

REPOWERING

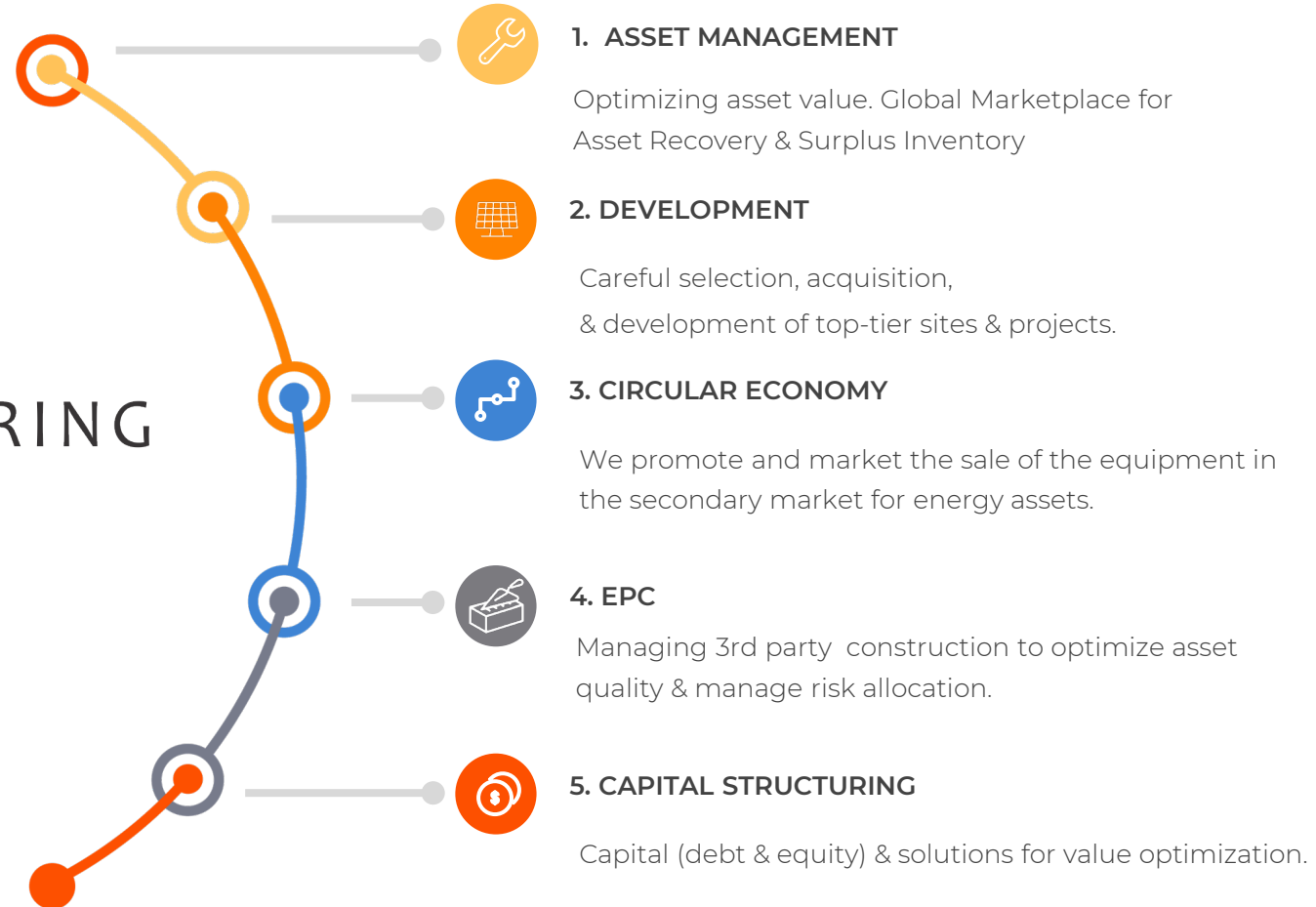
REPOWERING SOLUTIONS

New Concept

- 1 We developed specific solutions and tools** for different assets which required especial exhibition in the market and a deep knowledge of the area:
 - New/Unused and used wind turbines.
 - Components wind turbines.
 - Wind farms, energy plants, etc.,
 - Remanufactured wind turbines
 - Thermal power plants
- 2 If you need to estimate an asset of energy, we can help you.** We have a broad experience and proved capacity for estimating wind turbines, wind farms, etc. Projects from almost any industries energy and for different purposes have been assessed by our team of expert appraisers.
- 3 Circular Economy** we promote and market the sale of the equipment in the secondary market for energy assets.
- 4 Experienced person team** with deep expertise in development, financing, construction and operations.
- 5 Management team active in Latam Renewable sector since 2013** Track-record over 4,5 GW under developed in LatAm



Core focus: Europe and América Flexibility to invest throughout region.



BUSINESS MODEL

New Concept

You have assets that are no longer useful
Assets (wind turbines, trafo, swichgear...)
Whole facilities (wind farms...)

- We can assess your stock through prediction models
- We classify those assets and manage them according to all regulations

If they are in good condition, we sell them

We look for buyers all over the world to make sure you get the highest revenue in market from your assets

We find buyers for your assets in order to:

- Provide a second purpose to the asset and decrease the environmental impact
- Generate revenue!
- We make sure the value is fair to buyers but also the highest possible for you

If necessary, we can remove, dismantle, transport or scrap them.

What is happening with those profits?

It pays for the whole process, from the beginning to the end.

We take percentage

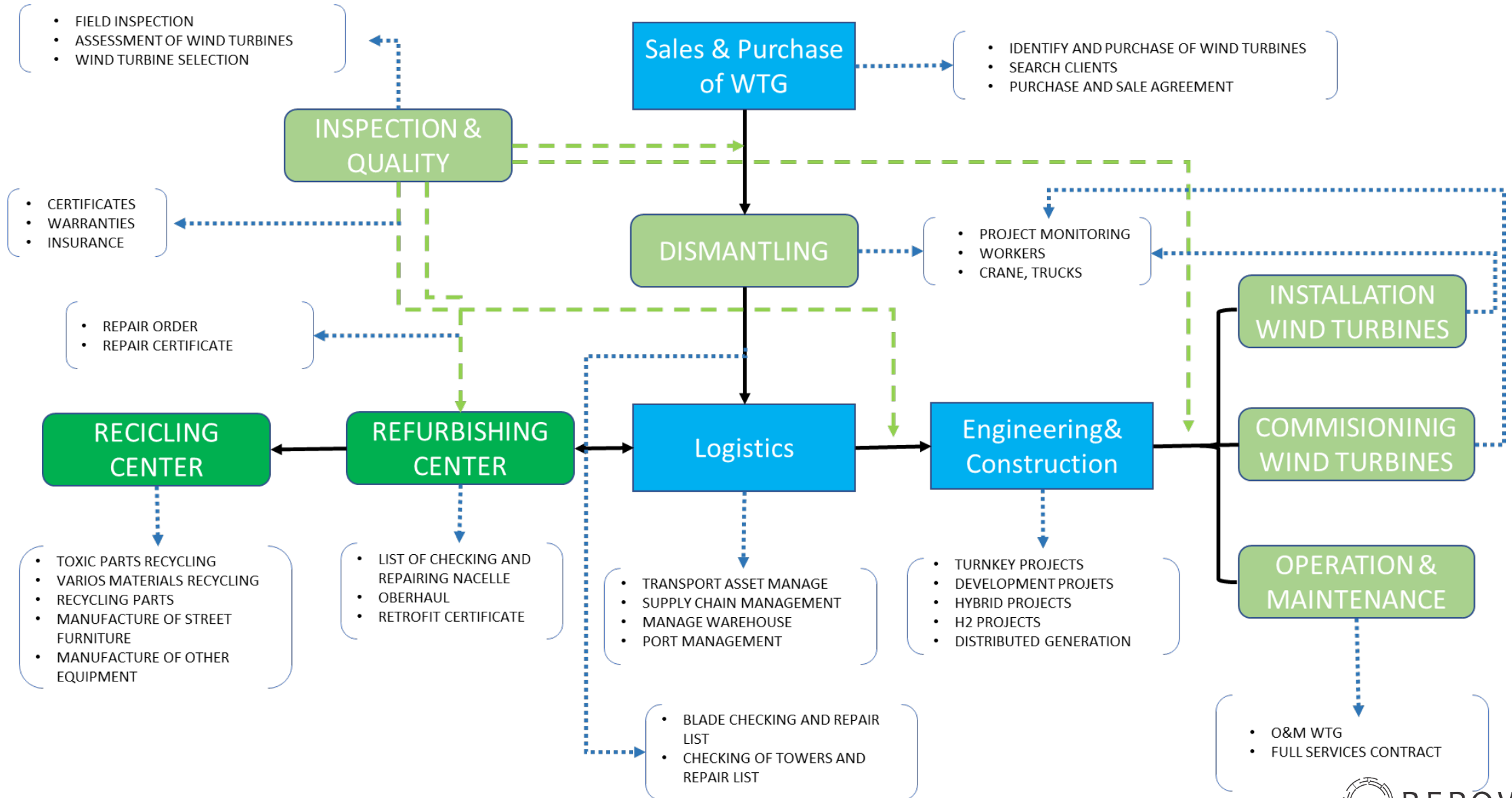
We provide a second life, remanufacturing wind turbines and components

We manage the sales process

- Support for buyers
 - Query management
 - Product exhibition
 - Documentation management: authorizations, licenses...
- Direct negotiating

BUSINESS MODEL

Value chain



CIRCULAR ECONOMY

we are experts in the optimization of the wind farm power industry assets. Thanks to our circular economy solutions, we can face the challenge of obsolescence without compromising the environment. On top of that, assets that can be reused offer an opportunity to companies from other markets.

REPOWERING SOLUTIONS, ACTIVELY IMPLEMENTS CIRCULAR ECONOMY SOLUTIONS THROUGHOUT THE ENERGY PLANTS LIFE CYCLE

REPOWERING SOLUTIONS implements circular economy solutions throughout the various stages of the wind farms life cycle, to transform end-of-life equipment and parts into a resource for the production and maintenance of energy plants, with a view to reducing the consumption of raw materials.

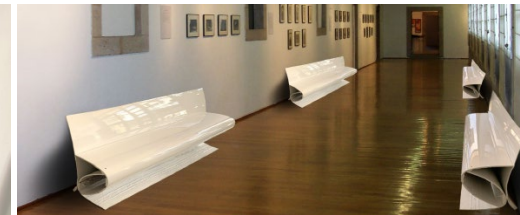
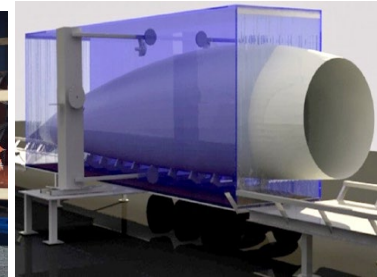
The circular economy is based on a systemic vision inspired by the observation of nature. Nature produces no waste: everything is reused, composted, and digested. Manufactured products too can be produced in a more resource-efficient way and brought back into the production process through repair, reuse or remanufacturing.

REPOWERING SOLUTIONS uses circular economy principles to reduce the use of raw materials, since it provides an economic model that reconciles prosperity and the preservation of limited natural resources.



When the wind turbine blades finish their cycle in the wind sector, our work begins. The components and structures of these elements are removed - in their entirety - from the wind turbine itself for subsequent disassembly. Without wasting any material, we proceed to its transfer thanks to a cutting technique that allows a simple and efficient transport.

Ventos Metódicos Reciclagem LDA, we are specialists in waste management, in strict compliance with the new guidelines stipulated by the European Union. Circular economy, reuse and zero carbon footprint in new products are the philosophy of our company.



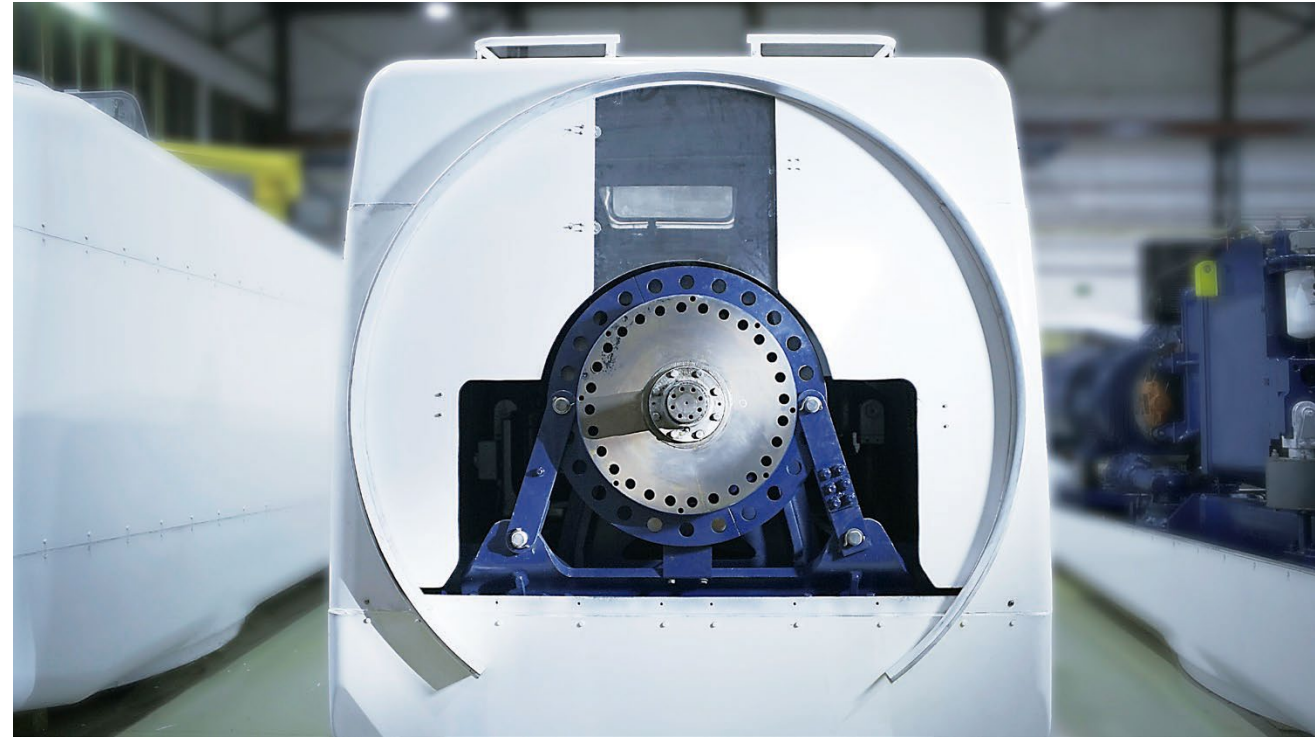
ENERGY ASSET MANAGEMENT & RECOVERY

What makes REPOWERING SOLUTIONS a leader in its sector?

REPOWERING SOLUTIONS provides Asset Management and Advisory Services to investors in the energy sector. Our understanding of energy in the countries where we are active, combined with our unique Engineering, Accounting, Legal and Advisory skillset are at investor's' service to create value through superior management. Our services provide assurance through timely, accurate and proactive reporting.

The trade in wind turbines has increased substantially over the past years. Used wind turbines that can operate for a second term have become very popular. Which wind turbine would be suitable for your situation? And what are the costs when refurbishing a pre-used wind turbine?

REPOWERING SOLUTIONS offers solutions for recovering asset value (including wind turbines deemed for decommission and new equipment of failing projects). We promote and market the sale of the equipment in the secondary market for energy assets. We advise clients through the whole sale process, from the orientation phase up to the actual delivery.



WIND RETROFIT

Increase production, reliability and lifetime of your wind turbine

Our core business is the remanufacturing of wind turbines of different sizes; a work that we have been doing with good success for the past years. We have several references in Europe and Latin America. As an example, we have been the first installation approved by Enel in Italy, using remanufactured turbines (a Nordtank 300 derated to 200kw). Our final product has the same lifespan than a new turbine, comes with 2 years of guarantee.

We currently have different solutions for different projects specially in the range where you work: 80 to 3000kw. As a matter of fact, we sold 30 units of remanufactured turbine last year for the Italian, Spain, Nicaragua, Chile and UK market

We can adapt our scope to the different projects, from being a simple supplier of turbines, to a full EPC contractor. This flexibility will be very positive when collaborating with your company, since we can create good synergies.

REPOWERING can improve the wind turbine production and increase reliability, leading to extended lifetime by using new components and technologies.

Wind Retrofit enables your wind turbine to work at variable speed by controlling the system torque and allowing the maximum power transfer between the wind and turbine blades.

This improvement is possible with the addition of a low voltage full power converter, upgrade of superior control system, and reconditioning of the generator to work at variable speed.



STANDARD RETROFIT PROCESS

Increase production, reliability and lifetime of your wind turbine

- ✓ All components are removed for cleaning and inspection.
- ✓ Any component not meeting OEM manufacturer specifications is repaired or replaced.
- ✓ The nacelle frame is inspected for cracks and overall structural integrity. Any deficiencies are repaired and tested.
- ✓ The machine base and frame are stripped of all paint, cleaned of dirt and lubricant, and repainted.
- ✓ All critical rotating components (cylinders, rollers, etc.) are inspected for run-out. Any component not meeting OEM manufacturer specifications are repaired or replaced.
- ✓ All bearings (roller or plain) are repaired or replaced with new.
- ✓ All belting is repaired or replaced with new.
- ✓ All rubber hydraulic lines are repaired or replaced with new.
- ✓ All polymer couplings are repaired or replaced with new.
- ✓ All hardware is repaired or replaced with new.
- ✓ All gear boxes are cleaned, inspected, and new seals installed. Gears are inspected and repaired or replaced if needed.
- ✓ All generators are cleaned, inspected, and 100% rewind.
- ✓ Brake calipers are rebuilt, including new brake rotor and brake pads.
- ✓ Bull (Yaw) gear is repaired or replaced with new having a wider face than the OEM gearing.
- ✓ Pinion gear is repaired or replaced with new having a wider face than the OEM gearing.
- ✓ All Oil on wear blocks are replaced with new.
- ✓ All blades are inspected for defects, including wear, cracks, and blemishes.
- ✓ All blades are protected with a new covering of gel coat.
- ✓ All blades are weighed, balanced, and matched.
- ✓ Blade over-speed mechanisms are inspected. Any component not meeting OEM manufacturer specifications are repaired or replaced.
- ✓ All electrical wiring and components are new and upgraded above and beyond original manufacture specification.
- ✓ The main control system is repaired or replaced for new.
- ✓ Wind vane and anemometer are repaired or replaced with new.
- ✓ [OPTION] NEW full power converter



ADVANTAGES REMANUFACTURED WIND TURBINES

Increase production, reliability and lifetime of your wind turbine

Cheaper to transport, quicker to install

The light weight of the refurbished Wind Turbines minimizes construction and transportation costs. The refurbished Wind Turbines features a compact style of blade transportation which allows the safe transportation of three blades at one time using existing trucks and cranes. This makes installation quicker and minimizes transportation costs

Lowering maintenance costs for greater profitability

Maintenance and repairs can now be performed faster and cheaper up-tower, and with greater technical ease, thanks to our updated ergonomic nacelle design with increased access and working environment. With a new full scale converter, the complies with even the most challenging grid requirements of the modern energy market.

Grid requirements

The refurbished Wind Turbines are designed for optimum compliance with grid standards worldwide. The Full Power Converter of ABB advanced grid compliance system provides active and reactive power regulation, fast response to changes in frequency and fault ride-through capabilities to support grid levels and stability in the event of grid fluctuations. Investing in a refurbished Wind Turbines means investing in turbines that can adapt to even the most challenging grid codes.

Low Balance of Plant (BOP)

Installation and transportation costs refurbished Wind Turbines just like is designed to be transported easily (by rail, truck or ship) to virtually any site around the world. In terms of weight, height and width, all of its components comply with local and international limits for standard transportation. Specifically, not one of its components weighs more than 30 tones. Your foundation costs are also lowered with the refurbished Wind Turbines due to its improved load control. The innovative power system provides excellent grid support and is highly adaptable for future technical requirements. It also enables substations to be simpler and therefore more cost-effective.



LAGERWAY 80KW

Increase production, reliability and lifetime of your wind turbine

TECHNICAL DATA

POWER

Grid power 80kW
Rotor diameter 18 m
Hub Height 30 – 40 m

ROTOR

Number of blades 2
Position Upwind

GENERATOR

Asynchronous squirrel cage rotor, designed for VSD
Voltage 400, 690V
Manufacturer ABB

CONVERTER

Full Power Concept 4Q Operation
IGBT Power Rack Module
Grid Voltage 400, 480V 50/60hz
Control System DTC – Direct Torque Control
Manufacturer ABBV



LAGERWAY 80KW

Increase production, reliability and lifetime of your wind turbine



LAGERWAY 80KW

Increase production, reliability and lifetime of your wind turbine



NORDTANK 300KW

Increase production, reliability and lifetime of your wind turbine

TECHNICAL DATA

POWER

Grid power 150kW - 300kW
Rotor diameter 28 m
Hub Height 30 m

ROTOR

Number of blades 3
Position Upwind

GENERATOR

Asynchronous squirrel cage rotor, designer fo VSD
Voltage 400, 690V
Manufacturer ABB

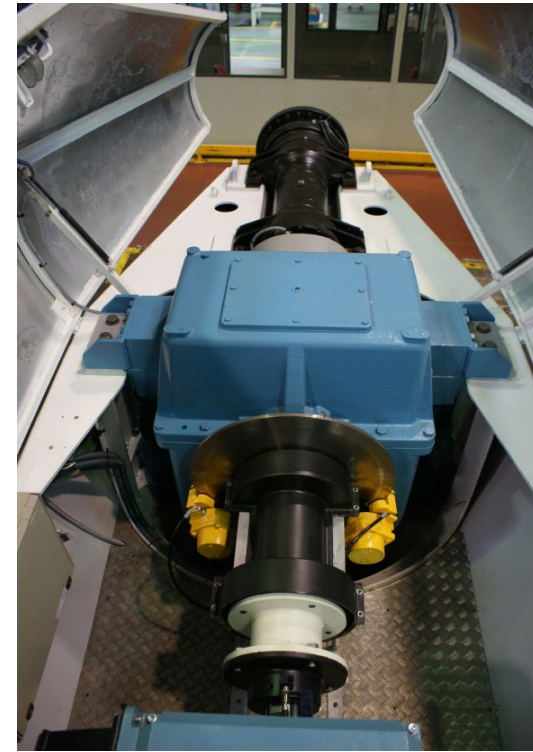
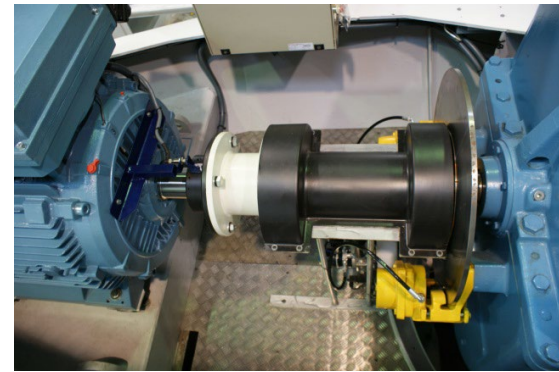
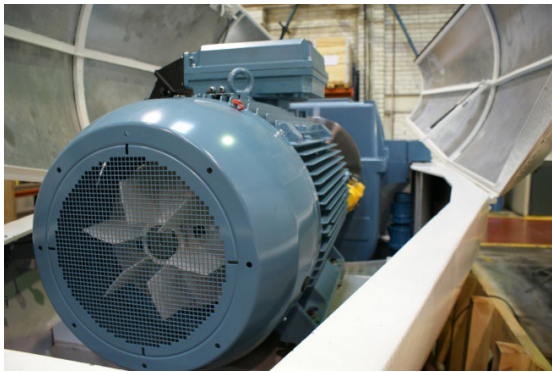
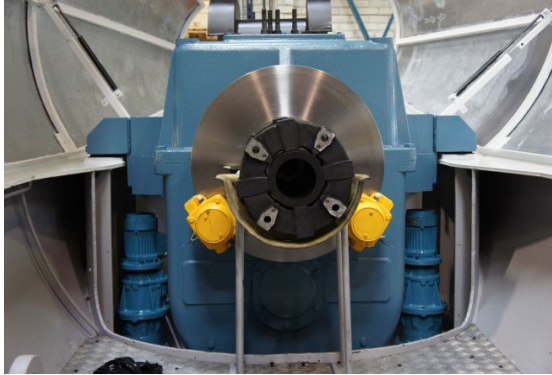
CONVERTER

Full Power Concept 4Q Operation
IGBT Power Rack Module
Grid Voltage 400, 480, 690V, 50/60hz
Control System DTC – Direct Torque Control
Manufacturer ABB



NORDTANK 300KW

Increase production, reliability and lifetime of your wind turbine



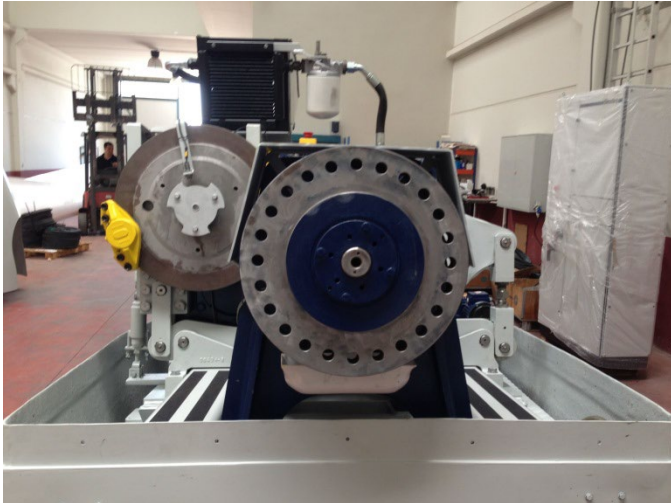
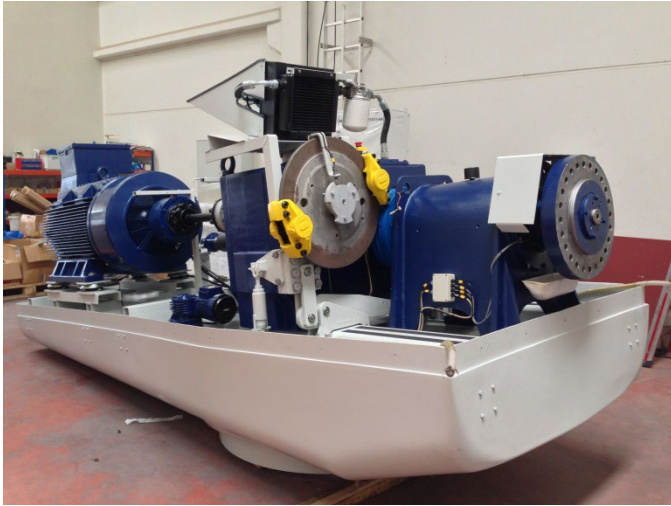
NORDTANK 300KW

Increase production, reliability and lifetime of your wind turbine



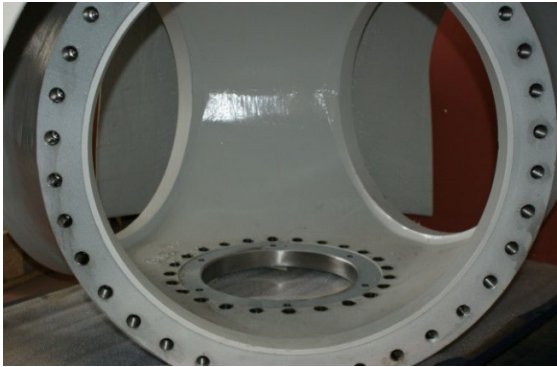
VESTAS V20, V25, V27,

Increase production, reliability and lifetime of your wind turbine



VESTAS V20, V25, V27,

Increase production, reliability and lifetime of your wind turbine



VESTAS V44

Increase production, reliability and lifetime of your wind turbine

TECHNICAL DATA

POWER

Grid power 600 kW
Rotor diameter 44 m
Hub Height 45 m

ROTOR

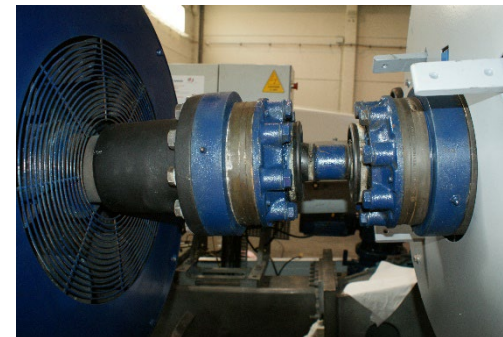
Number of blades 3
Position Upwind

GENERATOR

Asynchronous squirrel cage rotor, designed for VSD
Voltage 400, 690V
Manufacturer ABB

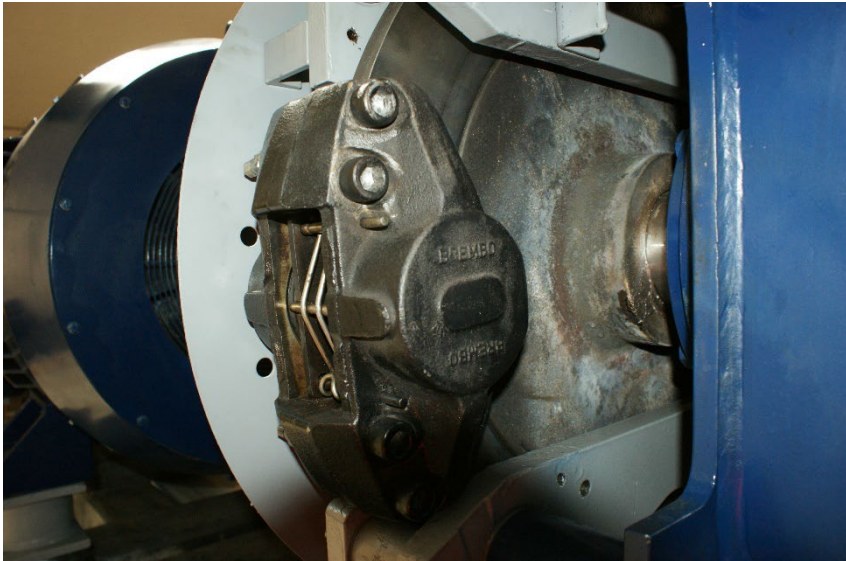
CONVERTER

Full Power Concept 4Q Operation
IGBT Power Rack Module
Grid Voltage 400, 480, 690V, 50/60Hz
Control System DTC – Direct Torque Control
Manufacturer ABB



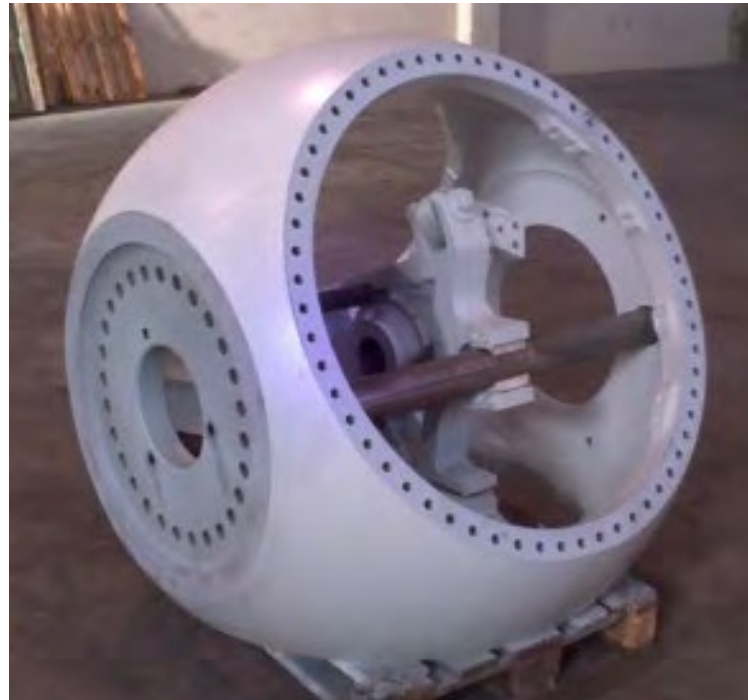
VESTAS V44

Increase production, reliability and lifetime of your wind turbine



VESTAS V44

Increase production, reliability and lifetime of your wind turbine

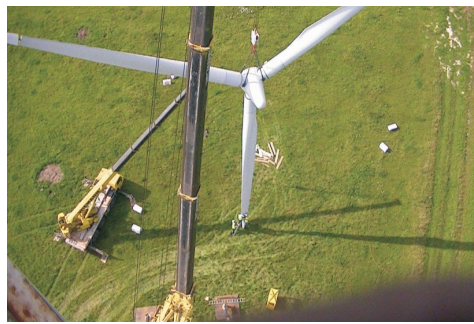


VESTAS V80, V90 (UNUSED)

Secondary Market



DISMANTLING WIND FARMS



DISMANTLING WIND FARMS



DISMANTLING WIND FARMS

