

Energy Ball

- What are, according to your opinion, the unique selling points of the Energy Ball



Unique Selling Points

- Small dimensions, decorative design
 - Almost no cast shadow
 - Applicable with other applications (e.g. flag pole)
 - Easier to meet legal regulations for installation, general accepted in communities
 - Attractive to install to and round the house, no skyline pollution
 - Energy Ball and pole are in right design balance



Unique Selling Points

- Noise generated by the Energy Ball is not exceeding surrounding noise
- The Energy Ball is operating at very low wind speeds (positive perception)
- Easy to install
 - Installation Energy Ball with standalone pole will take 2 persons approximately 3 hours (in general no crane needed)
 - Several installation options available

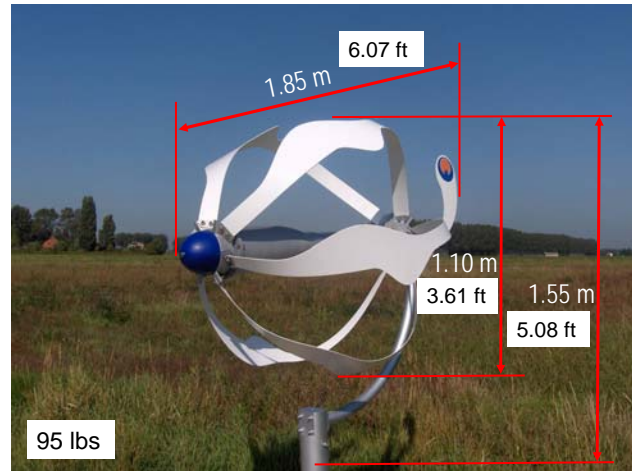


Unique Selling Points

- Technical performance
 - No maintenance
 - Technical life at least 20 years
 - Product warranty on parts 5 years
- Usable in other applications
 - Exhaust plume of cooling towers



Energy Ball V100 dimensions



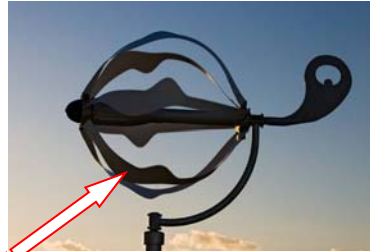
Regulations for installation

- Codes, ordinances and policy vary widely from community to community for installing an Energy Ball, based on the dimensions and functions of the Ball
- The Energy Ball is still unknown (in most cases not an advantage)
The branding of the Energy Ball is a continuing work in progress, globally
- In case of a legal permit, the Energy Ball can be compared with a satellite dish. The Energy Ball is unique among wind turbines, and should generally serve the interest of policy makers



The Energy Ball in operation

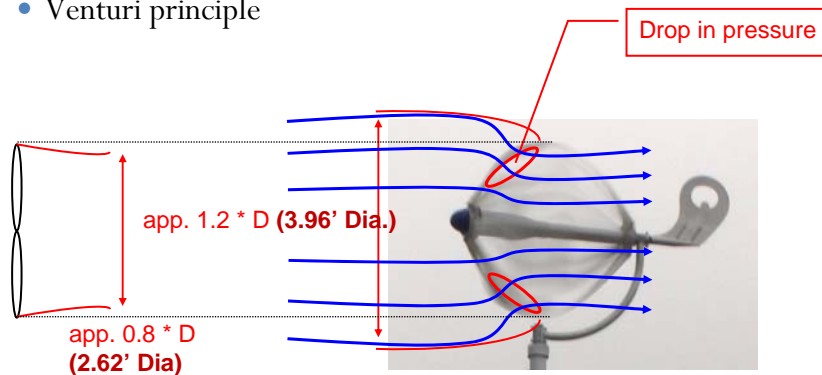
- Venturi principle



Curved rotor blades

The Energy Ball in operation

- Venturi principle



The Energy Ball yaws itself in the wind

Annual output Energy Ball

- What impacts the annual output of the Energy Ball (varies with the siting and wind density)
- What elements are influencing the annual output (wind speed, wind density, height, turbulence)



Annual output Energy Ball

$$Q = P_v * h * f$$

- Q = Annual output [kWh]
P_v = Output [kW] for specific location with average wind speed
h = Number of hours over the whole period
f = Correction factor [1.5 – 2.5] due to the shape of the power curve and circumstances surrounding of the Energy Ball



Annual output Energy Ball



Av. windspeed at location	Formula	Annual output
8 m/s	$55 \cdot 8760 \cdot 1,5$	720 kWh
7 m/s	$40 \cdot 8760 \cdot 1,5$	500 kWh
6 m/s	$30 \cdot 8760 \cdot 1,5$	400 kWh
5 m/s	$25 \cdot 8760 \cdot 1,5$	330 kWh

Out of range of the inverter

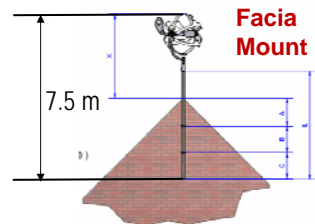
Wind speed units

Bft.	Subscription	Wind speed			
		Knots	km/h	m/s	mph
0	Calm	0 - 1	0 - 1	0 - 0,2	0.45
1	Light air	1 - 3	1 - 5	1.5	3.36
2	Light breeze	4 - 6	6 - 11	3.3	7.38
3	Gentle breeze	7 - 10	12 - 19	5.4	12.08
4	Moderate breeze	11 - 16	20 - 28	7.9	17.67
5	Fresh breeze	17 - 21	29 - 38	10.7	23.94
6	Strong breeze	22 - 27	39 - 49	13.8	30.87
7	Near gale	28 - 33	50 - 61	17.1	38.25
8	Gale	34 - 40	62 - 74	20.7	46.31
9	Severe gale	41 - 47	75 - 88	24.4	54.58
10	Storm	48 - 55	89 - 102	28.4	63.53
11	Violent storm	56 - 63	103 - 117	32.6	72.92
12	Hurricane	63 - +	117 +	32.6 +	

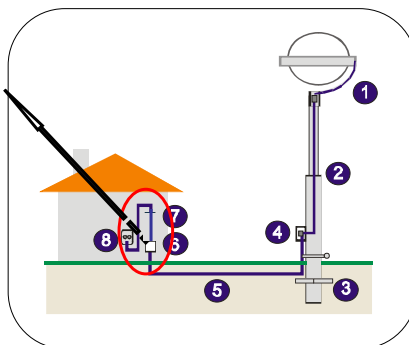
1 Meter per Second = 2.2369362920544 Miles per Hour

Installation of the Energy Ball

- On a mast
 - Lengths available: 8.5 m (27.88') and 10.5 m (34.44')
 - top with Ball is 10 m (32.8') and 12 m (39.36'), from ground level
 - Mast (**Monopole**) in 3 parts (**foundation pipe w top flange, base pole w/ bottom flange, top pole w/ yaw coupling**)
- On a flat roof
 - Length of mast: 3 m (9.84')
 - Top with Ball 4.5 m (14.76'), from flat roof surface
- Along façade of the house
 - Length of mast: 6 m (19.68')
 - Top with Ball above the roof depending on construction

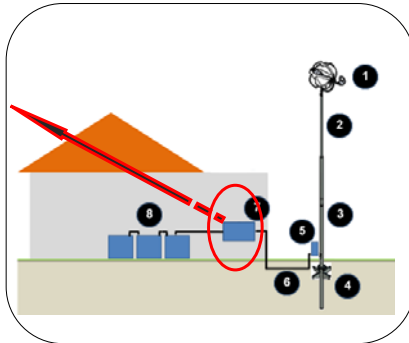


Energy Ball V100 system (grid)



1. Energy Ball V100
2. Mast (2 parts)
3. Mast base pole
4. Mounting box
5. Ground cable 3 x 2.5 mm²
6. WindPower Inverter
7. Mounting grid
8. Power panel 120V, 60Hz

Energy Ball V100 system (batteries)



1. Energy Ball V100
2. Top section of mast
3. Lower section of mast
4. Inground section of mast
5. Junction box
6. Underground cable
7. WindPower Charger
8. Batteries

Energy Ball material

- Documentation
- Technical details
- Installation summary
- Parts list
- Special tools
- Other tools



Wind Power

Energy Ball® V100

10 meter mast

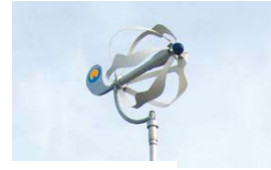
Certificering	
CE	
Lengte bovengrond	10 m
Lengte ondergrond	2 m
Gewicht mast boven grond	105 kg
Gewicht mast grondstuk	100 kg

1. Energy Ball® V100
2. Mast topstuk
3. Mast onderstuk
4. Mast grondstuk
5. Mastkabel
6. Grondkabel
7. WindPower Inverter / Charger
8. Wandmontage / Support / Accu pakket

4.4 Overige benodigheden en gereedschap

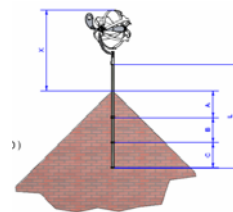
- Inclus 3 en 8
- PGI bouw (10 meter)
- Puistang
- Lichte 243
- Trekker 20 meter
- Fluor dip 24 en 30
- Verspreider tussen kabel en dip
- Spanningsmeter
- Minimale afstand (215) tot mast dip 24)
- Stijfheid
- Overstroom
- Spaak
- Mechanische grondboor 20 cm diameter
- Boordbrete 1,00 m
- Grondkabel pakket van mast tot inverter
- 60 meter 3 x 2,5 mm² en aparte afstand
- mast tot inverter - 60 meter 3 x 4 mm² en aparte
- Externe voor de tijdelijke afsluiting van het systeem
- Tuimeling voor het laten inklinken van de 2435 tot de mast
- Dik om de mast op te laten naderen systeem
- instabiele

Energy Ball safety



Types of installation

- Mention of all the 4 types of installation some characteristics and points of attention

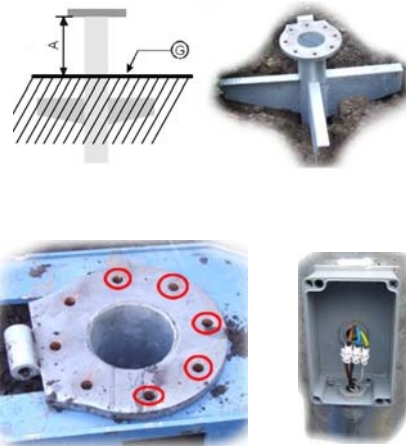


Energy Ball installation

- *Decide on position of mast*
- *Prepare position*
- *Ground cable*
- Mast assembly
- Energy ball assembly
- Wind Power inverter or WindPower charger
- Test

Foundation for V100

- | | |
|---------|---------------------------------------|
| Step 1 | Preparation |
| Step 2 | Dig hole |
| Step 3 | Position foundation unit |
| Step 4 | Install ground cable |
| Step 5 | Assemble tool 1 |
| Step 6 | Assemble 1 st part of mast |
| Step 7 | Align mast |
| Step 8 | Assemble tool 2 |
| Step 9 | Assemble 2 nd part of mast |
| Step 10 | Attach Energy Ball V100 |
| Step 11 | Check connections |
| Step 12 | Install connection box |



Decide on position of mast

- Position mast on open ground
- Total length of 10 or 12 metres (33-40') required
- Bear in mind hoisting tackle when positioning mast
- Minimize distance from mast to home connection
- Minimize loss through length of ground cable



Ground cable

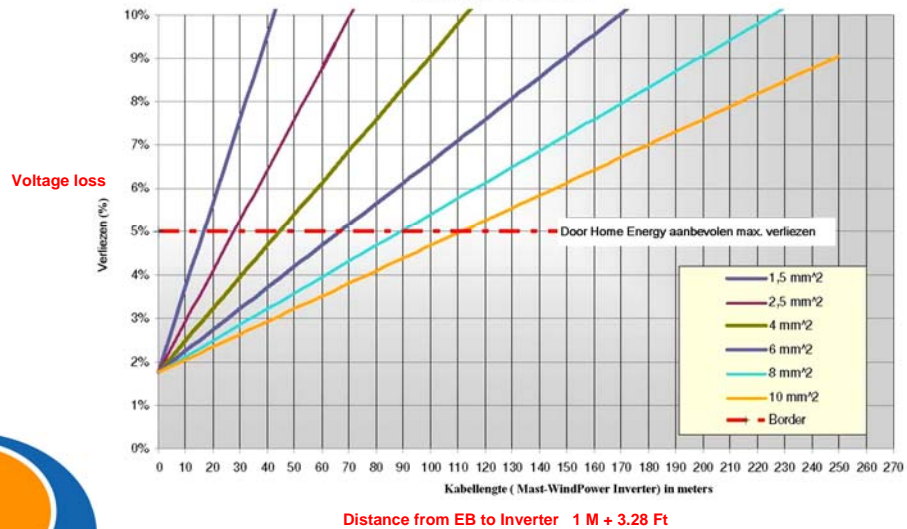
Distance of ground cable from mast to home connection gives resistance.

Reduce resistance by:

- Keeping distances small
- Thicker cable for longer distances



Ground cable losses



Investment Energy Ball

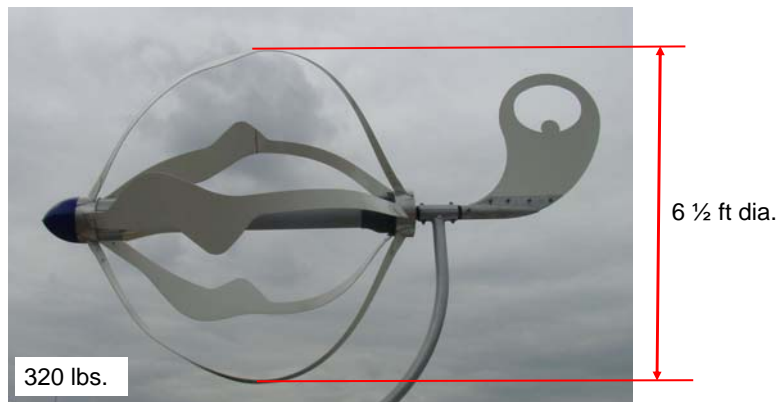
You are in a sales talk with a potential customer

- What are your answers on the following questions / statements:
 - What is my return on investment? **4 – 5 X**
 - In what period my investment will be paid back? **varies**
 - The Energy Ball is expensive (federal/state/local/utility incentives, consider property value increase, no property tax, no sales tax to distributor/dealer on resale, off set utility rate increase start saving immediately).

Sales offer

- Set up a written sales offer for
 - An Energy Ball
 - Standalone mast (12 m) (**approx. 40 ft**)
- Fill in completely the installation sheet
- The offer must be as complete as possible, specify all necessary parts and labor (**deduct incentives**)

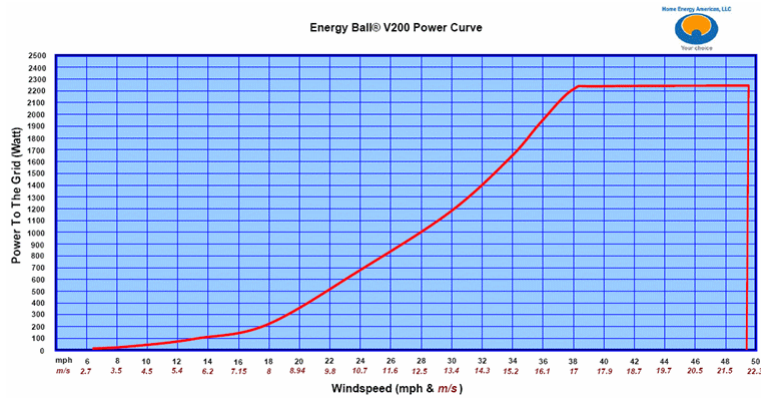
Energy Ball V200



Energy Ball V200

- 5 rotor blades
- Diameter < 2 m - 6 ½ ft. diameter
- To be installed on masts with total length (with Energy Ball V200 of 12 (40 ft) and 15 meter (50 ft)
- Installation to be done with crane

Annual output Energy Ball V200



V200 Installation

- Energy Ball V200 lifting
- Assembly blades
- Assembly Nose cone
- Testing



Maintenance and repair

- The Energy Ball V100 and V200 are low-maintenance
- Replacement parts are:
 - Blades
 - Vane
 - Arm
 - Generator

Energy Ball installation - points for consideration

- Decide on position
- Exact assembly
- Cord tied to rotor blade
- Cable length
- Windforce < 8 Beaufort (**39 – 46 mph**)
- Proper lifting equipment / crane
- And of course, the safety regulations!

