

Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

**Analysis of Renewable Energy in Russian Federation
with Focus on Solar Energy**

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Abstract:

The main objective of this thesis was to assess the potential and prospects of using alternative energy sources in the Russian Federation and especially in its southern regions using the example of a project for the small solar construction in Krasnodar. It can be considered the growing interest in renewable energy sources. Despite the positive trends, there are a number of unsolved problems. The barriers to the development of renewable energy include obsolescence of technologies and infrastructure, the lack of effective coordination of the construction of various types of renewable energy plants, and low interest from the government and investors in relation to the construction of renewable energy sources. The potential of alternative energy sources using in the whole Russian Federation was made. There is a paradoxical situation when a country has a huge potential for renewable energy, but practically does not use them. It was concluded that the most beneficial for the South region (especially for the Krasnodar territory) is the use of solar energy, which can also be combined with hydropower energy. Wind power can be used only in 20 % of the South regions territory. The Krasnodar Territory has relatively small reserves of fuel and energy resources (traditional) and it depends on external energy supplies in Russia (more than 60 % of energy is imported). Energy demand, however, is growing steadily – the region is developing (it is promising for investors in terms of tourism, manufacturing). Based on the analysis and conclusions made, it is possible to unequivocally point out the large role and prospects of renewable energy in certain regions of Russia, and especially about solar energy in the Krasnodar territory. In this work the calculation of the installation of a solar structure for a flat roof using the data of the leading manufacturer of solar panels was made. The total cost of 6.6 million rubles. It is shown that in modern economic conditions it is possible to build a solar construction with a payback period of up to five years.

Keywords:

Analysis, electricity, energetics, energy, potentials, power station, renewable energy, Russian Federation, solar energy.

Objectives and Methodology:

The main objective of this thesis is to assess the potential and prospects of using alternative energy sources in the Russian Federation and especially in its southern regions using the example of a project for the solar power plant construction in Krasnodar.

To achieve this goal it is necessary to solve the following tasks:

- to study the range of basic theoretical concepts that relate to this issue,
- assess the potential of alternative energy sources using in the Russian Federation,

- to propose and to plan the project of solar power station construction a in the city of Krasnodar,
- formulate and propose possible measures to improve the situation in the field of alternative energy.

In this thesis the study of the possibilities of alternative energy using in the Russian Federation is made. The subject of the thesis is the possibility of using alternative energy sources in the Krasnodar territory. A comparative analysis and basic methods of financial calculations for a specific project are chosen as research methods.

Literature Review:

Energetics is the total energy relations and transformations of a physical, chemical, or biological system. Energy sources are divided to two main groups: primary and secondary. Primary energy sources are natural resources that are not transformed by man. They can be divided into non-renewable (fossil fuels and nuclear fuels) and renewable (water power, wind energy, solar energy, biomass, geothermal energy). Secondary energy sources are resources generated by human activity (municipal waste, used oils, landfill gases, waste heat).

Alternative energy sources are mainly renewable. In addition, the sources of energy produced by human society are also alternative sources. The main advantage of alternative energy sources is that they are environmentally friendly and do not leave radioactive waste.

Practical Part:

Nowadays, the problem of energy deficit in Russia is one of the most important and urgent. In general, it's instability between production and consumption of electricity. The annual increase in demand for electricity, caused not only by the growth of industrial production, but also by the expansion of the scale of life in the face of a reduction in the natural reserves, leads to the need for changes in the structure of regional fuel and energy balances.

The high dependence of the Krasnodar Territory on external energy supplies, the minimum reserves of energy capacity for the implementation determine the need for large-scale work on the implementation of energy conservation principles in all sectors of the economy. Improving the efficiency of energy consumption is an extremely important area for improving the energy subsystem of the region.

The Krasnodar Territory has relatively small reserves traditional energy resources, therefore, the most promising way to increase the energy self-sufficiency of the region is to attract alternative energy sources to electricity generation, which are largely renewable.

The significant potential of the region is based not only on the availability of large-scale reserves of renewable energy sources, but also on many years of experience in their practical use.

The Energy Saving Program implemented by the Government today involves the introduction of innovative technologies, as well as the use of environmentally friendly electricity generators. Relying on the Energy Saving Program, the solar power plant is a unique solution, which, in fact, is a nationally beneficial project.

Conclusion:

The main objective of this thesis was to assess the potential and prospects of using alternative energy sources in the Russian Federation and especially in its southern regions using the example of a project for the small solar construction in Krasnodar.

To achieve this goal, the study of the range of basic theoretical concepts that relate to this issue was made at first. Then the potential of alternative energy sources using in the whole Russian Federation was made. It was concluded that the most beneficial for the South region (especially for the Krasnodar territory) is the use of solar energy, which can also be combined with hydropower energy. Wind power can be used only in 20 % of the South region's territory – too strong wind and negative temperatures in some regions may limit traffic of wind plants.

In this work, the potential of solar energy in the Krasnodar Territory was analyzed in detail, as well as the calculation of the installation of a solar structure for a flat roof (area of 100 m²) using the data of the leading manufacturer of solar panels of its own model VPK NPO Mashinostroenie. The total cost of 6.6 million rubles. It is shown that in modern economic conditions it is possible to build a solar construction with a payback period of up to five years.

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