

Taking on decarbonization and Circular Economy

A peek into the engine room at LM Wind Power and GE Renewable Energy

Industriens Dag 1 November 2022



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• Company overview

- Decarb and circular economy processes to drive change
- In practice: Zero Waste Blades 2030



From LM Wind Power, to GE Renewable Energy to GE Vernova Portfolio of Businesses

12 businesses

- Digital
- Energy Financial Services
- Gas Power
- Grid Solutions
- Hybrids Solutions
- Hydro Power
- LM Wind Power
- Nuclear
- Offshore Wind
- Onshore Wind
- Power Conversion
- Steam Power

7,000 gas turbines installed



52,000 wind turbines installed

70,000 employees worldwide













Decarbonizing operations is important, but far from enough





Automated HVAC

Vadodara, India



New cooling tower pumps, Gebze Turkey



Rooftop solar



Baseline – What does Circular Economy mean for my business?





What are we doing already,

and how do we embed circular economy principles deliberately into every step of our product lifecycle?

Do Life Cycle Assessments to understand impacts



Working to integrate LCAs as standard steps in NPI process and for continuous design improvements

Foster new Solutions & Partnerships





Veolia US Partnership

- Dec. 2020 GE REN signed a multi-year contract with Veolia North America
- First agreement of its kind in the US wind industry
- Veolia will recycle blades removed from US-based onshore turbines during upgrades and repowering
- Veolia will process the blades for use as a raw material for cement production.
 VEOLIA



neowa Partnership/ Holcim Partnership

- Jun. 2021 GE entered a MOU with LarfargeHolcim (now Holcim) and neowa
- neowa to dismantle and recycle onshore wind turbines during partial and full repowering
- GE and Holcim explore new ways of recycling wind turbine blades, including use as a construction material to build new wind farms.





ZEBRA R&D Project

- Sept. 2021 (Zero wastE Blade ReseArch) ZEBRA project was announced
- The project is to design and manufacture a 100% recyclable blade
- 42 months and a budget of €18.5M (\$21.8M)





DecomBlades Project

- Jan. 2021 a ten partners consortium announced DecomBlades project, which is to provide commercialization basis of sustainable recycling of wind turbine blades
- 36 months and budget of 40,8 MDKK (\$6.1M)





Endesa Agreement

- Feb. 2022 GE REN signed an agreement with the utility Endesa to support a blade recycling project in Spain launched with its partners PreZero España and Reciclalia Composite
- GE REN to offer its customers based in Spain the option of recycling decommissioned blades using the new plant when built (start 2024)



Collaboration to decarbonize the wind power value chain upstream and downstream



Zero Waste Blades by 2030

To reach **zero waste** we need to cut off the tip of the pyramid, and move up the waste treatment hierarchy



TODAY'S TRASH **TOMORROW'S TREASURE**

Zero waste means we do not send manufacturing materials and packaging to landfill and incineration without energy recovery



Let's talk about waste



Core materials

Tape

Hoses

Plastic

Mesh

a GE Renewable Energy business



Focus on clean segregation and measurement of waste fractions; forming partnerships with suppliers to Wood reduce or reuse

Paper & cardboard



Cans





Chemicals & containers



Glass fiber





Batteries



Printer cartridges





Iron

Landfill 🖊

Focus on lean production, materials and process design to reduce material consumption; forming partnerships to recycle difficult fractions

Debagging (infusion)



Resin (cured & uncured)





Glue



Hot box (chemicals)



Mixed plastics, glass fiber & composites





Dust





From 100% recyclable To 100% recycled



a GE Renewable Energy business

Blades without waste

How we **partner** with our value

recycle or recover all resources

chain to reuse, repurpose,

in a circular economy



Questions