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Mechanical Recycling

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First stakeholder workshop

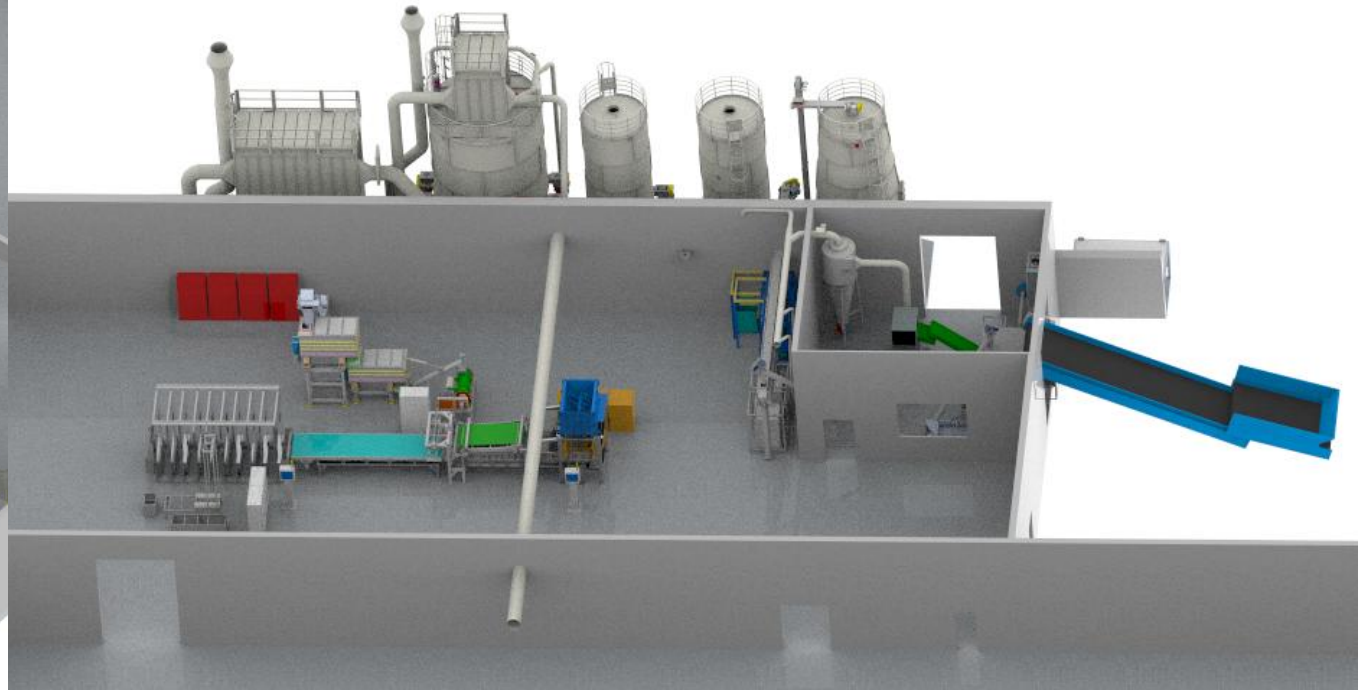
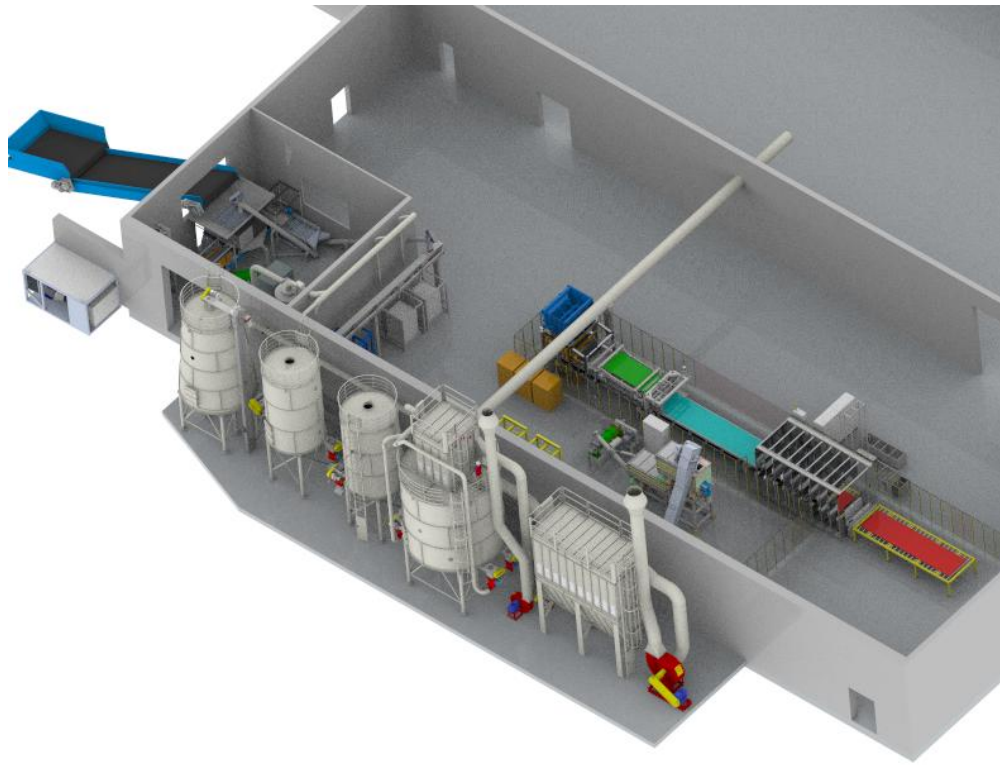
17 November, 2025, Online



Photo by Nicholas Doherty on Unsplash

Description of technology

Gees Recycling has nearly completed the installation of the new Mechanical recycling line



Description of technology

Gees Recycling has nearly completed the installation of the new Mechanical recycling line – First runs December 25



>7000 T/y
Press size
5500 x 1350
>6000 T
power

Challenges

Wind blades : In practice the root and wing are two different products

Wind blade : presence of core material in % on volume –
Excluding shear blade or torsion box

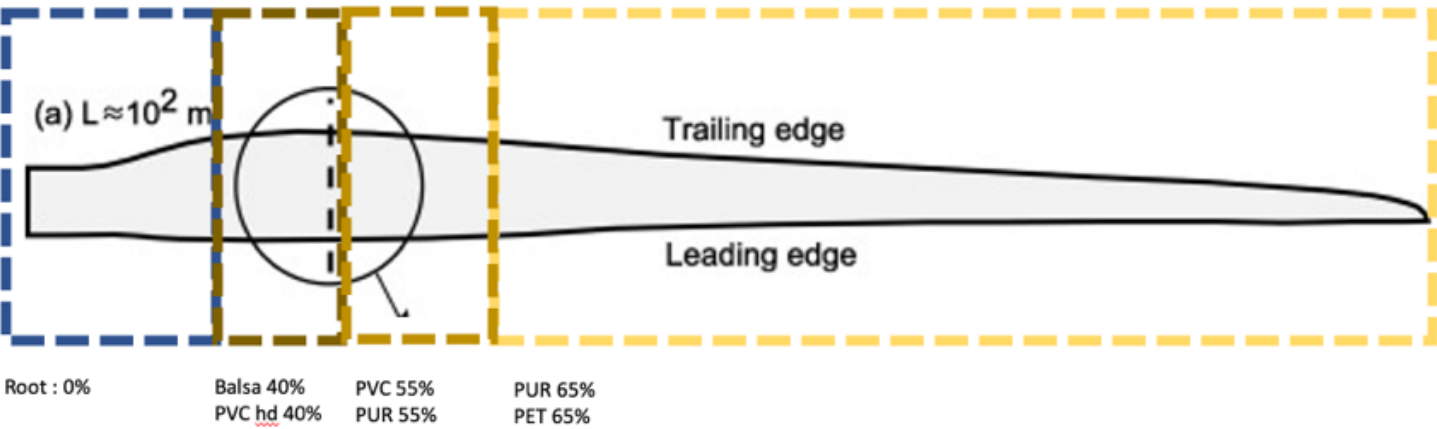


Figure 5 - Core material in blades - Giorgio Betteto

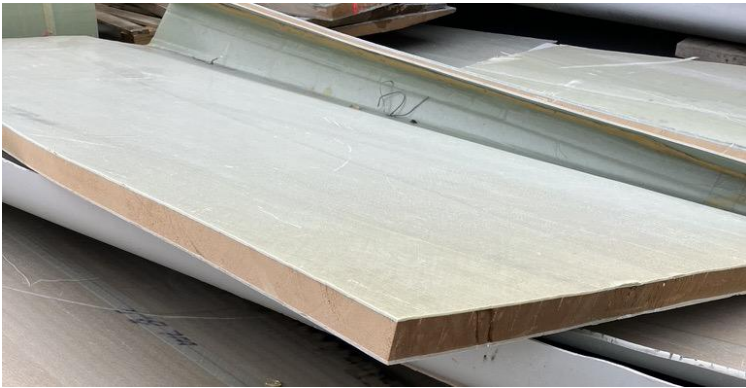
Figure 6 - Low density parts of blades - Giorgio Betteto



Horizon Europe
101096858

By volume , the core material presence in blades is significant , particularly after shredding:

Blades composition		Example Vestas V42 36 Meters					
		Specific weight after shredding					
		Fiberglass epoxy specific weight /S	Balsa Specific weight	Core Material specific weight			
weight of blade kg	1280	0,8	0,18	0,09			
Part	Material	Density	Lenght M	Weight Kg	Volume Shredded in Liters	% of volume	% of weight
Root (Blue)	Fiberglass Epoxy	1,5	5	510	637,50	23,35%	39,84%
Transition (brown)	Fiberglass epoxy	1,5	4	290	362,50	13,28%	22,66%
	Balsa / Core M	0,18	4	45	250,00	9,16%	3,52%
Wing connection (Light brown)	Fiberglass epoxy	1,5	27	340	425,00	15,56%	26,56%
	Core Material	0,09	27	95	1055,56	38,66%	7,42%
		Total		1280	2730,56	100,00%	100,00%



Core Material makes

- Much less interesting – if not forbidden - the use in cement kilns .
- Lower the production output by >70% in any thermochemical process like pyrolysis or solvolysis
 - Reactors have fixed volumetry , here the density is $\frac{1}{4}$
- Complicate (much) the process , with unwanted gases , byproducts and residues , that will change on type of CM.

Our proposal :

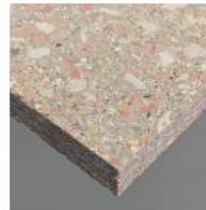
- Use the least interesting parts of blades , the less adapt to other recycling processes
- Transform in new materials using the RFM mechanical recycling – that was developed for composite waste regardless of resin , fiber or rigid foam type
- Exploit the low density as a value insted than a obstacle

The new REFRESH production line will make panels

- Better , Faster, more competitive
- Higher performances
- Future alternatives to MDF and Plywood



☐ Selected and tested **n. 4 types** of mechanically recycled panels as candidate for the proposed applications

Product	RFM Basic 850	RFM «wind blades»	D'ecò 1000	Replies
				
Nominal density (kg/m ³)	850	850	1000	FG sandwich
Nominal thickness (mm)	18	18	24	18

☐ Experimental results will be used as input data for **numerical model** and **product detailed design** aimed at matching the **application requirements**

REFRESH products results – what we obtain ? **Will be competitive?**

Circular economy - Building components

Recycled composites for shading
facades and architectural
components
40% lighter than ceramics
70% lighter than concrete
96% Recycled content



REFRESH products results – what we obtain ? **Will be competitive?**

Circular economy – cold chain / freezer components

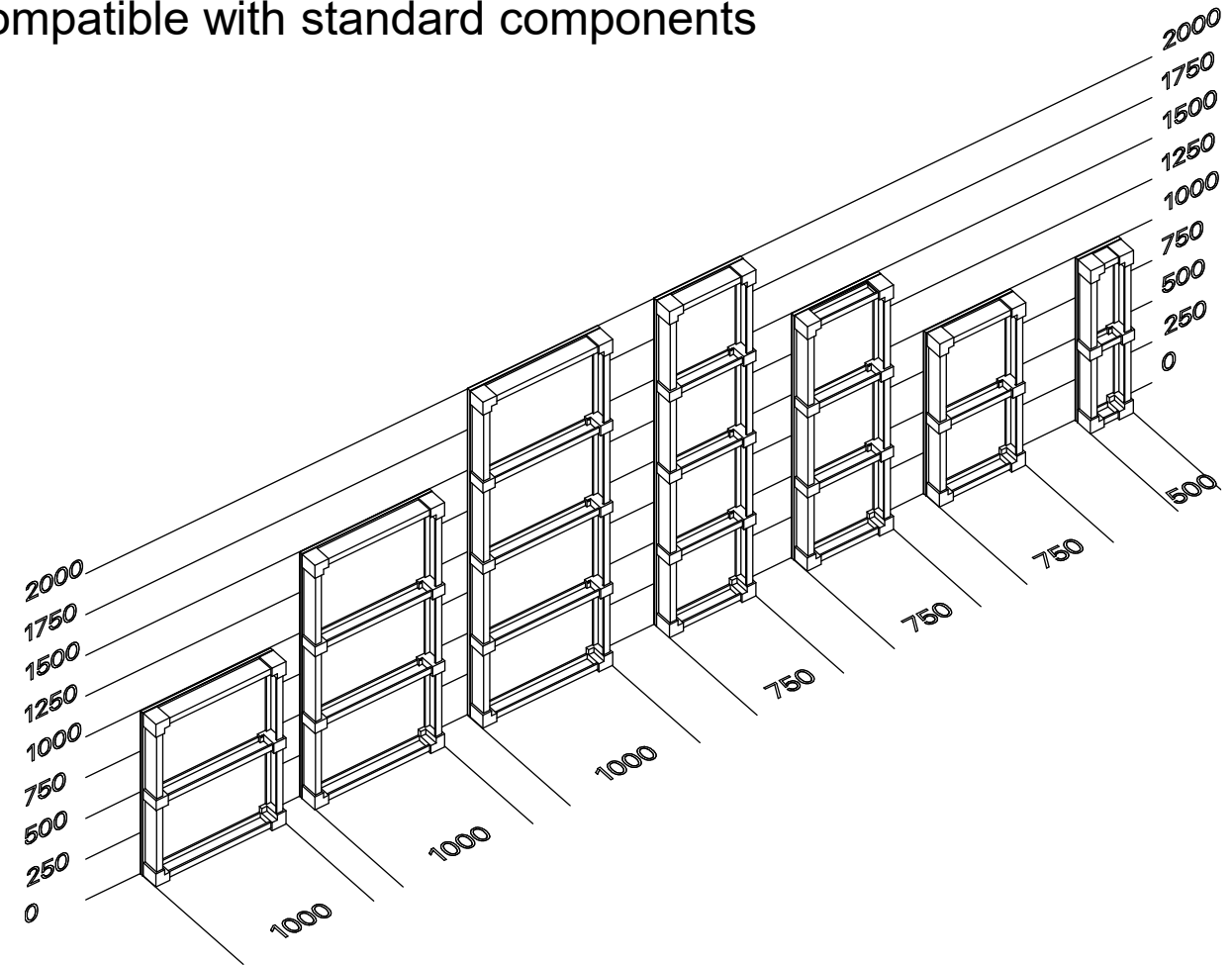
Recycled composites for Freezer /
cold chain components
96% Recycled content
Better insulation and no thermal
bridges
No rot, no rust
No need for reinforcing



REFRESH products results – what we obtain ? Will be competitive?

Formwork fully recycled – A complete system interchangeable and compatible with standard components

Recycled composites for Formwork
40% lighter than Alu ones
70% lighter than iron
90% Recycled content
No rust , no rot , EPD going on



REFRESH products results – what we obtain ? **Will be competitive?**

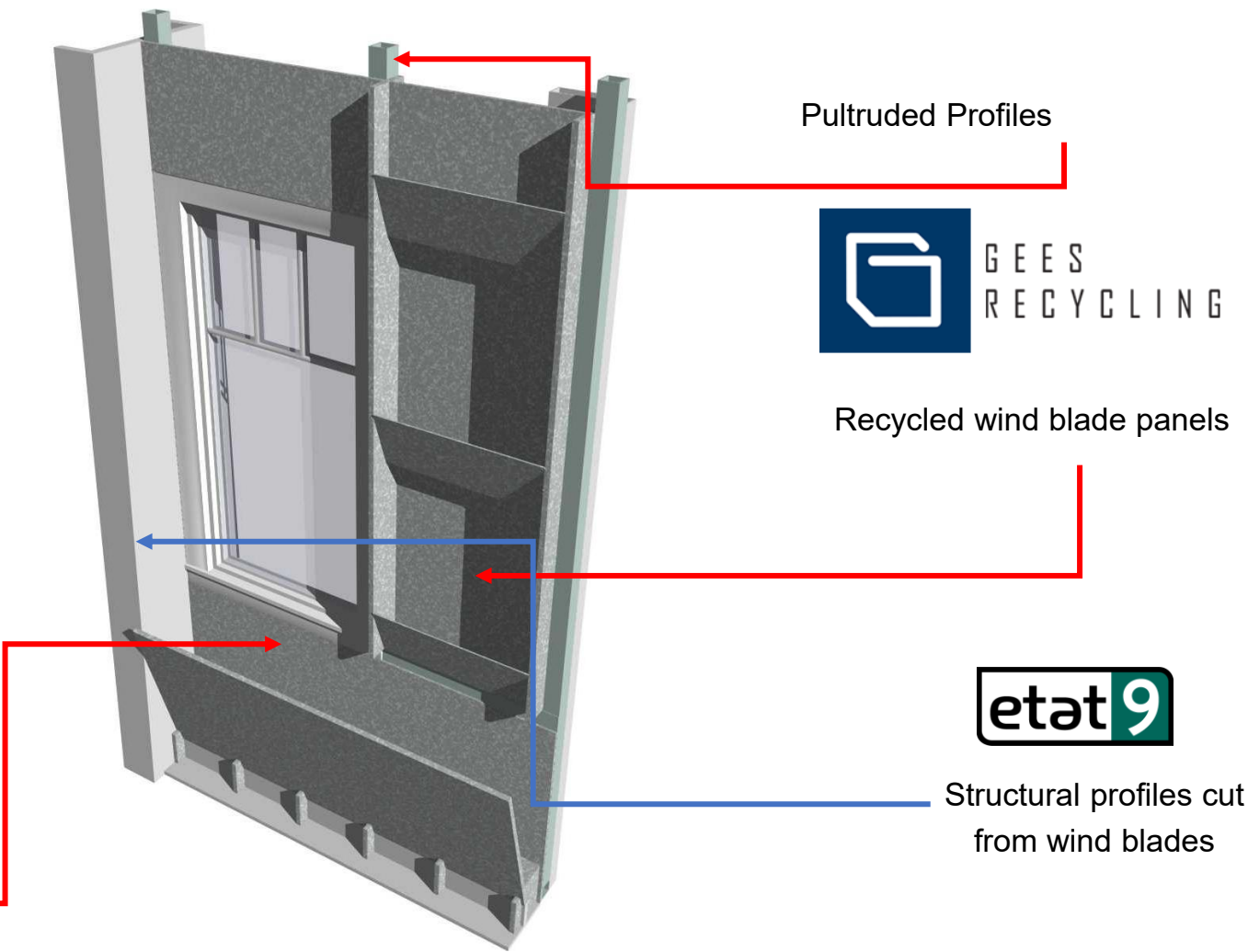
**We will see it
soon...couple of
months**



Recycled GF from pyrolysis



Glass fiber insulation





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Thank you for your attention!

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