



Wind Harvest

# Genius Solutions to Turbulent Wind

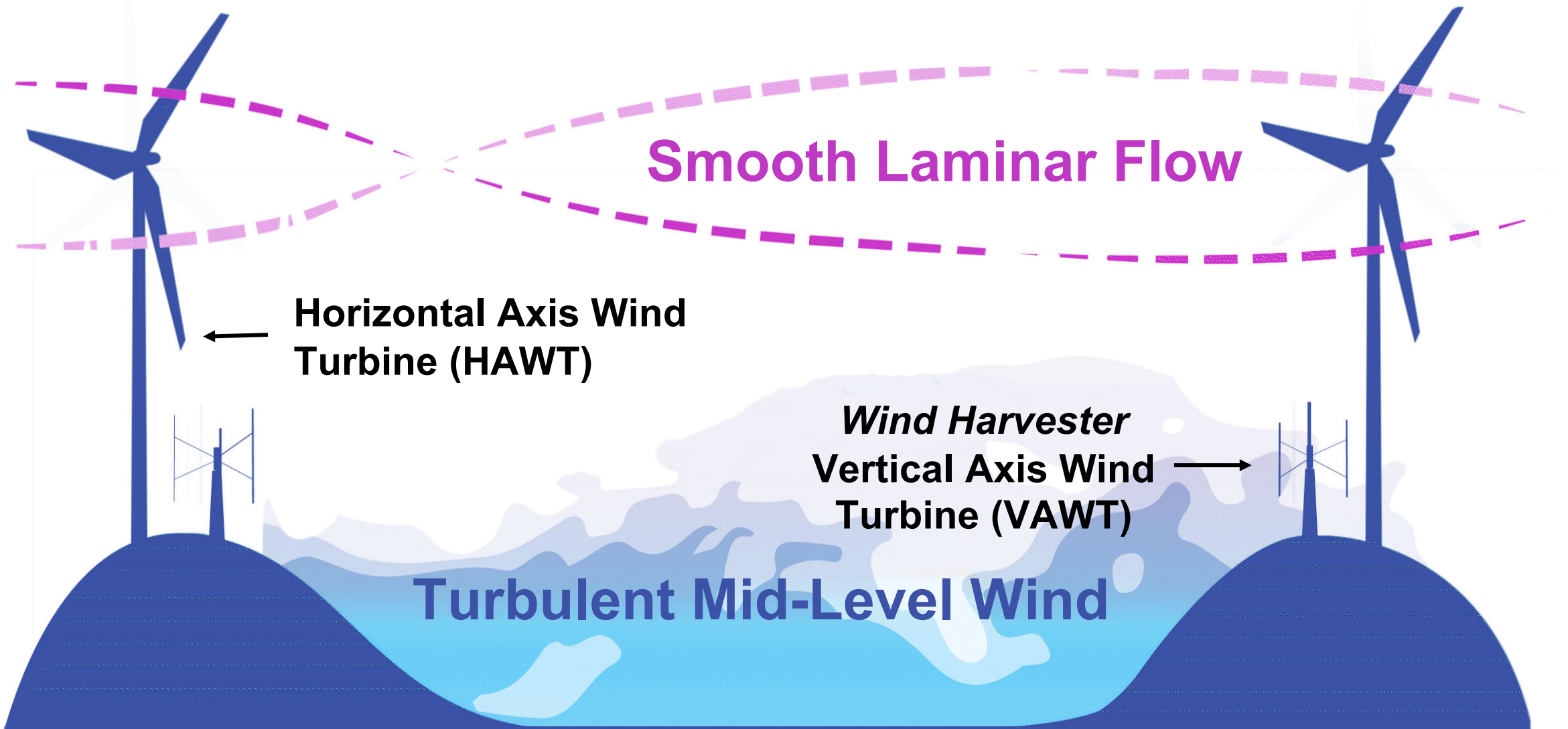


Kevin Wolf, CEO  
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# PROBLEM:

## Traditional Turbines Cannot Handle Turbulent Wind



# SOLUTION: *Wind Harvesters*

**Designed for Turbulence:** 2 arms per blade and a vertical axis

**Rugged & Durable:** Modeling predicts 70+ year fatigue life

**99% Recyclable:** Steel and aircraft aluminum

**Easy to Make, Assemble, & Install:** 50-80% can be made locally

**Ready for TRL 8\*** (3<sup>rd</sup> party certification) & **TRL 9** (bank financing)

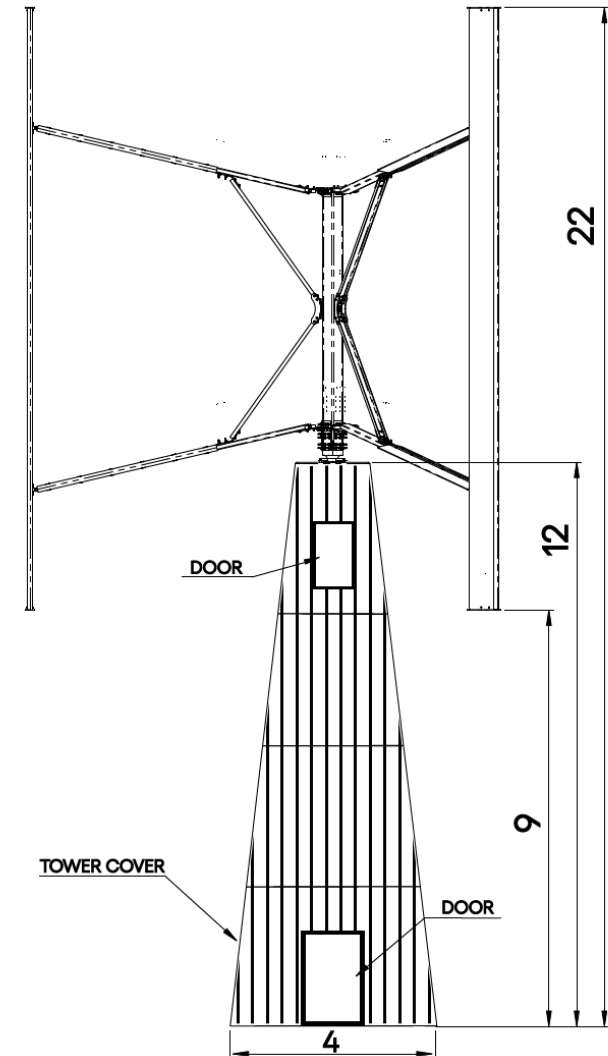
**Short:** 60'-120' (18-40m) to top of blade. They fit under HAWTs

**Compact:** Blades pass 3 feet (1m) apart from each other

**Synergistic with HAWTs:** can increase HAWT output by 10%

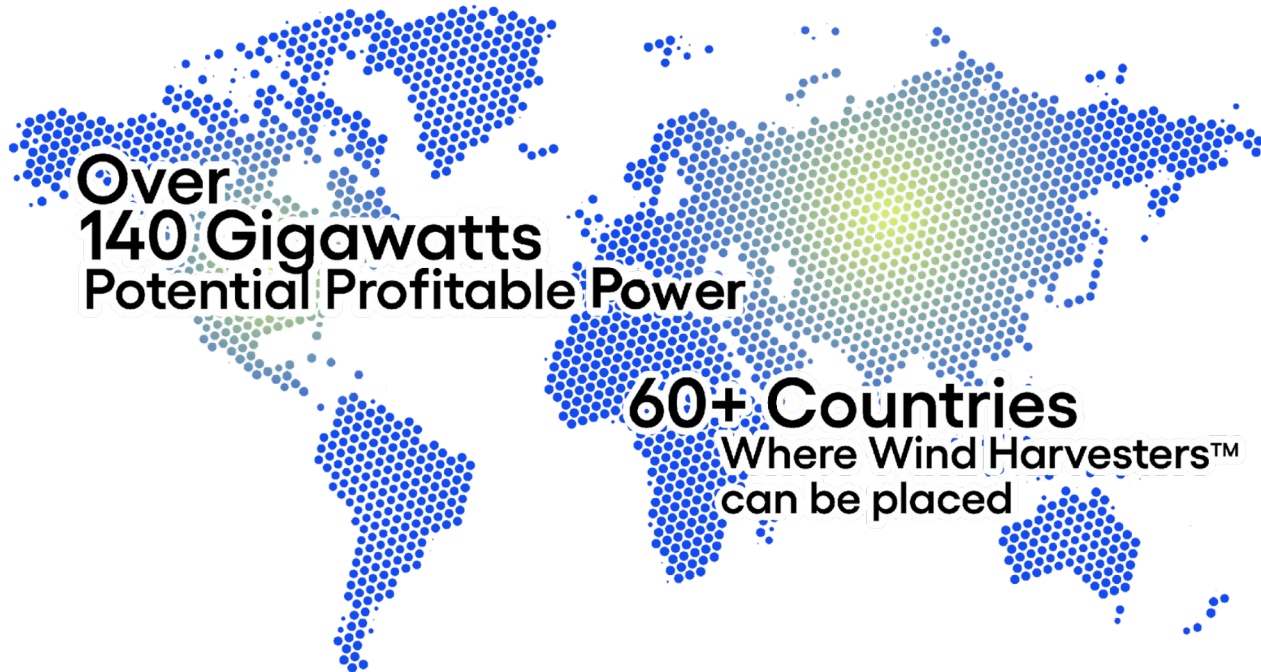
**Competitive:** Promises to be the least costly energy alternative

\*Technology Readiness Level



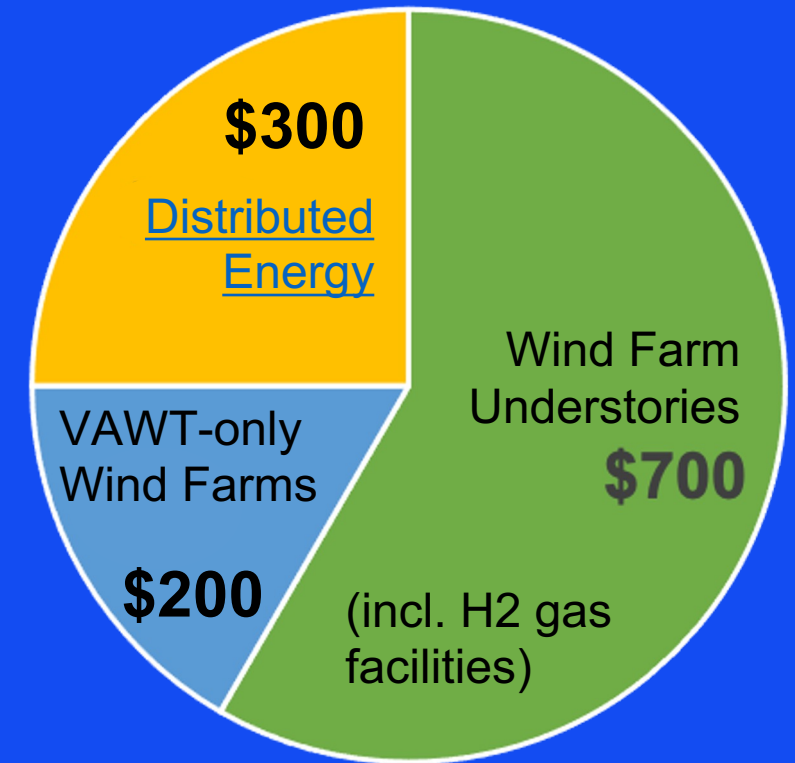
Model 4.0 in meters

# Market Opportunity:



Mid-level wind wasted in existing wind farms is worth \$400 billion. This market should double in 10 years.

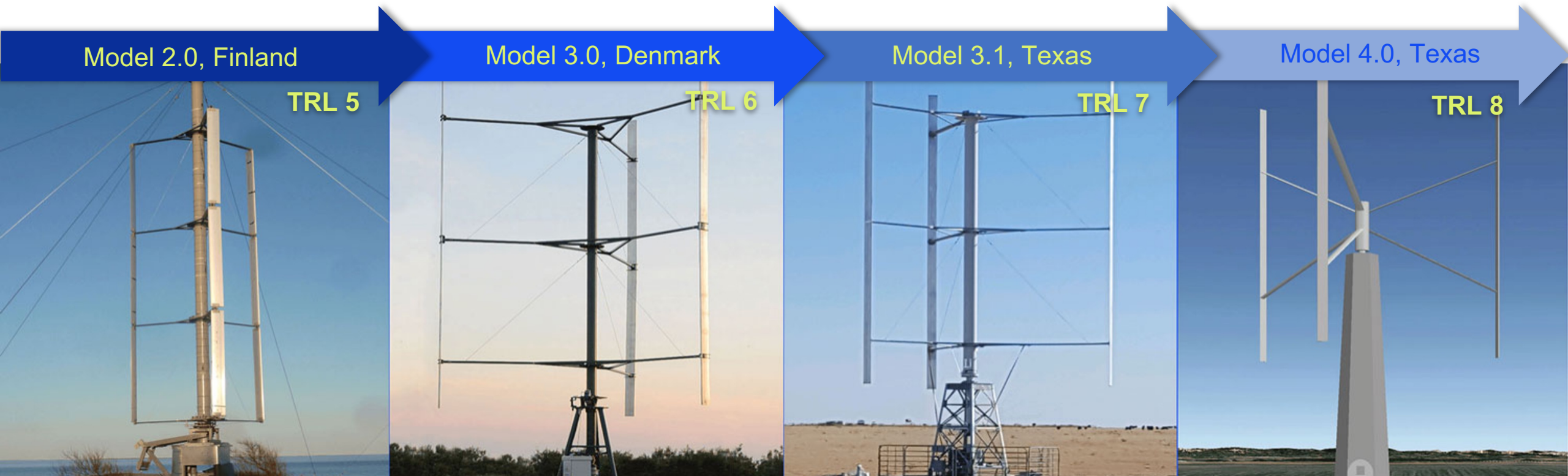
## 2030 Markets in Billions





# Achievements & Milestones

- **Completed TRL 7** - full-scale prototype operating in industry (turbulent) conditions
- Twice field-validated aeroelastic model – **1st in the industry**
- **\$22+ million** invested to date
- **New patents pending and granted** – more in development
- **\$100+ million** in the [project pipeline](#) for 2024-2026



# Ahead of the Competition:

Offshore – costly  
& time consuming

**SEATWIRL**®

WorldWideWind 

Not Utility Scale,  
Not for Turbulence

**XFLOW** ENERGY

 **FAIRWIND**  
Votre énergie pour demain

Early in TRL,  
Not for Turbulence

**AIRLOOM**  
ENERGY 

First-to-market advantages:

- Vertical axis wind turbines made for turbulence
- Competition will need Wind Harvest patents

# Some of the Passion Behind the Product:

Note: A CFO, General Manager/COO, VP of Sales and others will be hired after full funding



**Kevin Wolf**  
CEO and  
Co-Founder



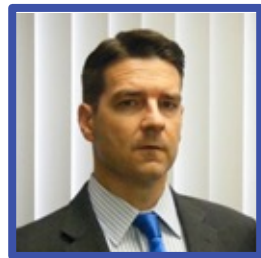
**Dr. Ola Ajala**  
Principal Engineer  
Team Supervisor



**Dr. David Malcolm**  
Senior Engineer  
VAWT expert



**Christine Nielson**  
Board Member



**Robert Loewer**  
Fractional CFO



**Rob Wheelock**  
Strategic  
Advisor



**Cornelius Fitzgerald**  
Board Member



**Dr. Ariana Marshall**  
Barbados Rep.



**Tom Williams**  
Strategic  
Advisor



# Funding the Next Steps:

- **\$5M Reg CF Offerings**
  - Installation and testing of two turbines
  - Third party Certification and TRL 8
  - File new patents
- **\$10-25M Series B Round**
  - Finance turbine sales in 2025-26
  - LiDAR for wake modeling
  - Install [wind farm pilot projects](#)
- **Access Project Subsidies**
  - 40% Investment Tax Credits
  - Accelerated depreciation
  - Grants, R&D Tax Credits



Visualization of *Wind Harvesters* deployed in the understory of a wind farm



# Creating New Markets for Wind Turbines

- First utility-scale turbines to operate in turbulent wind
- Difficult to make a steel and aluminum VAWT without licensing our patents
- \$100+M in sales being developed for 2024 - 2026
- Wind farm owners and developers want our turbines
- Near-limitless scalability
- Solid exit strategies with over 50X return possible

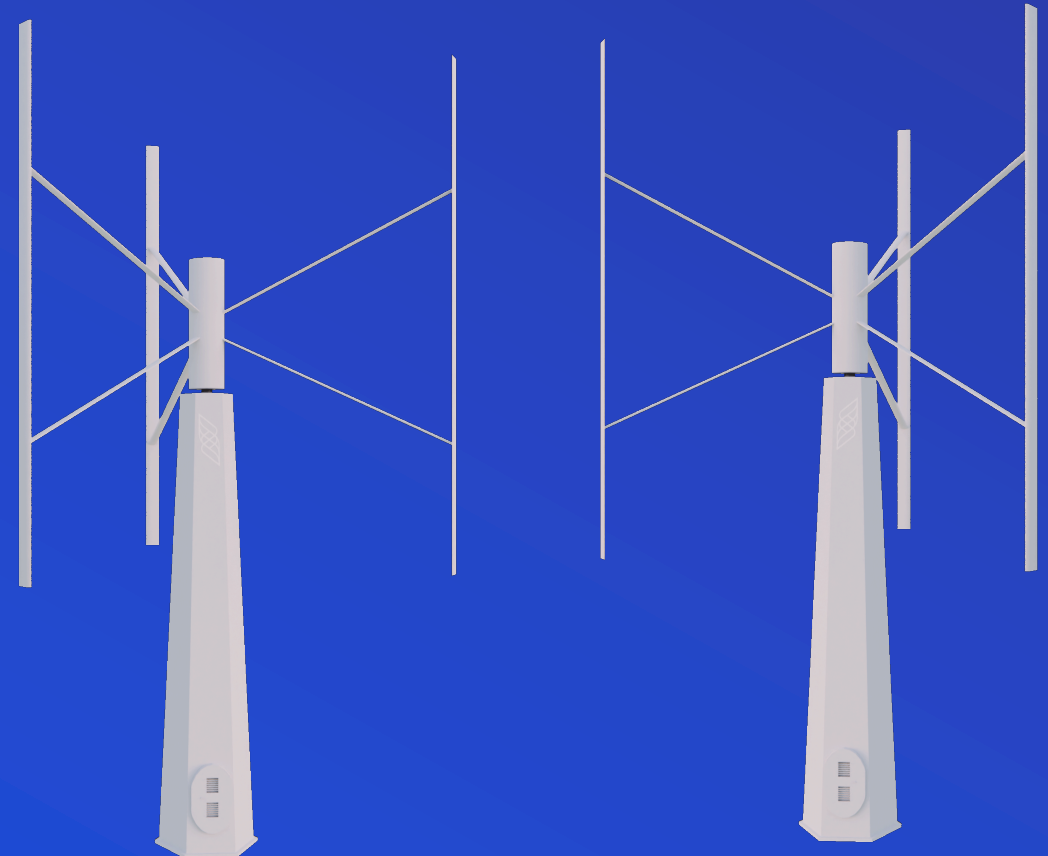


**Kevin Wolf** | Chief Executive Officer & Co-Founder

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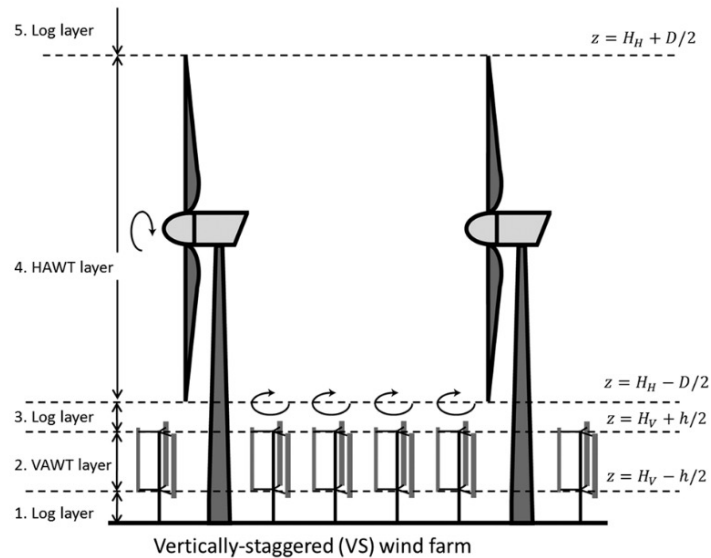
# Appendices

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  - [Use Case: High Energy Use Facilities](#)
  - [Use Case: Ellsworth AFB](#)
- [Sales & Project Pipeline](#)

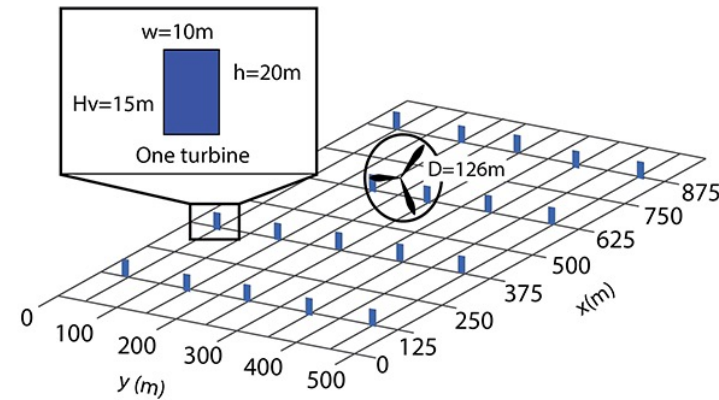
# Wind Farm Synergy:

## *VAWTs help HAWTs and Vice Versa*

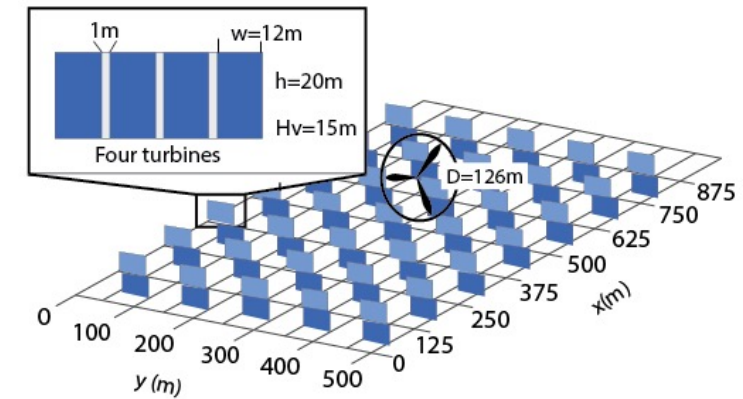
- VAWTs can create a **10% increase** in output of HAWTs
- VAWTs shed vortices that draw down **faster moving wind**



Sketch of 5 layers in the vertically-staggered mixed wind turbine array boundary layer [1]



Layout of staggered wind farm proposed in 2016 study (left) and by Wind Harvest currently (right) [2]



# 20% of Wind Farms Have Excellent Unused Mid-Level Wind Resources

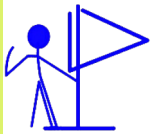
Because Horizontal Axis Wind Turbines (HAWT) have problems with turbulence, they are placed far apart from one another and high above the ground.



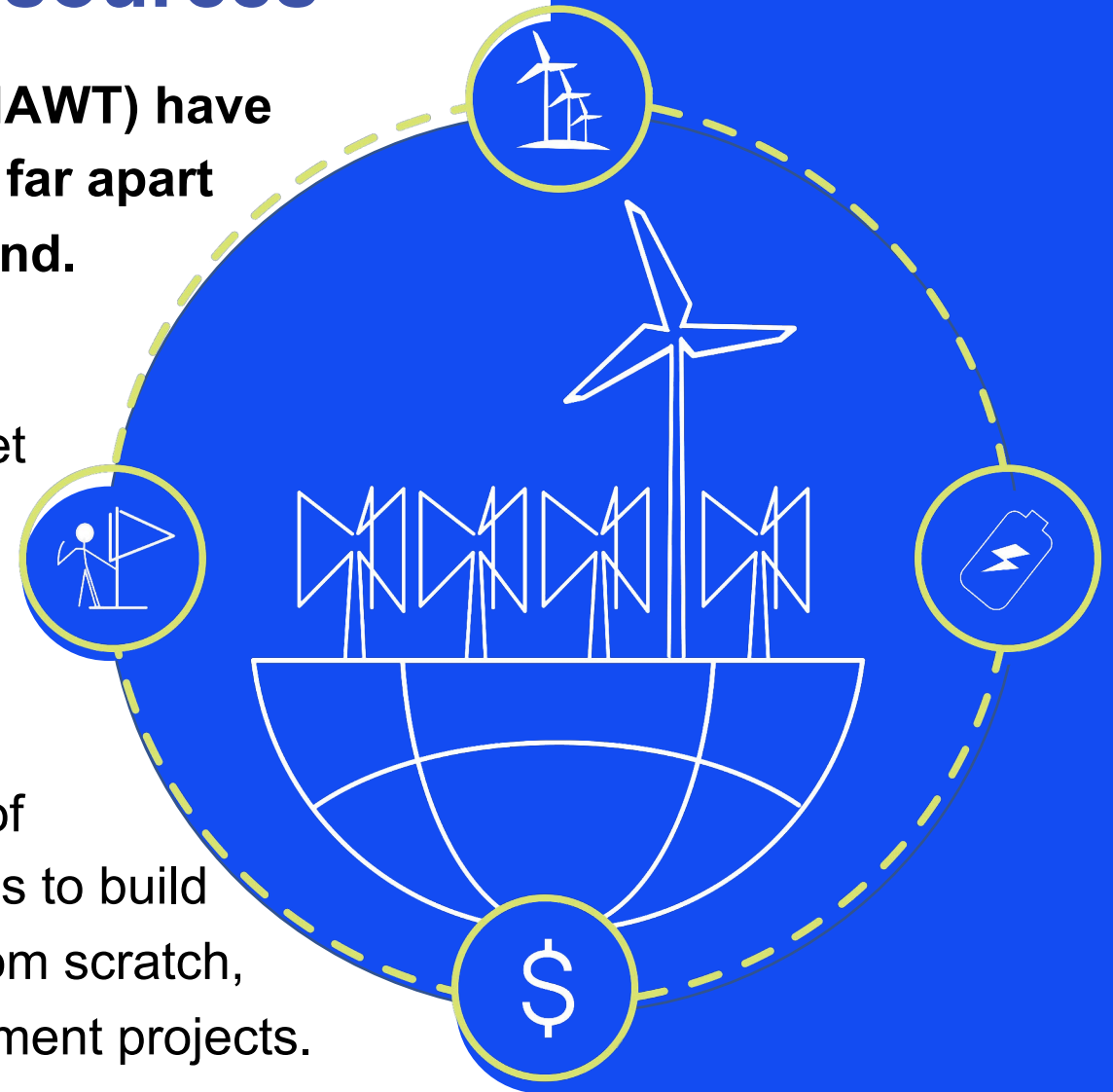
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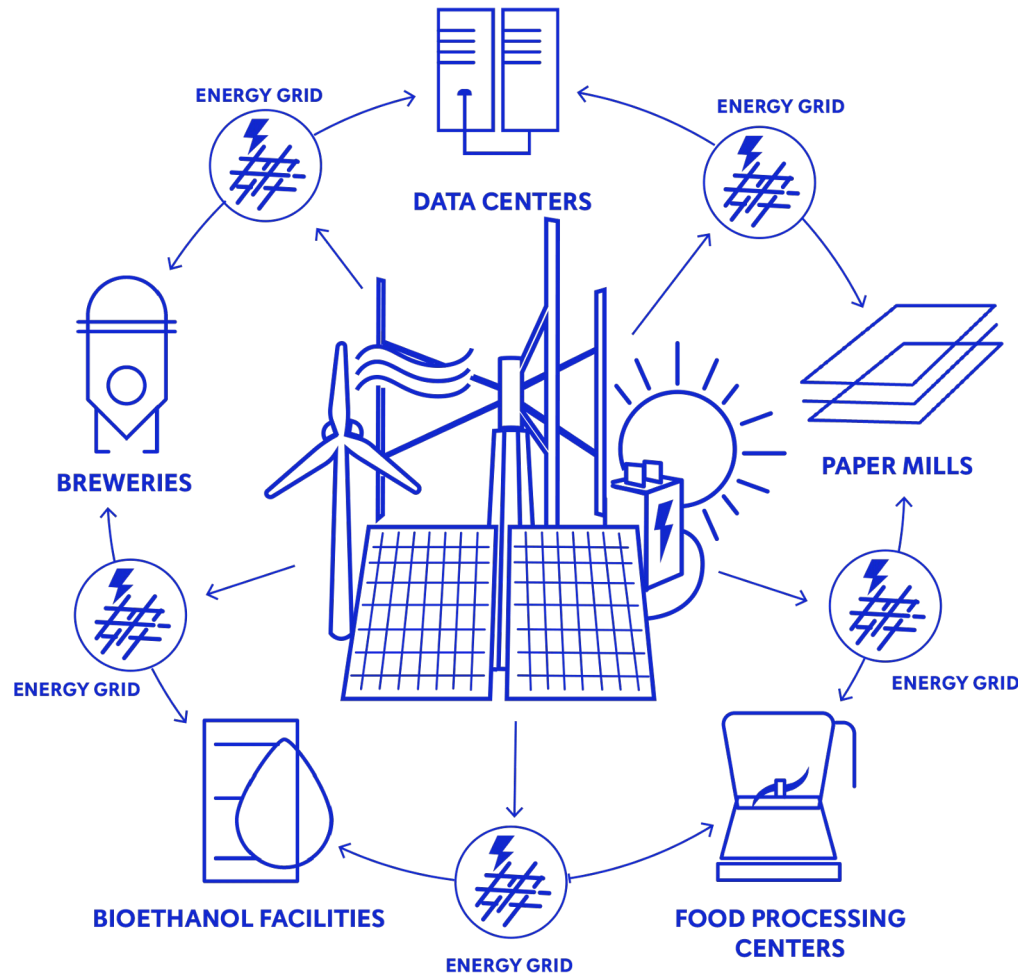
1-3X more MWs added per wind farm with [understories of Wind Harvesters](#).



It is much less expensive to add rows of *Wind Harvesters*™ underneath than it is to build new onshore or offshore wind farms from scratch, especially in Capacity Factor Enhancement projects.







## Where the Distributed Grid Needs Short *Wind Harvesters*

- Properties with tight setback easements
- Airports and Air Force Bases with radar issues
- Islands like Barbados where tourism and problematic roads make tall turbines unusable
- Telecom towers on windy ridgelines
- Places where visual impacts are important
- Bird and bat sensitive properties - VAWTs are safer for animals than HAWTs

# First Sale is Set

The first *Wind Harvester Project LLC* will:

- Purchase two *Wind Harvester 4.0* turbines
- Purchase the existing *Wind Harvester 3.1*
- Receive ~ \$400,000 in Investment Tax Credits (30% of turbine and development costs)
- Bring in \$500,000 from investors who can use the ITC and available accelerated depreciation
- Give full ownership to Wind Harvest after five years
- Provide the data that banks will need for customer loans

Once testing is completed, these turbines will be moved from the UL testing facility in Texas to their permanent homes. Tax benefits will not be affected by the move.



Model 3.1's costs will be recuperated when it is sold.

# ***USE CASE: Capacity Factor Enhancement***

## **Example: A 100 MW Wind Farm**

**25 MWs** (~350 *Wind Harvesters* = \$60M)

**125 MWs** combined. Uses only the existing 100 MW substation and transmission line

**20-25%** ↑ project Capacity Factor

**~5%** ↑ Energy Output for HAWTs

**10-year** HAWT life extension because they can pitch blades earlier

**No new** land, main roads, or fencing

**8-15+%** Project IRRs





# ***USE CASE: Distributed Energy***

## **Barbados Has Great Unused Mid-Level Trade Winds**

The country is struggling to meet its renewable energy goals.

- HAWTs are **too large** for views, roads and setback easement
- Solar takes up **too much land**
- Feed In Tariff PPA at US\$ 0.17/kWh
- **100s of MWs** of 6-7m/s (13-16 mph) mid-level winds are unused
- Windy government **land is available**
- **50% of each *Wind Harvester*** can be made and assembled on the island





# USE CASE: High Energy Use Facilities

- Tall turbines don't fit on these properties
- EVs will increase energy demand
- High-value PPAs
- Complements solar (*wind blows at night*)
- 40% Investment Tax Credits
- Easy to permit, build and maintain



# ***USE CASE: Ellsworth AFB, South Dakota***

## **Pilot Project to Open Airports and Military Bases**

- A two-turbine pilot project
- Research impacts on radar and flight patterns
- Potential for 5+ MWs on Base
  - 96 turbines
- Pilot project opens *Wind Harvester* for sales to Anderson AFB in Guam and Travis AFB in Solano County, California



*A build out of Wind Harvesters envisioned for the north side of the AFB.*

# Sales & Project Pipeline

Projects and Customers (Capacity of Turbine Generators)	Location	Wind Harvesters Sold			
		Year 1	Year 2	Year 3	Year 4
St. Lucy 1 and 2 (50kW)	Barbados	2	20	200	400
Anza Hills Projects (60kW)	Riverside County, CA		16		50
Wind Harvest First LLC (70kW)	UL Test Facility, TX	2			
High-Energy User (60kW)	USA		32	100	200
Solano County Projects (60kW)	Solano, CA		14		100
Other WH projects (e.g Ellsworth AFB)	US & International	2	12	100	200
Direct Customer Sales (70kW)	US & International		6	50	100
Distributors (60 kW))	US & International			50	200
<b>Turbines Sold</b>		<b>6</b>	<b>100</b>	<b>500</b>	<b>1,250</b>
<b>MWs Sold</b>		<b>0.4</b>	<b>6.0</b>	<b>30.0</b>	<b>75.0</b>