



SUPPLYING ELECTRIC POWER WITH SMALL SIZE WIND TURBINES



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ITEMS TO BE CONSIDERED



1. INTRODUCTION
2. CHALLENGES FOR A BRAZILIAN TECHNOLOGY-BASED COMPANY
3. MARKET CONSIDERATIONS
4. PRODUCT DEVELOPMENT
5. APPLICATIONS
6. CONCLUSION

1. INTRODUCTION

1.1 - THE BRAZILIAN ELECTRIC POWER SYSTEM CONTEXT

- The integrated power network reliability and capacity
The significant demand already supplied;
- Most people are included in the network
About 7% still excluded;
- A big geographical area left out
Scattered and isolated potential consumers;
- The efforts to transform people into citizens;



1. INTRODUCTION

1.2 – THE UNIVERSITY-INDUSTRY INTEGRATION

- Incamp – The business incubator of UNICAMP
Developing and launching high tech products;
- ELETROVENTO – a product of this partnership
Joining opportunity and knowledge;
- Wind turbines – Mixing technology concepts
Mechanical, electrical, aero dynamical and electronic;

1.3 – A SUCCESSFUL PARTNERSHIP

- Project with positive results
High quality and high performance equipment;
- Complying International standards



2. CHALLENGES FOR AN INCUMBENT

2.1 – INNOVATION – THE ENGINEER’S GREATEST MOTIVATOR

- Universities, Research Centers and Companies
 - Big number of ideas and successful products;
- The problem: To turn the product into a real business
 - To become an entrepreneur;

2.2 – RESOURCES TO PLACE THE PRODUCT ONTO THE MARKET

- Professionals with specific skills
 - Marketing, Market evaluation, Business strategy,
 - Price definition, Distribution policy, Negotiations;
- Amount of money needed for these activities
 - Marketing materials, Traveling, Fairs and exhibitions,
 - Demonstration activities, Introducing a new concept;

2.3 – SOURCES OF FUNDING RESOURCES

- Sponsoring institutions for research and development
 - Innovations and technology based products;
- Support and/or finance - Marketing and Production
 - Collaterals and guarantees - High interest



3. MARKET CONSIDERATIONS

- 3.1 – THE BIG CHALLENGE: TO SUPPLY ENERGY FOR ALL
- Scattered and isolated homes and small businesses;
 - Rural properties: farms and productive areas;
 - Islands and coast isolated communities
- 3.2 – GOVERNMENT PROGRAMS AND INCENTIVE
- The “Luz Para Todos” program
 - Aneel regulations and conditions
 - Proinfa and Rural electrification programs
- 3.3 – OPPORTUNITIES IN DIFFERENT MARKET NICHES
- Agricultural growing areas
 - Social programs
 - Telecom repeaters and cellular radio-base stations
- 3.4 – PREPARING THE FUTURE
- Environmental conditions to be preserved
 - The present sources of energy are getting critical



3. MARKET CONSIDERATIONS

3.5 – COMPARING THE CURRENT ALTERNATIVES

- Gas/Diesel generator units;
- Solar cells panels;
- Biomass based generators;
- Distribution network extension;
- Small size wind generators;

3.6 – PARAMETERS USED FOR COSTS EVALUATION

- Installation for about 500 kWh per month;
- Site 5 km away from the grid;
- Five years operation;
Initial investments, accessories, fuel, power bill, fuel storage, operation, maintenance, batteries replacement

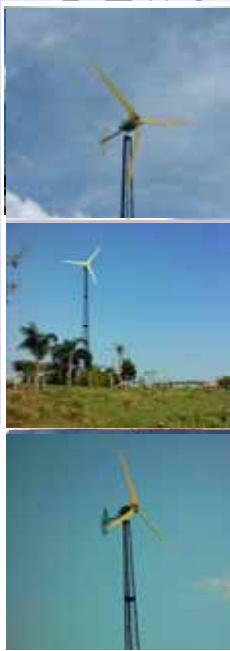
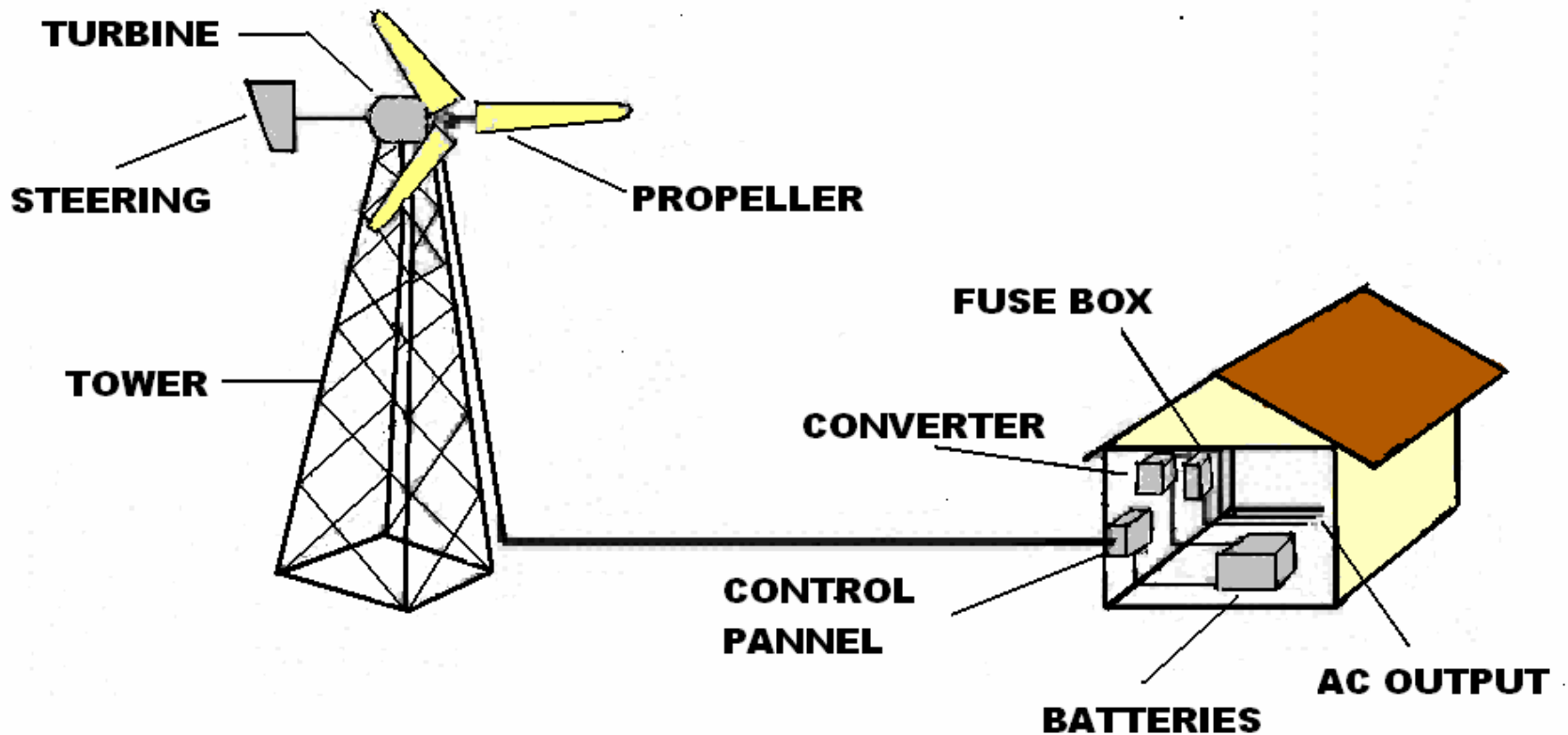
3.7 - COSTS COMPARATION ESTIMATE

- Wind generator - Factor 1
- Gas/Diesel - 2.2
- Network extension - 1.9
- Biomass - 1.47
- Solar cells - 1.98



4. PRODUCT DEVELOPMENT

SMALL SIZE WIND GENERATOR SYSTEM



4. PRODUCT DEVELOPMENT

4.1 – SMALL SIZE WIND TURBINES

- Generation completely independent of the power network;
- Capacity up to 50 kW;
- Storage system essential;
- Complex control system;

4.2 – PRODUCTS PORTFOLIO

- 2 kW wind generator – already in production;
- 5 kW wind generator – prototype – third quarter 2007;
- 500 W wind generator – under development - 2007;
- Anemometer for wind monitoring;



4. PRODUCT DEVELOPMENT

4.3 – BASIC SPECIFICATIONS

- Aero dynamics profile of the propeller
- Propeller and the mechanical structure robustness
- Electrical generator project
- Electronic control

4.4 – SPECIAL CARE CHARACTERISTICS

- Noise generated by the propeller ;
- Treatment of metallic parts to resist oxidation ;
- Control algorithm that sets the optimal working point ;
- Safety system ;
- Demand controller for batteries protection;



5. APPLICATIONS

5.1 – TYPICAL USE

- Supply electrical power to residences and small businesses scattered and far from the conventional electric network;
- Isolated communities;

5.2 – SOCIAL RESPONSIBILITY PROJECTS

To supply electric power to:

- Schools in the rural area ;
- Community centers in small villages ;
- Rural health centers ;
- Community storage facilities for the preservation of fish ;

5.3 – THE CASE “ILHA DO CARDOSO”

- A project sponsored by a large company, joining an NGO, an university and a private company:
- Up grade of two rural schools including energy, electrical equipment (refrigerator, TV, DVD) and training programs for the teachers



6. CONCLUSIONS

6.1 – THE SMALL SIZE WIND TURBINE

- A feasible solution for renewable and non-polluting energy;
- May help to attend the needs of a significant share of the least favored layers of society;

6.2 – THE STANDARDS OF QUALITY

- Meeting international standards and norms;
- Professional equipment with high durability and low maintenance;
- Qualified to work in severe whether conditions;

6.3 – THE MARKETING CHALLENGE

- To develop a good technology based product does not mean to have a good business and to be useful to the society;
- How to better use government investment in technological innovations to create business.





Thanks
Thanks

THANK YOU

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