

SMART Wind Consortium

Composite Subgroup: Select OEM SG Composites Info

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Aeronautica Windpower



Bergey Windpower



Black Island Wind Turbines



Dakota Turbines



Endurance Wind Power



Eocycle Technologies



Northern Power Systems



Pika Energy



Primus Windpower



Ventera Wind



Xzeres Wind

OEMs in red
expressed
interest in
Composites

Hard-to-Produce/Source Parts

Wiring rotor
towers alternators
stator magnets slip Towers windings
blades power-electronics generator US-made
castings foundations inverters
rings springs coils
circuit-boards

Structural Composites

Aeronautica Windpower	AW750 - 54 m	27 m	made in MI, open to new supplier; fiberglass layup, two halves, joined in a clamshell arrangement.
Aeronautica Windpower	AW750 - 47 m	23.5 m	made in India, low demand; fiberglass layup, two halves, joined in a clamshell arrangement.
Aeronautica Windpower	AW250 - 30 m	13.4 m	made in India, need new supplier; has tip brakes; fiberglass layup, two halves, joined in a clamshell
Endurance Wind Power	E4660	11 m	Made in Asia, hand-layup fiberglass clamshell designs
Endurance Wind Power	E3120	9 m	Made in Asia, hand-layup fiberglass clamshell designs
Eocycle Technologies	25 kW, Class 3	7.9 m	two fiberglass skins, single sandwich fiberglass web, foam core, fiberglass spar cap
Eocycle Technologies	25 kW, Class 2	6.2 m	two fiberglass skins, single sandwich fiberglass web, foam core, carbon fiber spar cap

Structural Composites

Dakota Turbines	DT-30	5.1 m	two fiberglass skins, carbon fiber root, foam core, carbon fiber spar caps (in-house)
Xzeres Wind	442SR	3.6 m	resin infused fiberglass, single spar, foam core
Bergey Windpower	Excel 10	3.5 m	pultrusion
Black Island Wind Turbines	HR3	2.5 m	Aircraft-grade birch laminate billet (C-lam), trimmed by CNC router
Bergey Windpower	Excel 6	3.1 m	pultrusion
Xzeres Wind	Skystream	1.8 m	compression molded fiberglass, two parts, bonded together
Bergey Windpower	Excel 1	1.3 m	pultrusion

Non-structural Composites

Aeronautica Windpower	AW750	Nacelle	fiberglass; interested in bringing in-house
Aeronautica Windpower	AW750	Spinner	fiberglass; interested in bringing in-house
Aeronautica Windpower	AW250	Nacelle	currently sheet metal; interested in changing to fiberglass
Endurance Wind Power	E3120/ E4660	Nacelle	chopped mat layup in a mold with gelcoat
Endurance Wind Power	E3120/ E4660	Spinner	chopped mat layup in a mold with gelcoat
Eocycle Technologies	25 kW	Nacelle	chop style with gel coat
Dakota Turbines	DT-30	Housings	chop spray
Xzeres Wind	442SR	Tail vane	fiberglass sandwich construction
Xzeres Wind	442SR	Cowlings	blown fiberglass

Aeronautica Windpower	AW750 - 54 m	27 m blade	made in MI, open to new supplier; fiberglass layup, two halves, joined in a clamshell arrangement.
Aeronautica Windpower	AW750 - 47 m	23.5 m blade	made in India, low demand; fiberglass layup, two halves, joined in a clamshell arrangement.
Aeronautica Windpower	AW750	Nacelle	fiberglass; interested in bringing in-house
Aeronautica Windpower	AW750	Spinner	fiberglass; interested in bringing in-house
Aeronautica Windpower	AW250 - 30 m	13.4 m blade	made in India, need new supplier; has tip brakes; fiberglass layup, two halves, joined in a clamshell arrangement.
Aeronautica Windpower	AW250	Nacelle	currently sheet metal; interested in changing to fiberglass

“The value in making both the blades and the nacelles in the states of course, is savings in shipping costs and hopefully turn time. The problem is going to be that the mid-scale market is a niche market, demand is not strong, and volume is low. So we’re stuck with short-run type of manufacturing. But there might be some others, like Endurance, who could combine to entice a US manufacturer to make the 30 m rotor blades”

Aeronautica



Dakota Turbines	DT-30	5.1 m blade	two fiberglass skins, carbon fiber root, foam core, carbon fiber spar caps (in-house)
Dakota Turbines	DT-30	Housings	chop spray

Dakota Turbines



“...this is the least understood part of the whole turbine manufacturing process. And because they are the engine that drives all turbines, it also should be the first and most important consideration.”



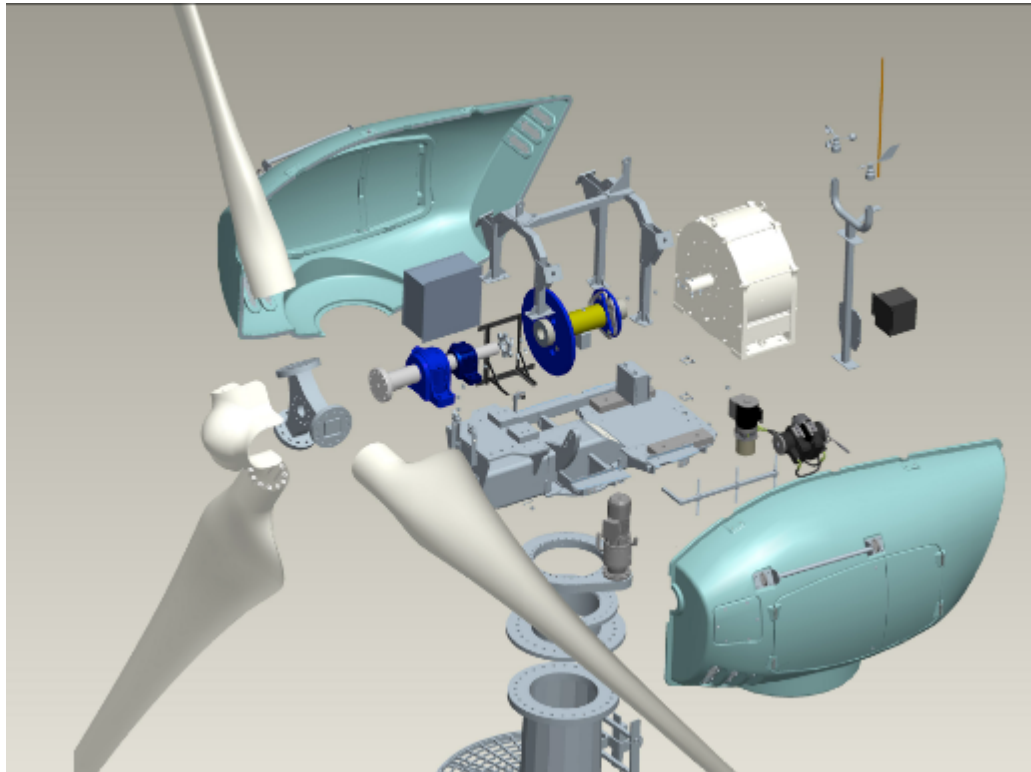
Endurance Wind Power	E4660	11 m	Made in Asia, hand-layup fiberglass clamshell designs
Endurance Wind Power	E3120	9 m	Made in Asia, hand-layup fiberglass clamshell designs
Endurance Wind Power	E4660	Nacelle and spinner	chopped mat layup in a mold with gelcoat

Endurance Wind Power

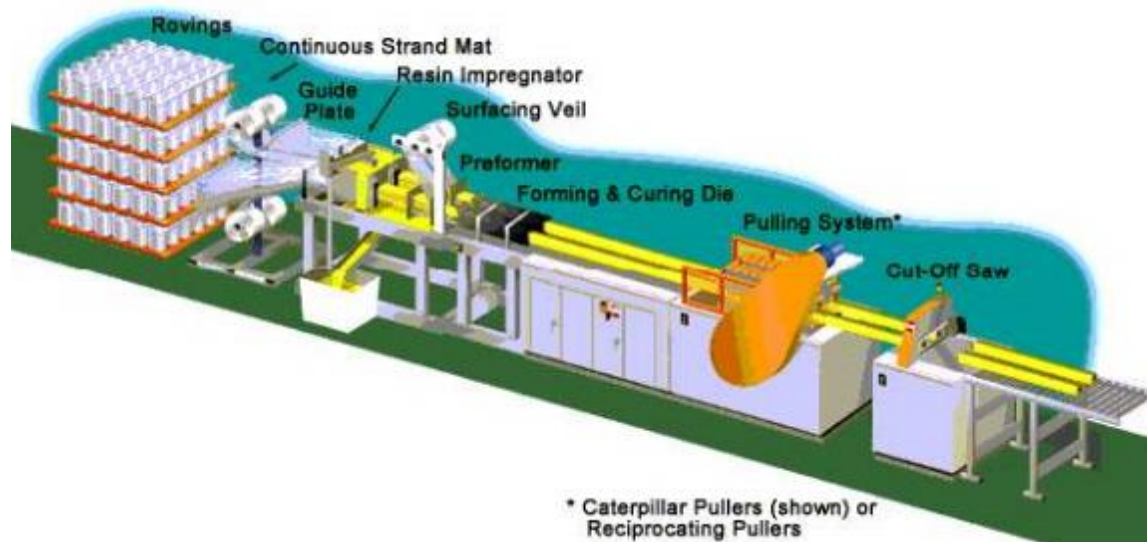


Eocycle Technologies	25 kW, Class 3	7.9 m blade	two fiberglass skins, single sandwich fiberglass web, foam core, fiberglass spar cap
Eocycle Technologies	25 kW, Class 2	6.2 m blade	two fiberglass skins, single sandwich fiberglass web, foam core, carbon fiber spar cap
Eocycle Technologies	25 kW	Nacelle	chop style with gel coat

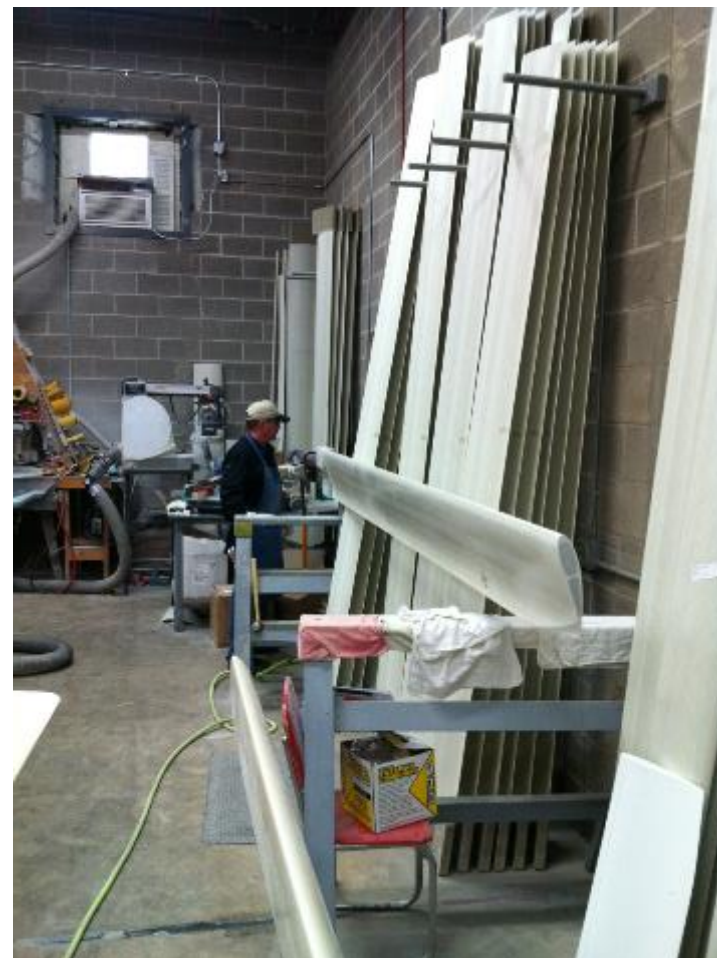
Eocycle Technologies



Bergey Windpower	Excel 10	3.5 m blade	pultrusion
Bergey Windpower	Excel 6	3.1 m blade	pultrusion
Bergey Windpower	Excel 1	1.3 m blade	pultrusion



Bergey Windpower



Xzeres Wind	442SR	3.6 m blade	resin infused fiberglass, single spar, foam core
Xzeres Wind	442SR	Tail vane	fiberglass sandwich construction
Xzeres Wind	442SR	Nose cone	resin infused fiberglass
Xzeres Wind	442SR	Cowlings	blown fiberglass
Xzeres Wind	Skystream	1.8 m blade	compression molded fiberglass, two parts, bonded together

Xzeres Wind

“We have surveyed the US extensively for suppliers of blades and actually have switched suppliers six times since 2010; the 442SR blade was redesigned in 2011 as well. The costs (materials and labor, transportation, certification) and cyclic sales are very challenging.

We have a local partner we are currently teamed with that is working out well for our 442SR parts. We have some IP and unique tooling the we have co-developed.”



Black Island Wind Turbines	HR3	2.5 m blade	Aircraft-grade birch laminate billet (C-lam), trimmed by CNC router
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Black Island Turbines

“...we are convinced that wooden blades are the best fit for high-reliability turbines that are sometimes sited in extreme cold: we do not see evidence of cold-embrittlement to -50C. And with today's automation, we get excellent consistency of material properties with these engineered laminates.

The success of these turbines validates these blades. The HR3 turbines operating in Antarctica for over 25 years, with very dynamic generator movement and wind exceeding 150 mph on an annual basis are fitted with these laminated wood blades.”

