the power - ten times. On the plant will be conducted to collect data on how the panels collect solar energy and how much, how the equipment reacts to weather and temperature conditions. This information will serve to create technical standards for solar plants that are not in Russia.

Evaluation of economic efficiency of the solar PV plant in the Republic of Khakassia:the average payback period of solar station in Khakassia is the same as the world average - 15 years.

Furthermore,the local governments welcomed the construction of the plant as it's a big step towards greener Siberia with less hazardous emissions.

Thus, the use of the solar PV plant in the Samara regionSTI as a source of supply of the autonomous consumerelectric energy have great potential.Development of renewable energy sources is one of the strategic priorities. Today the trend using new power generation technologies continue. The Siberia's future power industry should be based on environmentally friendly technologies.

ELECTRIC DISCHARGE TECHNOLOGIES

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This article is devoted to the initiation of an electrical discharge in the water environment. Novelty of this research is the development of a new technology using the dielectric insert in the electrode, which allows solving the problem of "triple point". Triple point is a meeting point of 3 media such as metal, insulation and dialectal liquid.

The source of impulse action is the electric discharge in a liquid as the basis of the methods of electro-discharge treatment. The techniques of electro-discharge treatment are widely used in various areas like drilling, agriculture and electro-treatment of metal surfaces. The methods are implemented in HV electrohydraulic systems are used to implement these methods practically.

Service water possessing high specific conductivity ($\gamma \geq 10^{-4}$ $Ohms^{-1}$ cm^{-1}) is usually used in electro discharge techniques. Some production procedures employ high conductivity solutions such as the cement solution or concrete mix.

An electric discharge is the release and transmission of electricity in an applied electric field through a certain medium.

There are two types of discharges. The first one is non-self-maintained discharge — a discharge that ceases in the absence of an external ionizing agent.

The second one is called self-maintained discharge — a discharge that continues after removal of the external ionizing agent [4].

The process of electric discharge includes electrical breakdown which is a transient condition between non-self-maintained and self-maintained discharge and can be defined as a large, usually abrupt rise in electric current in the presence of electric

voltage increase. As a rule high value of voltage is required for electrical breakdown. Breakdown is necessary to start the process of electric discharge and make current flow through a medium.

In order to accumulate energy in the working interval 2 electrode schemes can be used, relatively «rod-rod» and «rod-flat surface». The article covers only «rod-flat surface».

30 KV is required to make an electrical breakdown through 1 centimeter thick air.

To obtain desired voltage quickly Pulse Voltage Generator (PVG) is used. PVG is an electronic circuit consisting of condensers, which are connected in parallel for the charge and in series for pulse.

Now it is necessary to describe the problem associated with physical properties of the field around electrodes in order to cope with it properly. This problem is called "triple point" is known the most week point of the electrode system is located on the boundary of the potential electrode insulator ($\varepsilon_i \sim 2\ldots3$), the electrode metal surface ($\varepsilon_{md} \sim\infty$) and the processed medium ($\varepsilon_{md} \sim 80$) [3]. It spoils the rods and wastes energy.

Different methods of discharge are used for decreasing the energy losses during the pre-breakdown state and the local discharge channel formation. The article focuses on techniques which uses the dielectric insert in the potential electrode. As liquid medium the service water with the specific resistance was used.

The usage of the dielectric insert as an initiating element is founded on the following expectations. The discharge originates very often from this point, though it is far from the grounding electrode. The length of the current flow is longer than the working gap. Usually this phenomenon causes the failure of potential electrode insulation [2]. We suppose the introduction of the "triple point" right in the working gap will considerably improve the conditions of the overheat instability near the potential electrode due to the increase of local electric field strength and, therefore, the decrease of time till the discharge formation [1]. The obtained results show that various insulating inserts located at the potential electrode end increase the breakdown probability of the gaps compared to the breakdown of the same gaps without the insert. This confirms the impact of the insert by the formation of the overheat instability near the potential electrode. Different insulating materials used for the insert cause different effects on the breakdown probability. High density of polyethylen shows the best quality but rubber and textolite have no effects on the breakdown probability.

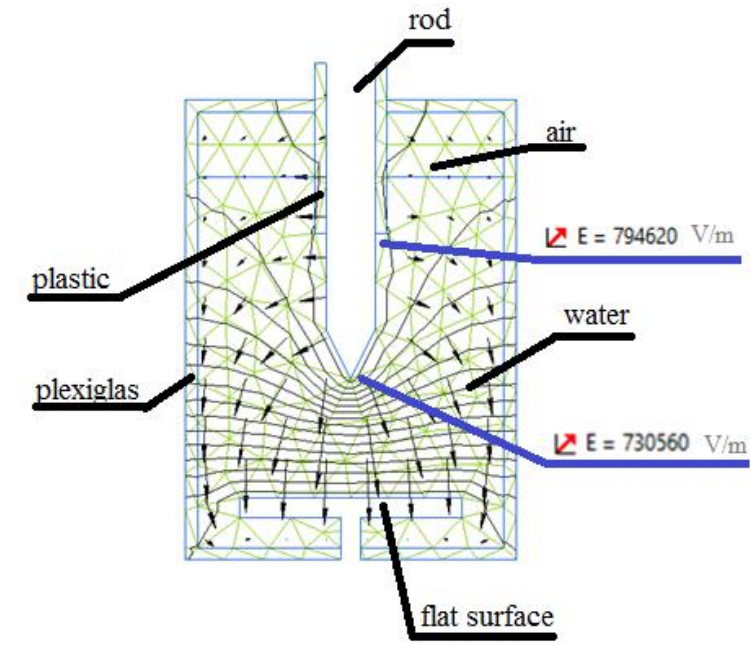

Fig. 1. Electrode scheme without a dielectric insert

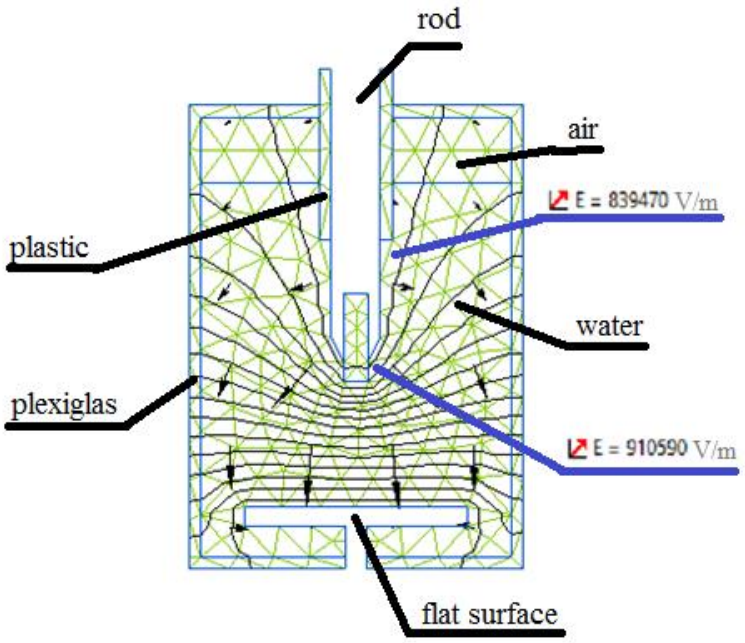

Fig. 2. Electrode scheme with a dielectric insert

One of the most famous example of using electric discharge technologies is electro pulse technique of well-drilling.

Professor Vorobiev Alexander Akimovich from TPU is the author of the above mentioned method. To start the process of electro pulse well-drilling, firstly, it is necessary to make a hole of half meter length using a traditional method. The remained part of drilling is done by electro pulse method based on the destructive effect of an electric pulse discharge in a rock mass. Energy from Pulsed Voltage Generator gets to the rock and pieces of the rock are splitted off from the solid mass as a result of tensile forces created by the discharge. The necessary condition of this technology

is the presence of fluid (diesel gas oil) which removes small pieces from the well. This technique was tested in Altai where the reservoir rock was micro quartzit (one of the most solid rocks). This method showed the increase of well drilling speed from 3.3 by using traditional method to 5-6 m/h by applying electro pulse technique of well-drilling. The findings of this research showed that the proposed method is economically viable and can be used practically in oil industry.

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MPI AND PVM SYSTEMS

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In modern world it is already impossible to do science without a computer. It accompanies all scientific research, experiments, helps in the data analysis, modeling and description of the processes. However, some areas of science require very accurate calculations or complex programs for making new discoveries. The capacity of a typical computer will be not enough for that. That is why supercomputers are becoming more and more popular now. With its high performance and MPI and PVM systems help it’s possible to speed up data processing and get accurate results. Let’s try to understand the essence of these systems.

MPI (Message Passing Interface) – special messaging library, a collection of functions on C / C ++ or Fortran languages, which give a chance to facilitate communication and synchronization problems between the processes of a parallel program with shared memory. Currently, the library has become the established standard for parallel programming, it has implementation for modern and popular computer platforms and programming languages (Fortran, C / C ++, Java), applies not only to write programs for supercomputers, but also for clustered systems. Library versions are constantly updated, it allows you to perform new operations, solve different range of tasks. In accordance with this system it is allocated to the memory node master and slave core. The main problem comes on the leading core, where it is recognized and redirected to the slave core, where there is an immediate solution to the problem and then results are returned to the master mandrel core.