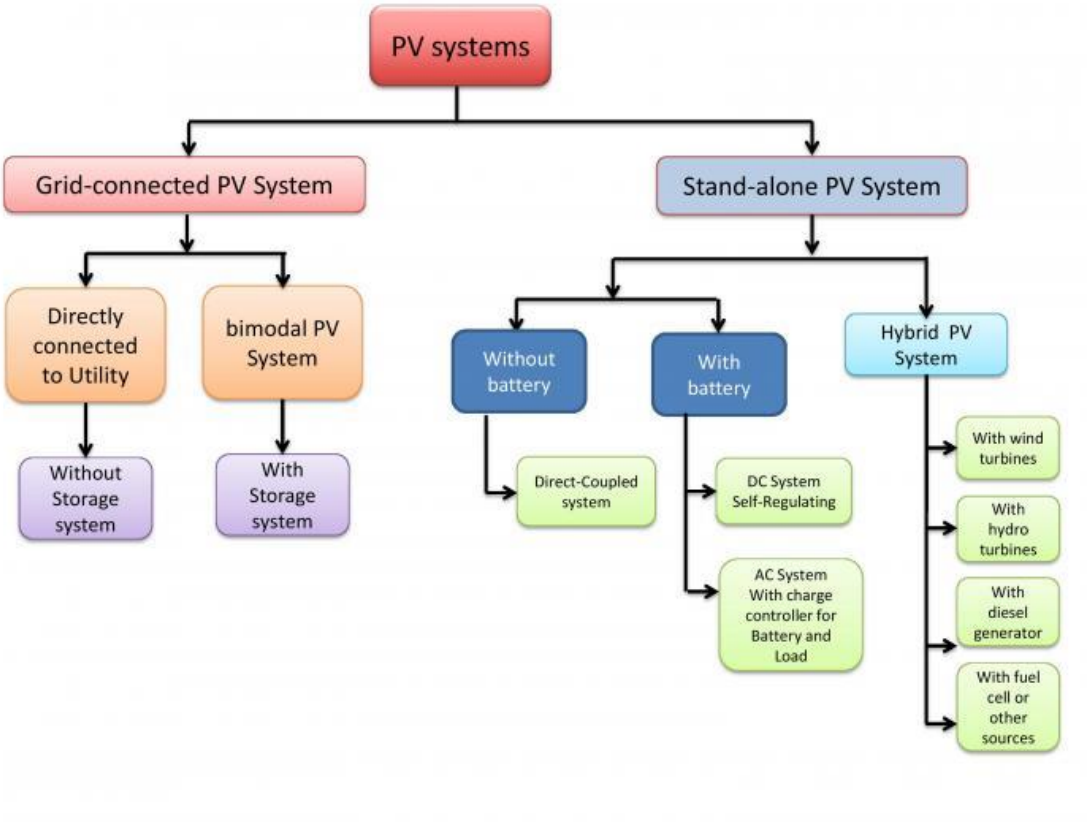
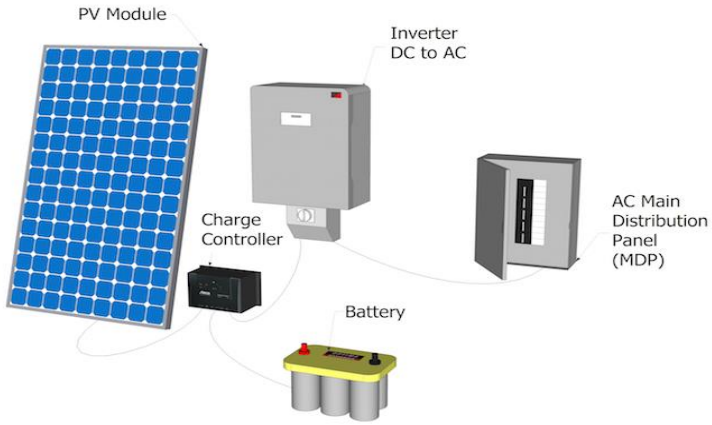
2.5 PV system types



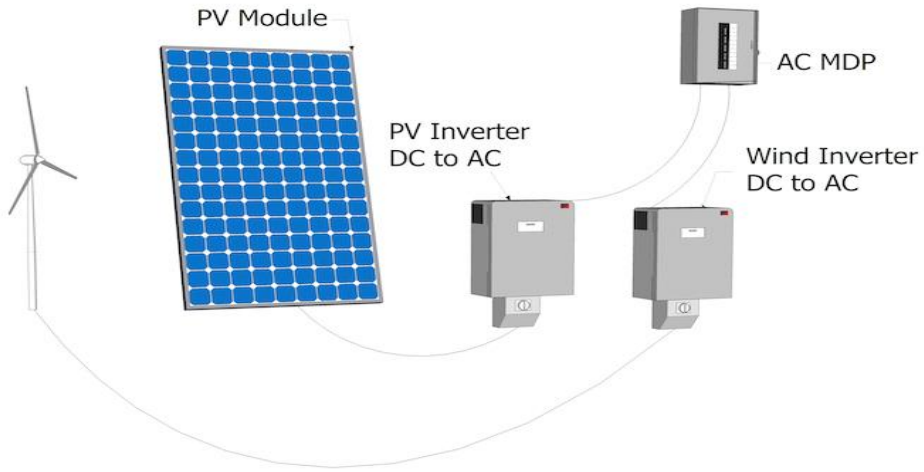
2.5.1 Stand-alone PV systems:



All stand-alone (AKA off-grid) systems work in general without the utility grid, as shown in the above figure It can be seen that we expect a perfect match between the supply and demand, or in other words between PV system size and load requirement. When this match is done perfectly for a single load, the PV system in this case can be called a "Direct-Coupled PV System," and very minimal components are needed without the need for storage systems.

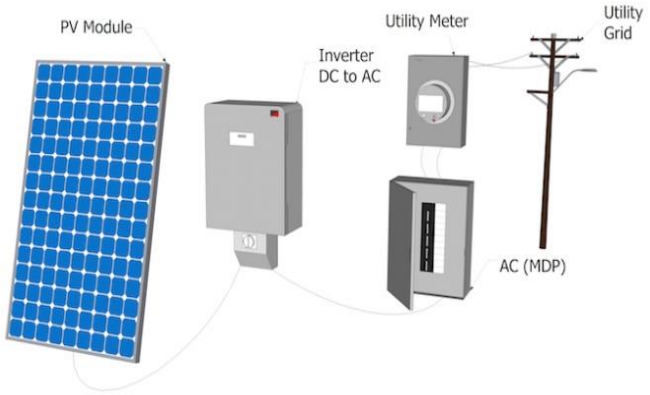
Another type of stand-alone requires a storage system to allow excess energy to be stored when it is not needed by the load and can later be drawn when the sun is not available. This type can be connected directly to DC loads or to AC loads through an additional power conditioning component, or “Inverter,” as we will learn later.

The other common type of stand-alone system is the "Hybrid PV System," as shown in figure below, which uses other energy sources in parallel to the PV array to supply loads. These energy sources can be Wind Turbines, Hydro Turbines, Diesel Generators, or Fuel cells. Hybrid PV Systems can also use Batteries for energy storage.



2.5.2 Grid-Connected system:

This type of configuration is the most common type for applications where clients want to save energy on their utility bills and while the utility grid exists for use when the PV array is not generating any energy. The PV array can be directly coupled to the grid without any storage system and is called “Utility-Interactive PV System or Grid-Tied PV System,” as illustrated in Figure.



Alternatively, it can store excess energy into battery banks for later use, and in this case, it is called a “Bimodal PV System or Battery Backup PV System,” as shown in Figure.