

The Re-Wind project: Sustainable re-use of decommissioned wind turbine blades

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Re-Wind Team

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Accelerating
wind turbine
circularity

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Bilbao



Georgia
Tech



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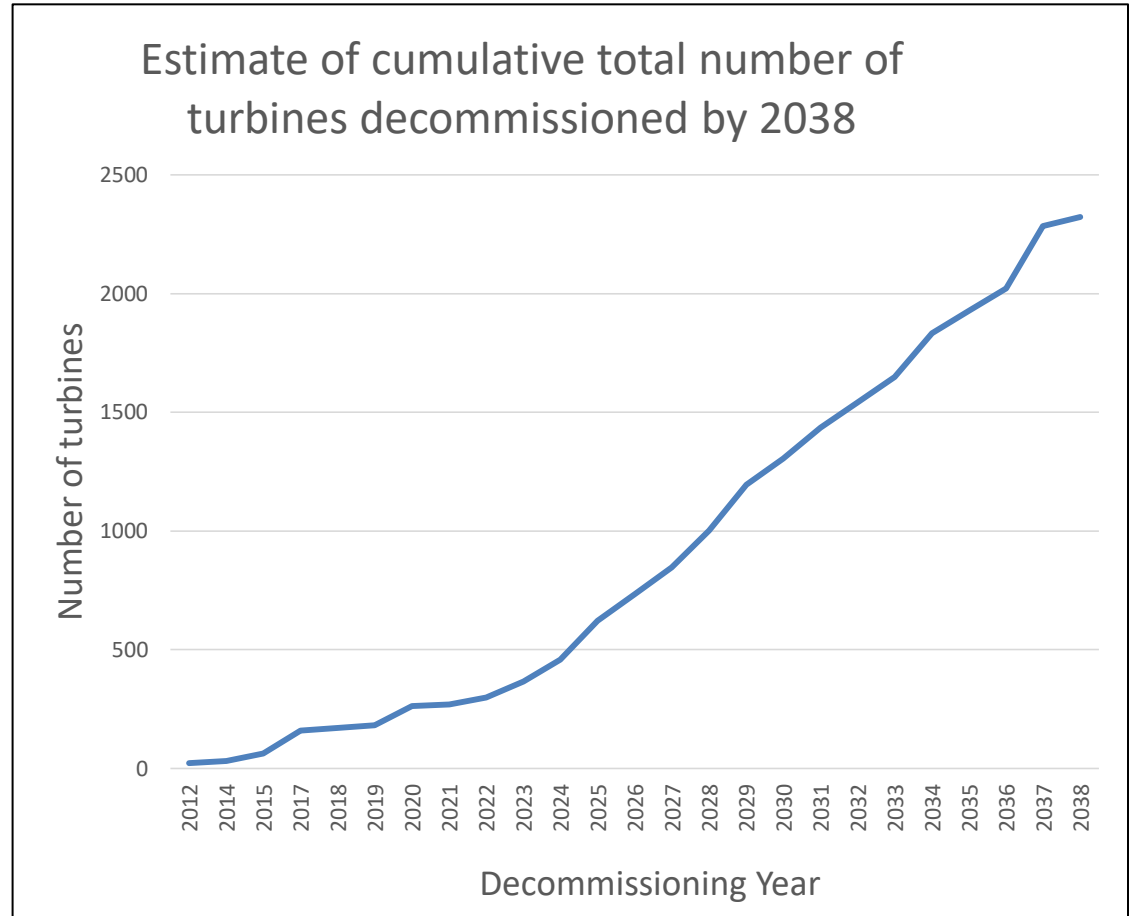
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Turbine end-of-life & the FRP blade 'waste' issue

Approximate total number of turbines to be decommissioned in Ireland by 2038:

2323

Annual global FRP blade waste is expected to reach 40 million tonnes by 2050



Emma Delaney, QUB

US EPA Waste Hierarchy

Re-Wind fits within the Circular Economy paradigm

- **Reuse:** Remanufacturing for use in new products
- **Recycling:** Shredding, grinding and milling for filler for FRP or concrete
- **Recovery:** Pyrolysis, thermolysis, solvolysis to recover polymer resins or fibers or gasses for energy
- **Incineration** – then landfill ash or with energy recovery and “Cement-Kiln” process
- **Landfilling**

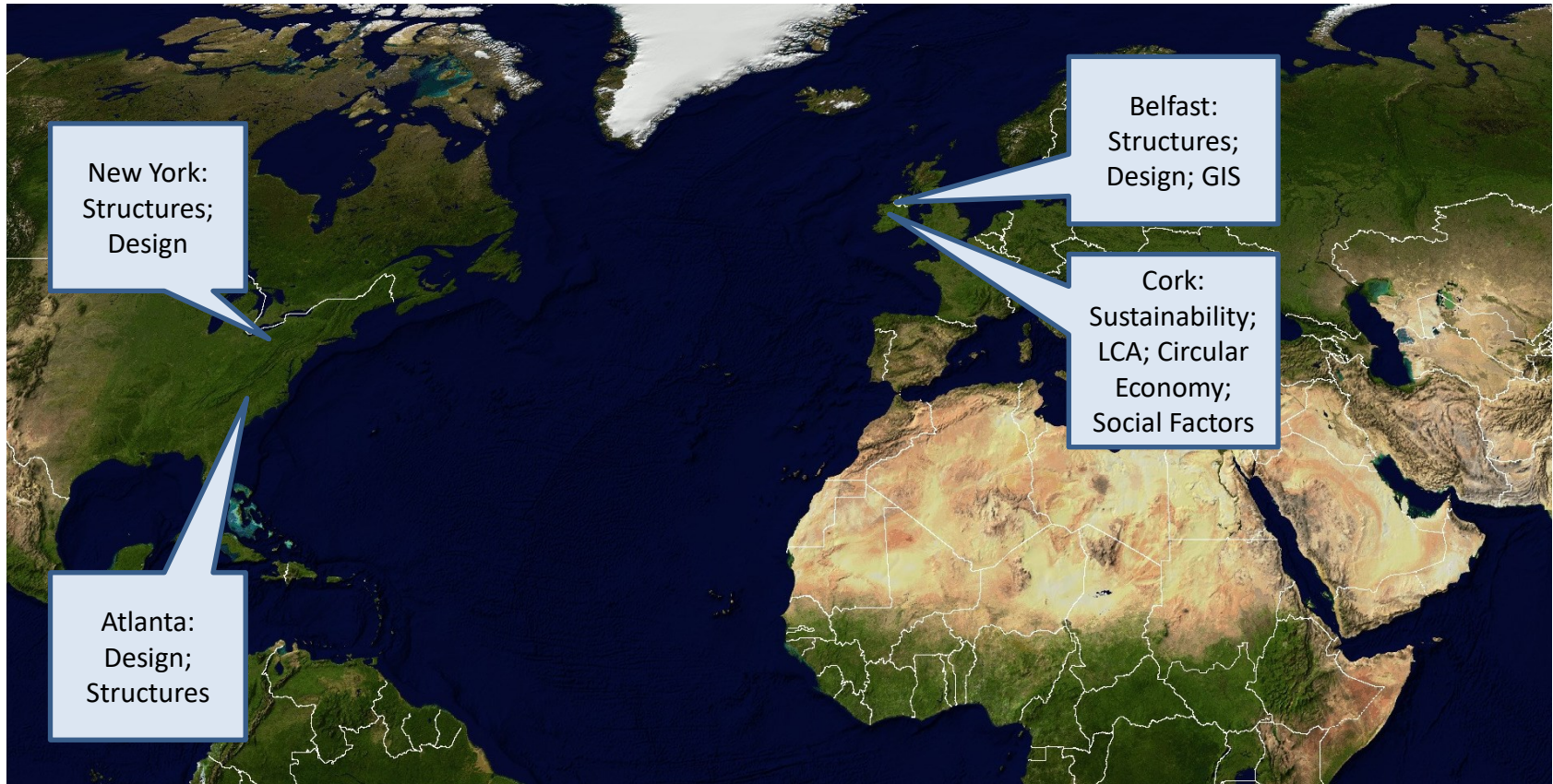


Re-Wind : a unique transdisciplinary project

- Finding socially, environmentally and economically sustainable end-of-life blade reuse applications is challenging
- *Transdisciplinary* thinking is required
- Re-Wind is a collaboration of Engineers, Architects, Sociologists, Geographers, Political Scientists, Local Development Experts



Re-Wind team locations



Re-Wind Methodology

More than 50 reuse concepts identified

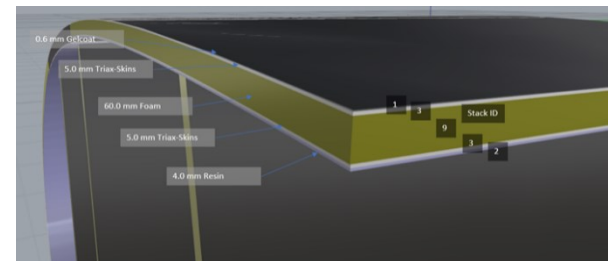
>Re-Wind Design Studio will develop and refine a subset

The success of reuse cases will depend on technical feasibility, location & social, environmental and economic sustainability

We are developing tools to assess all of these:

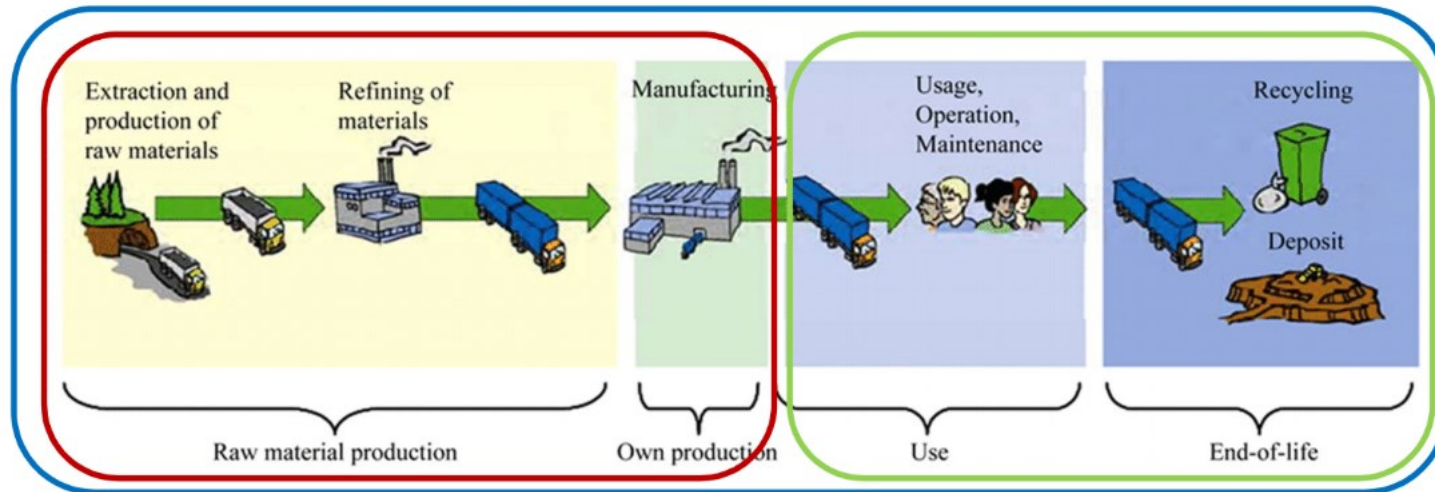
- All-Ireland blade geodatabase
- Blade reverse engineering software
- Structural analysis & testing methods
- Community engagement
- Lifecycle analysis
- Sustainable business model development

- Robust set of internationally-deployable success indicators
- 'Atlas' of Reuse Designs



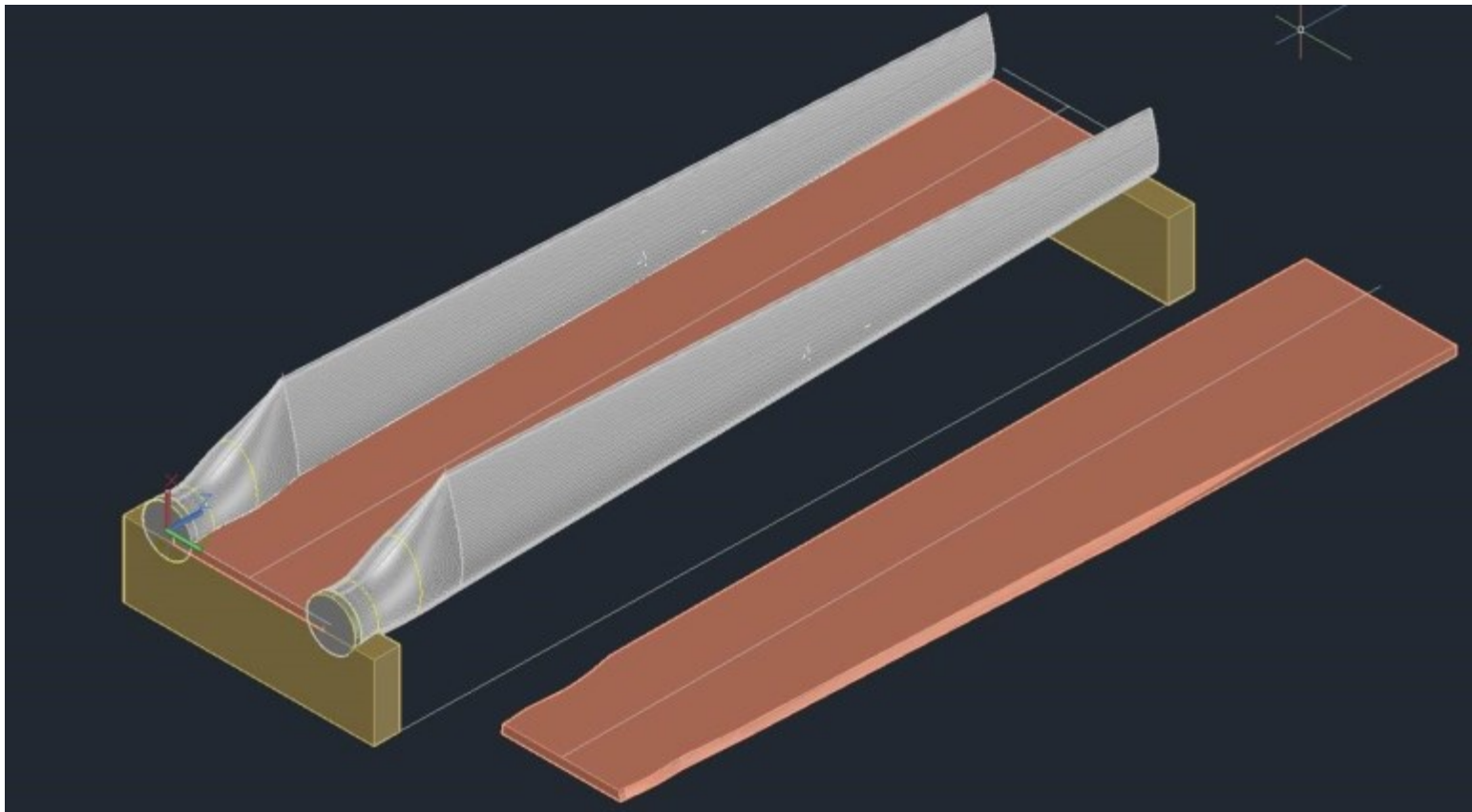
Sustainability Methodology

- Life cycle assessment is being used to evaluate environmental impacts against alternative disposal



- Community engagement to gauge social acceptability
- Circular Economy in Business Models

Reuse case: pedestrian bridge



Reuse case : emergency housing



Thank you

Re-Wind contacts:

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Theme 5: Turbine Lifecycle Considerations **eawe**

Mini-symposium:
Making Wind Circular
End of life options for wind turbines and blades

Dr. Paul Leahy
UCC

A new stream of waste has emerged as end-of-life wind turbines are decommissioned. Of particular concern is the fate of composite material wind turbine blades. Innovative solutions for repurposing or recycling blades are urgently required. This mini-symposium welcomes submissions on socially, environmentally and economically viable solutions for end-of-life wind turbines and subsystems.

Wind Energy Science Conference 2019
17-20 June, Cork

www.wesc2019.org

Also at WindEurope/CEFIC workshop:

Angela Nagle, PhD Student, LCA / Environmental Performance

Heloisa Lemmertz, PhD Student, Social Dimensions

We welcome approaches from all stakeholders in FRP wind turbine blade end-of-life and reuse

www.re-wind.info