

THE SOLID MUNICIPAL WASTE RECYCLING AS THE ORIGIN OF THE RENEWABLE SOURCE

Sofce Trajkova, Boris Krstev, Aleksandar Lazarov, Aleksandar Krstev, Tome Danevski, Blagoj Golomeov, Mirjana Golomeova

Goce Delcev University, Faculty of Natural & Technicacal Sciences – Stip, **FYROM**

ABSTRACT

In the last two to three decades technological processes has been reported and increasing of the municipality waste with the amounts. The current state of treatment of municipility waste can qualify as irregular and untotal. To overcome this unacceptable situation, in this paper modern approach for effectively managing and reducing of the solid textile waste is presented.

Key words: industry, municipality waste, modern approach, reduction, recycling.

INTRODUCTION

In different industries, different manufacturing processes are accompanied by the creation of small or large amounts of solid waste, the place must be disposed of in the prescribed manner. This is important because in many cases the same waste can usefully be applied. Municipal waste is commonly referred to as secondary raw material. If the technical, economic and other reasons can not be re-used, waste is left to the biosphere that has changed. The legal requirement is not to create harmful effects in the natural environment. Global environmental problems facing humans today are: Damage to the biosphere and its ecosystems, global climate change (greenhouse effect, ozone screen, etc..) Pollution - contamination of water courses and lack of clean drinking water, pollution of air and reducing the threat to biodiversity; formation of waste and its inadequate delay; genetic engineering; Impairment of health, Lack of discipline, and developed environmental responsibility in agricultural production.

In this context, the increase of solid waste is one of the major problems of our civilization, as well as the communal aspect of environmental, sanitary-epidemiological, technological, urban, construction, hydrology and energy aspects. Increasing the number of inhabitants, urbanization, directly affect the growth of solid waste that must be collected, transported and processed in a way that will satisfy the first sanitary conditions, then technological, economic and conditions relating to the protection of environment.

Municipal waste management includes the following phases: establishment of waste collection and storage, transportation, treatment, recycling and disposal. The increasing population and urbanization of settlements directly affect the growth of the quantity of municipal waste is destroyed in a manner that meets the requirements and standards for environmental protection. Increasingly increases the amount of plastic packaging in municipal waste and other solid waste as a result of human activities in all fields such as public places, industry, agriculture, homes and more. The management of solid waste need to consider two aspects: environmental protection and rational utilization of waste. The first task is to reduce waste production, then find a selection method for recycling by type of waste, waste processing and disposal of waste is processed.

Today greater emphasis is placed on these global environmental problems. Facing the consequences of extensive use of fossil fuels, and lately of nuclear fuel, the man is a witness to today's natural problems that happen to us and the great destructive power of nature and becomes aware that this is the result of past neglect and contempt of man to nature. Blinded by his greed in order to satisfy their needs, relentless and merciless man turned to nature, destroying everything before him, without considering what might be the consequences of this destruction and unaware that destroys itself. As one of the main solutions is a gradual transition from the current use of non-renewable, conventional sources of energy to using renewable energy sources. Like other countries, and Macedonia with the strategy ie the strategy for renewable energy sources in the Government of the Republic of Macedonia until 2020, where the current 16.3% to increase to 21% share of renewable energy from the total needs of energy, and by 2030 is planned participation renewable forms of energy to increase to 27%. [1]

1.0 Characteristics of renewable energy sources

Renewable energy sources have certain characteristics that differ from non-renewable, energy sources conventional. Some of the important advantages of renewable energy sources are:

- free use (energy from the sun and wind), or relatively cheap fuel (wood waste and solid waste), significantly shorter time to build than conventional plants, which reduces risk, significantly reduced environmental pollution (no danger of acid rain and global warming from the release of CO₂), making them much cleaner sources of energy than fossil fuels.

Some of the important deficiencies are:

- not permanent (not available at any time); small intensity of energy sources (small single power plant for the transformation of energy), low availability during the year (except geothermal and biomass energy); major investments in the equipment for transformation of energy greater cost of compensating kWh heating or electricity (not in all renewable sources).

In the near future will not be surprised if the necessary energy for residential homes is provided only by the sun, wind, or car with biofuel. City garbage can satisfy a significant portion of energy needs for heating, or electricity to the city. In everyday scientific research, improved technologies for the transformation of renewable energy sources in terms of increasing efficiency and reducing investments in systems, people will soon be freed from dependence on fossil fuels. [2], [3]

1.1 Ways of using solar energy

Solar radiation is the source of life and fuel the human society is based on renewable energy and biological resources of solar energy flux is several times greater than the conversion of all other forms of energy;

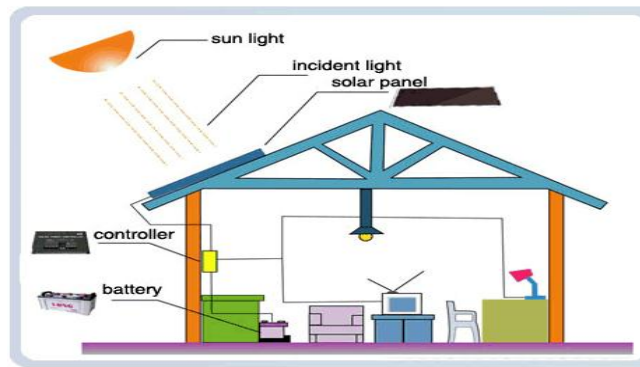


Figure.6.1. Solar panel (photovoltaic) for getting the electricity

Solar energy can only increase the energy reserves of the planet, as it turned out millions of years through the creation of fossil fuels. Considering the human time scale, solar energy is inexhaustible. According to current insights, the utilization of solar energy has a relatively small impact on the environment. However, there are two main barriers to entry into the era of solar technology. Because of significant fluctuations in solar radiation during the day and night, through summer and winter, solar energy is not sent if the demand for its components will store and transport;

1.2 Solar energy potential in Macedonia

Today, available technologies allow utilization of solar energy converted into the same: electric energy through solar cells or so-called photovoltaic systems based on photoelectrical effect;-thermal energy through a variety of solar collectors.

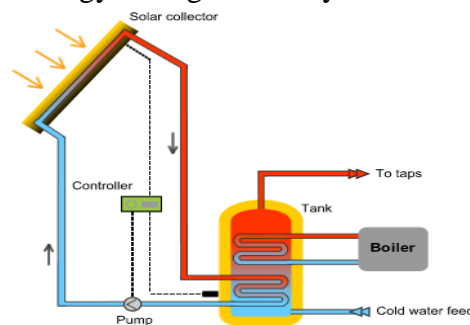


Figure 6.2Solar collector for heating water

Experimental integrated photovoltaic systems in Macedonian conditions despite the advantages of solar energy for Macedonia as a country in southern Europe, low in domestic energy resources, but with a long tradition of theoretical and experimental research in the field of photovoltaic systems, the practical application of these systems in our is still limited to only a few telecommunications installations.

Global solar radiation is maximum in Macedonia in south-western mountainous region and its total annual value is about 1500 kWh/m². The total annual global solar radiation for Skopje (north latitude 41059 'east longitude 21028' and an altitude of 240 m) is 1367 kWh/m² which is one of the smallest values in Macedonia. Assumed first photovoltaic

installations to be placed on the roof of the buildings of the Macedonian Academy of Sciences and Arts (MANU) and Electrical Engineering (ETF).

2.0 Geothermal source of energy

Earth is a great reservoir of heat, but most of that power is hidden so deeply that her presence on the land is quite dispersed and unevenly. Thermal energy contained inside the Earth is called geothermal energy. That the interior of the country is hotter than its surface is confirmed by the occurrences of volcanic eruptions, in which ejects molten material with temperatures higher than 800oC, sources of vapor mixture of steam and water from the artery type called Geysers, hot water etc..



Figure 7.1. Geysers, Geothermal lakes - in Iceland

3.0 Energy of the wind in Macedonia

Wind is a form of solar energy. Winds are caused by unequal heating of the atmosphere under the influence of solar radiation and rotation of the earth. The movement of wind adapt to terrain (earth or sea surface) and vegetation. This movement of air, or the floating power in modern wind turbines can be used to electricity. The term "wind energy" means the process by which wind is used to obtain mechanical or electrical energy. Wind turbines convert the kinetic energy of wind into mechanical. The mechanical energy can be directly used for: grinding grain, pumping water, or the electrical - generator, which will turn it into electricity and used in homes, schools,

industry and others. According to the "Strategy for development of the energy sector," the region around Stip is one of the most favorable in terms of wind speed. The images can be noted that only about 2,000 hours a year with wind speeds of 5 m / s, which is less than one quarter of the year.

4.0 Energy from MSW

Each year from households, commercial, industrial, administrative, and similar facilities collect millions of tons of solid waste that is usually suspended in the landfill. The composition of solid municipal waste varies depending on location, time and method of assembly. Most of the waste man kicked in the environment, has a biological origin, i.e. composed of the following organic materials (paper, food wastes, etc..) waste that can be used as fuel for obtaining thermal or electric energy. Solid urban waste can be converted into energy with his direct combustion or anaerobic natural reaction to the landfill. The landfill gas produced by natural decomposition of solid urban waste (typically contains 50% CH₄ and 50% CO₂) were collected and purified before it is entered into SVS engines or gas turbines for obtaining thermal or electric energy. In order to obtain relevant data on the quantities and composition of municipal solid waste is carried classification of sources

4.1 Commercial Waste

Commercial waste is the one generated by the commercial (not industrial) and administrative facilities, ie offices and shops and waste similar to that of households, collected from industrial premises. This waste is very similar to waste from households , but with much greater share of paper and cardboard (especially clean paper and cardboard). This is especially waste from offices and shops which sell food.

4.2 Waste generated during construction and demolition

The composition of this material depends on the type of construction material, but in general consists of earth, stone, brick, cement and ceramic materials, wood, packaging materials and others. Most of this waste material is inert, but some can be separated with separation, as dangerous or as material which again can be used either as a material that makes problems in its further processing.

4.3 Industrial waste

Industrial waste is any material that is exhausted in the process of industrial production, packaging, transportation and sale of industrial products, and on the composition, properties and quantities vary from municipal wastes. Because the industry includes more branches with different products and facilities, waste from one can be quite different compared to other industries. Industrial waste includes materials such as waste plastics, textiles, paper and cardboard, pieces of metal, slag, rubber, ceramics and more. Assessments of the waste industry in general are two basic data such as: number of employees in industry and participation in national income.

4.4 Definition of the energy potential of urban waste R. Macedonia

The regions defined potential energy is divided according to the source of solid waste. When it is taken into account all the analysis regarding the possibility of recycling of useful materials such as paper, plastic etc., and the adopted assumptions on the possible composition of the waste. Based on the data in this work, we can determine the energy potential of solid waste in the Republic of Macedonia adopted a regional division of the Republic. Macedonia, with 7 regions, without having to perform recycling of paper, plastic and rubber and leather and with 25% and 40% of their recyclability. The total energy potential in R. Macedonia occupies substantially the energy obtained from: municipal waste, commercial waste and the negligent waste industry. [4], [5]

CONCLUSION

The findings of the current analysis on the one hand, we consider that enough to justify our interpretation. On the other hand, have not introduced slowly into the depths of the problem and raised the question of determining the basic concepts of renewable energy sources such as solar energy, geothermal energy, wind power, hydropower, biomass, energy from CCI.

The problem in today's increased environmental pollution which is the result of the use of fossil fuels for energy. The challenge to humanity is to make saving the environment by activation of renewable energy sources (which include small hydro, geothermal sources, solar energy, wind energy, biogas and utilization of municipal waste). Considering the subject of our interest, this kind of energy is the energy of the future. Special emphasis should be placed on rural areas where production of energy from renewable sources in these areas will allow the opening of jobs. To participate in the creation of a national energy strategy that will accept the contemporary experience of other countries and European energy policy, opening small businesses in the sector of energy production from renewable energy sources. Hence, the alignment of EU directives in relation to renewable energy sources and to ensure sustainable energy development.

Literature:

- [1] National Plan for Waste Management in the Republic of Macedonia (NWMP) - (2009-2010);
- [2] Slave Armenski - First Edition, 2004 - Renewable energy sources;
- [3] Kiril Popovski - Renewable energy sources in Macedonia;
- [4] John Pichtel - Published in 2005 by CRC Press Taylor & Francis Group. - Waste management practices Municipal, Hazardous and Industrial;
- [5] Strategy for Renewable Energy Sources of the Government of the Republic of Macedonia until 2020.