



We improve the yield of solar energy harvesting.

An integrated solution to **measure soiling levels** and **system degradations** for **predictive maintenance intervention** of photovoltaic systems

Energy Start Up Day Zürich 2023



Soiling, the key driver for yield loss



- **Dust deposition (soiling) on solar panels reduces productivity and hence revenue**
- Soiling is caused by various environmental factors
- By 2023 , soiling is estimated to negatively affect global solar power production by €7 billion*
- **Current soiling solutions are costly, intrusive, require maintenance and need to be operated by experts**

Pollen



Engine exhaust



Agriculture emissions

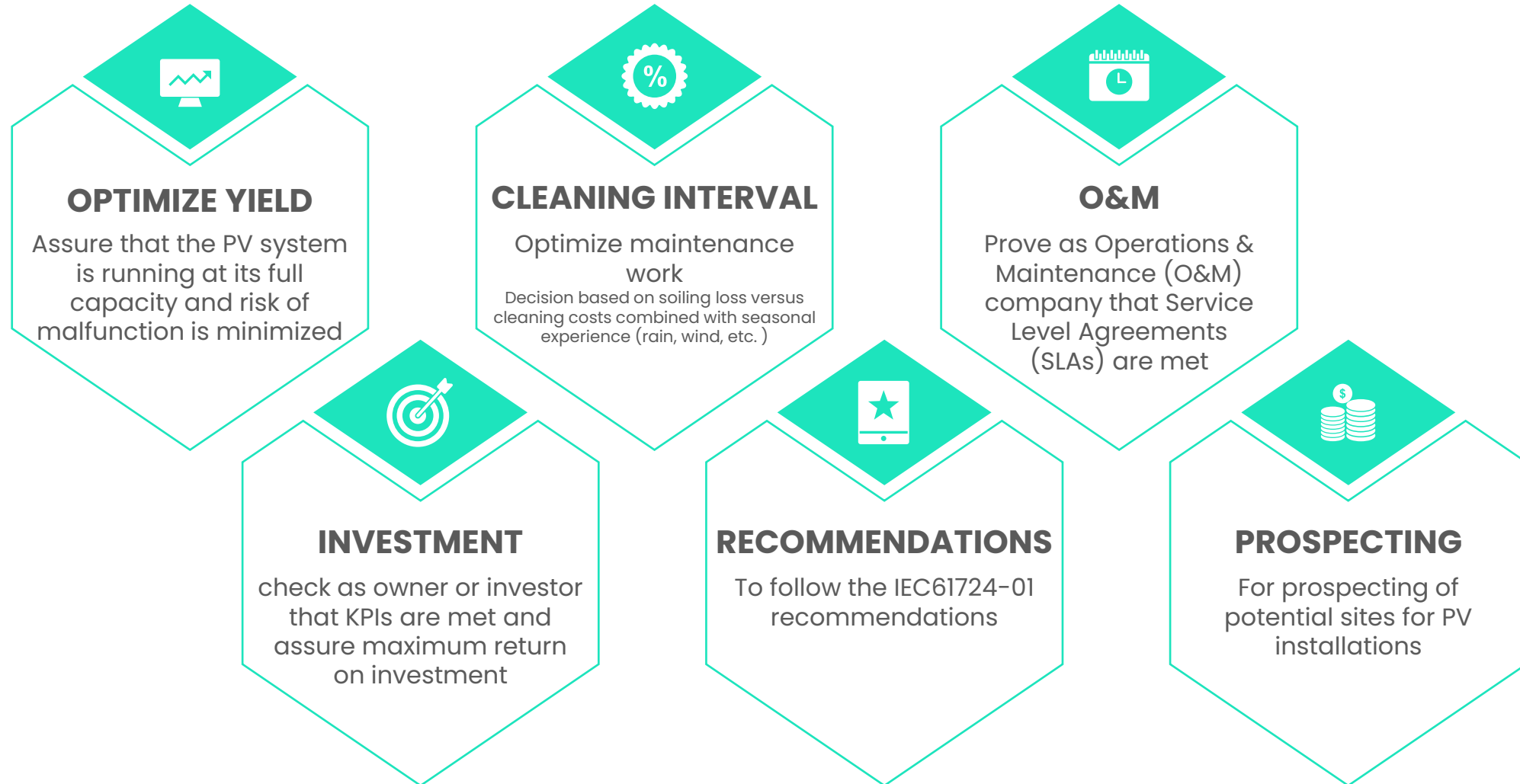


Industrial activities



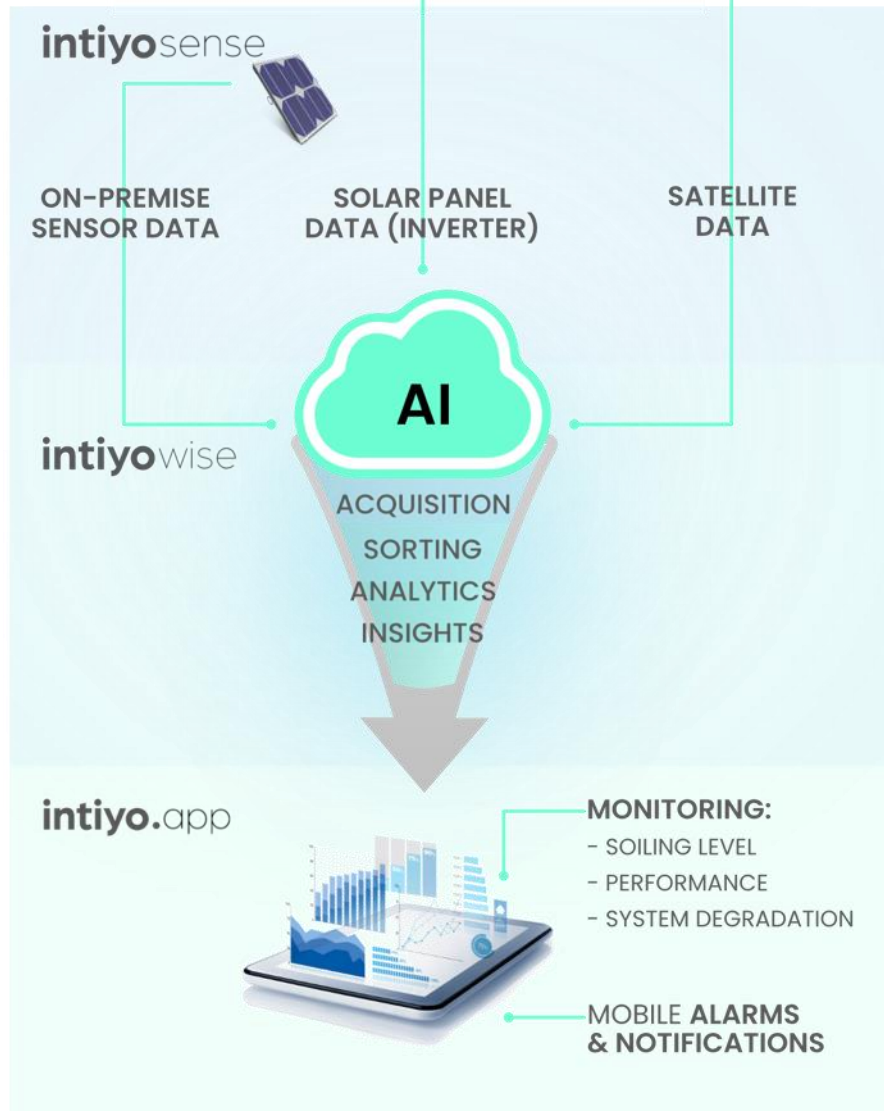
* Joule, Techno-Economic Assessment of Soiling Losses and Mitigation Strategies for Solar Power Generation

Why measuring soiling and performance?





Integrated platform



Sensor based on proprietary technology

- Mounted next to PV system
- Collects irradiation & temperature data
- Data upload in real-time (1 min. interval)

Backend & data processing engine

- Data aggregation from satellite, sensor and PV system (API)
- Data processing engine
- AI to identify soiling levels, performance and system degradation

Dashboard and reporting tool

- Web based (responsive for mobile)
- Analytics, reporting and alarms
- Alarms in case of energy loss and required maintenance

intiyo installations



intiyo^{sense}

Innovative, proprietary hardware

- Easy install in the plane of system
- No cabling and moving parts
- No external power source
- Automatic calibration
- No manual intervention
- No maintenance "Set and Forget"
- Real time data availability via WiFi





The sensor in a nutshell

- The sensor has to be installed in the plane and nearby the module / PV array.
- The unit produces its own energy and measures / transmits data even at very low irradiance (50W/sqm).
- The Wi-Fi has the standard range of 50 m. Range extender can be used if necessary.

Specifications

- **Dimension** 700 x 150 x 65mm
- **PV cells** 10 mc-silicon 125 x 125 mm
- **Electronic board** in IP 65 box
- **Warranty** 2 years
- **CE / EMV** marked
- Module design and materials tested in accordance to **IEC 61215 / 61730**
- **Weight** 3.5 kg
- **Power** 40 Wp
- **Irradiation sensor** mc - silicon
- **Temperature sensor** Pt 100



intiyo installation on commercial rooftop



Commercial rooftop installation

- Location **Vevey, Switzerland**
- Plant size **750kWp**
- Initial installation **2 intiyo**sens sensors
- Rational: measure impact of different exposures

intiyo installation for BIPV performance

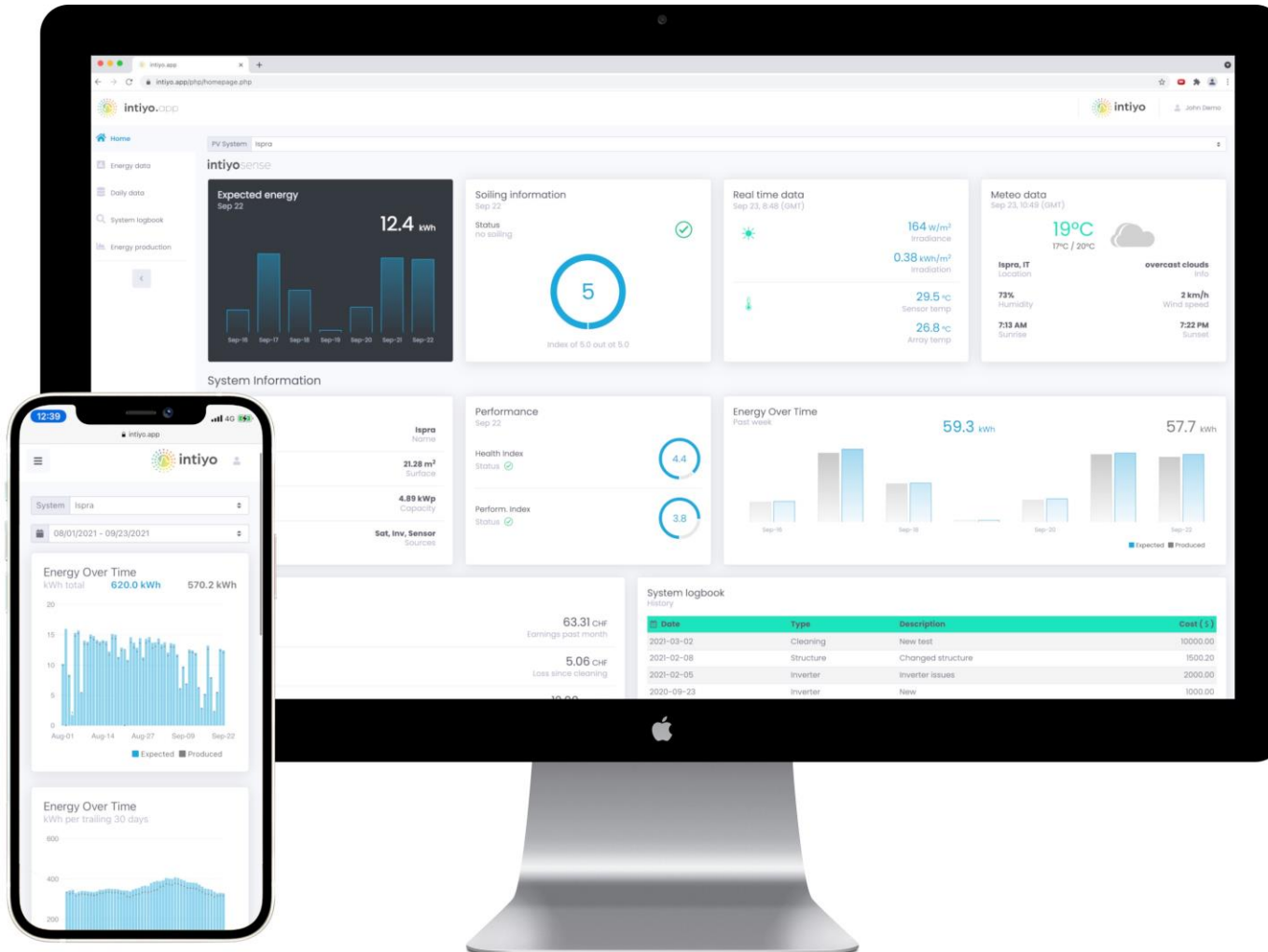


Kromatix™ 



BIPV (Building-Integrated Photovoltaics) performance monitoring

- Client: Kromatix, leading BIPV technology and module manufacturer
- Installation: Multi channel monitoring solution
- Rational: Benchmark efficiency levels of various BIPV materials
- Objective: intiyo technology built-in all commercial installations to monitor yield, soiling and potential degradations



Web based analytics solutions (responsive for mobile)

Overall system health, performance ratio, soiling and expected energy production

Turnkey solution



Benefits

The system **measures and aggregates critical key solar data** from the proprietary sensor, the PV system and the weather satellite.

It **reports soiling losses, performance degradation** and the overall health of the PV system.

Predictive Maintenance maintain and clean when it is needed

Assure reliable performance

Avoid unnecessary deterioration

Improve productivity and hence revenue

Sensor

intiyosense

Proprietary hardware



- Easy install in the plane
- No cabling and moving parts
- No external power source
- Automatic data upload via WiFi
- Automatic calibration
- No maintenance "Set and Forget"
- No manual intervention
- Real time data availability

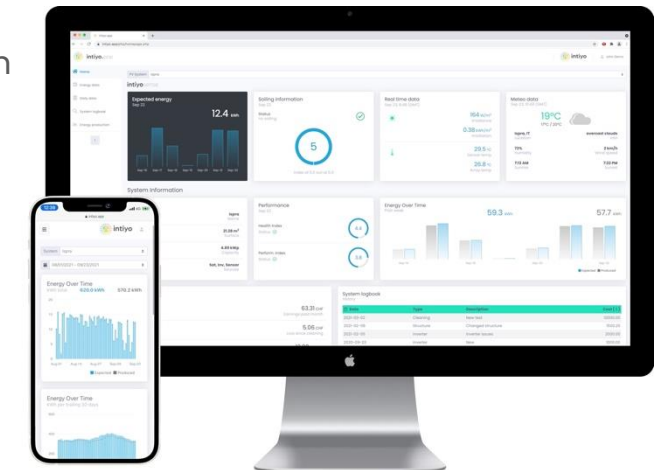
Analytics & reporting

intiyowise

Data aggregation and processing

intiyo.app

Analytics and reporting



Integrated, web based analytics solutions optimized for all browsers and mobile. The solutions enables real time analytics, overall system health assessment including various performance parameters, soiling and expected energy production.

Business model

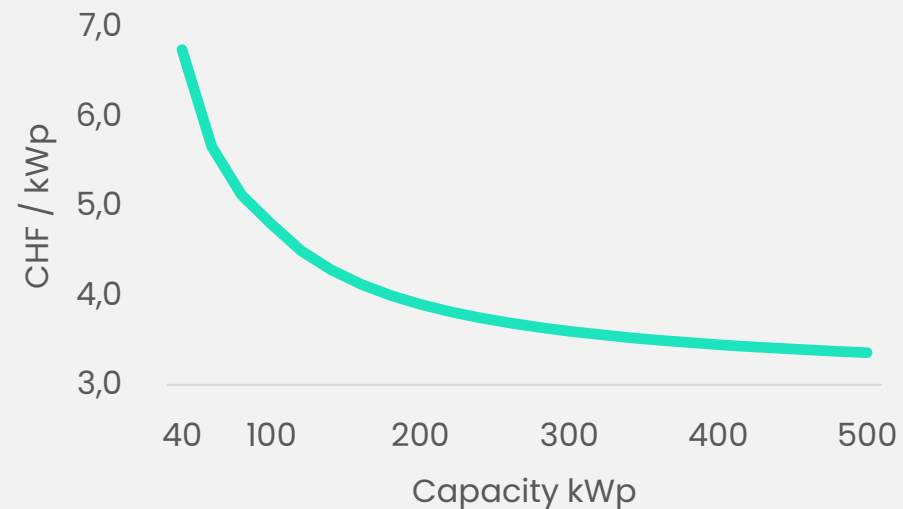


One-off

- **Per sensor (CHF 450)**
proprietary, patented technology, developed and produced by intiyo

Recurrent SaaS fee

- **Pricing based on installed capacity**
Degressive pricing model CHF/kWp



ROI

- **1.03 years payback time**
100kWp installation
Soiling loss of 5%
Feed in tariff CHF 0.19/kWh



Thank you!



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