



Distributed Generation Wind Energy

Distributed electricity generation

on experience



By generating and using electricity locally, we can reduce transmission costs and increase the proportion of renewable energy we use with less impact on the environment.

What is distributed generation?

Most of electricity is generated in large, centralised power stations which can be a long way from where the electricity is used. The electricity is transported around the country through transmission lines, and then carried through local distribution networks to where it is needed.

Distributed generation is different - electricity is generated from small-scale systems and is used on-site or nearby. It can be used to generate electricity for homes, farms, businesses and industries.

Distributed generation projects are hooked up to the local distribution network. These local networks are connected to the national grid. This means that when there is not enough electricity being generated by the local project, users can still get electricity from the network. It also means if excess electricity is being generated, the excess can be exported into the network.

In some cases, 'cogeneration' heat is produced as well as electricity.

Off-grid generation is also known as stand-alone power systems. They are similar to distributed generation systems but are not connected to the electricity network.

Distributed generation can contribute to an efficient and renewable electricity future by potentially:

- Increasing the use of renewable sources of energy

- Improving the efficiency of our electricity system by reducing transmission and distribution losses

- Improving the security of our electricity supply

- Deferring the need for lines upgrades where it is more cost effective to invest in localised energy generation projects.

Distributed electricity generation

POWER GENERATION CLOSEST TO THE NEEDS

A distributed generation system stands halfway between a classic wind farm and an isolated facility. It generates power for local needs, all while being connected to the grid. Various configurations are possible :

- The generated power is consumed by the owner: the installation provides energy independence
- The generated power is sold to the grid operator: the installation is a profitable investment
- Mixed solution : local consumption of the generated power and sale of the surplus



WHO CAN BENEFIT FROM DISTRIBUTED GENERATION ?

Farmers, manufacturers, mines, rural communities... in many cases decentralised production turns out to be the ideal solution :

- Electricity is produced inexpensively, reliably and with no risk of shortages
- High power yield, grid losses are minimised
- Potential source of revenue from selling the power
- The delivered power is adapted to the needs of the site
- Production control
- Maintenance carried out locally: cost control and creation of local jobs

A new business model

Thanks to massive technological advances in the wind power industry, we can now design medium-power machines that offer the same yield as high-power machines.

The capacity to ensure a 20-year service life, and at a reasonable investment cost are only two of the key choice criteria. Our [RE]built turbine models are especially suitable for distributed generation :

- VESTAS V27 225KW
- VESTAS V39, V42 AND V47
- BONUS MK 600KW

Machines of this type are installed or being installed in Germany, Ireland, UK, Italy.

Distributed generation

Wind Energy

about us

REPOWERING SOLUTIONS provides consulting and construction services to the distributed generation market utilizing wind energy and renewable energy. Distributed generation reduces the amount of energy lost in transmitting electricity because the electricity is generated very near where it is used, perhaps even in the same building. This also reduces the size and number of power lines that must be constructed. We do not claim to be able to handle every type of project type and size out in the marketplace. Our focus is in the distributed renewable generation market. These projects are usually smaller to mid-size construction and generation projects under 20 Mws.

By utilizing wind energy, industries, municipalities, schools, universities, and other large energy users can take control of the ever increasing costs of energy. Distributed generation projects have several advantages over traditional energy sources:

- Distributed generation, in many cases, has a lower cost to integrate into the existing grid than large utility scale projects.

- Distributed generation, in many cases, can supply energy much closer to electrical loads than conventional power plants significantly reducing electrical losses as well as lessening constraints on congested power lines,

- Distributed renewable generation is a way for organizations to control energy generation costs, allowing the control of energy costs.

If your organization is looking at renewable energy, REPOWERING SOLUTIONS can assist you in developing and constructing such a facility. Our team can help whether you would like to own the facility within a design/build model or simply like to contract with someone to buy the energy from such a facility with a build/own/operate model.

Whether it is a single wind turbine generator for industrial or school use, multiple generators at a wind farm, REPOWERING SOLUTIONS can assist in the development and construction.

- Wind Energy Development and Construction for Independent Power Producers (IPPs)

- Wind Energy Development and Construction for Generation & transmission cooperatives

- Wind Energy Development and Construction for Municipalities & Governments

- Wind Energy Development and Construction High Energy Industrial Users

- Wind Energy Development and Construction Schools & Universities



Solutions

Centralised generation



A centralised wind farm can output anywhere from 1 to 20 MW.

Routed to a grid via a single high or medium voltage connection, this type of system can provide massive power along with offer economies of scale.

CLEAN AND AUTONOMOUS ENERGY

Wind power can replace thermal power while offering other advantages :

- An eco-friendly source of energy
- A local and inexhaustible source of energy
- A profitable source of energy at an unvarying cost

CAN A WIND FARM BE INSTALLED IN ANY COUNTRY ?

Unlike conventional wind turbines usually installed in industrialized regions, REPOWERING's technology has been designed for the remotest areas :

- Extreme conditions
- Weak grids
- Lack of logistics and civil works means

It is in these challenging environments that the [RE]BUILT WIND TURBINE® turbines have been proving their reliability for the last years.

Solutions

autonomous networks

In remote areas, such as islands for example, the power grid cannot be linked to interconnected networks. Power production is therefore local. It is usually based on generator groups. But this solution has disadvantages :

- High cost : the need to import oil, high transport costs adding to the price of the fuel
- High dependency on oil-producing countries, and exposure to geopolitical risks
- Vulnerability to oil price rises
- High greenhouse gas emissions

WIND POWER, A PERTINENT SOLUTION FOR ISOLATED SITES

For these regions, adding wind power to the energy mix considerably reduces these disadvantages. Wind power is a permanent local resource, efficient and non-polluting.

It has a beneficial effect on public finances, reducing the energy bill while attracting carbon credits.



SITES WITH SEVERE CONSTRAINTS

Remote sites are often subject to various constraints :

- Weak or unstable grids
- Power production unable to meet demand due to the small size of the grid
- Lack of local resources (civil engineering, experienced technicians)

Successful [RE]BUILT WIND TURBINE® solutions

For last years, REPOWERING SOLUTIONS has been installing wind turbines in the most inaccessible sites, particularly on islands. Widely renowned and proven, our solutions are based on four key principles :

- Turbines must be easy to transport and install
- The electrical design must work with weak grids
- The operating system must allow output to be regulated to suit demand
- We must have technical teams on the ground around the world, allowing [RE]BUILT WIND TURBINE® technology to be transferred effectively and sustainably at any site.

[RE]BUILT WIND TURBINE®





[RE]built

on experience

[RE]built PROCESS

- 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% rewound.
- 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. Deficiencies are repaired and the surface profiles returned to OEM manufacturer specifications.
- 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 manufacturer specifications.
- The main control system is repaired or replaced for new.
- Wind vane and anemometer are repaired or replaced with new.
- ABB full power converter

Reliable, competitive and compliant

Re-built the future of wind



Cheaper to transport, quicker to install

The light weight of the [RE]BUILT WIND TURBINE® minimises construction and transportation costs.

The [RE]BUILT WIND TURBINE® 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 minimises 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 ABB full scale converter, the [RE]BUILT WIND TURBINE® complies with even the most challenging grid requirements of the modern energy market.

Low Balance of Plant (BOP)

Installation and transportation costs Just like [RE]BUILT WIND TURBINE® is designed to be transported easily (by rail, truck or barge) 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 40 tonnes. Your foundation costs are also lowered with the [RE]BUILT WIND TURBINE® 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.

Easy-access serviceability

The [RE]BUILT WIND TURBINE® nacelle is ergonomically. This extra space also makes it easier for maintenance crews to gain access – reducing the time and cost spent on servicing and therefore maximising uptime.

The technology you need

– wherever you need it

Grid requirements

The [RE]BUILT WIND TURBINE® 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 [RE]BUILT WIND TURBINE® means investing in turbines that can adapt to even the most challenging grid codes.



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Full Converter

A brand new ABB full converter transforms the energy output to DC and inverts again to AC allowing the generator to produce electricity at all the range of Capacitors and reactors provide reactive energy transferring all active power to the grid.

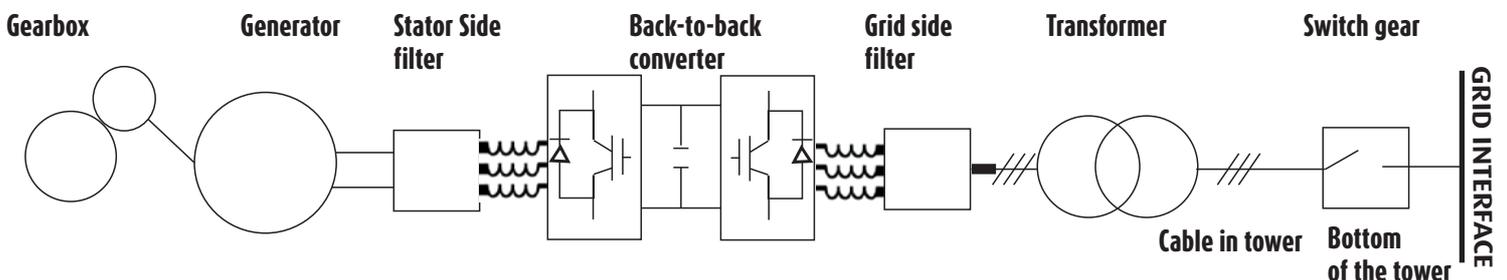
LCL filters control the THD injection in the grid keeping low additions and being compliant in all grid codes.

Robust control can keep the turbine connected during a low voltage helping the grid stability.

Advantages of Full Converter

1. Reactive compensation from 0.8Cap to 0.8ind
2. LCL filter for Harmonics limiting THD emissions into the grid
3. Low Voltage Ride Through capabilities.
4. Dynamic power factor control and voltage control
5. Primary response in frequency control
6. Crow bar optional for safety breaking

Excellent grid support



The experience to secure your wind energy investment

[RE]BUILT WIND TURBINE®

2 year guarantee
EXWORK terms of sale

Optimise energy production

- Designed for high productivity
- Excellent grid support

Reduce energy costs

- Low Balance of Plant (BOP), installation and transportation costs
- Designed for serviceability
- Innovative ABB full Power Converter uses the wind's own energy

Secure your investment

- Proven technology
- Reliable and robust product

[RE]BUILT WIND TURBINE®

Wind Turbine models

2 year guarantee



VESTAS V39 500kW
VESTAS V42 600kW
VESTAS V47 660kW



VESTAS V25 200kW
VESTAS V27 225kW



BONUS 600kW



NORDEX N54 1000kW



**Sageguarding
your
investment,**
powering your profits.

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available, which may not apply in all cases.
The required technical options should therefore
be specified in the contract.

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