



GEV MP C  
200 kW  
225 kW  
250 kW  
275 kW

Wind with a vision

# GEV MP C 200-275 kW

32-m rotor  
55/60-m height

## Energy throughout the world

In remote locations, it is very difficult to install wind turbines. However, such sites often have the strongest need for a dependable, cost-effective and self-reliant source of energy – like wind energy.

We at Vergnet took up this challenge. For more than 20 years we have been developing innovative, practical solutions to the specific concerns of all complex sites, either difficult to reach or subject to harsh conditions, such as hurricane-prone areas or salty environments.

Like all our Farwind® turbines, the GEV MP C is both robust and light. Thanks to its guy-wired tilting mast, it is very easy to transport and install anywhere in the world, and can sustain hurricane winds when secured to the ground.

The GEV MP C meets all the specific requirements of small grids and outperforms any turbine of its class. All these assets have transformed a technological breakthrough into a commercial success, with more than 500 GEV MP-type wind turbines running worldwide.



Easy to transport



Easy to install



Ground-level maintenance



Hurricane-proof



Suited for the harshest conditions



Robust and long-lasting



High performance



Remote supervision

# A LIGHT, COMPACT AND VERSATILE DESIGN

## Lightweight structure

Despite being 55m tall, the GEV MP only weights 20 tons. It is twice as light as a conventional wind turbine for the same rated power.

## Compact nacelle

Two nacelles can fit in a standard 20' container.

## Light guy-wired tower

Comprised of 5 x 11.88 meters modulares, it also fits into 40' containers.

## Self-erecting concept

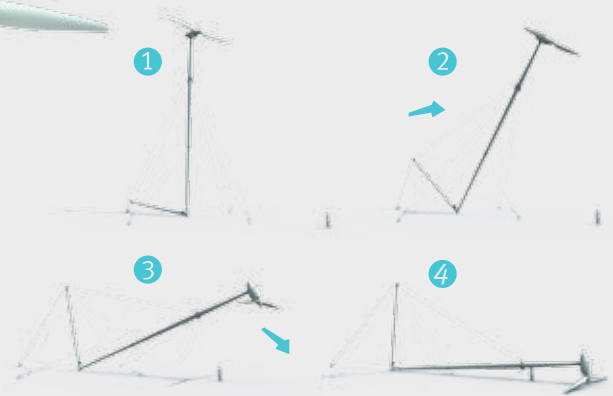
The whole turbine is assembled on the ground, and then erected using an integrated hydraulic winch. No crane is required. Only a forklift is necessary for the assembly.

## Reduced foundation

The light, guyed tower allows for a much smaller foundation; therefore, the amount of concrete required is reduced to only 15m<sup>3</sup>. That's 80% less than conventional wind turbines of the same class.

## 2-blade rotor - Exclusive lowering system

Thanks to its 2-blade design, the GEV MP can be lowered to the ground for maintenance operations and blade cleaning. Using an integrated winch, the whole machine can be lowered by two people in an easy and safe operation that takes less than one hour.



## Hurricane-proof

In case of a weather alert, any wind farm can be rapidly secured, since the lowering operation takes less than 1 hour. Once fastened to the ground, a GEV MP can sustain up to 300km/h wind gusts (a Category 4 hurricane).

## Earthquake-proof

The guyed tower's adaptable architecture also proves efficient in areas prone to seismic activity.



## Easy to transport

Designed to fit in five 40' standard containers (blades excluded), the GEV MP can be shipped easily and cost-effectively. Standard trucks, unpaved roads, islands, hilly countries... We can reach any destination.



## Ground-level maintenance

All maintenance operations can be performed at ground level thanks to the lowering system, which drastically reduces maintenance costs, as well as downtime.



## Easy to install

Thanks to its exclusive self-erecting concept, the GEV MP is astonishingly simple to install, and requires no crane.



## Hurricane-proof

The GEV MP can sustain up to Category 4 hurricane winds. This protection is recognized by our insurers.

# AN ALL-TERRAIN WIND TURBINE

## Highly resistant blades

Our rotor blades feature an optimized design. They are manufactured in our own facilities using state-of-the-art methods: a vacuum infusion process, appropriate finish processes including gel coat, filler and edge protection, and disposable anti-abrasion strips.



## Anti-corrosion treatment

The mast and all exposed parts are protected by a special coating, which ensures effective protection during the entire usage time even in wet, salty, corrosive or abrasive conditions.

## Robust design

All parts of GEV MP are made from superior quality materials. Most parts are standard and widely used in many industries, which guarantees their reliability. Major cast components including rotor hubs are made of spheroidal cast iron. The GEV MP is designed to bear 365 grid outages per year, compared with 20 per year for conventional turbines.

## All-terrain generator

The GEV MP features a robust and reliable squirrel-cage generator, supplied by a first-class specialist. It is designed to operate even in extreme weather conditions:

- from -20°C to +50°C
- 100% relative humidity
- marine environments (less than 100m from the seashore)
- IP 55 sealing protection
- specific tropical corrosion treatment of the stator and rotor, including stainless steel greasers, screws and fan cover



## Protected sensors

- varnish coat on electronic components to withstand possible condensation
- High protection grade sealed connectors (up to IP 67)
- EMC immunity

## Teetering hub

Through its rubber/metal bushing, this innovative technology reduces stress on the whole structure, including the drive train and mast, by 35%. It thereby reduces maintenance costs and provides a longer turbine life.



## SUITED FOR THE HARSHTEST CONDITIONS

Our 20 years of worldwide experience helped us design GEV MP as a real world traveler.

Perfectly protected from aggressive elements, including the most extreme weather conditions, it will provide trustworthy power production during its entire service life.



## ROBUSTNESS AND RELIABILITY

A wind turbine must withstand unequalled loads and stresses, and endure even more hardships in hurricane-prone areas. Equipped with heavy-duty parts and efficient dampering technologies, GEV MP is astonishingly reliable, even in the windiest areas.

## Higher energy production even in hurricane-prone areas

Thanks to its unique lowering system, GEV MP can be installed in places where only reinforced class-1 conventional wind turbines previously could be installed. With a 32-meter rotor and a height of 55-meters, the 804m<sup>2</sup> rotor swept area maximizes wind potential.

### Shock absorber

A mechanical shock absorber evenly adjusts the torque variations. This device reduces the stress on the drive train and helps produce a pure sine-wave signal.

### Hydraulic pitch regulation

The pitch regulation allows accurate setting of the power output, cancels any risk of rotor overspeed and ensures fast and failproof stop of turbine.

### Safety systems

All the safety systems comply with international standards:

- aerodynamic braking system through pitch regulation, including individual backup power units in case of supply failure
- safety rotor lock system to ensure safe service operations
- lightning protection

### INDUSTRIAL PLC

The PLC (Programmable Logical Controller) is sheltered in the electrical building. It constantly monitors all the necessary parameters:

- Wind data (direction and speed)
- Wind turbine parameters (rotor speed, blade angle, yaw position, generator power output...)

### V-SCADA™

- real-time production monitoring, either remote or on-site
- allows recovery from system failures directly from a remote computer or from Vergnet headquarters: no need to send a technician.
- records data and establishes statistics in graphical, user-friendly forms
- adapted to digital or analog telecommunications system (public phone wire)
- backup protection in case of a grid outage by a battery located in the electrical building



## HIGH PERFORMANCE

The whole GEV MP is designed to make the most of wind potential. At 55 meters high, the 32-meter rotor harnesses maximum wind energy. The pitch control, together with the regulation of torque variations, ensures high quality power production.



## REMOTE SUPERVISION

As it is designed to be installed anywhere in the world, a GEV MP can be monitored and controlled remotely, using any telecommunications system available locally, even the lightest ones.

## Eritrea

### Trip to the end of the Earth at Assab

Sand storms, scorching heat, corrosive air, undeveloped logistics, unstable grids... In Eritrea, extreme conditions make it far from easy to install a wind farm. However, this country had a strong need for a cheap, self-reliant source of energy. Vergnet Eolien took up this challenge and installed a wind farm in Assab in 2007. Being easy to transport, to install and to operate, the GEV MP has turned out to be particularly reliable and high performing.



6



## Guadeloupe

### GEV MP gets a jump on Hurricane Dean

In the Caribbean, Vergnet wind turbines rapidly turned out to be the market benchmark, as the only effective answer to hurricane hazards.

On August 16, 2007, while Hurricane Dean was approaching, local crews lowered the 216 wind turbines located in the Caribbean in record time: 14 hours. Among them, the 27 turbines of Guadeloupe, which were securely fastened to the ground, sustained more than 250 km/h wind gusts. Once Dean passed over the island, the wind farms quickly resumed production, maintaining availability rates above 95%.



## Australia

### Successfully combining wind and diesel energy

The Coral Bay wind farm perfectly demonstrates Vergnet's know-how regarding wind/diesel coupling and high penetration rate. Installed in a very isolated, cyclone-prone site, the farm includes three GEV MPs, which are coupled with seven low load diesel generators, with energy storage through flywheel. The complete wind farm supplies 95% of the local grid production, and offers up to a 90% penetration rate.

# GEV MP C - TECHNICAL DESCRIPTION

## TURBINE CONCEPT

- 2-blade down wind rotor, two-speed generator
- Teetering hub with rubber/metal dampening
- Hydraulic pitch control

|  |                                  |
|--|----------------------------------|
| • Cut in wind speed .....                    | 3.5 m/s                          |
| • Cut out wind speed .....                   | 25 m/s                           |
| • Output Voltage & Frequency (3-phase) ..... | 400 V - 50 Hz or 460 V - 60 Hz   |
| • <b>Class (as per IEC 61400-1): 1999</b>    | <b>From class II to class IV</b> |
| • Hub height .....                           | 55/60 m (180/197')               |
| • Rotor diameter .....                       | 32 m (105')                      |
| • Rotation speed (50 & 60 Hz) .....          | 31 to 46 rpm                     |
| • Max. wind speed (average 10 mn)            |                                  |
| Operating position .....                     | 30 - 42.5 m/s                    |
| Lowered position .....                       | 85 m/s                           |

## EXTREME CONDITION PROTECTION

|  |  |
|--|--|
| • Corrosion .....                      | Galvanized tower + option marine anti-corrosion protection (C5)  |
| • Generator tightness/insulation ..... | IP55 / Class F   |
| • Hurricane resistance .....           | Lowering system  |
| • Earthquake resistance .....          | Flexible architecture (guyed tower)<br>Multi-pole, shock-absorbent anchors                                 |
| • Lightning protection .....           | Fully-integrated lightning protection (IEC-61400-24)<br>Lightning arrester on nacelle (IEC 62305/61643-12) |
| • Operating limits .....               | Standard : -5°C to +40°C (+23°F to +104°F)<br>Polar : -20°C to +35°C (+4°F to +95°F)                       |
| • Survival .....                       | Standard : -10°C to +50°C (+14°F to +122°F)<br>Polar : -40°C to +40°C (-40°F to +104°F)                    |

## PERFORMANCE DETAILS

|                                     |   |
|-------------------------------------|---|
| • Gearbox .....                     | 2-stage planetary gearbox   |
| • Generator .....                   | 2-speed, asynchronous, squirrel cage generator - rated power : 275 kW               |
| • Grid connection .....             | Power factor compensation<br>Electrical cabinet including transformer at tower base |
| • Emergency and parking brake ..... | Aerodynamic and disc on high speed shaft  |
| • Yaw .....                         | Hydraulic active yaw, automatic cable untwisting                                    |

## MAST

|                      |  |
|----------------------|--|
| • Type .....         | Guyed : Tubular or Lattice                 |
| • Sections .....     | 5 x 11.88m (5x39')                         |
| • Material .....     | Galvanized steel                           |
| • Installation ..... | Self-erection via hydraulic winch          |
| • Anchors .....      | Boreholes with steel rods cast in concrete |

## BLADES

|                  |  |
|------------------|--|
| • Material ..... | Twisted vinylester reinforced with fiber glass |
|------------------|--|

## CONTROL COMMAND SYSTEM

|                              |   |
|------------------------------|---|
| • Automation control .....   | Industrial automation Siemens through Profibus + Ethernet |
| • UPS (voltage outage) ..... | 56 Ah   |
| • Remote supervision .....   | V-SCADA™ / through RTC, radio, internet...                |

## WEIGHT - DIMENSIONS (CLASS III)

|                             |                                       |
|-----------------------------|---------------------------------------|
| • Nacelle with rotor .....  | 9 t (17196 lb)                        |
| • Wind turbine mast .....   | 15 t (26455 lb)                       |
| • Total packed volume ..... | 5x40' containers<br>+ blades (1 load) |

## MANUFACTURERS

|                      |               |
|----------------------|---------------|
| • Blades .....       | ACO (VERGNET) |
| • Blade design ..... | AERODYN       |
| • Gearbox .....      | BONFIGLIOLI   |
| • Generator .....    | ABB           |

## POWER CURVE

| Wind speed<br>(m/s)<br>d=1.225kg/m <sup>3</sup> | Power curve<br>(kW)<br>32m blades |
|---|-----------------------------------|
| 2,5   | 0                                 |
| 3,0   | 0                                 |
| 3,5   | 0                                 |
| 4,0   | 3                                 |
| 4,5   | 10                                |
| 5,0   | 18                                |
| 5,5   | 27                                |
| 6,0   | 36                                |
| 6,5   | 47                                |
| 7,0   | 58                                |
| 7,5   | 78                                |
| 8,0   | 98                                |
| 8,5   | 119                               |
| 9,0   | 141                               |
| 9,5   | 164                               |
| 10,0  | 189                               |
| 10,5  | 215                               |
| 11,0  | 243                               |
| 11,5  | 262                               |
| 12  | 275                               |
| Up to 25  | 275                               |

## PRODUCTION ESTIMATES

| Hub height<br>wind speed<br>(m/s) | Annual gross<br>production<br>(MWh/year) |
|-----------------------------------|--|
| 4                                 | 164                                      |
| 4,5                               | 246                                      |
| 5                                 | 342                                      |
| 5,5                               | 449                                      |
| 6                                 | 560                                      |
| 6,5                               | 674                                      |
| 7                                 | 785                                      |
| 7,5                               | 893                                      |
| 8                                 | 994                                      |
| 8,5                               | 1089                                     |
| 9                                 | 1176                                     |



[www.vergnet.com](http://www.vergnet.com)

This brochure is not contractual. Technical information subject to change without notice. 04-14  
agence.lic.com | ad | power | photo credits: Quasar Prod., Fotolia



12, rue des Châtaigniers  
45140 Ormes - FRANCE

Tél. +33 (0)2 38 52 35 60

Fax +33 (0)2 38 52 35 83

[export@vergnet.fr](mailto:export@vergnet.fr)

@vergnetwind 