

Real Time Monitoring of Solar Power Generating Station using LabVIEW

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Abstract— Generating power with solar cells has been developed rapidly in recent years and in parallel of photovoltaic (pv) systems becoming wide spread in power generation systems in all around the world, there has been some requirements about integration of pv power generation systems into the traditional generating system[1]. In this proposal the monitoring of solar power generating station is implemented through My RIO, LabVIEW software's. Here the output from the solar panel is fed to the charge control to feed a constant DC voltage to the battery. An inverter circuit is used to supply a single phase load. For the proper utilization of the power obtained, a monitoring system has been developed using LabVIEW software.

Key words: My RIO, LabVIEW, Renewable Energy, Photovoltaic Cell

I. INTRODUCTION

Now a days, fossil fuels like coal, natural gas, nuclear energy etc., are vanishing. As a substitute to those fuels generation of power through solar is an emerging idea. The abundant supply and non-polluting nature of solar energy have made it a natural choice for electricity generation[2]. But there are some difficulties in the solar power generation, in which it involves high cost battery banks, solar panels, charge controllers etc. Partial shading occurring in one or more modules of the solar PV array would result in considerable reduction in its efficiency and could lead to the formation of hotspots that may destroy the panels[3].

It is necessary to operate the solar PV system at its maximum power extraction condition because of the poor energy conversion. This is achieved by introducing a high efficiency switched DC to DC converter[3]. Monitoring of solar power is done through LabVIEW software. LabVIEW is a product of National Instruments which is used in simulation for real time applications. In this approach solar panels are connected in series and for further use the output of the panel is stored in a battery.

II. NECESSITY FOR MONITORING

A monitor system is required to monitor the strength, life term of battery banks and to constantly maintain the output power from the solar panels. In contrast to the current system of large, centralized power plants servicing vast regions of energy consumers, the energy infrastructure of the future will see many different forms of power generations taking root wherever the demand exists[4]. The cost of all equipment's used in the solar power generating station and the periodic service requirement are so high. Proper maintenance of all components is necessary, so that the monitoring of the whole station will inform the upto date information of the components.

III. SURVEY

The Indian power industry continues to struggle to meet power generation goals, and conventional sources, especially coal, cannot keep up with the country's ever-increasing demand. As a result, interest has shifted to renewable sources of energy. Underpinning the importance of non-conventional sources, in a recent survey of businesses and residential consumers, nearly half of those polled said that solar power can bring a bright future. According to 49 percent of commercial and 45 percent of residential respondents, it is "very important" for India to develop and use solar power[5]. The data gathered from the 2010 SECE aimed to provide benchmark information on the country's energy utilization patterns of industries, generate indicators of energy intensities of industries, measured as energy consumption per unit output and highlight energy-producers and energy-intensive users among the country's industries[6].

Electricity Generation from solar		
Year	Energy(TWh)	% of Total
2004	2.6	0.01%
2005	3.7	0.02%
2006	5.0	0.03%
2007	6.8	0.03%
2008	11.4	0.06%
2009	19.3	0.10%
2010	31.4	0.15%
2011	60.6	0.27%
2012	96.7	0.43%
2013	134.5	0.58%
2014	185.9	0.79%
2015	253.0	1.05%

Table: 1 Electricity Generation from solar

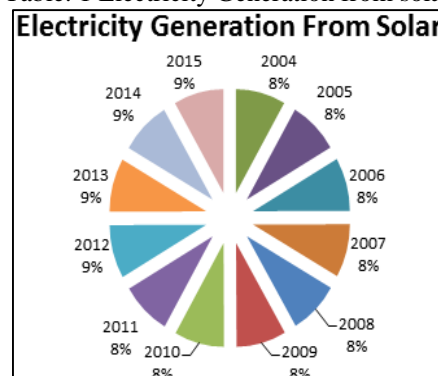


Fig. 1: Graphical Representation on Solar Power Generation

This graphical representation is about the electricity generation from solar. This graph states the last 12 years solar power generation.

IV. FLOW CHART

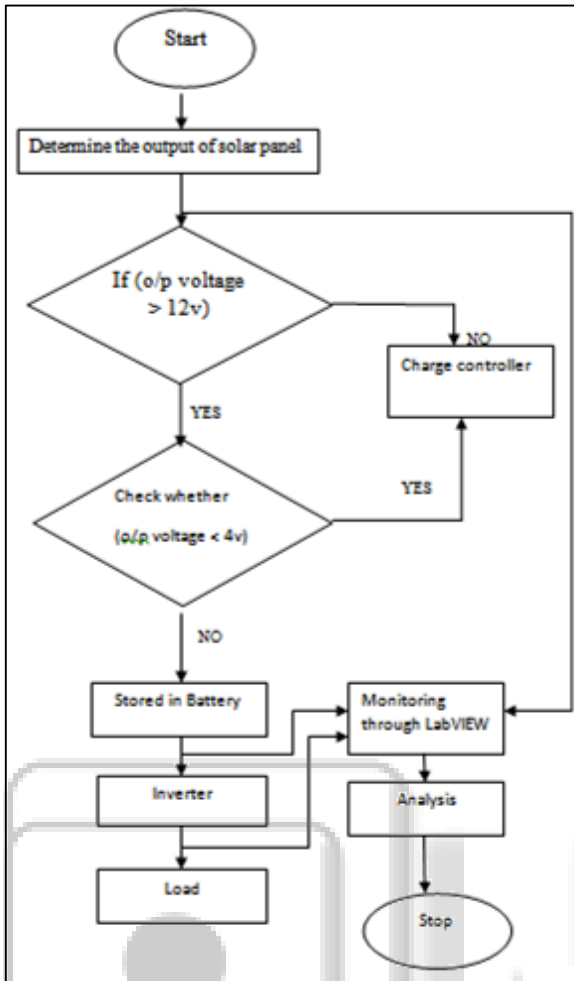


Fig. 2: Flow Graph

The output from the solar panel is additive since it is connected in series. The power generated in the solar panel will not be constant it depends on the light intensity. To maintain a range the output from the panel is checked whether it is in the specified range or not. According to that charge controller operates. And then it is stored in the battery and by the use of an inverter it is supplied to a single phase load. On the whole the output from the solar panel, charge controller, battery and inverter are monitored through LabVIEW and required analysis is carried out. The information are then stored in excel sheet as a record.

V. CONCLUSION

The solar power output from the solar panel is determined and the output is regulated using a charge controller. The regulated output is stored in a battery of 12v which is converted to AC. This is done by a suitable inverter. The output of the inverter is fed to a single phase load. The output of each component is monitored through LabVIEW. Monitoring of the whole system through LabVIEW proved to be more efficient. All the information obtained are stored in an external device for future reference and analysis.

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