Next-Generation Wind Turbine

Generating Electricity from Typhoon

Challenergy Inc.

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Company Overview

Founded: October 1st, 2014

Mission: R&D and Marketing for the Next-Generation Wind Turbine

Representative: Atsushi SHIMIZU, Founder & CEO

Member: Total 8 (3 board members + 5 employee)
+ 3 Advisory Board members

Office: Tokyo (HQ), Okinawa (Branch, Test Site)

HQ R&D Center @Tokyo

Our Vision

Supply safe electricity to all human beings by our innovative wind turbine

People without electricity

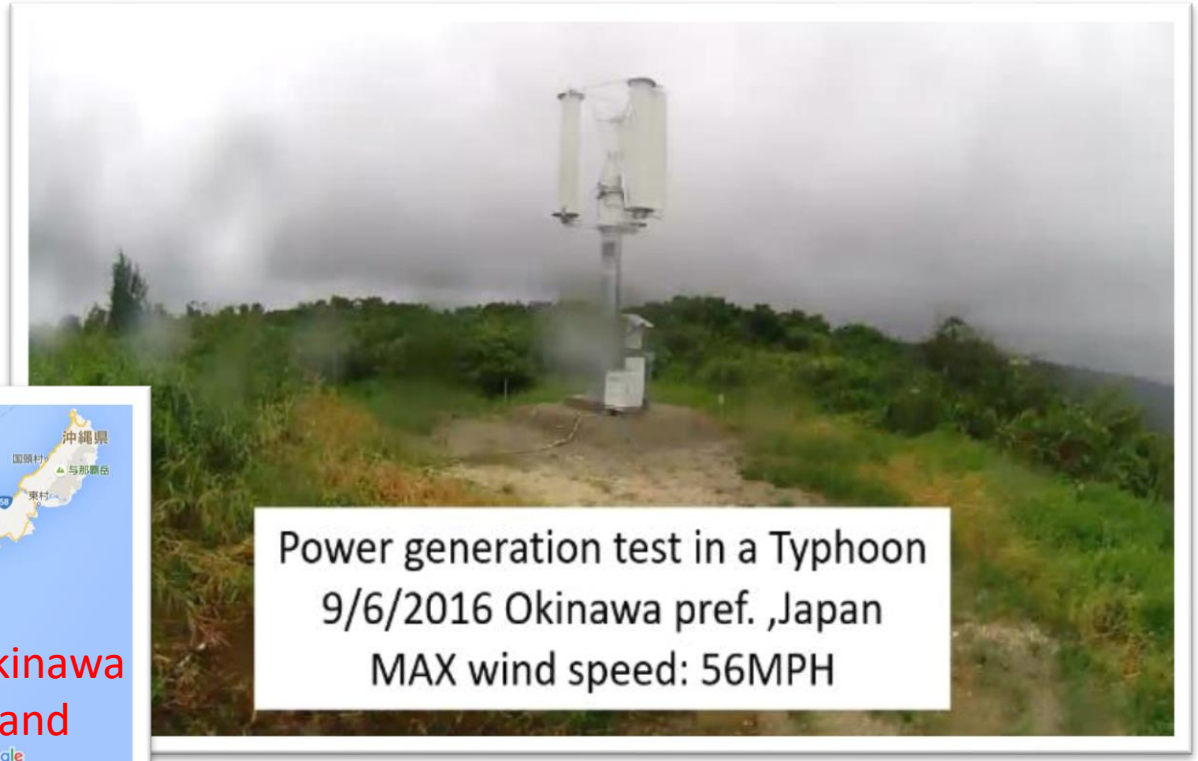
Fukushima nuclear disaster

The Problem

- Many wind turbines are broken by strong wind.
- In Asia, we seriously suffer from Typhoons every year.
- Wind condition differs depending on the place.

The Solution: “Bladeless” Windmill

- Capable of power generation from storms
- Low noise
- Prevention of bird strike



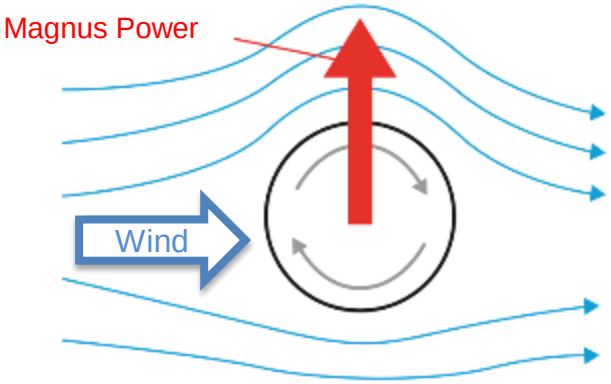
The Only One Wind Turbine

Typhoon “Talim”

The Technologies Behind “Bladeless”

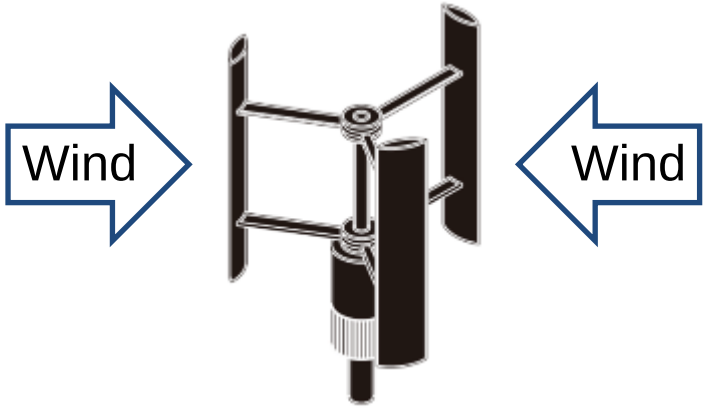
①Using “Magnus effect” instead of propellers

- Principle of banana shoot
- Controllable by rotation speed
- More durable than propellers
- Cheaper than propellers

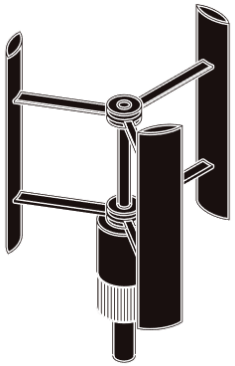
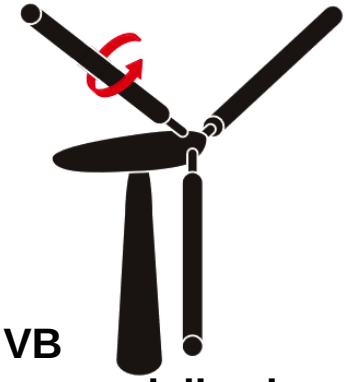


②Adopting vertical axis

- Omnidirectional
- Low maintenance cost
- Able to install in urban areas

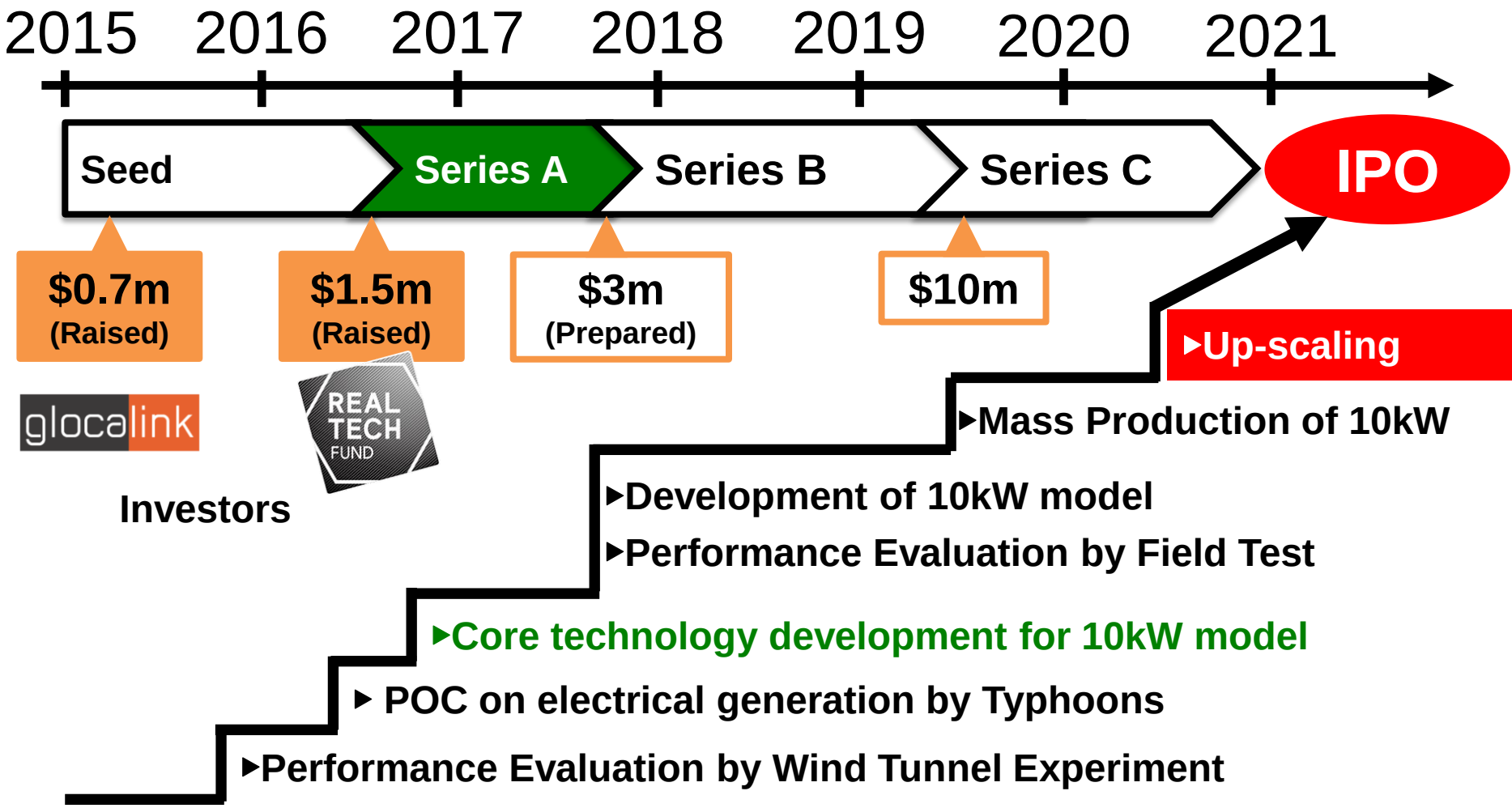


Wind Turbines Portfolio

	Horizontal Axis	Vertical Axis
Propeller Blades	 **Leading Model**	 **the main application is a Monuments**
Magnus effect	 **Japanese VB already commercialized**	 **World-First Magnus Vertical Axis**

Reference: i:ENGINEER https://haken.inte.co.jp/i-engineer/human/challenergy

Road Map to 2020



The Supports & Recognition

Financial Support

NEDO

Research Support for Magnus Vertical Axis Wind Turbine Development (Governmental Research Funding)

Financial Support

METI
Ministry of Economy, Trade and Industry

Feasibility Study for Adaptation Technology in the Philippines

Financial Support

沖縄県
OKINAWA PREFECTURE

Research Support for Commercializing 10kW Magnus Wind Turbine

CNN Web(Jun 2017)

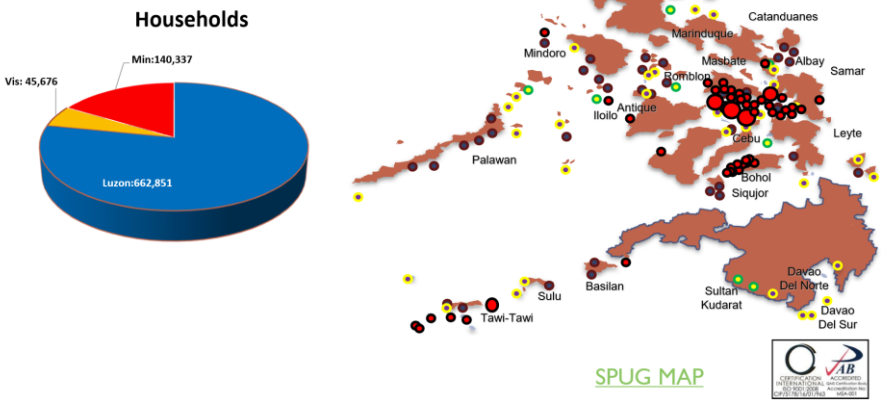
Cleantech Open Winner @San Francisco (Feb 2017)

MOU for Cooperation Singed with NAPOCOR (Oct 2017)

The Business Plan in the Philippines

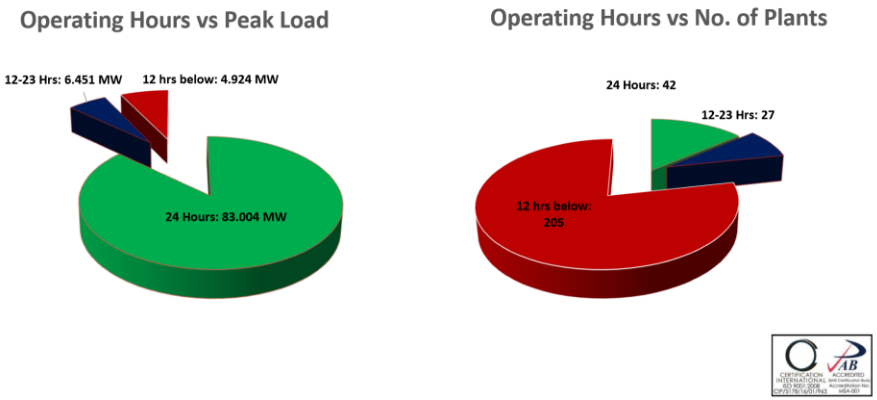
- There are still a lot of small diesel generators owned & operated by NPC in the small islands.
- Over 90,000 MW demand in the isolated islands.
- Generation cost of small diesel is 12-20 PHP/kWh.

SPUG AREAS	NO. OF AREAS	NO. OF HOUSEHOLDS	NO. OF PROVINCES	NO. OF MUNICIPALITIES	NO. OF BARANGAYS
Luzon	174	674,621	16	118	2,132
Visayas	43	48,223	9	29	222
Mindanao	21	145,553	9	41	479
TOTAL SPUG	**238**	**868,397**	**34**	**188**	**2,833**



Location Map of Small Diesel Unit

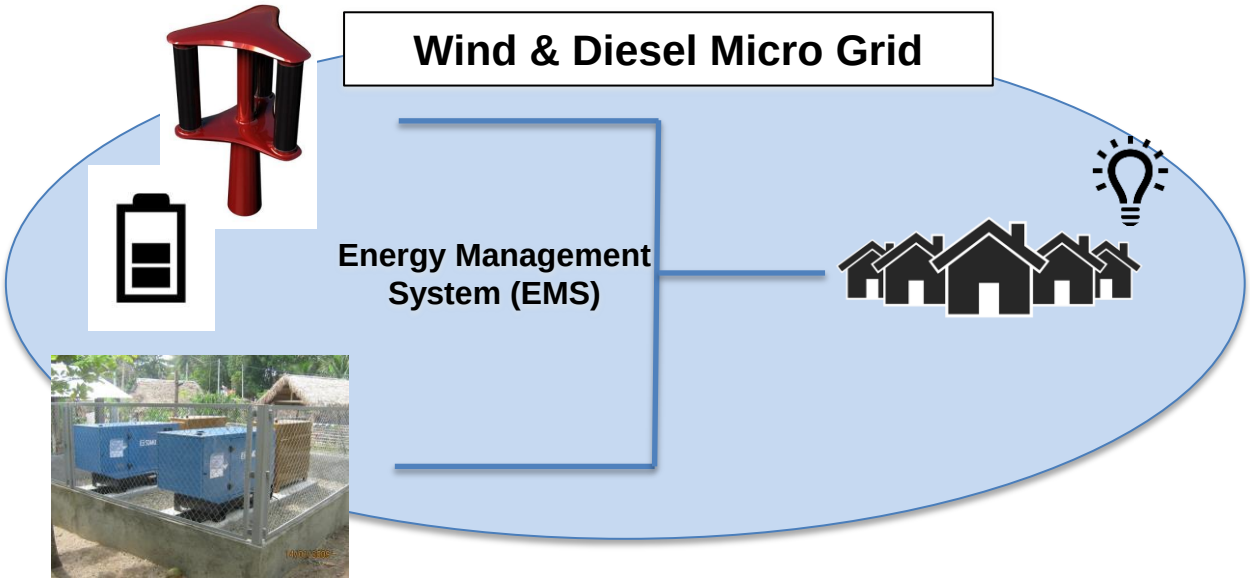
SPUG AREAS	NO. OF PLANTS	TOTAL CAPACITIES		PEAK LOAD	NO. OF AREAS	NO. OF HOUSEHOLDS	NO. OF MUNICIPALITIES	NO. OF BARANGAYS
		RATED	DEP					
24 hours	42	170.780	117.397	83.004	34	794,710	129	2,289
12-23 hours	27	22.539	18.097	6.451	27	38,759	27	220
Less than 12 hours	205	14.127	11.299	4.924	177	34,928	32	324
TOTAL SPUG	**274**	**207.446**	**146.793**	**94.379**	**238**	**868,397**	**188**	**2,833**

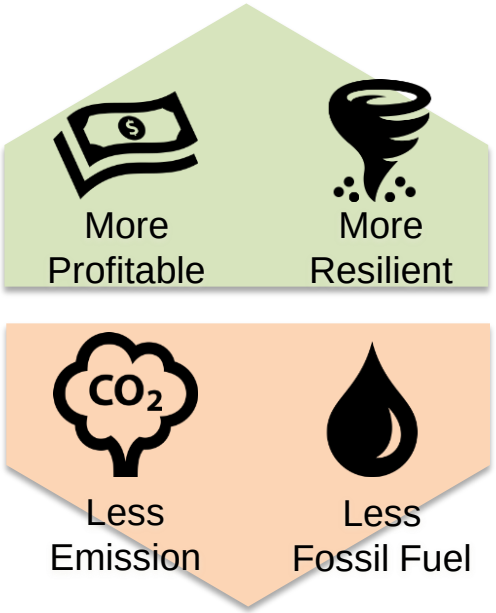


Operation Status of Small Diesel Unit

The Business Plan in the Philippines

- Reduce generation cost by combining Wind, Diesel and Battery (Wind and Diesel Micro Grid)
- Provide energy management system technology by Challenergy (Wind) & Diesel

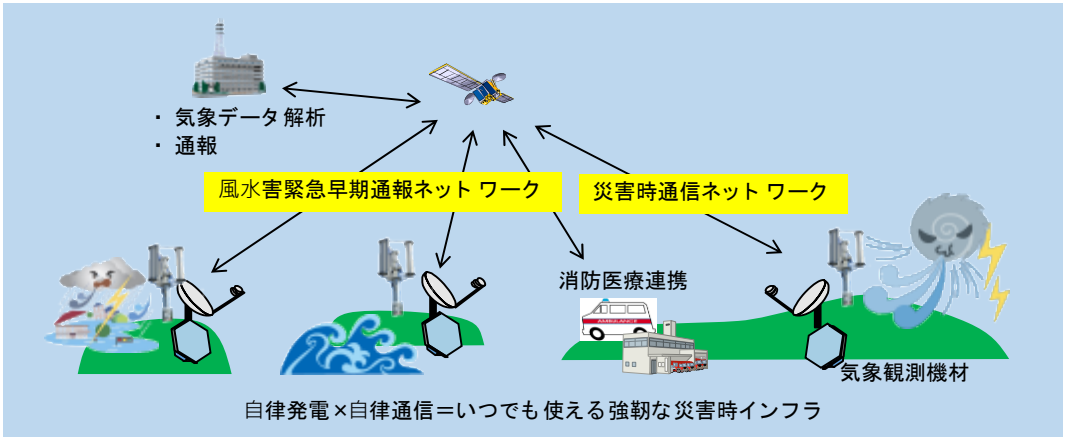




Disaster Risk Reduction

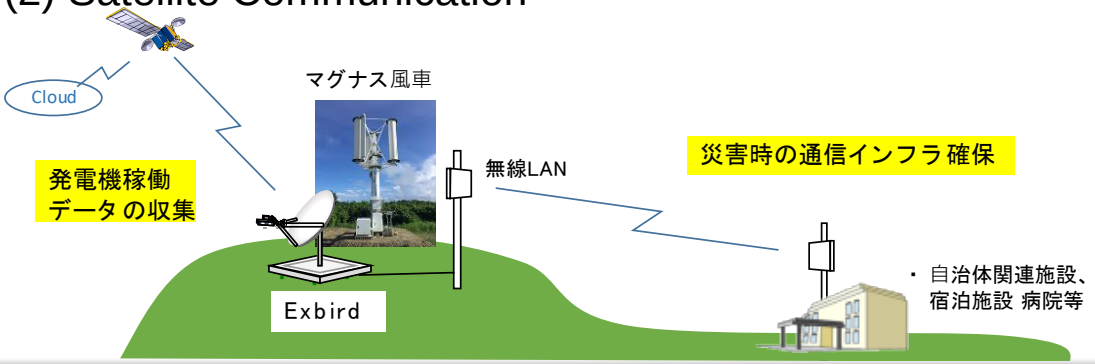
More resilient to Typhoon Disaster

(1) Disaster Alarming System



- Wind energy used for the independent power source of sensor and satellite antenna.
- Stable connection with the central agency

(2) Satellite Communication



- Secured power supply for medical and communication purpose
- Satellite antenna for monitoring and emergency communication