

Hybrid electric power supply systems for microgrids and short-term storage

Global electrification is now entering a new era with the use of electric power becoming increasingly detached from national grids and power plants. This is creating small independent electricity networks that meet the needs of a limited locality, and even nanogrids confined to a single building. One integral technical feature of these new microgrids is a flexible, multi-source electric power supply or hybrid system combining such sources as solar power, batteries and diesel generators into a steady supply system that matches network power consumption.

An estimated 1.2 billion people on the planet are living without electric power in localities that are off the grid for one reason or another. There are also regions where electric power supplies rely wholly or substantially on costly diesel generators that also pollute the environment. An efficient power supply provides a substantial boost in the quality of life and standard of living of people living in such regions, enabling power-dependent enhancements such as electric lighting, use of electric water pumps and improved storage of foodstuffs and medicines.

Another typical need for microgrids arises at various isolated temporary or continuously operating sites, such as research projects, hotels and even refugee camps requiring steady electricity. Customised microgrids may also be required for various special military and industrial plant applications.

One technological requirement for microgrid is a diversified power source that combines various generating approaches, coupled with short-term storage to offset fluctuating consumption. For example, electricity generated by solar panels during the day may charge batteries that subsequently combine with an intermittently operating diesel generator to meet periods of peak demand, thereby ensuring a steady power supply within the micro-network area.

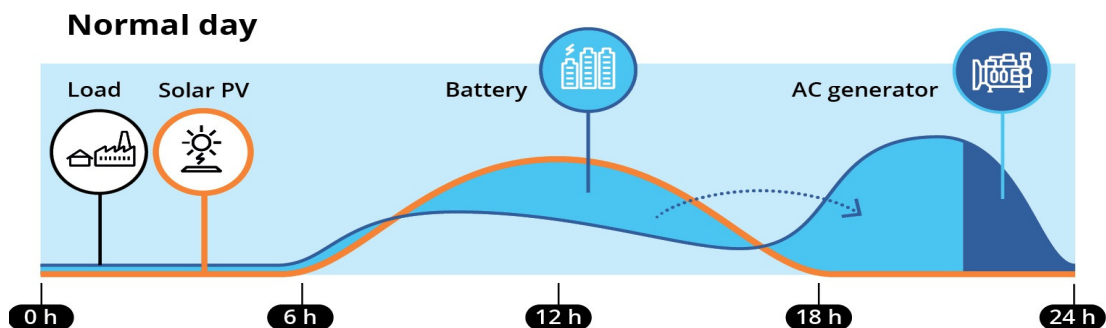


Figure 1: Hybrid system ensuring power supplies

Renewable energy sources play a key role in popularising electric power microgrids. The electricity network must remain manageable and reliable, even when incorporating various individual energy sources, such as solar or wind power. Advances in battery technology will also provide a wider range of potential generating applications as opportunities for power storage evolve. We are evidently now witnessing a highly dynamic and interesting stage in the development of electric power microgrids.

MSc has responded to the challenge of evolving microgrids by spearheading commercialisation of the MSc HESS compact hybrid power generating system, integrating inputs from various energy sources into a 3-phase network with automation that guarantees a steady supply of electric power. Check out our website for further details of the MSc HESS system (<http://www.msc.eu/products/smart-grid/12>).

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