AGILE
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VERTICAL SKY®

ELECTRICITY FROM WIND POWER – GENERATED LOCALLY AND IN AN ENVIRONMENTALLY FRIENDLY WAY

AUGUST 31, 2021

CHALLENGE: RENEWABLE ENERGY FUTURE NEEDS MORE DECENTRALIZED POWER GENERATION

Commercial & Industrial face significant challenges:

- Have a high energy demand
- Are faced with rising electricity costs
- Need to de-carbonize their businesses

Generating your own electricity offers a solution and is increasing in popularity

Wind energy has great potential for this, but:

- The expansion of wind energy combined with increasing urbanization brings conflicts, which is why wind turbines are often not accepted near populated areas

The negative effects of wind turbines (e.g., noise) lead to problems of acceptance of wind energy

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AGILE WIND POWERS SOLUTION

Agile Wind Power is developer, manufacturer and supplier of

VERTICAL SKY

- Wind turbines with low impact on the site environment
- Enables the use of new locations, especially decentralized on-site applications
- First large vertical-axis wind turbine for commercial on-site power generation

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CUSTOMERS: COMMERCIAL & INDUSTRIAL, LOCAL POWER SUPPLIERS

Typical Applications:

"Behind-the-meter" *supply of electricity-intensive industries such as water treatment plants, hydrogen production, cold stores, data centers, breeding plants, factories, mines, business parks, etc.*

→ Own electricity production

*Supply of municipalities, islands, remote areas, mountain railways, tourist facilities, "**smart grid"** integrations, etc.*

Customers worldwide benefit from:

/ Reduction of electricity costs
(self-produced electricity is significantly cheaper than electricity from the grid)

/ Reduction of CO2 emissions (local and global)

/ Avoidance of increasing energy taxes

/ Planning & supply security

/ Increase of energy self-sufficiency

No direct competitor products available

/ Besides Vertical Sky® there are no other manufacturers with certified large vertical-axis wind turbines

/ Vertical Sky® does not address the traditional wind energy market for electricity production with remuneration for feeding into the grid

/ Electricity consumers who produce their own electricity cheaply do not have to purchase it expensively from the grid

/ Large demand from all industries worldwide

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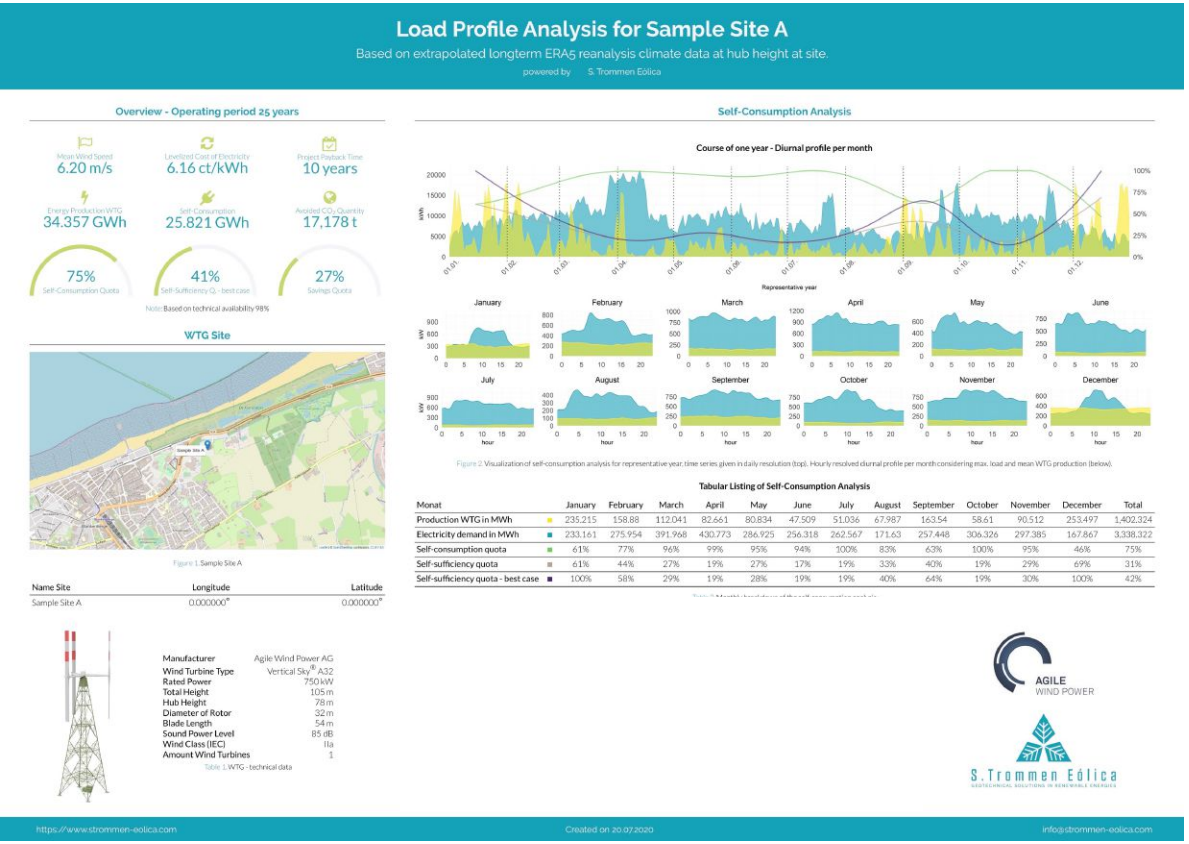
CASE STUDY: GREENHOUSE OPERATOR IN GERMANY



Load Profile Analysis for Sample Site A

Based on extrapolated longterm ERA5 reanalysis climate data at hub height at site.

powered by S. Trommen Eólica

Overview - Operating period 25 years

Mean Wind Speed 6.20 m/s

Levelized Cost of Electricity 6.16 ct/kWh

Project Payback Time 10 years

Energy Production WTG 34.357 GWh

Self-Consumption 25.821 GWh

Avoided CO_2 Quantity 17,178 t

75% Self-Consumption Quota

41% Self-Sufficiency Q. - best case

27% Savings Quota

Note: Based on technical availability 98%

WTG Site

Figure 1: Sample Site A

Name Site	Longitude	Latitude
Sample Site A	0.000000°	0.000000°

Manufacturer	Agile Wind Power AG
Wind Turbine Type	Vertical Sky® A32
Rated Power	750 kW
Total Height	105 m
Hub Height	78 m
Diameter of Rotor	32 m
Blade Length	54 m
Sound Power Level	85 dB
Wind Class (IEC)	IIa
Amount Wind Turbines	1

Table 1: WTG - technical data

Self-Consumption Analysis

Course of one year - Diurnal profile per month

Representative year

January February March April May June July August September October November December

Figure 2: Visualization of self-consumption analysis for representative year, time series given in daily resolution (top). Hourly resolved diurnal profile per month considering max. load and mean WTG production (below).

Tabular Listing of Self-Consumption Analysis

Monat	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production WTG in MWh	235.215	158.88	312.041	82.661	80.834	47.509	51.036	67.987	163.54	58.61	90.512	253.497	1,402.324
Electricity demand in MWh	233.161	275.954	391.968	430.773	286.925	256.318	262.567	171.63	257.448	306.326	297.385	167.867	3,338.322
Self-consumption quota	61%	77%	96%	99%	95%	94%	100%	83%	63%	100%	95%	46%	75%
Self-sufficiency quota	61%	44%	27%	19%	27%	17%	19%	33%	40%	19%	29%	69%	31%
Self-sufficiency quota - best case	100%	58%	29%	19%	28%	19%	19%	40%	64%	19%	30%	100%	42%

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S. Trommen Eólica

https://www.strommen-eolica.com Created on 20.07.2020 info@strommen-eolica.com

Facts & Figures:

Customer's current electricity price:	€ 0.17/kWh
Electricity price with Vertical Sky®:	€ 0.06/kWh
Electricity price cheaper by:	**€ 0.11/kWh**
Annual electricity demand:	3,300 MWh
Electricity Production Vertical Sky®:	1,400 MWh
Self consumption quota:	75%
Self-sufficiency quota:	41%
Total cost savings:	27%
Payback:	10 years

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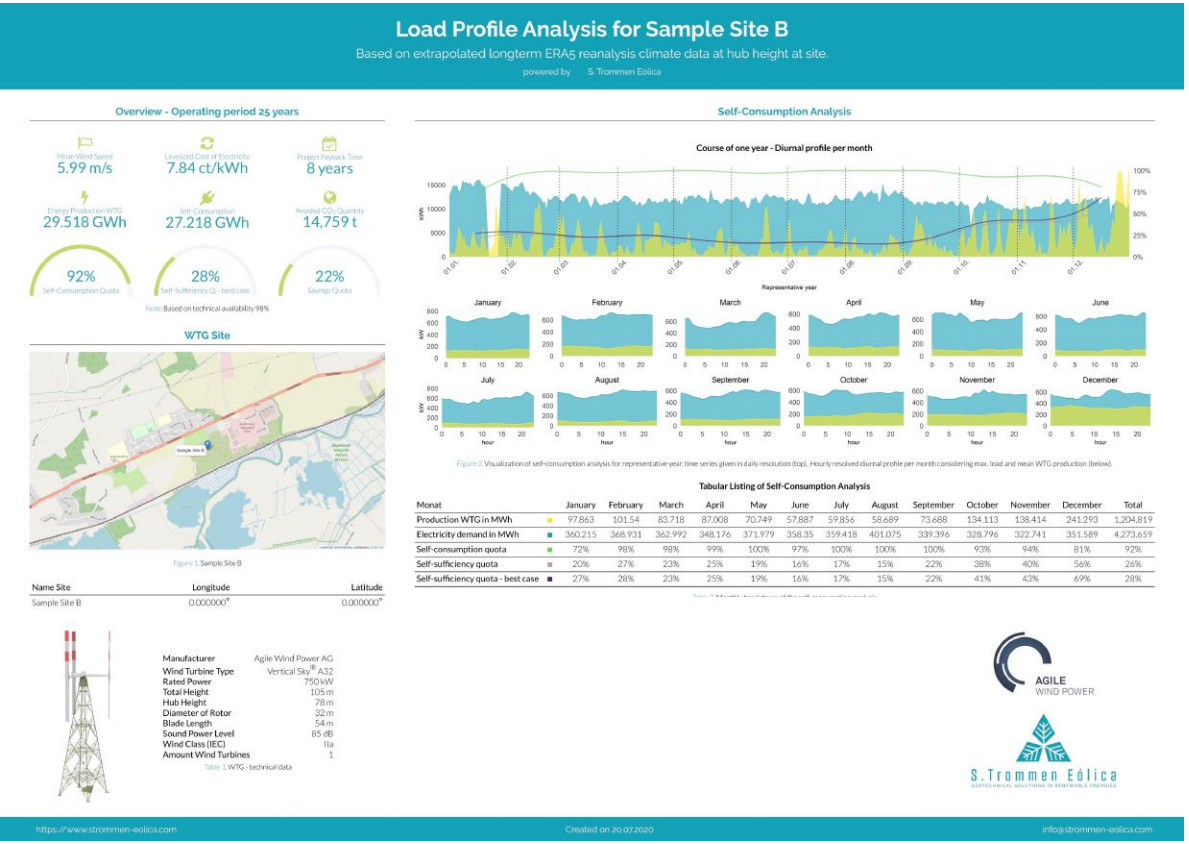
CASE STUDY: WASTEWATER TREATMENT FACILITY IN GERMANY



Load Profile Analysis for Sample Site B

Based on extrapolated longterm ERA5 reanalysis climate data at hub height at site.

powered by S. Trommen Eólica

Overview - Operating period 25 years

Mean Wind Speed 5.99 m/s

Levelized Cost of Electricity 7.84 ct/kWh

Project Payback Time 8 years

Energy Production WTG 29.518 GWh

Self-Consumption 27.218 GWh

Avoided CO_2 Quantity 14,759 t

92% Self-Consumption Quota

28% Self-Sufficiency Q. - best case

22% Savings Quota

Note: Based on technical availability 98%

WTG Site

Figure 1: Sample Site B

Name Site	Longitude	Latitude
Sample Site B	0.000000°	0.000000°

Manufacturer	Agile Wind Power AG
Wind Turbine Type	Vertical Sky® A32
Rated Power	750 kW
Total Height	105 m
Hub Height	78 m
Diameter of Rotor	32 m
Blade Length	54 m
Sound Power Level	85 dB
Wind Class (IEC)	IIa
Amount Wind Turbines	1

Table 1: WTG - technical data

Self-Consumption Analysis

Course of one year - Diurnal profile per month

Representative year

January February March April May June July August September October November December

Figure 2: Visualization of self-consumption analysis for representative year, time series given in daily resolution (top). Hourly resolved diurnal profile per month considering max. load and mean WTG production (below).

Tabular Listing of Self-Consumption Analysis

Monat	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production WTG in MWh	97.863	101.54	83.718	87.008	70.749	57.887	59.856	58.689	73.688	134.113	138.414	241.293	1,204.819
Electricity demand in MWh	360.215	368.931	362.992	348.176	371.979	358.35	359.418	401.075	339.396	328.796	322.741	351.589	4,273.659
Self-consumption quota	72%	98%	98%	99%	100%	97%	100%	100%	100%	93%	94%	81%	92%
Self-sufficiency quota	20%	27%	23%	25%	19%	16%	17%	15%	22%	38%	40%	56%	26%
Self-sufficiency quota - best case	27%	28%	23%	25%	19%	16%	17%	15%	22%	41%	43%	69%	28%

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S. Trommen Eólica

https://www.strommen-eolica.com Created on 20.07.2020 info@strommen-eolica.com

Facts & Figures:

Customer's current electricity price:	€ 0.23/kWh
Electricity price with Vertical Sky®:	€ 0.08/kWh
Electricity price cheaper by:	**€ 0.15/kWh**
Annual electricity demand:	4,300 MWh
Electricity Production Vertical Sky®:	1,200 MWh
Self consumption quota:	92%
Self-sufficiency quota:	28%
Total cost savings:	22%
Payback:	8 years

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KEY ADVANTAGES OF VERTICAL SKY®

Nearly soundless
(3 x quieter)

Shorter project implementation
(simplified & faster approval procedure)

Reduced risk for birds and bats
(Expert opinion)

Easier operation & maintenance
(no special crane necessary)

Visual Impact
integrates in the surroundings

Better space utilization

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VERTICAL SKY® MEETS THE REQUIREMENTS FOR DECENTRALIZED ELECTRICITY MARKETS

Visualization: Electricity production with Vertical Sky® on site

Allows the use of locations that cannot be operated with conventional wind turbines

efficient, economical and environmentally compatible

Illustration: Ratio of required distances for compliance with regulatory requirements

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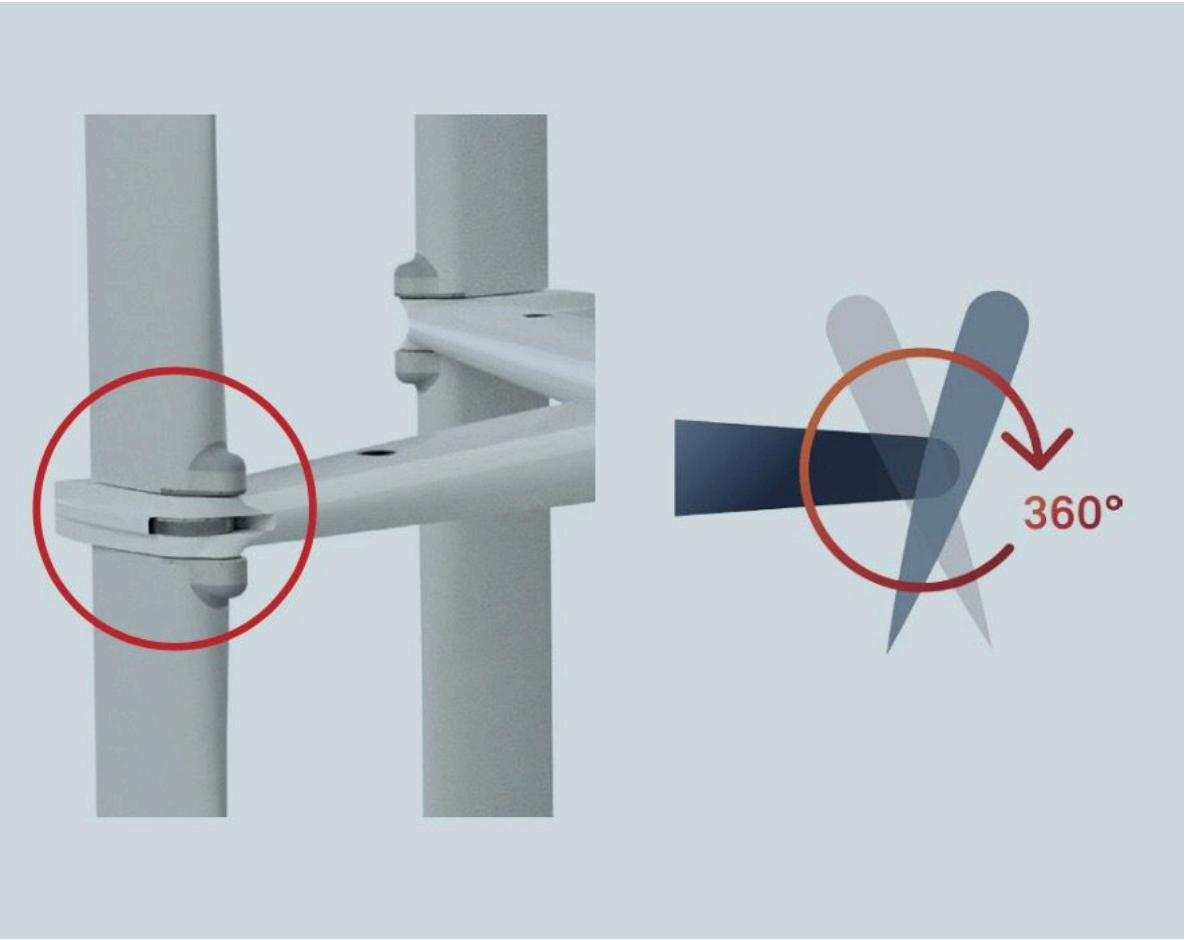
UNIQUE TECHNOLOGY: NOW POSSIBLE, THANKS TO TECHNICAL BREAKTHROUGH



/ In the past, large vertical-axis wind turbines always failed

/ **Patented innovation:**

→ Continuous and self-optimizing adjustment of the rotor blades (pitch) during the rotation of the vertical rotor

→ Lifetime > 25 years

→ Core technology of Agile Wind Power

→ **Economical and reliable scaling of vertical-axis wind turbines becomes reality for the first time**

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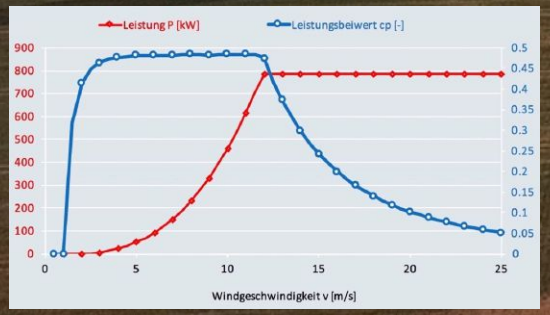
Prototype Vertical Sky® A32

Certification according to IEC 61400

Technical Data	
Rated power	750 kW
Total heigth	105 m / 345 ft
Hub height	78 m / 256 ft
Diameter of rotor	32 m / 105 ft
Rotor blade length	54 m / 177 ft
Designed for wind class	IEC II/A
Operating wind speed	2.5 m/s – 30 m/s



Wind Test Field Grevenbroich
(North Rhine-Westphahlia, D)

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Location: Dübendorf (CH): HQ, development site
Lemwerder (D): Production site (5'000m²)

Foundation: 2010

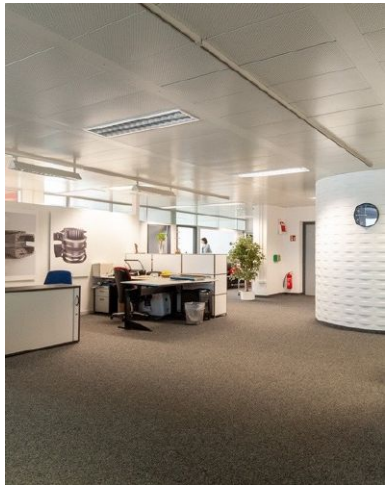
Membership: Swissmem, swisscleantech, Suisse Eole, BWE (D), AWEA (USA)

Sales & Project partner:

KLIMAWIND – Ihr Partner für Eigenstromerzeugung.
renewable energy consulting reencon — Germany
OneWorld Resource Management, LLC
EthosDistributed Solutions — USA
ELCASYSTEMS — Middle East, Africa, South Asia

Research partner:

inspire
ETH Eidgenössische Technische Hochschule Zürich, Swiss Federal Institute of Technology Zurich
zh aw School of Engineering
OST Ostschweizer Fachhochschule



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Repowering the world!

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