1. **Solar Irradiance Data:**
   * **Global Horizontal Irradiance (GHI):** The total amount of solar energy received per unit area on a horizontal surface. This data is crucial for estimating the total sunlight available at the location.
   * **Direct Normal Irradiance (DNI):** The solar radiation received per unit area on a surface perpendicular to the sun's rays. It is important for tracking the intensity of direct sunlight.
   * **Diffuse Horizontal Irradiance (DHI):** The solar radiation received indirectly from the sun, scattered by the atmosphere. It helps account for the scattered light that doesn't come directly from the sun.
2. **Weather Data:**
   * **Temperature:** Solar panels' efficiency is affected by temperature. Higher temperatures can reduce efficiency.
   * **Wind Speed:** Wind can impact the performance of solar panels and affect their cooling. Extreme wind conditions may also pose structural risks.
   * **Cloud Cover:** Clouds can significantly reduce the amount of sunlight reaching solar panels. Cloud cover data is crucial for accurate forecasting.
   * **Humidity:** While not as critical as other factors, humidity levels can still have some impact on solar panel performance.
3. **Geographical Information:**
   * **Latitude and Longitude:** The location of the solar park determines the angle and intensity of sunlight.
   * **Elevation:** Higher elevations may receive more direct sunlight, affecting the solar park's performance.
4. **Solar Panel Characteristics:**
   * **Type and Model of Solar Panels:** Different types and models of solar panels have varying efficiencies and performance characteristics.
   * **Tilt and Orientation of Panels:** The angle and orientation of solar panels impact their exposure to sunlight.
5. **System Configuration and Components:**
   * **Inverter Efficiency:** The efficiency of the inverter used in the solar park affects the conversion of DC electricity generated by solar panels into AC electricity.
   * **System losses:** Considerations for losses in the system due to factors like shading, soiling, and other technical inefficiencies.
6. **Historical Energy Production Data:**
   * Past performance data can provide insights into seasonal variations, daily patterns, and overall efficiency.
7. **Regulatory and Environmental Factors:**
   * **Policy and Regulatory Environment:** Changes in regulations or incentives can affect the economic viability of the solar park.
   * **Environmental Conditions:** Environmental factors, such as dust, pollution, or proximity to bodies of water, can influence the performance of solar panels.
8. **Load Profile:**
   * The expected energy demand or load profile for the specific location and timeframe.

Energy (kWh)=Panel Efficiency×Solar Irradiance×Panel Area×Time

For example, let's say you have a solar panel with an efficiency of 18%, the solar irradiance for your location is 5 kWh/m²/day, the panel area is 1 square meter, and you have 5 hours of sunlight during the day:

Energy (kWh)=0.18×5×1×5=4.5 kWhEnergy (kWh)=0.18×5×1×5=4.5kWh