A IMPACT OF DISTRIBUTION NETWORK FOR MICROGRID PROTECTION AND PROTECTION STRATEGY OF THE DISTRIBUTED NETWORK SYSTEM

[1]Mangesh R Pande, [2]Prof. Harshal V. Takpire
PG Student M. Tech 4th Semester, Department of Electrical Engineering, G. H. Raisoni University Amravati, Maharashtra, INDIA[1], Assistant Professor, Department of Electrical Engineering, G. H. Raisoni University Amravati, Maharashtra, INDIA[2]
mangeshpande.mp@gmail.com[1], harshal.takpire@raisoni.net[2]

ABSTRACT

Distributed generation (DG) is a playing a important role in microgrid power system. Make a efficient distribution of a power supply, by a distributed generations. (DG's).Microgrid has provide a connection by the distribution network in a forward path of the conductor. If it is fundamentally connected with the 3 phase bare conductor . if the fault is occurred in microgrid then its impacts could be on a microgrid protection and auto-reclosing is a such term important after the fault maintenance , before the fault maintenance , auto-reclosing did analysing the fault and given a protection to microgrid system. And fault majorly impacts on efficiency of the microgrid protection. In this review paper explained a Adaptive protection in microgrid and what was the impact of that on protection of distribution network. As well as structure of microgrid and D.G. Line protection by the relay , relay sensed the fault current and tripped the circuit breaker.

Keyword: protection , distributed generation,(D.G.) Microgrid, relay protection.

INTRODUCTION

In this globalization world, electricity is very need for the world. So much demand of electricity and that's why largest number of power grid are increasing. Now-days controllability of the power grid is difficult. Because of the different types of the many loads connected to power grid.so there will be a some fault confusion in distribution network checking to the fault region.

Distributed generation also help to improving a reliability of power grid. Which is a best and strong complement to large power grid system. Now-days main power supply line connection are so developed because of the various types of consumer. Distributed generation cam save the operating costs as well as maintenance cost of the resources of distribution and transmission line. Distributed generated is also helpful to balanced power system. Microgrid power system is most important solution for the besides of transmission and distribution power system because of microgrid doesen't require a extra transmission or extra distribution line from the distributed generation and that with there is no need long distance power line, high voltage power line. So, microgrid and its protection is also help option against with a transmission /distribution line. And adaptive protection of microgrid was introduced in this paper.so there is some parts of good impacts of microgrid on protection of distribution network. Protection strategy will be decide to reliable in microgrid power system.

THE TYPICALLY STRUCTURE OF THE MICROGRID POWER SYSTEM

The microgrid power system is composing of of the incoming and outgoing load.it has mainly power supply from the distribution line. It will be be easy to distribution, controlling and providing power supply to number of consumer , but it will be rarely difficult to sometimes in seviar fault region. Microgrid has made for the some function work, it means that the microgrid has doing a main work for the conversion and controlling. Microgrid is a such a system to provide a micro -power to different load. While for consumer of different load. Microgrid could complete the requirement of exact power quality of local load. Or output connected loads. Microgrid doing a control unity of the power system. By the power electronics technology system. The power conversions means a changes in voltage and current level in a balance power system condition. Power factor

cos phi =1, can be balanced by the power can be balanced by the power. The power electronics technology . it is also a power controllability and to keep the sustainability on the power system.

Figure 1 is shows the basic structure of the microgrid which is the commission / consortium for electric reliability technology solutions. [certs] proposed. The CERTS proposed to microgrid power system in the purpose of reliability, controllability as well as conversion of power to providing to another connected load . and power quality, power factor cos phi , also defined by this commission / consortium. CERTS HAS main purposed defining a stable power system in conversion and controlling power process. Microgrid power system commonly connected to the public distribution network system by the point of common couple (p c c) and static switch / static relay are connected with the bus- bar section. Because first fault current attack on the bus-bar, and relay / static switches are sensed the fault current and given a instruction. through relay electronic device to the circuit breaker and disconnect a incoming connection from the microgrid and it is again same for the outer connected fault region. Pcc will be goes off mode.

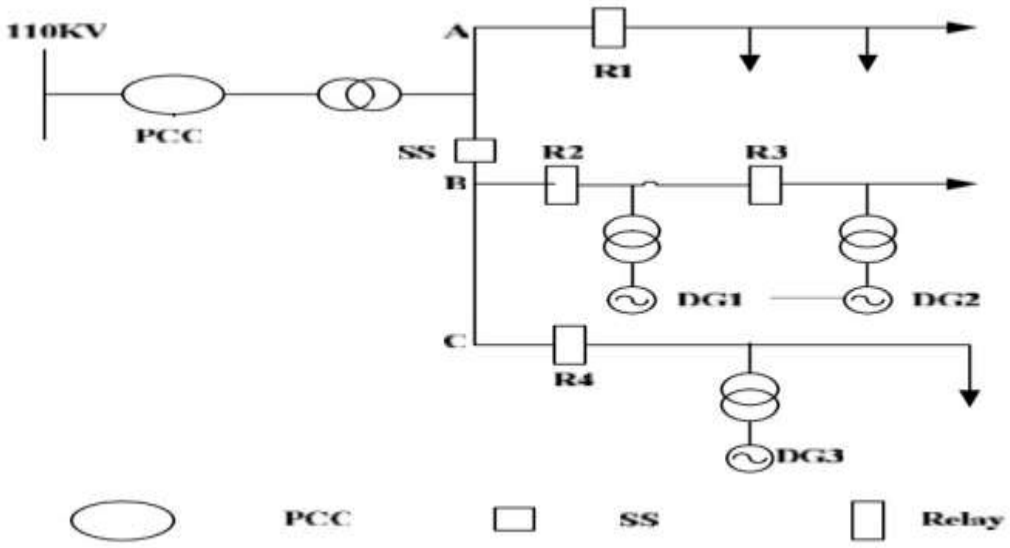

Figure 1 the basic structure of microgrid

In above figure 1 shows the 110 k line p.c.c (point of common couple) and relays are connected that are R2, R1, R3, R4, DG1, connected with relay R2 DG2 connected with Relay R3, R4, Relay across the DG3.

Microgrid are operating in the grid connected mode. If the fault occurred in power grid then relay will take the rapidly action on circuit breaker and power system of microgrid in off mode. Power devices not disturb / losses not affected.

IMPACTS OF MICROGRID ON PROTECTION OF DISTRIBUTION NETWORK :

so there is a fundamental impact on the protection of distribution network in figure 2 shows, the grid connected power system. R1 is the relay which is connected with the distribution line for the protection proposed. Security of the grid and distributed generation is very important in microgrid connected power station but there is a one thing again the distributed generation (DG) is not connected to distribution network after connection of distribution network, distribution generation of the microgrid decreases the sensitivity of distribution line protection.

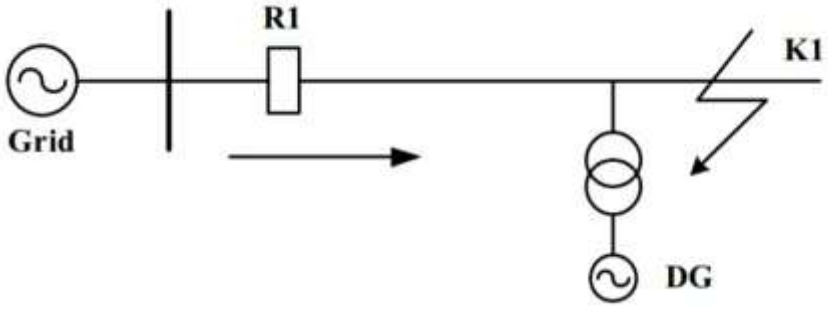

Figure 2 Impact of DG downstream fault on the protection.

in figure 2 shows the k1, k1 is indicating a fault current occurred in line. There is same capacity of DG, for the current are flowing through the R1, only the because of residual voltage of access point in the case of DG points. Access point of line will be reduced the faulty current values. It will be beneficial for the line protection detects figure 2 shows the single / unidirectional flow current of the old/traditional distribution network.

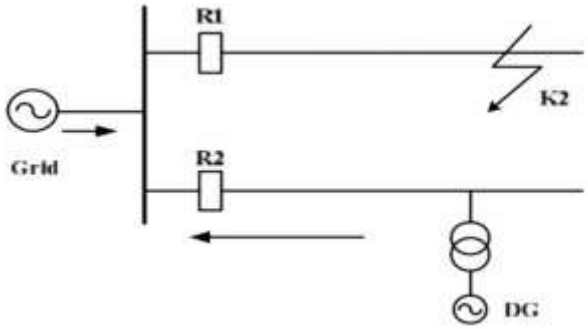

Figure 3. line protection where is connected malfunction.

DG in the microgrid impact on the auto-reclosure. When DG is connected with the line , if the fault is occurred then it tripped from the distribution network.

THE STRATEGY OF MICROGRID PROTECTION

[A]A RESEARCH ON MICROGRID PROTECTION

It is very important initiating part research can gives a some important result.so, its guessing usually working time microgrid protection is difficult in case of island operation. Number of issues are coming in microgrid power system. It can not have large magnitudes to trip the circuit breakers with the traditional based. That's why the distribution network protection is no long time. The island modes of microgrid protection not the controlled for the all types of faults. fault currents of inverter based microgrid is island mode may not have adequate magnitudes to trip traditional overcurrent protection.

Current protection is dividable in two parts . the first case is regarding to a improve the traditional distribution network protection and second case is for the protection of transmission lines.it is used in power distribution system such a distance protection pilot protection.

As in [1] actually, microgrid protection system put as a unit level protection that is in forward path only. Power system protection is already installed in a p.c.c. and unit level protection is installed with small fault current small ground technology,but microgrid protections electrical devices / circuit current / voltage power can be sensed by the electronics system. And gives a direction to proper protection.

As in [6] , in order to protection the possibility of number of faults difficult in island operation, Relays protection is must inbuild in islanded area . it will become a very reliable to microgrid power system. And reliably detect the islanding and surely disconnect the DG which is islanded. As fault current limiter (F.C.L.) is again important in impacts of microgrid power system. It is applicable to set the proper and exactness value of running current and fault current. It is one type of limits ratio of current which is flowing through the microgrid power system. Set the reasonable limit of the impedance converter by the proper and specific model and parameter of the system. It is so impact on the fault current and it reduce by this parameters.

[B] ADAPTIVE PROTECTION OF MICROGRID POWER SYSTEM

The basically adaptive protection is important to protect the power system to adapt as a much as it can be changes. Further improvement in performance of the micro-grid protection. Figure 4 is showing the adaptive protection in the microgrid applications. this is a basic diagram of microgrid protection in-build with relay R1, R2, R3.

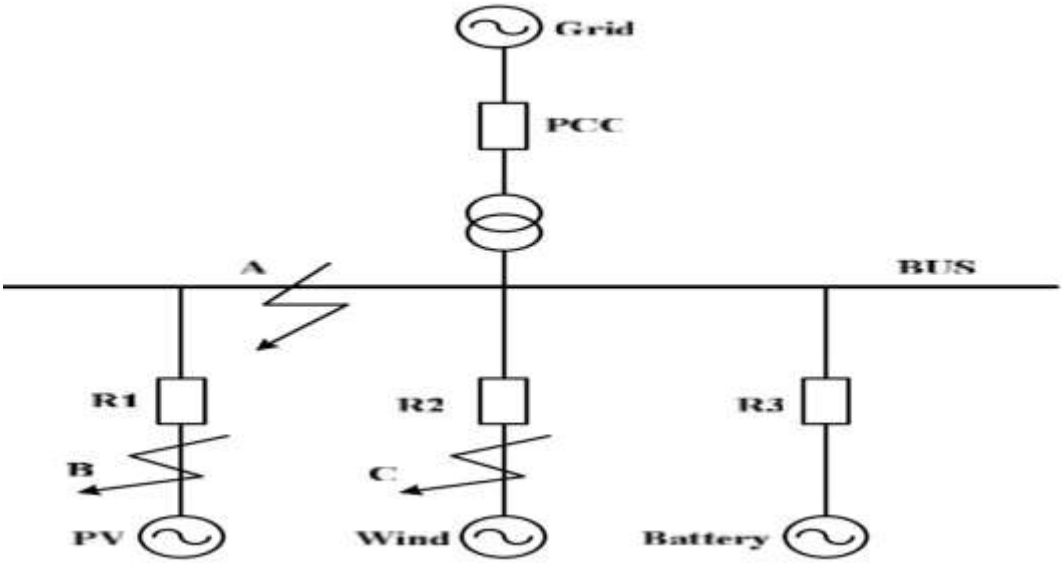

Figure 4 adaptive protection in the microgrid application .

Adaptive protection of microgrid is mainly used for the instantaneous over-current over is the fault current in microgrid protection . for the relay R2, Protection relay ,when the fault R2, (Protection relay , when the fault came at c , the fault current flowing through protection R2, is provided by the main grid .

The fixed value inbuild value of instantaneous current is nearly high than the maximum magnitude of load current. The restriction and self-start coefficient makes protection sensitivity is not higher. The fixing / setting and waveform / characteristics of adaptive protection can be altered by actual changing outside current of the load and using a Adaptive protective/ protection method to improve the sensitivity, reliability of the microgrid power system.

The setting value of traditional instantaneous over- current protection is always higher than the maximum three-phase short circuit current at line end user the maximum operation condition. While observation and testing the sensitivity of the microgrid is minimum . testing of the microgrid under the minimum operating condition in according to get over the defect the setting of adaptive protection can be alternate by the exact system operation condition and the type of short circuit and protection by the adaptive method.

CONCLUSION

1] the microgrid protection will have parts of two parts of two different types first case is a diagram is the unit level protection and that is why, microgrid protection can be face a different types of fault. And it should able to avoid a all types of faults.

2] microgrid connected system is a multi-source network to provide a power supply different power consumer. It may be small scale industry as well as domestic and agricultural sector.

3] The traditional segment protection conformity with timing will short when the fault is occurred in microgrid. Its tripping time will no a longer .

4] when microgrid power system are connected to distribution network.it is obviously impact the speed relativity, sensitivity, and auto-reclosing of microgrid system .

5] Adaptive protection of microgrid can well observe the protective effect because of it , improving the reliability of microgrid protection.

6] The research on protection of microgrid is in continuous and it is a expandable the enhancing development of microgrid protection.

REFERENCES

1. H.Nikkhajoei, Member, IEEE, R.H. Lasseter, Fellow,Ā Microgrid Protectionā
2. ZHANG Zong-bao, YUAN Rong-xiang, et al. Research on microgrid protection-a new power system. J Power system protection and control, 2010, 38(18): 204–209
3. ZHANG Jian-hua, HU Wei. Microgrid control and protective technology. beijing, China electric power press, 2010: 156–175
4. Hu Cheng-zhi, LU Ji-ping, HU Li-hua, RAN Li. Analysis of the impact of DG on the protection of distribution system. J Journal of Chongqi university(Natural Science Edition), 2006, 29(8): 36-39
5. HUANG Wei, LEI Jin-yong, XIA Xiang, et al. Influence of distributed generation on phase-to-phase short circuit protection in distribution network. J Automation of electric power systems, 2008,324(1): 93–97
6. ZHANG Yong.Review of impact of ditributed generation on distribution system protection. J Proceedings of the CSU-EPSA, 2010, 22(2): 145–151
7. Hopewell P D , Jenkins N , Cross A D. Loss of mains detection for small generators. J IEE Proceedings: Electrical Power Applications,1998 Warin J, Allen W H. Loss of mains protection]. ERA Conference on
8. Circuit Protection for Industrial and Commercial Installations, London , U K: 1990
9. Technology for distributed generation systems. J Power system protection and control, 2009, 37(2): 99-104
10. WANG Wei. Research on the protection of distribution network with microgrid. Shandong university, 2009, 143(3)□225 – 230.