



TOTAL
COMMITTED TO BETTER ENERGY

TOTAL AND GREEN ENERGY

SOLAR IMPULSE 2



SOLAR IMPULSE ENERGY DASHBOARD

Power of the Sun on Panels



Current
sunrays
power

0 %

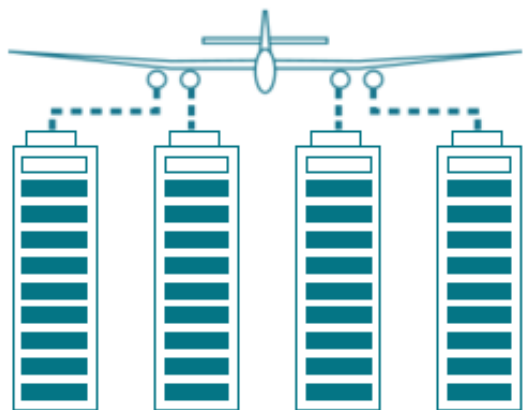
Altitude

13142 ft

Local Time

22:38

Batteries forecast



95.1%

93.6%

94.8%

93.3%

94%

92.3%

95.1%

93.5%

Batteries

95 %

93% in 1 hour

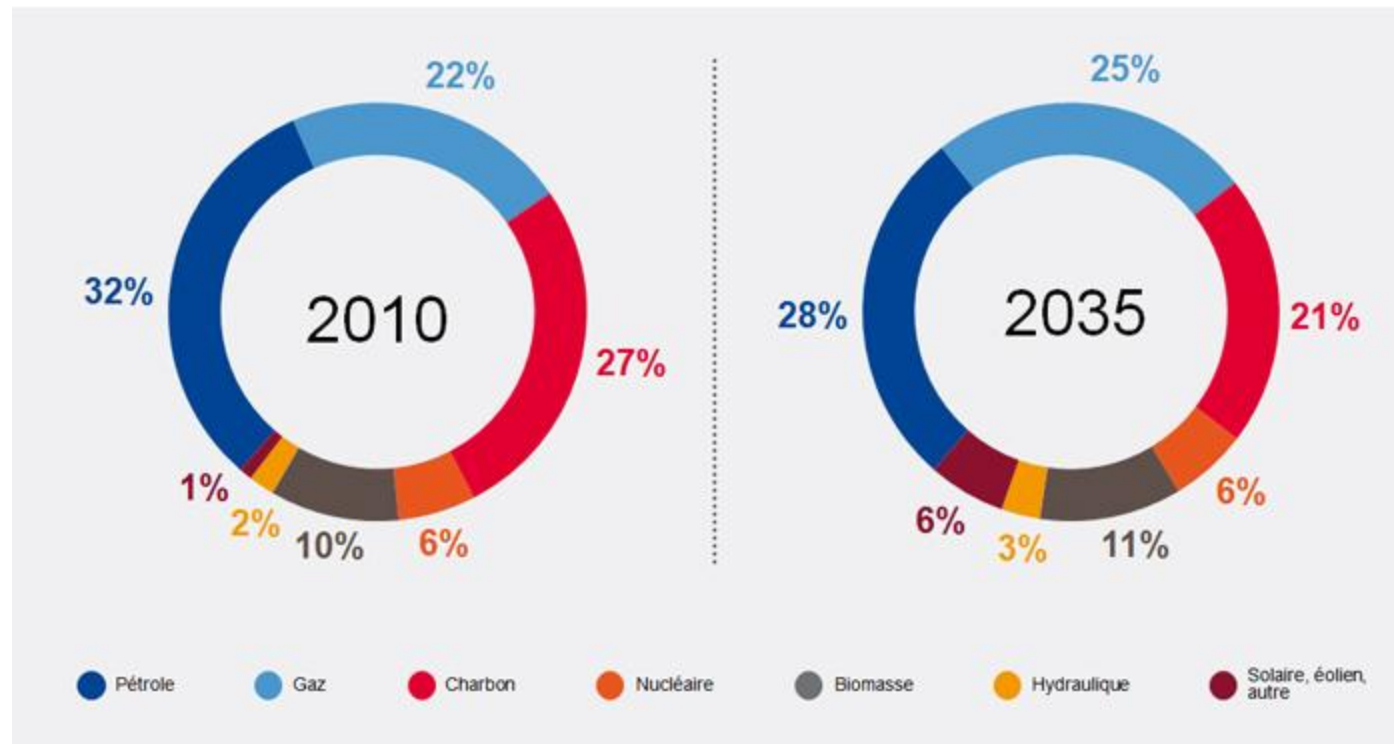
11:20

Before batteries
are expected to start
charging

POTENTIAL OF SOLAR – IEA

According to the International Energy Agency, Solar will become the primary source for electricity in 2050.

In 2035, global energy demand is expected to be 25% higher than in 2010.



SUNPOWER – TOTAL AS MAJORITY SHAREHOLDER

2
Worldwide


World Record of
Panel Efficiency
21.5%

6 GW of
Photovoltaic Panels
deployed worldwide


+7000
EMPLOYEES

SUNPOWER




+450 Patents

Revenue 2014
2.6 ** Billion \$

> 1.3 GW/Yr
Production Capacity of
Photovoltaic cells

* In terms of 2014 revenue
** Non-GAAP

SUNPOWER

SUNPOWER SOLAR SOLUTIONS

On Grid

**POWER
PLANT**



PROJETS DE
DEVELOPPEMENT

**ROOF OF
FACTORIES**



GESTION CONTRAINTES D ESPACES

**ROOF OF
RESIDENCE**



Off Grid

**REMOTE
SITES**



OFFRE MULTI-ENERGIES

SUNPOWER INTERNATIONAL PRESENCE

SUNPOWER



● Headquarters

○ EMEA APAC* Headquarters
 * EMEA: Europe, Middle-East, Africa
 * APAC: Asia Pacific

■ Manufacturing

□ Main PV installations

▽ SunPower distribution network (in Japan=partner)

★ Commercial and industrial Joint-Venture

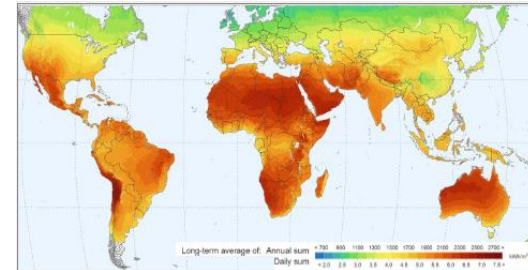


TOTAL
COMMITTED TO BETTER ENERGY

TOTAL CAMBODGE AND SOLAR

MARKET OVERVIEW

- **More than 1.6M rural inhabitants are depending on kerosene and car batteries to satisfy their lighting and electricity needs**
- **Very good level of irradiance**
- **High electricity cost (3x compared to Vietnam)**
- **Constraints on development**
 - Consumer accessibility: high cost of rural distribution network
 - Low consumer knowledge about the solar product
 - Lack of consumer confidence in solar products
 - Lack of financing solutions
 - Huge variance in quality of technical support and supplier profile



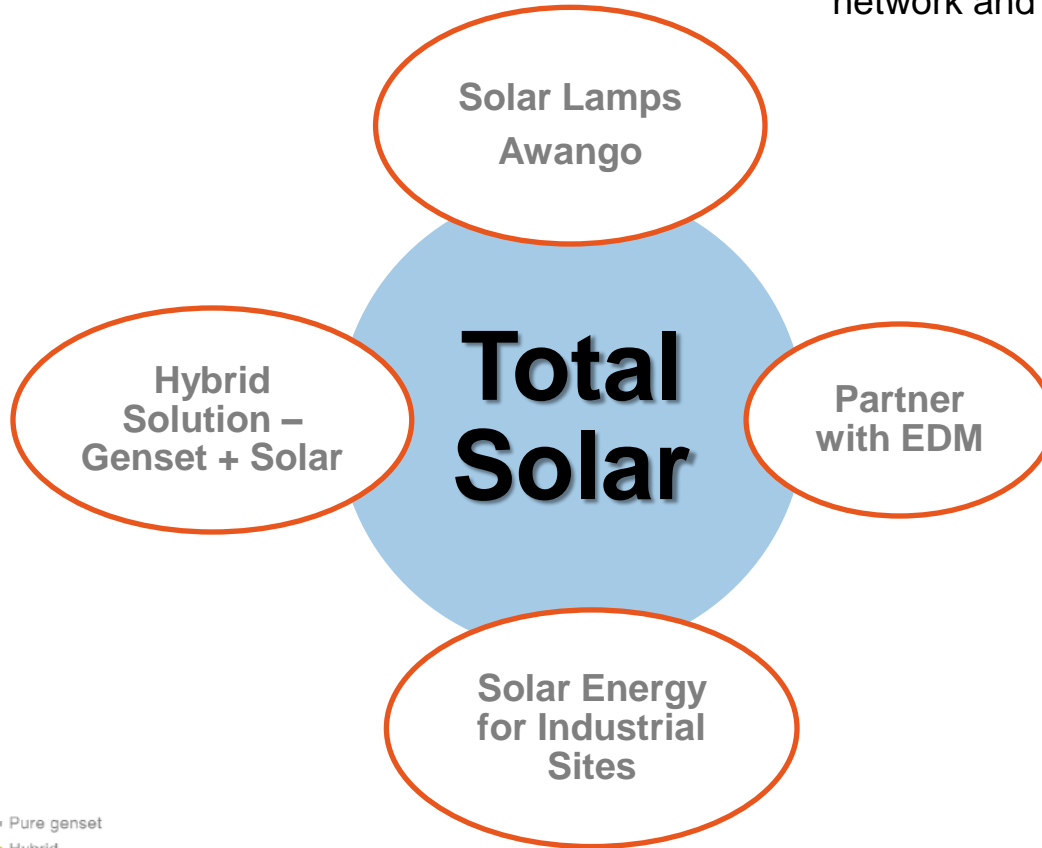
4 AXES DE DEVELOPPEMENT



Distribution through our retail network and distributors



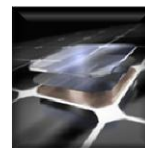
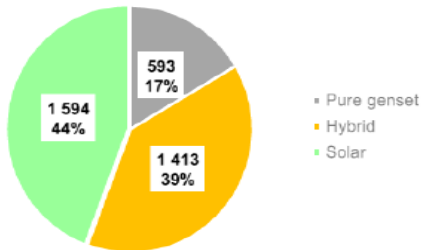
Project under development to supply remote telecom towers



ENTREPRENEURS
du Monde

Solar Lamps and SHS
+micro-financement

Off-grid sites: energy sources



Depots or stations of Total

BACKUP

Exemple: BRINGING SOLUTIONS TO THE TELECOM ENERGY CHALLENGES

1 CLIENTS



- Becoming the **Energy Solution Provider** of reference to answer our clients' needs evolutions,
- Define the relevant solutions to help our client's optimizing their energy costs
- Partner up with our client and be **Committed to Better Energy**

2 CAPABILITIES



- Worldwide footprint** (150 countries): strong market positions in Middle East Africa, growing presence in Asia Pacific and America
- Direct access to field operations and knowledge (regulations etc.) through our **network of local affiliates**
- Big Telecom companies** already clients in Africa, Asia and Caribbean Islands: diesel & lubes supply, more than 3000 solar sites

3 STRENGTHS



- Top quality products, services and reactivity: in-house solar technology with TOTAL'S asset SunPower**
- The only worldwide oil major company able to provide **diversified energy solutions including solar for the Telecom industry**
- Capabilities to develop **win-win integrated multi-energy offers, leveraging on operational local capabilities**

SUNPOWER MAXEON TECHNOLOGY

- Reliability in time and rough conditions: <http://www.youtube.com/watch?v=kdi-qmhCLgl>
- Cell performance: <https://m.youtube.com/watch?v=AHGZ92Estno>

SunPower patented back contact cell technology

With the highest efficiency of:




24.2%

World record full-scale champion cell efficiency verified by NREL

THE HEART OF THE SUNPOWER PANEL IS THE MAXEON® SOLAR CELL

- The Maxeon cell has a Fundamentally Different design from a conventional solar cell: it's built on a solid Copper foundation
- Copper plated cells cost more to manufacture than conventional solar cells, but the investment pays off with a much more durable and high-performing solar cell.
- SunPower is the only manufacturer offering a copper-plated cell – all the conventional cells are made by baking a metal paste onto the silicon wafer – just like screen-printing a logo onto a T-shirt

SunPower Panel with Maxeon



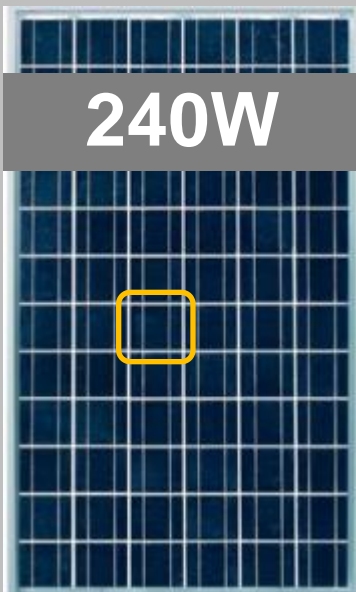
327W

FRONT **BACK**

No metal Copper-plated

The image shows a SunPower panel with a 327W rating. A yellow square highlights a single Maxeon cell. To the right, two small images show the front and back of the cell. The front is a dark, smooth surface with no metal lines. The back is a light-colored surface with a grid of vertical copper-plated lines.

Conventional Panel (same size)



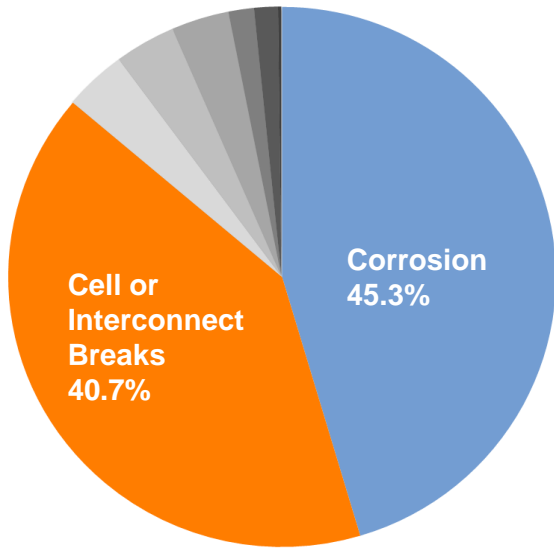
240W

FRONT **BACK**

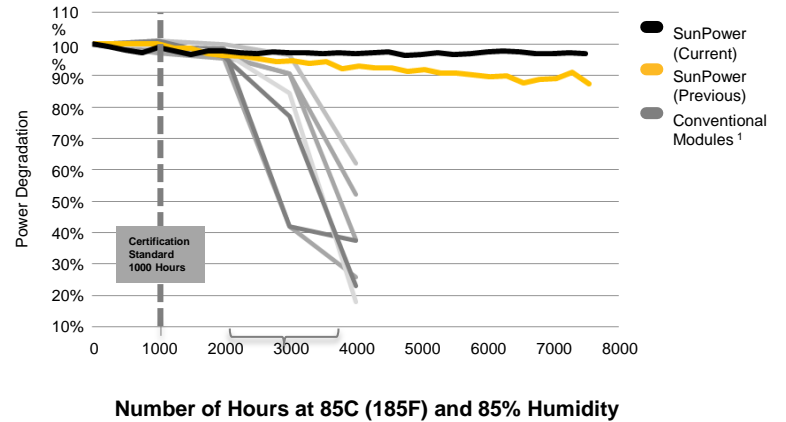
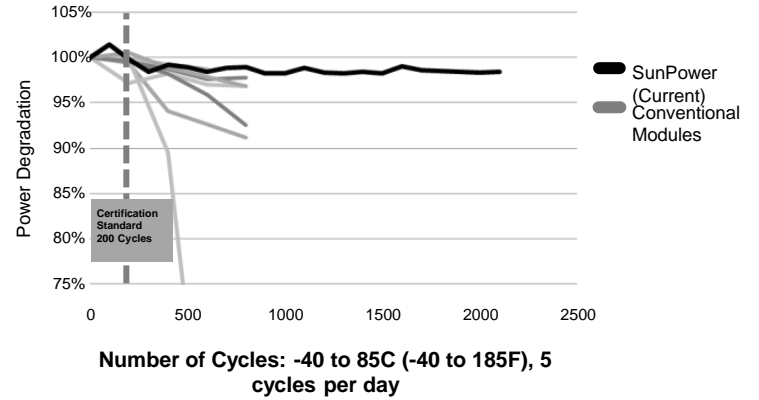
Thin lines of metal paste Full-coverage metal paste

The image shows a conventional panel with a 240W rating. A yellow square highlights a single cell. To the right, two small images show the front and back of the cell. The front has thin, dark lines of metal paste. The back has a full-coverage metal paste grid.

SUNPOWER MAXEON CELLS: UNPARALLEL LONG-TIME PERFORMANCES AND RELIABILITY



- Corrosion
- Cell or Interconnect Breaks
- Output Lead Problems
- Junction Box Problems
- Jbox Delamination
- Overheated Wires, Diodes, Terminal Strips
- Mechanical Damage
- Defective Bypass Diodes



7x
IEC

12x
ISO

5x
UL



Wohlgemuth, J. "Reliability of PV Systems."
Proceedings of SPIE, Aug, 2008.