

Elements & Applications of Smart Grid Technologies

Mr. Ashank Kushwaha¹, Dr. Pratibha M. Deshmukh²

¹Student, ²Assistant Professor,

^{1,2}Bharati Vidyapeeth's Institute of Management and Information Technology, Navi Mumbai, Maharashtra, India

ABSTRACT

Nowadays, the smart powered strength device is going through a revolutionary change in global with the decarbonize electrical energy furnish to change growing older property and manage the herbal assets about modern information and interaction ways. Smart Grid Technologies is important to provide simple combination and reliable suppliers to the customers. This device is an important electric energy public gadgets mostly located on digitally automated knowledge for check, control, and review interior allow series.

This device can identify the respond to the difficulties very soon in an exist device that have reduce the team of staff and it will interests supportable, dependable, secure and huge electric energy to all customers.

KEYWORDS: Revolutionary, Technologies, Transformation, Electric Energy, Supportable, Reliable

How to cite this paper: Mr. Ashank Kushwaha | Dr. Pratibha M. Deshmukh "Elements & Applications of Smart Grid Technologies" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-5, August 2020, pp.1564-1568, URL: www.ijtsrd.com/papers/ijtsrd33190.pdf

Copyright © 2020 by author(s) and International Journal of Trend in Scientific Research and Development Journal. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (<http://creativecommons.org/licenses/by/4.0>)

INTRODUCTION

Smart Grid is a electric network which makes benefit of details and interact technologies to obtain and operate with details that these details with the behaviours of suppliers and consumers in an computer style to increase the loyalty, effective, supportable and economy of sharing and producing of energy supply.

Smart grid have been using in energy supply systems from power plants to consumer of energy supply in qualities and companies. This "grid" amounts to network which take electric energy from the plant life then locate its created to consumers. This grid contains of substations, cables, switches, converters etc. The main benefits is huge improving in energy effectivity on the electric grid for proper use in the energy users houses and offices.

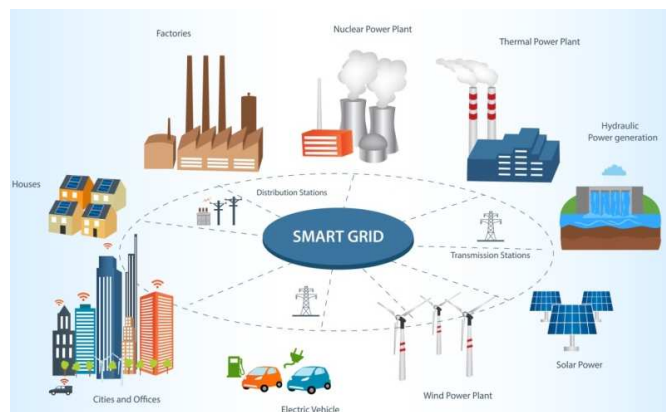


Figure 1: Smart Grid Technologies

What is Smart Grid??

In a standard smart grid, main aim is to controls every gadgets related to make sure to operate them on better

capable. The core control help in higher energy control inner the ability but in addition it helps in reducing the power usage at several issue at peak times. This reduce is been reflected as great energy savings.

This also helps shift from standard energy to recoverable energy. In a way of having a supplying of recoverable electricity that ability the grid accepts an suitable approach to merge into grid. Smart grid lets in major perception of particular varying sustainable sources of energy, such as wind energy and solar energy.

I. LITERATURE REVIEW

Mesawriter, "Smart Grid data Transmission Methods", March 29, 2013 [1].

R. Bayindir, I. Colak, G. Fulli, K. Demirtas, "Renewable and Sustainable Energy", December 2016, Volume 66, Pages 499-516 [2].

Dalia Yacout, "Advantages of Organic and Eco-Friendly Matters", August 13, 2019 [3].

Yang Zhang, Tao Huang, Ettore Francesco Bampard. "Big Data Analysis in Smart Grids", August 13 2018 [4].

Thales DIS, "Future Scope of Smart Grid Technology", June 17, 2016 [5].

II. OBJECTIVES

- To study the elements of smart grid technologies.
- To identify the scope for new applications of smart grid technologies.
- To specify the benefits of smart grid technologies.

III. DATA TRANSMISSION METHODS

The Communication Infrastructure of Smart Grid have been Network is classify into 3 categories they are as follows-

- A. **WAN (Wide Area Network):** A network that can enable units inside a massive geographic vicinity to speak with every other. For instance countless meter facts collectors, cellular meter readers, and substation automation units would possibly ship data to the utility places of work over a WAN.
- B. **HAN (Home Area Network):** This kind of Network can be communicate within a home with each other. In this smart grid environment, these gadgets may want to encompass clever meters, smart appliances, and home power management devices.
- C. **NAN (Neighbourhood Area Network):** The network that permits gadgets in a small area, such as a neighbourhood, to speak with every other. For Example: All the Smart Meter in a regional can also speak with every different and with a router to structure an interconnected mesh of smart devices.

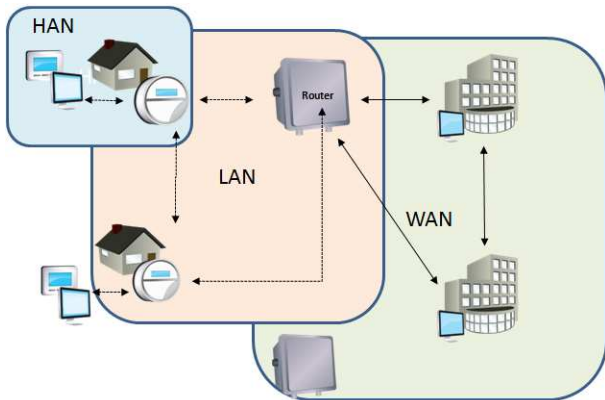


Figure 2: Data Transmission Methods

IV. SMART GRID COMPONENTS

To purchase smart grid, high types of these are developed & been used by them. The technology are normally grouped into one important technology. These are same mentioned as follows:-

- A. **Intelligent Appliances:** This Intelligent Appliance have Successfully have knowledge of primary based consumer pre defined set. It helps us lead to going away alongside towards decreasing top masses which have an have an effect on on electrical energy technology costs.
- B. **Smart Power Meters:** This Smart Meters have provided with propably with 2 ways verbal exchange energy i.e Power Suppliers and to reduce users purchasing to automate generate bill records collection, and also see to system failures and sending recover to actual area a lot faster.

HOW YOUR SMART METER HELPS YOU TAKE CHARGE OF YOUR POWER BILL



Figure 3: Smart Grid Components

- C. **Smart Substations:** These Substations are huge centers which consists of control, important & main functioning that are status power, particular element performed, switches, protection, converter status, etc. This are also radically change voltage at a number of instances in many locations, that supplying secure and dependable transport of energy.
- D. **Super Conducting Cables:** These Conducting cables are helping us to provide far away to the power broadcasting, control automate and device review success of error identified by them broadcast records.
- E. **Integrated communications:** The main objective of a these facilities has every knowledge of interacting. They have to be as very quick to deal with system actual needs. Some such Techniques are PLC (Programmable Logic Controller).

V. SMART GRID APPLICATIONS

The Smart grid have added to these techniques into the system of grid they some kind of changes made in real way. It has made itself not only converting from energy to other but also it has added provide more benefits to the trade with customer as capable, secure and avaiability related electric supply.

Some of its purposes are as follows:

- A. Proper Functioning on Broadcasting Cables Performance can be Improved.
- B. Break and failure or any type of mistake in the system can be repaired Quickly.
- C. It also helps in Lower our Electricity Power Supply.
- D. We can also buy Cheaper Products rather then High Price Products.

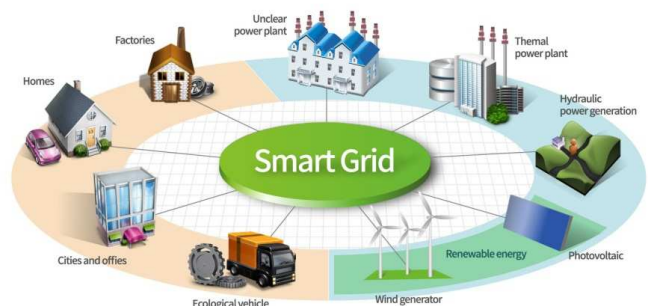


Figure 4: Applications related to Smart Grid

Smart Meters:

These are some actual days of Smart Meters which are capable of performing some responsibilities communication between the customers and the suppliers. This secure Communication is been installed which have only Customer and Company Supplier which is only once if Supplier fail to operate, looking to the Meters or any type of risk can take place in communication.

Smart Meters Features:

- A. Remotely assessing meters readings.
- B. Best Knowledge of how various applications contribute to energy generation.
- C. Faster alerts and provide a notified instantly to service provider.
- D. Power Grid is been used for interacting with Radio Frequency.

VI. BENEFITS OF SMART GRID

- A. Techniques like Complete Devices and Introducing of Interconnection between User & Providers are able to provide by Smart Grid at huge speed and can control such Technologies.
- B. In case of any Disappointment or tragedy situation it provides an extra secure controls to system
- C. Smart Grid has been Provides more & Order in System administration.
- D. Better Quality of Electric to Customers who have been using Smart Grid which also have extended battery period.
- E. In Newer Grids They doesn't more Carbon dioxide and give more valuable information about Electricity & much more better then Older Version
- F. Smart Grid has property of reading Meters have in build features located in it. These Readers doesn't show its property but readers can read them carefully. It will all be completed via IT resources.

VII. FUTURE OF SMART GRID

Advantages of Smart Grid are various but it demand to fights against vital resources to be remain in current days. Raise the growth in Products by some Retailers as a great deal as 400% in western nations that fail to set up smart grids. With so a whole lot at stake it need to arrive our smart grid

facilities are been growing up among the 13.2 thousand measure predict need to be send and \$2.6 million spend a particular area of smart grid in U.S.A in 2016 itself. Not Only Smart Grid gives lots of profit but also provides various kinds of problems, This Problems have totally changed our Environment Resources. Such high benefits given by them secure our services from danger.

VIII. CONCLUSION

Smart have changed lots about electricity energy among these years. The Electricity generated by them is not only increased but also made them realize how to secure & managed to resources. People not only realize to consumption of these resources but also use advantages of using these smart grid in order of facing any electricity consumption problem. These Smart grid have been increased Core Components & Functionality of using these resources when have benefits to all people in many such like stable, reliable & Use less electricity resources. Smart Grid have generated so many electricity power so that the industries using such resources is very much supportive, effective, and reliable can considerably make a contribution towards economic prosperity, address many environmental issues and minimize normal consumption. Finally, the overarching purpose of Smart Grid stays the enablement of increased customer participated, & this issue alone can be accomplish many of the best goals and ideals of smart grid system.

IX. REFERENCES

- [1] Mesawriter, "Smart Grid data Transmission Methods", March 29, 2013.
- [2] R. Bayindir, I. Colak, G. Fulli, K. Demirtas, "Renewable and Sustainable Energy", December 2016, Volume 66, Pages 499-516.
- [3] Dalia Yacout, "Advantages of Organic and Eco-Friendly Matters", August 13, 2019.
- [4] Yang Zhang, Tao Huang, Ettore Francesco Bampard. "Big Data Analysis in Smart Grids", August 13 2018.
- [5] Thales DIS, "Future Scope of Smart Grid Technology", June 17, 2016.