Photovoltaic panels convert sunlight into electricity.

Photovoltaic (PV) cells are made of special materials called semiconductors, usually silicon.

The cell has two silicon layers, with small amounts of other elements, and metal contacts at the top and bottom.

When light hits the cell, some of it is absorbed and its energy is transferred to electrons in the semiconductor.

Photons from sunlight collide with electrons pushing them into a higher state of energy and creating electricity in the process.

This produces electricity (DC).

Photovoltaic panels need sunlight but not necessarily direct sun.

To be most effective, a PV array needs to be installed on a south-facing roof which is not overshadowed by trees or buildings.
How photovoltaic panels are constructed

A single photovoltaic cell only produces a fraction of a volt. This is only enough electricity to power a torch bulb.

To give higher power and a higher voltage, many PV cells are connected together in series. This is called a module.

A number of these modules are then connected together in parallel, to make a photovoltaic array. This increases the amount of power produced, ensuring an adequate supply of electricity to meet demand.
Photovoltaic panels

PV Array on roof of Gibson Mill

PV Array

Photovoltaic Charge Regulator
Converts variable voltage from panel to constant voltage for battery

Battery gives direct current, appliances need alternating current!

Inverter

Battery

DC bus 48V (DC)

Electricity to appliances 240V (AC)

Appliances