IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 6, June 2020

Optimization and Comparison of Renewable and Non-Renewable Energy Sources: A Review

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Abstract: Today, Increase the demand for Renewable Energy Sources (RES) in distribution systems because total energy demand is supplied by the burning of fossil fuels and it is limited. In this paper presents a control strategy of three-phase four-wire grid interfacing inverter to effectively utilize the renewable energy Source with a grid. In the contrary of decrease of fossil energy now a days, the demand of energy, the global warming, and continuous increase in oil prices have got attention all over the world. Since without energy life is an imaginary, the newly emerging renewable energy technologies are hope fully at least minimizing the problem. The concept of "electric spring" is proposed to enhance the stability of the smart grid with intermittent renewable energy sources.

Keywords: Energy saving; energy efficiency; renewable energy sources; integrated systems of RES; emergency power supply; energy efficiency, electric vehicle, and renewable energy optimization. DC-DC converters, Boost converter, Flyback converter, High step-up gain.

I. INTRODUCTON

The shortage of petroleum storage and the increase of gas emissions (CO_2, SO_2, and NO_x) have become a worldwide concern at economic, environmental, industrial, and social levels. The goal of our work is to design a methodology for efficient EV charging with renewable energy supply. Optimal charging scheduling is required to achieve that goal. In many renewable energy sources applications including photovoltaic systems and fuel cell systems.
A Renewable hybrid energy system is a system that contains two or more renewable energy sources. Renewable energy sources include **wind, solar, geothermal, tides, hydropower**, and various forms of biomass.

II. RENEWABLE ENERGY RESOURCES

The most important factor in developing a hybrid energy system is the geographical location, where the available wind and solar data can vary significantly.

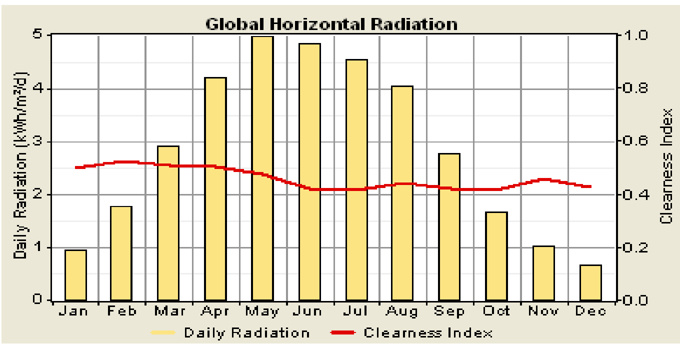

Fig. (1) Global Radiation Analysis.

III. NON-RENEWABLE ENERGY SYSTEM

The existing system architecture is shown in the figure which consists of a diesel generator and batteries to power the load. A Perkins 404C-22G diesel generator with 25kW

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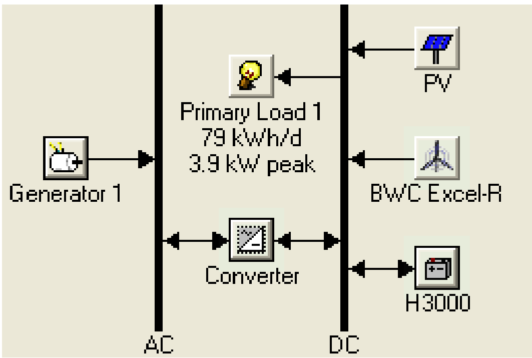

Fig. (2) Non-renewable energy system.

IV. PRINCIPLE OF OPERATION OF THE PROPOSED CONVERTER

The proposed converter is shown in Fig. 3The first stage is a conventional boost converter composed of the input inductor Li, the switch S1, the diode D1, and the capacitor C1. The second stage is a boost fly-back converter composed of a step-up transformer with turns ratio n=N2/N1, the
diodes D2and D3 and the output capacitors Co1 and Co2.

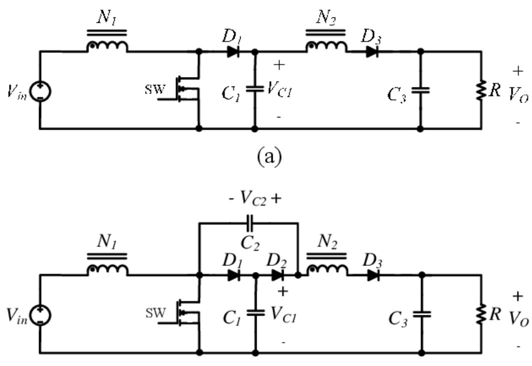

Fig. (3) proposed high step-up boost-boost fly-back converter.

V. CONTROL STRATEGY

A DC-Link Voltage and Power Control Operation Due to the intermittent nature of RES, the generated power is variable. The dc-link plays an important role in transferring this variable power from the renewable energy source to the grid.

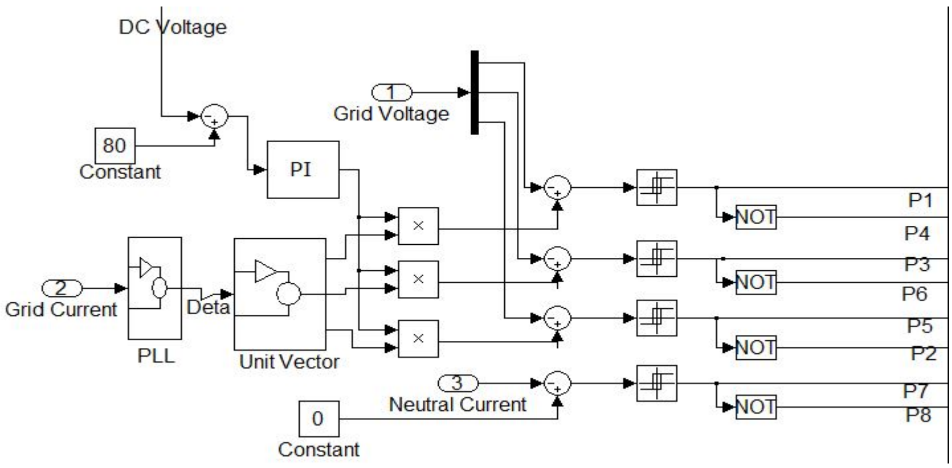

Fig. (4) DC-Link Connection.

→RES are represented as current sources connected to the dc-link of a grid-interfacing inverter. Fig. 1 shows the systematic representation of power transfer from renewable energy resources to the grid via the dc link. The dc-capacitor decoupled the RES from the grid and allows the independent control of the inverter on either side of the dc link. P1 to P8 switching signal of the inverter where P7 and P8 are multiplied with constant zero to compensate for the neutral current.

VI. EV CHARGING

Aggregated **EV Charging Control** To fully regulate the charging rates of flexible EV loads, in the smart grid system, we assume that the charging of a fleet of EVs is controlled by an aggregator, which could be distribution system operators or other third party entities. EVs can communicate with aggregators in real-time and can be charged at various charging rates.

VII. OPERATING PRINCIPLE OF ELECTRIC SPRING AND ITS CONTROL

A. Operating Principle of Electric Spring

Since an electric spring has to damp out the electric oscillations generated due to intermittent renewable energy sources, it is necessary to connect the lossless electric spring in series with a dissipative electric load (such as a water heater).

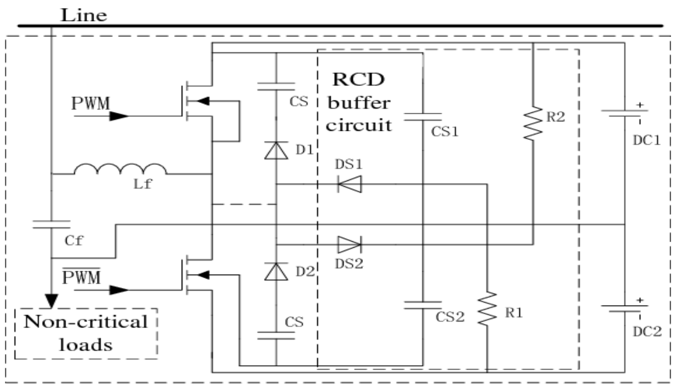

Fig. (5) Electrical Spring dia.

B. CONTROL ALGORITHM FOR ELECTRIC SPRING

The control of electric spring is different from other reactive power compensators (such as dynamic voltage restorer) in a way that it controls input voltage instead of the output voltage. The aims of the electric spring are.

(i) To control the point of common coupling (PCC) voltage to predefined value and

(ii) To reduce the voltage distortion of PCC voltage.

These aims can be achieved by injecting proper compensating voltage through electric spring that

(i) injects some reactive power for voltage regulation and

(ii) changes the non-critical load voltage to meet the generation.

VIII.CONCLUSION

This paper compared two different systems for providing uninterruptible power for a telecommunication tower on a remote site. This comparison based on the pre-feasibility for each system is done using HOMER software. The first system is a non-renewable energy system and the second is a renewable energy system. This paper also provides power quality improvement in grid-connected renewable energy at distribution by using a three-phase four-wire inverter. The inverter is mainly is used to DC to AC at the desired voltage level of the grid. Harmonics level of supply current is 28% without filtering, after implementing filter (inverter) the harmonic level is reduced to 2.94%.

REFERENCES

1). C. Lee, B. Chaudhuri, S. Hui, ‘‘Hardware and Control Implementation of Electric Springs for Stabilizing Future Smart Grid with Intermittent Renewable Energy Sources,’’ IEEE Journal of Emerging and Selected Topics in Power Electronics, vol.PP, no.99, pp.1,1, 0.

2.) C.K. Lee, N.R. Chaudhuri, B. Chaudhuri, S.Y.R. Hui, ‘‘Droop Control of Distributed Electric Springs for Stabilizing Future Power Grid,’’ IEEE Transactions on Smart Grid, vol.PP, no.99, pp.1,9, 0.

3.) J. M. Carrasco, L. G. Franquelo, J. T. Bialasiewicz, E. Galván, R. C. P. Guisado, M. Á. M. Prats, J. I. León, and N. M. Alfonso, “Power electronic systems for the grid integration of renewable energy sources: A survey,” *IEEE Trans. Ind. Electron.*, vol. 53, no. 4, pp. 1002–1016, Aug. 2006.

4.) R.D.Patidar, S.P.Singh, "Hannonic, Reactive and Neutral current compensation in 3P4W Distribution System" International Conference on Engineering and Technology ICCET'09, Vol 2, pp 403 - 415, Singapore 2009.