



# NTS-X-Wind plants

**Substituting fossil fuels with renewable energy  
by harnessing the strong winds up to 500 m**

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# X-Wind plants combines well known technologies



Airborne steering unit



Generator/Engine



Railway track

# X-Wind plants combines well known technologies



Automatically steered kites



ICE-Rail-System



Simulation of an X-Wind plant



# The main facts

- Wind availability for operation up to 90%
- Up to 3 x more efficient than common windmills\*
- Grid independent, scalable and suitable  
(for almost any territory)
- Operational costs **comparable to fossil fuels\***

\*Source: Fraunhofer Institut IWES, Bremerhaven

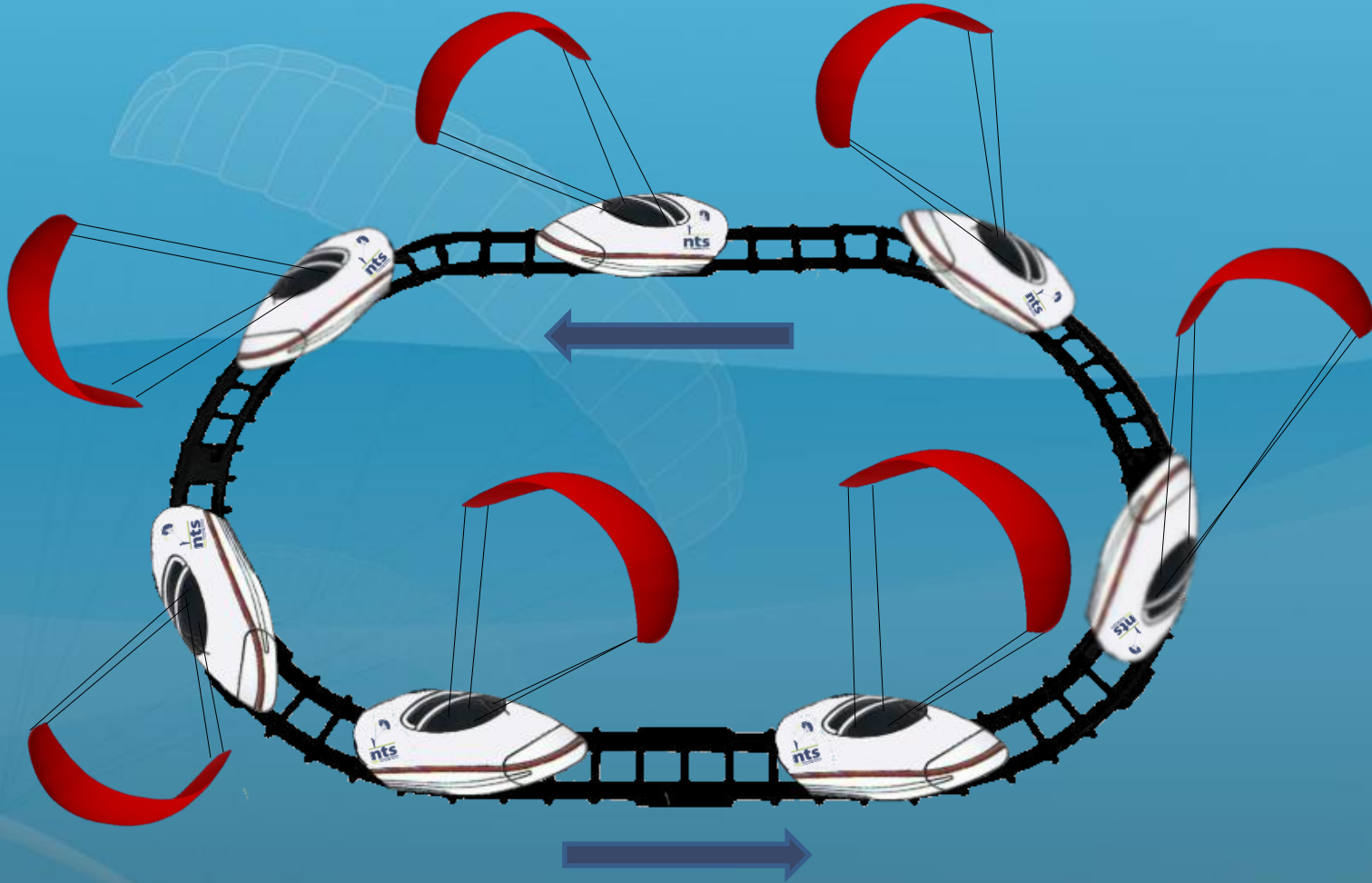
# X-Wind principle

Back and forward with wind from one direction

## Main principle



X-Wind power into the grid, departure, landing, and holding the Kites in the air



# Wind energy costs comparable with fossil fuels



- 120 GWh/year = 1 NTS-plant
- Starts at 2 m/sec, operates at 500 m



- 120 GWh/year = 60 x 1 MW windmill
- Starts at 5 m/sec, operates at 120 m

For the first time in history:

Wind will produce energy comparable to fossil fuels!

# Assigned patents

- USA
- China
- Russia
- E

Market potential  
>50% of mankind  
>80% of the world market





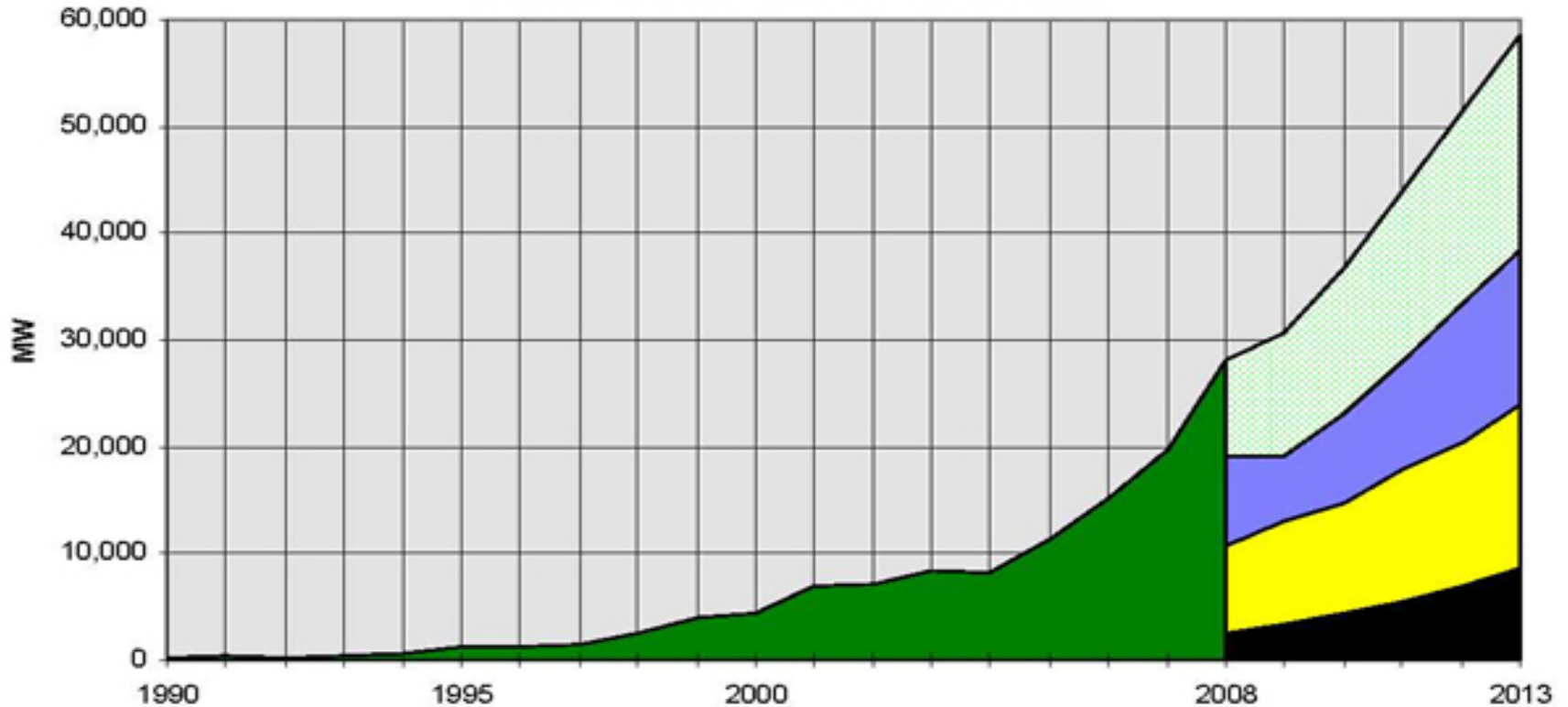
Investment 25 Mio. for 120 GWh plant: Profit worst case: 5.8 mil Euro  
 Profit best case: 9.1 mil Euro

Costs				
Maintenance				133.700
Replacement				1.321.333
Insurance			1,80%	375.595
Others				284.726
Production Costs / Year			€	2.115.355
Archievment / Year	120.000.000	kWh	€/kWh	0,018
Revenues / Year German feed in tariff		8,90	Cent/kWh	10.680.000
Revenues / Year Baseload Year Future 2015 EEX		6,62	Cent/kWh	7.944.000
Revenues / Year Peakoad Year Future 2015 EEX		9,35	Cent/kWh	11.220.000
Profit / Year German feed-in-tariff		80%		8.564.645
Profit / Year Baseload Future 2015 EEX		73%		5.828.645
Profit / Year Peakload Future 2015 EEX		81%		9.104.645

# Market outlook

## Annual Wind Power Development

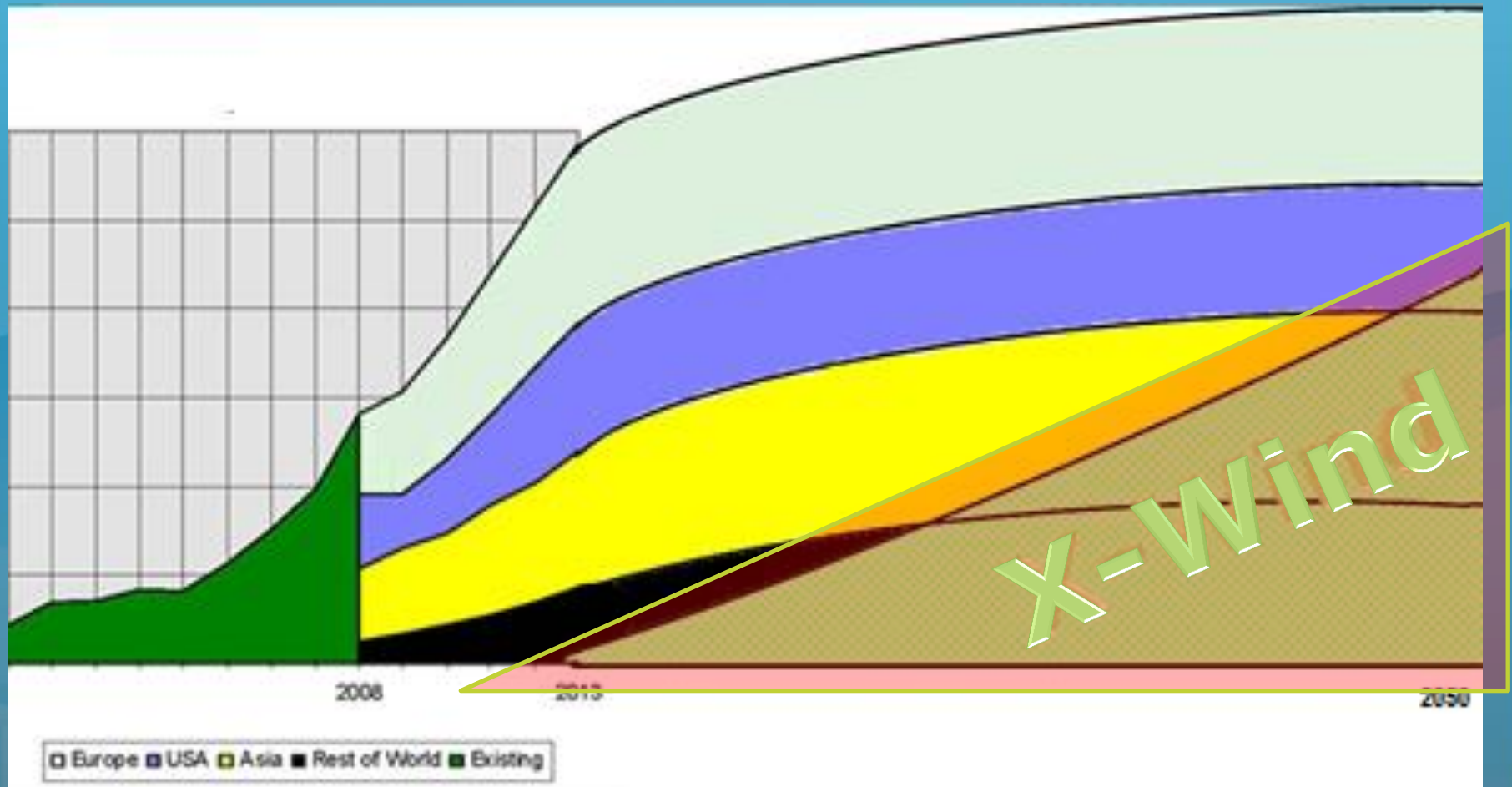
Actual 1990-2008 & Forecast 2009-2013



Source: BTM Consult ApS - March 2009

□ Europe □ USA □ Asia ■ Rest of World ■ Existing

# Market outlook X-Windplants



# Investment opportunity

- 10% of NTS X-Windtechnology 2 mio. €
- Invest 120 GWh X-Wind Plant 25 mio. €
- Revenues after 3rd year 7.9 to 11.2 mio. €
- Profit after 3rd year 5.1 to 9.1 mio. €

(without 72.000 t reduction of CO<sup>2</sup> /a; another 0.7 to 1.4 € mio. profitability/a)\*



# Business- and exitmodel X-Wind plant

- Depending on country regulations
  - Selling the X-Wind plant to an operator
  - Selling energy
  - Lending X-Wind plant to an operator
  - PPP
- Maintenance and service via outsourcing

# Business- and exitmodel NTS

- Depending on country regulations
    - Selling X-Wind plants
    - Selling energy
    - Leasing of X-Wind plants
    - Licensing
    - Regional selling of patents
  - Maintenance and service via outsourcing
  - **IPO**
  - **Trade sale**
  - **Secondary market**
- } 3-5 Years

# Experienced Team



## **Uwe Ahrens, Founder:**

- Toolmaker, VW
- R&D, VW
- Qualitymanagement , VW and BMW
- Dipl.-Ing. Aerospace-Aviation Engineer, TU Berlin
- Design Manager, J&J
- Operation Manager, J&J
- Founder and long-standing CEO of aap Implantate AG. IPO in 1999
- Chairman of innovation, technology and industry at the Berlin Chamber of Commerce, among others.

## **Experience:**

Founding  
R&D  
Qm & Um  
EDP  
Knowledge Management  
Operation  
Education  
Marketing  
Sales  
Finance  
IPO  
Akquisition  
Super visor boards  
Restructuring

**11 employees: 9 engineers, 1 office manager, 1 apprentice**

## **Advisory Board**

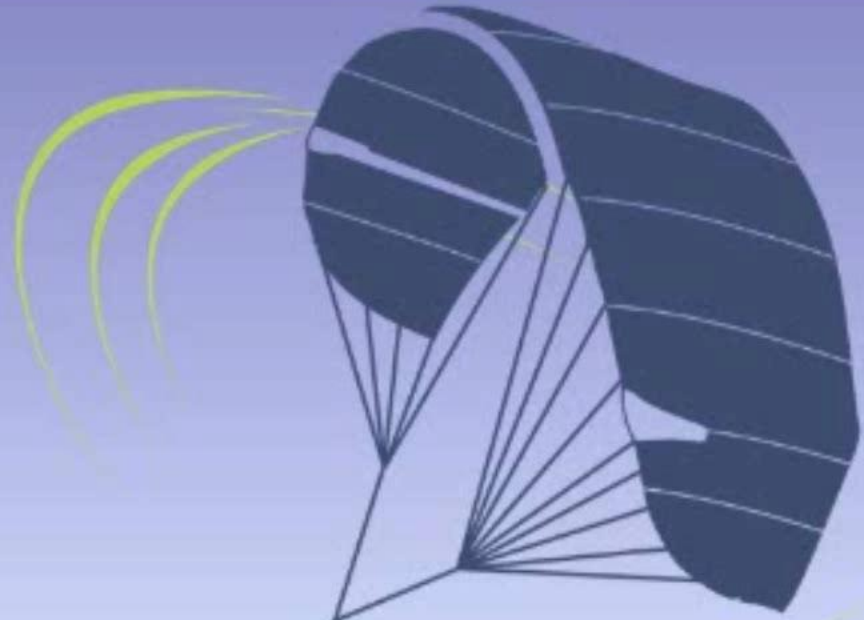
**Senator Mario Caroli, Managing Director** and shareholder **Bankhaus Ellwanger & Geiger**

**Dr. Martin Wienkenhöver, CEO CABB-Chemicals**

**Dr. Henner Gladen, MAMA Sustainable Incubation AG former CTO Solar Millenium**







**mnts<sup>®</sup>**



**Nature Technology Systems**



Real proportion of X-Wind Plants

Back up slides

# Existing investors

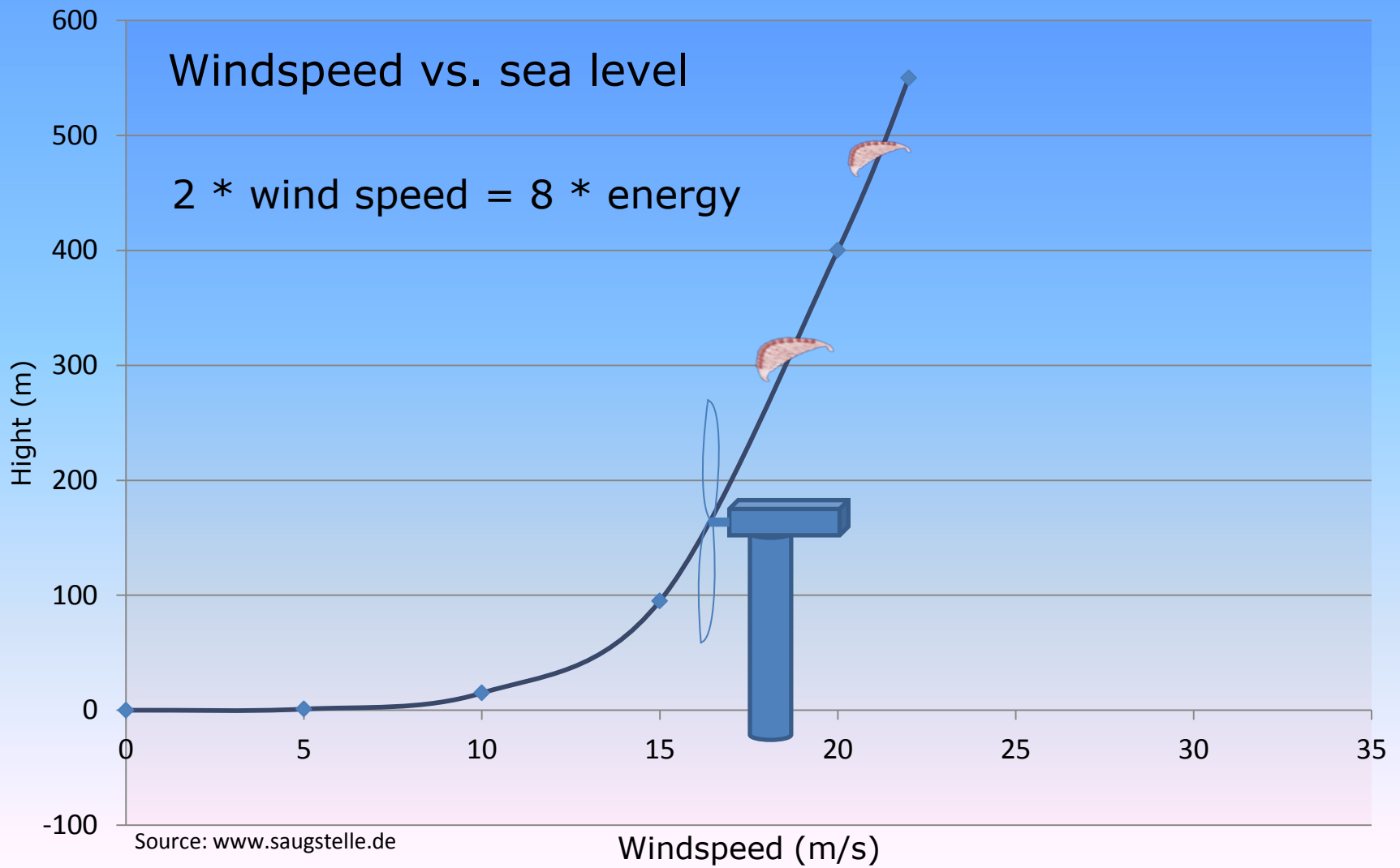
- 3M 21,5 %
- KfW 17,5 %
- FFF ca. 12,5 %
- Uwe Ahrens 48,5 %

Invested roughly 4 Mio. Euro



# Windspeed vs. sea level

$$2 * \text{wind speed} = 8 * \text{energy}$$



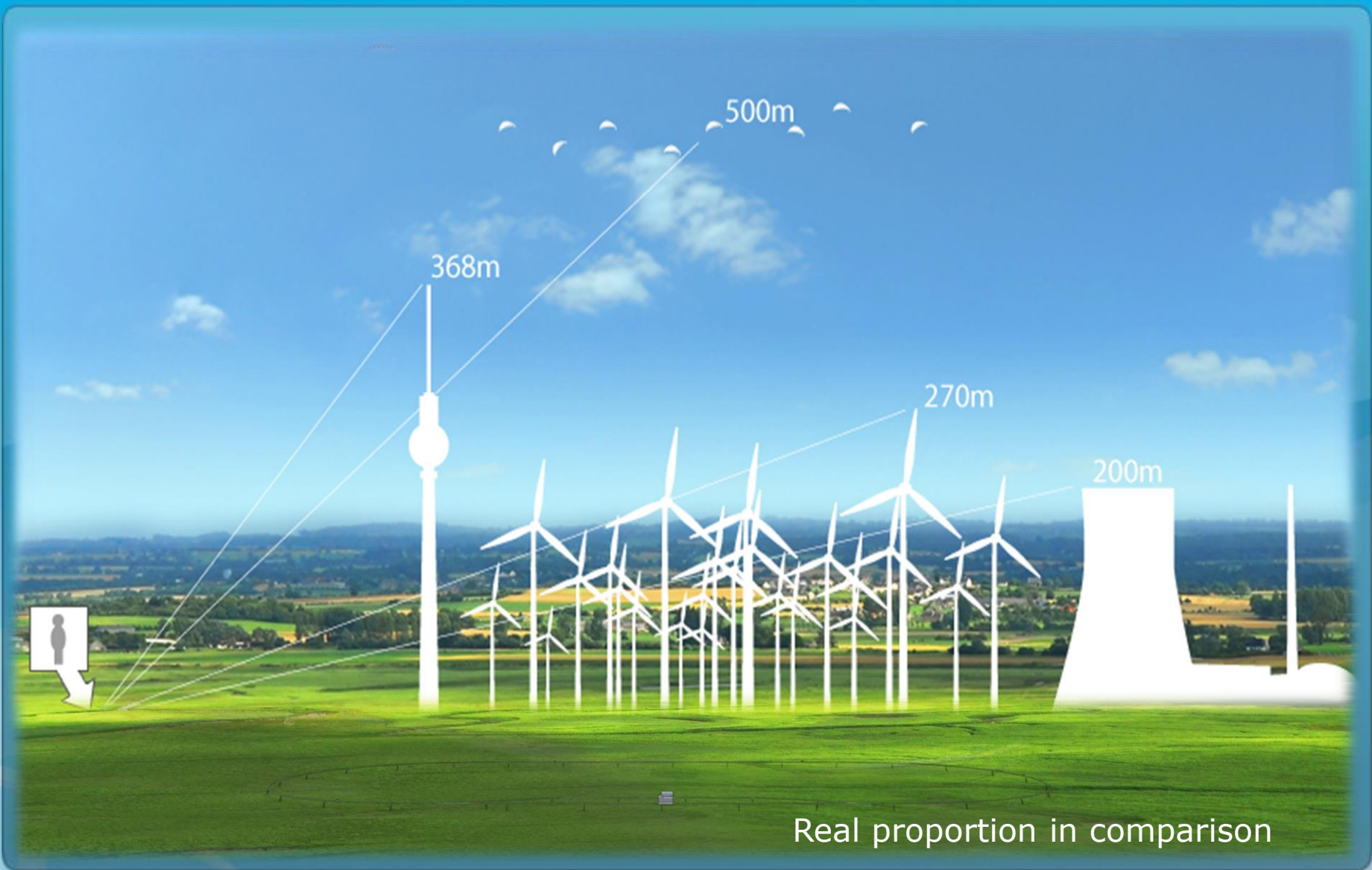
Source: [www.saugstelle.de](http://www.saugstelle.de)



# Equity Story NTS X-Wind Technology

Product	<p>Renewable energy with Airborne Wind energy plants competitive to energy out of fossil fuel electricity producers</p> <p>Nearly invisible in scenery</p> <p>Capacityfactor 70 – 90% (nearly basic loadable)</p>
Technique	<p>Assembling of approved technologies to profitable X-Wind plants</p> <p>Utilization of world wide standardized track technology</p> <p>Utilization of world wide standardized generator-/engine technology</p> <p>Utilization of approved Kites-steering technology</p> <p>In 9 regions granted patents (USA, China, Russia, Europe, et al). Covering 80% of the market</p>
Market	<p>Renewable energy</p> <p>Electricity producers</p> <p>Manufacturer of energy plants</p> <p>Cooperatives</p> <p>Operating enterprises</p> <p>Licensees</p>
Management	<p>Turn around, IPO experienced and cross-linked management (CEO member of BBUG)</p> <p>Turn around, IPO experienced and well cross-linked super visor board</p> <p>Excellent scientific network to scientists, scientific institutes, universities and consultants</p> <p>Annual environment and CSR-report, quality and environmental certified by TÜV (ISO 9001 and ISO 14001)</p>
Company-structure	<p>Continuous administered due diligence data room</p> <p>Well administered and structured data base, educated reporting system</p> <p>Cockpit and monthly reporting over all departments for our interest groups (shareholder, customer, supplier, staff and public), periodic management- and staff evaluation</p> <p>Clear marketing- and sales strategy, pronounced customer orientation</p> <p>Integrated important pressure groups, founded AWE federation, initiator and co-editor of the first scientific book across AWE (Airborne Wind-energy). Issuer Springerverlag</p> <p>Developed risk-, admission- and contract management</p> <p>Credo, CD, CI, professional personal management and development continuous trained and audited</p>
Investment- and Exit- opportunity	<p>Trade sale</p> <p>IPO</p> <p>Secondary market</p>





# Milestones and next steps

- Allowance for test track construction
- ISO 9001 and 14001 certified
- Data room available
- Automated flight
- Production of electrical energy
- Construction of closed loop 2012-2013
- Design of a serial plant 2013
- Construction of a serial plant 2014
- Beginning of operation 2015



# Specific area need

- Biomass power plant 1-2 GWh/km<sup>2</sup>\*a (Central Europe)
- Geothermal power plant 1-2 GWh/km<sup>2</sup>\*a (Turkey, Italy)
- Conventiennell windpower 5-50 GWh/km<sup>2</sup>\*a (Coast, Offshore)
- Hydro electric power plant 5-50 GWh/km<sup>2</sup>\*a (Norway, Alpes)
- Photovoltaic 10-100 GWh/km<sup>2</sup>\*a (Southern Europe)
- Solar thermal power plant 100-250 GWh/km<sup>2</sup>\*a (Northern Africa)
- X-Wind power plant >2.500 GWh/km<sup>2</sup>\*a (nearly worldwide)<sup>2)</sup>

# Further advantages

- Bird save
- Low noise generation
- No stroboscopic effect
- Easy maintenance on ground
- Confirmation of feasibility  
(airspace, ground protection)
- Tremendous reduction of material use  
( $<10\%$  of comparable windmills)

# Partners

## Letters of Intent

- BMW, Werk Leipzig
- DSM/Dyneema, Niederlande

## Development Partner and Sponsors

- 3M
- Berliner Stadtreinigung BSR
- Autodesk
- Friedland Industrial Minerals GmbH
- Fraunhofer Institut IPA, ISW Stuttgart
- Thyssen Krupp
- Hapag-Lloyd
- Liros
- Swing Flugsportgeräte
- TU Berlin, Beuth Hochschule für Technik Berlin

## Associations

- Bundesverband Windenergie e.V.
- Airborne Wind Energy Consortium
- Organization committee AWEC 2011

## Investoren

- Kreditanstalt für Wiederaufbau
- 3M
- Investitionsbank Berlin/EFRE (Grant)



# Harnessing the strong winds up to 500 m

The strong and stable winds at higher altitudes could easily be harnessed with kites





# Selected References



Katherina Reiche, Parliamentary State Secretary of the German Federal Ministry for the Environment congratulates NTS at their office opening on January 7<sup>th</sup> 2011.



Minister for Energy Mr Schlotmann Germany, Mecklenburg Vorpommern Visiting the Test-track at Friedland Site in March 2012



Mr Jeannot Krecké, Luxembourg Minister of the Economy and Foreign Trade awards NTS in November 2010 at the European Venture Contest as best Cleantech Company.

# Awards

- February 2009, KIS-Forum Brussels: "Most Successful company"
- September 2009, EVC, Lisbon: "Best Cleantech Company"
- November 2009, 2. Münchner Cleantech-Konferenz: Best Presenting Company
- December 2009, EVC Barcelona: Finalist "Top 25" of the best European Venture Opportunities
- September 2010, ecolink+, Vienna: Best Presenting Company
- Nov. 2010 European Venture Contest, Luxembourg: Best Cleantech Company



# NTS is looking for:

- Development partners
- Energy producers/consumers
- Universities, R&D institutes
- Green Energy Cooperatives
- Public Private Partnerships
- Investors in X-Wind technology
- Licencees

# NTS Energie- und Transportsysteme GmbH

- Founded June 2006 in Berlin, Germany by Uwe Ahrens (CEO)
- Developing and marketing of X-Wind Plants (spoken: Cross-Wind Plants)
- 11 Employees (9 Engineers, 2 General Management)
- Test track in Friedland, Germany

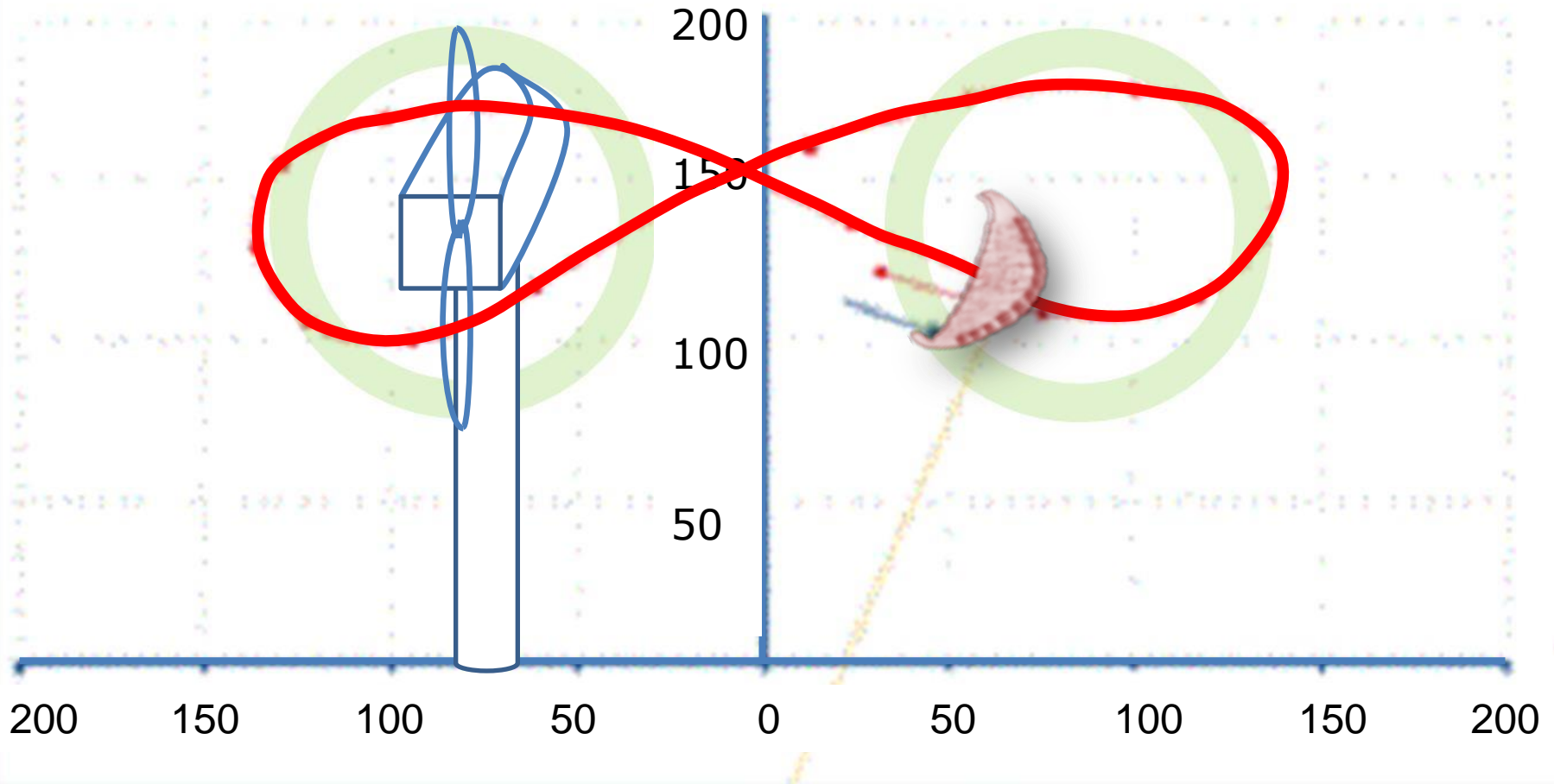




80% der Energie  
werden

mit 20% der  
Blattfläche  
erzeugt

# Flugbahn NTS Drachen (nur in effektiverer Höhe)



# Test tracks in northern Germany, Region Mecklenburg-Vorpommern

40.000 sqm area at Mecklenburg-Vorpommern  
Tests are permitted and approved  
Circle tests in 2012/2013

Salow, Datzetal

Main wind direction

circle track (starting 2012)

500m

400m single test track (operational since 2011)

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