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Energy Management of a Hybrid Active Wind Generator

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Abstract: I have studied in this paper properly. The main purpose of this project is that control system is coordinate these two deferent energy sources, and particularly their power exchange and maintain constant power supply in order to make controllible the generated power and their distribution. An active wind generator can be built to provide some constant services to the grid for maintain supply. With the help of maintain strategies the power system should be control. Two power management strategies are presented and compared experimentally one by one. After all experiment and performance, we found that power maintenance strategy is better than another. Integration of the Grid can make successful these energy management and Active Wind generation system.

I. INTRODUCTION

The generation of power with the help of Wind is totally depend on flow of wind and the speed of flowing wind, The wind speed is assumed to be a sum of slow and turbulence components containing the total energy generation. The generation of such large frequency band of energy will increase the profitability of a hybrid wind-diesel, coal, or any fossil fuel power source and their control will be depends on Grid system. Indeed, to absorb all fluctuations of the wind generator, it is necessary to oversize diesel generator, because if wind flow will slow than external source of energy generation to increase or to connect storage devices for medium and high frequencies components absorption and can control the fluctuation for supply. We can store the charge particle or energy with the help of battery or any kind of storage device when Wind generator is generation more power than consumption. An original strategy presented in this paper is based on the frequency share of fossil fuels and storage behaviour ensuring a better lifetime demand of the load. The aim of this paper is to analyze the wind power power generation and make them more useful and make possible wind energy to directly useful and reduce to use fossil fuel to generate energy, in the case of wind energy will be not capable to generate cause of weather and another problem we can manage that with connecting external source and supply should be constant and these two system will be control with grid . Below graph shown the gradually increase the wind energy generation in GW.

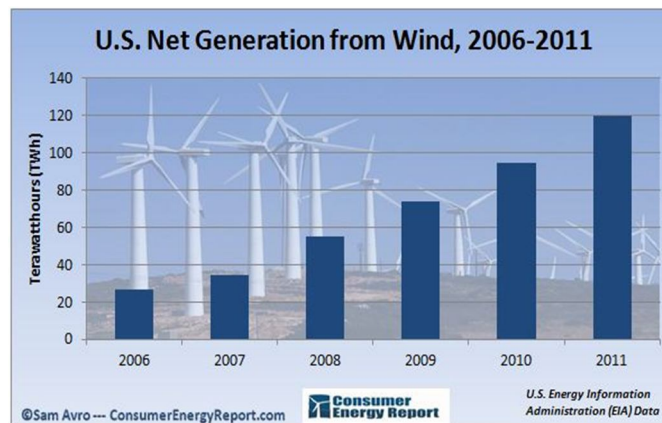


Fig. 1. Total wind power (in Giga watts) installed in the world (2006-2011)

II. WIND ENERGY CONSERVATION SYSTEM

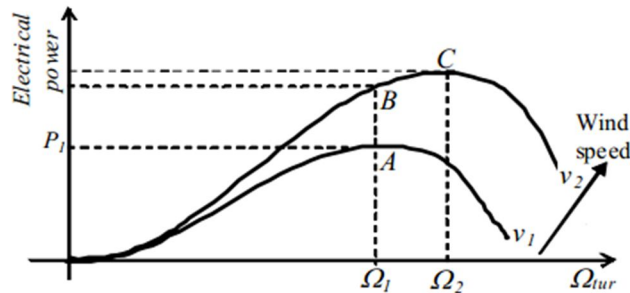
A wind energy conversion system (WECS) or wind energy generator is the system that is the turbine which is directly converted Mechanical energy to Electrical energy by Wind Energy Conservation System and Wind energy Turbine. The conversion of the energy of the wind into more useful forms can be done using a rotor fitted with blades or sails and convert mechanical energy into another form. Note that a preferred perfect location needs to be select for the Wind Energy Conservation System(WECS),

A. Wind turbines

The latest and modern generations of wind energy are called wind turbines, or wind generators, and are primary equipment to convert mechanical or motion energy to electrical or frequency energy. Modern windmills are designed to convert the energy of the wind that is firstly converted into motion or mechanical into electricity. The peak wind turbines can generate up to 6MW power.

III. AUTOMATIC CONTROL UNIT

The electrical power against speed curves of a given wind generator is given in Figure below. For example if the velocity of wind is v_1 the raised output power can be the maximum upto point A by setting of the mechanical rotor speed to Ω_1 . If the speed of wind is change to v_2 the power output jumps. For this the maximum wind velocity power can be extracted by setting the speed to Ω_2 . This shows that, as the wind speed changes, the change of speed of wind and wind blade is tracking with strategies. And this strategy is called Maximum Power Point Tracking strategy.



IV. MODE UNIT CONTROL

The wind generator depends on the wind speed condition and the speed of microgrid requirements. The wind generator and microgrid can work normally while the microgrid capacity is enough to receive the fluctuating wind power without more negative affect. the wind speed is totally depend on weather it is low or medium, the wind generator works in maintain power strategy. Otherwise, the wind generator should be limited with the rated power value with high wind speed, In the case of high wind speed the rotor and wind generator should be stoped and provide them safety.

V. ELECTROLYZER SYSTEM

A updated scheme of this modeling and control electrolyzer system is presented graphically by using the Energetic Macroscopic Representation, in order to give a synthetic view of the whole system. The modeling parameters with experimental tests are validated. The control system is or grid system is designed in order to use the electrolyzer as a controlled load to damp high power surplus from the wind generator in case of high flow of wind generation and extra power should be controlable and storage device will be store that and use that in case of low wing generationa at time. Finally flexible this electrolyzer experimental test bench will be used to implement the active generator with Grid and control whole system and maintain over all system and maintain supply.

VI. TECHNOLOGIES

There are mainly three existing electrolyzer technologies which are working :

- A. The most developed and mature technology is alkaline technology,
- B. Solid Polymer Electrolyte (SPE) technology, which is equivalent to the Proton Exchange Membrane.
- C. Third technology is Steam Vapor technology, which is analogue to the Solid Oxide Fuel Cell. The steam vapor electrolyzer has the minimum operating voltage but the peak current density is still very low.

VII. SYSTEM PERFORMANCE

A. Electrolyzer stack

The key component of an electrolyzer system is The electrolyzer stack and performs the main function of energy conversion within the system, as the fuel cell stack in the fuel cell system. Since the voltage of a single cell is very small, and a number of cells should be connected in series to obtain a higher voltage and give a beter performance, which can be used by other electrical systems to control over all unit.

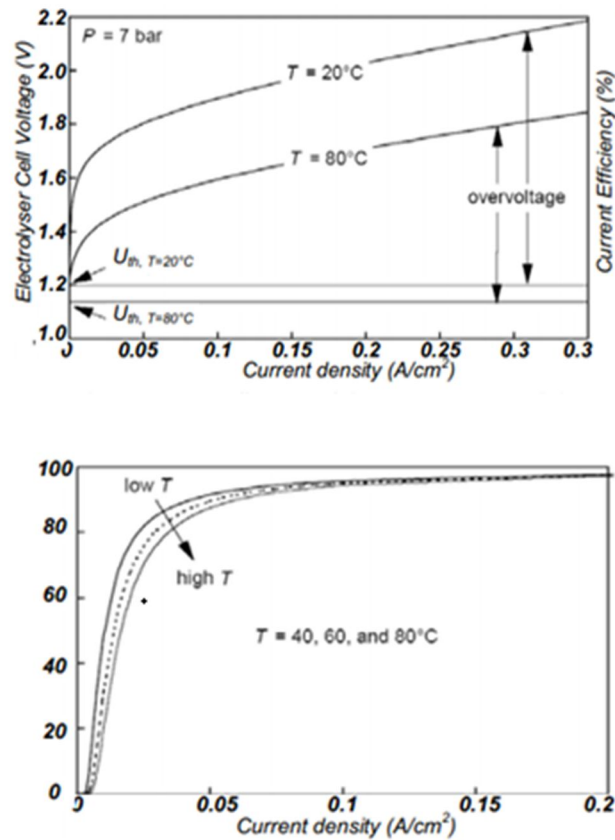


Figure : Influence of the temperature and the current on voltage efficiency and current efficiency by electrolyzer(alkaline electrolyzer)

The energy efficiency, which is also called The voltage efficiency is the ratio of the consumed electrical energy on the global used energy of the reaction.

B. Important parameters

Two parameters, the pressure, operating temperature the electrolyzer performance, especially the voltage efficiency, reduces the stack Increasing the temperature operating voltage because the amount of energy needed to initiate the reaction is reduced. There are more advantages to operate the electrolyzers at high pressures. These include reductions in specific power consumption and wind generation control system are need for smaller electrolyzer cells and gas compressors.

C. Electrolyzer system

The gases, the water, the heat, the pressures and the electrical supply for the electrolyzer stack The auxiliary systems ensure the management of control unit. They are used to composed of different sensors, regulators, and power electronic converters like turbine. All these elements consume a part of the energy, which is supplied to the electrolyzer system which is used as a battery or another source of energy.

VIII. SURVAY REVIEW

- A. When world were developing into industrialized and developed nations and countries on a large scale, Renewable energy resources were not developed. coal, oil, and natural gas are Fossil fuels, were abundant and cheap so the world's wealthy nations grew fast.
- B. As the world seeing developing nations turn into industrial power industries newly developed nations start with renewable energy resources in order to save money as well as prevent more greenhouse gasses from entering our world's atmosphere and save fossil fuels and reduce the level of pollution.

- C. A renewable energy source, like as wind, is becoming a valuable resource around the world to generate power with the help of natural sources. Mongolia is example of a country that is generating wind-generated power potential as renewable energy resource. In order to generate the large-scale wind farms, a few groups have come into the country to assess its potential as a wind-energy source and a few projects have been started. Domestic, and commercial to use Wind generator for save money and reduce greenhouse effect.
- D. Three organization has supporting to research about renewable energy sources and research for a more sustainable Mongolia, the National Renewable Energy Corporation of Mongolia, the National Renewable Energy Laboratory from the United States Department of Energy and power, and the United Nations tries to change climate and reduce to temperature deference.

IX. CONCLUSION

We have studies lots of thing in this paper and finally we got conclusion or we have reached upto result on the the grid control following strategy and the source of control over all system with following strategy. For both of them, the dc-bus voltage and the grid power can be well regulated and we can regulate that by manually or automatically with the help of trip signal. The experimental tests have shown that the source-following strategy has better performance on the grid power regulation than the grid-following strategy, and in that strategies external energy sources are connected with grid integration of the system and that external source may anything like coal power plant, fossil fuels or battery storage device which is balance the constant power supply and make the grid successfully. The regulator of grid can be manually or automatically as per demand of supply to balance the level of supply, main conclusion of this paper is that wind energy generation is totally depend on weather and flow of wind and we are making possible solution to directly provide supply from generation unit but contestant supply will not possible so we are installing grid system and balance the fluctuation with external energy sources.

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