

A Research on Microgrid Technology by Non Conventional and Renewable Sources

M. Anjalakshi, S. Pavithra, M. Moovendan, P. Srinivasan

Abstract--- Microgrid are little gathering of interconnected power age in charge innovations that can work inside or free of a focal matrix, genuine aggravations and expanding system unwavering quality. Distributed resources can give capacity to local loads in the electric distribution system just as advantages, for example improve unwavering quality. Microgrid are capable of operating in grid tied mode and islanded mode. An ideal power system is utilized to decide the ideal allotment of assets utilizing a transformative programming strategy, accomplishing the most the minimal expense of providing the interest while representing physical activity.

Index terms--- Microgrid, Renewable Resources.

I. INTRODUCTION

The need to assorted variety vitality sources, vitality self rule and vitality efficiency the infiltration of distributed generation from renewable sources like solar and wind is quickly expnding as the patern moves from sustained unified power stations towards progressively fit power transmission on the electricity grid .

At the point when low voltage distributed power capacity acomplishes a high extend to a specific to be specific high permiability, the acknowledgment of parity of circulation arrange control and the unwavering quality of high power supply will be very difficult . The improvement of microgrid to certain extend determines the application size of renewable energy . In this paper the development of microgrid is briefly studied .

II. BASIC CONCEPTS

Microgrid (MG) is a solitary controlled unit in a power system that can be worked as a solitary aggregated load. The unit is comprised of generators energy storage load controller and power electrnic interfaces like inverters. The MG has to basic segment a static switch and a smaller scale source which comprises of generator storage and an inverter. IEEE 1547 standard sets down program tripping of the interconnected generators of a power system.

The CERTS specificly consortium for electric reliability, technology solution first put forward the idea of microgrid in 2001. Our country advances the idea of "microgrid in a micro network technology system search" work concerns held by the state grid electric power research institute in

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2009, microgrid is a little secluded, decentralized energy supply network based on distributed power generation with the subject of decentralized resources joined with poer quality management an energy utilization technology.

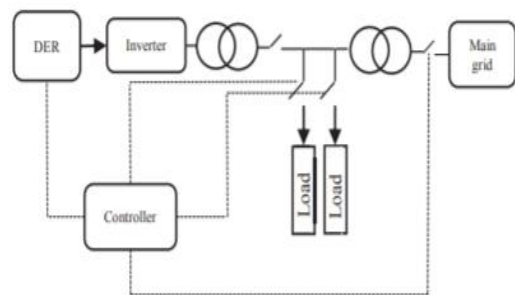


Fig. 1: Basic Micro Grid Circuit

III. TYPES OF MODE

Grid connected mode

It is a ordinary working method of a MG with no power quality disturbance on the main grid to which it is associated. In this mode the MG may take into account its whole local loads or may either import or export poer to the main grid depending on the total ower generation to the nearby DG.

Islanded Mode

It is a condition in which a distributed generate(DG) continous to power a location even though electric grid power is no longer present.

IV. CHARACTERISTICS OF MICROGRID

Flexibility: As defined in the paper the microgrid can run in both isolated network and grid connected network. The grid connected mode acts as a normal operation in which display the system can either obserbe power from the grid network or supply power to the main network. At the point when something happens to the network the microgrid disconnect the connection with thw main network turning of the boundary switch and transform into detached system rate.

Comptability: Microgrid is the best method to accomplish the association of distributed energy. It coordinates the unique distributed energy and balances out the power supply further most, balance among free market activity through distributed energy and control assurance which successfully survive the hazards of distributed energy and take care of the issue when microgrid connects to the bulk grid.



Economy: Microgrid access to huge measure of renewable energy which implies we can distribute the output of different microsource ideally. Further more consolidating the microgrid with medium size heat supply can reduce the change of various energy and improve energy efficiency, advance the energy structure so as to accomplish.

V. TECHNOLOGY OF MICROGRID

Activity microgrid framework cannot be discrete from innovation that help from each part that make up the microwave matrix system, as the wellspring of vitality, interconnected switches and microgrid control freamwork. Technologies in energy sources distributed generation includes the utilization of renewable energy sources such as photovoltaic , wind turbines and fuel cells . Technology in energy storage microgrid system which include battery, supercapacitor and flywheels.

VI. IMPORTANCE OF MICROGRID

- a. Normal power supply to the MG area is maintained during natural disasters, blackouts , etc...
- b. Cost for per unit of energy is greatly reduced by setting up a MG with locally available renewable energy source in the remote locations
- c. MG utilise mostly renewable ecofriendly technologies for power generation.
- d. The power generations will have zero emission.
- e. Reliability and quality of power received by a customer is greatly enchanced by setting up a MG

VII. CLASSIFICATION OF MICROGRID RESULTS

Based on the nature of output voltage, MG classified into (1) AC MG (2) DC MG

A .AC Microgrid

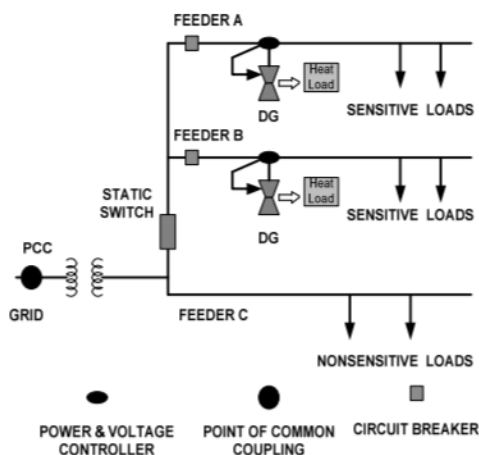


Fig. 2: AC Micro Grid

A MG consists of cluster of loads, distributed generators, some energy storage system and is also connected with the utility grid. some of the energy sources, which qualify for DER like fuel cells, PV units Microcontroller etc... produce DC output or produce electric output at frequencies not compatible with the grid frequency. The MS such as photovoltaic or fuel cell generate output often at variable frequencies.

Microturbines create voltage at higher than matrix frequencies. As prescribes for CERTS in icroGrid.

At the point when a few DRs are accessible on a MS the yield of every convertor is associated in parallel and controlled to create a similar dimension of the voltage, generating transport.

The circulation framework is comprised of radical feeders A,B where the senaitive burdens are associated on feeder . The feeder C has non touchy burdens and which are not influenced by power quality occasions on the network.

The MG can operate in two modes gridconnected mode and islanded mode. In the grid connected mode the MG supports the utility grid while exchanging power with it. In this mode the frequency of MG is maintained by the utility grid. The utility grid and its required to control the amount of harmonics and dc injected into the grid at the PCC.

In the island of activity,the interconnections with primary matrix is associated mode, the MG either attracts or supplies capacity to the fundamental grid, depending on the age and burden blend and market approaches..

B. DC Microgrid

With the coming of semiconductors gadget, there has been an unrest in the realm of hardware gades over the most recent couple of decades. A large portion of the home use apparatuses telephones,laptops,ipods and so on .. Use dc control either from a battery or after correction of the air conditioner source. Each of them has a connector or charge the battery. Thus DC microgrid turned into a plausibility of a low voltage bipolar DC microgrid.

VIII. CONTROL AND MANAGEMENT OF MICROGRID

1. Relentless state and dinamic attributes of microgrid unique in relation to regular plants..
2. Microgrid has innate uneven burden because of one stage load.
3. The supply of intensity from microgrid can emerge out of un controlled source, for example, wind .
4. The job vitality stockpiling is extremely.
5. Microgrid accomodate dis substantial in the control instrument utilized.
6. Microgrid requires initially requirement of intensity quality or administration inclinations for specific sorts of burdens.

IX. MICROGRID ASSOCIATED TECHNOLOGY

Microgrid can be considered as a little age usage system, which has control assets and loada inside the framework. Inany case it isnot as basic as a of the key specialized necessities on different parts of its arranging and configuration, request and supply balancing, protection confounded and setting, and so forth. They include:

- a. Utilization of appropriated age sources,including sustainable and CHP generatorsuse of multiple invertres.



- b. ability to island the system
- c. multiple operation modes, such as integrated operation is islanded operation, integration transition

X. MICROGRID AND SMALLGRID

- a. There are regularly perplexity on the definition and extents of microgrid and brilliant grid, which is not right. In spite of the fact that microgrid may join many keen lattice features, the key refinements of a microgrid, be close to customers
- b. heavily use of power electronics, such as inverter.
- c. be able to fully separate from the main grid and operate independently.

XI. TECHNICAL CHALLENGES ON MICROGRID

As a new paradigm of power system, implementation of microgrid still face many obstacles. Less understanding about microgrid and unfavorable government policies become an obstacles in applying microgrid technology. In general, in addition can be applied as a solution to electricity in remote areas, microgrid technology can also be used as electrical solutions such as urban residential complexes, offices, schools and others. In which implementation of microgrid technology will provide advantages compared if have to build a new transmission and distribution network.

XII. ADVANTAGES OF MICROGRID

- a. Microgrid, have ability, during a utility grid disturbance, to separate and isolate itself from the utility seamlessly with little or no disruption to the loads within the Microgrid.
- b. In peak load periods microgrid can prevent utility grid failure by reducing the load on the grid
- c. Microgrid have environmental benefits made possible by use low or zero emission generators.
- d. In microgrid to increasing energy efficiency, the use of both electricity and heat is permitted to get closer the generator to user
- e. microgrid can act to mitigate the electricity costs to its users by generating some or all of its electricity needs.

XIII. DISADVANTAGES OF MICROGRID

- a. In microgrid, that must be considered and controlled voltage, frequency and power quality parameters to acceptable standards whilst the power and energy balance is maintained.
- b. Electrical energy needs to be stored in battery banks thus requiring more space and maintenance.
- c. The difficulty of resynchronization with the utility grid.
- d. Microgrid protection is one of the most important challenges facing the implementation of microgrids.
- e. Issues such as standby charges and net metering may pose obstacles for Microgrid.

XIV. CONCLUSION

With regards to the energy lag globally, microgrid excited around the world as the compelling structures to utilise

distributed energy. Microgrid complies with the necessities to advance recharging renewable energy power generation and social manageable improvement and will involve an imperative position in the advancement of development of network.

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