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S U M M A R I E S

ENERGY STRATEGY OF GEORGIA IN TERMS OF APPROACH TO THE PRINCIPLES OF THE EU CRITERIUM. *N.Samsonia, N.Akhvlediani, B.Kikilashvili.* **"Energy". №1(77). 2016. Tbilisi. p. 4-9. geo. sum geo.engl.rus.**

In this work introduced creation of ways of the competitionbased nationalenergy system,which will be adjusted to EU criteria. As a result, will be possible maximum use of the Georgian energy resources and the county's strategic geographical location, which provides users with energy security. One such way is considered by the creation by the Georgian government JSC "Partnership Foundation" with aim to purchase the energy companies mergers and acquisitions, which are involved in the extraction, production, transfer, transit and management operations. For the harmonization with EU energy directives and regulations is necessary to create of competitive market of energy resources, with approved the network traffic, which will facilitate cross-border (international) free trade. Bibl.5.

OPTIMAL ENERGO-ECOLOGICAL HEAT-COLD SUPPLY SYSTEM SELECTION. *K.Vezirishvili-Nozadze, A.Morchiladze, T.Nozadze, M.Jikhvadze.* **"Energy". №1(77). 2016. Tbilisi. p. 10-15. rus. sum geo.engl.rus.**

In the article you'll find the information about energy transformation and heat-cold supply system optimization methods for different climatic conditions in heat pumps. The recommendations are made about the complex system projecting and improvingof the heat pumps. We've estimated the perspective of involving renewable resources in fuel-energetic complex and their role in protecting the environment. Ill.3, tabl. 2, bibl.4.

USING OF STORAGE BATTERIES IN GEORGIAN POWER SYSTEM. *G.Arziani, G.Vakhtangadze, M.Rukhvadze.* **"Energy". №1(77). 2016. Tbilisi. p. 16-18. geo. sum geo.engl.rus.**

Georgian power system two important problems can be solved by storage batteries: quality of electrical energy andcontrol of emergency regimes. Use of storage batteries excludes load shedding after loss of generation in power system, It supports full utilization of power reserve. Use of storage batteries improves the dynamic stability of power system and helps the system to extinct the oscillations caused by different reasons. Ill.2, bibl. 1.

ANALYSIS OF WIND ENERGY INTEGRATION INTO THE GEORGIAN POWER SYSTEM. *D.Datashvili, A.Kokhtashvili.* **"Energy". №1(77). 2016. Tbilisi. p. 19-21. geo. sum geo.engl.rus.**

Georgia is rich country in renewable energy resources. In this regard, wind energy is an important part, but this part of almost unused. In addition, the cost of wind turbines, is getting lower, that is why wind energy is becoming more attractive. In the article the feasibilityof wind power integration into the Georgian power system is considered. The modeling has been performedusing the PSS/E (Power System Simulation for Engineering) software.

Calculation is carried out based on 2015, 2018 and 2020 year scenarios. The simulation results show the feasibilityof wind energy integration into Georgian power system for 2015, 2018 and 2020 years, considering the stability and reliability of power system. Ill. 1, bibl. 6.

ABOUT THE BASIS OF USE OF ENERGY MULTIPLIER ENGURI HPP SERIES. *V.Jamarjashvili, R.Pataraia, G.Gigiberia, P.Merabishvili, A.Mirianashvili, N.Chakhvashvili, E.Tumanishvili.* **"Energy". №1(77). 2016. Tbilisi. p. 22-32. geo. sum geo.engl.rus.**
Tht work has been performed according to the Grant Agreement #AR/137/3170/14 "Innivative Green Alternative on Georgia's example - Identification of Design (Project) Values of Wind and Solar Energy Multiplier Power Plants" executed with Rustaveli Foundation.
Based on the study. at the first stage, the calculation results according to which the prime cost of the energy generated by the energy multiplier using wind and solar energy make 0,12 USD/kW.hr are obtained. This is unprecendented achievement in the field of wind and solar energy engineering. Ill. 3, bibl. 8.

THE ANALYSIS OF THE SELF-EXCITED ELECTROMAGNETIC OSCILLATIONS ARISING IN SINGLE-PHASE ASYNCHRONOUS ENGINES. *Z.MchedliSvili, Z.Sabashvili, G.Bagdavadze.* **"Energy". №1(77). 2016. Tbilisi. p. 33-37. geo. sum geo.engl.rus.**

In the given work are analyzed the self-excited electric oscillation occur in a single-phase asynchronous electric circuit of electric machine, which consists of the armature winding and the auxiliary excitation coil and obtained the formula determining the frequency of these oscillations. Ill.1, bibl. 12.

CALORIFIC VALUE OF COAL OF TKIBULI-SHAORI MINE'S DIFFERENT LEVELS.
K.Chkhikvadze, O.Kiguradze, T.Chkhikvadze. "Energy". №1(77). 2016. Tbilisi. p. 38-41. geo. sum geo.engl.rus.

Defined is calorific value of different level coal obtained from Tkibuli-Shaori mine. The experiment is carried out on isothermal calorimeter XRY-1C. The measurement degree is 1.2%. The outcomes state that the maximum variance between calorific value of different level results equal 22.5%. Ill. 1, tabl. 2, bibl. 6.

ABOUT THE RESEARCH OF SLIPPING PROCESS OF WHEELS OF DC ELECTRIC LOCOMOTIVES THROUGH THE MATHEMATICAL MODEL OF MATLAB SIMULINK.
A.Zerekidze, T.Natenadze, N.Kereselidze. "Energy". №1(77). 2016. Tbilisi. p. 42-51. geo. sum geo.engl.rus.

The methods of identifying and eliminating slipping (skidding) of the wheels electric locomotives of direct current have been reviewed. A mathematical model of definition of slipping of the wheels, which include technological deviations occurring in the production of electric traction motors has been built. Maximum use of electric power is achieved by individual adjusting of the speed of wheels in the beginning stages of slipping. Calculation of the value of the speed is suggested by the mathematical model of MATLAB Simulink. Ill. 4, tabl. 3, bibl. 5.

OF COMMUTATION IN VALVE ENGINE ASYNCHRONOUS TYPE BY EXCITATION ROTOR ALTERNATING CU RRENT. *G. Kharshiladze.* "Energy". №1(77). 2016. Tbilisi. p. 52-56. geo. sum geo.engl.rus.

By analyzing the obtained complex equations valve motor rotor excitation by an alternating current. The equations are valid for the analysis of switching in the transient and steady-state modes. The transitional regime in the equations take into account all the parameters of the engine, and in the steady state does not take factor into the active resistance of stator and rotor windings. Bibl. 2.

ARC PLASMA RECYCLING OF FREON'S. *A.Prangishvili,   Z.Gasitashvili, G.Gogia, D.Gelenidze, M.Gelenidze, G.Gelenidze.* "Energy". №1(77). 2016. Tbilisi. p. 57-61. engl. sum geo.engl.rus.

The work is dedicated to design of electric arc reactor for Arc Plasma Recycling of Freon's. We have created the design of arc plasma reactor with long electric arc for plasma chemical recycling of Freon's with following characteristics:

Simple and cheap electric arc plasma reactor with a long arc discharging in the steam of Freon's and other components, which skipped in the reactor.

Putting of electric power in the installation with less current and higher voltage. By doing this, arc plasma reactor's energetic, technological and economic indicators are improved at least by factor of two. Since the mass, size and energy loss of the arc plasma reactor are roughly proportional to the square of the current, the figures not less than 10 times better are expected in the proposed device. Advantages of design of the arc plasma reactor are:

Cost effective recycling of Freon's.
Environmentally friendly technology without releasing hazardous substances. Ill.1.

OPTIMAL LOAD DURING POLYHYDRAMNIOS HYDROPOWER PLANTS.
G.Makharadze, U.Khachiuri. "Energy". №1(77). 2016. Tbilisi. p. 62-67. engl. sum geo.engl.rus.

There are considered the particular cases of the daily occupancy of hydroelectric power plants of Georgian electricity network in high water period, the existing condition of the occupancy illogical distribution between plants, and the system of equations, allowing the hydroelectric plant optimum occupancy determination. Considering above stated, the cost of electric energy, delivered to the user, will be minimal. Tabl. 1, bibl. 5.

TRANSFORMATION OF OFFERED $\sigma-\varepsilon$ DEPENDENCE ACCORDING TO THE HEREDITARY (THEORY OF ELASTIC-CREEPING BODY) AND ELASTIC HEREDITY THEORIES CONSIDERING THE PROCESS OF AGEING.
G.Gvinchidze,   J.Esaiashvili, N.Eremadze, M.Turdzeladze, M. Abazadze. "Energy". №1(77). 2016. Tbilisi. p. 68-75. engl. sum geo.engl.rus.

In result of the transformation of offered $\sigma-\varepsilon$ dependence according to hereditary and elastic heredity theories and considering the process of ageing, there is obtained the analytical expression with the creeping functions in open appearance, allowing description of creep deformation of ageing (concrete) and un-ageing (base soils, some types of composites, very old concrete) building materials, varying the parameters u, θ_0, m in the strict limits. Ill. 1.

DETERMINATION OF THE SPECTRUM OF Θ_0, φ_k, β, υ, m, k_0, **PARAMETERS OF THE OFFERED** σ-ε **DEPENDENCE FOR THE CONCRETES OF CLASSES B15-B60.**
G.Gvinchidze, J.Esaiashvili, N.Eremadze, M.Turdzeladze, M.Abazadze. **"Energy". №1(77). 2016. Tbilisi.** p. 76-81. engl. sum geo.engl.rus.

Based on experimental results there are obtained the analytical expressions to determine the spectrum of parameters of creep kernel of the offered σ-ε dependence of the elastic-creeping body theory, that allows to avoid the uncertainties having place at fixing of their values from existing normative documents. The determination of these parameters immediately experimentally is the only way to the adjustment of these values and gives the ground for further investigations. Ill. 1, bibl. 2.

DETERMINATION OF DEFORMATION FIELDS, GENERATED BY THE INTERNAL VOLTAGES, DEVELOPED AS A RESULT OF TEMPERATURE INFLUENCE ON THE CONCRETE.
G.Dalakishvili, K.Khazalia. **"Energy". №1(77). 2016. Tbilisi.** p. 82-88.   rus. sum geo.engl.rus.

The object of the study is a deformation of concrete, crack formation in the contact zones of matrix and coarse aggregate, which is caused by the temperature influence during a process of hardening of a cement stone.

As a result of researches by a method of holographic interferometer, there was obtained a qualitative, as well as a quantitative evaluation of a shrinkage deformation and formation of stressed state in micro-volumes among the grains of aggregates and on the contact surfaces of "matrix-aggregates". Ill. 4, tabl. 1, bibl. 8.

CALCULATION OF MAXIMUM COSTS AND LEVELS IN THE CASE OF EXISTENCE OF THE HETEROGENEOUS OBSERVATIONS COLUMN. *T.Ambroladze.* **"Energy". №1(77). 2016. Tbilisi.** p. 89-93. geo. sum geo.engl.rus.

Calculation of maximum levels and costs in the case that their origin conditions are totally different requires special methods of calculation. In such a case floods and deluge analytical curves should be set separately. And then by means of these curves the general duration curve will be set. According to which the maximum costs (levels) are calculated. In order to set the general duration curve, the program Mathematica-8 is made in the symbolic language. The calculation is made for one case and is attached to the article. Ill. 1, tabl. 3, bibl. 3.

SMELTING OF SILICAMANGANESE IN FURNACE BURDEN USING OWN PRODUCTION METAL REMNANTS. *Z. Simongulashvili, G. Qurdadze, R. Abesadze.* **"Energy". №1(77). 2016. Tbilisi.** p. 94-101. geo. sum geo.engl.rus.

Technology of silicamanganese smelting is suggested the main point of which is that reduction of manganese and especially silica with carbon is conducted at coexistence of manganese- and iron-containing metal phase. Mentioned technology allows to process all kinds of metal remnants by using manganese and silica summative effective use and with lower material-energetic expenditures. Tabl. 1, bibl. 7.

CALCULATION OF PILE FOUNDATION LYING ON ELASTIC BASIS AND HAVING A CONTILEVERS AT THE ENDS OF CONSTRUCTION.
T.Kikava, T.Jojua. **"Energy". №1(77). 2016. Tbilisi.** p. 102-106. rus. sum geo.engl.rus.

Proposed is the calculation method of these types of pile foundation mats by using general positions of I.A.Simvulidi's theorem. Given are formulas for determining unknown efforts appearing in cantilevers. Considered is an actual example of the calculation.

The calculation of piles foundation generally was made on strength, i.e. on the action of horizontal forces and bending moments the quantities of which generally depend on the quantity and on the law for reactive pressure distribution of the ground on the foundation mats.

Knowing the maximum value of the horizontal forces, bending moments and the law for distribution of reactive pressures it can be easy to determine the dimension and the percentage piles foundation reinforcement. Ill. 2, bibl. 3.

WORKS RELATED TO FIRE USE. *N. Machavariani, N.Razmadze, N.Ratiani.* **"Energy". №1(77). 2016. Tbilisi.** p. 107-109. engl. sum geo.engl.rus.

The paper deals with the fire safety requirements of energy facilities,including the necessity of taking special measures, which is associated with the works to be carried outnear electrical equipment by using an open flame. The work presents the specific requirementsto perform fire extinguishing works on devices of power plants and substations under 400 V voltage , the types offire extinguishers to be used for extinguishing fire and the safe distances of use them with the electrical installations. Tabl. 1, bibl. 3.

ELECTROMAGNETIC WAVES INTERACT WITH THE SUBSTANCE.
I.Janjgava, L.Chagelishvili, M.Kiknavelidze. **"Energy". №1(77). 2016. Tbilisi. p. 110-114. geo. sum geo. engl. rus.**

This article describes the phenomenon that occurs due to electromagnetic interaction with matter of will. It shows the basic mechanism of this interaction, after which there is an acceleration of numerous charges of microscopic substances. All these phenomena despite the large difference have in common - they are not universal and quantum mechanism. Ill. 1, bibl. 3.

DETERMINATION OF <u>POISSON</u> AND VOLUME STRESS COEFFICIENTS BY CONCRETE CREEP <u>NUCLEIS</u> AND THEIR DEPENDENCE ON TIME. *A. Sakvarelidze, N.Gudushauri, N. Narimanidze.* **"Energy". №1(77). 2016. Tbilisi. p. 115-119. geo. sum geo. engl. rus.**

Stress-strain, shear and volume creep nucleus are determined by theoretical treatment of the results of experiments. Appropriate formulation of creep nucleis application is determined by poisson and volume stress coefficients.

It is proved that coefficients values practically do not after and are contant. Tabl. 1, bibl. 7.