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MAINTENANCE OF HYBRID POWER SYSTEM

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ABSTRACT

Maintenance mode hybrid power system is subject to all laws of maintenance, more or less complex, technical system. It is characteristic of large wind power and solar power, management is done remotely from the dispatch center, which also applies to the surveillance operation and maintenance.
In such circumstances, maintaining focus on a strategy that includes: basic maintenance of the operator, preventive periodic reviews, technical diagnostics, find and eliminate weak points, preventive replacement, periodic preventive repair, repair and renovation work etc.
Due to its characteristics of hybrid power systems provide cost-effective operation and maintenance.

Keywords: hybrid systems, solar energy, wind energy, wind power, maintenance

1. RENEWABLE ENERGY

Renewable energy sources can be divided into several groups: solar power, wind energy, water currents, biomass energy, geothermal energy, gas, energy, environment.

1.1. Solar energy

Figure 1. The use of solar collectors for heating and hot water

Given the continuous rise in prices of energy products, the popularity of using solar energy is increasingly growing. Since the lifetime of the solar system more than 20 years, is clearly the cost of initial investment in the installation of the solar system, not only financially, but also in environmental terms. The objective of thermal solar collectors is as follows: heating of sanitary water (Fig. 1), pool heating, water heating system heating - radiators, air-conditioning and electricity generation.

1.2. Wind power

Wind power and air power are the types of power plants using wind energy, which is a renewable energy source. Wind power (with horizontal and vertical axis) is made up of supporting structure in the form of pillars, wind turbines, electricity generators, gearboxes, which regulates the speed of rotation of the generator and output voltage of the wind power and connection to a system for accumulation of energy or the power grid.

1.2.1. Wind power with a horizontal axis

Figure 2.

The advantages of wind power with the horizontal axis (Fig. 2):

- set up at higher altitudes with higher wind speeds,
- better performance than most wind turbines with a vertical shaft,
- the possibility of changing the propeller angle of attack (increasing the efficiency and facilitate speed control).

Disadvantages of wind turbines with horizontal axis:

- expensive towers taller,
- vibration in working ,
- the need for continuous guidance to the wind axis,
- structural complexity,
- expensive to maintain high tower and generator assembly at a high altitude.

1.3. Hybrid power systems

Hybrid systems are used mainly to generate electricity for several elections. Hybrid systems that are not related to renewable energy use in buildings where it is necessary to the existence of electricity regardless of the state in the network (hospitals, special institutions, military facilities, banks, etc.).. In such facilities in addition to conventional electricity grid, there are aggregates or bundles. Hybrid solutions provide greater safety and availability of electric power. They enable smaller capacity batteries as power source (Fig. 3).

Figure 3. Hybrid battery power

2. MAINTENANCE OF SOLAR SYSTEM

Solar systems – collectors (Fig. 4), the quality selected and installed equipment, generally do not require frequent and expensive maintenance. It is necessary to pay attention to every 3 to 5 years and change controlled by a magnesium anode, in the solar tank, then somewhere in the same period of time to check the solar fluid (which minus submitted) and finally, now that the installation of the solar tank at the entrance of cold water in the tank, install the unit or equipment for softening and filtering water.

2.1 Basic maintenance by the operator

Basic maintenance (regular technical supervision) includes all procedures which is performed by the operator (or user) of the technical system, without any special equipment and tools.

The basic maintenance includes: supplying fuel, lubricants and other liquids, washing and cleaning, replacement of technical fluids (oil, sewage, etc..), control (diagnosis) of the basic component parts of the system, visually or with simple tools (or through built-in instruments), anticorrosive protection, tightening loose joints, control (monitoring) process, the functioning of technical systems through control boards and so on.

2.2 Preventive periodic reviews

Should be specifically controlled by the purity of glass. They are cleaned as needed, wash only in the early morning hours while collectors are still warm. At least twice a year, after the summer and after the winter will be reviewed in depth by the glass. Should be checked for leaks of all external sites and any loose connections tightened. If there is an automatic system for releasing water when the collector is not working, verify its correctness.

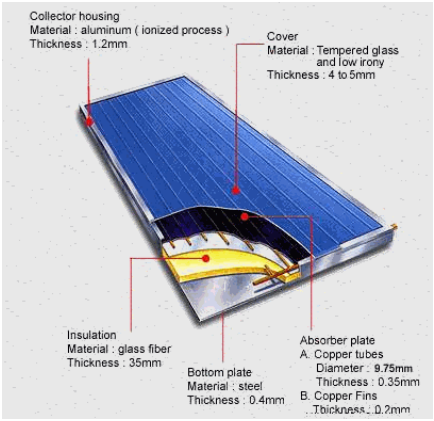


Figure 4. Flat panel collector

2.3 Finding and eliminating weak points, preventive replacement, periodic repairs

The cause of the weak spots in the solar collector can be a little technical solution (weak isolation, the appearance of higher temperatures than predicted and so on.). Causes of the phenomenon of weak sites can be found in poor operation and maintenance of solar collectors. Glaze is exposed to the deposition of dust and other particles of air pollution on its outside surface.

This action removes the proper and regular washing of the glass. On the inside of the glass is deposited dust and other particles of air pollution. Remove these impurities are carried disassembly assembly collectors. During the audit, pay special attention to the relationship between collectors and collecting pipes. If the collector provides for work in the winter at the latest in October to replace the water with antifreeze. With the system filled with antifreeze check the quality of liquid at the time of replacement.

When replacing the glass panels, after removing the frame should be cleaned from all surfaces of permanent kit and make sure not to damage the surface of the absorber. It is necessary to examine the internal parts (absorber, connection, isolation, etc.) and replace the damaged parts.

Medium and large periodic preventive repairs include replacement or repair of component parts of the collector with a longer service life. The collector is usually shifts from the ground up. Sometimes it is rational to perform repairs on the spot. Volume of medium and large scale preventive repair is defined based on the assessment of the previous panels, performed preventive screenings, control systems and other.

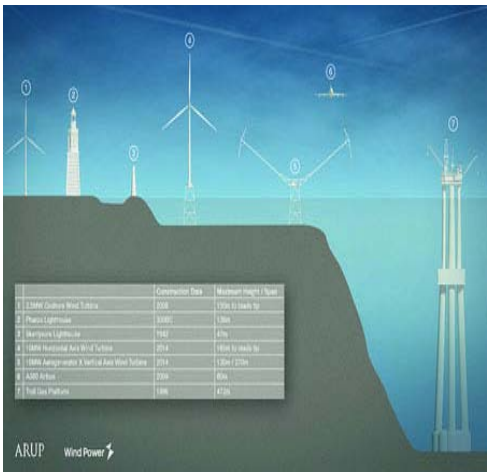
2.4 Maintenance of wind power with horizontal axis

Components of a typical wind power - wind turbine with horizontal axis are shown in Fig.10b. Management is done remotely from the dispatch center, and oversee the work usually done by a manufacturer of wind turbines - also from a remote center. According to the American Wind Energy Association (AVEBE), in late 2006., across the globe, there are more than 74,000 installations MV turbines, which operate for commercial purposes over a decade.During that time, manufacturers have learned a lot about keeping gear and generators, and the experience inside the new generation of wind turbines.

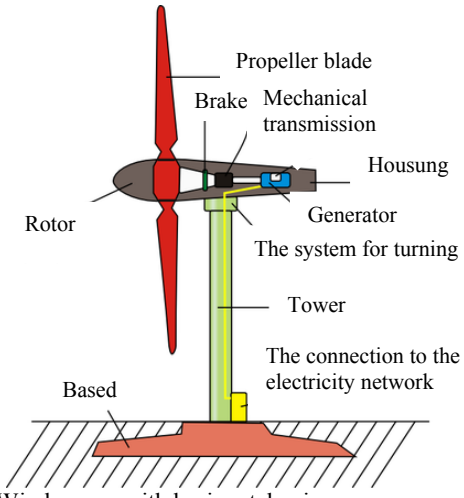
2.4.1 Maintenance of wind power

Maintenance work on large scale wind turbines include: a) inspection, cleaning and lubrication (periodic change of oil), cleaning propeller turbine, tightening screw propeller turbine, b) preventive and routine maintenance activities on the basis of the monitoring system, using the methods of technical diagnostics, c) medium and large repairs with the replacement of certain parts of assemblies.

The recommendation is that the designers planned inspections, cleaning and lubricating performed twice a year for 12 to 18 hours of break in the work of wind.



a)Wind power with vertical axis



b)Wind power with horizontal axis

Figure 5. The basic construction of wind power

2.4.2 Methods of maintenance of wind power

Generators and gearboxes are objectively the most expensive systems of wind turbine for maintenance, as components and in terms of commitment of funds for work (big crane) when it comes to replacing and larger interventions. One of the main tasks of designers was to overcome a large torque, of the large propellers, which is transmitted to the gearbox.

One way of facilitating the gear torque was the transfer of more generators. In this way, were reduced by gear failure, with more generators provided a greater readiness (availability) of wind power and simplified maintenance.

Some manufacturers in operation to facilitate maintenance works set the service panel on the pole top mounted wind turbine with a crane, large enough for work to repair the generator, gear, transmision, etc..

It is a significant comfort to workers in terms of maintenance of premises and easy access circuits. The goal is the availability of equipment from inside the tower, increasing the safety of workers and quality work. In order to avoid „alpine“ climbing workers to vital equipment in the towers of large wind turbines are installed service lifts. Processes of maintenance of these systems are carried out according to general recommendations in terms, strategies, techniques, technology and maintenance, the head office. terotechnological principles.

3. CONCLUSIONS

- Elements hubridnog energy systems are only forms of technical systems that require high reliability, regardless of their specificity.
- Systems operation and maintenance are based on an automatic on-line monitoring of distance, which is especially pronounced in vjetroenergana, given their (in) convenience of maintenance, location and other characteristics.
- From the point of the strategy priority is given to proactive preventive maintenance, with a high degree of application of technical diagnostics in the fields of vibration, temperature, sliding elements, electrical quantities, and more.

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