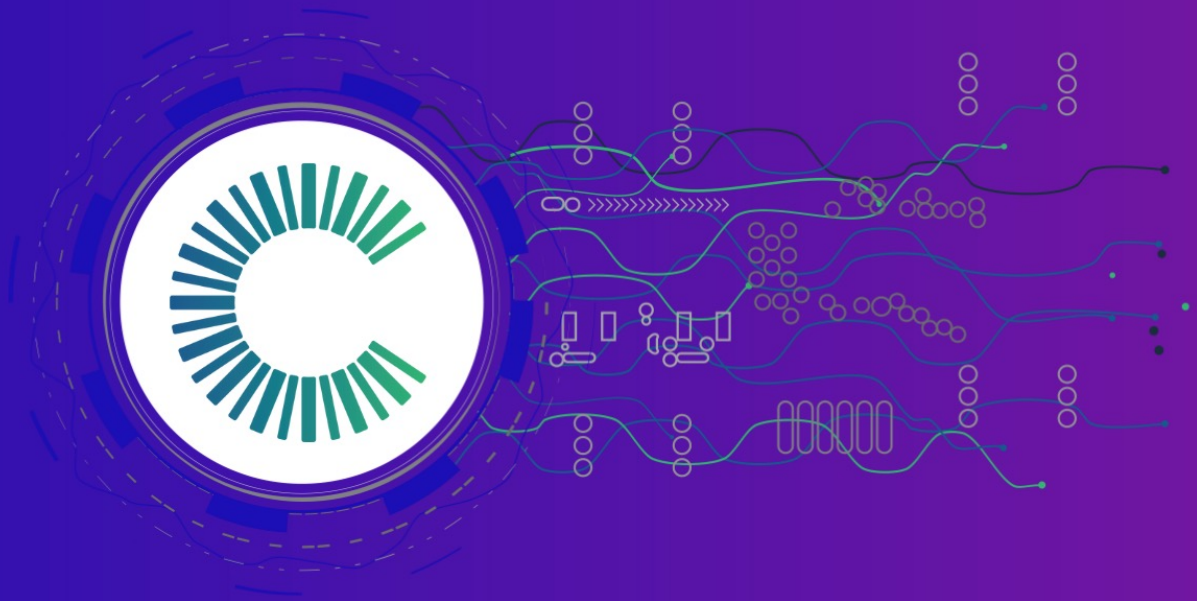

Clever solar devices
by the Numbers

INNOVATIVE SME
Valid until Feb 16th 2024

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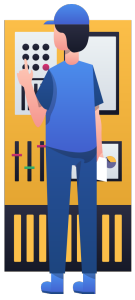
70%
REDUCCIÓN
de Costes

WHAT, WHERE in 100% of your PV at the same time while improving PRODUCTION with a MASSIVE COSTS REDUCTION up to 70%

WHAT HAPPENS AT THE END OF THE INSTALLATION'S LIFE?

Cumulative costs in 30 years for a 700.000 modules installation:

CONVENTIONAL

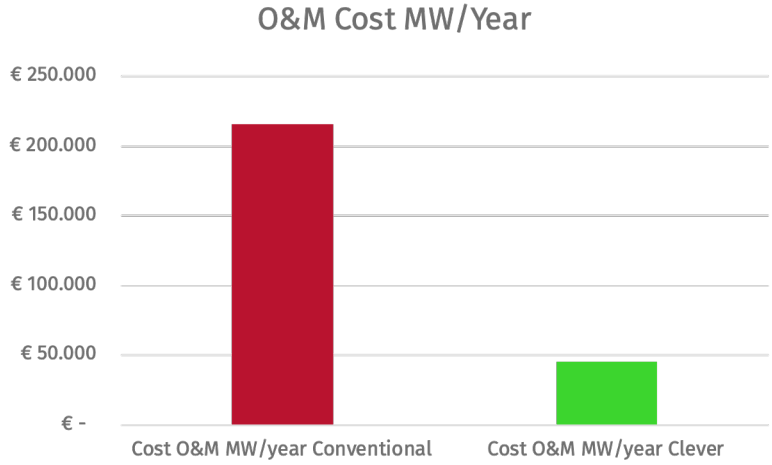


Energy cost (100€/MWh)	€	4.235.986
Total labor cost	€	35.086.042
Total Drone flights	€	294.000
Energy not produced by strings	€	132.650
Energy not produced by modules	€	268.333
Non diagnosed panels cost	€	24.741.394
Total Conventional	**€.**	**60.522.419**

CLEVER SOLAR DEVICES

CLEVER power	€	275.940
CLEVER HW	€	11.725.000
CLEVER SW	€	3.600.000
Non diagnosed panels cost	€	0 (we diagnose 100% of the panels)
TOTAL CSD	**€**	**15.600.940**

Comparing the total costs of using a conventional solution and its hidden costs compared to use Clever Dx. Plants can save up to 70% costs at the end of the PV installation life.



NOTE: This calculations have been made with 50€/KW cost, however CONVENTIONAL costs are highly dependent on electricity cost and rises exponentially when the price/KW goes up while Clever Solar Devices solutions remains unaffected.

BEHIND OUR NUMBERS

The scenario is calculated for PV production plant that requires to maximize production and reduce O&M costs.

The target is the companies that want to maximize their production capability and improve their service by reducing costs.

(Note that this analysis doesn't include other extra maintenance tasks like grass cutting, mechanical inspections)

The case study was done for 700.000 modules (280MW), if the number of modules is reduced or increased, the costs will change accordingly.
Contact us if you wish us to analyze your specific case.

THE PARAMETERS:

We consider **3 different Failure Rate (FR) stages depending on the years of life of the installation**. The FR is the frequency with which an engineered system or component fails. It has relation with the manufacturing procedure. Environmental working conditions influence increasing the failure rate. It is divided into 3 different phases; installations requires more maintenances at the beginning and end of their life.
We contemplate:

- **Early years** – 2 maintenances/year (Infant mortality - 0 to 5 years)
- **Maturity of the installation** – 1 maintenance/year (constant random failures- 6 to 16 years)
- **End of Life** – 2 maintenances/year (wear out failures – 17 to 30 years).

Installation	
Number of Modules	700.000
Hour Solar Pick (HSP)	1.752 hours
Electricity Cost (€/MWh)	100
Number of Modules/String	20

Modules			
	Early years	**Maturity**	**End of Life**
Failure rate	0,44%	0,25%	0,88%
Power (W)			
Modules Power in Watts		400	

Maintenance			
	Early years	**Maturity**	**End of Life**
String coverage	100%	50%	80%
Modules Coverage	10%	5%	15%

CONVENTIONAL Costs			
	Early years	**Maturity**	**End of Life**
Drone flight	12.000€	6.000€	12.000€
String coverage	100%	50%	80%
Module's coverage	10%	5%	15%
Troubleshooting Time (Operator's average time to access and measure):			
Per String		15 min	
Per PV Module		10 min	
Technician hourly cost			
Cost per Hour		35€	

CLEVER Dx Costs	
Hardware Investment (€/unit)	15€
Installation Time of the Hardware	2 min
Electricity Consumption of HW (mWh/unit)	300
Failure Rate (ppm)	100
Platform Fee	10.000€ /month
Technician hourly cost	
Cost per Hour	35€

The theoretical string coverage is much higher during the first operating years and last operating years due to the **greater possibility to incur in failures**. In the same way with individual PV module inspection.

The **Cost for conventional** maintenance is composed of the **energy lost due to troubleshooting, the troubleshooting time, and the required drone flights.**

Other costs impact the conventional linked to the early years are **not detecting in time manufacturing issues** and **losing component warranties.**

The cost estimated for Clever Dx platform is composed of **investment** in the Hardware (measurement devices), the **time needed for the installation**, the **power consumption** of different measurement devices, and the **platform subscription**.

No other costs are required with Clever as we don't need extra work other than just connect the cable and read the QR code.

OUR SOLUTION

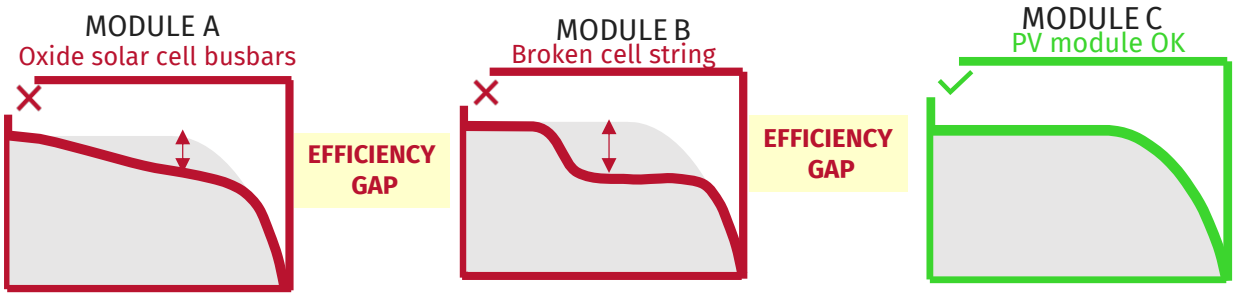
Compared to **conventional processes**, **Clever Solar Devices** provides **HIGH EFFICIENCY** and **COST REDUCTION** to Photovoltaic plants.

PV Plants today do maintenance in a **conventional way**.

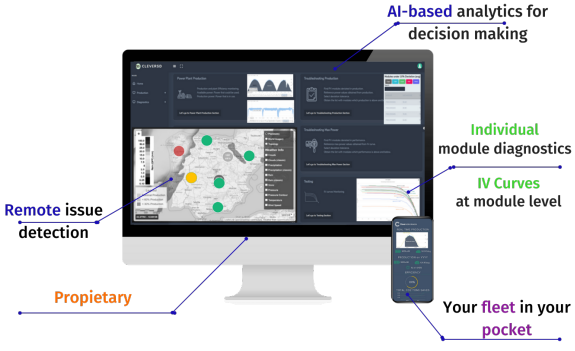
Measuring some data points on the IV curve at string level and **flying expensive drones** a couple of times a year to get **thermal and visual checks** on the status of their plants. Those processes thought stationaries today creates a lot of inefficiencies and extra costs.

We redefine the diagnosis of PV systems by remote **AI-powered digitalization**.

Clever Dx is an analytics platform to support operational decisions knowing exactly what is happening to each module in real-time.



We measure the IV curve at PV module level generating enough data to create an accurate IV curve for **efficient operational decisions**.



The **data is EXTRACTED from EVERY module** with a compact hardware that communicates via WIFI to a central **AI-based platform diagnosing 100% of the PV modules** of the plant.

We are the only ones who trace the IV curve at the PV module level, not just a single voltage and current value expressing the production. **We have the certainty in predictive diagnostics** thanks to having the **most accurate data.**

We ensure the **BEST EFFICIENCY** for PV plants

DO YOU WANT TO KNOW MORE?

You could see Pilot Power Plant performance using the FREE trial access https://demo.cleversd.com/register.php

Contact us for more details on our calculations and parameters and **get to know the numbers for your specific business**!
info@cleversd.com | +34 644 677 311