Change the history of renewable energy, change the world

Tornado Wind Turbine
The Design Philosophy of Eco-Technology

1. Safety
2. Care for the surrounding environment
3. Generation Efficiency

Designed with the thought that if the things people use are not safe or good for those people and living things around them, they are not "eco." Industry specialists have applauded the exceptional precautions for wild birds and noise in its operations.
Examples of Installed Wind Turbines Worldwide

### Types of Wind Turbines

<table>
<thead>
<tr>
<th>Turbine Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Darrieus</td>
<td>A turbine which uses curved airplane wing-like blades installed on a vertical axle.</td>
</tr>
<tr>
<td>Straight-Blade Vertical Axis Wind Turbine</td>
<td>A vertical blade turbine that uses airplane wing-like blades.</td>
</tr>
<tr>
<td>Mitsubishi 1000kw HAWT</td>
<td>Horizontal-Axis Wind Turbines (HAWT)</td>
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### Vertical Wind Turbines

- **Savonius Wind Turbine**: Shaped like a two halves of a vertically-cut pipe and shifted towards the circumference.

### Horizontal-Axis Wind Turbines (HAWT)

- **Giromill Wind Turbine**: A vertical blade turbine that uses airplane wing-like blades.
- **Tornado Model**: The world’s first turbine to use both drag and lift to rotate the two levels of turbine blades bidirectionally.
- **Savonius Wind Turbine**: Shaped like a two halves of a vertically-cut pipe and shifted towards the circumference.
- **Standard Wind Turbine 3-Bladed Propeller Turbine**: Possesses both functionalities.

### Turbine Comparison

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<tr>
<th>Types of Wind Turbines</th>
<th>Blade Shape</th>
<th>Start-Up</th>
<th>Efficiency</th>
<th>Blade Tip Speed</th>
<th>Noise Development of the Advanced Vortex</th>
<th>Axle Vibration</th>
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<td>Motor Ring</td>
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<td>Multi-Blade Propeller</td>
<td>Knife Shape</td>
<td>Self Start-Up</td>
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<td>Savonius</td>
<td>Knife Shape</td>
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**Horizontal-Axis Wind Turbines (HAWT)**

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This is new! Gaining an International Permit, the Tornado Wind Turbine Blade Structure (Wind Flow)

Bidirectional generator
Both upper and lower level blades have their own coil and magnet and when rotated bidirectionally it doubles their relative speed.

The structural is stabilized by a gyroscoping effect which neutralizes the counterforce incurred during rotation as it rotates.

Patented Bidirectional Blade
The blades operate using both lift and drag, thus producing powerful torque
Company B Giromill Model

Company A, Propeller Model

Eco Tech's Tornado Model

Being a drag-powered model, cut-in is quick

Even if wind speeds go above a set speed, the rotation will not. Because of (the recovery brake) There is no cut out

Operating conditions in which others' wind turbines fail
Small-Scale Wind Turbine Plan (Installation Example) Hybrid Streetlight (TN-30HL)
Small-Scale Wind Turbine Plan (Installation Example) 1kW - Max 2kW Wind Turbine (TN-100)

Taketoyo, Aichi Prefecture
Bidirectional Wind Turbine (10kW Class)

Shinmaiko: New Multi-level Design

Hokuriku Expwy, Kanazawa, Tokumitsu Parking Area
Tornado Wind Turbines: Types and Sizes

TN-30HL

TN-100R

TN-1000R

Eco Technology Co. Ltd.
Landscape type, a plan to harmonize with and care for nature and living things

It is mindful of problems facing natural living things (noise, low-frequency vibrations, bird strikes, etc.) and does not mar the landscape.
Examples of wind turbine collapses and bird-strikes

Typhoon-caused collapses

Damaged by wind gusts

Lightning strikes

Bird-strikes
Outstanding features of Tornado wind turbine in comparison with other existing wind turbine (Summary)

1. **Small Footprint**
   Smaller footprint means it can be installed on top of buildings or in hazardous mountain areas

2. **Low-Noise, Low Risk of Bird Strikes**
   It is noise-less and prevents bird strikes, thus it is neighborhood- and bird-friendly

3. **Resistant to Lightning, Gusts, and Typhoons (Cyclones)**
   It can stand up to the harsh climate conditions of Japan. Also, the sturdy triangular frame means less damage.

4. **Its simple structure means easy maintenance**
   Since there is no pitch- or yaw-control, there are fewer parts to break down.
   Also, when stopped, it does not consume electricity.

5. **Its simple structure also means fewer flickering shadows**
   The simple structure also lends itself to solving the problem of cost efficacy. You can expect to save on parts.

6. **No cut out means more viable sites**
   Normally, wind turbines cut out at wind speeds of 15-20 m/s, but Tornado wind turbines can still generate power during these ideal times.
It is hard to estimate the cost effectiveness of small scale wind turbines.

Peripheral Application + Tornado Wind Power = Revolutionary Innovation

1 + 1 = 3

It's not a finalized product. It's a platform. Together with the user, we design a system to meet their needs.

Thus, as a system, its cost effectiveness and added value are increased.
Tornado Wind Turbine Application Methods

- Kanazawa, Tokumitsu Parking Area

- During snowstorm
- At low pressure
- Typhoon

- Newly developed bolt-on type

- Wind turbine application methods

- Natural energy utilization for eco-friendly information provision systems

- Tornado wind turbine application methods are developing towards commercialization.

- The tornado wind turbine ensures safety for vehicles during storms by utilizing natural energy.

- Key features:
  1. Wide range of application with high power generation
  2. Sturdy support structure
  3. Low noise and low vibration
  4. Resistant to severe weather conditions
Small-Scale Wind Power

Hybrid Signal Tower

The signal towers become an advertisement for the cell phone company.

(TN-30H Model)

Urban Model, Skyscraper Rooftop Solar Model

Skyscraper Rooftop, Cell Phone Relay Station Model

Small-Scale Wind Power Hybrid Signal Tower
Tornado Wind Turbine Application Methods

Mobile Cell Phone Signal Tower Plan

Relay Station Equipped with Wind Power Hybrid Generation and Battery Storage

(TN-100H Model)
The Tornado wind turbine setup stands out more than the rest stop.

It acts as a light for Sukusukugaoka, and becomes a symbol against the dark background of the hill area.

The Tornado wind turbine setup stands out more than Sukusukugaoka.
For the airport, it was the first demonstration experimental streetlight equipped with both emergency lighting and power source.

Because it is located in an airport, the FRP blades used were made with care regarding signal disruption.
A response which took lessons from the Great East Japan Earthquake

(Tornado Wind Turbine Application Methods)

(Revised Independent Power Source)

Normal Situation

[Normal Situation]

Commercial Power Source

Wi-Fi Station

Emergency Situation

[Emergency Situation]

Evacuation Center Etc.

Advertisements etc.

Cloud Computing

Wi-Fi Station

Emergency Power Source

Hybrid wind power generator

Things to Do

Security of the home or office

Monitoring and management system

TOKYO D Signage

(Revised Independent Power Source)

Normal Contents

Emergency Contents

(Emergency Contents)

(Emergency Contents)
EV mobility stand image with a wind genera

EV Mobility Stand Equipped with Wind and Solar Power

Wind 10kW Class

Hybrid Streetlight Wind 300W Class

Raising visibility as an EV stand landmark.
Wind Turbine/Tsunami Evacuation Tower (TN-1000)
Conceptual plan *Macroscale model of Tornado wind turbine* (1000KW class)

If it's a Tornado model, it would be possible to build a Megawatt-sized wind turbine with its own observation deck.

The structure and parts are the same as existing construction methods, just scaled up.

(Height 120m)
1. Neutral buoyancy
2. Escape function
3. Easy installation is