

WINDELO

INNOVATIVE ECO-CATAMARANS

The staff at Windelo have aimed high and succeeded in combining innovation with ecology, performance, safety and comfort. Designed in partnership with the architects Christophe Barreau and Frédéric Neuman, our catamarans come in three different versions: Adventure, Yachting and Sport.

Windelo's primary goal is to reduce the environmental impact of catamarans by almost 50%. This is achieved through different technological innovations (eco-composite, boat weight, engine power, fittings) on the boat.

The Windelo boatyard stands apart for its eco-design approach to materials and construction methods. The construction methods reduce the need for molds, giving the yard greater freedom to create model variations and make changes to the boats designed. The catamaran structure is made from a new environmentally-friendly composite sandwich, mixing basalt fiber and PET (Polyethylene Terephthalate) from recycled plastic bottles. The new innovative composite reduces carbon emissions by nearly 50 % compared with traditional GRP composite manufacturing methods.

Studies were conducted in partnership with researchers from Mines d'Ales with a view to using the most eco-friendly materials.



BASALT



Basalt

Basalt is the most common type of volcanic rock on earth.



Transformation into basalt fiber

Basalt fiber is a natural product made from basalt stone with no additives required.



Use and physical properties

Basalt fiber has unique fire, heat and chemical resistance, along with higher mechanical properties from 12 % to 15 % than glass fiber.



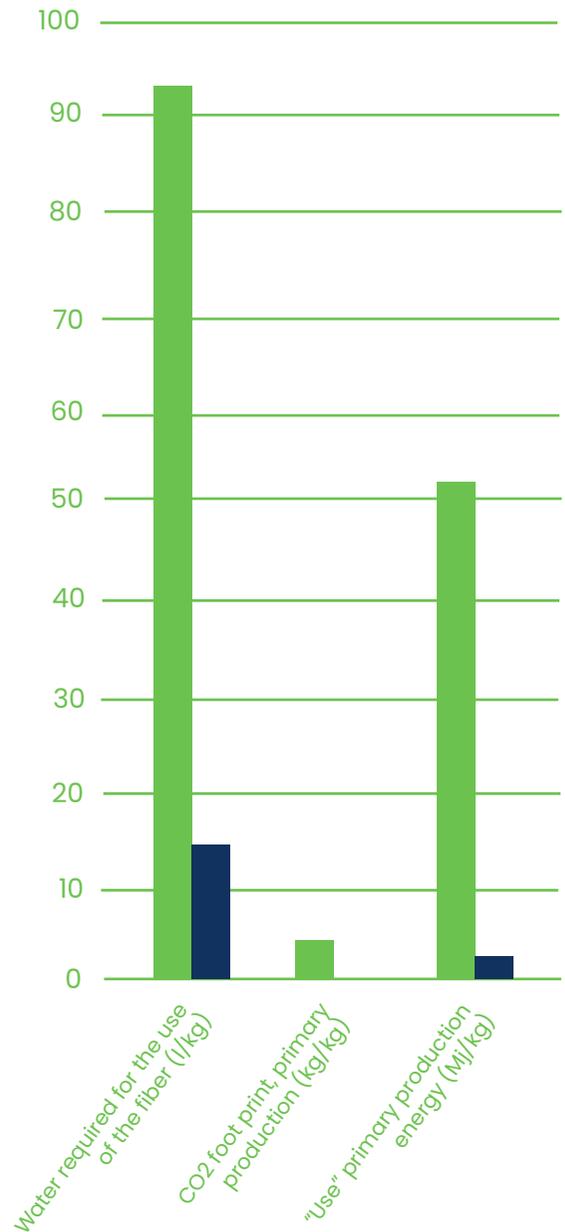
End of life and recycling

Basalt fiber is 100 % recyclable. It can be remelted in a furnace and rewoven.

SOME KEY FIGURES

- Environmental impact, energy: 91.5 kg glass = 1,000 kg basalt
- Environmental impact, carbon: 115 kg glass = 1,000 kg basalt

	BASALT	GLASS
Energy consumed over 40 years:	62.7 MJ / year	1330 MJ / year
CO ₂ consumed over 40 years:	4.25 kg / year	77.60 kg / year



- Implementation of fiberglass
- Implementation of basalt fiber

PET

Plastic bottles

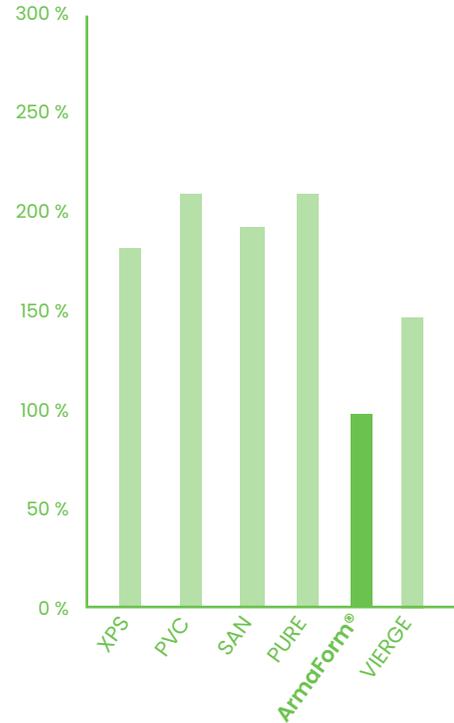
ArmaForm® is made from recycled PET, mainly from reused plastic water bottles.



Transformation into PET foam

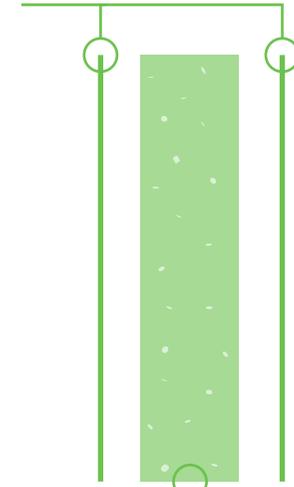
The bottles are cleaned of impurities and then ground to flakes, then used as the raw material for the production of PET foam.

CO₂ emissions per kg foam



Structure: a high-performance eco-friendly composite sandwich

BASALT FIBER



PET FOAM

ELECTRIC PROPULSION

- **A reliable engine:** The electric engine is of simple design with few moving parts and extremely reliable.
- **Instantly powerful on ignition:** : With no need for preheating, you have the engine's full power from the moment it is switched on.
- **Excellent cruising range:** Thanks to the generator(s), the electric engines can cruise for over 1 100 miles at 6 knots. When the batteries are low the 17.9 kW backup 500 L diesel generator(s) start(s) up and power(s) the electric engines, reloading the batteries.
- **Hydrogeneration:** The engines also use hydrogeneration while sailing to recharge the batteries.

Windelo catamarans are equipped with a two 20 kW electric engine propulsion system, powered by a 1120 Ah 48 V battery bank. At 6 knots, the Windelo catamarans have a range of nearly 3 hours and 45 minutes under battery bank.

SOURCE DISTRIBUTION

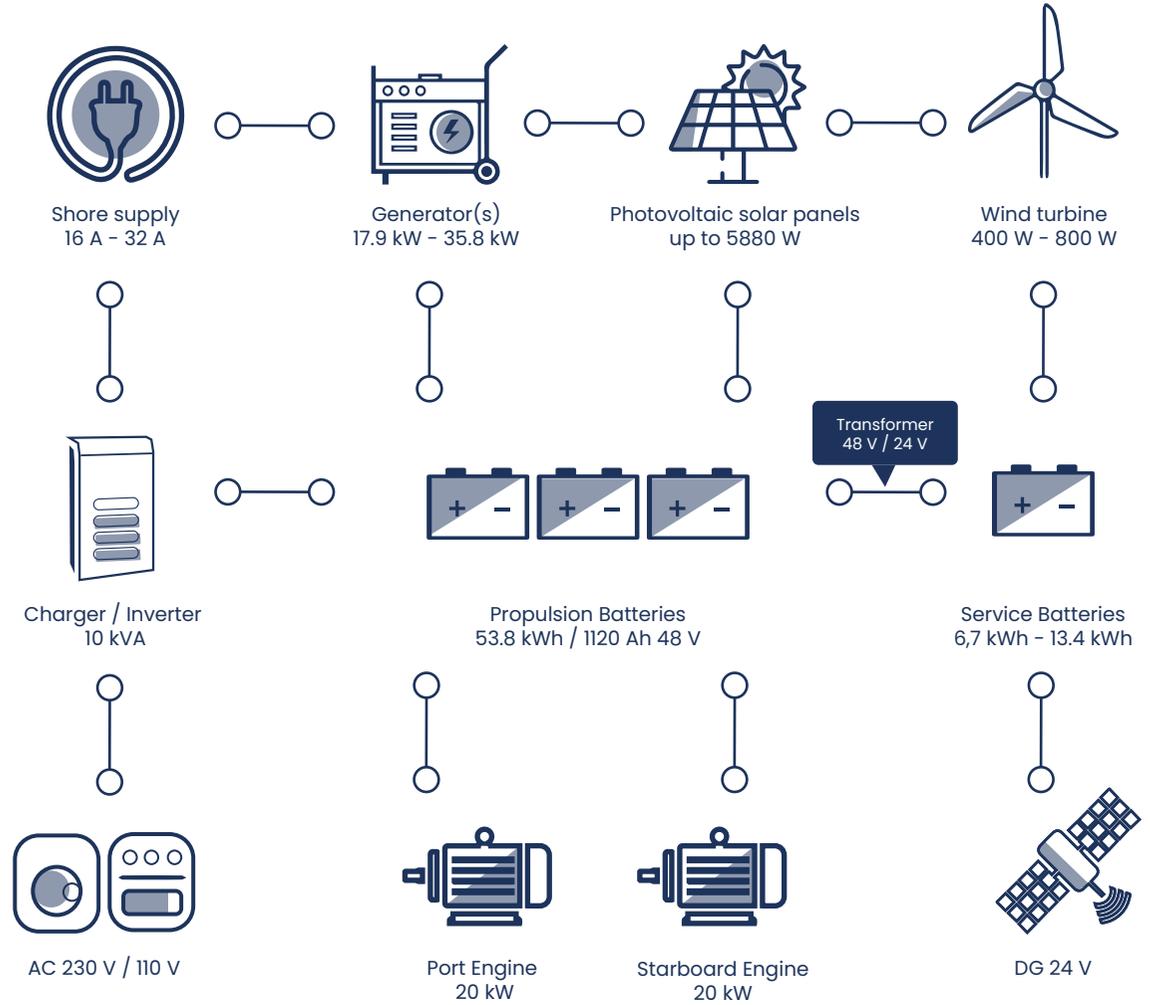
TRANSFORMATION / ENERGY

DISTRIBUTION

220 V / 110 V SYSTEM

48 V SYSTEM

24 V SYSTEM



BATTERY BANK (LFP Batteries)

53.8 kWh 48 V for **propulsion**

6.7 kWh 24 V for **service**

20-80 % CHARGING CYCLES FROM SINGLE POWER SOURCES

Solar up to 4 500 W: 22 hours of sunshine

Solar up to 5 880 W: 17 hours of sunshine

Hydrogeneration: 24 hours at 10 knots

1 generator (17.9 kW): < 3 hours

Shore Power (220 V 32 A): < 8 hours

TYPICAL USE CASES:

Day at anchor

Making 200 L of water and using all comfort equipment (washing machine, dishwasher, electric hobs & oven...) would use 10 kWh. **3 000 W of solar will provide a positive energy balance.**

Even better **4 500 W of solar will produce 18 kWh giving you 8 kWh to spare.**

Motoring only

Cruise 4 hours full electric at 6 knots and top up with the generator in 75 minutes **OR** motor up to 1 100 nm with the Generator in Autonomy mode.

Coastal cruising

For example, motor 1-2 hours and sail 3-4 hours with hydrogeneration. The boat will be **recharged by the evening when you reach anchorage.**

Long passage

Fully autonomous and constantly charged from green energies only (solar & hydrogeneration).