

Siemens Wind Power FÓRUM ABINEE TEC 2009 – São Paulo

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World energy consumption and the role of renewable sources of energy





With intensive expansion of wind energy utilization, ca.700 million tons of CO_2 will be avoided in 2020. This corresponds to 5% of the emissions produced by Power Generation. Main Challenges: 1. Demographic Dynamics 2. Resource Scarcity 3. Environmental Awareness

Wind and solar are the main and fastest growing markets in renewables





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Technology Vs. Market Maturity



Wind Power Worldwide: The most important renewable energy source is expanding to more and more countries





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Wind Power in Latin America Long Term Program for Renewables not in place yet



*Source: Erlangen Forecast

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Latin America Wind Power Capacity Additions by Country, 2007–2020 Other LA Mexico Costa Rica Colombia Chile Caribbean Brazil 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 Argentina

- CAGR 25 % (123 MW/year)
- CAGR 26% (362 MW/year)
- CAGR 35 % (71 MW/year)

*Source: Emerging Energy Research Forecast

Development in Wind Turbine Sizes



Technology Development – Wind Turbine Size

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Boeing / Douglas Aircraft MTOW Growth



Until 2003 exponential growth

- From 22 kW to 2.3 MW over 25 years
- Doubling size in 4 years (1999 to 2003)
- Plateau reached 2003 at 2.3 MW
- Flagship SWT-3.6-107 turbine has 107m wing span – Boeing 747 has 64m

Recognized Leader in Engineering and Reliability

7,031 installed WTGs worldwide with a capacity of 7,043 MW



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Energy / R / WP

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Robust Design Proven high availability and durability



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Gaza increase the low relational sparel of

12,91%

3.44%

Gearbox

How a Wind Turbine comes together

% in Cost



Made from steel, must be enough to support the online turbing drive than, builded too heavy.

aladdrectio

1998 211 487



ACCESSION OF

1.04%

Design life of the SWT-2.3-series

- Calculated structure life of 20 years
- Total CO_2 -reduction: 60-100kton (1,5 to 2,0 kton CO_2 / installed MW)
- The energy consumption for making a SWT-2.3-series' turbine is generated within 3-6 months
- Metal parts can be recycled or disposed
- At present glass fiber parts are stored recycling possibilities in the near future

Our innovations boost our business

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Turbine Conditioning Monitoring



- Flexible Online-System
- Designed to continuously monitor the external and internal state of the wind turbine
- Detect significant deviations from its normal operating condition

Integral Blades



- Patented manufacturing process
- Delivering an unique integrated blade with excellent power and noise performance
- It is based on vacuum-assisted resin injection without adhesives or chemicals
- Eliminates glue joints
- "State-of-the-art" technology with significant weight reduction

SWT- 2.3-93 Wind Turbine

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Main data:

IEC Class:	IIA
Rotor diameter:	93 m
Blade Length:	45 m
Swept area:	6,800 m ²
Hub height:	80 m
Power regulation:	pitch regulated
Annual output at 8 m/s	8,800 MWh
Blade weight:	11 t
Rotor weight:	60 t
Nacelle weight:	82 t
80 m tower weight:	162 t
Experience data:	
Prototype installed:	2004-2005
Serial production:	2005
Total number installed:	777



SWT- 2.3-101 Wind Turbine

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Main data:

IEC Class:	IIB
Rotor diameter:	101 m
Blade Length:	49 m
Swept area:	8,000 m ²
Hub height:	80 -100 m
Power regulation:	pitch regulated
Annual output at 8 m/s	9380 MWh
Blade weight:	12 t
Rotor weight:	62 t
Nacelle weight:	82 t
80 m tower weight:	162 t
Experience data:	
Serial production:	2008



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SWT- 3.6-107 Wind Turbine

Main data:

IEC Class:	S
Rotor diameter:	107 m
Blade Length:	52 m
Swept area:	9,000 m ²
Hub height:	80-90 m
Power regulation:	pitch regulated
Annual output at 8 m/s	12,700 MWh
Blade weight:	17 t
Rotor weight:	95 t
Nacelle weight:	125 t
80 m tower weight:	250 t
Experience data:	
Prototype installed:	2004
Serial production:	2006
Total number installed:	42
Under installation:	325



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Siemens Wind Power Locations Worldwide – Global Supply Chain





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Siemens as a single supplier offers a complete solutions for Wind Farms



Jundiaí Site The biggest industrial complex of integrated solutions for: Power Generation, Transmission and Distribution in Latin America



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Global Strategy

- Target: Be the market leader
- Triple production capacity by 2011
- Excellent technology
- Keep success in core markets
 - Offshore
 - USA/Canada
 - Europe
 - Asia-Pacific
- New target market: Latin America
- Establish a global manufacturing network
- Attract and keep high performance employees

...to be Best@Wind.



Latin American Market Strategy

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Our Target: become one of the top turbine suppliers for the Latin American market by offering:

- Commercial presence to support Latin American market growth
- Products and Solutions of:
 - High quality
 - High reliability
 - Best performance fit
 - High competitiveness
 - Services:
 - Close an quick response to our customer's requests by strengthen its local presence
 - Service concept from technical assistance to Maintenance Programs
- Development of local supply chain, identify potential partners for further cooperation and agreements **to be Best@Wind.**





Obrigado! Siemens Wind Power ...*to be Best@Wind.*

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Present CSP technologies



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Worldwide market leader in offshore projects

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* planned

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