

OCOVA 2011
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Andrea Bagnasco, PhD

WISELaboratory
Department of Biophysical and Electronic
Engineering – DIBE

University of Genoa
Genoa - Italy



The Laboratory



It is a joint Laboratory DIBE (University) and FOS srl (local SME)

Wireless Identification and Sensing - The laboratory is specialized in high-technology solutions in the field of wireless communication, identification, and sensing (WSN and RFID).

The WISE laboratory follows a **vertical approach**: it is able to **study and provide applicative solutions**, facing both **hardware and software** aspects.



The Projects



Some recent research initiatives at the WISE laboratory includes:

AgriWISE – it is an innovative solution based on WSN for ambient monitoring and decision support in agriculture applications. It has been applied to the olive culture and lets to monitor environmental parameters (such as humidity, temperature, leaf wetness, etc.) as well as the pest insects (*Bactrocera oleae*) population dynamics;

SoundWISE – the concept of WSN lets to create a network of inexpensive wireless microphones for pervasive noise pollution monitoring for urban area;

FarmWISE - WSN are used to monitor the temperature profile of the computer racks in a Server Farm;

SunWISE – WSN for photovoltaic power plant monitoring.



SunWISE



The SunWISE project generated a **start-up** company:

Sun Wise
bright wireless solutions



The Problem We Solve



- The **high cost of energy** production from renewable sources, compared with that from the exploitation of traditional sources (coal, oil, etc.) makes extremely important the **maximization of the efficiency** of the plants, which is achieved through **continuous monitoring** of their state.
- In the **context of photovoltaic power plants**, the experience gained from the first installed plants few years ago, has brought the need for **monitoring systems** which measure the energy output not only at inverter level, but directly from the **"strings" of solar modules**.
- SunWise products allow the **real-time monitoring and the diagnostics** of the operating status of a **medium/large photovoltaic plant**.



SunWISE String Monitor



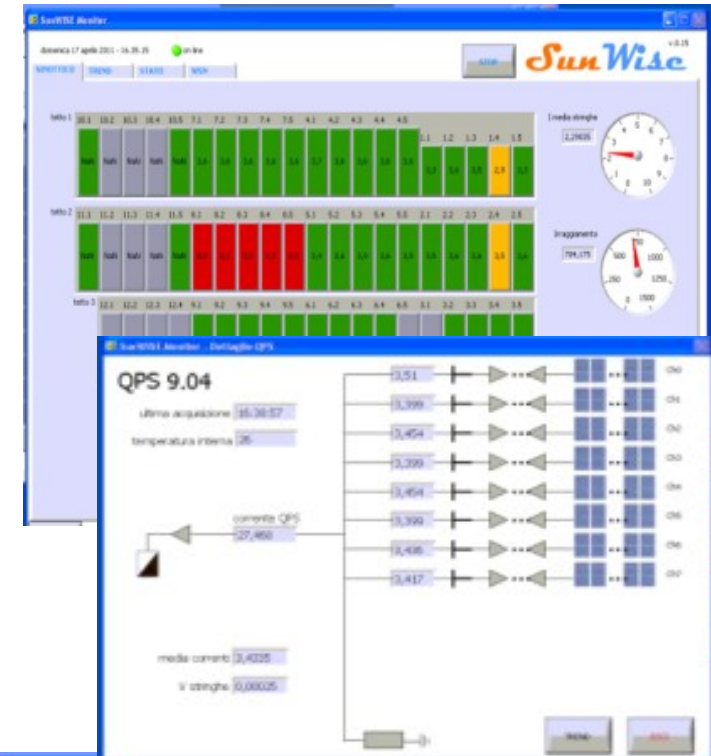
- It is a **wireless acquisition device**, able to acquire field data related to the production and the physical condition of **each single string of photovoltaic modules**.
- It has been **specifically designed** for the task and compared to traditional solutions in the market, the main added value of the product is the **lack of wiring**, resulting in a **significant reduction in installation costs** and less rigorous requirements for electrical isolation and security.
- The wireless technology is **based on the Wireless Sensor Networks approach**, that lets the creation of self-configuring networks of sensors. It has been based on the ZigBee standard and **can be powered by the photovoltaic modules under monitoring** (energy scavenging).



SunWISE Plant Analyzer



- It is a **software suite of applications** for data acquisition, storage, presentation, and analysis.
- Each module of the suite is able to **connect to different devices available on the plant**, such as inverters, energy counter, solar meter, and, of course, SunWise String Monitors.
- The SunWise Plant Analyzer has been entirely developed using LabVIEW from National Instruments. It is a de-facto standard for data acquisition and control, and makes the **SunWise Plant Analyzer open to almost all the industrial protocols and technologies.**



Advantages

- SunWise **wireless vs. cabled** string monitor
 - No communication or power cables needed
 - Reduced insulation requirements
- **cost reduction** for devices and installation hardware and work-hours
- SunWise **string monitor vs. generic** wireless daq board
 - I/O number and type are application specific
 - Totally ground insulated
 - High voltage protection
 - Energy scavenging
- **better (or unique) application fitting**



Early Adopters

At September 2011 **SunWise products are installed** in three Italian photovoltaic power generator plants:

- Solux spa, Casella (GE),
 - Rooftop
 - 2100 kWp
 - 80 SunWise String Monitor
- Energy-e Eliolite 1, Racale (LE),
 - Greenhouse
 - 988,32kWp
 - 70 SunWise String Monitor
- Energy-e Eliolite 2, Parabita (LE),
 - Greenhouse
 - 999kWp
 - 75 SunWise String Monitor.



Thank you for your attention!

info@sunwise.it

www.sunwise.it

