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Analysis of Various Topologies of DC-DC Converter for Hybrid Renewable Energy Sources

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Abstract : Eco-friendly solutions are becoming more prominent than ever as a result of concern regarding the state of our deteriorating planet. Renewable energy technologies offers clean, abundant energy gathered from self-renewing resources such as the sun, fuel etc. As the power demand increases, power failure also increases. So, renewable energy sources can be used to provide constant loads. Hybridizing solar and fuel power sources provide a realistic form of power generation. This project proposes a new DC-DC converter for simultaneous power management of multiple renewable energy sources, which can be of different types and capacities. Comparative analysis is done with different topologies (CUK and SEPIC, with and without transformer) to achieve minimum voltage ripple, minimum number of components used and to regulate the output voltage. This configuration allows the multiple sources to supply the load separately or simultaneously depending upon the availability of the energy sources. MATLAB simulation is done to highlight the merits of the proposed circuit.