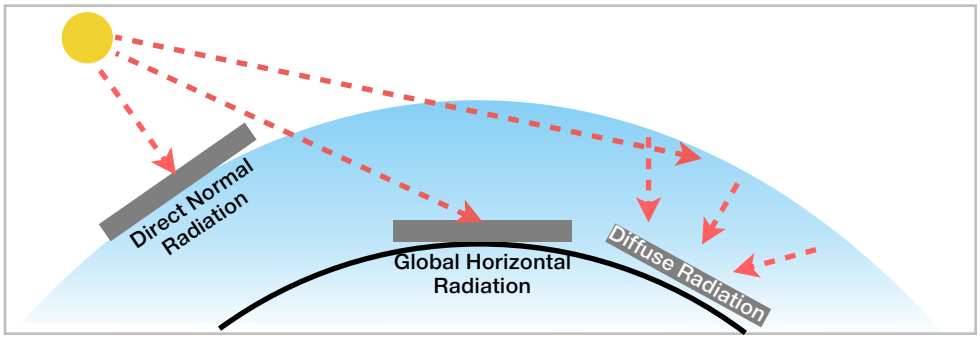
Week 2. Three Radiation Data on EPW File

On EPW file, there are three kinds of radiation data; Global Horizontal Radiation, Direct Normal Radiation and Diffuse Radiation. Three types can be determined by the way how the radiation is measured.



Global Horizontal Radiation is the radiation of total sunlight measured from the horizontal surface, including direct and diffused radiation. Pyranometer sensor would be used for the measurement of this radiation.

Direct Normal Radiation is the radiation of direct sunlight received on the surface, which is perpendicular to the sun direction. It is generally measured by a pyrheliometer mounted on a solar tracker.

Diffuse Radiation is the radiation of indirect sunlight, detected on the horizontal surface, without direct sunlight. The indirect sunlight has been scattered and reflected through the atmosphere, so equal from all direction. It is usually measured by a pyranometer, with its glass dome shaded from the Sun's beam.

The relation among three radiation type can be shown from an equation of irradiation. (The total amount of radiation is called irradiation.) This following equation can be applied to estimate different radiation; “Global Horizontal Irradiation (GHI) = Direct Normal Irradiation (DNI) X cos(θ) + Diffuse Horizontal Irradiation (DHI).”

[http://www.seco.cpa.state.tx.us/publications/renewenergy/solarenergy.php]

[http://www.seco.cpa.state.tx.us/publications/renewenergy/exhibits/exhibit3-02.php]

[http://www.bom.gov.au/climate/austmaps/solar-radiation-glossary.shtml#directirradiance]