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## SUMMARIES

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### **FEASIBILITY ANALYSIS OF FORECASTING HYDROLOGY OF ENGURI RIVER.**

*G.Mirinashvili, A.Kokhtashvili.*

"Energy". №2(106). 2023. Tbilisi. p. 5-10. geo. sum geo. engl. rus.

The article discusses the role of the Enguri river basin on the hydro-energy of Georgia. The software and mathematical base of Tethys, a platform for forecasting hydrological indicators. Emphasis is placed on both the technical and financial benefits of hydrology forecasting. The volumes of water spilled by Enguri HPP in 2013-2022 are taken into account. Turkish Energy Exchange 2020-2023 electricity prices are reviewed. The financial consequences of energy spilled by Engurhesi are calculated.

*Ill. 5.*

### **IGBT- PROCESSING OF THE PRINCIPLE ELECTRICAL SCHEME OF ENERGY TRANSMISSION WITH TWO-BRIDGE TRANSDUCER DC BIPOLAR LINE CONTAINING TRANSISTOR MODULES UNDER THE CONDITIONS OF IMPROVING THE EFFICIENCY OF ELECTRICAL ENERGY ACCOUNTABILITY.**

*G. Kokhraidze, Z. Gachechiladze, N. Beradze, Gocha Kokhraidze.*

"Energy". №2(106). 2023. Tbilisi. p. 11-23. geo. sum geo. engl. rus.

The scientific-engineering paper presents the processing of the principle electrical scheme of energy transmission with two-bridge transducers DC bipolar line containing IGBT-transistor modules under the conditions of improving energy accountability. It provides transmitting and receiving system generators with appropriate frequencies; appropriate loads; bridge schemes of rectifier and inverter substations; bipolar transmitting line; voltages and currents at the input of the rectifier substation. As a result of the presented processed electrical drawings, different normal operating modes can occur during operation, starting with a complete scheme (all bridges are connected) and ending with a non-complete scheme (only one footbridge is connected). A bipolar transmission line DC formula is obtained for the established processes of operation of the entire conversion system.

*Ill. 4, bibl. 3.*

### **A BATTERY ENERGY STORAGE SYSTEM THAT AIMS TO MAKE THE ENERGY SECTOR MORE AFFORDABLE, MORE CLIMATE AND ENVIRONMENTALLY EFFICIENT AND COMPETITIVE, SAFER AND MORE SUSTAINABLE.**

*T.Museliani, B.Jintchveleishvili.*

"Energy". №2(106). 2023. Tbilisi. p. 24-36. geo. sum geo. engl. rus.

Combating climate change is effective through better understanding of its causes, evolution, risks, impacts and opportunities. A battery energy storage system that will be able to supply energy to the customer will also be able to store energy that comes with a certificate of origin, or electronic document, that confirms that the share of electricity supplied to the customer is derived from renewable sources.

*Ill. 9, bibl. 9.*

### **WATER PUMP POWERED BY AN EVAPORATIVE-CONDENSING HEAT ENGINE.**

*E. Machavariani, I. Shekriladze.*

"Energy". №2(106). 2023. Tbilisi. p. 37-44. geo. sum geo. engl. rus.

The paper describes the current state of development of the low-potential heat-driven pulse pump (HDPP) and the prospects for further development. HDPP differs from the classical membrane pump in that the membrane is moved in opposite directions not by a mechanical drive, but by the simplest thermal drive, which works by alternating evaporation-condensation processes. The working liquid evaporates on the evaporator (heated by the capillary surface directed from top to bottom) and the steam inflates the membrane, which displaces water from the pump. Then the steam condenses (the membrane is cooled by water supplied from below), which causes a decrease in the internal volume of the inflated membrane, that is, the membrane moves back to the

evaporator and, as a result, fresh water is sucked into the pump. When such a pump is integrated with a flat plate solar collector, it can pump water from a well, pass it through the solar collector for heating, and pump it to a hot water tank at a high point. In the early years, four prototypes of such pulsating pumps were developed, the experimental investigation of which confirmed the expediency of PP in practical use.

The thermodynamic cycle in the heat engine of such a pump is discussed and its efficiency is compared with the thermal efficiency of the Carnot cycle operating in the same temperature range. It is reasoned that after some modernization, the practical use of the described steam engine driven PP will be quite profitable.

*Ill. 4, bibl.9.*

#### **A NEW MODIFICATION OF THE WATER PUMP OPERATING ON EVAPORATIVE-CONDENSING HEAT ENGINE WITH TWO-SPEED CONDENSATION.**

*E. Machavariani, I. Shekrladze.*

"Energy". №2(106). 2023. Tbilisi. p. 45-52. geo. sum geo. engl. rus.

The article describes a new design modification of a heat-driven pulsating water pump (HPP) based on low-potential thermal evaporation-condensation processes, in which the process of steam condensation slows down during the evaporation of the working fluid and accelerates after evaporation. A new modification of the HPP design is described and the process of its operation is considered.

The thermodynamic cycle in the thermal drive of the HPP is analyzed and it is shown that the efficiency of the HPP significantly depends on the degree of dryness of the steam obtained at the end of the evaporation of the working fluid. To increase the degree of dryness of the steam, a new design of the HPP was developed and created - prototype No. 4, in which a two-speed mode of condensation of the steam of the working fluid is implemented.

It is shown that the two-speed condensation mode, implemented in the prototype No. 4, made it possible to increase the efficiency of the HPP by almost three times, while the specific power of the pump increased sharply.

*Ill. 4, bibl. 6.*

#### **RESONANCE IN AN ELECTRICAL CIRCUIT.**

*I.Jangirashvili, M. Dvalidze.*

"Energy". №2(106). 2023. Tbilisi. p. 53-59. geo. sum geo. engl. rus.

The resonance in an electric circuit is discussed, an analogy is made with the parallel and series connection of the R, L, C circuit with the corresponding values, and on the basis of tests the most important conclusion is also made that at resonance, due to the fact that the circuit as a whole behaves like an active resistance, there is no place for the source of modulated voltage to give energy from the fields of the circuit.

*Ill. 4, bibl. 2.*

#### **POSSIBLE WAYS TO IMPROVE THE TRACTION PROPERTIES OF DC ELECTRIC LOCOMOTIVES EQUIPPED WITH TRACTION MOTORS WITH COMMUTATORS.**

*A.Zerekidze, T.Natenadze, N.Kereselidze.*

"Energy". №2(106). 2023. Tbilisi. p. 60-67. geo. sum geo. engl. rus.

The article discusses various schemes for improving the traction and speed properties of DC electric locomotives equipped with traction motors with commutators. Their pros and cons are given. An optimal model is proposed that takes into account the power supply of the excitation winding of traction motors from a microprocessor converter, which forms the characteristics of series excitation traction motors in traction mode, and the characteristics of independent excitation in the regenerative braking mode. When slip of the wheels is detected, less drooping characteristic of traction motors is formed.

*Ill. 2, bibl. 5.*

**NEW HEAT EXCHANGER DESIGN FOR FAST AND PRECISE CONTROL TEMPERATURE OF LIQUIDS OF LARGE CAPACITY.**

*L.Papava, M.Razmadze, S.Patarkalishvili, G.Gugulashvili.*

"Energy". №2(106). 2023. Tbilisi. p. 68-73. geo. sum geo. engl. rus.

Heat exchange devices are considered and it is shown, that they are characterized by low efficiency of heat transfer, which predetermines the increase in the duration of reaching the required temperature and the low accuracy of the temperature reached. This shortcoming is especially revealed when the temperature of liquids of a large volume changes.

A new design of the heat exchange device is presented, which, using heat pipes mounted on a rotating heat exchange pipe, provides an intensification of the heat transfer process, which increases the accuracy of the obtained liquid temperature and reduces the duration of its achievement.

*Ill.1, bibl. 6.*

