Flower Turbines

The wind turbine you want to live and work next to. Great for airports

Dr. Daniel Farb, CEO | dfarb@flowerturbines.com

First, we tell you about us, our products, our technologies. Then, what we can do for you at an airport:

1. Clusters of turbines to make cost-effective power, on ground and roof.

2. Our special recycling of exhaust wind

3. E-bike and device charging stations to encourage less-polluted commuting for employees and passengers

4. Off-grid charging stations for security, resistant to loss of grid power.

Validation

Pepperdine University Business School picked Flower Turbines as one of the 10 Most Fundable Companies in America in 2020 out of 4500 companies examined.

Source

IMPEL +

Flower Turbines chosen as a 2021 Innovator by Livermore Labs in Berkeley and the US Department of Energy

Source

Solar Impulse Foundation picked Flower Turbines as one of their “1000 Efficient Solutions” for climate change.

Source

Award Winner

Winner of Dutch Sustainability Award Two Separate Years

Dutch Climate Minister at an Installation

Award Winner

A Winner of Yes San Francisco Cleantech Competition
In Association with the World Economic Forum

SAN FRANCISCO
OFFICE OF ECONOMIC & WORKFORCE DEVELOPMENT

Mayor London N. Breed
Executive Director Sarah Dennis Phillips

December 20, 2023

Daniel Farb
CEO
Flower Turbines
dfarb@flowerturbines.com

Dear Mr. Farb,

I want to offer my warmest congratulations as being one of the innovators chosen to reimagine and transform San Francisco.

I am glad you are here to help bring sustainable and equitable growth to the City's economy. I look forward to helping you in accelerating your expansion from the startup phase, and hope to assist you in locating in our great City over the long term.

Congratulations again and look forward to connecting soon.

Happy holidays and best wishes for 2024.

Sincerely,

Problem

Small wind hasn't lived up to its potential as a distributed energy source — Why?

Low noise and efficiency don't mix.

Turbines close together interfere with each other

Controversial esthetics

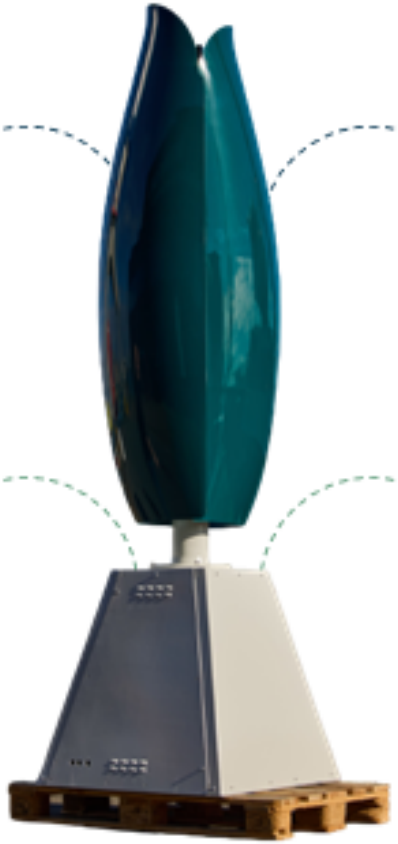
Bird dangerous

Solution

Say Hello to Flower Turbines
It can provide a better solution than any other wind turbine

We patented how to make vertical axis turbines much more efficient. Third party report: noise less than wind

Beautiful yet efficient



The turbines make their neighbors perform better.

Bird friendly

And they start at low speeds and survive high speeds.

Patented

Flower Turbines IP Categories—First Class Portfolio

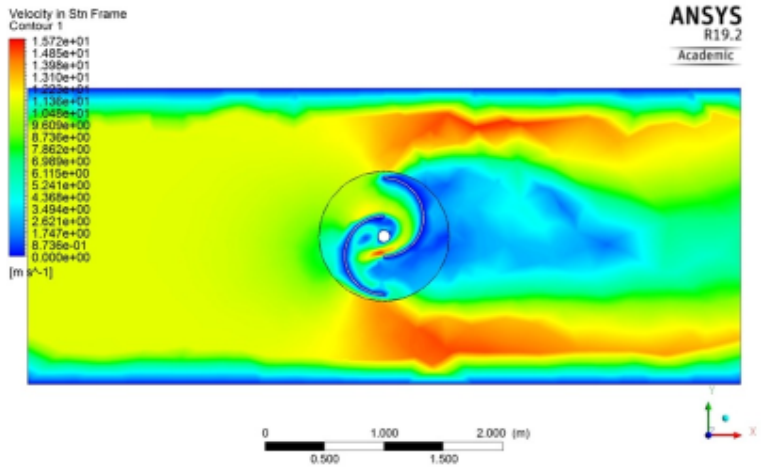
We solved the 3 sources of turbulence and have moved on:

1. Within the turbine aerodynamics
2. Turbine to turbine aerodynamics
3. Building to turbine aerodynamics
4. Manufacturing: Greater strength and lower cost
5. Installation – Open markets
6. Electronics
7. Design Patents and Copyrights

We have patents and know-how addressing each. We also have copyrights and trademarks. Strong IP of over 30 patents, each often filed in several countries. Our two sets of disruptive innovations are aerodynamics and wind turbine electronics.

The patented design decreases turbulence, increases efficiency, and allows turbines to work together.

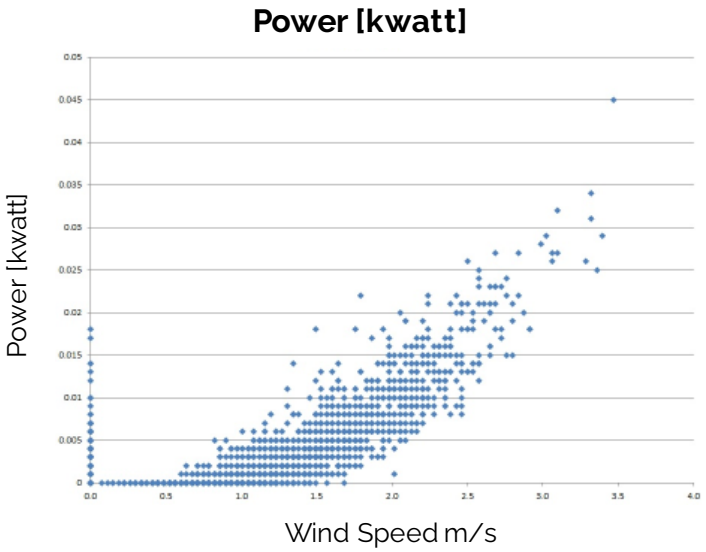
Wind from left, red highest velocity, yellow is outside wind speed, horizontal slice through the turbine's two blades, shaft in center.



Higher speed red area inside the turbine to hit the second blade and the turbine creates higher speed areas on the side.

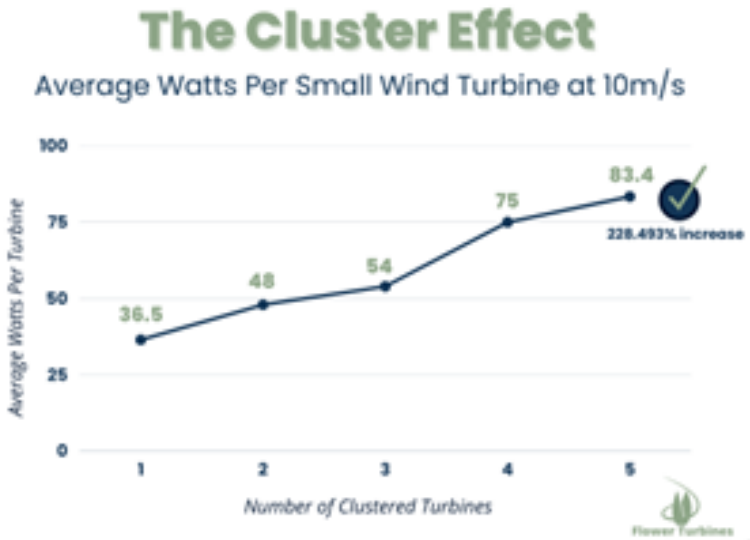
Efficiency

Efficiency Even at Low Speeds; Actual Data on Earlier Version



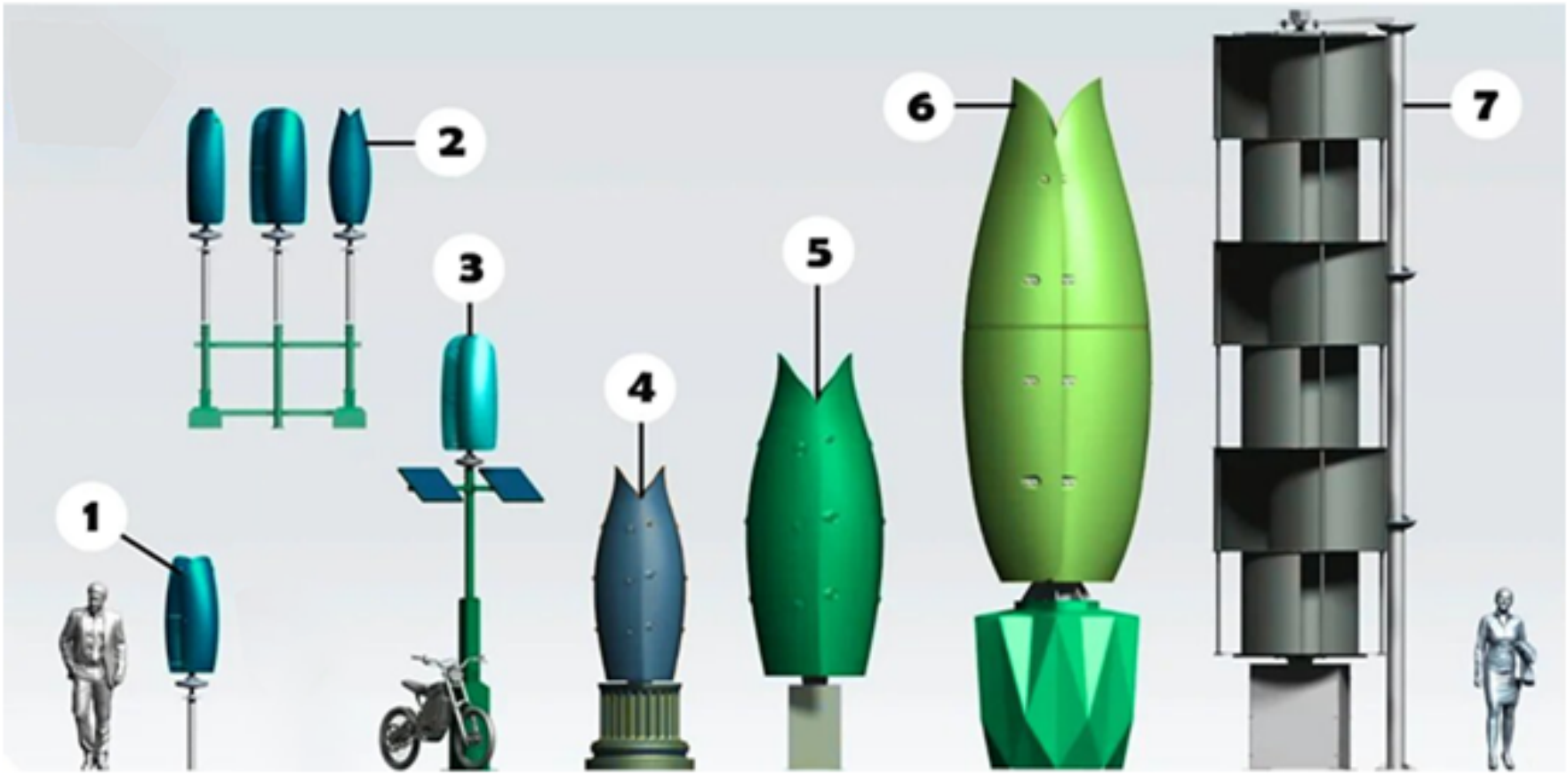
Other turbines start turning at 3m/s (6 mph), but the Wind Tulips are already turning at 1 m/s

Synergistic Clustering



Each turbine produces more and more power the more turbines are in a line in the correct configuration relative to wind direction. 5 turbines correctly placed produce 228% more power than 5 separate turbines.

The Product Line



1. Small Tulip Turbine
2. Eco-Roof Energy Hub
3. Charging Station
4. Medium Tulip Turbine
5. 3-M Tulip Turbine
6. Large Tulip Turbine
7. AL13 Power Tower

What is the Flower Turbines Key to Making Space and Cost Effective Small Wind Projects for the First Time?

1. High efficiency; the larger models have an aerodynamic efficiency over 40%, close to that of the modern large ones
2. Low starting speeds so they capture wind energy that other turbines miss
3. The projects are at the point of use—no transmission losses
4. THE BIG ONE: The “bouquet effect” means that each turbine added to a project makes the whole group perform better; each one added improves the investor return!

Flower Turbines (Large Size) Compares Favorably to Solar in Windy Areas: Economic significance of the cluster effect even in a small project

	Solar	Flower Turbines
Number of kilowatts capacity and kilowatt hours per year	20 and 27,381	20 and 50,000
Space in square meters (example: 10 story apt. building)	148.7	36
Cost of system with 30% Federal tax subsidy	$48,980	$70,000
Value of electricity per year	$4381	$8000
Payback period (years)	**11.24**	**8.75**
Revenue per square meter	$29	**$222** **770% Higher**

* Zip Code 02532 on Cape Cod Using $0.16 per kilowatt hour

Summary: The Advantages of Flower Turbines

1. Quiet
2. Beautiful
3. More Efficient
4. Bird Friendly
5. Start at Low Speeds
6. Endure High Speeds
7. “Bouquet” or Cluster Effect→ Cost and Space Effective
8. Available in Different Sizes

General Principle: Larger and More Turbines→ Lower Costs

Clusters for the Airport

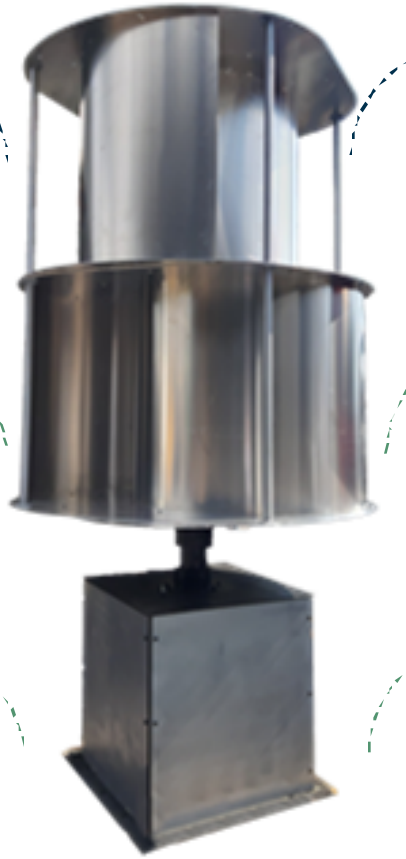
Tulips for the public; power towers for behind the scenes.
Cost effective on ground or roof.

Innovative Features of the AL13 Power Tower:

Can stack up to eight 1-meter modules in one tower

Low Noise

Uses wind from any angle



Recyclable Turbine

Bird friendly

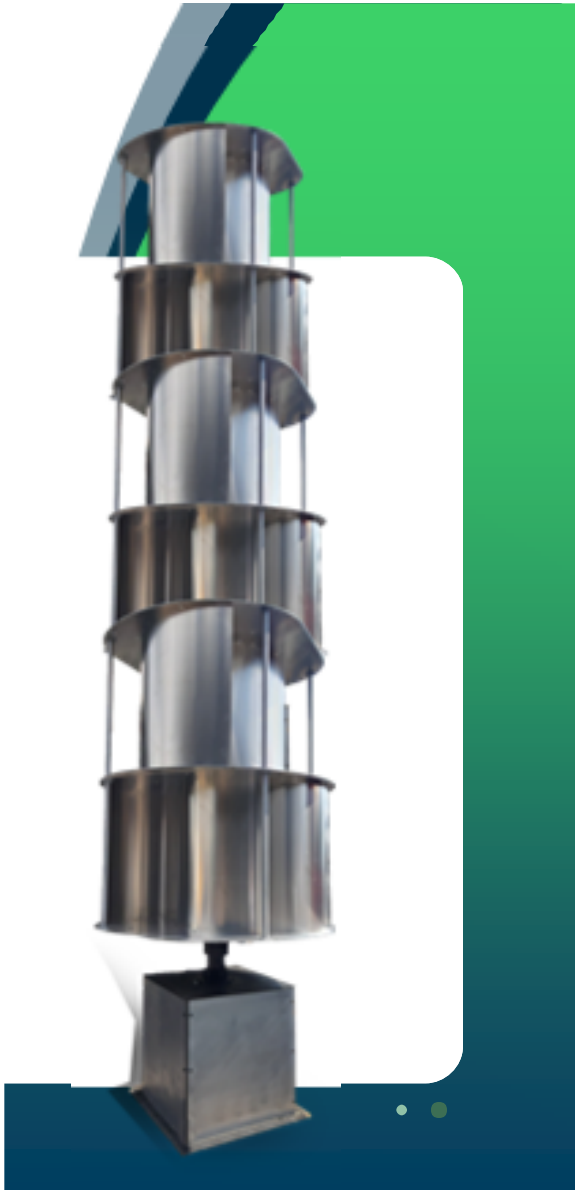
Efficient internal aerodynamics

The AL13 Power Tower™ delivers unmatched **effectiveness, cost-efficiency, and space optimization**

AL13 Power Tower

This product addresses the challenge of making our turbines:

1. Cheaper for all markets due to using aluminum blades.
2. Easier and cheaper to transport and assemble.
3. Starting at even lower wind speeds.
4. Available for more industrial uses.
5. Improved uptake of wind from all directions due to the stacking constructed at alternating angles.



Ground Mounted: A Serious Producer of Electricity in a Small Space

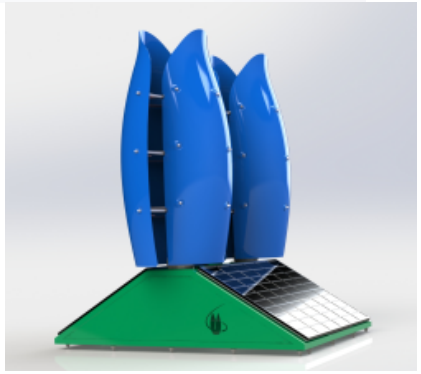
Rough example of only 10 large AL13 Power Tower turbines in 6 m/s wind, fitting within 2x20 meters:
Cost with installation: $275,000 (for illustration only)
Energy cost: $0.145 (common in West Texas) per kwh
Annual production: 230,000 kwh = 230 megawatt hours
Energy Inflation: 3% per year
Federal Tax Credit: 30%
ROI: 4.5 years
ROI: With no tax credit: 6 years
ROI: East Coast: Electricity at $0.25 with tax credit: 2.5 years

Power Tower or Tulips on the Ground

Roof Mounted: An Excellent Producer of Electricity

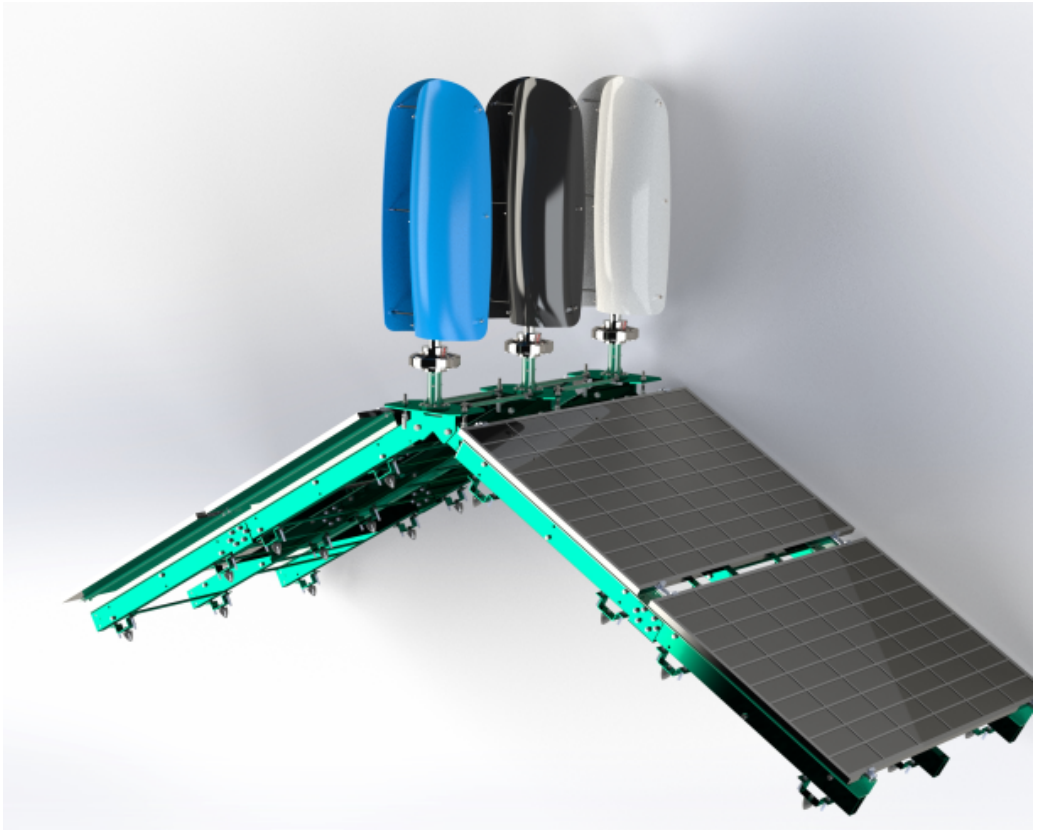
Rough example of only 10 3-meter AL13 turbines in 6 m/s wind, fitting within 2x20 meters:
Cost with installation: $145,000 (illustrative only)
Energy cost: $0.145 (common in West Texas) per kwh
Annual production: 80,000 kwh = 80 megawatt hours
Energy Inflation: 3% per year
Federal Tax Credit: 30%
ROI: 6.5 years
With no tax credit: 9 years
East Coast: Electricity at $0.25 with tax credit: <4 years

Use Cases



See them in operation in San Francisco:
https://youtube.com/shorts/BI_U76Llqzo

Slanted Roof Option



Wind-Only Rooftop Option

Only Flower Turbines Has the Solution for Exhaust Harvesting

-Patent granted
-Computer model for determining the right distance
-Turbine shape matches outlet shape
-Turbine design efficient for this type of wind. The return voyage of the non-cupped turbine deflects half the “resistance” into more force.

Choices for Wind Exhaust

Tulips

Available in various sizes

Have the efficient internal aerodynamics

Have a cluster effect

AL13 Power Tower

Available in various sizes

Have the efficient internal aerodynamics

Have a cluster effect

Generally recommended for exhaust applications due to their optimal shape compatibility and lower cost per unit.

E-bike and Device Charging

You can encourage e-bike use and make better use of employee and visitor parking.
You can provide greater convenience for your staff and visitors in outdoor and lounge areas.

In Use at Many Cities and Schools

ZW Pole
(Solar and Wind)

Z Pole
(Solar)

SL Pole
(Grid-Tied Charging)

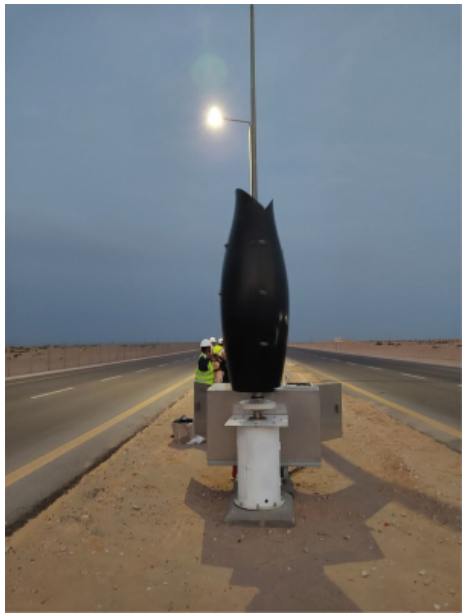
The needs for modular EV charging:

1. Small footprint
2. Independent of grid connection
3. Tightly spaced

Flower Turbines Technology is the Solution

Off Grid Charging

You can have more security devices and lighting not dependent on grid functioning.



Payment Options

Special no-risk 100% financing for selected projects of at least 10 turbines:
You pay us two cents less per kilowatt hour than the grid price and we provide everything at no cost. Fixed price also possible.
Option to buy after 7 years.
Signed PPA
Details at: https://d528cc30-602d-4d22-97c0-a5de10f37782.filesusr.com/ugd/f810b5_0f8a863ac1fd433e90d66bad27065564.pdf

Your Next Steps

Read materials on our website, https://www.flowerturbines.com/

Contact support.us@flowerturbines.com or just for Europe: support.eu@flowerturbines.com

Fill out the project detail form to tell us about your project: https://docs.google.com/forms/d/e/1FAIpQLSd2OJWnyEwZ7BZNi187P9Q-LDW9ysOjgSxnSMC-XI8kH407aA/viewform?pli=1

You may be eligible for 15 minutes free guidance from our CEO to make sure you are planning correctly.

Flower Turbines

Join us to change the world!

Dr. Daniel Farb, CEO | dfarb@flowerturbines.com