SUSTAINABILITY IN EVERY SPIN:

HOW ONE INDUSTRY LEADER OPTIMIZES WIND TURBINE DESIGN TO MINIMIZE WASTE

When a wind turbine blade supplier wanted to reduce its fiberglass waste, Dassault Systèmes offered an automated simulation solution to make it a reality.

DASSAULT SYSTEMES

The global push for decarbonization is driving the wind power industry forward. Yet, like any other sector, this growing market still consumes significant resources, contributing to its own carbon footprint.

For one leading wind turbine supplier, the key challenge is slashing resource consumption — an essential step toward truly sustainable renewable energy.

With over 40 years of experience in wind turbine blade manufacturing, the company recognized that staying competitive requires continuous innovation. So, it wasted no time to take decisive action to turn things around.

By adopting an integrated composite solution for design, simulation and manufacturing, the company has successfully reduced scrap and optimized material usage.

Instead of manually cutting flat patterns for molding, the company now simulates the process — precisely modeling the cutouts of fiberglass and other materials.

The results? 4% less fiberglass waste per wind turbine blade — directly lowering emissions and conserving resources while driving a faster, more sustainable production process.

Discover how Dassault Systèmes' CATIA solution helped this global supplier minimize waste, shrink its carbon footprint and take meaningful steps toward a decarbonized future.

About the customer

Industry:
Wind energy

Company size:
9,800 employees

Location:
Strong presence in 10 countries worldwide

Use case:
Deployment of CATIA on the **3D**EXPERIENCE® platform to optimize wind turbine blade design by precisely modeling cutouts in flat material patterns, reducing waste and enhancing design fidelity and quality while lowering costs.

The EU Taxonomy

This case study focuses on the estimated contribution to the objectives of **Climate Change Mitigation** and **Transition to a Circular Economy.**

Results

1.358tCO2e

Avoided emissions[1] per onshore wind turbine blade produced

4%

Reduction of fiberglass per wind turbine blade produced

IN A NUTSHELL

The challenge

The customer's key challenges stemmed directly from its:

I. Business needs

a. Reduce environmental impact by minimizing material waste and lowering emissions to align with decarbonization targets

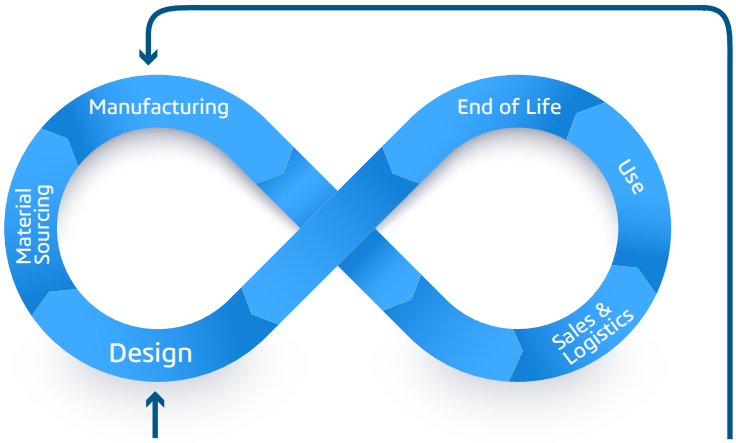
b. Cut operational costs and increase production capacity for better profit margins and faster time to market

II. Operational requirements

Adopt technology with simulation capabilities and advanced patterning techniques to minimize the material input needed for each wind turbine blade and streamline overall operations.

The solution

Dassault Systèmes' approach addressed a crucial part of the process to achieve this objective:



a. Software used during the **design** phase

b. Primary benefits observed during the **manufacturing and construction** phase

The outcome

By leveraging CATIA's advanced composite capabilities, the wind turbine supplier successfully transformed its design process. As a result, it drastically reduced material waste — reinforcing sustainability and promoting circularity in every blade.

With precise modeling of cutouts in rolled-out flat material patterns, the company optimized material usage, cutting fiberglass waste from 15% to just 8%. But the benefits went beyond material savings.

With CATIA's integrated design, simulation and manufacturing capabilities, the company embraced flat patterning and laser projection technology, effectively cutting fiberglass mass per blade by 4%. This strategic shift helped the company minimize scrap, maximize resource efficiency and reduce raw materials consumption per blade. These improvements, in turn, translate into a measurable decrease in emissions, directly lowering the company's carbon footprint.

OUR RECOMMENDATIONS AND METHODS

Adoption of Dassault Systèmes' automated simulation solution on the **3D**EXPERIENCE platform.

The **avoided emission estimation** was estimated following the:

EU Taxonomy (Regulation Guideline), ISO 14067, 11044 and Guidance of WBCSD Net Zero Initiative Guidelines.

Methodology based on the comparison of two scenarios for one given functional unit (ISO 14067:2018 and ISO 14064-2:2019).

3DS methodology has been certified by an independent third party and elaborated in compliance with the EU Taxonomy (Regulation Guideline), ISO 14067, 11044 and Guidance of WBCSD Net Zero Initiative Guidelines. The end result expressed in tCO2e remains an estimation.

THE END RESULT

Transition to a circular economy

Lower natural resource consumption

From 15% to 8%

Fiberglass scrap minimized

Climate change mitigation

Reduced carbon footprint

7,995tCO2e

Avoided emissions[1] for 7850 blades produced per year

To learn more, visit our website

[1]Each of these case studies is a past or current project for which emissions avoided or reduced have been estimated following EU Taxonomy (Regulation Guideline), ISO 14067, 11044 and Guidance of WBCSD Net Zero Initiative Guidelines. The 3DS approach and these calculations, along with the allocated contribution of the software, have been certified by an independent third party. External View URD 2023, Chapter 2.