Beurffer

a

Nohaltegkeet

10.01.2014 Athénée de Luxembourg

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Quel rapport avec une éolienne?
Wat huet dat mat enger Éolienne ze din?

Qu’est-ce?
Wat ass dat?

A quoi ça sert?
Fir wat ze machen?

Pourquoi?
Wiesou?

Quel rapport avec une éolienne?
Wat huet dat mat enger Eolienne ze din?

Un coup marketing ou plus sérieux?
E marketing coup oder mi éscht?

Quels métiers?
Wéi eng Beruffer sin dat?

Et Moi? Comment puis-je y accéder?
An Ech ? Wie kann Ech esou äppes machen?

Är Froën
Vos Questions
Quel rapport avec une éolienne?
Wat huet dat mat enger Éolienne ze din?

« CRADLE TO CRADLE »
(RE-MAKING THE WAY WE MAKE THINGS*)
VS. CRADLE TO GRAVE MANUFACTURING

For a New Product to be developed, Choices are still possible
... yet, Realism is also a Key to Success

Development of ESTREYA L2, SUSTAINABILITY was the major value/issue
which influenced all further choices:
Renewable Energy Principle
Technology
Materials
Safety issues
Positioning as an Investment good vs. a Consumer good

* Michael Brangart, William McDonough, Vintage books, London
Renewable Energy Principle: local use of energy available locally
Wind is sustainable, renewable & available locally
Small Wind can be produced & used locally

Chosen Technology should be sustainable
A WT does no harm, during & after its lifetime (no waste or contamination)
Importance of grey energy & CO² balances

Materials for ESTREYA L2
Steel is 100% recyclable
PDCPD has best grey energy & CO² balances
When burnt, it gives 92% back in heat with no toxic residues

Safety issues
To harm nobody & provide production availability over time

Marketing issues
Positioning as an Investment good vs. a Consumer good
High End Quality & Top Service

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Aerodynamic Engineering
Wind & Solar ROI Studies
buildings, cities, rural, highways...

Mechanical Engineering
Rotating equipment

Structural Engineering, Statics

High quality manufacturing of
wind turbine & structural steel
and PDCPD components

Grid Connection Engineering
Electronic Products

IEC Certification

Management
General & Detail Engineering
Assembly
Quality control
Logistics
Installation & Service
Lightning protection & Panel
Turbine Security, Control
& Communication System
Thinkware™ TSC²S

Estreya Turbini L2
Vertical Axis Wind Turbine
For Urban & Rural Applications

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Estreya L2 Business Development, Sales & After Sales Service Network Turnkey Supply & Service

Business Development Network

Global Service Network Management
Remote supervision
Maintenance
Warranty
Turbine Security, Control & Communication System
Thinkware™ TSC²S Global

Global Commercial & IPR Licenses

Syneola Switzerland

Luxembourg SA

Luxembourg based Representatives

Eurasia
North Africa
South America

Commercial & licenses CH, I, D, A, F

Sales L, B, D

Estreya Turbini L2
Vertical Axis Wind Turbine
For Urban & Rural Applications

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Urban environment
– Topography
– Wind potential

In partnership with

CFD: Comprehensive Project feasibility & profitability studies

Wind rose

Wind speeds

Energy content in the Wind

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CORE TECHNOLOGY
Knowledge based WT Communication
Thinkware™ TSC²S

Level 1
“Estreya® current condition
monitoring”
MEMS

In context with Estreya® Design
Database
Out of context with Estreya®
Design Database

Level 2
“Condition related to
DB”

Meteorology
Design Database
Alarm
Micro grid
Maintenance
Information
Updates
Product News

“All OK”, Comfort area
“What’s that?”,
Sudden Gust, Icing
Just check area
“Tell me more”
Inform area
“Short story”,
Last hour report
“Full play”,
Monthly / yearly production
Alarm Area
Estreya® history area

Level 3
“Estreya® & Owner
Communication”

Report: Conditions vs. DB
Slow down,
Shut down
Call Owner & Maintenance
Continued supervision

Real time wind speed, “meteo”
kWh, GPS sensors

Correlation with Meteo, sensors & Database,

Level 4
Estreya® & Friends Community
Advertising

Source: US pat. N° 8,280,827
MULTILEVEL SEMIOTIC AND FUZZY LOGIC USER AND METADATA INTERFACE MEANS FOR INTERACTIVE MULTIMEDIA SYSTEM HAVING COGNITIVE ADAPTIVE CAPABILITY

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# Product Specifications*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting wind-speed</td>
<td>4 m/s</td>
</tr>
<tr>
<td>Nominal wind-speed</td>
<td>11 m/s</td>
</tr>
<tr>
<td>Power @ nominal w-s</td>
<td>2 kW</td>
</tr>
<tr>
<td>Installed power (max)</td>
<td>6.5 kW</td>
</tr>
<tr>
<td>Cut-out wind-speed</td>
<td>25 m/s</td>
</tr>
<tr>
<td>Power @ 17 m/s</td>
<td>6.5 kW (300Nm, direct drive)</td>
</tr>
<tr>
<td>$C_p &gt; 5 &lt; 15$ m/s</td>
<td>$&gt; 0.36 &lt; 0.38$</td>
</tr>
<tr>
<td>Noise generation</td>
<td>40 ± 3dB ($&gt; 2 &lt; 6$ m/s) @ hub to be certified IEC 61400</td>
</tr>
<tr>
<td>Brake</td>
<td>Electrical &amp; hydraulic failsafe disc-brake</td>
</tr>
<tr>
<td>Generator</td>
<td>PM rotor/stator kit</td>
</tr>
<tr>
<td>Self-monitoring energy conversion &amp; communication module</td>
<td>Proprietary Turbine Security System Thinkware™ TSC²S, Inverter plus GPRS</td>
</tr>
<tr>
<td>Turbine (patents pending)</td>
<td>2.40m Ø, 2.7m Height</td>
</tr>
<tr>
<td></td>
<td>Active surface 6.48 m²</td>
</tr>
<tr>
<td>Weight</td>
<td>Rotor 270 kg, Total 456 kg</td>
</tr>
<tr>
<td>Material</td>
<td>Telene™ (pDCPD) &amp; Steel</td>
</tr>
<tr>
<td>Colour</td>
<td>Blades: RAL 5018 blue or custom</td>
</tr>
<tr>
<td></td>
<td>Steel: Surface treatment</td>
</tr>
<tr>
<td>Support</td>
<td>Roof / pole, min 3 / 18 to 24 m</td>
</tr>
</tbody>
</table>

* Preliminary specifications. ESTREYA L2 is in IEC 61400-2 certification for wind class I with GL
APPLICATIONS: kWh PRODUCTION
FIRST INSTALLATIONS IN LUXEMBOURG

Decentralized electricity for:
- Homes
- SMEs / SMIs
- Farms
- Communities
- GSM autarkic towers
- Water pumping / desalination

...-

New water tower in Berdorf

Security Storage in Windhof

Each kWh by Estreya L2
- Saves 0.4L Fuel or 2.5kg coal
- Avoids 1.66kg CO²

5-7.5% more Energy harvest from single to Cluster configuration
Container for easy transportation mounting support, permanent electronics, battery (Long Life Energy Storage Lithium Yttrium), ICT housing.
Options:
Small Diesel &/or Fuel Cell

Higher kWh Production in Nomad/Cluster Formation
Turnkey hybrid wind / solar power supply & GSM container solutions

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**Wind Energy Conversion**

**Theory:**

Energy content in the Wind,

\[
p/2 \times S \times v^3 \times Cp
\]

(Air density/2 * swept surface * wind speed³ * Capacity factor)

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Merci
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