

## ABSTRACTS

### **Complex Problems of Power Systems Based on Renewable Energy Sources**

TRYPOLSKA G. (Kyiv). **Economic aspects and state policy regarding the production of electricity from renewables by the households in Ukraine.**

The paper focuses on the economic aspects and state policy regarding the production of electricity from renewables by the households. The levelized cost of electricity generated using the energy of wind and the sun was calculated; the data obtained were compared to the actual feed-in tariff rates. Wind energy-derived electricity is economically more feasible than the sun energy-derived electricity; nonetheless the renewable electricity is more expensive than using electricity from the grid. If the household does not have a grid access, using the renewable energy is justified. Schemes to involve households into electricity generation using renewables were suggested.

KHVOROV M. (Kyiv). **Renewable power in the system of long-term national measures as for adapting to climate changes.**

There have been described a growing role of renewable power within the framework of long-term climate changes and their influence over generating capacities as well as peculiarities of seasonal usage dynamics. Possible components of the National plan of Ukraine as per adaptation to climate changes in power system and energy conservation fields have been analyzed.

ZAPOROZHETS Yu. (Kyiv). **Adding to renewable sources integration into traditional power supply systems; considering the key role of water electrolysis.**

The article considers problems regarding technological scheme basis for renewable power integration with traditional power systems. This scheme combines all advantages and levels disadvantages in a balanced way thus forming the background to build a global integrated power system. Water electrolysis has been defined as the main circuit of this scheme. Also intensification process by non-traditional methods has been worked out. The technological option and resources availability to build up the competitive hydrogen generating economy in Ukraine has been described.

### **Solar Energy**

GAEVSKYI Yu. (Kyiv). **Calculation of radiation flow in solar concentrators on tangent plane approximation basis.**

The method to calculate radiation intensity distribution in solar concentrators of arbitrary shape based on the Kirchhoff tangent plane approximation has been proposed. The analytical expression for radiation flux reflected from the concentrator surface represented by locally flat segments has been obtained. This method can be applied to optimize solar concentrator shapes and provide comparative analysis of concentrators' efficiency and various receivers.

KHAIRNASOV S., ZARIPOV V., RASSAMAKIN B., KOZAK D. (Kyiv). **Studying thermal and technical parameters of solar collectors based on aluminum.**

The article considers and provides the research results of two types of solar collectors – traditional running and the one based on thermal pipes use. The studies were carried out in the temperature range of a heat-carrier as follows: +10 ... +30°C with solar radiation flow density being 400 ... 1000 W/m<sup>2</sup>. The received experimental characteristics have shown that they are located on the same level as the traditional solar collectors and

have got values as much as 0,65-0,73. However this design with thermal tubes has got 2-2,4 times less hydraulic resistance.

MAKAROV A., HANUS V., DYKUSHA V. (Kyiv), GORBULYK V. (Chernivtsi). **A Synchronized faceted system for solar panels installation.**

There has been developed and studied a double-axes faceted synchronized tracing system for solar modules installation. The suggested tracing system is easy-to-use in quite dense urban conditions with very many buildings. The modules can be installed on horizontal and vertical surfaces of high-rise building roofs and walls. Experimental parameters of a prototype tracing system have been provided.

PASICHNYI V. (Kyiv). **Studying the possibility of nanosized SiO<sub>2</sub> powder production from carborundum waste in solar furnace for technological investigation.**

The article studies the possibility of nanosized high purity silica powder production by thermal treatment of waste silicon carbide and using the method of evaporation and condensation of oxide under concentrated solar energy heating. Since the power of the laboratory solar furnace did not exceed 2.2 kW there was set a task to evaluate the possibility of powder output in an amount demanded by the primary technological research by using "mass production" mode. The characteristics of specific power and efficiency of the process were obtained. The ways to improve the performance of "solar" technology are being discussed.

### **Wind Energy**

GOLOVKO V., KOKHANEVYCH V., SHYKHAILOV M., ZINCHENKO T. (Kyiv). **Analysis of rotor blades parameters of a stand-alone wind turbine.**

There has been made a comparative analysis of airfoils for wind turbine blades. There have been also suggested instructions as for airfoils selection when designing stand-alone wind turbines with small installed capacity.

EREMEEV I., SOLYANYK P., SURGAILO M., CHMOVZH V. (Kharkiv). **Experimental studies results of wind turbines with vertical-axis scheme and straight blades.**

Dependences of power coefficient from tip speed ratio are presented. They were obtained as a result of experimental researches of vertical-axis wind turbines models with straight blades in the wind tunnel. Influence of blade thickness, rotor solidity, blade angle of incidence on the power coefficient at the permanent aspect ratio of the blades and diameter of rotors have been studied.

KUZNETSOV M., KARMAZIN O. (Kyiv). **Spatial dispersion effect over total power of wind farms.**

Capacity of wind farms varies with time according to current wind speed. Change of wind speed in remote regions occurs at different time so the wind farm power fluctuations are not synchronous. With considerable spatial dispersion of wind farms the total capacity has got a smoother character than for a single one which is important for power system stability.

### **Hydroenergy**

VAS'KOP P., VIKHOREV Yu. (Kyiv). **Small hydropower development on the territories with special nature management.**

Rising prices for fossil fuel, environmental problems

and need to manage flood control make it feasible to develop small hydropower on the territories of national and nature reserve parks where special nature management conditions are kept.

### Geothermal Energy

MOROZOV Yu., VELICHKO V. (Kyiv). **Comparison of calculations with experimental data of thermal impact of a well over ambient massif.**

There have been compared theoretical calculations and experimental data. The results proved the validity of a developed method to figure out temperature field of a massif being influenced by thermal impact of a well.

### BIOENERGY

ZHOVMIRM. (Kyiv). **Theretical combustion emperature of biomass and products of its thermolysis.**

Forming of zones of thermolysis, burning out of volatile and burning out of coke remainder at the biomass combustion in layer were regarded. The results of calculated studies of a

theoretical combustion temperatures of biomass and products of its thermolysis - coke and of volatile dependent on moisture content of initial biomass and excess air ratio are presented; temperatures and excess air ratios are substantiated for zones.

DOVZHENKO D., NOVYTSKA E., MEDVEDENKO M. (Kyiv). **Technical and economical feasibility to use gas-generator plant on trucks.**

There have been analyzed technological parameters of current mobile gas-generator plants that can be installed on trucks. Economical feasibility to build such a gas-generator plant working on various gas-containing fuels has been evaluated.

KUZMINSKYI E., SHCHURSKA K., SAMARUKHA I. (Kyiv). **Fuel cells. Part 2. Predicted application fields and biotechnological outlooks.**

The review considers state-of-the-art, application field and current problems of fuel cells development. Biotechnological prospects for fuel and biofuel cells development have been also determined.

**МІЖНАРОДНИЙ ІНВЕСТИЦІЙНИЙ БІЗНЕС-ФОРУМ З ПИТАНЬ ЕНЕРГОЕФЕКТИВНОСТІ ТА ВІДНОВЛЮВАНОЇ ЕНЕРГЕТИКИ**  
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