ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 17, March 2017

POWER SOURCE CAPACITY OF OPTIMUM SIZING& ANALYSIS OF RENEWABLE ENERGY IN MICROGRID

M.LAVANYA[1], B.SARITHA[2]

M.Tech Student, Department ofECE, SR Engineering College, Warangal,India[1]

Assistant Professor,Department of ECE,SR Engineering College, Warangal,India[2]

Abstract:

In this project we will maintain energy consumption of different Renewable energy sources of household and also control the appliances. Generally renewable energy sources are using effectively for household purpose the units of load consumption are transmitted. So that consumer can maintain data base. Hence consumer can know the indoor environment consumption units and also he can control the home appliances. The EMS (Embedded Memory System) guarantees that the critical loads are powered when the AC grid fails in which case the VSI (Vertical Shaft Impactor) is controlled as a voltage source. It also accomplishes peak power control by supplying battery power to the local loads while they are powered by the AC grid if the loads get large. The electricity cost savings accomplished by peak shaving are estimated. The EMS functionality is demonstrated by experimental measurements on a laboratory prototype. The control architecture and logic embedded in the EMS are discussed in detail. It can be extend the data transmission to IOT (Internet Of Things) so that the relevant parameters are monitored through GUI. This is very useful in the case when the user is moving in industrial area. Along with the data monitoring devices is also controlled based on the values.

Introduction:

Use of Renewable Energy Sources in Household electrification has always been the most effective method to minimize the amount of carbon emissions that we contribute towards the cumulative carbon emissions of this planet earth. These carbon emissions have given rise to global warming due to depletion of the ozone layer. Use of alternatives like solar water heaters helps to reduce individual carbon emission footprint upon the environment. But the use of these alternatives is location and climate dependent. The power grid supply to our homes still remains the primary source of energy for most of the Appliances in our homes. Also the reconfiguration of the electrical circuitry of the entire home is a cumbersome process for the end user. If the users are provided with an inexpensive process to configure the power supply of their homes as per requirement, the use of generated renewable energy can be maximized. This would eventually put an impact on the total carbon emissions due to the generation process of power from non-renewable energy sources. The Web of Things comprise of a number of Internet enabled Embedded devices which provide such an interface to the user by means of Web services. The end user can access this through a web browser of any computer with an Internet connection.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 17, March 2017

Literature survey:

Our aim is to add intelligence and bidirectional communication and energy flows to today's power grid in order to address the efficiency, stability, and flexibility issues that plague the grid. Existing system is the smart grid is an intelligent power generation, distribution, and control system. The proposed system is helpful in collection and analysis of real time data along with the control of electrical loads for energy reduction. Emphasizing the importance of the communication infrastructures required to support device control and data exchange between the various domains which comprises the smart grid. Our proposed scheme is implemented with an IP protocol. Proposed system is proposed system we extend our data transmission to IOT so that the relevant parameters are monitored through wi-fi this is very useful in the case when the user is moving in industrial area. Along with the data monitoring devices is also controlled based on the values. Christo Ananth et al.[6] discussed about E-plane and H-plane patterns which forms the basis of Microwave Engineering principles.

Proposed Scheme:

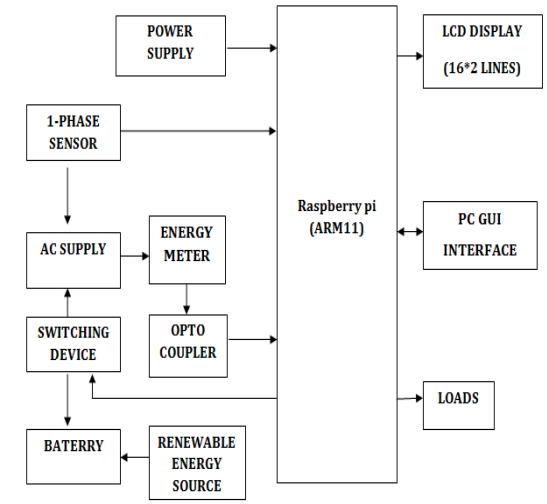

Fig:1:block diagram

In this project we will maintain energy consumption of different Renewable energy sources of different houses and also control the appliances. Generally Renewable energy sources are using effectively for household purpose the units of load consumption are transmitted through IP protocol. So that consumer can maintain data base in the web services.Hence consumer can know the indoor environment consumption units on web services and also we can control the home appliances from web services.

Methodology:

Micro controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 17, March 2017

forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

Raspberry Pi 2:

The Raspberry Pi 2 delivers 6 times the processing capacity of previous models. This second generation Raspberry Pi has an upgraded BroadcomBCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte.

Liquid-crystal display (LCD)

LCD is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Opto Couplers:

There are many situations where signals and data need to be transferred from one system to another within a piece of electronics equipment, or from one piece of equipment to another, without making a direct electrical connection. Often this is because the source and destination are (or may be at times) at very different voltage levels, like a microcontroller which is operating from 5V DC but being used to control a triac which is switching 230V AC. In such situations the link between the two must be an isolated one, to protect the microprocessor from over voltage damage. Relays can of course provide this kind of isolation, but even small relays tend to be fairly bulky compared with ICs and many of today's other miniature circuit components. Because they are electro-mechanical, relays are also not as reliable ó and only capable of relatively low speed operation. Where small size, higher speed and greater reliability are important, a much better alternative is to use an Optocoupler. These use a beam of light to transmit the signals or data across an electrical barrier, and achieve excellent isolation.

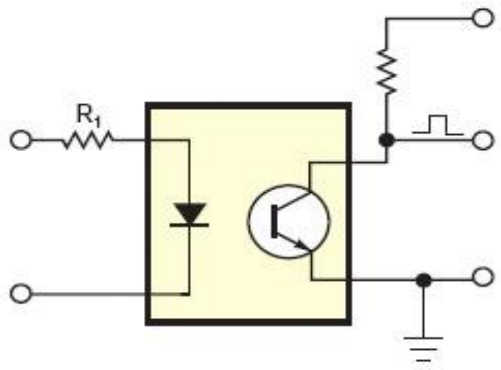

Fig: 2:Optocoupler structure

Energy Meter:

An electricity meter or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device. Electricity meters are typically calibrated in billing units, the most common one being the kilowatt hour. Periodic readings of electric meters establish billing cycles and energy used during cycle.In settings when energy savings during certain periods are desired, meters may measure demand, the maximum use of power in some interval. In some areas the electric rates are higher during

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 17, March 2017

certain times of day, reflecting the higher cost of power resources during peak demand time periods. Also, in some areas meters have relays to turn off nonessential equipment

Conclusion:

Regarding the accelerated development of eco-friendly technologies such as RES, SG, and EV, which are finding increased economic and social acceptance, planning an efficient electric power system requires consideration of these technologies in the design stage. Therefore, we introduced a method for sizing an HRES operating within the frame of a smart grid that coherently considers the electric demand flexibility offered by DSM. Contemplating a case study for a residential microgrid in Okinawa, we studied the effect of demand flexibility on HRES sizing and estimated the potential economic benefit of such applications under different scenarios. Generally, the optimal components sizing was affected by demand flexibility and strongly affected by operational conditions (scenarios), asserting the potential use of the introduced method in modern smart grid design. The observed benefits gained by demand flexibility were encouraging for the increased adoption of SG technology, especially when there are limitations to using BESS. In this study, our focus was limited to EV as consuming elements, where their potential use in vehicle-to-grid application was not considered. In future research, we will integrate vehicle-to-grid application after developing a proper model for accounting to the performance of embedded lithiumion battery, as this can result in a more economically and environmentally efficient system.

References:

[1] D. Feldman *et al.*, "Photovoltaic (PV) pricing trends: Historical, recent,and near-term projections," U.S. Dept. Energy, Washington, DC, USA,Tech. Rep. DOE/GO-102012-3839, Nov. 2012.

[2] R. Wiser, E. Lantz, and M. Hand, "WREF 2012: The past and futurecost of wind energy," U.S. Dept. Energy, Washington, DC, USA,Tech. Rep. LBNL-5421E, Mar. 2012.

[3] V. C. Güngör*et al.*, "Smart grid technologies: Communication technologiesand standards," *IEEE Trans. Ind. Informat.*, vol. 7, no. 4,pp. 529–539, Nov.

[4] C.-H. Lo and N. Ansari, "The progressive smart grid system fromboth power and communications aspects," *IEEE Commun. Surveys Tuts.*,vol. 14, no. 3, pp. 799–821, Jul. 2011.

[5] W. Kempton and J. Tomi´c, "Vehicle-to-grid power implementation: Fromstabilizing the grid to supporting large-scale renewable energy," *J. Power Sources*, vol. 144, no. 1, pp. 280–294, Jun. 2005.

[6] Christo Ananth, S.Esakki Rajavel, S.Allwin Devaraj, M.Suresh Chinnathampy. "RF and Microwave Engineering (Microwave Engineering).", ACES Publishers, Tirunelveli, India, ISBN: 978-81-910-747-5-8, Volume 1,June 2014, pp:1-300.

[7] M. Alsayed, M. Cacciato, G. Scarcella, and G. Scelba,"Multicriteria optimal sizing of photovoltaic-wind turbine gridconnected systems," *IEEE Trans. Energy Convers.*, vol. 28, no. 2,pp. 370–379, Jun. 2013.

[8] R. Atia and N. Yamada, "Optimization of a PV-wind-diesel system usinga hybrid genetic algorithm,"

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 17, March 2017

in *Proc. IEEE Elect. Power Energy Conf.*,London, ON, Canada, 2012, pp. 80–85.

[9] R. Chedid and S. Rahman, "Unit sizing and control of hybrid wind-solarpower systems," *IEEE Trans. Energy Convers.*, vol. 12, no. 1, pp. 79–85, Mar. 1997.

[10] M. Sharafi and T. Y. ELMekkawy, "Multi-objective optimal designof hybrid renewable energy systems using PSO-simulation basedapproach," *Renew. Energy*, vol. 68, pp. 67–79, Aug. 2014.

[11] R. Huva, R. Dargaville, and S. Caine, "Prototype large-scale renewableenergy system optimisation for Victoria, Australia," *Energy*, vol. 41,no. 1, pp. 326–334, May 2012.

[12] Y. A. Katsigiannis, P. S. Georgilakis, and E. S. Karapidakis, "Hybridsimulated annealing—Tabu search method for optimal sizing ofautonomous power systems with renewables," *IEEE Trans. Sustain.Energy*, vol. 3, no. 3, pp. 330–338, Jul. 2012.

[13] L. Xu, X. Ruan, C. Mao, B. Zhang, and Y. Luo, "An improved optimalsizing method for wind-solar-battery hybrid power system," *IEEE Trans.Sustain. Energy*, vol. 4, no. 3, pp. 774–785, Jul. 2013.