

Control System and Wind Speed Can Be Set Using the Blade Rotation Angle

Ershad Sadeghi-Toosi

Department of Science and Engineering, Neka branch, Islamic Azad University, Neka, Iran

Abstract: Use of new and renewable energy, due to its advantages today, has been highly regarded. After the energy, crises in the seventies when most deaths occurred, according to many countries around the world using new energy such as solar, geothermal and other renewable sources have been drawn together. However, before the 17th, the research was sporadic and in this regard would be accepted but only after years of research and research applications range in relation to energy in a new area. The inexhaustible nature of these energies, the trend to end fossil fuels, environmental health and benefits of this energy, the obvious human encouragement of investment in this direction have been encouraged.

Key word: Energy • Renewable • Wind • Power • Speed Factor

INTRODUCTION

According to the cost of electricity production between 1995 to 2005, we find that the cost of electricity production which is derived from gas fossil fuels and oil has increased in influence worthy of note after crisis (steep slope diagram for gas fossil fuels and oil in 1999 for Afghanistan war and in 2003 for Iraq war confirmed this issue). On the other hand, the Figure 1 shows the independency of electricity production by nuclear energy, coal and wind. Among these preferable energies, the benefits of wind are especially non-pollution, non-crisis for third world countries (as opposed to nuclear) and making stabilized development resources of energy supply and low cost are completely observed (Figure 1).

Figure 2 Show the independency of electricity production cost and of fuel cost changes, which present that investment in the use of wind energy, can follow a long term and a permanent development in the field of energy supply [1-5]. This diagram shows independency of wind energy from world inflation and economic recessions (Figure 2).

Successful performance of the mechanical system due to lack of induction machines (DC machines) is contrary to the aforementioned. In addition, an induction machine can be used in a vacuum (such as in space) because there is no sparking system and there is no performance car. Contrary to these advantages, induction machine control is an issue that requires further study and work due to the following factors:

- Dynamic system with machinery; fifth order nonlinear differential equations are analyzed.
- Two variables of state; these variables (rotor flux and flow) are not easily measurable.
- Rotor resistance with temperature changes working conditions of the car.

For better control of variable speed in wind power production with a horizontal axis, wind turbine blades and variable angles may be the best choice. Wind turbine rotor systems usually have two or three blades. Blades in the system rotate around its axis to enable power regulation. The blades rotate based on information on performance received from the generators and anemometer sensors. Also necessary is a high-pressure hydraulic system, which is responsible for the blades. Here, the control block to control the blades can be productive and pay functions to control conversion are obtained. Performance at the end of the block can offer suggestions on various fixed exchange rate is shown in the wind [5-8].

Overall Model of Wind Generator Connected to the

Network: Structures presented in three main subsystems are, wind turbines (horizontal axis, three blades, blade angle variable), Electric generator (Asynchronous Generator) and Controls (2 ring, ring output and blade angle). We assume power wind turbine wind speed before and after the collision with the turbines, respectively, V_2 , V_1 . Kinetic energy of the turbines will be spent and working equations (1 and 2) are obtained [8-9].

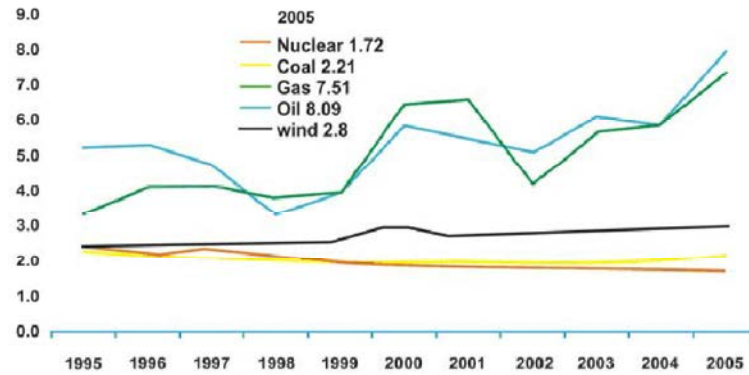


Fig. 1: U.S. Electricity production costs, 1995-2005 (averages in 2005 cents per kilowatt-hour)

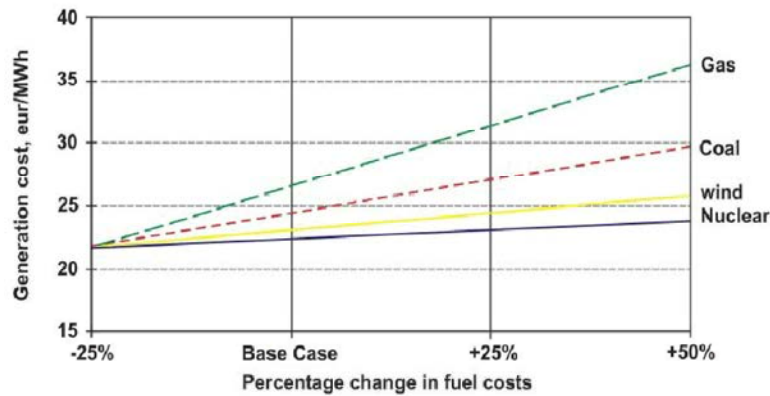


Fig. 2: The impact of fuel costs on electricity generation costs in Finland, early 2000

$$E_{e1} = \frac{1}{2} \rho v V_1^2 \quad (1)$$

$$E_{e2} = \frac{1}{2} \rho v V_2^2 \quad (2)$$

The p , v , respectively, is volume and density of air. Thus, the kinetic energy of car number equation (3) is calculated,

$$E_{e1} - E_{e2} = \frac{1}{2} \rho v (V_1^2 - V_2^2) \quad (3)$$

According to Euler theory, force the turbine to rotate in accordance brings relationship (4):

$$F = \rho V S (V_1 - V_2) \quad (4)$$

Where, S and V respectively are wind speed turbines that meet the center and surface winds that swept to power the engine must be absorbed by the relationship number is expressed in (5 and 6).

$$P = FV = \rho V^2 S (V_1 - V_2) \quad (5)$$

$$V = \frac{1}{2} (V_1 + V_2) \quad (6)$$

For the wind turbine, power generator providing power the factor to take into account in the relationship number is (7).

$$P = \frac{1}{2} \rho C_p S V^3 \quad (7)$$

Considering the density of standard air and the power factor in accordance with the limitations, will be by providing the highest possible form of relationship (8).

$$P = 0.369 S V^3 \quad (8)$$

Using the above relationship can produce the desired area, which can be analyzed. Wind speed and blade angle factor can be produced from two factors of wind speed and the angle of the blades and our goal is affected by the control system, which is a useful effect on the amount of wind speed changes, which can degenerate [9-11].

CONCLUSION

Long a source of inexhaustible energy in the universe is due to thermodynamic differences such as temperature

and pressure differences occurring between adjacent areas. One of the best methods of exploiting wind energy is the harnessing of electrical energy from the wind. In this case, the placing of a wind turbine in the direction of the wind enables transmission of mechanical energy to a direct or alternating current generator (asynchronous or synchronous) directly or through an appropriate gear ratio for conversion to electrical energy. Use of a control system is common to set the reference wind speed for the rotation angle of the blades with the desired direct current motor.

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