

TECHNOLOGY DEVELOPMENT PROJECT FACT SHEET

RT001 : Solar Energy Technologies

Solar energy is energy that comes from the sun.

Solar Power Plants are comprised of Photovoltaic modules, usually rectangular shaped, that convert sunlight directly into electricity. The modules create DC (Direct Current) electricity in which electrons flow in one direction only. The DC current is converted into AC (Alternating Current) by an Inverter.

Modules are an assembly of solar cells and ancillary parts intended to generate power when exposed to sunlight. Most solar cells are made of silicon which is a common constituent of sand and quartz and is an excellent semiconductor material.

There are several types of photovoltaic solar cells: Crystalline, Polycrystalline and Thin Film.

Crystalline solar cells are made from a single crystal of silicon.

Polycrystalline solar cells are fabricated from multiple crystals of silicon.

Thin Film Solar is a layer of semiconductor material such as copper indium diselenide, cadmium telluride, gallium arsenide, or amorphous silicon, a few microns or less in thickness, used to make photovoltaic cells.

High Concentration Photovoltaic (HCPV) Technology makes use of low cost acrylic plastic lenses to harvest solar energy over a large area and concentrate that energy onto small photovoltaic cells which convert the solar energy into electricity.

Solar Thermal technologies use the heat from the sun to make electricity.

There are different types of photovoltaic solar generation systems: Fixed panel, Single Axis Tracking, and Dual Axis Tracking.

As their name implies, Fixed Panels remain stationary and convert sunlight to electricity when sunshine falls on them.

Tracking panels follow the path of the sun to maximize the exposure of the panels to solar radiation in order to convert sunlight to energy.

Single Axis Tracking – panels are tracked on a single axis.

Dual Axis Tracking systems move the solar panels so that they continuously point toward the sun, using both azimuth and elevation axial movements.

Houses that are powered by solar modules store electricity generated during the day in a battery. The battery is a storage device that operates on the principle of changing electrical energy to chemical energy and then back to electricity. The energy stored in the battery can be used at night after the sun has gone down.

Utility companies that have solar power plants send the electricity to the grid to supplement electricity generated from other fuels. There is usually no storage of the electricity.

