

Low Wind LLC



EXECUTIVE SUMMARY

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By

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Lift-Type Drag-Type

Key Executives

Richard K. Sutz

- Founder & CEO
- Inventor, Low Wind's Turbine Technology
- 30 years' experience with Drag-Type wind machines

Consultant

Peter Jenkins, PhD, PE

- Former Director, Texas A&M Turbo Machinery Laboratory, and former
- Dean of Engineering at U of Colorado
- Recognized expert in Gas Turbines and Drag-Type wind machines

Future Personnel

- Seasoned industry execs and engineers will join Low Wind upon funding.

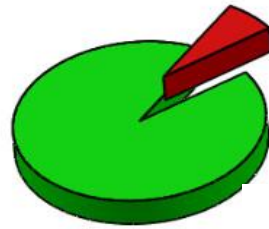
Advisory Board

Martin Zwilling

- Business Advisor
- Low Wind will form alliances and retain as consultants, leaders in renewable energy, academia, finance & marketing

Lift-Type Turbines Require Locations with Prevailing Winds of ~15 MPH

Locations with prevailing ~15 MPH wind speeds are only available over approximately 10% of the earth's land mass



Over the Earth's surface, the % of time wind speeds are greater than 15mph

- 10% => 15mph
- 90% =< 15mph

Over the Earth's surface, the % of time Lift and LW's Drag turbines can operate

- 10% Lift Turbines
- 90% LW's Drag turbines

Summary

Low Wind Turbines operate cost-effectively over 90% of the earth's land mass

Low Wind's (LW) DRAG-Type turbines produce power from wind speeds beginning at 5 mph, which prevail over ~90% of the earth's land mass.

Summary – Low Wind Patent Pending Turbine's Features:

- Delivers grid-level power in wind speeds beginning at 5 MPH (8 KPH)
- Turnkey Price (purchase & installation) ~half of a same size Lift Turbine
- Low Wind turbine's long-term O&M is a fraction of a Lift turbine's O&M
- Unsubsidized cost/kWh cost =~ \$0.01
- Warrantied 50-year life - Rugged, reliable and virtually maintenance-free

Market for Low Wind's Drag-Type Turbines

- Opens a worldwide, billion-dollar market, from the untapped energy in locations with prevailing low wind speeds =<12 mph, which prevail over 90% of the earth's land mass
- Distributed Energy sites in Developed & Developing countries
- Worldwide licensed manufacture, marketing, sales, installation & service
- Licensees require only standard machine shop level skills, available worldwide
- MW-size wind farm groupings utilize multiple Low Wind 50 to 100 kW turbines

SUMMARY COMPARISON		
Low Wind Drag Type vs. Lift Type Turbines		
Features	Drag-Type Turbines	Lift-Type Turbines
Financial		
Cost/KWH	The <u>unsubsidized</u> cost/KWH = \$0.01 ~one penny	The <u>subsidized</u> cost/KWH = \$0.08 ~eight pennies
Rated Speed	12 MPH	Generally => 25 MPH (40 KPH)
Capacity Factor	70%	30%– 50%
Turnkey Cost	~ Half the cost of a comparable Lift-Type Turbine	~ One to Two \$million/MW
Operational		
O & M	Virtually maintenance free	Very high throughout its life span
Controls	YAW – Move turbine into the wind - Not required – Automatic PITCH - Protect against high winds - Not required – Automatic	YAW – Anemometer signal to a gear train PITCH - Anemometer signal to a gear train
Warranty	50 Years – Projected life 75 years	5 Years – Projected life 20 Years
Major Issues		
Noise-Thump	No Amplitude modulation noise	Serious noise issue - Amplitude modulation noise from large blades
Installation	Like an Erector Set® - No special equipment or requirements	Large blades require special handling & logistical requirements
Bird deaths	Not an issue – Birds see a solid disc	Bird “death trap” – Birds do not see the blades
Business Model – Patent Holding Company with Worldwide Licensees		
Business Model	Patent Holding Company – Worldwide Licensees	Company doing manufacture, sales, installation & service
Location	~90% of the Earth's land mass with prevailing winds => 5 MPH	~10% of the Earth's land mass with prevailing winds => 15 MPH
Manufacture	Worldwide – requires standard machine shop level skills	Limited to locations with state-of-the-art level skills
Materials	95% low carbon galvanized steel	95% state-of-the-art materials
Market		
Market	Distributed Energy Market	Distributed Energy Market
	USA – FloDesign Projection – 3.5 million 100 KW turbines	USA – FloDesign Projection – 3.5 million 100 KW turbines
	Re-powering aging wind farms	Re-powering aging wind farms
	~90% of Earth's land mass with prevailing wind speeds =< 12 Mass	
Spacing	Four/Acre	Minimum spacing = two diameters

LW Turbine Specs

- **Rated Output at 12 MPH as compared to Rated Power of Lift Turbines => 20 MPH**
- Cutout Speed 35 MPH
- Survival => 100 MPH
- **50 Year Warrantied Life as compared to 5-year warranty for Lift Turbines**
- Low Maintenance & Noise
- Output Voltage Standard

Product Line

- 10 to 100kW Turbines

Funding History

- Prior R&D of \$5.5 million

Investment

- \$5 MM
- Phase One - \$1.5 million
- Phase Two - \$3.5 million

Business Model

- Patent Holding Company with worldwide licensing for Manufacture, Sales, Installation and Service

Exit Strategy Options

- Alliance or Acquisition
- Public Offering

Use of Proceeds

Phases One Two

- Scale Model 35% 2%
- Validate/Test 15% 8%
- Patents 15% 4%
- Mfg. 50kW 0% 42%
- 50 kW Install 0% 3%
- Marketing 10% 17%
- Working Cap. 25% 25%
100% 100%

Contact

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Low Wind's Technology Status

- LW's patent pending technology exists in SolidWorks®
- Analyses of Low Wind's performance features, have been confirmed by:
 - o Peter E. Jenkins, PhD, former Director of the Texas A&M Turbo Machinery
 - o The RE staff at the Illinois Institute of Technologies. Reports available.

The Next Step – Test a Scale Model – Produce Power Curves



Low Wind Competitive Advantage

- Ability to cost-effectively utilize the currently untapped energy in the low wind speeds that prevail over approximately 90% of the earth's mass
- Lift turbines cannot operate optimally in wind speeds =< 12-15 mph
- Low O&M due to its rugged, reliable & virtually maintenance-free characteristics
- Warrantied life of 50 years – as compared to 5 years for Lift turbines
- Projected life of 50 years – as compared to 20 years for Lift turbines
- Unsubsidized cost/kWh of ~\$0.01/kWh as compared to Lift turbines which require government subsidies to make their operation cost-effective
- Can be manufactured worldwide requiring only machine shop level of skills

Business Model - Patent Holding & Licensing Company

- Earning 10% of the Licensee's turn-key turbine price, plus territory fees
- pro forma example is for a 50 KW turbine with a turnkey price of \$200,000
- LW's projections, based on **OginEnergy's** market research; are equal **only to 1% of their published projection of 3.5 MM 100 kW Lift turbines for the USA alone**
- Manufacture, Sales, Installation & Service require only machine shop level skills

5-Year Pro forma Financial Projections – Based on an Investment of \$5 Million

\$ Dollars in 1,000s	2016	2017	2018	2019	2020	2021	2022
Investment	5 MM	Development of a line of 50/100 kW Low Wind Turbines					
50 KW Manufacturing Cost	\$50	\$53	\$55	\$58	\$61	\$64	\$67
50 KW Turbine Sales Price		\$200	\$210	\$221	\$232	\$243	\$255
Turbines Sold - Domestic	0	50	500	1,500	3,000	4,500	5,000
Turbines Sold - Foreign	0	50	250	750	1,500	2,250	2,500
Total Turbines Sold	0	100	750	2,250	4,500	6,750	7,500
Total Turbine Revenue	\$0	\$20,000	\$157,500	\$496,125	\$1,041,863	\$1,640,933	\$1,914,422
Low Wind Royalty at 10%	0	\$2,000	\$15,750	\$49,613	\$104,186	\$164,093	\$191,442
Operating Exp - 20%	\$1,500	-\$3,100	\$3,150	\$9,923	\$20,837	\$32,819	\$38,288
Net Income Before Tax	\$0	-\$1,100	\$8,000	\$39,690	\$83,349	\$131,275	\$153,154
Cumulative NIBT (Cash)	-\$3,500	-\$4,600	\$3,400	\$43,090	\$126,439	\$257,714	\$410,867

Use of \$5 Million

Phase One: \$1.5 - Wind Tunnel testing for optimization of performance features

Phase Two: \$3.5 - Design and manufacture of a 50/100 kW Low Wind Turbine

- Design Demo Manufacturing Facility, and build a prototype 50/100 kW turbine
- Establish Low Wind as a Patent Holding Company, to license the manufacture, marketing, sales, installation & service of Low Wind's 10 to 100 kW turbines