ECONOMICS OF WIND INSTALLATIONS

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Summary

This article presents to the potential users of wind energy systems the guide how to compare the cost of energy from wind turbines with the cost of electricity from conventional sources taking into account installed purchase price, annual energy capture and operation and maintenance costs. Economics of wind energy for utilities and for rural electrification are examined.

1. General Considerations

Users of wind energy systems compare the cost of energy from wind turbines with the cost of electricity from conventional sources. The cost of energy from wind systems depends on three parameters: installed purchase price, annual energy production and operation and maintenance (O&M) costs. All three of these parameters are gradually improving, thereby lowering the cost of energy from wind turbines to ranges that are competitive with costs of conventional electrical generation.

Once an analysis of the suitability of available wind turbine generators for a given application has been made and a variety of appropriate energy systems have been designed, the consideration of wind energy is sufficiently defined to warrant economic analyses. These analyses are based on quantifying the costs and benefits of each energy system design. Each method of economic analysis is based on life cycle costing, i.e., the time period used in the analysis is that equal to the anticipated life time of the wind turbine generator.

The first and most important element of cost is the estimated price of the totally installed wind system. Included in the installed cost are such items as:

- Cost of site (land);
- Cost of site preparations;
- Cost of tower and foundation;
- Cost of WECS;
- Cost of complementary system for hybrid coupling;
- Cost of interconnecting equipment;
- Cost of storage system and shelter;
- Shipping and handing costs;
- Installation costs;
- Taxes (if applicable).

In addition to installed equipment cost, other related costs must be identified these might include the following:

- Insurance costs;
- Property taxes (if applicable);
- Operating and maintenance costs;
- Supplemented or competing fuel costs;
- Cost of utility-generated energy;
- Interest on loans.

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Biographical Sketch

Professor Vladimir A. Dobrovolski, Ph.D. was born in Moscow, Russia in 1936. He graduated from Moscow Aviation Institute in 1960 and Ph. D. Degree in 1968.

1960-1963 - test engineer, the USSR Civil Aviation

1963-1970 - researcher, Thermodynamics department of Moscow Aviation Institute

1970-1973 - head of department, Central Aerohydrodinamics Institute

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