



Flower Turbines

An Answer for Business Energy Needs

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



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Your Problem

-Electricity Prices are Rising Faster than Inflation

-The grid is in serious trouble, particularly as more electric transportation is added. Data centers are contracting electric power away from consumers and other businesses. More demand; higher prices.

Solar photovoltaic helps, but the modules decline in output while prices go up.

So if you are in a windy area, Flower Turbines small wind power could be your solution!



Outline

- About Flower Turbines and Its Tech and Products**
- AL13 Power Tower Introduction**
- Ground Mounted**
- Roof**
- Exhaust**
- Off-Grid Security and Lighting**
- E-bike charging and outdoor benches for employees**



Company 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](#)



Innovator of the year!
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





Company Validation

Award Winner

A Winner of Yes San Francisco Cleantech Competition



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,



Patents

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.



General 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



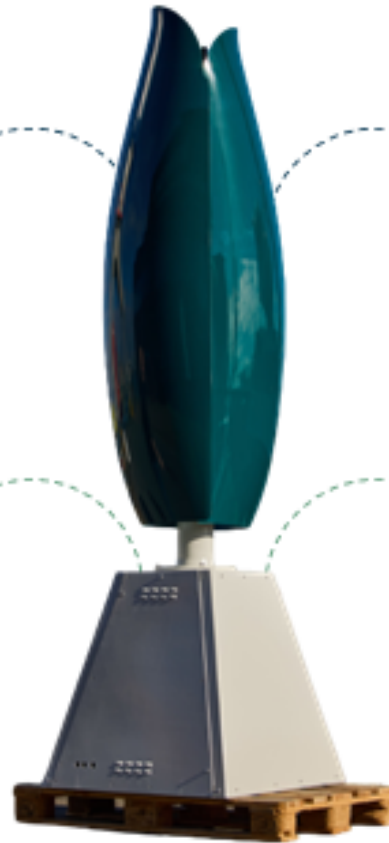
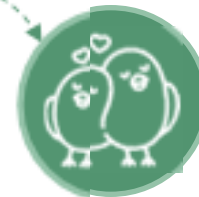
The turbines make their neighbors perform better.



Beautiful yet efficient



Bird friendly



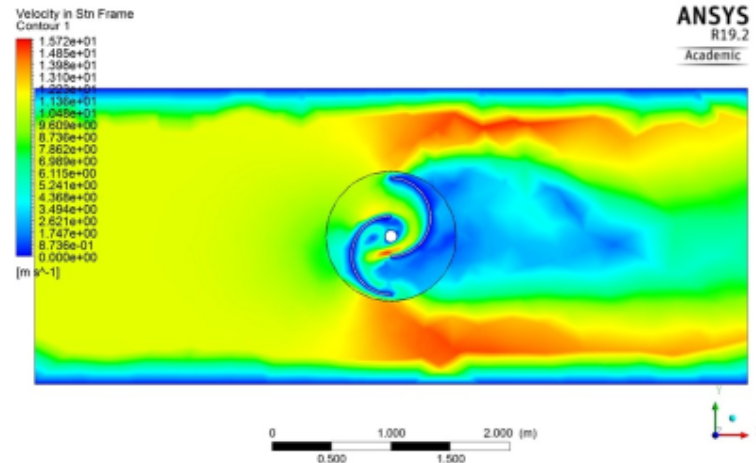
And they start at low speeds and survive high speeds.



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.



ANSYS
R19.2
Academic

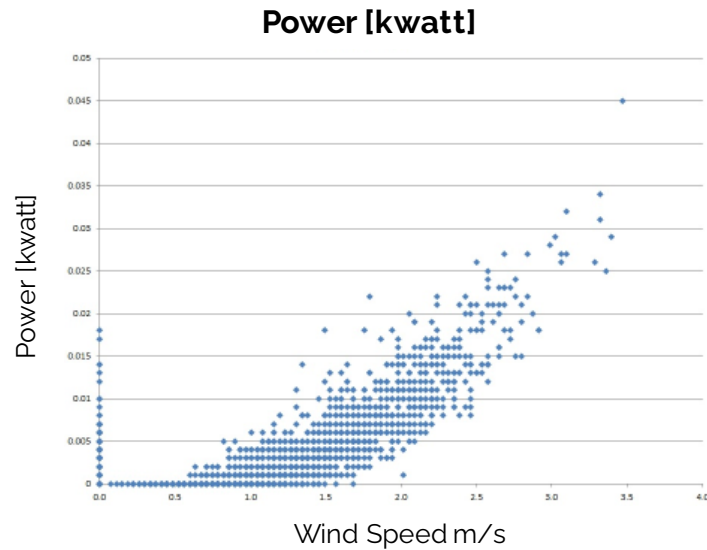


Higher speed
red area inside
the turbine to hit
the second
blade and the
turbine creates
higher speed
areas on the
side.



Efficiency

Efficiency Even at Low Speeds; Actual Data on Earlier Version

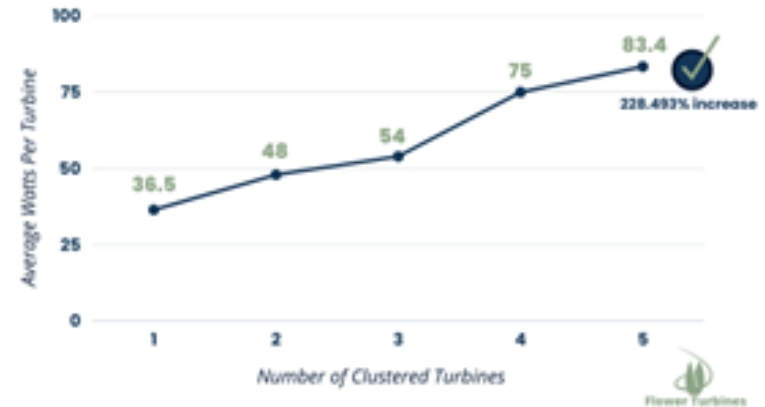


Other turbines start turning at 3m/s (6 mph), but the Wind Tulips are already turning at 1 m/s

Synergistic Clustering

The Cluster Effect

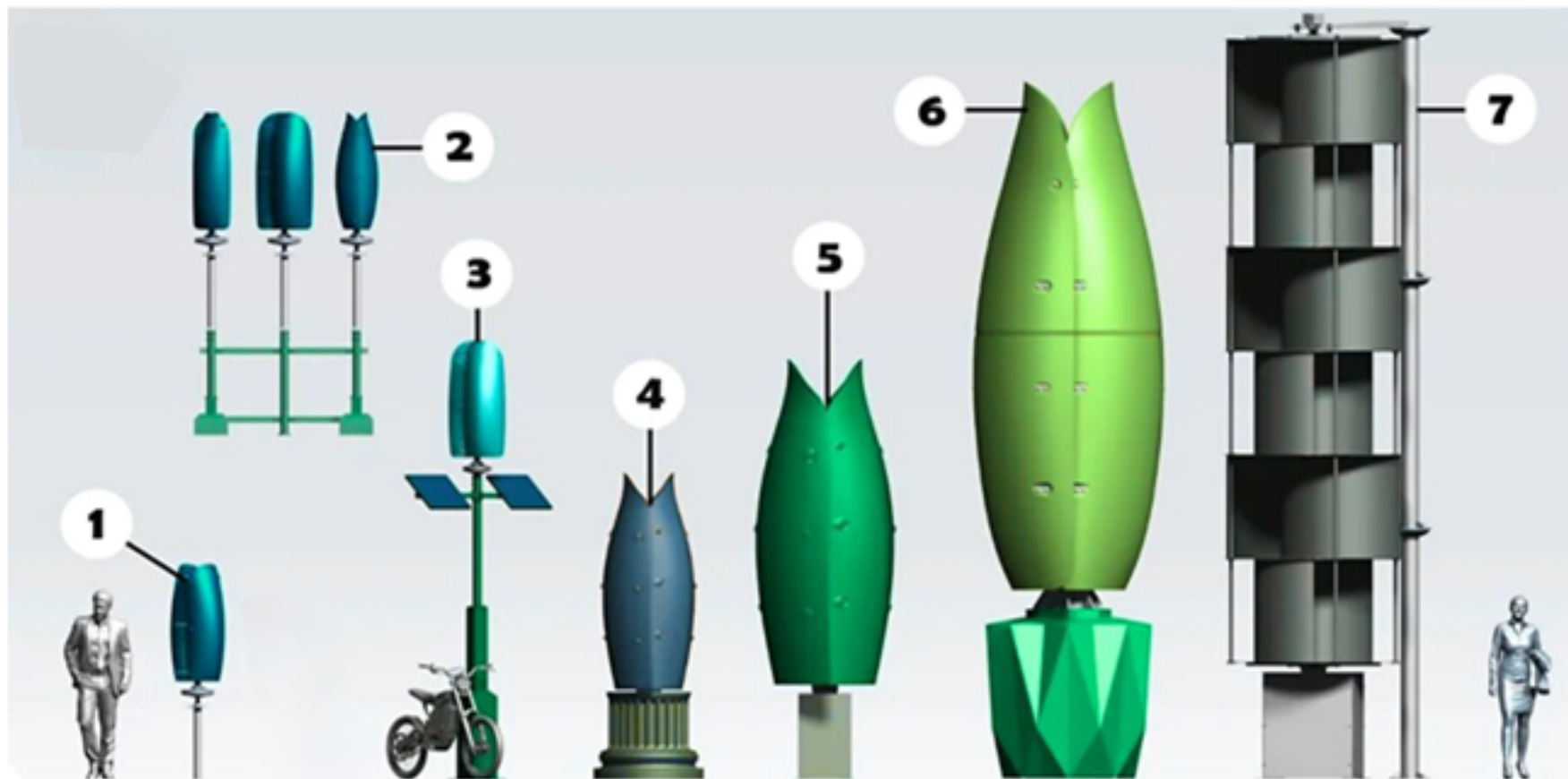
Average Watts Per Small Wind Turbine at 10m/s



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



Solution

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!**



Solar Vs Flower

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



Dr. Farb and Engineer Ika Baitish at the factory where the first prototype was made.

Power Tower





AL13 Power Tower

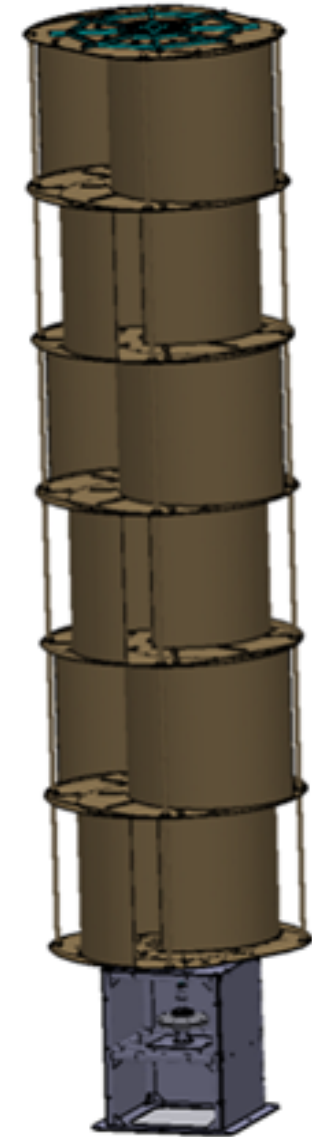
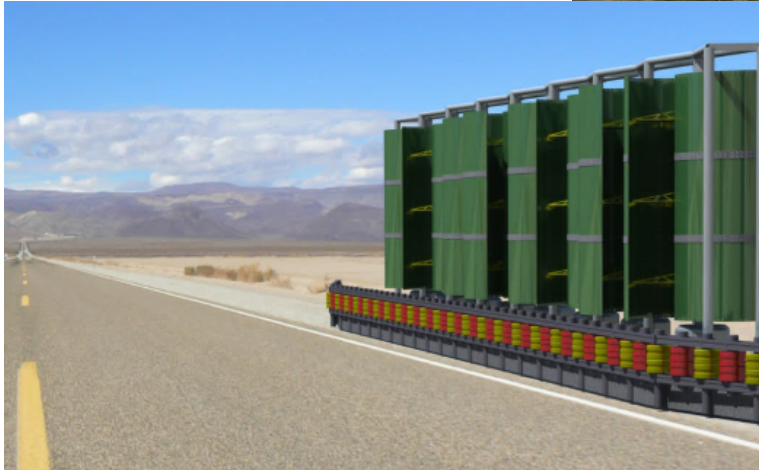
This product addresses the challenge of making our turbines:

- 1. Cheaper for certain markets-aluminum blades**
- 2. Easy to transport blades flat**
- 3. Modular, available in 1m to 8m stacks**
- 4. Starting at even lower wind speeds—the stacking is at alternate angles, so it picks up low winds from many directions.**
- 5. Available for more industrial uses.**



Power Tower on the Ground

Renderings





Power Tower or Tulips on the Ground





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



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

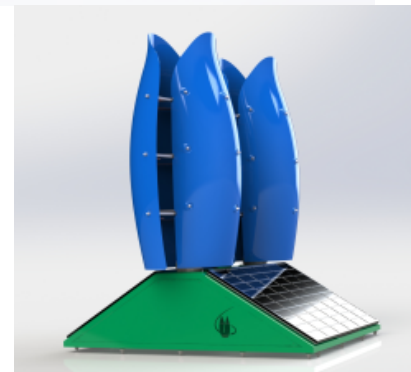


Rooftop Eco-Hub

- Wind alone or wind and solar
- Two granted patents for flat and slanted roofs
- Space saving
- No drilling into roof!
- Spreads out downward forces
- Pre-set bouquet effect
- Adjustable so turbines can be vertical
- Modular
- Easy to assemble on site
- Easy installation on roof or flat ground



Use Cases

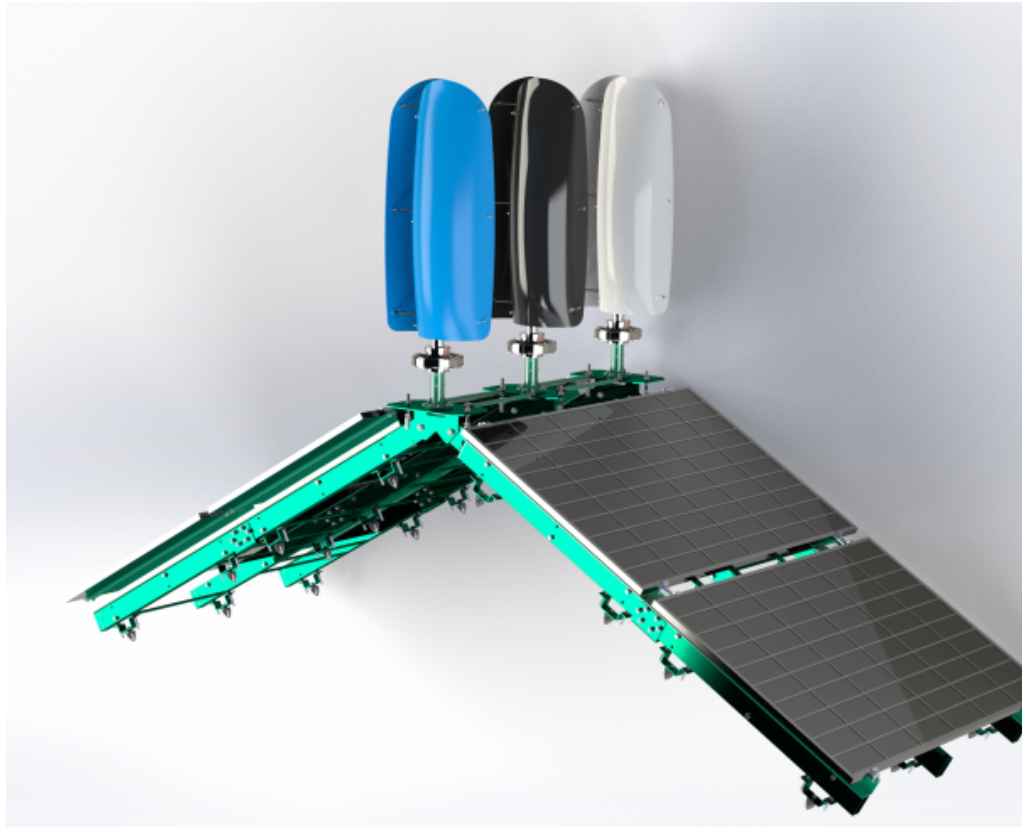


See them in operation in San Francisco:
https://youtube.com/shorts/BI_U76Llqzo



Use Cases

Slanted Roof Option





Use Cases

Wind-Only Rooftop Option





Does Your Building Produce a Lot of Air Exhaust? Recycle it!

- Patent granted in US
- 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 blade deflects half the “resistance” into more force.
- Different rotational directions for different positions relative to the exhaust.
- The right distance enables this concentration without blocking outflow.





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.



Charging Systems: E-Bikes and More

Our off-grid wind/solar/battery charging systems have some great uses:

Defense of periphery: Off-grid power whose power lines can't be cut. Can power security cameras, motion detectors, etc. Help employees come to work sustainably.





Market

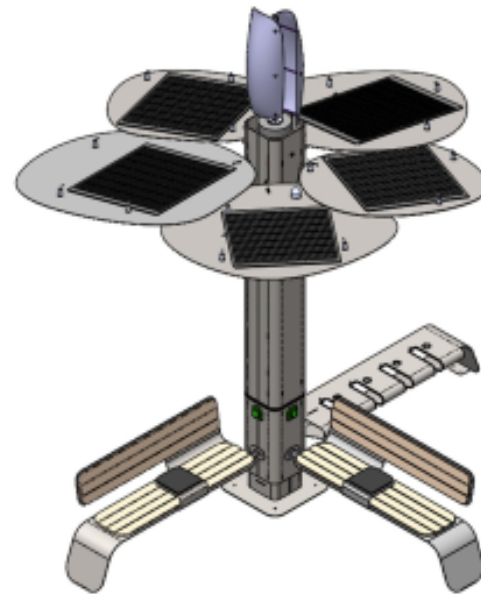
Now: Many Cities and Schools in Europe





Overview

New Design—Employee Relaxation and Device Charging





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

Some banks also offer you loans.

https://www.flowerturbines.com/_files/ugd/f810b5_63ac0135930d4df084fd477882efceae.pdf and <https://www.ritaliafunding.com/>



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



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