain. It is their role to ensure that suppliers are compliant in time and form, meet deadlines, monitor costs (based on previous planning) and encourage the use of the latest technologies to optimise supply chain management.

In each project they establish continuous and fluid communication and manage the risks until the reception of the material in the plant.

To comply with these requirements, meetings are held and monitoring templates are shared, to facilitate the identification and minimization of risks.



### Warehouses

These are responsible for the entry of the goods and the inventory management at all the plants under the group standard, seeking to optimize the processes the reduce costs and stock levels, as well as to continuously improve service without compromising neither the quality, nor the delivery times.



## Purchases

We differentiate purchases into two types based on their characteristics: direct and indirect. In both groups it is essential to meticulously follow our purchase procedures which are based on the parameters of the group's general purchasing conditions. These conditions safeguard us in the service we provide and in the most significant measures linked to our responsibility to sustainability.

### > Direct Purchases

In all business lines there is a wide range of product families.

Steel, in terms of volume and cost, is our main raw material, which, depending on the country, has certain limitations, both due to regulatory aspects as well as customer requirements. For this reason, we only work with suppliers which are adequately calibrated in the market.

As steel processors, we are very proud of our strategic relations that tie us to other steel providers, by dedicating a great deal of effort to ensure that these relations are long-term and present a competitive advantage to both parties.

Apart from steel, other products fundamental for our competitiveness stand out, such as: internal tower parts, doorframes, flanges, etc. for which we seek global and strategic partnerships.



### > Indirect Purchases

For purchases related to investments, supplies and services there is a selection process based on service quality criteria, market positioning, competitive advantage and risk prevention.

We seek to develop relations with suppliers to assure that the company has a cost and service advantage over its competitors, and at the same time to build a creditworthy and fruitful business for the supplier.





## Supplier Quality

This is done at both the corporate level and at each of the plants. The department is responsible for the certification/auditing of suppliers, complaint management and remedial action development, which allow us to ensure that products and their providers live up to the Group’s standards.

To reinforce these issues, reduce complaints and align our suppliers with group standards we deployed numerous initiatives. We should mention the new “Online Supplier Portal”, developed in collaboration with the company “FullStep pro” which is integrated into SAP.

This new platform allows for immediate registration and access to each supplier’s portal, where they update their information and certificates. The homologation requirements are defined and adapted to the different categories of materials / services and supplies that are provided, categorizing as critical or non-critical. At all times, suppliers are informed on their current status, for instance: certification nearing expiration, documentation pending, additional data to be provided, valuation, etc; or even on the non-conformities they have.

The homologation requires that 100% of the suppliers provide certain data and evidence, which we believe guarantees that we can choose the best suppliers in the market. This information includes, among others, aspects of sustainability, ethics and compliance, availability of environmental, quality and safety and health certificates, absence of conflicting minerals, Reach compliance, etc.

In addition, in accordance with the procedure for “Control of suppliers for processes, products and services”, for the suppliers of subjects considered “critical”, an onsite audit is carried out that verifies conformity on the requested matters as well as a “First Piece Qualification” (FPQ) inspection focused on the product.

The final evaluation of the suppliers includes and weighs the result and the degree of conformity of all these requirements, and depending on their result and classification, different measures are established.

For those with lower ratings, action and improvement plans are defined, monitoring tasks and plans are drawn up in order to make them reach the good or excellent category.

All suppliers, once approved, are periodically evaluated each semester as a control mechanism to maintain their classification.

With regard to audits and inspections, these are always repeated whenever any incident occurs, a new product is required, any change is made to the process or any other cause that calls for their repetition.

It should be noted that some customers, among their contractual conditions, establish which suppliers and materials are to be used for the towers, which, in these cases, substantially limits our decision-making capacity. Similarly, in order to create local value, in some countries we find suppliers with whom we work closely, with which we increase control measures in order to minimise any risk, and with which we define action and improvement plans in order to improve their results in the assessment.

### GRI SUPPLIERS PORTAL



### Evaluated suppliers

In 2018 we have focused on the definition and implementation of the new portal, and in particular on the updating and re-evaluation of our standard suppliers.

A total of 70 new suppliers were evaluated and 41 existing suppliers were re-evaluated, amounting to a total of 111 suppliers (308-1 and 414-1).

In addition to the evaluation, 20 “in-situ” audits, both for products and processes, were conducted by the purchase teams from the Plants and Corporate.



## Logistics

This department focuses on the reduction of transportation costs (for acquired goods, as well as for the finished product); thereby improving service and creating competitive advantage over competitors in the sector.

Additionally, this department centralizes all information related to tariffs and taxes associated with the movement of goods, which is of increasing relevance.



## Main achievements in 2018

### Purchases

- Acquisition and commissioning of a new rolling mill in GRI Flanges Iraeta.
- Equipment and supplies for the new cutting & bevelling centre in GRI Towers Galicia.
- Management of suppliers for the start of the first Off-Shore project in GRI Towers Seville.
- Complex area revision to adapt to the new requirements and market deriving from the start up of GRI Towers India II.

### SUPPLIER QUALITY

- Development of procedures and integrating of the new tool "Full Step", in order to track all suppliers in the group portfolio.
- Formalization of the obligation to report on sustainability, ethics and human rights in process and/or product audits as part of the "General Process Check List".

## Expenditure in local suppliers

204-1

We contribute to the development and generation of wealth in the communities of the countries in which we are present through expenditure in local providers.

In 2018, supplier spending reached 506,329,772 euros, 81% of which corresponds to local agents. Its distribution per country is shown below:

|              | Total supplier's expenses | Local supplier's expenses | Local supplier's % |
|--------------|---------------------------|---------------------------|--------------------|
| Brazil       | 61,821,740                | 53,844,877                | 87                 |
| Spain        | 117,391,082               | 85,964,862                | 73                 |
| India        | 20,506,096                | 20,174,273                | 98                 |
| Turkey       | 21,818,136                | 12,512,126                | 57                 |
| USA          | 40,320,931                | 27,665,960                | 69                 |
| S. Africa    | 34,985,468                | 11,401,141                | 33                 |
| China        | 209,486,319               | 199,024,818               | 95                 |
| <b>TOTAL</b> | <b>506,329,772</b>        | <b>410,588,056</b>        | <b>81</b>          |

No negative social and environmental impacts have been detected in the supply chain, therefore no measures to eliminate/mitigate these effects were necessary (308-2 and 414-2).



# Information security

Cyberthreats continue to grow in ingenuity and frequency, on-line fraud continues to evolve thanks to new social engineering techniques and these are responsible for million-dollar losses in companies worldwide.

The rapid proliferation of intelligent devices and the connectivity given by the Internet of Things (IoT), coupled with the lack of global security standards makes many of these devices very vulnerable and exposes personal and business information.

Today, hackers are increasingly using corporate computer equipment to "mine" crypto currencies. This is done through a modern malware that is designed to go after business networks which can make these collapse or even damage the hardware. Attempts at phishing fraud are also on the rise, making the adaptation of information and device security policies more relevant every day in order to protect both assets and people's security.

GRI Renewable Industries is convinced that information has become a strategic asset for business and people.

For this reason, the necessary mechanisms have been established to safeguard information privacy and to protect the data of customers and providers, as well as to manage and treat documentation adequately according to its level of relevance, and to enhance security. Information security procedures are periodically reviewed and systems are continuously tested to ensure their tightness.

In the year 2018, the following measures, among others, have been taken to improve security policies:

- **Periodical system** scans to detect external and internal vulnerabilities and their correction based on their level of criticality.
- **Diagnosis of information security and its risks** based on the ISO 27000 standard. To reinforce awareness and training of the group's employees, campaigns and training courses took place. The "Anti-Phishing" campaign stands out, which aimed to detect the risk level and to make employees aware of these attacks.

In addition, training sessions have been carried out in both corporate and plant offices on the risks of connecting to public networks and protecting your personal data, due to the risk this new type of crime poses to people and assets.

- **Information security.** Yearly Information Security Course, aiming to update employee's knowledge of applicable policies.

In addition, new versions of anti-ransomware analysis software have been installed through pilot tests, new tools for cataloging and protection of corporate information (IRM - Information Rights Management) and for the protection of smartphones or tablets (MDM - Mobile Device management).

## Business Process Support

The Information Systems are a fundamental component for the execution of the business processes. With this objective, the IT department keeps the ERP SAP, the PLM tool and the Group's infrastructure and communication services centralized. At the same time, the department carries out transformation projects to align the systems with the growth of the company and to the new processes, focusing on business support, efficiency and profitable and sustainable growth.



In some cases, the collaboration of third parties may be necessary for which an impartial selection process is followed, consisting of the publication of the needs, reception and appraisal of offers and the final selection based on criteria related to business support and IT systems efficiency.

To this effect, the Systems area has been present not only in the incorporation of new companies to the Group (GRI Argentina, GRI India II Argentina), but also in new challenges that the organization faces in its innovation strategy and the improvement of productivity and efficiency, such as tools to exchange documentation with providers, the digitalization of invoices and the digital management of cost notes.

During the year, the rollout of the new Immediate Provision of Information system (SII) was finalized which allows for the daily and automatic sending of information required by the Spanish tax authorities (national and provincial).

# Customers

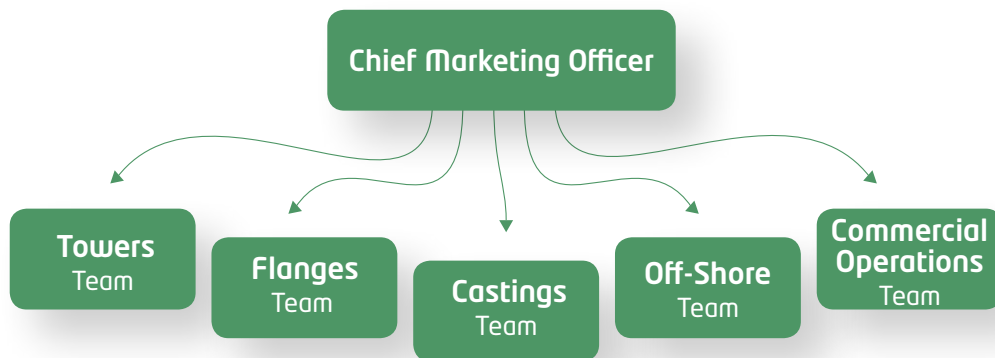
The success of GRI Renewable Industries is based on its capacity to identify and meet its customer needs. As the only supplier with the capacity to design and manufacture new prototypes of towers and flanges, innovation plays an essential part. Because of this, we have highly qualified innovation teams, who focus directly on improving our products, on process efficiency and cost reductions, while keeping to our high safety and quality standards. The main initiatives in this field are described in the innovation section.

In addition, we pay special attention to meeting our customer's demands, which is why all plants are certified under international quality standards ISO 9001. Furthermore, plants that supply products to the European market, or which are required to do so by the customer, have the EN1090 certificate.

These products bear the CE conformity marking.

Likewise, we follow a rigorous procedure of homologation and control of suppliers to ensure the adequate reception of raw materials, components and equipment according to our requirements.

Closeness to the client is a fundamental aspect, for that reason we are committed to the personalization and the constant improvement of our service through our commercial teams, specialized and adapted to each type of business, client, country and product, which allows us to provide a more specific coverage. In 2018 we augmented the team with offshore experts, mainly focused on the northern European market.



Within the projects started in 2018, which will result in patents in 2019, we would like to highlight the following:

- Installation of a new rolling train in the GRI Flanges Iraeta plant, currently in the testing phase, which will be fully operational in 2019. An investment of around €16M was made for this new facility which will allow us to go one step back in the supply chain, and manufacture our own steel bars.

This investment will lead to various benefits such as, among others, improving the product quality, delivery terms and control of the supply chain, optimizing the customer's coverage.



- We are producing a new prototype for offshore towers in collaboration with one of our main customers, which is planned to be the biggest tower in the world, which will increase the power generated at each position in the park and will reduce the LCOE.
- The new installation China IV is a fundamental milestone for the flange business. The new technology will allow us to develop flanges up to 16 metres diameter.
- Due to the increase in the demand for our steel balls for the mining sector, we have approved investment in a new plant in Mongolia, the development of which will start in 2019.
- ENERCON, one of the world's leading OEMs in renewable energy, subcontracted GRI Renewable Industries as wind tower designer & supplier for an important international project, manufacturing and delivering the towers from GRI factory located in Brazil. Thanks to the improvements done from the initial tower design, GRI has helped ENERCON to reduce tower weight and therefore costs, without compromising final tower height or its resistance. These improvements also ease the transport and handling of the different tower sections.

Facing this new challenge and due to the improvements in our towers, we have managed to reduce the weight of the tower and with it their total landed cost, as our improvements not only reduce the raw material, but also reduce the total production and logistical costs.



## 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



### SDG 9.4

By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, all countries taking action in accordance with their respective capabilities.

Investment in innovation and infrastructure are fundamental drivers for growth and economic development as much in the company as in the country.

Therefore, promoting renewable energy is very important for the company, as it promotes its growth and technological improvement.

Technological advances are essential in order to find permanent solutions to economic and environmental challenges, just as/as well as for the generation of new employment opportunities and the promotion of energy efficiency.

For this reason, Innovation and Development initiatives are essential at GRI Renewable Industries.

## Innovation

In 2018 we have started different projects, which demonstrates the real commitment made by GRI Renewable Industries to innovation and the improvement coming from new developments, among which the developments of the new Forestalia parks in Aragon stand out.

### Development of new parks in Aragon

As a result of auctions held in 2016 and 2017, one of our main clients became the contractor for a large part of the future wind parks of the Government of Aragon, where the MWh has the lowest allocated cost to date in Spain.

GRI Renewable Industries collaborates directly in this project,

for which it has designed some specific towers with a height of 85m made up of three lighter sections, which allow for cost reductions and enable the towers to meet the established prices. 3 of our plants participate in the project, for which they will deliver at least 280 units between 2018 and 2019.





## Our commitment to R+D+I

The R+D+I department is in charge of managing and coordinating projects related to innovation, together with plant staff. There is also the division known as “GRI Hybrid Towers”, located in Madrid and designated to hybrid tower designs.

We are currently involved in different national and international projects, including our participation in REOLTEC (Wind Industry Technological Platform), in which we coordinate R+D+I activities that respond to the needs of the sector.

Within the most significant matters of this year, we pride ourselves on the approval of the project to create the “Elcano Centre for Innovation and University Training” in the Port of Seville.

The project is led by the Seville University, together with the Évora and Algarve Universities and is seconded by the Seville Port Authority. GRI Renewable Industries plays a key role in the development of wind component research projects and in the training of future professionals in the sector.

The Centre will take residence in buildings and warehouses located in the area conceded to GRI, as well as in other buildings still belonging to the Port Authority, and will have a testing area, laboratories, a welding area and training areas.

Its close proximity with GRI Towers Seville is a fundamental lever for the company’s strategy to promote the Innovation and Development department for new tower designs, as well as to make improvements in production processes and, through these, increase our competitiveness.

In addition, we must highlight the upcoming opening of an R&D centre in Turkey within the GRI Tower Turkey’s facilities, which will have an area exclusively dedicated to machinery for the production of wind towers, with a multidisciplinary team permanently dedicated to this project.

With all this, the R&D team is already developing different equipment for the multiple critical manufacturing processes for towers with very satisfactory results. This shows the importance of innovation in our sector, which is not only external innovation through different collaborations, but also internal in order to serve as a reference for advanced production processes in order to reach operational excellence.

## Improvement in processes

At GRI Renewable Industries we consider technological investments and continuous improvement through innovation to be part of our culture, and this brings us important benefits such as, among others: excellence in quality, worker safety and better control of results (data collection, analysis and management).

In 2018 we continue to be immersed in Industry 4.0 projects and in the digitalization of all phases of the production

process. This allows us to improve their standardization, to increase our flexibility and to personalize our service to the customer’s needs, to shorten our design, production and sales cycles, through shorter, faster and more efficient production series.

Similarly, we will be able to integrate all data from multiple channels; exploit, optimize and analyse it in real time through “Big Data”.

In our culture and search for excellence in our processes, the “Lean Manufacturing” philosophy instilled in all our plants plays a fundamental role. This allows us to be more efficient and to improve our response capacity through waste minimization and time and cost reductions.

A clear example of the improvements obtained in our processes are the initiatives developed by the multidisciplinary team of GRI Towers, among others:

- **Welding process:** although this is not a complex process, it requires highly qualified operators. For this reason, we designed an internal welding machine that simplifies and reduces work times. Moreover, it also minimizes the qualification requirements, brings ergonomic improvements and, through these, improves the health and work environment of our employees.  
With respect to the final product, this new installation brings faster results, with lower consumption and with high quality finishes.
- **Robotized painting system:** focussed on automating the complete painting process and on improving the quality of the finishes, while reducing paint consumption, favouring environmental quality and minimizing exposure risks for our employees.
- **Automatic pre-blasting systems:** project aimed at reducing the duration of the blasting process, increasing efficiency, improving the quality of the finishes and reducing the efforts to finish the complete section of the wind turbine. All of this is done in a cleaner industrial environment with numerous direct and indirect benefits both for the maintenance work, as for the health of our workers.
- **Automatic system for the doorframe:** this system improves the machine design used in the cutting and welding processes for the doorframes of a wind tower.  
Among its advantages is the improvement of operating times and finishes, safety conditions and, therefore, the reduction of risks in the work environment.

## Improvement in products

GRI Renewable Industries relies on an expert team dedicated to designing the manufacturing of towers and flanges, meeting the objectives set by each customer.

Offering a quality product and service is an essential aspect for our development and profitability, which is why all operating plants are certified under international quality standards. GRI Towers Sevilla and GRI Towers Turkey plants have updated to the new 2015 version of the standard and the remaining plants are in the adaptation process.

Similarly, all plants, aside from GRI Towers Brazil, are also certified under the EN1090 standard, and, consequently, our products have the CE conformity declaration.

Regarding product labelling (towers and flanges), our obligations focus on being able to provide necessary information for their adequate traceability and their correct definition. In any case, our products do not feature any chemical or environmental risk.

Due to the classification of our products and services, their evaluation on health

and safety matters is deemed non-applicable (416-1). Moreover, no incidents have occurred due to non-compliance concerning impacts of products and service on health and safety during their life-cycle (416-2).

At GRI Renewable Industries we continue to be immersed in the development of new models for wind towers and flanges, which are more versatile, efficient, cost-efficient and easy to develop, transport and assembly. Some examples are given next:

### With regard to flanges

We are developing projects focused on new rolling and joining methods for flanges, primarily through our plant GRI Flanges Iraeta.



#### BRISA PROJECT

This project, which is planned to last 2 years, was defined to develop new flanges with sections of up to 80,000 mm<sup>2</sup>, through a new joining technology, the flanges are more flexible, efficient and homogeneous for mass production for the onshore and offshore market.

#### FLASHEO PROJECT

For the development of wind tower flanges with sections of up to 45,000 mm<sup>2</sup>, which is expected to become a safe, sustainable and competitive energy system.

### With regard to towers

#### ROCKET PROJECT

It responds to the challenge of developing a new disruptive solution in structural designs for a new generation of wind towers that aims to revolutionize the current state of the art. The R&D department participated on its development in collaboration with other departments and plants from the group.



This new cable-stayed tower differs from the current ones in that the satellites work both with traction and compression, which serves to give it structural stability and to reduce its central body. This will allow us to reduce the structure's dimensions and weight, therefore adapting the height of the tower to the different customer needs, as its on-site modular execution facilitates logistics. This all will lead to higher productivity and reductions of production and installation completion times at a lower cost.

The model is patented in the different markets where the wind energy market is flourishing and has been classified as Research and Development and has been financed by the CDTI, due to the big advances made in the structural design and the significant improvement in the design of wind components.

#### PROTOS PROJECT

The main objective of project PROTOS is to develop welding and inspection strategies to reach the productivity ratios necessary in order to compete in the global market for tower production. This is in line with the current trend towards more efficient, bigger, stronger, heavier wind turbines, especially for the offshore market, in which the welding phase plays an essential role.