CLEAN GRID ALLIANCE
Delivering Midwest Renewable Energy

FACT SHEET

WIND TURBINE RECYCLING AND DISPOSAL

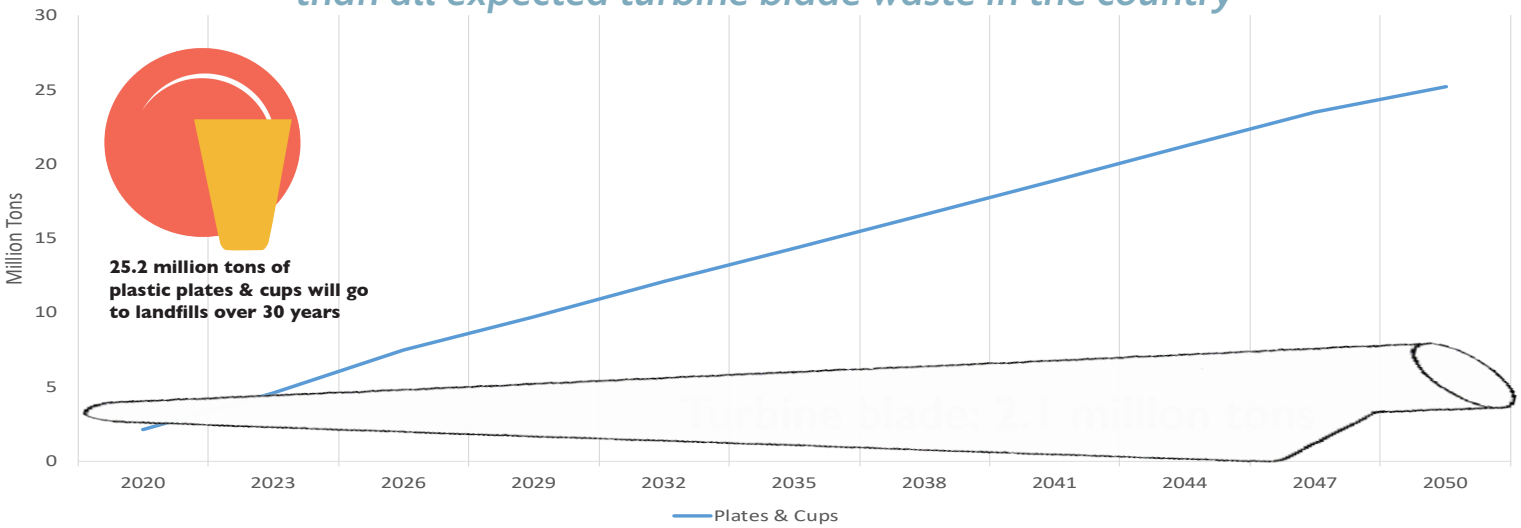
As more wind turbines are nearing the end of their useful life, the need for environmentally responsible turbine recycling and disposal is growing.

"Turbine blades are the most inert, non-problematic waste we're accepting."
-Casper Solid Waste Manager Cynthia Langston[3]

Currently, between 85-90% of a turbine's parts can be recycled or sold, including the foundation, tower, gear box, and generator.

- Fiberglass turbine blades are non-toxic and completely safe for landfills.
- Although turbines blades are large, all turbine blade waste through 2050 represents approximately 0.05% of all the municipal solid waste going to landfills every year, according to data from Electric Power Research Institute.[1]
- In Europe, some blades are repurposed as sound barriers, thermal insulation, or even bridges.[2] In the United States, however, there are few companies that recycle turbine blades. The need for recycling processes is creating a business opportunity. Startups like Global Fiberglass Solutions are developing processes to break down wind turbines blades and repurpose them into other useful materials, like railroad ties and panels.
- The EPRI estimates there will be 2.1 million tons of cumulative blade waste combined through 2050. By comparison, 2.1 million tons of plastic cups and plates end up in landfills every 2.5 years![4]

Plastic cups/plates will take up 12 times more landfill space by 2050 than all expected turbine blade waste in the country[5]



1. Pu, L., Barlow, C., 2017, "Wind turbine waste in 2050", https://www.researchgate.net/publication/313800207_Wind_turbine_blade_waste_in_2050
2. Stone, M., 2021, "Today's wind turbine blades could become tomorrow's bridges", https://grist.org/energy/todays-wind-turbine-blades-could-become-tomorrows-bridges/
3. Hughes, Morgan, Erickson, Camille, 2020, "Controversy over turbine blades in Casper landfill is overblown, manager says", https://trib.com/business/energy/controversy-over-turbine-blades-in-casper-landfill-is-overblown-manager/article_74c5fca6-06d5-51a1-83ca-a378ac6e4f0e.html
4. Electric Power Research Institute, 2018, "End-of-Life Disposal and Recycling Options for Wind Turbine Blades", https://www.epri.com/#/pages/product/3002012240/?lang=en-US
5. United States Environmental Protection Agency, 2017, "Nondurable Goods: Product-Specific Data". https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/nondurable-goods-product-specific-data

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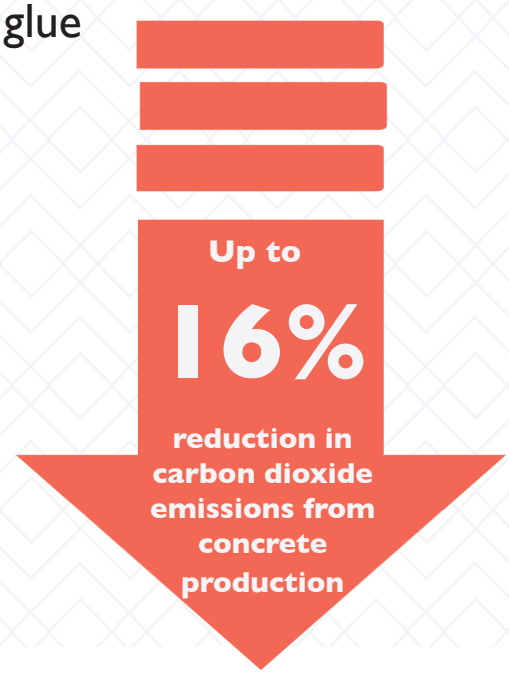
RETIRED TURBINE BLADES GO THROUGH ONE OF TWO STANDARD PROCESSES:

Mechanical Recycling

- Cutting and dismantling blades on-site
- Shredded into raw fiberglass material that produces fine and course particulates that can be mixed with rock, plastic, or other fillers
- Mixture is then turned into thermoplastic fiberglass pellets or panels used in various products
- **Pellets can also be used in:**
  - Injection molding and extrusion manufacturing processes
  - Decking boards
  - Warehouse pallets
  - Parking bollards
  - Manhole covers
  - Building walkways
  - Weather-resistant siding

Thermal Recycling

- Crushing and burning blades
- Composition portion is combustible when burned and can be used for electricity generation or industrial processes like cement production
- Leftover glass and carbon fibers go through co-processing in which the fibers are mixed with fillers and reused in concrete, paint, and glue



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