RecyclableBlade

Taking responsibility. Blade by blade.

With the RecyclableBlade, Siemens Gamesa is leading the way to a sustainable future. For the first time in the industry we are able to separate and recycle the blade materials to be used in new applications.

This is a major step towards achieving 100% recyclability of our turbines.

1 Why do we need the RecyclableBlade?

85% of a wind turbine is already recyclable, but it has been inherently difficult to recycle the wind turbine blades in a cost-efficient way.

Until now blades are mostly disposed as landfill.

10% of the total fiber-reinforced composite (FRP) waste in Europe stems from wind turbine blades.

Several European countries have introduced bans on the use of fiber-reinforced composite (FRP) in landfills.

Some countries have introduced or are planning to introduce requirements for the recyclability of the entire turbine including the blades.

As the number of installations and turbine sizes continue to increase it becomes even more important to reduce the amount of waste and to reuse and recycle all parts to achieve a green future.

2 Imagine what would happen if we apply the RecyclableBlade to all new projects globally projected until 2050?

+2,120,000

blades could be recycled and avoid ending their life as e.g. landfill.

+ 180,000 km

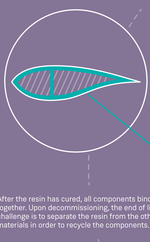
The length of all the blades in total would be more than 180,000 kilometers long if stretched out in a line, reaching more than 4 1/2 times around the world.

+56,400,000t

All blades together would amount to more than 56,400,000 tons of recyclable material, or the weight similar to more than 9,400,000 elephants.

3 What are the challenges in producing recyclable blades?

Wind turbine blades are cast using glass and carbon fiber, a core material like wood or polyethylene terephthalate foam (PET), and a resin system.



After the resin has cured, all components bind together. Upon decommissioning, the end of life challenge is to separate the resin from the other materials in order to recycle the components.

4 The RecyclableBlade

New recyclable resin - same technology.

The RecyclableBlade is produced the same way as a standard blade and is based on the same manufacturing processes. The only difference is the use of a new type of resin that makes it possible to efficiently separate it from the other components at the end of the blade's working life. This allows the materials to be recycled for new applications.

1. Decommissioning after end of life

The blades will be dismantled from the turbine and prepared for the recycling process.

2. Immerse in mild acidic solution

The blade will be immersed into a heated mild acidic solution, which will separate the resin from the fiber glass, plastic, wood and metals.

3. Reclaim separated components

The separated materials can then be recovered from the solution and prepared for secondary use ie. rinsing, drying.

4. Re-use

The materials are now ready to be used in new products matching the technical properties of the materials, ie. in the automotive industry, or in consumer goods like flight cases and flat-screen casings.

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