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**R. ARVELADZE.** About Restoration Of The Ministry Of Energy Of Georgia And Foundation Of The Scientific And Research Center.

"Energy". №4(100). 2021. Tbilisi. p. 7- 13. geo. sum geo. engl. rus.

The ministry of energy of Georgia, which, due to some unknown reasons, in our opinion, was abolished by the Georgian government with the purpose of structural reform, was quite successfully functioning in Georgia until 2018. As a result of the reform the situation in the energy sector has not only stayed unimproved but it keeps deteriorating every year. We believe that the reason for this, along with the abolishment of the ministry, is also the abolishment of the scientific and research center and design and construction companies where highly qualified staff successfully developing the projects and resolving the issues relating to the operation and development of the heat-and-power engineering complex worked.

Part of the activities to be fulfilled by the Georgian ministry of energy and its subordinate scientific and research center as well as the expediency of their restoration are described in the article.

According to the author, in case of failure to implement the proposal, the situation in the energy sector will become even tenser.

**G.ARABIDZE, M.ARABIDZE, D.DOMUZASHVILI.** Assessing the impact of greenhouse gas emission reduction measures in the transport sector based on available statistics.

"Energy". №4(100). 2021. Tbilisi. p. 14-24. geo. sum geo. engl. rus.

It is established that the largest share of greenhouse gas emissions in Georgia comes from the transport sector. The article deals with the assessment of emission reductions as a result of recent measures taken in the transport sector. Measures include raising fuel excise tax, promoting hybrid and electric vehicles, and introducing road worthiness tests for vehicles. The analysis revealed that the measures taken in road transport sector since 2016 have significantly reduced energy consumption and, consequently, CO<sub>2</sub> emissions. As a result of these measures, a total of  $\approx 56,237$  TJ of energy and  $\approx 4,052$  Gg of carbon dioxide emissions were reduced in 2017-2019.

*Ill. 9, bibl.8.*

**O.KIGURADZE, M.RAZMADZE, L.PAPAVA, G.DAVITAIA.** Using solar energy to reduce heat loss in buildings.

"Energy". №4(100). 2021. Tbilisi. p. 25-30. geo. sum geo. engl. rus.

About 80% of the energy resources needed for housing and communal services are used to provide heating for buildings. Such a large percentage is explained by the reduction of energy efficiency of buildings, which is caused by the expiration of their construction, as well as the non-compliance with the standards of new buildings. This issue can be resolved by sharing the experience of developed countries.

Energy saving in the field of housing and communal services of EU countries is carried out in three directions:

1. Reduce heat loss by buildings;
2. Passive and active use of renewable energy sources;
3. Introduction of modern technologies in microclimate management inside the building, so called. "Smart House"

The concept of passive houses is presented and their important function is significantly improved thermal performance of building envelope structures. An energy audit of an existing apartment is shown. Based on the results of the audit, the structural and thermal characteristics are calculated, which are typical for the passive transformation of an apartment into a passive house.

*Ill. 3, diagr. 2, bibl. 6.*

**O.KIGURADZE, L.PAPAVA, M.RAZMADZE, SH.KEZUA.** Drying process technology. "Energy". №4(100). 2021. Tbilisi. p. 31-34. geo. sum geo. engl. rus.

The current situation in Georgia regarding the drying process is presented, including the current situation from the post-Soviet period. In addition, the types of drying process and the advantages of the product obtained as a result of the drying process are presented. The desired consistency of the raw material for the drying process (the raw material must be ripe, healthy, undamaged), as well as the stages of pre-preparation, the desired temperature regime, drying time and storage conditions.

The physical and biochemical properties of the drying product change during the drying process. During physical changes there is a decrease in weight and volume, deformation, partial loss of nutrients. During biochemical change, vitamins are broken down under high temperature conditions.

The development of the above processes is essential to avoid unintended consequences. This requires knowledge of fruit and vegetable drying technology, monitoring of drying processes and selection of optimal modes for each fruit and vegetable.

*Tabl. 2, bibl. 5.*

**O.BURDIASHVILI.** Computer modeling of existing remedial action scheme in the georgian power system.

"Energy". №4(100). 2021. Tbilisi. p. 35-38. geo. sum geo. engl. rus.

In this article is reviewed existing situation of the Georgian power system, is shown advantage of synchronous operation of the power systems with small synchronous inertia to the neighboring systems. Also are described problems related to frequency stability of the Georgian power system when it operates with isolated mode. It is described logic of existing Remedial Action Scheme "RAS" in the Georgian power system for one particular accident and also are shown the purpose of creation of "RAS" computer model and test results of the Remedial Action Scheme. According to the test results modeling is successful.

*Ill. 1.*

**T. MUSELIANI, M. GVARAMADZE.** Determination Of Magnetic Field Tension Of Dual Chain High Voltage Overhead Power Transmission Line At A Finite Line Distance From The Projection.

"Energy". №4(100). 2021. Tbilisi. p. 39-44. geo. sum geo. engl. rus.

It has been determined based on the calculations, that in case of Y220-2m+14 type dual chain 220 kW voltage overhead power transmission line supports, limited values (0,2-0,3 mf) of safe magnetic field induction determined by International Agency of Cancer and recommended for human health by International health Protection Organization, in case of the shortest distance (8,0 m) of the power transmission line from the earth surface established by the regulations for arrangement of power equipment, the distance of more than 50 m the overhead power transmission limb line from the projection from the projection is safe enough.

*Ill. 1, tabl. 1, bibl. 4.*

**N. KEVKHISHVILI, T. JISHKARIANI, N. JAVSHANASHVILI, N. INVIA, P. SKHIRTLDZE.**

Methodology For Determining The Thermal Conductivity Coefficient Of A Building Limiting Wall At A Non-Stationary Temperature Mode.

"Energy". №4(100). 2021. Tbilisi. p.45-51. geo. sum geo. engl. rus.

The Law of Georgia on Energy Efficiency of Buildings emphasizes that the construction sector accounts for about 40% of the potential for energy savings, which means that the introduction of energy efficiency measures is the best way to reduce energy consumption in buildings. In the near future, all new buildings and/or their part, existing buildings and/or their part for sale, rent or lease, and all public buildings must meet with the requirements for almost zero energy consumption and must be subject to mandatory energy efficiency certification [1]. The energy

efficiency certification of a building is carried out by independent experts who, based on energy audits, should determine heat losses from the buildings' envelope (walls, roof, floor, windows, doors), analyze the current energy consumption and develop all possible measures to reduce it. To calculate the amount of heat lost from the walls of a building, it is necessary to know the wall thickness and its thermal conductivity, which depends on the wall material and the current methods for its determination are entirely based on the use of stationary fields in laboratory conditions. This article describes the method of determining the coefficient  $\lambda$  - thermal conductivity, which is determined using the velocity of heat flow in a non-stationary temperature field, which allows on site determination of the thermal insulation characteristics of the buildings' wall.

*Ill. 4, tabl. 1, bibl. 4.*

**Z. GOBIANIDZE, GR.KHARSHILADZE, T. GAKHARIA.** Overview Of Power Equipment Protection.

"Energy". №4(100). 2021. Tbilisi. p. 52-56. geo. sum geo. engl. rus.

The quality and quantity of the products produced by any enterprise depends on reliable and uninterrupted operation of the power equipment. The main units of the power equipment are the electric machines that drive the product producing machines. Therefore, the protection of the power equipment from electric, magnetic, mechanic and other types of malfunctions is a very urgent task.

Negative sides of the protections to-date are analyzed in the presented report. New method of protecting from mechanical malfunction so that the electric machines are running in a reliable and uninterrupted way is provided.

*Ill. 1, bibl. 3.*

**R.CHIKHLADZE, K.CHIKHLADZE, Z.JANIASHVILI, J.GABOSHVILI.** Diagnosis of Insulation System of Transformer bay Quantity of Resistance.

"Energy". №4(100). 2021. Tbilisi. p. 57-63. geo. sum geo. engl. rus.

The paper considers the resistance of the insulation system according to the duration and magnitude of the impact of voltage. Formulas for calculating the resistance of a separate zone of the insulation system based on the results of measurements using the traditional resistance scheme is given. The measurement accuracy in terms of electrode shortening time is studied. Namely, ten to fifteen minutes. This paper estimates the percentage difference between the measured and calculated values. The dependence of this difference with the magnitude of the measurement voltage is evaluated. In particular, by doubling the measurement voltage, the percentage difference between the measured and calculated values almost doubles, but is less than the norm.

*Ill. 1, tabl. 2, bibl. 10.*

**G. KHURTSILAVA.** Research of An Effective Management System of Ecs-11 Locomotive in Field Conditions.

"Energy". №4(100). 2021. Tbilisi. p. 64-68. geo. sum geo. engl. rus.

The issue of replacing an outdated ECs-11 locomotive control relay-contact system on Borjomi-Bakuriani railway by modern power efficient electronic-impulse control system is reviewed. With double bottom locomotive wagon.

It was determined under experimental mileages that on Borjomi-Bakuriani route the locomotive equipped with modern control system circuit consumes significantly less electric power saving 279.3 kW/h (48.6%) electric power.

*Ill. 2, tabl. 1, bibl. 4.*

**T.ELIZARASHVILI, G.ARZIANI.** Improvement of voltage profile in microgrids using static var compensators.

"Energy". №4(100). 2021. Tbilisi. p. 69-74. geo. sum geo. engl. rus.

The article discusses the issue of voltage control in microgrids operating on renewable energy sources. The modeled microgrid consists of solar power plants, hydropower plants, and load centers of a variable nature over time. The models of static var compensators are used for voltage regulation. Results of load-flow, dynamics and quasi dynamics simulations are presented and analyzed. Comparative analysis of electrical regime parameters is conducted for two specific scenarios: grid voltage control by classical method and grid voltage control by using the static var compensators.

*Ill. 6.*

**T. KOKHREIDZE, M. KHAKHANOV.** Estimation of power losses based on transient processes in amorphous-superconducting combined transformer power controllers.

"Energy". №4(100). 2021. Tbilisi. p. 75-82. geo. sum geo. engl. rus.

Power losses in the amorphous-superconducting combined transformer power rectifier are estimated based on transient processes. Calculation of the losses is obtained. It can be seen on the figure that the losses depend on circuit configuration and all its parameters such as load inductance, inductance of the transformers' branches, frequency of power supply alternating current. By increasing them the losses increase respectively and vice versa – losses in normal state decrease by increasing an active resistance of the switching element.

It was determined that the power losses and respectively the efficiency coefficient in the rectifier depend on not only the rectifier circuit parameters, but on the load inductance too. Therefore, it is not allowed to optimize the rectifier without considering the load.

*Ill. 3, bibl. 2.*

**D.NAMGALADZE, T.GVANIDZE.** Determination of the stochastic characteristics of the calorific value of natural gas and the determination of the characteristics of interchangeability (wobbe number).

"Energy". №4(100). 2021. Tbilisi. p. 83 -88. geo. sum geo. engl. rus.

The article deals with the random processes of natural gas supply and their parameters. In particular, the heat capacity and density. Here it is considered the data on the supply of natural gas from Azerbaijan and Russia for 5 years, in particular, the values of heat capacity and density. In the article there are constructed histograms of the heat capacity and density series and the probability density function. It was established that the probability density distribution functions are normal. As a result, it is possible to determine the Wobbe number, which creates the prerequisites for the principles of combustion control.

*Ill. 3, bibl. 11.*

**G.KAPANADZE.** Peculiarities of the magnetic properties of the CaCu<sub>5</sub> type compounds of thorium with Fe, Co and Ni with.

"Energy". №4(100). 2021. Tbilisi. p. 89-92. rus. sum geo. engl. rus.

A comparative analysis of the magnetic characteristics of the CaCu<sub>5</sub> type thorium compounds with 3d-metals of the iron group (Fe, Co and Ni) has been carried out. The role of the degree of electron filling of the 3d-shells in the formation of the magnetic properties of the investigated ThMn<sub>5</sub> compounds is discussed within the framework of the "rigid" zone model. It is assumed that thorium can transfer all of its valence electrons to the 3d-zone of Fe, Co and Ni.

Isomorphic compounds of Thorium 3d-transition metals, particularly of Fe, Co and Ni may be ferramagnetics and paramagnetics as well, in this regard its important to study such solid solions of these compaunds where it can be observed the transition from ferromagnetic into paramagnetic when one atom of 3d-metal is changing by another one.

*Ill. 1, bibl. 5.*