

Complex Problems of Power Systems Based on Renewable Energy Sources

ROKHMAN B. (Kyiv). About gasification of solid fuels in the vertical streamed pressure reactor.

There has been built a model of aerodynamics, heat transfer and chemical reaction of the fine coal dust in the vertical gasifier. There has been studied the process of steam-oxygen gasification of different combinations of binary mixtures : lignite, fiery and black coal, anthracite culm and lignite under pressure 3.2-3.8 MPa. It has been shown that using two-step thermochemical circuits to process solid fuels the content of methane in synthesis gas (4.3%) is significantly higher in comparison to a single stage process (0.06%). To avoid combustion of the pyrolysis gases (which are the raw material for generator gas production) in two-stage gasification processes of binary mixtures, it is advisable to apply coal with a low content of volatile substances into oxidizer-rich lower part of the reactor. There have been defined optimum-size particle diameters of fiery and black coal as well as lignite thus providing a minimum mechanical incomplete combustion at different ratio of a binary mixture expenditure components.

BUD'KO V. (Kyiv). Peculiarities of a stationary wind power station charging the battery of an accumulator vehicle.

The paper analyzes the feasibility of using wind power plants to charge accumulator traction vehicle batteries. The calculation of electricity generation at power plants with various installed capacity during the year, month and day have been made. The feasibility of implementing classical and impulse charging methods at stationary WPP targeted on charging accumulator traction vehicle batteries has been focused on thus giving a chance to increase wind electricity consumption ratio. There has been suggested a graphical dependency between WPP power and accumulation battery capacity that allows selecting generating facilities subject to accumulator vehicle capacity.

PASICHNYI V., ZENKOV V. (Kyiv). Producing hydrogen by metal-steam method and using tungsten waste and heating them in solar furnaces.

There have been studied kinetic characteristics of tungsten-based wastes oxidation process due to precision thermogravimetric method as being the basic process in hydrogen generation technology by metal-steam method. The influence of various factors on the extent and rate of metal oxidation has been considered. The work is aimed at using concentrated solar power as a heating source. The installation called URAN-1 has been used as a solar furnace simulator. Preliminary studies of a heating on the installation have been performed.

LEVKOV V. (Kyiv). Structural synthesis methodology of a utility subsystem that provides border protection hardware power supply.

There has been suggested an implemented scientific and methodical approach for building structural subsystem of utility power supply systems based on renewable energy sources.

Solar Energy

BEKIROV E. (Simferopol). Analysis of parameters and power processes in photovoltaic systems with different loads.

The article deals with photovoltaic solar systems modes when connected to various modes: electricity generation into the grid, charging batteries, electricity supply of a dwelling house.

KNYSH L. (Dnipropetrovsk). The method to record absorber heat conductivity in a flat solar collector.

The influence of absorber walls thermal conductivity on the energy performance of a flat solar collector has been studied. Absorber thermal conductivity record in transverse direction was based on the steady-state heat balance. There has been shown a significant effect of thermal conductivity of the wall material and the geometry of the absorber on the temperature control system. The unsteady heat balance and heat transfer equation in the longitudinal direction has been solved numerically. The negligible effect of thermal conductivity in the direction of coolant flow has been proved.

KOZYRSKYI V., MARTYNYUK L., ALEKSHYUK I. (Kyiv). Modeling heat transfer processes in solar batteries.

There have been presented mathematical models of the processes occurring in batteries. The ways of solving them have been pointed out. The generalized equation of three-stream heat accumulator has been offered.

Wind Energy

BASOK B., DAVYDENKO B., NOVIKOV V. (Kyiv). Numerical modeling of wind flows in urban development area.

There have been presented numerical modeling results of transfer processes resulted by interaction of a wind flow in the surface atmospheric layer with buildings and structures located within compact urban development. There have been calculated three-dimensional velocity and pressure fields of wind flow in target area aimed at determining the most efficient location of wind power plants that would provide electricity supply to a passive type pilot building.

KUZNETSOV M. (Kyiv). Providing electricity balance in the presence of wind farms.

Providing balance between electricity production and consumption requires setting up spare capacity that would compensate unpredictable load changes in the grid. Availability of wind power plants with variable operation mode demands additional requirements reserve capacities. Mathematical modeling of power system operation allows evaluating real needs in additional reserves in order to avoid excessive costs.

PEKUR P. (Kyiv). Stochastic parameters of a wind turbine.

There has been developed a stochastic model of a wind turbine power rate which allows determining probabilistic characteristics of the wind turbine power due to probabilistic characteristics of the wind speed. The model takes into account the ambiguity and non-monotonicity of a wind turbine functional dependence over wind speed. Probabilistic power characteristics allow setting the mode of the electrical machine and its duration.

Hydroenergy

MOROZ A. (Kyiv). Properties and features of probabilistic three-parameter gamma distribution determining technical hydropower potential of a small river.

There have been analyzed properties of the three-parameter gamma distribution in Kritsky-Menkelya form that allow determining the probability of hydrological characteristics and technical potential of small rivers.

Geothermal Energy

SHVETS' M. (Kyiv). **An outlook to use geothermal heat carrier for electricity production in Ukraine.**

The article discusses implementation of the most promising schemes of geothermal electrical installations at Ukrainian geothermal fields.

OLINYCHENKO V. **Waste heat utilization of a geothermal heat carrier.**

The article describes an option to use absorbing thermotransformers in geothermal energy.

BIOENERGY

PLESHKOV P., SEREBRENIKOV S., STETS' P. (Kirovograd). **Evaluation of fuel and energy potential of crop field agriculture.**

There has been developed a method to determine crop energy-resource potential that would ensure boiler-houses switch over to work on alternative fuels. The maps of energy potential distribution over all regional districts have been worked out and priority bioenergy crops have been selected.

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

ЕЛЕКТРОТЕХНІЧНЕ, СВІЛОТЕХНІЧНЕ ОБЛАДНАННЯ, КАБЕЛІ ТА ПРОВІДИ, ЛІНІЇ ЕЛЕКТРОПЕРЕДАЧ, АВТОМАТИЗАЦІЯ, КВПІА, ЕЛЕКТРООБЛАДНАННЯ УСТАНОВОК, МАШИН І МЕХАНІЗМІВ, ЕНЕРГЕТИЧНЕ МАШИНОБУДУВАННЯ

СПЕЦІАЛЬНІ ТЕМИ:
СИСТЕМИ КОНТРОЛЮ І ОБЛІКУ ЕНЕРГОРЕСУРСІВ • УСТАТКУВАННЯ ЕЛЕКТРИЧНИХ ПІДСТАНЦІЙ

**XII МІЖНАРОДНИЙ ФОРУМ
ПАЛИВНО-ЕНЕРГЕТИЧНИЙ КОМПЛЕКС УКРАЇНИ:
СЬОГОДЕННЯ ТА МАЙБУТНЄ**



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**23-25
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