

October 1, 2020

Challenergy Inc.

Challenergy's Next-Generation Wind Turbine successfully generated power during Typhoon Hagupit, sets a new record at 30.4 m/\*.

**We have updated the maximum recorded instantaneous wind speed at which our Magnus Vertical Axis Wind Turbine (Magnus VAWT) can generate electricity. Challenergy's Magnus VAWT prototype, located at Ishigaki Island, Okinawa Prefecture, generated electricity at wind speeds of up to 30.4m/s\*(109 km/h).**

We would first like to express our deepest sympathies to all the victims of the natural disasters caused by typhoons this summer.

Last August 1, 2020, Typhoon Hagupit developed in the southern seas of Okinawa and strengthened northwest towards the Ishigaki Islands. The Ishigaki Island Region started experiencing strong winds at around noon on August 2, and the typhoon category was upgraded to "very strong" at around 2 AM on August 3. The recorded maximum instantaneous wind speed in Tonoshiro, Ishigaki City was 36.4 m/s. The typhoon left almost 800 households without electricity.

Source: Okinawa Meteorological Observatory (<https://www.jma-net.go.jp/okinawa/data/kencho/T2020/T2004.pdf>)

The Magnus VAWT prototype has been collecting data for more than two years, from August 2018 under natural conditions, such as during typhoons, to improve the turbine's structural and operational performance. Based on the turbine's specifications, the maximum wind speed at which our turbine can generate electricity is 40m/s, but the maximum instantaneous wind speed it has experienced for the past two years was only 24m/s, which was during Typhoon Kong-rey back in October 2018. However, based on the data acquired last August 2020, our prototype generated electricity at up to 30.4m/s\* of wind gusts, the highest wind speed it has experienced so far. The data obtained from this typhoon will be used to further improve our wind turbines' performance and reliability.

\* Maximum average instantaneous wind speed per second measured by the anemometer installed on our prototype.

#### ■ About the Magnus Vertical Axis Wind Turbine

The Magnus Vertical Axis Wind Turbine is a next-generation wind turbine that combines Magnus force and vertical-axis. Instead of the traditional propellers, this wind turbine is controlled by the Magnus force generated by rotating its cylinders. Conventional wind turbines suffer the risk of breakage and failure when the wind speed exceeds 25m/s, so they are designed to

automatically stop under these wind conditions. However, the Magnus VAWT can operate in wind conditions of up to 40m/s, allowing for continuous delivery of electricity, even in extreme weather conditions. Also, it can respond to sudden changes in wind direction given its vertical-axis. Finally, since the rotation speed is slower than that of the traditional wind turbine, it can reduce adverse environmental effects such as noise pollution and bird strikes.

## ■ Company Profile

Focusing on Japan's energy problems in the wake of the Fukushima nuclear disaster, the company developed the Magnus Vertical Axis Wind Turbine that can withstand strong winds and sudden changes in wind direction brought upon by typhoons. Our Magnus VAWT prototype started its demonstration in 2018, and the company expects to enter its mass production soon. "Supply safe electricity to all human beings through innovation in wind energy."

<https://challenergy.com>