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**ABAKAN SOLAR POWER PLANT ANALYSIS OF PROSPECTS OF USING  
SOLAR ENERGY IN KHAKASSIA (ABAKAN SOLAR POWER PLANT)**

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On our planet, the hydrocarbon is limited thus inefficiency of hydropower engineering and ecological damage made by heat and nuclear power engineering make it extremely important to develop alternative energy sources. Most of solar and wind power plants were launched in last 3 years following Russian government's call to introduce renewable energy.

Siberia may not seem like the most obvious place to build a solar power plant, but Russia's largest independent power company disagrees. On the eve of Russia's Energy Industry Workers' Day in December 2015, the country's largest privately-held power company launched Siberia's biggest solar photovoltaic (PV) plant in Abakan, capital city of the Republic of Khakassia.

This paper presents the prospects of solar energy in Khakassia, but first of all the key moments of the solar plants are considered. Therefore, we discuss the advantages and disadvantages of the solar energy.

We select the following advantages:

1. Renewable Energy Source
2. Reduces Electricity Bills
3. Diverse Applications
4. Low Maintenance Costs

And disadvantages:

1. Cost for purchasing a solar system
2. Weather Dependent
3. Uses a Lot of Space

Siberia generally has a very continental climate: it is cold but sunny in winter and in summer. The doubts of skeptics about the ineffectiveness of the solar power plant in cold Siberia creators refute statistics. The particular place has over 300 sunny days, it opens up a huge potential for the expansion of the solar farms further in the area. The low temperatures don't really affect solar panels, it's purely a matter of the number of sunny days. Now Abakan SPP produce 6.5 mln kilowatt-hours of electricity annually that is equivalent to burning about 5 thousand tons of coal to the power station. The solar plant has an installed capacity of 5.2 megawatts (for comparison, Sayano-Shushenskaya hydropower plant on the Yenisei River, has an installed capacity of 6,400 MW), over 20,000 solar modules, and a total area of 18 hectares. The plant provides 1/30 of the needs of the region's capital. In the future performance of Abakan SES can be increased: in the perspective area can be increased by five times, and

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 region STI as a source of supply of the autonomous consumer electric 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 dielectric 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<sup>-1</sup> cm<sup>-1</sup>) 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