

Complex Problems of Power Systems Based on Renewable Energy Sources

KLYMENKO L., VOSKOBOINIKOVA N. (Mykolaiv). **Improving ecological safety of heat-and-cool-supply systems in buildings by balanced use of alternative and traditional energy sources.**

The researcher worked out the method of complex evaluating the ecological safety of heat-and-cool-supply systems based on the index and expressed through grounded indicators considering versatile environmental impact aspects and intensity of different types of technogenic influence on a human. The mechanism for increasing ecological safety of heat-and-cool-supplying through sustainable use of alternative and traditional energy sources has been proposed.

STOYAN O. (Mykolaiv). **Improving state regulation mechanisms of renewable power development in Ukraine within the context of environmental security.**

There have been analyzed main approaches to the definition of "economic" and "environmental security". The author gives the definition of this concept which in author's opinion describes the contents the best possible way. The key advantages and disadvantages of using renewable energy sources as well as solutions to problematic aspects of renewables have been presented and analyzed. There have been considered key aspects that must be focused on when choosing the state policy renewable energy development. The improvement ways for state regulation in power sector within the context of ecological safety of Ukraine have been suggested.

ROKHMAN B. (Kyiv). **On the steam-oxygen gasification of the coke-ash particles of brown and black coal in a fluidized bed under pressure.**

Evolution of the state of the ensemble of reacting coke-ash particles in a fluidized bed gasifier is considered. Kinetic equation for the distribution function of particles in small ranges of carbon concentration for surface and bulk stages of reaction is constructed and integrated. Boundary conditions ("linking" conditions) at the interfaces of the specified ranges are formulated. Influence of raw coal particle size distribution, height, porosity and temperature of the bed on the process of steam-oxygen gasification of coke-ash particles of separate grades of fuels and coal binary mixtures is investigated.

BUD'KO V. (Kyiv). **Studying parallel operation modes of ecomobile traction power supplies.**

The work carried out research work and analysis of operation modes for ecomobile traction power supply, namely diesel engine running on biodiesel and electricity powered by the battery, being charged by electric generator and photovoltaic panels installed on the roof of the vehicle. The efficiency of charging battery by PV charging station during the vehicle idle time has been shown. This efficiency can increase mileage of the ecomobile running on electricity.

Solar Energy

RYEZTSOV V., SURZHYK T., SHCHOKINA V. (Kyiv). **The model of average temperature unstable changes of moisture-containing environment in solar drying processes.**

The article provides the use of integral theorem of divergence vector analysis to obtain a differential equation for the mean bulk temperature of moisture-containing mediums while solar drying. There has been offered the analysis methods of average temperature fluctuations due to power

solar radiation fluctuations, ambient temperature fluctuations and thermodynamic characteristics determining heat transfer of moisture-containing environment with general environment.

BEKIROV E., VOSKRESENSKAYA S., ASANOV M. (Simferopol). **Solar based energy supply system based on the exhaust career as a heat accumulator.**

The article analyses possibility of using waste career with installed solar collectors for heat supply purposes when the career itself is used as a heat accumulator. This eco-friendly heating process will improve the indoor environment and environmental security in the region. The main objective is to determine the parameters of the effective operation mode of a solar system with environmental and power perspectives.

RYEZTSOV V., KUCHINSKY V., SURZHYK O., KOKOSHYN S. (Kyiv). **Features of temperature field distribution on the surface of photovoltaic and photothermal modules under various heat withdrawal terms.**

By using finite element method the article analyzes temperature field distribution of the composite photothermal module under various heat withdrawal terms.

USHKALENKO O., GAEVSKY A. (Kyiv). **Statistical forecasting of solar radiation based on satellite images. The "displace" algorithm.**

The statistical short-term solar radiation forecasting method based of satellite images analysis has been developed. The proposed "displace algorithm" for cloud elements path determination allows substantially decreasing the calculation time compared with conventional semi-Lagrangian (SL) method. Comparison of the different filters for movement vector field smoothing and optimization of the block size for correct account image correlations have been provided.

Wind Energy

KUZNETSOV M. (Kyiv). **Modelling capacity peculiarities for wind farms located in a restricted area.**

Due to natural instability wind farms can have a negative impact on the energy balance. Realistic assessment of such effects is important for proper grid organization. Correct modeling of joint energy system and wind farms performance requires consideration of the local wind behavior. Comparison of actual data for selected regions allows us choosing the most adequate mathematical model.

PERMINOV Yu., BUDYONNY I. (Kyiv). **Some modes of asynchronous generator performance.**

The article describes conditions of asynchronous generator self-excitation. The capacitance choice for necessary self-excitation has been shown.

DONETS A. **Analyzing the existing types of wind-diesel systems.**

This article discusses the classification of wind-diesel electrical and analyzes main components of the system including rewards and penalties.

Hydroenergy

MOROZ A. **Method to analytically determine hydropower potential for a small river alignment based on linearization probability distribution of water consumption.**

There has been developed a method to calculate power and

annual energy consumption for water flow alignment of small rivers based on analytical expressions functions of security runoff.

Geothermal Energy

PUKHOVY I., POSTOLENKO A., RADCHUK Yu. (Kyiv). **Analysis of heat supply circuits with two heat pumps, using ventilation and air emissions, heated by water produced by crystallization.**

There have been developed and analyzed heat-supply schemes for public and residential buildings for the coldest period of the year. The influence of ventilation multiplicity and thermal insulation properties of buildings as well as coolant temperature over the efficiency and schemes effectiveness with two heat pumps, one of which uses the heat of crystallization water, has been considered.

BIOENERGY

ZHOVMIR M. (Kyiv). **Analysis of conditions for burning of volatiles and air mixtures at biomass combustion.**

Conditions of volatile and air mixtures combustion with regard to flammable components and oxygen content, adiabatic temperature, their ability to forced ignition or to the thermal self-ignition in volume have been analyzed. Constructive and regime measures which facilitate reaction of volatiles and air mixtures depending on biomass moisture content have been defined.

GOLUB N. (Kyiv). **Bio-hydrogen (bio-methane) production from microalgae wastes.**

Technological scheme of biotechnology processing of microalgae biomass wastes, nutrient medium and biodiesel production into gaseous energy (methane and hydrogen) includes the steps of cultivating seeds for organic material destruction and hydrogen production; two-stage anaerobic fermentation of liquid and solid wastes; cleaning energy carriers. Due to formation of appropriate conditions during fermentation process there has been formed microorganisms associations that are raw materials destructors and produce hydrogen. Separating the process into 2 stages allows increasing the speed of organic raw material transformation and energy carriers production.

МІЖНАРОДНИЙ ІНВЕСТИЦІЙНИЙ БІЗНЕС-ФОРУМ З ПИТАНЬ ЕНЕРГОЕФЕКТИВНОСТІ ТА ВІДНОВЛЮВАНОЇ ЕНЕРГЕТИКИ
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