IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 7, July 2021

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 7, July 2021 ||

| DOI:10.15662/IJAREEIE.2021.1007066 |

# IOT Based Controlling of Hybrid Energy System Using ESP8266

**Mrs. R .Krishnaveni M.E , R. Nirmal Raj , S. Dhivagar , S. Lokeshvaran**

Assistant Professor, Dept. of ECE, Panimalar of institute of Technology, Chennai, India

UG Student, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

UG Student, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

UG Student, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

**ABSTRACT**:In this paper, authors have centered on controlling of hybrid energy system the usage of IOT. There is various mixture of strength and all of them are alternative to each different like sun energy, wind strength, bio gasoline, gas cell, and so forth. But the need of controlling of hybrid energy device arises while it is established for domestic or industrial motive. At this factor IOT plays an critical role in controlling device. The facts are transmitted wirelessly through website to ESP8266 module which controls the resources of electricity. This allows person to have bendy control mechanism remotely through a secured internet net connection. This device enables the consumer to control the assets of power, manually and remotely using clever telephone or non-public laptop. This device could be very efficient, less expensive and bendy in operation.

**KEYWORDS:** IOT, Controlling of Hybrid System, Home Automation, ESP8266, Router, Arduino IDE.

## I. INTRODUCTION

Energy is the basic need for development and the requirement of energy is more due to the rapid increase in world population, technology and other political and economic condition. Now a day's electrical energy is generated by the conventional energy resources like coal, diesel, and nuclear etc. and these are depleting day by day. So, there is an urgent need to switch on to non-conventional energy resources. Solar and wind are easily available in all condition can be good alternative source. With the rise in the demand of renewable energy resources the need of better utilization of these systems has aroused [1]. This in turn has given rise to the hybrid energy system. Hybrid Energy System is the combination of the two or more energy systems. Here, two sources are used solar and wind energy [2]. In order to control the hybrid system IOT can be used. IOT (Internet of Things) is the inter-networking of physical devices embedded with electronics, software, sensors and network connectivity that enable objects to collect and exchange data [3]. IOT is used to switch the power supply i.e., wind energy and solar energy of a house through secure website when the grid supply is off. A prototype is designed to control the switching between these two sources of energy.

## II. SYSTEM MODEL AND ASSUMPTIONS

Energy resources are classified into two ways:

• Non-renewable Energy: Resources which are limited in quantity and can be depleted after few years. Example: Petroleum, Natural gas, Coal etc.

• Renewable Energy: Resources which are abundantly available in nature. Example: Solar energy, Wind energy, Tidal energy etc. [4].

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 7, July 2021 ||

| DOI:10.15662/IJAREEIE.2021.1007066 |

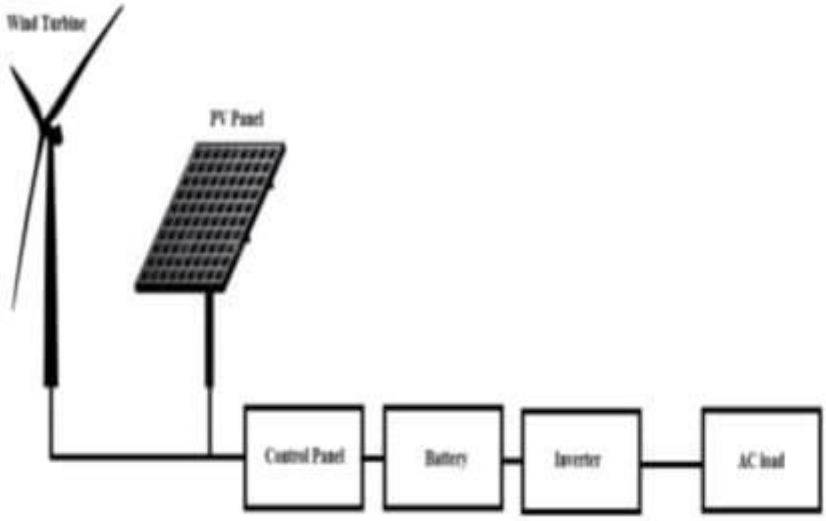



Fig.1. Hybrid electricity generating system

[1] Solar PV cell Photovoltaic cell absorbs light energy (photons) from the Sun and converts it into electricity by the photovoltaic effect. Lots of modules are used to make wafer-based crystalline silicon cells or thin-film cells. The load contained number of modules that can either be the upper layer or the lower layer. It must be shielded from mechanical harm and humidity. Nearly modules are rigorous, but on the basis of thin-film cells, semi- malleable ones are feasible. All cells are connected in series electrically to each other. Apparently, MC4 connector types are used in nearly all photovoltaic modules to expedite simple weatherproof connections to other system. Individual solar module can generate less power; almost all connection consists of multiple modules. A photovoltaic cell usually associated of bundle of photovoltaic modules, an inverter and a storage battery, connection of wiring and alternatively a solar tracking mechanism [5].

B. Wind Mill A windmill is a machine that converts the wind energy into rotational energy with support of vanes called blades. Wind turbines are the evolutions of the typical windmills that can be observe in more rural areas of the world. Their purpose is to lessen reliance on fossil fuels to create energy and also to create energy in a less wasteful manner. They function by using the kinetic energy of the wind, which pushes the blades of the turbine and spins a motor that transform the kinetic energy into electrical energy for consumer use. They supply clean and renewable energy for both home and office. Wind Turbines are a way to save money and make the environment clean and green. Essentially, there are two types of wind generators; those are vertical axis and horizontal axis. They can be used to generate electricity both onshore and offshore. We are using vertical axis wind generator to control [6]

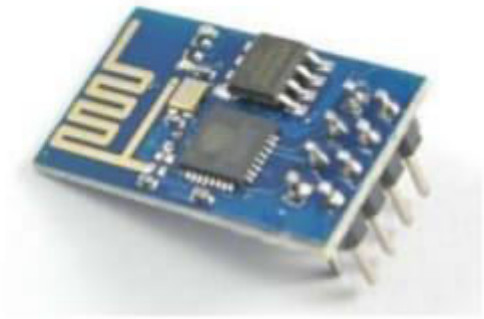


Fig.3. Esp8266

ESP8266 is a system on chip (SOC) and Wi-Fi network that can carry software applications. It also has TCP/IP protocol that permits to access Wi-Fi network. The ESP8266 is efficient to host an application or remove all Wi-Fi networking functions from another application processor. The flash memory can be started straightly from an

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 7, July 2021 ||

| DOI:10.15662/IJAREEIE.2021.1007066 |

external move. In-built cache memory will help upgrade system performance and curtail memory requirements. Another condition is when wireless Internet access considers the task of Wi-Fi adapter, just by SPI / SDIO interface. The module has very good processing and storage capability. The system of ESP8266 supports the following features: energy saving VoIP applications and Bluetooth interference. It has self generated RF allow it to work on the operating condition with no external RF parts. The input voltage of the module is 3.3 V, with 8 pins, which have two pins of 1 TXD and 1 RXD, 2 GPIO pins i.e. GPIO 0 and GPIO 2, RST is Reset, VCC and GND is Ground. The module is very cheap and transforming it into an IOT solution is a unique thing.

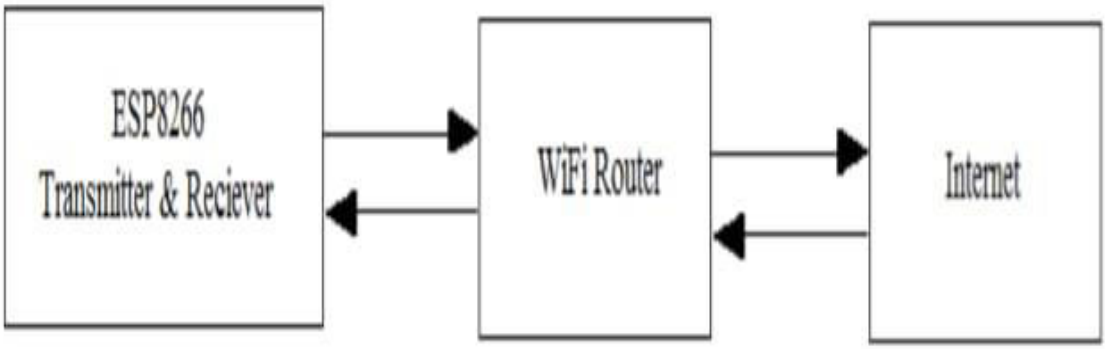



Fig.2. Receiver Section of smart controlling system

C. ROUTER A router is networking gadget designed to receive, analyze and transfer incoming packets to another network. It is a networking device which forwards the data packets and performs the "traffic directing" functions on the Internet. A data packet is usually forwarded from one router to another over the networks that establish the inter-networking until it enters its destination node [8].

There are three pins,
• Ground
• Output (3.3 V)
• Input (5 V)

E. OP-AMP [AP 358] It consists of two independent, high gains; internally frequency compensated operational amplifiers that are designed specifically to work from a single power supply over a wide range of voltages. The rating is ±15V power supply with 1 A current. The output voltage is +5V.
F. Sofware [Arduino IDE] The program code written in Arduino IDE is known as a sketch. The Arduino IDE software used for developing sketches for ESP8266. This IDE contains the following parts in it [9]:

• Text editor: This is where the interpreted code can be written using a simplified version of C++ programming language.
• Message section: It shows error and also gives a feedback on saving and exporting the code.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 7, July 2021 ||

| DOI:10.15662/IJAREEIE.2021.1007066 |

## III. METHODOLOGY

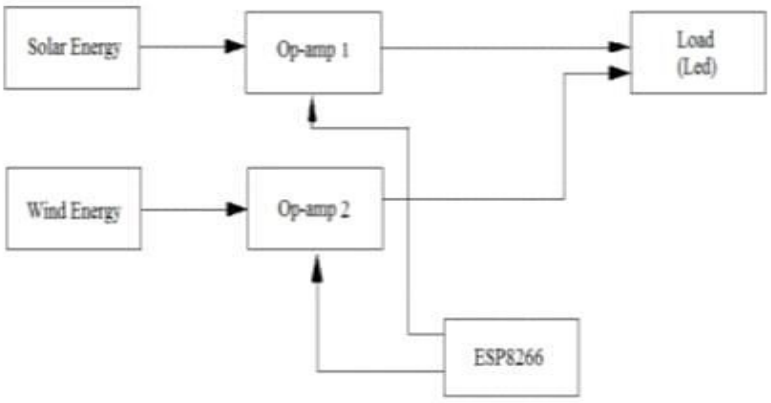



Fig.5. Block diagram of the control system

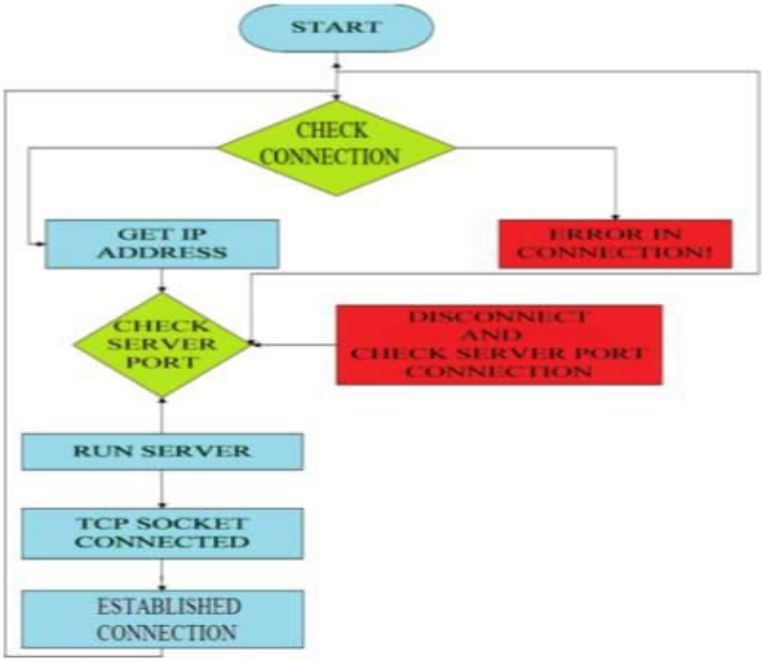



Fig. 6. Flow chart [10]

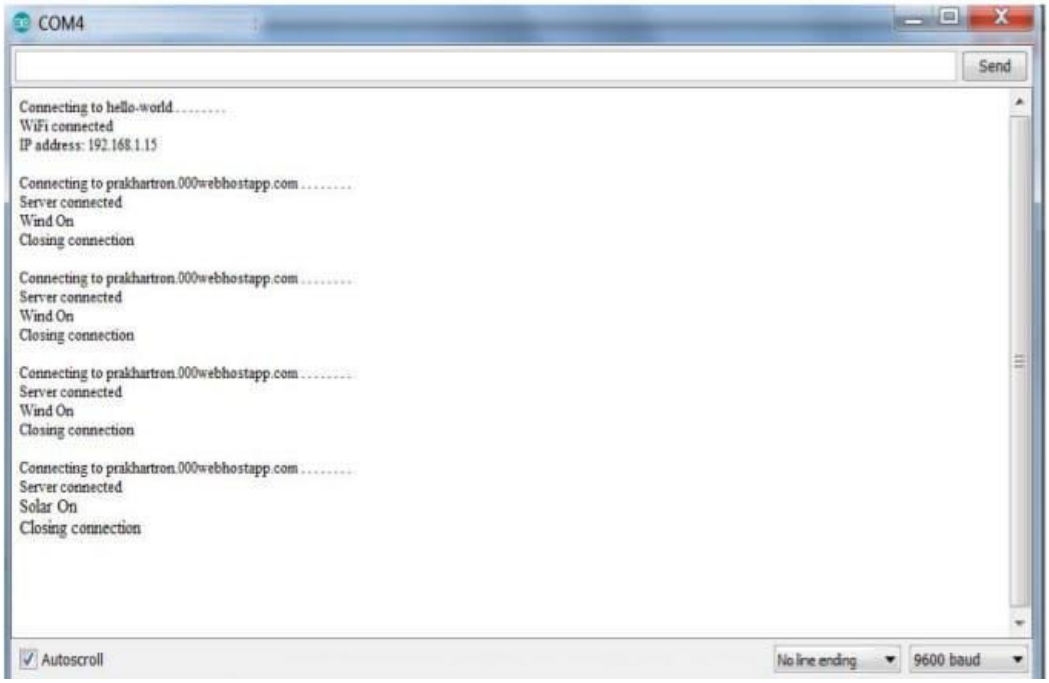
The main power supply is 220V AC and an adapter is used to convert 220V AC into 9V dc to charge a battery. The battery is connected to the system and it is of 9V. This 9V is supplied to AMS1117. AMS1117 is a voltage regulator, it is used to convert 9V into 3.3V for ESP8266 WiFi module. Since ESP8266 Wi-Fi module will only work on 3.3V supply above this voltage, it will burst out or not work properly. There are two capacitors used with the AMS1117 voltage regulator, one is of 0.1µF and other is of 100µF. The application of these capacitors is to filter the current because all components work on DC current.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 7, July 2021 ||

| DOI:10.15662/IJAREEIE.2021.1007066 |

## IV. OUTPUT




.

## V. CONCLUSION

This combination of solar-wind energy source will be highly effective in commercial areas. It is eco-friendly at the same time prevents accidents due to lightening. It is used to cut short power charge. By this system electricity charge could be saved as very less maintenance charge is required for equipment. Moreover there is no power cut or load shedding at any times. In addition to this, the system is controlled by INTERNET OF THINGS as site manager is able to receive detailed information of facility at site, efficient maintenance for regular checkup and failure could be performed conveniently. It is the most reliable and cost efficient. This research is at an underdeveloped stage and may take years to bring it into market. We encourage the scientific community to consider this technology along with others when contemplating efforts and resources for renewable energy.

## REFERENCES

[1] Kalaiarasi.D, A.Anusha,D.BerslinJeni and M.Monisha, "ENHANCEMENT OF HYBRID POWER SYSTEMS USING IOT",International Journal of Advanced Research Trends in Engineering and Technology (IJARTET),Vol. 3, Special Issue 19, April 2016.

[2] Ali Dehgani, Mojtaba Hakimzadeh, Amir Habibi, Navid Mehdizadeh Afroozi, "Small Signal Stability Enhancement for Hybrid Power Systems By SVC" World Academy of Science, Engineering and Technology International Journal of Electrical, Computer, Energetic, Electronic and Communication Engineering Vol:8, No:10, 2014.

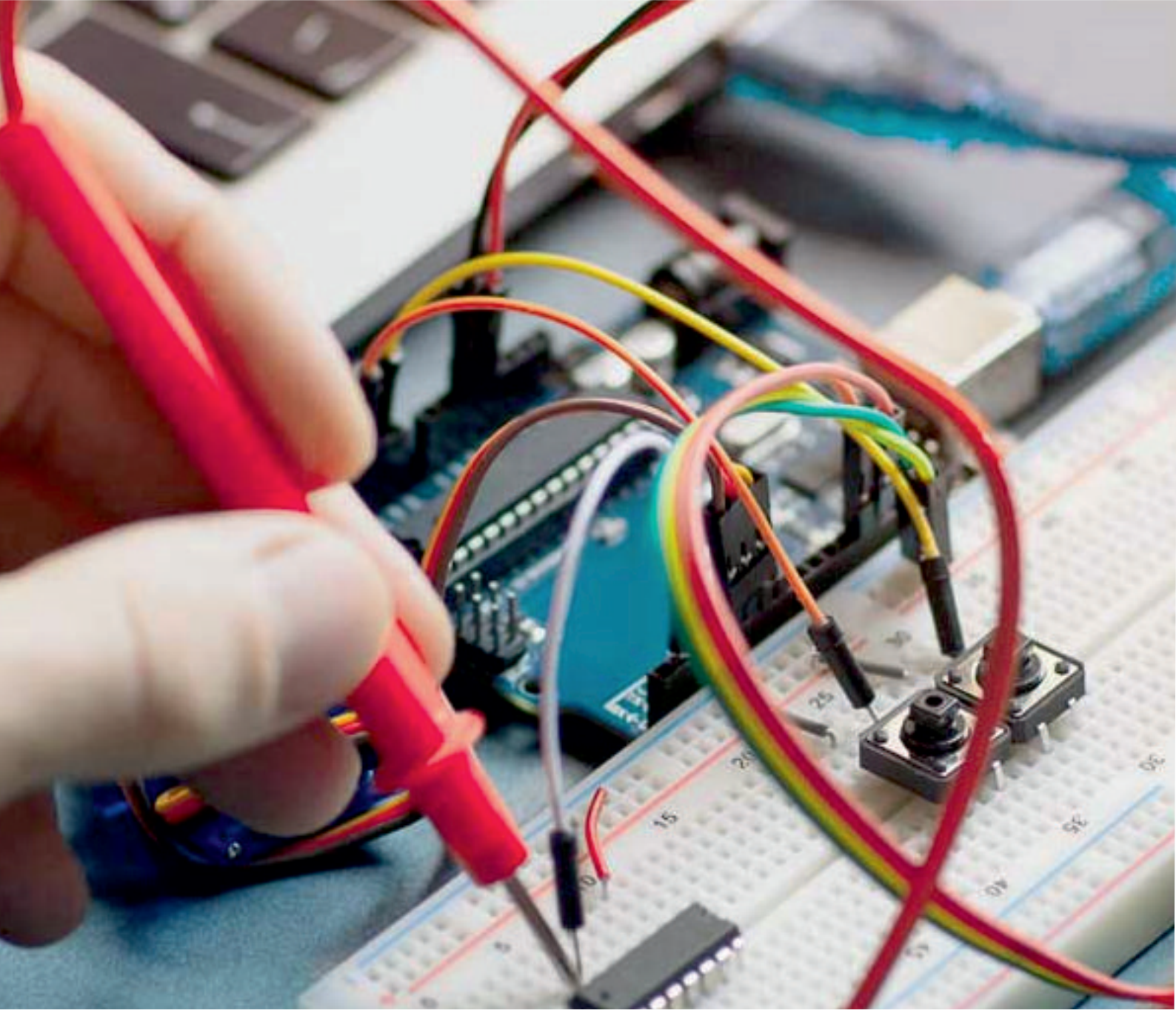
[3] Jaehak Byun, Sooyeop Kim, Jaehun Sa, Sangphil Kim, Yong-Tae Shin and Jong-Bae Kim, "Smart City Implementation Models Based on IoT Technology", Advanced Science and Technology Letters Vol.129 (Mechanical Engineering 2016), pp.209-212.

[4] Sambeet Mishra, Hardi Koduvere, Dr. Ivo Palu, Dr. Reeli Kuhi-Thalfeldt, "Modelling of solar-wind hybrid renewable energy system architectures", Energy Conference (ENERGYCON), April 2016 IEEE International, pp.1-6.

[5] R. Caso, R. Garroppo, S. Giordano, G. Manara, A. Michel, P. Nepa, L. Tavanti, M. Magnarosa, G. Nenna, "Antennas and Photovoltaic Panels: Toward a GreenInternet of Things", Internet of Things (WF-IoT), IEEE 2nd World Forum on dec 2015, pp.128-131.

[6] Pranit Nagare, Rammohan Shettigar, Arnav Nair, and Pratibha Kale, "Vertical axis wind turbine", International Conference on Technologies for Sustainable Development (ICTSD-2015), Feb. 04 – 06, 2015 IEEE.

[7] Saraswati Saha; Anupam Majumdar. "Data centre temperature monitoring with ESP8266 based Wireless Sensor Network and cloud based dashboard with real time alert system" , 2017 Devices for Integrated Circuit (DevIC), 23-24 March, 2017, pp.307-310.



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

# International Journal of Advanced Research

## in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details