

Meteorological Data Monitoring at Photo-Voltaic Power Plants in the U.S.

Challenge

Imperial Valley Solar Company has built the largest photovoltaic power plant in the U.S. that requires a sophisticated monitoring solution to optimize performance.

Solution

The choice fell on the ultrasonic wind sensor VENTUS from Lufft. It consists of a robust metal housing and has no moving parts, making it maintenance-free. It was purchased directly from Lufft USA.

Benefits

With the new technology, the engineer in charge ensured that the monitoring was carried out continuously and reliably and that the performance of the turbine fleet was optimized.

“ [...] the network of the site was not built for the accommodation of meteorological stations. [...] we recommended connecting the devices to the Remote Intelligent Gateway (RIG) via a secure radio frequency. This approach allows us to transfer to CA-SIO the required data while minimizing the cost of construction at the same time.”

Robert Hinchman, Business Development Manager, Trimark Associates

Technologies used

 **Lufft**



LUFFT WS500

Smart Weather Sensor

Multi-parameter weather sensor measuring temperature, rel. humidity, air pressure, wind direction/speed.

 **Lufft**



LUFFT WS503

Smart Weather Sensor

Multi-parameter weather sensor measuring temperature, rel. humidity, air pressure, wind direction/speed radiation.

Case Study

The Imperial Valley Solar Company has built the largest photo-voltaic power plant of the USA and the Lufft WS500 and WS503 compact weather sensors are an important part of this project.



Imperial Valley

Imperial Valley is located in Southern California in America and is adjacent to Arizona and Mexico. The valley is a part of the Colorado Desert and the arid climate is characterized mainly by very hot summers and mild winters. With an average maximum temperature of 31.6 degree Celsius and a minimum of eight hours of sunlight per day, the region is ideal for the production of renewable energy. The guaranteed sunshine and mostly uninhabitable desert-like land are an ideal location for photo-voltaic systems.



The IMPC plant 1 produces 300 million MW/h of electricity per year.

Weather Data Monitoring at Photo-Voltaic Power Plants in California

The Imperial Valley Solar Company (IVSC) 1 has built the largest photo-voltaic power plant in the USA. The 360 million U.S. dollar Imperial Valley Solar 1 plant is one of five planned plants in this region. It is the first to be connected to the public electricity supply of San Diego Gas & Electric energy service. Accurate real-time weather monitoring and weather forecasts from the Lufft multiparameter weather sensors WS500 and WS503 enable utilities to use the predicted available energy from renewable sources. They measure solar radiation, air temperature, wind speed and wind direction. Thus, the power output of the massive plant can be maximized and bottlenecks can be avoided through efficient power management of electricity and other energy resources.

Trimark Associates, a longtime Lufft USA partner and supplier of measurement as well as communication solutions, is locally responsible for planning, implementation and monitoring of the Imperial Valley Solar 1 plant. The decision to use Lufft weather sensors was taken because of the high quality. They are normally used only in the industrial sector, are highly reliable and long-term maintenance-free. In addition to the durability and resistance of the

sensors, the versatility of the multi-parameter data platform played a major role.

In recent years, more and more American power generators have been using professional framing sensors due to a change of state laws that require monitoring of meteorological data in grid-connected solar systems. The California Independent System Operator (CAISO) demands that all grid-connected solar power plant in California that generate more than one MW must be equipped with at least one weather station. As a 200 MW power generating solar project, Imperial Valley Solar 1 needs requires even two meteorological stations for monitoring ambient temperature, wind speed, wind direction, humidity, air temperature, solar radiation and surface temperature. CAISO monitors the operation of the statewide power grid with 300 million MW hours of electricity per year and the administration of about 80 percent of California's power flow.

Soon, the Imperial Valley Solar farms will be in full operation, generating more than 1,100 megawatts of renewable energy. Electricity will be delivered to San Diego, using a 188 km transmission line.

The WS Family



WS800

First and only smart weather sensor (WS) detecting lightning strikes. Plus measurement of temperature, rel. humidity, air pressure, wind direction/speed, precipitation intensity/quantity & radiation.

Solar Radiation

Temperature

Lightning



WS510

First and only WS with integrated Kipp & Zonen CMP10 Pyranometer (secondary standard). Plus measurement of temperature, relative humidity, air pressure, wind direction/speed & radiation.

Temperature

Wind

Solar Radiation



WS503

Measurement of temperature, relative humidity, air pressure, wind direction/speed & tiltable radiation.

Temperature

Wind

Tiltable Radiation



WS600

Smart WS measuring temperature, relative humidity, precipitation intensity/type/quantity, air pressure, wind direction/speed.

Temperature

Wind

Precipitation

Advantages of the WS Series

- Combining several sensors in one housing
- No movable parts for long-term stability
- Suitable for all climate zones

Examples of Use of the WS Series

- Weather observations
- PV-Monitoring
- Hydro-Met stations
- Building automation
- Traffic observation

Accessories of the WS Series

- Cabinet
- Power supply
- Surge protection
- ANACON analog transmitter
- ISOCON interface converter

General Specifications of the WS Series

- Ø approx. 150 mm, 1.5 kg
- RS485, 2-wire, half-duplex interfaces
- -50...60 °C operating temperature
- 0...100% RH
- IP66 protection class