

Complex Problems of Power Systems Based on Renewable Energy Sources

ZHOVTYANSKY V.A., NEVZGLYAD I.O., YAKY-MOVYCH M.V. (Kyiv).

Conversion of renewable carbonaceous raw materials using plasma technology

The efficiency of the processes of alternative gaseous fuels production based on the conversion of biomass and carbon-containing waste using plasma technology are discussed. The properties of the certain types of this raw – wood, municipal solid waste, medical waste, poultry and livestock waste as well as algae and waste corn are analyzed from the view point of gasification technologies. It is shown that the processing of certain types of waste involve environmental hazard. The plasma-vapor installation for waste processing that eliminates the risk of dioxins and furans production in the process of gasification is briefly described. It is shown that the plasma-steam technology has got higher energy efficiency characteristics as compared to steam-oxygen one contrary to popular view point.

ROKHMEN B. (Kyiv). **On the organization of the most effective mode of burning a mixture of dropouts anthracite culm and sludge in the boiler with a circulating fluidized bed of number 4 unit of the Starobeshevskaya thermoelectric power plant. 1. Methods of verification-based design and analysis of numerical results.**

We have built a semi-empirical engineering method of calculation, which allows in real start to identify and correct the aerodynamic and heat and mass transfer parameters of the combustion chamber, remote heat exchangers and heating surfaces located in the convective duct of a boiler with a circulating fluidized bed of number 4 unit of the Starobeshevskaya thermoelectric power station. The developed model can be used to organize the optimal combustion of coal, in which the temperature at the outlet of the furnace will not exceed 900°C, which is a necessary condition for the maximum capture of sulfur oxides. This provides the required parameters of steam at the turbine.

BUD'KO V., KLYMYUK R. (Kyiv). **Potential to use renewable energy sources at factory-farm and food manufacturing enterprises in Ukraine.**

The article gives state-of-the art of using energy sources at factory-to-farm and food manufacturing enterprises. Main common groups of problems have been defined. Some of them can be solved by using energy generating equipment working on renewables.

SHCHOKIN A. (Kyiv). **Problems and outlooks for further synthetic combustible gases utilization in Ukraine.**

There have been considered some issues and prospects to enlarge synthetic combustible gases utilization in Ukraine. These gases can be helpful in solving problems in energy power sector of Ukraine.

Solar Energy

BEKIROV E., SOKUT L. (Simferopol). **Basic phases to evaluate solar power plant parameters.**

There have been analyzed basic technical tasks when evaluating parameters of megawatt solar power plants integrated into Ukrainian energy grid. Basic principles for making decisions plan on solar power plants construction have been worked out. Also there have been made offers as for evaluating parameters

that could be used when establishing standards.

ANTYPENKO R., KYRPATENKO I. (Kyiv). **The device that simulates current-voltage characteristics of the PV battery physically.**

The article describes the device simulating the current-voltage characteristics of the PV battery which uses a silicon photodiode. The developed device has got photodiode current being proportional to current load while voltage load is the amplified voltage of a silicon photodiode. Since the current-voltage characteristics of the photodiode are similar to the ones of the solar cell the device uses current-voltage characteristics of the PV batteries.

Wind Energy

KUZNYETSOV M. (Kyiv). **Fluctuations of individual and cumulative capacities at wind farms.**

The work of wind farms is accompanied by fluctuations in power capacity which can have a negative impact on the operation of grid the. Real studies suggest frameworks when wind farms suffer some power drops. Power variation range and extreme modes of operation depend on the composition and number of wind farms and their geographic dispersion.

SURGAILO M. (Kharkiv). **Studies results of a vertical-axis wind turbine with direct blades made of NACA-0018M profile.**

The influence of free stream velocity over maximum value of power coefficient and optimum angle of the blade have been investigated. Also there have been studied the influence of rotor solidity and blade aspect ratio on aerodynamic characteristics of vertical-axis scheme wind turbines with direct blades with the modified NACA-0018M profile having various number of blades.

Hydroenergy

MOROZ A. (Kyiv). **History of development and state-of-the art of small hydropower in Ukraine.**

There have been analyzed historical aspects of small hydropower history of development and state-of-the art of reconstruction and rehabilitation of small HPP in Ukraine.

YAKOVLEV A., ZHADANOVA V. (Kharkiv). **Belt-type hydraulic station that uses the power of drag.**

The purpose of the research is to determine the main characteristics of the hydraulic power plant. The research has been done by applying classical equations that describe hydro power plant operation to the given hydro power plant. The oriental capacities of the hydro power plant, the character of the main energy dependencies have been undertaken.

Geothermal Energy

SHVETS' M. (Kyiv). **Optimizing joint operation of the 6th Kyiv cogeneration plant and heat pumps that utilize waste heat. Problem solution.**

There have been presented task solutions to optimize the joint operation of the 6th Kyiv cogeneration plant and heat pumps that utilize waste heat. As a result there has been offered a technological scheme to connect heat pumps into cogeneration plant operation. The most power-saving conjoint operation of the 6th Kyiv cogeneration plant and heat pumps have been

determined. This allowed reducing investment and operating costs.

BIOENERGY

ZHOVMIR M. (Kyiv). **Concentration conditions of forced ignition of volatiles at biomass combustion.**

Results of analytical study of volatiles and air mixture forming, which can be ignited from spark or open source of flame in cold furnaces are presented. It was substantiated suitability of staged mixing of volatile with air at biomass burning.

KLYUS S. (Kyiv). **Determining the share of straw and**

plant residues for energy production.

There have been considered basic ways to use straw from grain crops. These ways are: in livestock farming and as a fertilizer. Straw excess is derived when available straw stocks don't match theoretical needs in straw in agriculture. This very excess can be used for energy production.

DOVZHENKO D., ZABARNYI G., MEDVEDENKO M. (Kyiv). **Thermodynamic cycles of automobile internal-combustion engines that run on power gas.**

The probable thermodynamic cycles that progress in engine when it uses producer gas as fuel have been analyzed. The favorable thermodynamic cycle has been chosen. The calculating methodology of thermodynamic cycle has been done.

**XII МІЖНАРОДНА СПЕЦІАЛІЗОВАНА ВИСТАВКА
ЕНЕРГЕТИКА В ПРОМИСЛОВОСТІ-2014**

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МІЖНАРОДНИЙ ВИСТАВКОВИЙ ЦЕНТР
Україна, 02660
Київ, Броварський пр-т, 15
"Лівобережна"
тел./факс: (044) 201-11-57
e-mail: lyudmila@iec-expo.com.ua
www.iec-expo.com.ua
www.tech-expo.com.ua

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