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KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Potential Energy Saving in Ligthing Systems		
Jumlah Penulis	:	3 orang (Ratih Wahyu Wijayanti, Eddy Prianto and **Jaka Windarta**)		
Status Pengusul	:	penulis ke-3		
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		b. Nomor ISSN	:	2576-1463
		c. Vol, No., Bln Thn	:	Volume 8, Issue 2, 2019
		d. Penerbit	:	Innovative Energy & Research
		e. DOI artikel (jika ada)	:	-
		f. Alamat web jurnal	:	https://www.omicsonline.org/open-access/potential-energy-saving-in-ligthing-systems-109085.html
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Reviewer 2

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Reviewer 1

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Semarang,
Reviewer 2

Mochammad Facta, S.T., M.T., Ph.D.
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Potential Energy Saving in Ligthing Systems

Ratih Wahyu Wijayanti[1*], Eddy Prianto[2] and Jaka Windarta[1]

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[2]Department of Architecture, Tropical Architecture Technology Laboratory (TBA), Diponegoro University, Central Java, Indonesia

Abstract

Nowadays, Carbon-rich fuels are the principal energy supply utilized for powering human society, and it will be continued for the next some decades. Connecting with this, modern energy technologies are very essential to convert the available limited carbon-rich fuels and other green alternative energies into useful energy efficiently with an insignificant environmental impression. Therefore, the main objective of this study is assessing the potential of municipal biomass solid waste for briquette production in Bahir Dar city, Ethiopia. To conduct this research, various data collection instrument tools were used to achieve the intended objectives for instance questionnaire, direct measurement, field observation and related literature based on necessity. Moreover, to confirm the reliability of the information obtained through a questionnaire, a focus group discussion was conducted with different concerned bodies. The main finding of this study shows that Bahir Dar city has the potential to generate 50.19 tons of municipal biomass solid waste per day. The collected waste was characterized as 82.5% of them is organic waste that may be converted in to clean energy (briquette and biogas) based on their sized whereas the remaining 17.5% of them were inorganic (plastics, glass, and metals) that can be resent for recycling and reuse to their original sources. Biomass-related solid municipal waste is a promising potential to utilize as a feedstock for briquette production. Besides, it has a prodigious role to reduce deforestation, land degradation, save foreign currency and reduce greenhouse gas emissions. This is because the demands of household's energy that was fulfilled with wood charcoals and fossil fuels are substituted with locally available renewable energy sources. The experimental results confirmed that all the physicochemical properties of briquette charcoal that are produced from municipal solid biomass waste were acceptable. Besides, the burning efficiency of the briquette, fanning time and carbon content determination were measured and obtained as adequate results based on the standards. Hence, it will be a possible alternative fuel for household energy using a special design stove that is available in the market. It has also played a great role in waste management and treatment system to achieve sustainable clean city developments.

Keywords: Energy saving; Lighting; SNI 03-6197-2000

Introduction

Energy plays an important role in every sector of life. Every day the needs for energy continue to increase in line with the increase in population. While the national energy reserves are mostly composed of fossil fuels and dwindling, so it is feared scarcity.

In 2000 and 2015, the electricity demand in Indonesia has increased 150% in line with the increase of the Gross Domestic Product. In 2017, Indonesia's Energy Efficiency Report states that Indonesia consumes up to 36% of total energy needs in Southeast Asia [1]. The energy consumption is spread in several sectors, such as households that consume up to 378.05 million BOE, transportation sector consumes energy up to 303.31 million BOE, the industrial sector amounted to 255.81 million BOE, and other sectors up to 112.13 million BOE [2].

The government was aware of this and tried to find a way to prevent such scarcity from happening. One is through energy conservation policy as stipulated in Government Regulation number 70 of 2009. Energy conservation or energy savings is an activity to improve efficiency in energy use. One of the policies is that users of energy sources must use energy economically and efficiently [3].

In Indonesia, the building sector contributes up to 70% of overall electricity consumption [4]. The energy consumption is dominated by the air conditioning system in the first rank and the lighting system in the second rank [5].

College as a place to gain knowledge is expected to have knowledge and awareness about the importance of energy savings and can apply them in daily learning activities. The savings are most easily done on the lighting system. The trick is to maximize daylighting, due to the use of daylighting is expected to reduce the use of artificial lighting [6]. The issue is not just turning off lights when not in use, but also looking at how these savings do not reduce the comfort of the occupants [7].

The background of this research is the results of the audit conducted by Rudiyanto, Adrya W & Ronaldo [8] in Building A of the Postgraduate Program at Diponegoro University. The Energy Use Intensity (EUI) score was 3.41 kWh/m^2/month [9] (Figure 1). Where the EUI value is still very efficient by Ministry of Energy and Mineral Resources Regulation (PERMEN) Number 13 of 2012 [10]. Another finding is that lamps are the second largest major energy user after air conditioning, which around to 6.10% of total electricity consumption, while the air conditioning was 76.86%. According to this background, it is necessary to re-observe the savings opportunities in the lighting system. The lighting system was chosen because savings can be made with minimal costs, but still pay attention to the applicable standards.

Methodology

Postgraduate building A is facing south. Building A consists of

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A Study of the Performance and Carbon Credit Analysis of a 6 KWP Rooftop Solar Photovoltaic Power Plant at Sanjay Group Aurangabad, India

Dhanaji Kale* and Prasad Kokil
Sanjay Techno Products Pvt Ltd, Aurangabad, India

Abstract

The performance analysis of a solar Photo Voltaic power plant is important aspect as far as concern with technology and economic analysis. Due to seasonal variation standalone system cannot provide a continuous power supply. Therefore, in recent years Photo Voltaic energy systems that combine solar energy and other conventional conversion units are becoming more popular and efficient fulfill the consumers load demand. Solar energy is clean, infinite and environment friendly source of energy. The performance of Photo Voltaic technology depends upon the operating conditions like module operating temperature, solar insolation, shading and dusting on the module. This paper presents overall performance and economic analysis of a 6 kW off grid solar Photo Voltaic system over a period of February 2017 to January 2018. By keeping a goal to study the performance and carbon credit analysis of solar roof top Photo Voltaic systems on the yearly basis, the power generation achievement as per target value is close to 83%. Also, on the basis of actual power generation the payback period of this rooftop mounted system is 9 years.

Keywords: Solar energy; Carbon credit; Solar photo voltaic; Power plant

Introduction

Energy consumption of a country is one of the important indicators of its socioeconomic development. With the ever increasing energy demand, load shedding, pollution and global warming we have to switch over to environment friendly options like renewable energy resources. Our country has shown rapid deployment of renewable energy technologies such as solar, wind and bioenergy. Solar energy is clean, inexhaustible, environment friendly, abundant and freely available resource among the various renewable energy options [1].

Photovoltaic (PV) means the direct conversion of sunlight in to electricity. It is an attractive alternative to conventional sources of electricity for various reasons: it is silent, non-polluting, and renewable; it is reasonably reliable; requires simple maintenance; also, can be installed anywhere as per requirement.

In addition this technology has additional benefits as: day by day the system costs largely reduced; power is produced at the point of end use; so that transmission and distribution costs are significantly reduced and deduce theft of electricity. India has an average 250-300 clear sunny days out of 365 days and average incident solar radiation is an around 4-7 kWh/m^2 per day [2]. Today different companies are developing PV panels with several manufacturing technologies. These PV panels can have the almost same maximum power at standard test condition, but the technical information provided from standard test conditions may never occur in practice [3], not only due to spectral reactions, temperature coefficients, voltage and current values which are different, but also to their reactions to environmental factors like radiation, temperature and wind speed.

However, grid-connected PV systems will not be attractive unless power production is large scale and the cost of electrical energy produced by it is comparable to other conventional energy sources [4,5]. Several types of research work, in different places in the world, about the performance and characteristics of grid connected systems have been found in the literature [6,7]. Recently Indian government launched net metering system for domestic and commercial application, in which any one can install solar PV set up as load per sanctioned by energy Distribution Company. Energy generated from solar PV system can be used for regular use; if they don't need of electricity then they can sell to government.

We have injection moulding machine plant, which requires too much electricity for moulding. For sustainable development to use of natural resources we have installed 6 kWp solar plant on terrace roof. This paper presents overall performance, payback period and carbon credit analysis of 6 kWp roof top PV plant on the basis of experimental data collected over a specific period.

Methodology and Plant Details

The 6 kWp rooftop solar PV plant is installed in Feb 2017 at company premises of Sanjay Techno Product Pvt Ltd. It consists of 19 modules, each module rated at 315 Wp. All modules were divided into two strings and connected them in series for each string. Two strings have been wired to an inverter rated 6.9 kWp. The PV plant is located in Aurangabad district of Maharashtra state with latitude 19.87°N, and longitude 75.34°E. All modules were inclined and tilted equal to their site's optimum inclination angle (30°) toward the equator to get better output, as shown in Figure 1. The installed PV systems have been fully monitored and supervised to study its performance. More detailed specifications of the PV module and the inverter are described Table 1.

The performance results of installed PV systems had been monitored from February 2017 to January 2018 to investigate operational characteristics of setup. The daily output power generation of PV array

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The Tertiary Blessing and the Recent Neglects: A Case Study of the Anambra Lignite Energy Resource of Southeastern Nigeria

Chidera Ikechukwu V[1]*, Okpoko Ephraim I[2], Nfor Bruno N[2], Egbunike Michael E[2], Mgbenu Chukwuma N[3] and Blessing Chizoba O[2]

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Abstract

Lignite is the lowest rank of coal; its deposits found within the Paleogene Anambra Basin are Tertiary in age. They occur within the uppermost stratum of the Eocene Ameki Group, the Oligocene Ogwashi-Asaba Formation and the basal part of the Miocene Benin Formation. Energy is considered as one of the fundamental resources for industrialization. The current situation in Anambra State is that energy demand is greater than energy supply; this forms the basis of this research. Lignite can play an important role for power generation in Anambra State as a domestic resource that will be proximally available. Anambra State is enriched with substantial lignite deposits, but these deposits are currently under fire attack, which if not tackled will result in total loss of the deposits and unimaginable geologic hazards. The lignite seam fires were examined; the causes and possible solutions were documented. Strategies for sustainable exploitation and harnessment of this resource were also enumerated, which when properly implemented will solve the energy problem facing the State, thereby enhancing its socioeconomic status and also create opportunities for investments, employment and national development.

Keywords: Lignite seam fire; Paleogene Anambra Basin Ogwashi-Asaba Formation; Anambra State; Power generation; National development; Spontaneous combustion; Sustainable exploitation

Introduction

Anambra is one of the 36 states of the Federal Republic of Nigeria and is located in the southeast geo-political zone of the country (Figure 1) [1]. The industrial sector of the state is a fast growing one with major industrial hub and activities at and going on around Onitsha, Nnewi, Ekwulobia, Awka, Nkpor, Ogbaru and the proposed Orient Petroleum Refinery at Aguleri. Energy is considered as one of the fundamental resources for industrialization [2]. With a recent population of about 200 million people [3] and a current electric power generation of 30000 megawatts [4], the energy supply is yet to meet the energy demand of most Nigerian states. Lignite as a rank of coal can play an important part in electric power generation [5,6]. Anambra State is blessed with substantial amount of lignite and ligniferous deposits [7,8]. The lignite occur within the uppermost stratum of Eocene Ameki Group (Nanka Formation), Oligocene Ogwashi-Asaba Formation and the basal part of Miocene Benin Formation [9] all of which are in Paleogene section of Anambra sedimentary Basin and are outcropping within the state. The lignite blessing which was deposited in the Tertiary and ever since been neglected is recently under fire attack at the Oduga stream in Nnewi southeast of Nigeria. The paper has evaluated the recent lignite seam fires; the causes, solution and has provided strategies for sustainable exploitation of this resource which when properly implemented will inhibit further future environmental and geologic hazards and in turn solve the energy problem facing the state thereby fostering industrialization hence enhancing the socio-economic status of the people and resulting to national development.

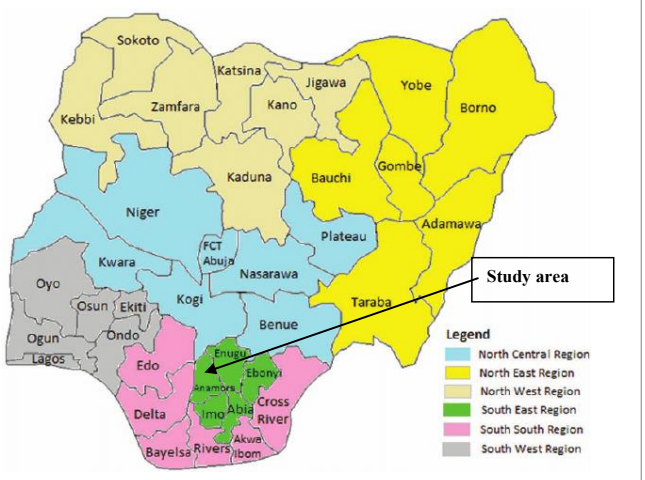

Figure 1: Map of Nigeria showing the 36 states, the Federal Capital Territory (FCT-Abuja) and the six geopolitical zones, arrow indicating study area.

Geographic and geologic setting

Study area (location and accessibility): The study area lies within the area bounded by latitudes 06° 00[1] N and 06° 05[1] N of the equator and Longitudes 006° 50[1] E and 006° 58[1] E of the Greenwich meridian with an area extent of about 123.3 km^2 (Figure 2a). Major settlements include Oraifite, Nnewi, Oba, Ojoto, Okija and Ozubulu. The area is accessible through Nkpor-Nnobi road, Onitsha-Owerri expressway, Awka-Etiti – Ekwulobia road and Abatete-Alor road. The area under study is located in Anambra State of the Federal Republic of Nigeria.

Physiography and drainage: The prominent topographic feature in the area is Ukpo-Abagana-Oraukwu-Ichida-Orlu cuesta (Figure 2b) [10]. The cuesta in this area is characterized by undulating topography

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