SOLAR BIODIESEL HYBRID MINIGRID OF 50KW PEAK CAPACITY

IINTRODUCTION

Demand for electricity in our country is increasing rapidly with improvement in standards of living. Currently, bulk of this demand (62%) is met from fossil fuel (coal, lignite, gas, Diesel etc.) based thermal power plants. However, rapid depletion of these limited fossil fuel reserves has led to the concerns of energy security. In this project CSIRCMERI developed efficient harnessing techniques for renewable energy like Solar Photovoltaics (PV), Biodiesel etc. through establishment of Solar Biodiesel Hybrid Minigrid at CSIR-CMERI, Ludhiana campus, for fulfilling energy needs of the residential colony. Solar Photovoltaics is a rich source of energy available throughout many parts of India. Biodiesel is also a renewable source of energy that can be produced from wide variety of feed stocks like Used Cooking Oil, Waste Vegetable oil, variety of seeds etc. Depending upon the availability of feed stock of the selected location, it can be produced throughout the country. These types of systems, besides being a unique solution for uninterrupted power in remote areas, villages, hilly area etc., also find applications in Smart city projects. Unlike in rural areas, power requirement of domestic loads in cities are higher along with huge fluctuations due to varied usage patterns making the power balancing a challenging issue. To address this issue, Experiments were conducted in the CoEFM residential colony during different times of day, month and different seasons to understand the performance of the developed system under different conditions of loading, solar radiation etc.

SALIENT FEATURES

Peak Capacity: 50 kWp
Solar PV Capacity: 48.35 kWp
Diesel Genset Capacity: 50 kW, 62.5 kVA
Battery Bank: 48V, 2350 AH
Load: Residential Colony (37 Households), Guest House (10 Rooms), Agricultural pumps (10HP Submersible pump & 5 HP Monoblock Pump), Street Lights (~2.5kW)

MAJOR RAW MATERIALS: Solar Panels, Diesel Generator, Biodiesel, Cables, Power conversion system, communication systems

BLOCK DIAGRAM OF THE INSTALLED SOLAR BIODIESEL HYBRID MINIGRID