Windar renovables

Environmental commitment

Lifecycle impacts of our products and industrial processes. Information for stakeholders

GD000567-R.08

Environmental commitment

Introduction

The WINDAR Group is firmly committed to acting responsibly and ensuring the preservation of the environments where it conducts its business, preventing all forms of air, soil and water pollution. To this end, it has defined and implemented environmental policies related to climate change and energy use, the circular economy and waste management, the protection of biodiversity, forests and land use, water use, air pollution, and chemical substance management.

Environmental preservation and protection against pollution at each of the locations where the WINDAR Group conducts its business operations is a fundamental and key part of the company's sustainability and growth strategy. The company's activities are subject to material issues of relative importance to the environment, which may be related to both production processes and the products supplied to customers. Environmental preservation and protection against air, soil and water pollution are the subject of commitments at all levels, throughout the entire life cycle of the products supplied, and in the decision-making process of the Governing Body, motivated by the growing requirements for information and reporting to the company's stakeholders.

These commitments are based on an Environmental Management System based on the international standard ISO 14001, global sustainability goals such as the 2030 Agenda, and the Fundamental Principles of the United Nations Global Compact on the Environment, to which we have voluntarily adhered.

Environmental commitment

"We are committed to implementing environmentally friendly business practices, contributing to the sustainable development of our environment, responding to the needs of our future generations. Likewise, in the development of our activities and the manufacturing of our products, we globally promote the prevention of air, soil and water pollution, the reduction of traditional fossil fuels in favor of the use of renewable energy, and the reduction of our CO2 emissions and the generation of waste resulting from these activities".

Vision of the impacts we generate

The use of fossil fuels has dominated most of the global electricity generation system for years. However, today, the use of renewable energies such as wind power has become a real alternative for generating clean electricity. The wind turbines we supply to our customers and which they install in wind farms around the world generally do not produce direct carbon emissions. However, there is absolutely no form of energy generation that has a completely zero environmental impact, and to a lesser extent, renewable energies also have some impact on the environment.

The substantial difference between onshore and offshore wind power compared to other conventional energy sources is based on the fact that the environmental impacts generated by wind turbines are concentrated at two critical moments: the manufacturing of the wind turbine itself and, secondly, its end of life, when it must be dismantled. The wind towers and offshore foundations manufactured by the WINDAR Group involve industrial production activities and processes that can generate a variety of environmental impacts, both positive and negative, on the environment and local communities where they are installed.

On the one hand, wind towers and offshore foundations contribute to a positive environmental footprint by promoting and fostering the development of wind energy, avoiding the emission of carbon emissions into the atmosphere on a global scale, and lighting thousands of homes with clean energy. However, wind towers and offshore foundations also contribute to a negative environmental footprint on the environment and the sites where we manufacture our products. These impacts are reflected in air, soil, or water pollution that can have an impact on the environment when they materialize, i.e., emissions into the atmosphere, discharges, waste generated, or other vectors that arise as a result of different risk scenarios.

The WINDAR Group has focused its activities on gradually reducing these impacts through its Sustainability Strategy, achieving profitability that reaches all our stakeholders. More information about our annual contribution to the market can be found at www.windar-renovables.com.

To determine the environmental footprint generated by the WINDAR Group, the environmental risks were identified and evaluated in five phases from the perspective of the entire life cycle of the wind towers and foundations we supply.

Product life cycle analysis

PHASE 1: Product Design Perspective

We have applied Circular Economy and waste management principles and criteria related to manufacturing. We do not have direct control over this phase. The WINDAR Group's scope does not typically include the design of towers and foundations, although the company is qualified to do so.

Currently, in this phase, the scope is to analyze the manufacturability of the product based on the design supplied by customers. Therefore, we have analyzed the risks and environmental impacts derived from the use of raw materials and consumables required in production processes, with the aim of providing innovative and more sustainable solutions that meet customer needs.

PHASE 2: Supply Chain Perspective

We have identified and assessed risks throughout the value chain, including the purchasing and supply processes for the raw materials and consumables required for the processes used in our activities.

Direct control in this phase is limited. Although most of the materials we use are recyclable (steel sheet, cast flanges, etc.), they are selected and optimized according to the initial guidelines and specifications of the customer's design, as described in the previous phase.

PHASE 3: Product Manufacturing Perspective

For the WINDAR Group, this is the priority action phase in terms of environmental impacts, where we have focused on the processes over which we have direct control. We have identified and assessed environmental risks through the manufacturing processes, using established internal procedures and protocols.

During this stage, the most critical risk aspects are identified below:

Air Pollution

⇒ GHG emissions from conventional combustion sources for electricity or power generation.
⇒ Other emissions such as VOCs from the use of solvents and paints in surface treatment processes.
⇒ Environmental noise generated by activities.

Soil Pollution

⇒ Generation of hazardous and non-hazardous waste in processes related to boilermaking and welding, as well as in the surface treatment of wind towers and offshore foundations.
⇒ Slag from submerged arc welding processes.
⇒ Solid particles such as shot dust and paint dust.

Water Pollution

⇒ Accidental spills of liquid emissions that may reach a wastewater treatment system.

Use of Chemical Substances

WINDAR Group is a company committed to sustainability in all its dimensions and scope, with a special focus on the health of its employees and the prevention of contamination. Therefore, we promote the safe use of the chemical substances we employ at each of our locations, minimizing the risks associated with their handling. The main products used are:

1. Paints and solvents used in the preparation of paint mixtures for surface treatment.
2. Welding wires and flux used in welding processes.

In this regard, we manage the chemical products used to identify substances of concern (SVHC) according to the REACH Regulation in the manufacture of wind towers and offshore foundations, adopting the necessary measures to prevent any risks to people and the environment. In all cases, WINDAR Group delivers finished products that comply with the clients' design requirements, consisting mainly of carbon and stainless steel, coated externally with paint. Under no circumstances will unauthorized chemical products be delivered.

Information regarding the types of waste and annual quantities of waste and emissions generated by the WINDAR Group is included in the annual sustainability report available on the corporate website.

PHASE 4: From the perspective of product delivery, installation and use

Direct control over environmental risks ends once the product is delivered and made available to the customer for transport. The WINDAR Group does not currently carry out activities related to the transport of finished products, wind farm assembly, or wind turbine commissioning; these activities are outside its scope.

This phase is addressed through the information provided to the customer, end users, and other stakeholders through this document. The WINDAR Group is not responsible for the products at this stage; therefore, its scope is limited to providing information about the products themselves.

Under normal conditions, the completed and stockpiled wind towers and foundations do not generate environmental pollution risks such as emissions, waste, or spills. These structures are part of larger structures, which are transported to the field and installed and commissioned by the client.

The products supplied by the WINDAR Group do not require instructions or documentation for assembly, installation, or treatment when they are delivered to the client.

PHASE 5: From an End-of-Life Perspective

The decommissioning of wind farms is addressed in the same way as in the previous phase. The WINDAR Group is not responsible for the decommissioning of the products in this phase, so its scope is limited to providing information on the composition of the products themselves, or on possible solutions for recycling, disposal, or reuse of the different materials that make up said product.

It's clear that with this idea in mind, environmental benefits can be achieved through treatment processes such as reuse, recycling, or heat recovery from the incineration of various wind turbine components.

Information for Stakeholders

Currently, wind farm owners are forced to bear the costs of dismantling and transferring obsolete wind turbines to landfills. However, it is estimated that in the coming years, most of these materials will not be accepted in landfills, offering an opportunity to reprocess and recycle wind turbines. Reconditioning and restoring value to the largest possible volume of equipment, including components, materials, and turbines, so that they can have a second useful life is becoming increasingly valuable.

In a few years, landfills would not accept this waste, so it is urgent to both utilize the materials for reconditioning and rethink those that are more difficult to recycle, such as blade materials, to facilitate their recycling on the path to a Circular Economy. Furthermore, and at the same time, wind turbine manufacturers are trying to make their products more efficient and sustainable to meet the Global Development Goals in their sustainability strategies. We want our customers, investors, and other stakeholders to better understand our products and the opportunities offered by proper management at the end of their useful life. Understanding the components of a wind turbine from the perspective of the materials it is made of and the impacts they can generate will help achieve this.

To begin, we can identify four key components, starting with the base of the wind turbine: foundation, tower, nacelle, rotor, and blades. In the case of offshore wind turbines, the foundation may include a transition piece with the tower and may be anchored to the seabed or floating.

In any case, most of the materials that make up wind turbines have a fairly well-known recycling chain, and generally speaking, approximately 85-90% or more of their components can be recovered. Of all the wind turbine components, the blades currently represent the greatest recovery challenge because the materials used are particularly difficult and expensive to separate.

The manufacturing processes of wind turbines basically use materials that can be grouped as follows:

Concrete Materials

Onshore foundations mostly use concrete and steel bars, which must be removed when the wind turbine is dismantled to restore the environment to its original condition. 100% of concrete waste is typically disposed of in landfills.

However, when it comes to offshore foundations, there are several factors to consider before their complete removal. Offshore foundations are typically metallic and create their own important marine habitats around the structure itself. For this reason, removal can depend largely on factors such as habitat formation, the species affected, or ultimately the danger to navigation.

The WINDAR Group recommends conducting an impact study before removing offshore foundations.

Steel, Cast Iron, Copper, and Aluminum Materials

The structure of the wind turbine tower and offshore foundations are made almost entirely of carbon steel, an iron alloy. Both steel and iron are ferrous metals that can be treated within the same recycling chain. These materials are generally infinitely recyclable and easy to recover, as both are magnetic.

However, this alloy typically includes other elements depending on the steel's intended use, including impurities during the scrapping and recycling process. Therefore, the purity of steel generally decreases each time it is recycled. For this reason, some studies identify a 90% recyclability for steel and iron (with a 10% loss).

Meanwhile, the interior of the tower uses wiring and other electrical components that use copper, one of the most valuable, recyclable, and in-demand metals. Copper can also be recycled and reused indefinitely without losing performance. Recycling requires up to 80% less energy than primary copper production.

In a wind farm, copper can also be used in transmission cables and is generally not recoverable as the cables are left buried. Only the copper in the turbine can be recovered. Studies indicate a 95% recycling capacity, with a 5-10% loss in landfills.

The interior of the wind tower includes stairs, platforms, and other elements made of stainless steel and aluminum. Like copper, aluminum is also infinitely recyclable. Furthermore, the aluminum recycling process is more energy-efficient than copper, as recycled aluminum requires 90% less energy than primary production. It is possible to recycle up to 95% of the aluminum.

Fiberglass and Related Composite Materials

Wind turbine blades are made of fiberglass and are difficult to recycle because they use complex composite materials, a combination of reinforced fibers (usually glass or carbon fibers) and a polymer matrix.

These composite materials increase performance by allowing for lighter, longer blades with optimized aerodynamics, but they pose recycling challenges.

The main components of composite materials are CFRP and GRP, whose recycling processes are much less established than those of the other materials mentioned above.

Fiber-reinforced plastics (FRPs) are difficult to recycle, as it is difficult to separate the reinforcing fibers from the polymer resins, meaning many end up in landfills at the end of their useful life. The more wind turbines are used, the more this problem worsens. Recovering the fiberglass found in wind turbine blades, cones, or hoods so that this material can be reintroduced into the market will be a key objective.

Plastics used in electronics, cables, and blades

The types and quantities will vary depending on the wind turbine design.

Plastic is not infinitely recyclable and will even depend on the type of plastic used. Recycling is complicated by cross-contamination from different types of plastics (e.g., PET and PVC share properties and are very similar, so sorting can be difficult). Generally, it is only recyclable once or twice and often ends up incorporated into non-recyclable products. However, recycling has advantages such as fewer environmental issues and savings in energy and material resources.

Current wind scenario

The design lifespan of a wind turbine typically ranges between 20 and 25 years, although it can be extended to 30 years with some investment in maintenance and component renewal. Today, we are approaching the time when a large number of wind turbines will need to be dismantled and waste managed, as they will be decommissioned once their useful life has reached the end of their useful life. It is estimated that by 2030, approximately 6,000 wind turbines will be decommissioned in Europe each year, representing approximately 200 GW.

In this sense, when a wind turbine ceases to operate, it becomes a large amount of scrap and waste. Most of the materials used in wind turbines, such as steel, cement, copper cables, electronic components, and gears, can actually be recycled.

Recycling all these materials and components that power wind turbines in wind farms is a path toward improving the sustainability of these devices as a source of energy generation. The management of waste generated by wind turbines is becoming a key issue in the renewable energy industry as companies promote sustainability and environmental stewardship, and this must be reflected in how waste from facilities that cease to operate is subsequently treated.

Therefore, the end-of-life stage of a wind turbine will be increasingly important due to two causes:

1. The increase in onshore and offshore wind power installations in the coming years, and
2. On the other hand, decommissioning as wind turbines reach the end of their operational lifespan.

This is why all the necessary improvements must be addressed in the future to maximize the sustainability of wind energy and wind turbine components.

At this point, we must consider the current procedures for waste management for each of the main materials that make up the wind turbine, as well as alternative waste management practices that represent improvements over current practices.

Environmental commitment

Wind supply chain

For the sustainability of both the onshore and offshore wind energy industry, activities such as research and innovation with a defined focus on the wind turbine life cycle will be essential in the coming years. Future trends in wind turbine design must be explored, and the impacts these trends will have on the future of this industry must be assessed.

We must research and innovate to determine the positive impacts on the availability of materials, as well as to develop practices that improve end-of-life waste management.

From the WINDAR Group's perspective, we hope, encourage, and recommend that all our clients, collaborators, and other stakeholders understand the analysis we have conducted in this document from a broad perspective. We offer to proactively assist them in this task, as well as in maintaining an increasingly sustainable industry.

We are available to clients, investors, and other stakeholders to provide any information and advice on final product lifecycle activities. To this end, we have our own capabilities for the recovery of ferrous materials such as steel and aluminum.

For more information or contact: www.windar-renovables.com