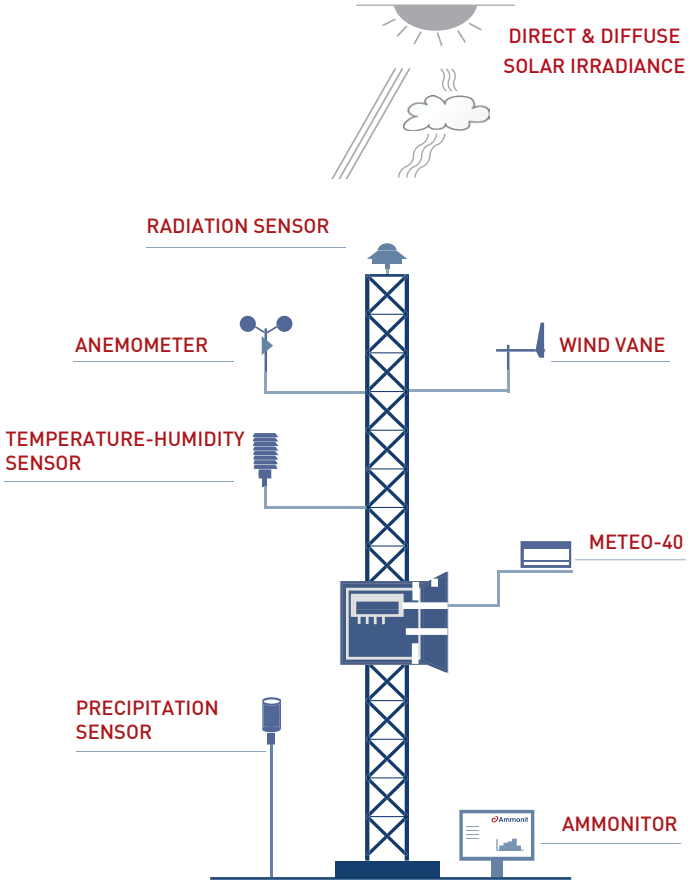
Ammonit Solar Assessment System

Why solar assessment?

In order to assure well-founded decisions in designing effective and profitable solar power plants, reliable measurement systems in the assessment phase have become more and more vital. There are many different ways and technologies to measure the irradiance phenomena that influence the power generation of a future solar power plant. Ammonit's solutions suit the demands of determining optimal locations with regards to accuracy and affordability of the measurement setup.

Influencing parameters



Radiation sensor
Solar irradiance is the most influential parameter to forecast the power output of a future solar plant. On the back page you find an overview of different measurement instruments.

Anemometer & wind vane
The measurement of wind speed and wind direction delivers important data about wind force to construct robust module carriers. The cooling effect of the wind on the modules can be estimated as well.

Temperature sensor
Temperature has a significant influence on the efficiency of solar panels. Thus it is essential to measure the temperature. In order to measure the temperature of the solar module, surface temperature sensors are used.

Precipitation sensor
The measurement of precipitation can give important information about the stability of the ground the solar power plant is planned on.

Data Logger Meteo-40
With 16-bit resolution, the generation of data logger Meteo-40 is prepared for the most accurate measurements. Thanks to an adjustable range up to ± 0.1 V in all analog channels, pyranometers can be connected without any additional amplifiers.

AmmonitOR (Ammonit Online Report)
The combination of Meteo-40 and the open source web platform AmmonitOR enables the management of the measurement data (archiving, monitoring, filtering, visualising, reporting and sending alert messages).

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Solar assessment with data logger Meteo-40

Ammonit offers precise measurement instruments to meet the growing demands in the field of solar assessment. In this context, the data logger Meteo-40 defines new standards in reliability, accuracy and affordability:

- 16-bit resolution assures highest accuracy
- Low voltage input channels (± 0.1 V) make expensive amplifiers redundant
- Convenient data analysis with AmmonitOR (Ammonit Online Report)

Measurement technologies

Solar radiation is divided into two components: direct and diffuse solar irradiance

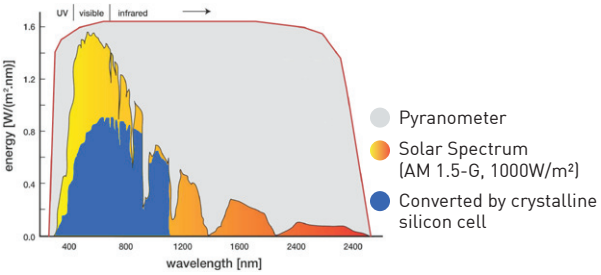
- **Direct solar irradiance** reaches the ground directly from the sun without any scattering or absorption by microscopic particles in the atmosphere
- **Diffuse solar irradiance** arrives on the ground after being scattered by air molecules, dust, water particles, etc.
- **Global radiation** is the sum of direct and diffuse radiation

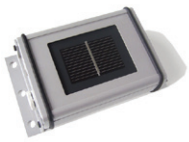
Different components of global solar radiation require specific technical solutions to measure them. Ammonit offers a variety of sensors and loggers to meet these requirements

1) Measurement of global radiation

There are two common ways to measure global radiation: with pyranometers or solar cells. Pyranometers present a linear response to complete spectral frequencies of the solar radiation, whereas solar cells transform solar light into energy, depending on the solar cell technology used. In order to forecast the expected solar energy at a given stage of currently-unknown solar technology, it is convenient to use a pyranometer combined with a solar cell. Thus as much information as possible about the behaviour of the sun can be collected.

Pyranometer
e.g., Kipp&Zonen, Hukseflux





Solar Cell

2) Measurement of diffuse & global (direct) radiation

Solar technologies (solar concentrators, photovoltaic modules, etc.) react in different ways on diffuse and direct radiation. Moreover, diverse PV technologies (mono-crystalline, poly-crystalline, thin film, etc.) respond differently to the components of sunlight. There are two possible devices that can measure direct and diffuse radiation: using the pyranometer SPN1 or pyranometer with shadow rings.

Pyranometer SPN 1

SPN1 uses an array of seven sensors and a computer pattern to measure the direct and diffuse components.

Pyranometer with shadow ring

In combination with a pyranometer, the shadow ring allows measuring diffuse radiation. A second pyranometer measures global radiation. Direct radiation = global radiation – diffuse radiation
(For more precise measurements, tracking systems with pyrheliometers are used.)

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measuring wind power
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