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VOLTAGE PROFILE IMPROVEMENT BY USING PV AND BES

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Abstract: Today the demand of electricity in India is increasing and is already more than the production of electricity whereas the reserves of the fossil fuel are depleting every day Solar tracker and the components which made up Solar Tracker. Solar cells are converters. They take energy from the sunlight and convert that energy into electricity this fact from the electricity-cuts during summer. Luckily sun throws so much energy over India, that if we can trap few minutes of solar energy falling over India we can provide India with electricaity for whole year. A solar tracker is a device for orienting a solar photovoltaic panel, day lighting reflector or concentrating solar reflector or lens toward the sun. Solar power generation works best when pointed directly at the sun, so a solar tracker can increase the effectiveness of such equipment over any fixed position. The solar panels must be perpendicular to the sun's rays for maximum energy generation. Deviating from this optimum angle will decrease the efficiency of energy generation from the panels.

Keywords: *Solar panel, Voltage boost, Energy, pic.*

I INTRODUCTION

In general terms, voltage stability is defined as the ability of a power system to maintain steady voltages at all the buses in the system after being subjected to a disturbance from a given initial operating condition. It depends on the ability to maintain equilibrium between load demand and load supply from the power system. Instability that may result appears in the form of a progressive fall or rise of voltages of some buses. Voltage stability problems mainly occur when the system is heavily stressed beyond its capability. While the disturbance leading to voltage collapse may be initiated by a variety of causes, the main problem is the inherent weakness in the power system. Recently a top priority is given to develop a reliable, sustainable, environment friendly as well as low-cost electrical energy supply. This includes a sensible energy mix and improvements in efficiency of energy generation, transmission and consumption [1]. As a number of events that have been brought to the vulnerability of the current centralized electrical energy supply infrastructure, such as terrorist threats, natural disasters, geopolitical disruptions, ageing of a highly complex infrastructure, climate change and regulatory and economic risks, DG appears to be one of the key answers for different problems [3]. In the distribution system, the electrical power supply will be transferred from a vertical one to a horizontal system.

In the traditional system the electric power industry has been driven by a paradigm where most of the electricity is generated in large power plants, sent to the consumption areas through HV transmission lines, and delivered to the consumers through a passive distribution infrastructure that involves HV, MV and LV networks. In this paradigm power flows only in one direction from the power station to the network and to the consumer.

The DG term is used to describe small distribution system close to the point of consumption. Such generators may be owned by a utility or more likely by a customer who may use the entire portion or perhaps all of it to the local utility combustion turbine generators, internal combustion engines and generators, photovoltaic panels, and fuel cells. Solar thermal conversions, sterling engines, are considered as DG. When the penetration of DG is high, the generated power of DG units not power flow in the distribution network consequence, the connection of DG to the grid may different technical issues, e.g. voltage profiles quality, stability etc..[8] In spite of the benefits of utilizing DG units within of the system efficiency and the improvements in the technical and operational challenge units into MV distribution networks are needed. Moreover, in more details with respect to the generation types. Optimization of the MV distribution networks with a large penetration of DG is also needed therefore the utilities can get more benefits [9]. Many voltage stability indices are based on the Eigen value analysis or singular value decomposition of the system power flow Jacobean matrix. The main difficulty in this method is that Jacobian of NR power flow become singular at voltage stability limit (critical point) .A power flow solution near the critical point prone to divergences and error.

II LITERATURE SURVEY

INFO: Voltage Stability is a severe problem in power systems, which steadily reach operating limits imposed by economic and environmental conditions. Whenever there is a change in load the system voltage level changes. With the drop in voltage level, the reactive power demand increases. If the reactive power demand is not met, then it leads to further decline in bus voltage resulting in the cascading effect on neighboring regions. Hence to maintain the voltage profile within permissible limits becomes essential. This paper reviews various methods and techniques with their advantages and limitations adopted to retain the voltage level. The review presents sensitivity based control strategies, Control based on structural characteristics of power system, secondary voltage control strategies, design and optimal placement of FACTS devices using various optimization algorithms for VAR compensation.

TITLE: Improving voltage profile of residential distribution systems using rooftop PVs and Battery Energy Storage systems

INFO: Large number of rooftop Photovoltaic's (PVs) has turned traditional passive networks into active networks with intermittent and bidirectional power flow.

A community based distribution network grid reinforcement process is proposed to address technical challenges associated with large integration of rooftop PVs. Probabilistic estimation of intermittent PV generation is considered. Depending on the network parameters such as the R/X ratio of distribution feeder, either reactive control from PVs or coordinated control of PVs and Battery Energy Storage (BES) has been proposed. Determination of BES capacity is one of the significant outcomes from the proposed method and several factors such as variation in PV installed capacity as well as participation from community members are analyzed. The proposed approach is convenient for the community members providing them flexibility of managing the integrated PV and BES systems.

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TITLE: Improvement of Voltage Profile in Distribution Network Using Distributed Generation

INFO: This paper presents an efficient methodology for integration of Distributed Generation (DG) power into distribution systems, in order to maximize the voltage limit load ability. The proposed methodology is based on continuation power flow (CPF). The effectiveness of the presented methodology is demonstrated in a test distribution system that consists of 85 nodes with integration of different penetration levels of DG power. The proposed method yields efficiency in obtaining more benefits from the same amount of DG power, decreasing the losses and improving the voltage profile. The simulation of the proposed model was carried out using MATLAB/PSAT and the effective performance was analyzed.

III BLOCK DIAGRAM

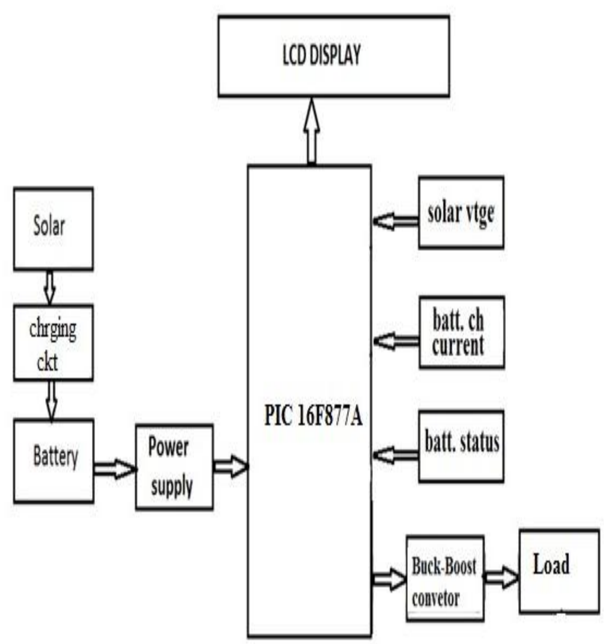

Figure 1: Block Diagram

HARDWARE SPECIFICATION

PIC16F877A
CAPACITOR
BATTERY (12 V,1.3AH)
SOLAR PLATE (12V,10W)
POWER SUPPLY
RESISTOR
DIODE
WIRES
LCD DISPLAY (16*2)

SOFTWARE SPECIFICATION

- PIC16F877a – PICKIT2
- Circuit & Layout Designing Proteus 8.1
- PIC16f877a – MPLAB IDE, HID BOOT Loader

IV RESULT

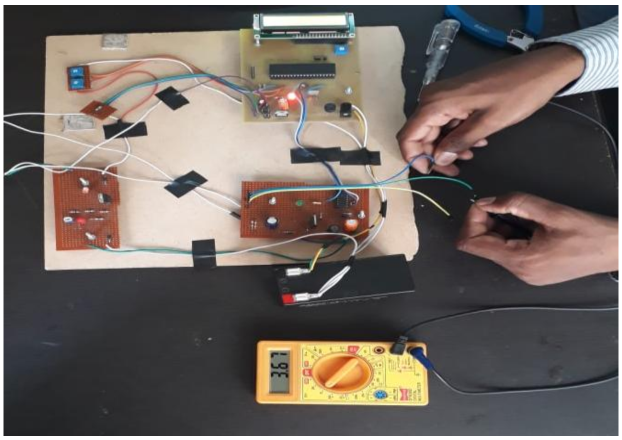

Figure 2. Input Voltage

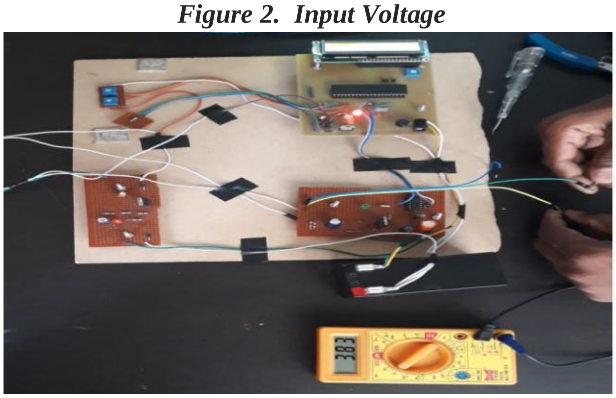

Figure 3. Output Voltage

V ADVANTAGES

- Increased reliability
- Flexibility
- Redundancy by design
- Reduced maintenance costs
- **Less expensive parts**
- Ease of expansion
- Solar trackers generate more electricity.
- Solar cookers are do not required fuel.
- Efficiency of MPPT is more as compared to stationary panels.

VI CONCLUSION

This system is simple, safe and cost effective which provides basic need to the developing countries. By using this system one can charge batteries through which many electric applications can be run. This system can not only be a solution of India, where this study was performed, but could be an option for many regions worldwide.

This paper introduces use of coordinated control of photovoltaic and battery energy storage to keep voltage in acceptable range. There is fluctuations in the solar output as solar radiations are not constant throughout the day. This disadvantage is overcome by using coordination of photovoltaic and battery energy storage system.

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