International Advance Journal of Engineering, Science and Management (IAJESM)
ISSN -2393-8048, January-June 2020, Submitted in April 2020, iajesm2014@gmail.com

The Transition to Renewable Energy Right Now: States and Structural View

Jyoti Mishra, Dept, of Computer Science, Manipal University, Jaipur (Raj.), jyoti.slc15@gmail.com
Dr. Shailendra Shukla, Professor, Dept. of Mathematics, Arya PG College, Jaipur (Raj.), shailjpr41184@gmail.com

Abstract

Indicators of climate change such as greenhouse gas concentrations, sea level rise, ocean heat, and ocean acidification each have new benchmarks set for the year 2011. These new benchmarks were created in the year 2011. This is yet another strong indicator that human activities are causing changes on a global scale on land, in the oceans, and in the atmosphere. These changes will have large and long-lasting effects, and this is yet another strong signal that these changes are being generated. If we want to have any hope of addressing this calamity, it is imperative that we wean ourselves off of energy that is sourced from fossil fuels. This is the biggest cause to climate change, thus we must wean ourselves off of this energy source.

Introduction

According to António Guterres, the Secretary-General of the United Nations, there are existing technologies for renewable energy such as wind and solar that are available now, and in most cases, they are less expensive than coal and other fossil fuels. "The good news is that the lifeline is right in front of us," adds Guterres. "The lifeline." "The good news is that the way out, the lifeline, is right in front of us." It is imperative that we put them to work as soon as possible, on as large a scale as feasible, and as swiftly as possible.

The Secretary-General identifies five important initiatives that the international community must prioritize immediately in order to update our energy infrastructure and expedite the transition to renewable energy - "because without renewables, there can be no future."

Literature Review

Garima Sinha (2010) In recent years, there has been a rise in interest in smart cities, which has brought to the forefront the significance of having a power supply that is both efficient and dependable. This relevance has been brought to the forefront due to the fact that it has become more of a priority. This is due to the fact that smart cities are gaining more and more popularity. The efficiency with which intelligent devices carry out the responsibilities for which they were intended has a direct correlation with the dependability of the power supply. The Internet of Things (IoT) and the many different types of renewable energy generation can make it feasible for smart cities to more efficiently supply the demand for them. This is a goal that may be achieved by capitalizing on the potential contributions that may be offered by renewable energy sources. This is a target that can be attained. In order for the internet of things to be beneficial in the creation of renewable energy, it is important to deploy intelligent sensors for the purpose of energy transmission and distribution.

Veerakumar Chinnasamy (2013) In the past few years, there has been a major growth in the number of renewable energy systems that have been put into operation all over the world in order to tackle a broad variety of environmental challenges. This is being done in an effort to reduce the amount of pollution that is being produced. This pattern is seen in virtually all parts of the earth at the moment. There has been an increase in the capacity of renewable power source installations over the course of the previous few years, and it is expected that this trend will continue for a substantial time into the considerable time into the foreseeable future. In light of this, it is very necessary to increase the production of renewable energy as well as the adaptability of the system in order to guarantee that renewable energy sources may be used in a secure manner. When renewable sources of energy are used in an efficient manner, not only will there be a reduction in the bad impacts that are created on the environment, but also as a consequence of this, there will be a rise in the dependability of the grid. This is one of the many benefits that will emerge from this. The Internet of Things (IoT) makes it much simpler to combine a diverse range of alternative sources of energy. This makes it simpler to distribute the available energy in a more equal manner to those who stand to profit the most from it at times when it is required the most. This makes it easier to meet the needs of those who stand to benefit the most from it. This is made feasible by the efficient management of the energy

generation, transmission, supply, and demand that takes place inside the renewable energy system itself. This makes it possible for the system to meet its own needs. The total energy efficiency of the system will experience a major improvement as a result of this update, which will bring it in line with modern standards. We will examine the significance of the internet of things (IoT) in the field of renewable energy in the next chapter, and we will place an emphasis on the relevance of this idea.

Molderink et al. (2010). This method was developed with the purpose of regulating loads on the demand side. The methods that they employed demonstrated how demand side management may have an influence not only on the consumption of energy but also on its production. This was demonstrated by the fact that there was a connection between the two. In each and every one of their projects, they made the incorporation of renewable energy sources into the infrastructure of electricity distribution a top priority. In addition to this, they demonstrated that their technique was effective in reducing peak shaving times without negatively affecting the level of comfort in the home. This was a significant achievement on their part. This was a really significant discovery. Their method was appropriate for use with microgrid systems, but not with bigger infrastructures that were dispersed over a number of locations.

Why Use in Renewable Energy to Kick-Start

Make the use of renewable energy a worldwide public good.

It will be essential to abolish obstacles to the sharing of information and the transfer of technological know-how, such as limits on intellectual property rights, in order for renewable energy technology to become a worldwide public benefit. This indicates that it will be available to all people, not just those who have a lot of money. This indicates that individuals who currently have a great deal of wealth will not be the only ones to gain from this technology. Essential technologies such as battery storage systems make it possible to store energy created by renewable sources such as the sun and the wind and then release it when individuals, communities, and businesses want power. This makes it feasible to generate electricity from sources that do not deplete the earth's natural resources, such as the sun and the wind. According to the International Renewable Energy Agency (IRENA), its one-of-a-kind ability to rapidly absorb, store, and re-inject electricity contributes to an increase in the flexibility of the energy system. This ability allows them to contribute to an improvement in the flexibility of the energy system. In addition, battery storage technologies, when combined with renewable energy sources, have the potential to offer reliable and cost-effective electricity to off-grid communities as well as isolated networks in remote places. This is made possible by the combination of the two technologies.

Increasing access to parts and raw materials globally

In order to successfully produce renewable energy, it is essential to maintain a steady supply of the necessary components and raw materials. It will be vital to have access, on a wider scale, to all of the key components and resources, such as the minerals needed for the construction of wind turbines and energy networks, as well as electric automobiles. The growth and diversity of global industrial capacity will necessitate a significant degree of collaboration on a global scale. In addition, more costs will need to be incurred in order to successfully complete the transformation. These investments must to be undertaken in domains such as the education and training of persons, research and innovation, and incentives to create supply chains via ecologically responsible methods that conserve ecosystems and cultural traditions.

Level the playing ground for innovations utilizing renewable energy

Even while international cooperation and coordination are of the highest significance, domestic policy frameworks need to be adjusted as soon as possible in order to simplify and expedite the licensing process for renewable energy projects and to encourage investments from the private sector. However, there is a dearth of regulations and procedures in place to limit market risk, facilitate, and incentivize investments, despite the fact that the requisite technology, capability, and finance are now available to make the shift to renewable energy. This may be achieved, for instance, by simplifying the planning, permitting, and regulatory procedures, as well as minimizing bottlenecks and needless red tape. Another option is to reduce the amount of red tape that is required.

One of these choices is the availability of land in particular places so that large-scale renewable energy plants may be built there. Nationally Determined Contributions, which are the individual climate action plans that nations have developed to reduce emissions and adapt to the effects of climate change, are required to set objectives for renewable energy that are linked with 1.5 degrees Celsius, and the percentage of renewables in global power generation is required to increase from its current level of 29 percent to 60 percent by the year 2030. It is vital to have policies that are clearly defined and adequately implemented in order to speed the adoption of wind and solar energy technologies. In addition to this, it is essential to have processes that are open and transparent, public support, and the availability of modern energy transmission infrastructure.

Subsidize renewable energy instead of fossil fuels for energy purposes.

The subsidization of fossil fuels is one of the most major monetary impediments that is holding down the transition to renewable energy all over the world. This is due to the fact that there is a greater demand for fossil fuels. The International Monetary Fund (IMF) estimates that the amount of money spent on providing subsidies to the fossil fuel industry in the year 2010 alone was around $5.9 trillion. This number takes into account not just overt financial handouts in the form of subsidies and tax breaks, but also expenditures related to health and the environment that were not taken into account when calculating the price of fossil fuels. This equates to around $11 billion being spent every single day. Not only are subsidies for fossil fuels a waste of money, but they are also unjust to those people who don't consume such fuels. According to the International Monetary Fund (IMF), over half of the public resources that are spent to stimulate the usage of fossil fuels in emerging nations benefit the wealthiest 20 percent of the population. This is the conclusion that can be drawn from the data shown in the preceding sentence. Moving subsidies away from fossil fuels and toward renewable energy sources not only helps to reduce emissions, but it also contributes to long-term economic growth, the creation of jobs, improved public health, and increased equality, particularly for the most underprivileged and at-risk populations all over the world.

Invest three times as much on renewable energy.

If we want to achieve our objective of having zero emissions by the year 2050, we will need to invest at least $4 trillion every year until 2030 in renewable energy. This will bring the total amount invested in renewable energy to $8 trillion. This number takes into consideration expenditures made on both technological advancements and physical infrastructure.Despite the fact that it is not quite as significant as yearly subsidies for fossil fuels, this expenditure will nonetheless result in a positive return on investment. It is anticipated that by the year 2030, the world would save $4.2 trillion annually if pollution and other climate-related problems could be minimized.The funding is available; what is required is a commitment and accountability, particularly on the part of the global financial systems, including multilateral development banks and other public and private financial institutions, which must align their lending portfolios toward accelerating the transition to renewable energy sources in order to achieve their goals. The funding is available. What is required is a commitment and accountability. The Secretary-General has been quoted as saying that "renewables are the only path to real energy security, stable power prices, and sustainable employment opportunities."

RENEWABLE ENERGY USE OF IOT

The greatest amount of energy that may be harvested from photovoltaic cells is essentially determined by two categories of factors: those that are fixed and those that are malleable. The aspects of the environment that cannot be altered in any manner include the sun's insolation, the movement of the wind, the rainfall, the characteristics of the dust, the ambient temperature, and the humidity. It is required in order for it to be accepted without any intervention. Because of the moveable factors, the design may be flexible, and the reaction might be different depending on how the design values are altered. The characteristics that may be altered to produce the maximum potential production include sun tracking devices, solar reflectors, the tilt angle of the panel, and the orientation of the panel itself. Physical monitoring of farms that use several forms of renewable energy sources, such as solar, wind, or hydropower, amongst others, presents a number of challenges and need the participation of humans.

The Internet of Things makes it feasible to control and monitor the generation, transmission, and distribution of power across remote sites without the need for human intervention thanks to sensors that are connected to the IoT. A controller and a converter are required in order to transform solar energy into power that can be sent into the grid. The converter may or may not contain MPPT tracking. A freestanding photovoltaic system consists of a converter, which may or may not contain a peak power tracker, a controller, battery storage, and an inverter. All of these components are required for the system to function. The businesses that have been suggested for the role of monitoring the parameters of PV may be found in the following list. Figure 1 depicts the general architecture of renewable energy systems that make use of the internet of things. In recent years, there has been a commensurate growth in the installation of solar photovoltaic systems as a direct result of both technological developments and price reductions connected with PV panels. This may be directly attributed to the fact that PV panels have become more affordable. It is vital to undertake continual performance evaluations of photovoltaic (PV) systems. This is due to the fact that PV systems are frequently deployed in regions that are inaccessible. Monitoring solar photovoltaic panels is made possible through the Internet of Things thanks to GPRS modules and inexpensive microcontrollers. Through the usage of these components that are fitted with PV, the user is provided with the opportunity to obtain data on the productivity of PV from any location they want. It assesses whether or not the yield of the PV system is sufficient to fulfill the demand, diagnoses the problem based on the data that was collected, and provides information on the maintenance requirements. A monitoring system that can be constructed at a cost that is only slightly more than using.

The Raspberry Pi is a sort of microcontroller that can offer data from a real-time system in the form of graphical output rather than numerical output. Temperature, voltage, and current in the surrounding environment are all monitored as part of the process of analyzing key factors. The statistics that are being tracked can be applied to a decision on whether or not the PV system can be expanded if they provide sufficient evidence. Monitoring a photovoltaic (PV) solar plant with internet of things (IoT) technology offers a more precise assessment of the production of a PV farm located in a remote place. In the method that has been presented, a voltage divider circuit is used to determine the battery voltage and the PV voltage, while a differential amplifier is used to determine the PV current and the battery current.

Both of these values may be found out using the method. The grid current was estimated by utilizing a current transformer, and the grid voltage was computed using the potential transformer. The PIC18F46K22 microcontroller, which acts as the heart of the data logging unit, and the SIM900, which acts as the communication module, are connected to one another by means of the single core processor AMR926EJ-S. This processor also serves as the link between these two components. It makes a diagnosis of the issue and gives a refresher on the maintenance schedule. Because the facility generates data in real time, the appropriate authorities will be able to significantly increase their ability to make decisions owing to this factor. Users get access to data that is constantly being updated thanks to the web server. It is becoming increasingly necessary in today's environment to have remote monitoring capabilities as a growing number of solar farms are connecting to the utility grid. The energy efficiency of a photovoltaic (PV) farm may be improved by the use of internet-of-things-based remote monitoring.

Things with Sustainability Energy

The Internet of Things (IoT) brings a large amount of value to the value chain of efficient energy through its application to the field of renewable energy. However, the majority of the value that the Internet of Things can bring to the table in terms of environmentally friendly energy comes from the advent of smart grids, which are a key accomplishment of the 21st century. The sustainable IOT paradigm, which includes IoT-autonomous and efficient grid management, has a considerable potential to offer benefits to both consumption and generation. This is because of the paradigm's ability to control the grid more effectively.

This opportunity has a tremendous impact. By carrying out real-time monitoring of the resources that are utilized to create renewable energy, the Internet of Things (IoT) has the potential to increase the efficiency of power generation from renewable sources like solar and

wind power. It is also possible to combine this monitoring with monitoring of the environment immediately surrounding the facility. Because of this, it is possible that they will be integrated into the grid so that we can get the most out of the supply. By adopting distributed and low-loss smart microgrids, this will help limit reliance and pressure on energy sources that are based on fossil fuels, which are sources of energy that are less efficient, have high demand, and generate pollution. This will help minimize the negative effects of both of these factors. The following is a list of the aspects that contribute to sustainability in outline form:

- Generation, including wind, solar, natural gas, and water, as well as renewable sources of energy
- Transmission, phasor measuring unit, and transmission Billing, SAP, CRM, and work order management Customers, markets, retail energy providers, and wholesale service providers SCADA Distribution, smart and microgrid control, and voltage control
- Administration of loads, bulk, and blackouts
- Management of plants and electric vehicles
- Intelligence gathered from throughout the system

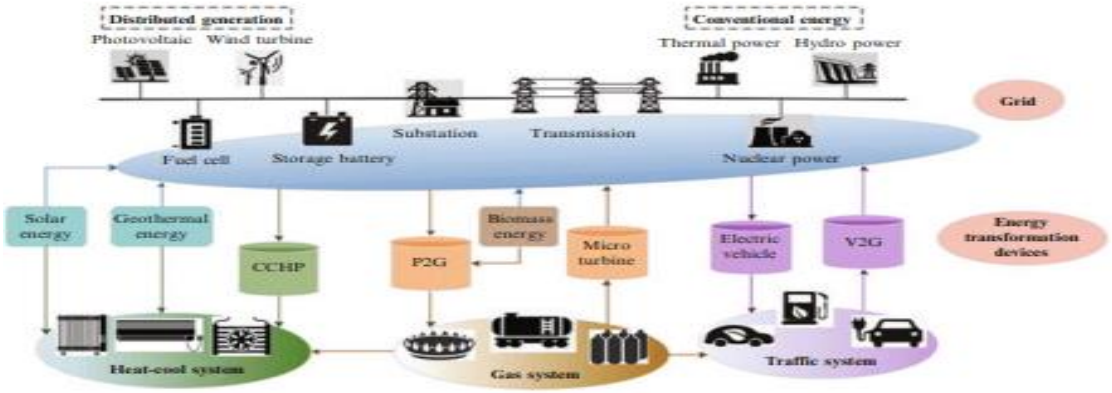

Fig.: An overview of the Internet of Things in the field of renewable energy

Conclusion of IoT

The ability to connect devices in the Internet of Things to provide renewable energy sources is significantly reliant on developments in communication technology. These are considered as the cornerstones of sensing and monitoring in energy systems due to the fact that they are an integral part of the control systems for energy and represent a necessary component of that which makes up such systems. The first chapter of this book provides an in-depth analysis of a variety of contemporary communication practices, the vast majority of which can be found in operation today in the energy sector. On the other hand, the focus of this chapter is on the advanced communication technologies that are connected to the Internet of Things and how they may be applied to the field of sustainable energy. This article will offer a general overview of the numerous types of technology. These technological advancements are the driving force behind most of the innovation that has occurred in the field of energy. They also add to the overall efficiency of the energy system in all of its aspects, which helps make the system more beneficial.

Fig. Communications through the smart grid

REFERENCES

1. E. Spano, S. D. Pascoli and G. Iannaccone, "Low-power wearable ECG monitoring system for multiple- patient remote monitoring," IEEE Sensors Journal, vol. 16, no. 13, pp. 5452–5462, Jul. 2016, 10.1109/JSEN.2016.2564995
2. F. Stradolini, A. Tuoheti, T. Kilic, S. L. Ntella, N. Tamburrano, Z. Huang, G. D. Micheli, D. Demarchi and
3. S. Carrara, "An IoT solution for online monitoring of anesthetics in human serum based on an integrated fluidic bioelectronic system," IEEE Trans. Biomedical Circuits and System, vol. 12, no. 5, pp. 1056–1064, Oct. 2018, 10.1109/TBCAS.2018.2855048
4. S. Yang, B. Gao, L. Jiang, J. Jin, Z. Gao, X. Ma and W. L. Woo, "IoT structured Long-Term wearable social sensing for mental wellbeing" IEEE Internet of Things Journal, vol. 6, no. 2, pp. 3652-3662, Apr. 2019, 10.1109/JIOT.2018.2889966
5. N. Ahmed, D. De and M. I. Hussain, "Internet of things (IoT) for smart precision agriculture and farming in rural areas," IEEE Internet of Things Journal, vol. 5, no. 6, pp. 4890-4899, Dec. 2018, 10.1109/JIOT.2018.2879579
6. P. Hambarde, R. Varma, and S. Jha, "The survey of real time operating system: RTOS," in Proc. ICESC, Nagpur, India, 2014, pp. 34-39.
7. S. Du, B. Liu, H. Ma, G. Wu, and P. Wu, "IoT-Based intelligent control and management system for motorcycle endurance test," IEEE Access, vol. 6, issue. 2, pp. 30567–30576, Dec. 2016, 10.1109/ACCESS.2018.2841185.
8. M. T. Lazarescu, "Design of a WSN platform for long-term environmental monitoring for IoT applications," IEEE Journal on Emerging and Selected Topics in Circuits and Systems, vol. 3, no. 1, pp. 45-54, Mar. 2013, 10.1109/JETCAS.2013.2243032
9. G. Wang, M. Nixon and M. Boudreaux, "Toward cloud-assisted industrial IoT platform for large-scale continuous condition monitoring," Proceedings of IEEE, vol. 107, issue 6, pp. 1193-1205, Jun. 2019, 10.1109/JPROC.2019.2914021
10. F. Zhang, M. Liu. Z. Zhou and W. Shen, "An IoT-based online monitoring system for continuous steel casting" IEEE Internet of Things Journal, vol. 3, no. 6, pp. 1355-1363, Dec. 2016, 10.1109/JIOT.2016.2600630
11. S. E. Collier, "The emerging enernet: convergence of the smart grid with the internet of things," IEEE Mag. Industry Application, vol. 23, issue. 2, pp. 12–16, Dec. 2016, 10.1109/MIAS.2016.2600737.
12. G. Bedi, G. K. Venayagamoorthy, R. Sigh, R. R. Brooks, and K. C. Wang, "Review of internet of things (IoT) in electric power and energy systems," IEEE IoT J, vol. 5, issue. 2, pp. 847–870, Feb. 2018,