Case Study on Power Electronics

Assume you are given 20 solar panels (24 V and 300 W, each) to be installed as an off-grid residential source of electricity in the city of Ottawa.



Design a 120 V Boost converter that comes out from the battery. Use a MOSFET at 2kHz switching frequency, for 10% ripple current and 10% ripple voltage. Assume efficiency of 90%.

Draw a circuit diagram for an inverter that converts DC from the 120-V Booster to AC at 120 V, 60 Hz to power the AC breaker panel for the house use.

 $\Delta I = V_o(V_s - V_o)/fLV_s \ ; \ \Delta Vc = \Delta I/8fC \ ; \ \Delta I = V_sDT/L \ ; \ \Delta V_c = I_oD/fC \ ; \ \eta = P_o/P_{in}$