WINDBULL

the real Urban Wind Machine

If you need some Energy…

power plants

environmental damage

distance

gigantic utility networks

security of supply

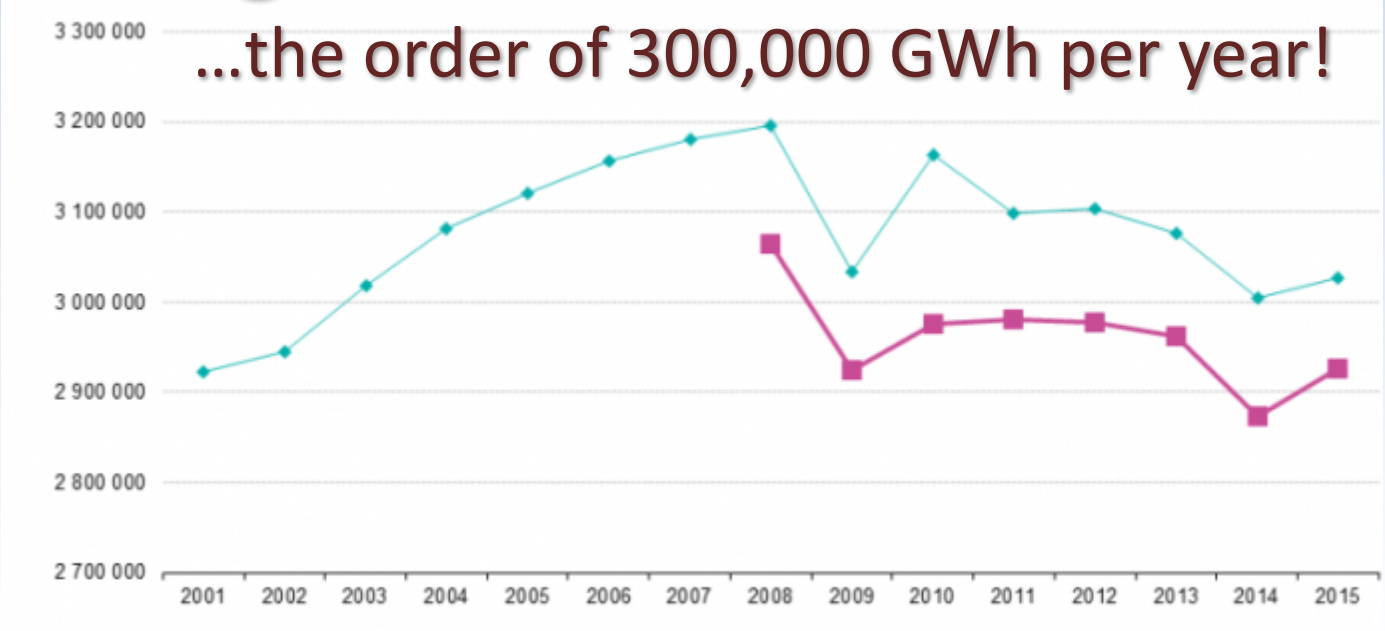
grid losses...

The price of electricity

costs of electricity transport

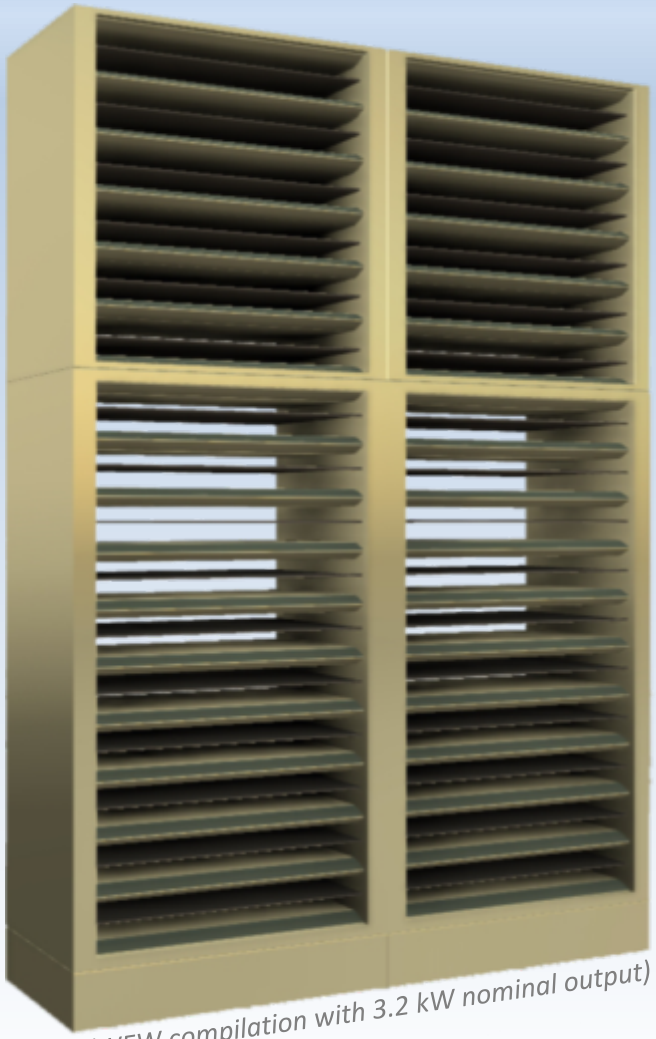
built up of grids
maintenances
grid losses…

11% grid-losses in EU…



EU-28 , in GWh, Source: EUROSTAT, http://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_production_and_supply_statistics

Wind Energy Wall

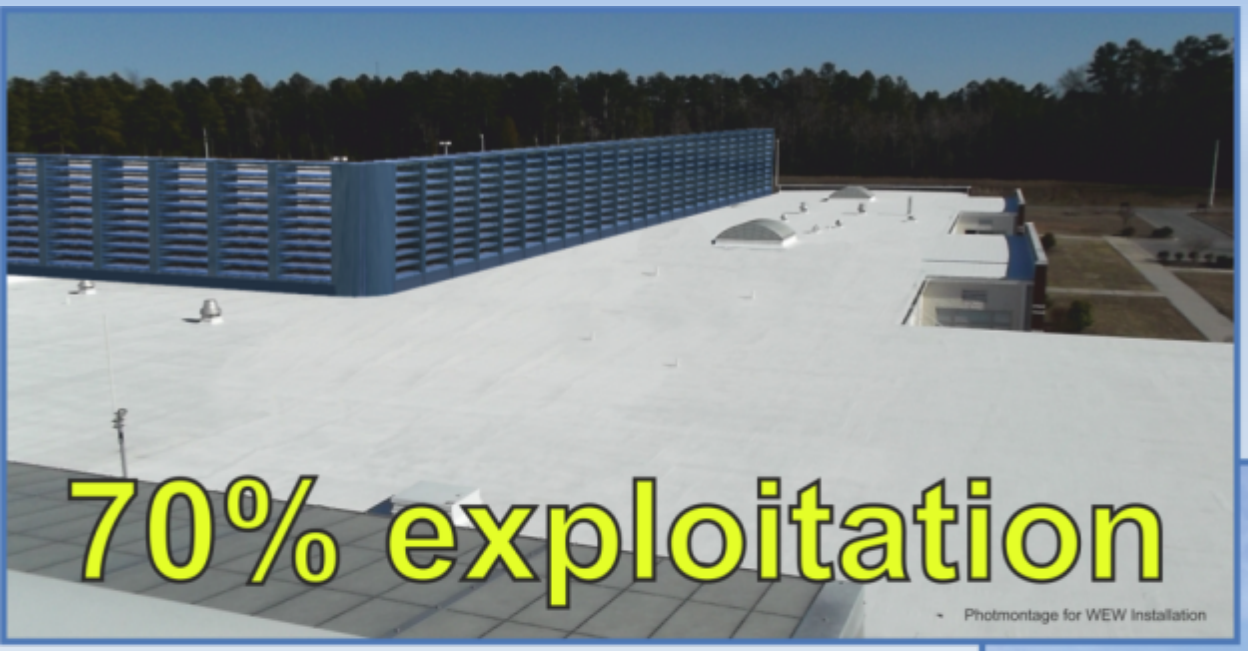


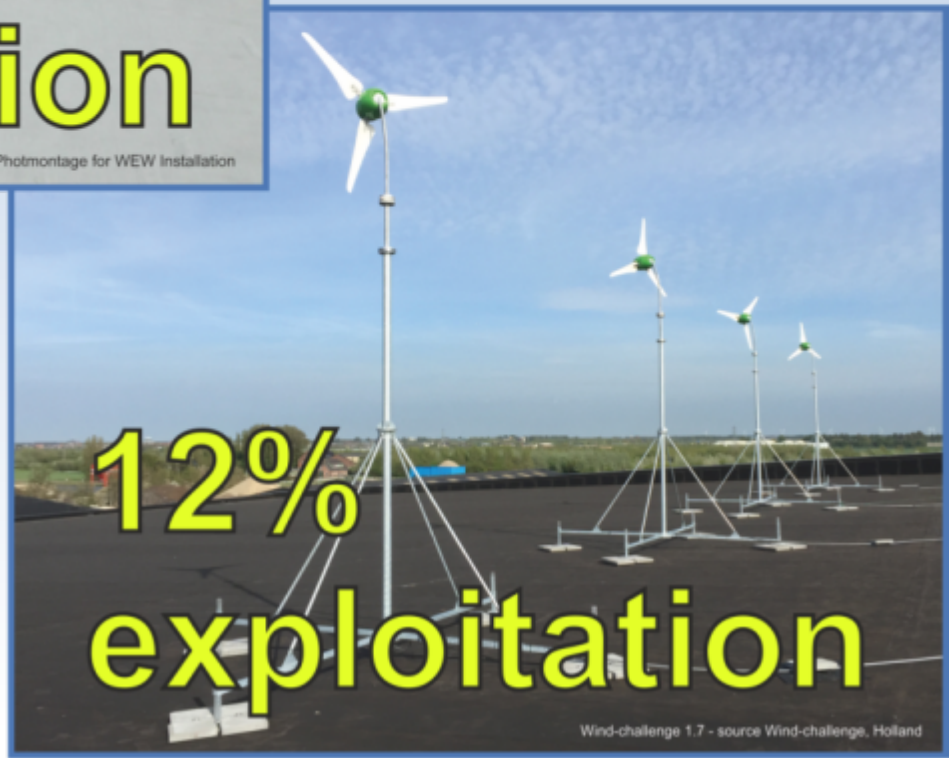
(WEW compilation with 3.2 kW nominal output)

- there is no twisted flows, no gap distances;
- modular, wall-like;
- bi-directional recovery;
- for urban winds;
- adjusted to the host building;
- variety of sizes, shapes;
- compatible with other green-energy solutions;
- based on traditional industries

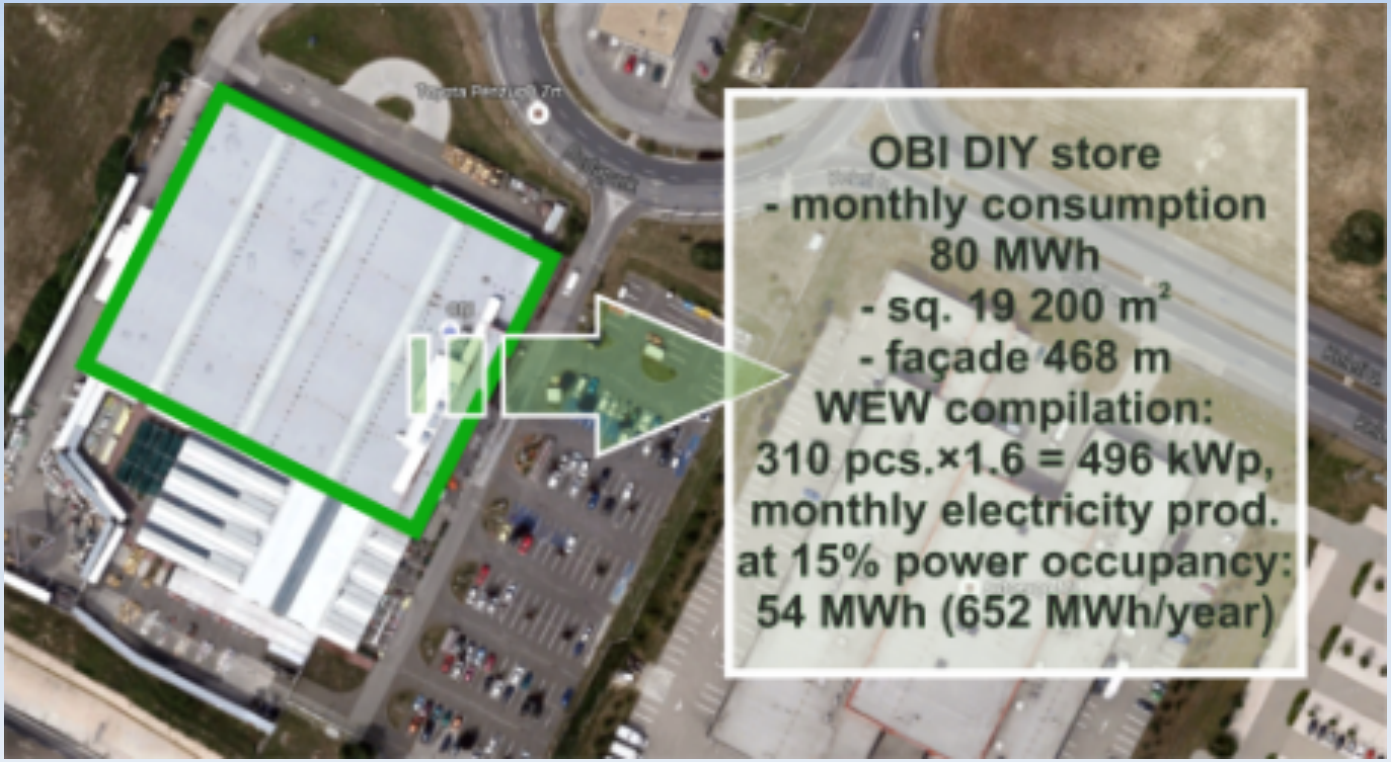
(WEW compilation with 1.6 kW nominal output)

Where the use of space counts...



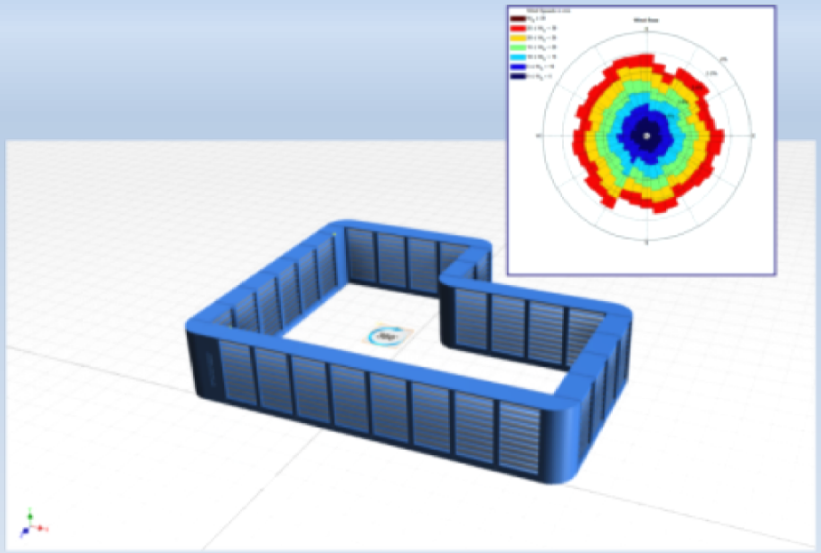


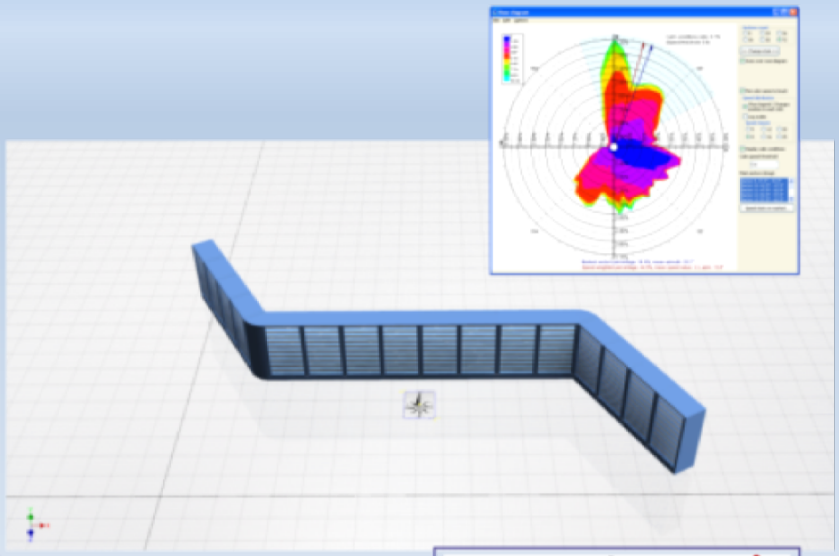
Just imagine…

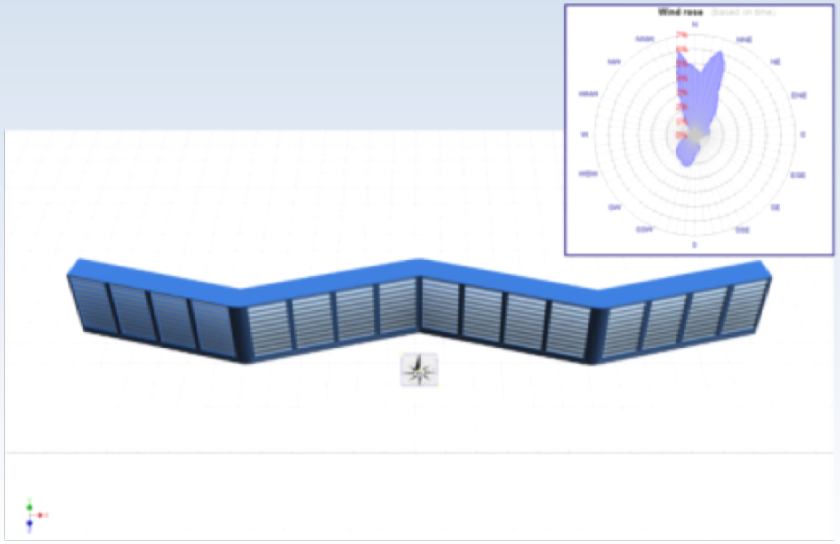


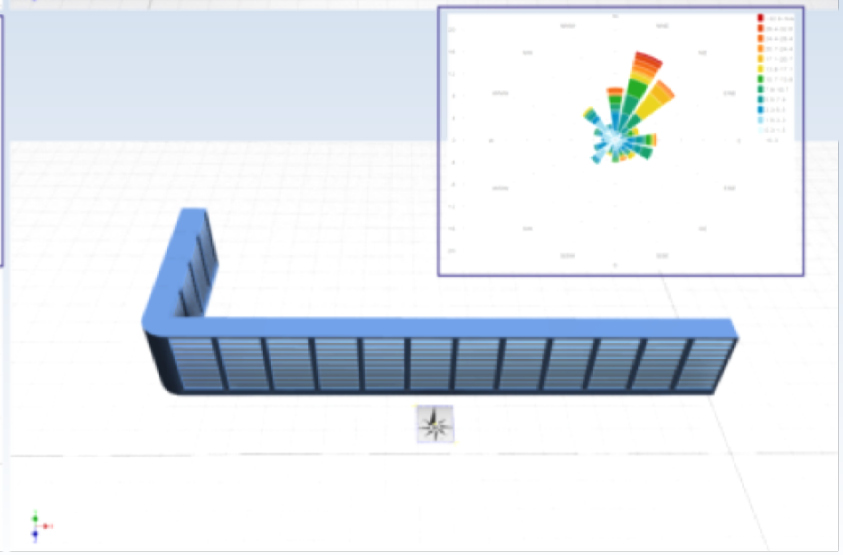
If all of OBI stores were fully installed with WEW in Europe, this could result in hundreds of thousands megawatt hours of emission savings year by year!

Calculations of WEW



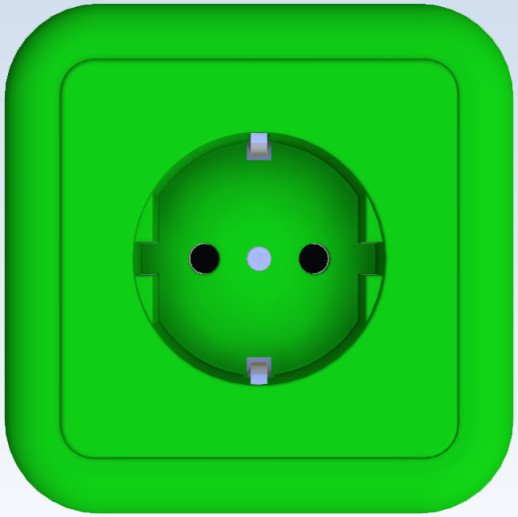






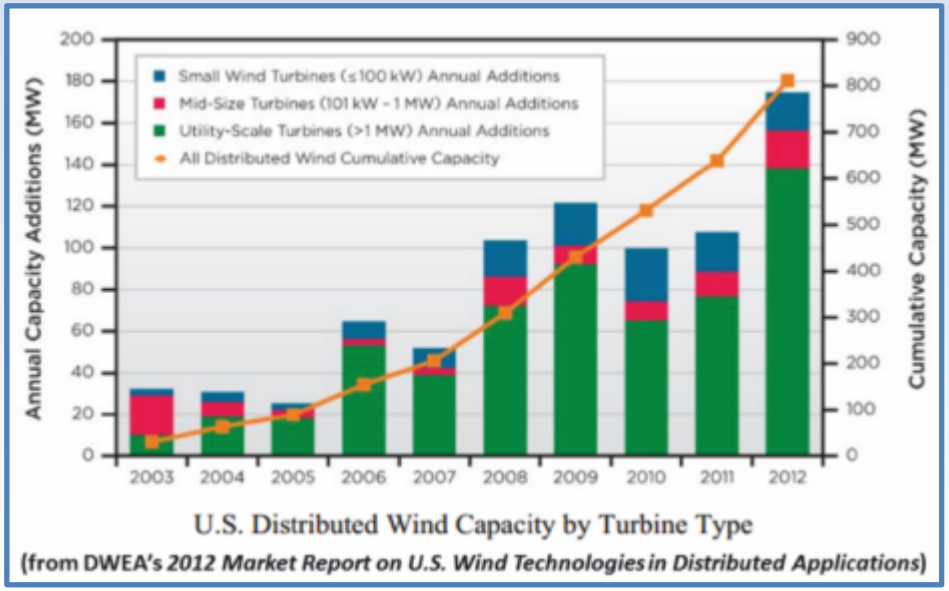
Target customers

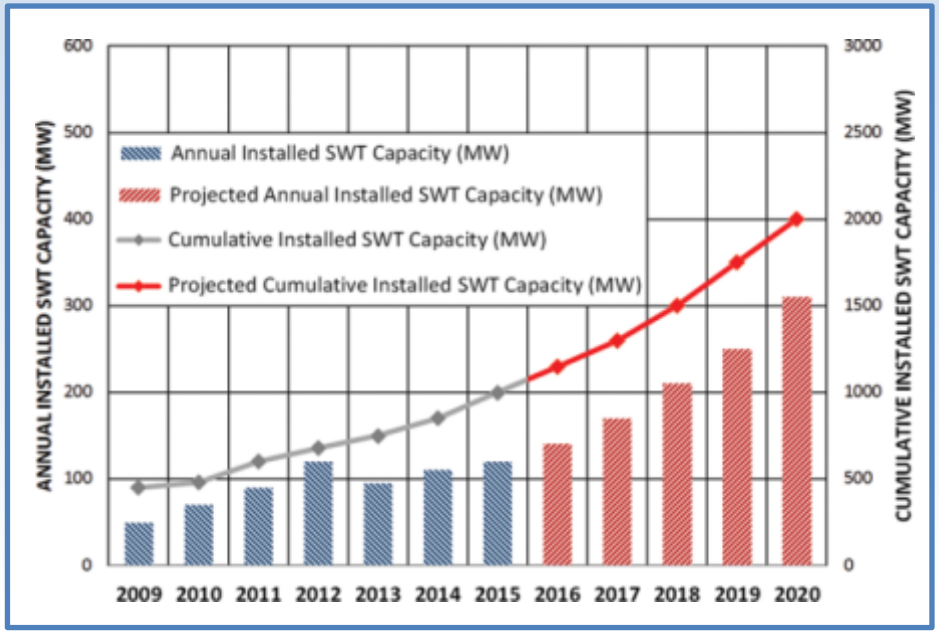
- industry park, office building, department stores, hotel owners and facility managers, (actually every block house)
- PV panels installers,
- construction companies



Markets of WEW

- The **total addressable market =** market of Small Wind Turbine (SWT) machine types.
- **Market size** was 1,611 MW = **EUR 6.8 billion** in the EU in 2015 (by EWEA).
- **Early adopters** are the facility management companies in the cities (office buildings, department stores, apartment houses, hotels…)
- **Other** special **available market** areas are: telecommunication providers, farms, airports, gas station owners, motorway companies, fire towers…





Our largest competitors

The most important competitors are the **Professional Small Wind Turbines (SWTs)**

							
Products	**WEW HHB**	**Aeolos-V**	**Apple Wind**	**Wind-challenge**	**ANTARIS 2.5 kW**	**Rutland 504Furl**	**Windspot 3.5KW**
Rated Output [kW]	**1.0**	**1.5**	**2.6**	**1.7**	**2.5**	**0.6**	**3.5**
Country of Origin	HU	UK	FRA	NED	GER	UK	GER
Cut-in wind speed [m/s]	2.4	1.5	no data	3.0	2.5	2.5	2.5
Cut-out wind speeds [m/s]	illimitable	25 (1)	no data	20	25	no data	30
Electric Power (2) / Swept area [W/m²]	218	159	178	152	217	230	178
Acoustic level [dB] (3)	< 10	< 45	no data	no data	no data	no data	no data
Required gap distance [m]	no need	8	8	6.8	12	4	16
Warranty [years]	10	5	no data	2	no data	1	5
Maintenance-period (hours)(4)	10 000	6 500	8 500	8 200	9 500	6 000	9 500
Specific maintenance cost [€/kWh] (5)	0.016	0.032	0.031	0.020	0.024	0.023	0.024
Construction Cost / Power [€/kW] (6)	2 200	2 720	2 730	2 800	3 550	6 690	2 510
Demolition Cost / Power [€/kW] (4)	1 010	1 720	2 300	2 000	2 810	3 220	1 600

(1) from formal survival data; (2) at 12 m/s wind speed; (3) at 20 m distance from nacelle; (4) estimated data; (5) based on generated electricity; (6) without accessories

Business model

Offerings for our primary target market segments:

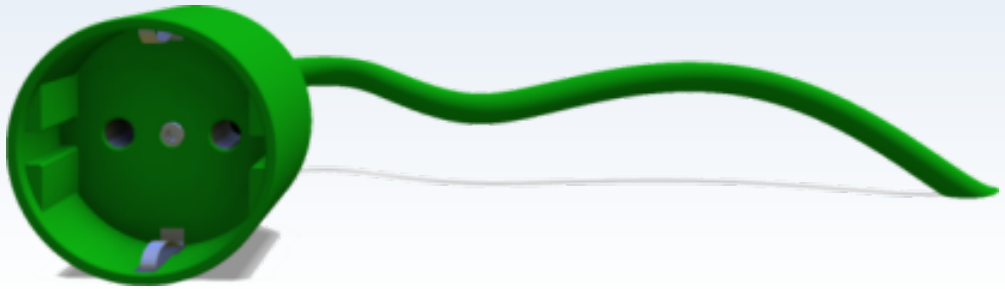
a. Customers **buy** directly from reseller or

b. lease the Windbull device from a leasing company,

c. Software aided measurement and design,

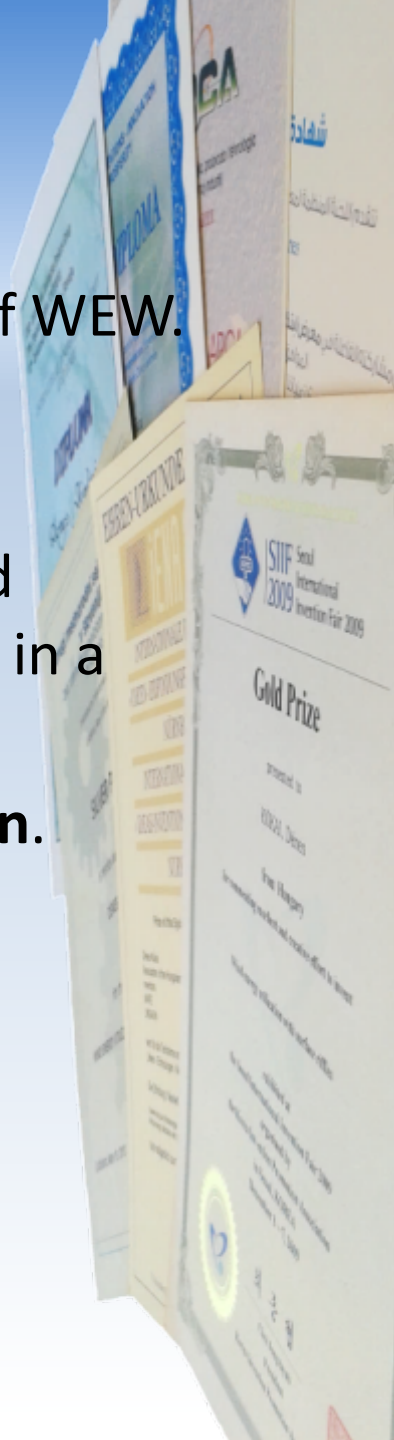
d. Energy production with built-in storage,

e. Local installation, maintenance partner.



Story & Current stage

- 2009: was awarded the predecessor invention of WEW.
- 2011: the improved technology with university measurement of DC power generation.
- 2011-15: new linear generator development and several smaller prototypes have been measured in a natural environment.
- 2015: **breakthrough of bidirectional exploitation**.
- 2016: we won the Special Award in KICkoff semi-final in Budapest
- 2017: looking for pilot project opportunity



Our Team & Partners

- **Dénes Kókai** CEO and project leader.

- **Dr. Márta Somogyvári** financial advisor

- **Dr. Viktor Szente** technological leader.

The proposed pilot installation consist of 30 pieces (1,5 m wide x 2,5 m high x 0,9 m deep each) with a power capacity of 48 kW, at a value of 105 kEUR.

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