International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, February 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

SEWAGE TREATMENT BY RENEWABLE SOURCES OF ENERGY

Shreyansh Gupta[1], Sharvan Kumar Meena[2], Mohd. Misbah[3], Vikas Babu[4]

[1,2,3,4]*Department Of Civil Engineering*

,IIMT College Of Engineering,Gr. Noida ,U.P.

ABSTRACT

Sewage treatment is the process of removing contaminants from wastewater and household sewage,both runoff(effluents),domestic,commercial and institutional.Its objective is to produce an environmentally safe fluid waste stream(or treated effluent) and solid waste(or treated slugde) suitable for disposal and reuse. Waste management has emerged as one of the greatest challenges facing developing countries. The volume of waste been generated has continually increased as global population is increasing and resources available cannot adequately handle it. Water may seem to be abundant on our planet but not readily assessable. In fact, less than 1% of world potable water is available for immediate human consumption and even that is not uniformly distributed around the globe. This implies that proper waste water management is a good way of bridging the water demand supply gap and this inevitably could be achieved using renewable energy on both environmental and cost grounds. Renewable energy sources are being promoted for a wide variety of applications worldwide including waste treatment. Renewable energy does not contribute to any form of pollution and is a capable substitute for convectional fuels in most of the applications.

I.INTRODUCTION

Dwindling water resources means that improving the quality of treated wastewater from sewage treatment plants for re-use has become more important than ever.

The poor quality of treated wastewater has limited its use for agriculture and aquaculture, Using advanced technology it is now possible to reuse sewage effluent for drinking water,although Singapore is the only country to implement such technology on a production scale in its production of new water.

Global warming is a huge problem which will significantly affect every country in the world. Many people all over the world are trying to do whatever they can to help combat the effects of global warming. One of the ways that people can fight global warming is to reduce their dependence on non-renewable energy sources like oil and petroleum based products. Almost all forms of waste treatment require energy which is scarcely available considering the global energy crisis. The objective of this study is to enumerate the solar energy applications in waste treatment as a way of global environmental protection and energy management. Solar energy which is abundant in most part of the world has been adopted as a very sustainable source of energy for waste treatment.

Its application in both solid waste and waste water treatment as in pyrolysis, solar incineration and gasification for solid wastes treatment and solar pathogenic organic destruction, solar photocatalytic degradation, solar distillation and desalination for waste water treatment. These waste treatment methods require light from the sun to photocatalyse reactions and also heat as thermal energy for the various endothermic reactions. This review therefore highlighted various methods of waste treatment which does not require the limited conventional energy sources. It also reveals that model optimizations for assessing the best options for potential pollutant treatment in pyrolysis,, solar incineration, gasification, photo catalytic degradation etc, of contaminants have not been achieved.

II.RESEARCH ELABORATION

Solar photovoltaic (PV) systems use free energy from the sun and convert it into electricity using photovoltaic cells. Every minute, the Earth receives sufficient energy to meet all power demands for a whole year - if only we could harness it efficiently.PV produces free electricity, on site where it is needed.

Solar Power works by the action of the sun's rays on solar panels. These solar panels create an electrical charge which is fed to a battery via a regulator, which must of the type that does not draw any power from the battery.

PV cells create Direct Current (DC) electricity. So we can use this electricity directly, without the need for an inverter (which would change it to AC current, such as used by domestic appliances).

III.INSTALLATION

The system must be installed by an electrician who understands 12V and solar systems.

The panel, regulator and battery MUST be close together to prevent voltage drop along the length of the cable.

The cable MUST be the correct size to avoid 'voltage drop' along its length.

3.1Efficiency of solar panels

Concentrating Solar Power (CSP) systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. The concentrated heat is then used as a heat source for a conventional power plant. A wide range of concentrating technologies exists; the most developed are the parabolic trough, the concentrating linear fresnel reflector, the Stirling dish and the solar power tower. Various techniques are used to track the Sun and focus light. In all of these systems a working fluid is heated by the concentrated sunlight, and is then used for power generation or energy storage.

3.2Enclosed trough

Inside an enclosed trough system

GlassPoint Solar, the company that created the Enclosed Trough design, states its technology can produce heat for Enhanced Oil Recovery (EOR) for about $5 per million British thermal units in sunny regions.

3.3Parabolic trough

3.4Solar power tower

IV.SOLAR DISTILLATION AND DESALINATION OF WASTE WATER

Water distillation is a typical mechanical/physical separation method which is achieved by evaporation and condensation processes. Solar distillation involves the use of solar energy to achieve distillation. In simple solar water stills, a solar collector which traps the solar radiation and converts it to heat is used to evaporate the water contained in the distillation chamber of the still.

The evaporated water as a result of saturation in the chamber condenses on the trapping side where the condensed water now passes through a funnel shaped hopper to the distillate storage tank. Solar distillation can be used to make salty water potable (desalination).

V.SOLAR PATHOGENIC ORGANIC DESTRUCTION

The last stage of any water treatment is to remove micro-organisms. Currently we use chlorine as the disinfectant but, even after treatment, the water still contains organic compounds. Chlorine removes the micro-organisms but reacts to the organic pollutants, producing disinfection by-products that are biologically undegradable and toxic and can't be removed from the water. When transferred to the eco system, they can cause serious health consequences if used in agriculture and other industries. This growing problem is of particular concern to the United Nations, where close attention is being paid internationally to organic pollutants, which cannot be removed economically.

Pathogenic organic destruction otherwise known as disinfection is a biological treatment method. It is a waste-water treatment method that could be achieved using solar radiation. It is being referred to as solar disinfection (SODIS). Solar disinfection is achieved by filling about 0.3-2.0 litre plastic bottles with low turbidity water, shaking the water to oxygenate and then place under the sun for six hours but if the weather is cloudy, then it should be left for about 2 days. The combined effect of UV-induced DNA alteration, thermal inactivation, and photo-oxidative destruction (POD), inactivates the disease causing organisms in the water..

VI.SOLAR PHOTOCATALYTIC DEGRADATION (SPD)

Normally micro-organisms are used to break down large organic compounds but, because these compounds are biologically undegradable, we have to use another form of energy to break them down. Our energy comes from UV sunlight in association with photocatalysts. Energy generated from the photocatalyst cell reaction can kill micro-organisms and break down the undegradable compounds, resulting in clean water that can be used for an extended range of agriculture and aquatic uses – and it won't damage the eco system,

Photocatalysis is the combination of photochemistry and catalysis, a process where light and catalysis are simultaneously used to promote or accelerate a chemical reaction.Photocatalysis appears as an excellent tool for final treatments of samples containing persistent organic pollutants (POPs) when compared to classical treatments.

VII.FINDINGS

7.1Financial savings

The long term financial savings of investing in solar power can be quite significant. The declining costs of equipment coupled with the substantial rebates and incentives makes it a great time to invest in solar.

7.2Betterment of environment

Generating your own electricity reduces your consumption of fossil fuels, therefore minimizing the emission of pollutants and greenhouse gases.

7.3Minium Use Of Chemicals In Treatment Of Watste Water

Many processes such as water distillation and water disinfection requires chemicals but they can be easily done with the help of solar radiation which prevents water from chemicals and also saves cost of purchasing such chemicals.

VIII.CONCLUSION

The word “sustainable” can be used in the environmental context, in which it means environmentally sound, or in the other context the word is almost self-explanatory, “can be sustained”.

Water is one of our most precious resources, and the supply of it needs to be guaranteed with a power source that is inexhaustible, such as renewable energy.

The same power plants that are powering the water treatment plants that provide us with drinkable and usable water are in most cases the same ones that help to pollute it by releasing smog, which causes acid rain of varying pollution levels.

Powering these facilities with zero-emissions power plants is one way to address this issue.

It is estimated that the worlds oil reserves will last for 30 to 40 years. On the other hand, solar energy is infinite (forever).

This study reveals that model optimization for assessing the best option for potential pollutant treatment in pyrolysis,, solar incineration, gasification, photo catalytic degradation of contaminant has not been achieved. Despite its obvious potential for the detoxification of polluted water, there has been very little commercial or industrial use of photocatalysis as a technology to date.

REFERENCES

[1.] Solar Energy Applicationin wastetreatment- A REVIEW (Nigerian Journal of Technology)HTTPS://WWW.AJOL.INFO/INDEX.PHP/NJT/ARTICLE/VIEWFILE/140625/130365

[2.] 2.Solar Energy (wikipedia)WWW.WIKIPEDIA.ORG/WIKI/SOLAR_ENERGY

[3.] 3.HTTP://WWW.WATERWORLD.COM/ARTICLES/2013/11/SOLAR-UNVEIL-FIELDS-OF-SOLAR-PANELS-TO-POWER-TWO-WA-WASTEWATER-TREATMENT-PLANTS.

[4.] 4.Solar energy for wastewater treatment by Geraldine Hinter

[5.] http://w3.unisa.edu.au/unisanews/2005/August/main3.asp

[6.] 5.GlassPoint Solarhttps://en.wikipedia.org/wiki/GlassPoint_Solar

[7.] *6.*Solar Powered Waste Water Treatment HTTP://WWW.PODTANKS.COM/SOLAR_POWERED_SEWAGE_TREATMENT_PLANT.HTML

[8.] *7.Concentrated solar energy(Wikipedia)*HTTPS://EN.WIKIPEDIA.ORG/WIKI/CONCENTRATED_SOLAR_POWER