Hingtgen, Robert J

From: Donna Tisdale <tisdale.donna@gmail.com>
Sent: Saturday, March 01, 2014 1:02 PM
To: Hingtgen, Robert J; Fogg, Mindy; Gungle, Ashley; Wilson, Adam
Subject: Soitec DPEIR-CPV brochure says no grading
Attachments: Soitec brochure_cpv_en.pdf; Soitec CX-S530-II_Technical_Data_Sheet.pdf; Soitec plug-and-sun_en.pdf; Soitec CPV Installations_V10.0 Feb 2014.pdf

Comments on Soitec Solar Development Draft Program Environmental Impact Report (DPEIR) : 3800 12-010; Tierra Del Sol, 3300 12-010 (MUP), 3600 12-005 (REZ), 3921 77-046-01 (AP); Rugged Solar, 3300 12-007 (MUP); Environmental LOG NO.: 3910 120005(ER) & Request of re-circulation of a revised DEIR

Hello Robert,

Please take note of and include the following information in the record for Soitec's Boulevard projects DPEIR and MUPs. I am submitting them as an individual and on behalf of the non-profit group Backcountry Against Dumps.

The attached Soitec CPV brochure is posted on their website and makes the following apparently false claims: http://www.soitec.com/pdf/brochure_cpv_en.pdf

- Few site requirements
- (no grading or water required)
- No water needed for operation or cooling
- Minimal impact on vegetation and wildlife
- Dual use with agriculture possible

These claims are demonstrated as false when based on their estimated grading and water use and other significant impacts for Rugged Solar, Tierra Del Sol Solar, LanWest and LanEast, removal of agriculture preserve, and through other information included in the DPEIR, and as demonstrated by Soitec's other projects.

The false claims, regarding no grading and minimal impact on vegetation and wildlife, are also contradicted by Soitec's own public relations Fact Sheets, and other documents, with evidence of clear grading, removal of virtually all vegetation, and disturbance of natural soil / binders at their following existing sites:

1. **Soitec's 1.37MW Questa New Mexico facility Fact Sheet** (173 Concentrix 18' x 21' CPV dual trackers): claims of zero water gallons per year for power production http://www.soitec.com/pdf/sites/Soitec_Questa_factsheet_en.pdf
2. **Soitec's 1.68 MW Newberry Solar 1 site in Newberry Springs,CA (60 CX-S530 CPV systems) Newberry Springs ID Card:** http://www.soitec.com/pdf/sites/Soitec_Newberry_ID_card.pdf
3. **Soitec's Newberry Springs PR video** (see video starting at 2:31 minutes for evidence of clear grading at Newberry site and at 3:30 where the video fades out just as the main glare from the CPV panels would show up):http://www.soitec.com/videos/soitec-newberry-springs/
4. **Soitec's Hazelemer 500kV site Durban South Africa Fact Sheet** (32 CX-S42 systems): http://www.soitec.com/pdf/sites/Soitec_Hazelmere_factsheet_en.pdf
5. **Soitec's Wadi El Natrun Egypt 40kW Fact Sheet** (5 Soitec CX-P6 systems) http://www.soitec.com/pdf/sites/Soitec_Wadi_El_Natrun_factsheet_en.pdf
6. **Soitec's Touwsrivier Western Cape South Africa 82kW (demonstration project) Fact Sheet (Soitec CX-P6):** http://www.soitec.com/pdf/sites/Soitec_Touwsrivier_factsheet_en.pdf

7. **Soitec's 680kW Puertollano, Castilla-La Mancha, Spain CPV plant Fact Sheet** (Soitec CX-P6): http://www.soitec.com/pdf/sites/Soitec_Puertollano_factsheet_en.pdf
8. **Soitec's 630kW Rains, Var , France Fact Sheet** (80 32m2 CPV Systems): http://www.soitec.com/pdf/sites/Soitec_Rians_factsheet_en.pdf
9. **These and other projects are documented in the Soitec CPV Installation document** dated February 2014, where all but 2 of the 12 projects shown are clear graded: http://www.soitec.com/pdf/Soitec_CPV_Installations_V10.0.pdf

Please also include these Soitec documents into the record

- **Soitec's February 2014 CPV technical data sheet that is attached and also posted here:** http://www.soitec.com/pdf/CX-S530-II_Technical_Data_Sheet.pdf
- **Soitec's 3.4kW Plug & Sun off-grid tracker system with 24/7 battery backup** that can be used as alternative distributed on-site generation: http://www.soitec.com/pdf/plug-and-sun_en.pdf

Regards,

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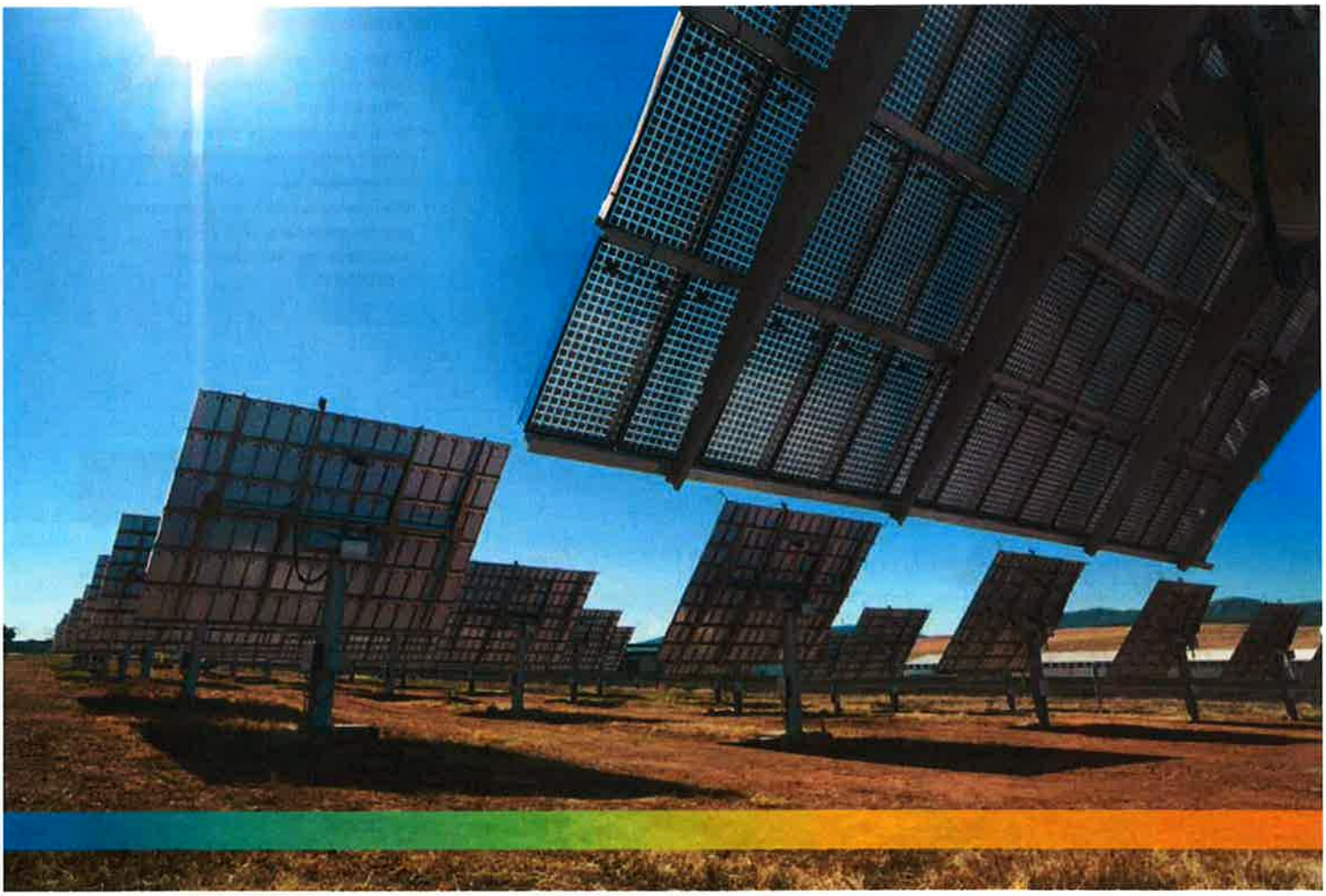
bcc: interested parties

Soitec

Concentrix™ Technology for Utility-Scale Solar Power Plants



The product

Soitec is a leading manufacturer and supplier of concentrator photovoltaic (CPV) systems using highly efficient Concentrix technology based on German engineering excellence. The company has a track record, with the first commercial power plants installed in 2008. We offer innovative CPV systems and additional services related to the project development, as well as supporting services for financing and operation & maintenance.

Why Soitec CPV power plants?

Soitec power plants are a profitable and ecological investment at the same time. Using Concentrix technology, Soitec offers a reliable, proven, cost-effective and bankable solution for energy generation in the sunniest regions of the world.

Low cost:
Concentrix technology offers low cost of energy combining:

- Low-cost materials
- High module efficiencies
- High energy yield production

Performance:
Highest efficiencies and best performance of all solar technologies – especially at hot ambient temperatures:

- Tracking enables constant power output curve throughout the day
- Solar production matches peak load demand
- Only one third of the energy loss due to heat compared to conventional silicon PV modules

Local value:
Soitec power plants can be easily and flexibly installed using local content and workers:

- Few site requirements (no grading or water required)
- Installation with local workforce and only a few specialists
- Commissioning in phases
- Sustainability of technology eases the permitting

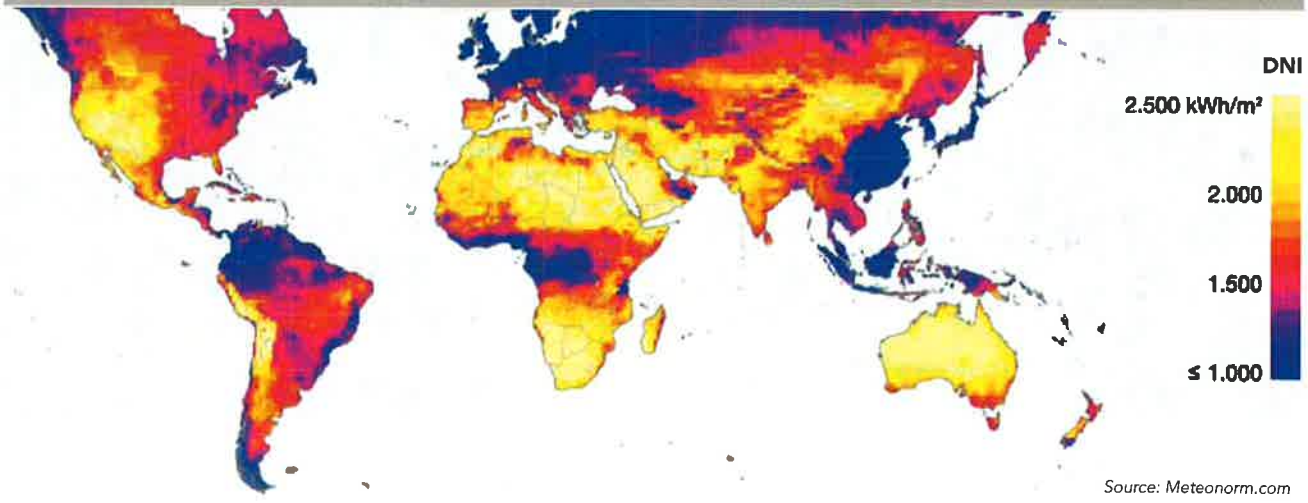
Green:
Soitec power plants use the most environmentally friendly solar technology:

- Short energy payback time
- Low environmental footprint
- No need for water during operation or for cooling
- Optimum use of land

Reliable:
The reliability of our power plants is proven by field data and through extensive reliability testing (IEC62108, CEC listing). This is achieved by a simple, robust and conservative design and material approach that is well suited for mass production:

- Glass-glass design, comparable to a double-glazing window with 30-40 years lifetime
- Small lens aperture area to reduce power consumption and working temperature of the cell
- Manufactured with full automation, proven materials, well-known processes and standard use equipment

CPV is perfectly suited for high-DNI regions



Source: Meteonorm.com

The technology

How it works

Concentrix technology uses Fresnel lenses made of silicone-on-glass to concentrate sunlight by a factor of 500 onto tiny, highly efficient, multi-junction solar cells. These cells are mounted on a base plate made of glass and convert the concentrated light directly into electrical energy. The lens plate and the base plate are connected via a metal frame and comprise a concentrator module.

The concentrator modules are mounted on a two-axis tracking system that follows the sun. It ensures that the focus point of the concentrated sunlight is directly on the cells at every moment of the day.

Components of Concentrix technology

Soitec's Concentrix technology is a very innovative, high-performance technology that consists of well-adapted, high-quality components. The components are designed for longevity and durability to ensure high performance during the lifetime of the systems.

Multi-junction cells

Concentrix technology uses optimized III-V based multi-junction cells (GaInP/GaInAs/Ge).

For almost 20 years, multi-junction cells have been used in space applications. The energy yield and the potential of these high-efficiency cells are enormous. In the lab, efficiencies of more than 41% have been achieved. This is double the efficiency of conventional solar cells.

In comparison to conventional solar cells, multi-junction cells are more efficient but also more expensive to manufacture. By using cost-effective concentrating lenses to focus the sunlight on these multi-junction cells, it is possible to minimize the amount of semiconductor material. The cells Soitec uses are only millimeters in diameter. This principle enables the manufacturing of CPV modules that are highly efficient and inexpensive at the same time.

CPV module

Soitec's Concentrix modules are made up of a lens plate (Fresnel lens) and a base plate on which high-performance solar cells are mounted.

For its module construction, Soitec uses elements from the circuit board industry and an insulating glass technology that are both cost-effective and have been proven reliable over many years. Precision and quality in the module manufacturing lead to an extremely high average module efficiency of almost 30%. Soitec's Concentrix modules are IEC62108 certified and won listing with the California Energy Commission (CEC).

Inverter

Soitec selects the most reliable and efficient inverters, enabling electricity conversion with very low losses. Two different types of inverters exist: string inverters and central inverters. Concentrix technology has been developed so that it can use both types of inverters.

Tracking system

Concentrix technology from Soitec requires the use of a two-axis tracking system. This system ensures that the focus point of the concentrated sunlight is exactly on the cells at every moment of the day. It uses unique, proprietary software and algorithms to position the tracker. Besides the astronomical positioning, it monitors the DC power output and calculates the next optimum position to maximize the system's power generation. Soitec uses the most reliable tracking systems, enabling constant energy production even at high wind speeds and requiring only simple maintenance for gears and motors.

The company

Soitec is an international company, a world leader in generating and manufacturing revolutionary semiconductor materials at the frontier of the most exciting challenges for energy and electronics.

Soitec's products and technologies dramatically improve energy-efficiency, performance, miniaturization, reliability and the quality of our daily life.

Headquartered in Bernin, France, with two high-volume fabs on-site, Soitec has offices and fabs in the United States, Germany, Japan, China, Taiwan and Singapore. Soitec shares have been listed on Euronext Paris since 1999.

In the solar market, Soitec is one of the leading technology providers of CPV modules and systems based on its Concentrix technology. Soitec has a proven track record with the first commercial power plants installed in 2008 and world-leading module efficiencies of almost 30%. Concentrix technology is a result of more than 15 years of research and 6 years of industrial implementation. It is IEC certified and CEC listed as well as field proven.

Soitec operates one of the world's most modern production lines for manufacturing CPV modules. Reliable, fully automated manufacturing processes ensure the high quality and durability of Soitec's products.

History

Soitec's Concentrix technology originated at the Fraunhofer Institute for Solar Energy Systems ISE, the largest solar research institute in Europe. Basic research into the technology was conducted over more than 10 years.

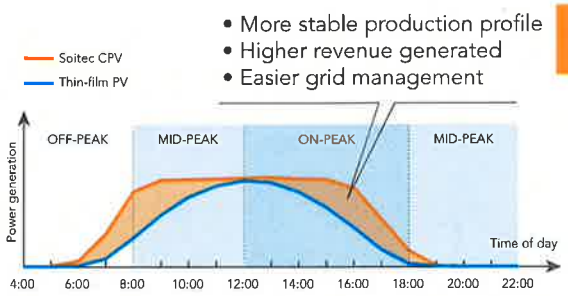
In 2005, Fraunhofer ISE spun-off a company to commercialize the technology. It developed a complete CPV system equipped with modules, a tracking system and an inverter. The company was acquired by Soitec in 2009.

Optimizing CPV technology

With our R&D department, we are continually working on improvements in the product design, the production quality and the output of our Concentrix technology in order to increase efficiency, to lower costs even further and to guarantee the product quality and performance for our customers.

By combining proven and certified Concentrix technology with Soitec's Smart Cut™ and Smart Stacking™ technologies, Soitec is paving the way for market-leading solar power plant efficiencies of 35%.

Leading the solar energy revolution in high-DNI regions



- More stable production profile
- Higher revenue generated
- Easier grid management

Energy production profile fits perfectly with demand

- Constant power production throughout the day including peak times when it is most valuable
- Very high electricity yields through low heat degradation at hot ambient temperatures

Local content, local value, local jobs

- Local jobs for construction, operation and maintenance
- Economic development through local manufacturing of components
- Indirect jobs for the local economy

Clean energy with a light environmental footprint

- No water needed for operation or cooling
- Minimal impact on vegetation and wildlife
- Dual use with agriculture possible
- Short energy payback time
- High recyclability

Low cost of energy

- Lowest cost per kWh
- Twice as efficient as state-of-the-art PV
- Low-cost materials such as glass and silicone
- Semiconductor area reduced to a fraction of the solar module size

Worldwide contacts

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Soitec Concentrix™ Technology Powers CPV Solar Power Plant in New Mexico

Soitec is a world leader in developing and manufacturing revolutionary semiconductor materials for microelectronics and energy applications. With the commercialization of its proprietary utility-scale Concentrix™ concentrating photovoltaic (CPV) technology, the company is now bringing its formidable R&D and manufacturing expertise to the solar power industry. Concentrix™ CPV systems have amongst the lowest environmental impact and shortest energy payback of any solar power technologies.

The Project

The CPV power plant is located in one of the smallest villages in the country. Situated on remediated land on a mine tailings facility near Questa, New Mexico, the Chevron solar power plant employs Soitec's Concentrix™ technology which includes 173 solar tracking systems approximately 18' by 21' in size. Each system houses Fresnel lenses that concentrate sunlight 500 times onto small, high-efficiency multi-junction solar cells. For maximum performance, the systems are mounted on pivoting dual-axis trackers that follow the sun's movement throughout the day. The tracking systems maximize energy generation, providing it to the local electric utility when it is needed most. The plant is capable of producing 1.37 MW_p of clean, renewable energy - enough to power all of Questa's 350 homes.

With its high altitude of 7,500 feet – and preponderance of clear skies and direct sunlight - the mountainous New Mexico region provides an ideal solar resource for CPV systems. The Questa mine tailings site required a solar power technology that could adapt to the remediated land's unique environmental needs. Soitec delivered a CPV solution with maximum energy-generating capacity and minimal impact on the local natural environment. Additionally, construction and on-going operations and maintenance efforts at the solar power plant provide much-needed economic development and job diversification for the Questa community.

The Benefits

Soitec's Concentrix™ CPV technology has many industry-leading benefits including amongst having the shortest energy payback of any solar power technology, as well as an exceedingly low environmental footprint. The systems have a high content of recyclable material, and require no water for ongoing operations - a major advantage in the hot, dry desert climates - most amenable to solar energy production.

Additionally, since Soitec's CPV systems are pedestal-mounted, they are slope-tolerant and require no disruptive land grading. The pedestal foundations reduce the impact on native vegetation and allow for dual land use. Finally, their shallow foundation design provides site flexibility and requires minimal ground penetration, making utility-scale solar power installations even more cost effective.

The Questa solar power plant confirms the attractiveness of Soitec's renewable energy technology – which generates large amounts of power with industry-leading efficiency and low environmental impact – in areas such as New Mexico that have abundant sunshine.

About Soitec

Soitec is an international manufacturing company, a world leader in generating and manufacturing revolutionary semiconductor materials at the frontier of the most exciting energy and electronic challenges. Soitec's products include substrates for microelectronics (most notably SOI: Silicon-on-Insulator) and concentrator photovoltaic systems (CPV). The company's core technologies are **Smart Cut™**, **Smart Stacking™**, and **Concentrix™**, as well as expertise in epitaxy. Applications include consumer and mobile electronics, microelectronics-driven IT, telecommunications, automotive electronics, lighting products, and solar power plants for large-scale utilities. Soitec has manufacturing plants and R&D centers in France, Singapore, Germany, and the United States.

For more information, visit the website **www.soitec.com**

Project Highlights

Location	Questa, New Mexico (USA)
Power Plant Commissioned	January 2011
Power Plant Capacity	1.37 MW_p installed capacity
Number of CPV Systems	173
Water Used	Zero gallons per year in power production

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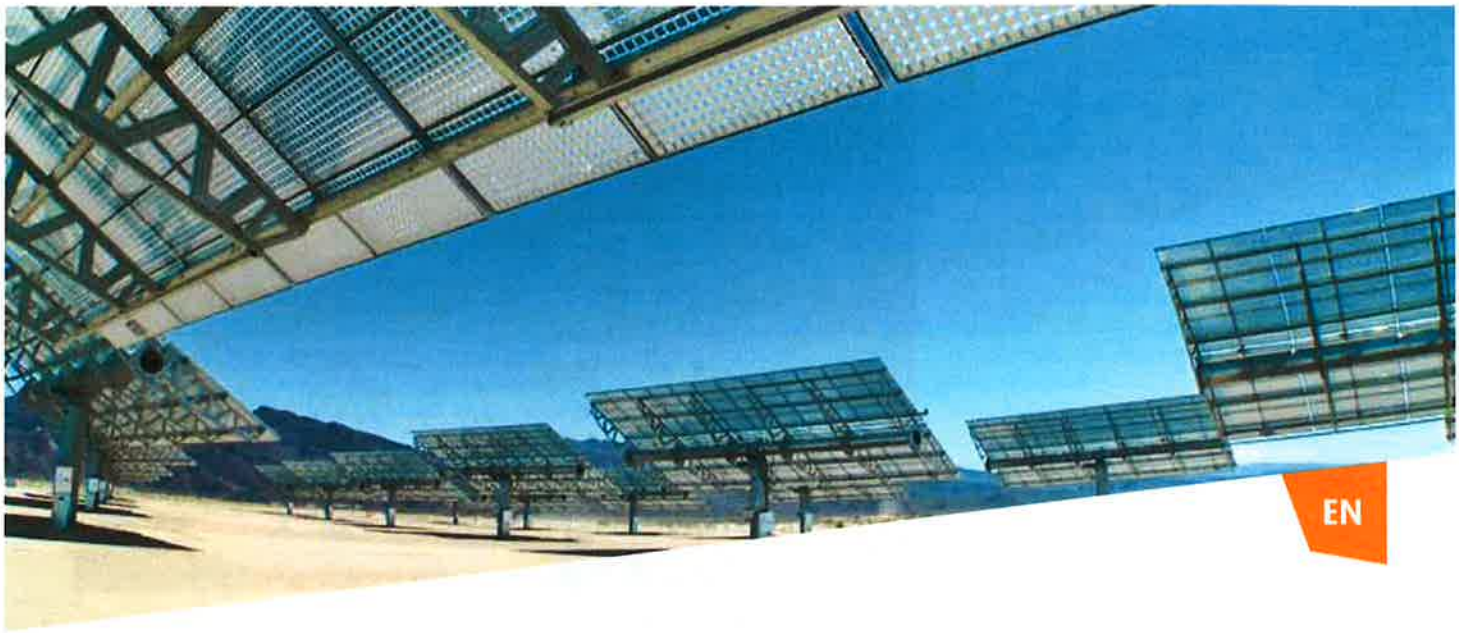

EN

Soitec

CPV POWER PLANT

NEWBERRY SPRINGS

PARTICIPANTS

CPV SYSTEM PROVIDER
Soitec S.A.

PROJECT DEVELOPER
Soitec S.A.

CONSTRUCTION
Blattner Energy, Inc.

PROJECT DESCRIPTION

In Newberry Springs, Soitec built its first CPV Power Plant in California. It is also the first CPV Power Plant which uses CPV Modules made in Soitec's new San Diego manufacturing facility.

Newberry Springs is located in the Mojave Desert about half way between Los Angeles and Las Vegas. This area receives brilliant direct sunlight almost 360 days a year. Here Soitec built a state-of-the-art CPV Power Plant. It connects directly to Southern California Edison's distribution network and provides 500 homes with clean, renewable energy. For the first time, Soitec used CPV Modules made in the USA. Since December 2012, Soitec produces CPV Modules in a 280 MW_p production facility in San Diego. This facility makes Soitec one of the top three solar module manufacturers in the USA.

QUICK FACTS

Country	**USA**
Location	**Newberry Springs, CA**
Capacity	**1.68 MW_p**
CPV System	**60 Soitec CX-S530**
Installed	**2013**

INFO & CONTACTS

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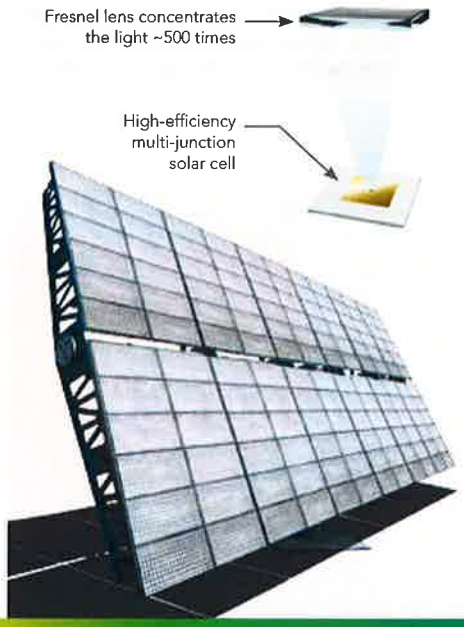
ABOUT SOITEC

Soitec is a world leader in generating and manufacturing revolutionary semiconductor materials, at the frontier of the most exciting energy and electronic challenges. The company has been founded in 1992 and is stock listed at the Euronext in France.

Soitec Solar is an industrial Concentrator Photovoltaic (CPV) Systems manufacturer. The company has a track record in more than twenty countries. Our innovative CPV Systems are specifically designed for the sunniest regions of the world.

We also offer a strong expertise in project development as well as operation and maintenance services. By exploiting the synergies of our proprietary semiconductor technologies for solar, we are committed to bring solar cells with record efficiency into production to further increase our systems efficiency.

CPV TECHNOLOGY



Soitec's Concentrix™ technology uses Fresnel lenses made of silicone-on-glass to concentrate sunlight by a factor of 500 onto tiny, highly-efficient multi-junction solar cells on the receiver plates. The cells convert the light directly to electrical energy. Lens plates and receiver plates are connected with a metal frame and comprise a CPV Module.

The CPV Modules are mounted on a dual-axis tracker that follows the sun. It ensures that the focus point of the concentrated sunlight is on the cells at every moment of the day to maximize the power output.

Concentrator Photovoltaic Power Plant in Hazelmere

This CPV Power Plant was installed to power the COP17 Climate Conference in Durban, November 28 – December 9, 2011. It is the first commercial CPV Power Plant in South Africa, inaugurated by His Excellency, President Jacob Zuma in December 2011.

Soitec is a leading manufacturer and supplier of Concentrator Photovoltaic (CPV) Systems using highly efficient Concentrix™ technology based on German engineering excellence. The company has a successful track record, with the first commercial power plants installed in 2008. We offer innovative CPV Systems and additional services related to project development, as well as supporting services for financing, operation and maintenance.

Location	Hazelmere, Verulam, ERF 1970
Soitec involvement	Turnkey contract
Capacity	500 kW_p (32 Systems)
CPV System type	Soitec CX-S420
Construction	October - November 2011
Grid connection	December 2011

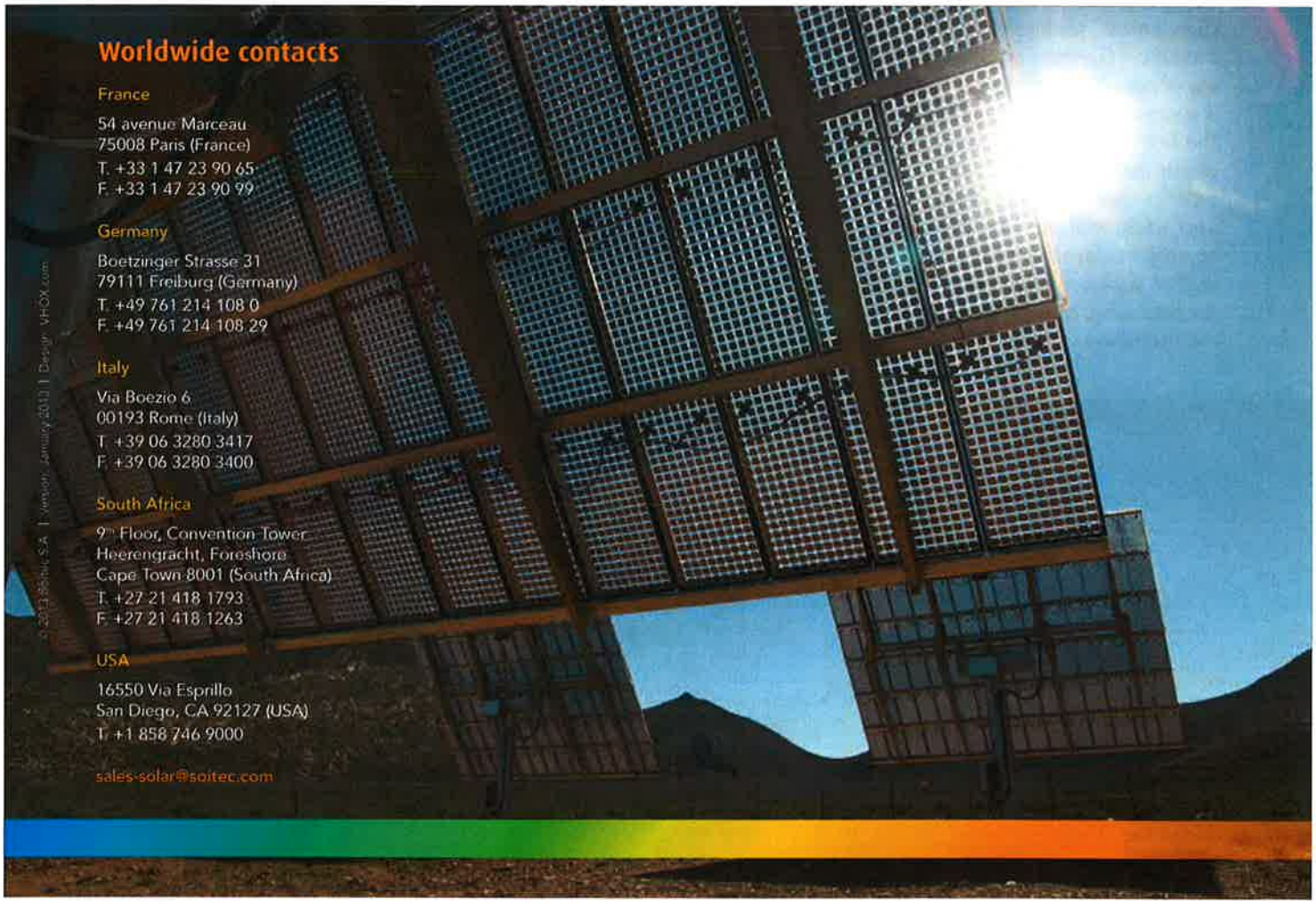
www.soitec.com

Soitec

Utility-Scale Power Plants
Based on Concentrix™ Technology

Concentrator Photovoltaic Power Plants for high irradiation regions

- Highest efficiency, best performance
- Local value, local content, local jobs
- Lowest cost of electricity
- Most environmentally friendly solar technology



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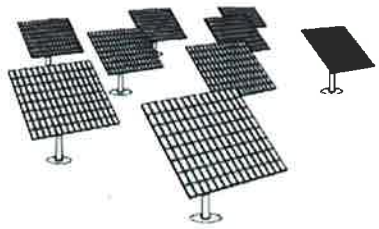
Soitec

Concentrator Photovoltaic Power Plant in Wadi El Natrun



In the frame of the NACIR Project, the most advanced European Concentrating Photovoltaic (CPV) technologies have been installed in Egypt. NACIR is a European initiative dedicated to cooperation with mediterranean partner countries in the field of concentrating photovoltaic. Soitec installed a 40kW$_p$ stand alone CPV Power Plant used for water pumping and irrigation purposes. This collaborative project focused on EU cooperation with mediterranean partner countries.

This demonstration project illustrates the use of the Soitec CPV Concentrix™ technology in an island system: a storage solution feeds an irrigation water pump and a desalination factory. The CPV Systems are integrated in an installation comprising batteries, irrigation pumps and desalination. The control of the electricity consumption is supervised by Fraunhofer ISE.

Location	Wadi El Natrun, Egypt
Customer	National Water Research Center
Installed Systems	5 Soitec CX-P6 Systems
Capacity	40kW$_p$
Installation	2010

www.soitec.com

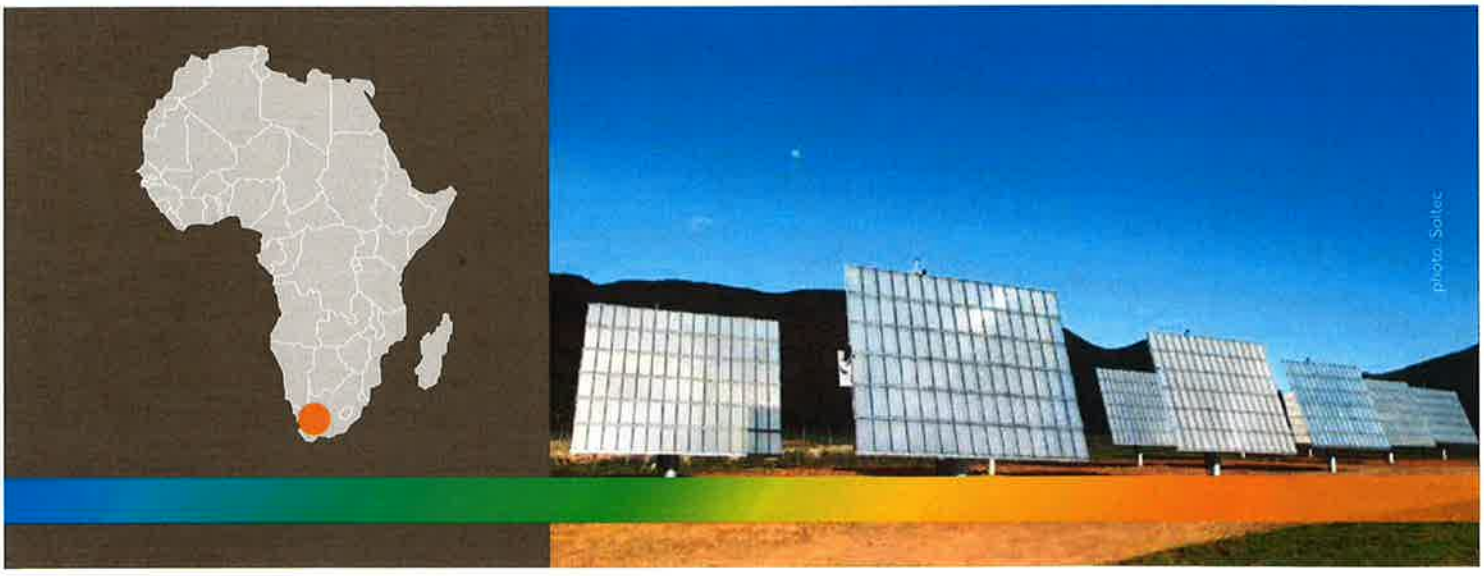
Soitec

Concentrator Photovoltaic Power Plant in Touwsrivier

Situated at the Aquila Private Game Reserve, Touwsrivier, South Africa, this CPV installation is used as a demonstration for the larger 44 MW_p solar power plant that will be located on an adjacent site. In addition to supplying energy to the reserve during daylight hours and promoting ecotourism, it serves as a test bed and training ground for the development and construction of the larger site. The CPV Power Plant is owned and operated by Soitec.

Soitec is a leading manufacturer and supplier of Concentrator Photovoltaic (CPV) Systems, using highly efficient and innovative Concentrix™ technology. We offer innovative CPV Systems and supporting services, including project development, as well as financing, operation and maintenance. Soitec has a successful track record with the first commercial CPV Power Plants installed in 2008.

Location	Touwsrivier, Western Cape, South Africa
Soitec involvement	Turnkey contract
Customer	Soitec
Capacity	82 kW_p (60 kW AC)
CPV System type	Soitec CX-P6
Installation	2010



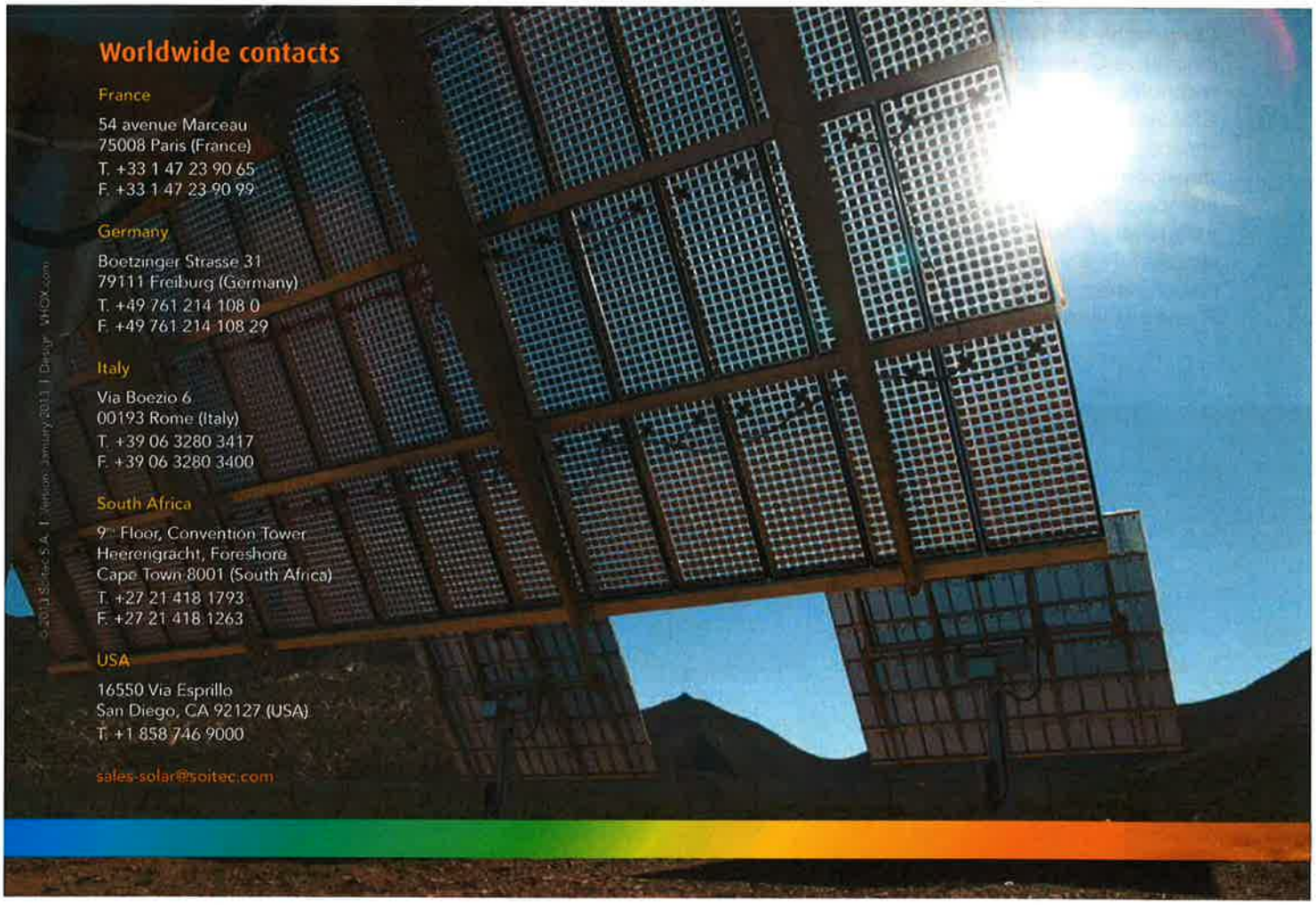
Soitec

Utility-Scale Power Plants

Based on Concentrix™ Technology

Concentrator Photovoltaic Power Plants for high irradiation regions

- Highest efficiency, best performance
- Local value, local content, local jobs
- Lowest cost of electricity
- Most environmentally friendly solar technology



www.soitec.com

Concentrator Photovoltaic Power Plant in Puertollano

Puertollano, Castilla-La Mancha is a 680 kW_p CPV Power Plant, part of a 3 MW CPV project and one of the first large-scale solar power plants in Europe to use highly efficient III-V multi-junction solar cells. In its four years of operation, data from Soitec's CPV Systems has been closely monitored by ISFOC (Instituto de Sistemas Fotovoltaicos de Concentración CPV) and demonstrated the high availability and efficient energy production levels of Concentrix™ technology.

Soitec is a leading manufacturer and supplier of Concentrator Photovoltaic (CPV) Systems, using highly efficient and innovative Concentrix™ technology. We offer innovative CPV Systems and supporting services, including project development, as well as financing, operation and maintenance. Soitec has a successful track record with the first commercial CPV Power Plants installed in 2008.

Location	Puertollano, Castilla-La Mancha, Spain
Soitec involvement	Turnkey contract
Customer	ISFOC S.A.U.
Capacity	680 kW_p
CPV System type	Soitec CX-P6
Installation	2008

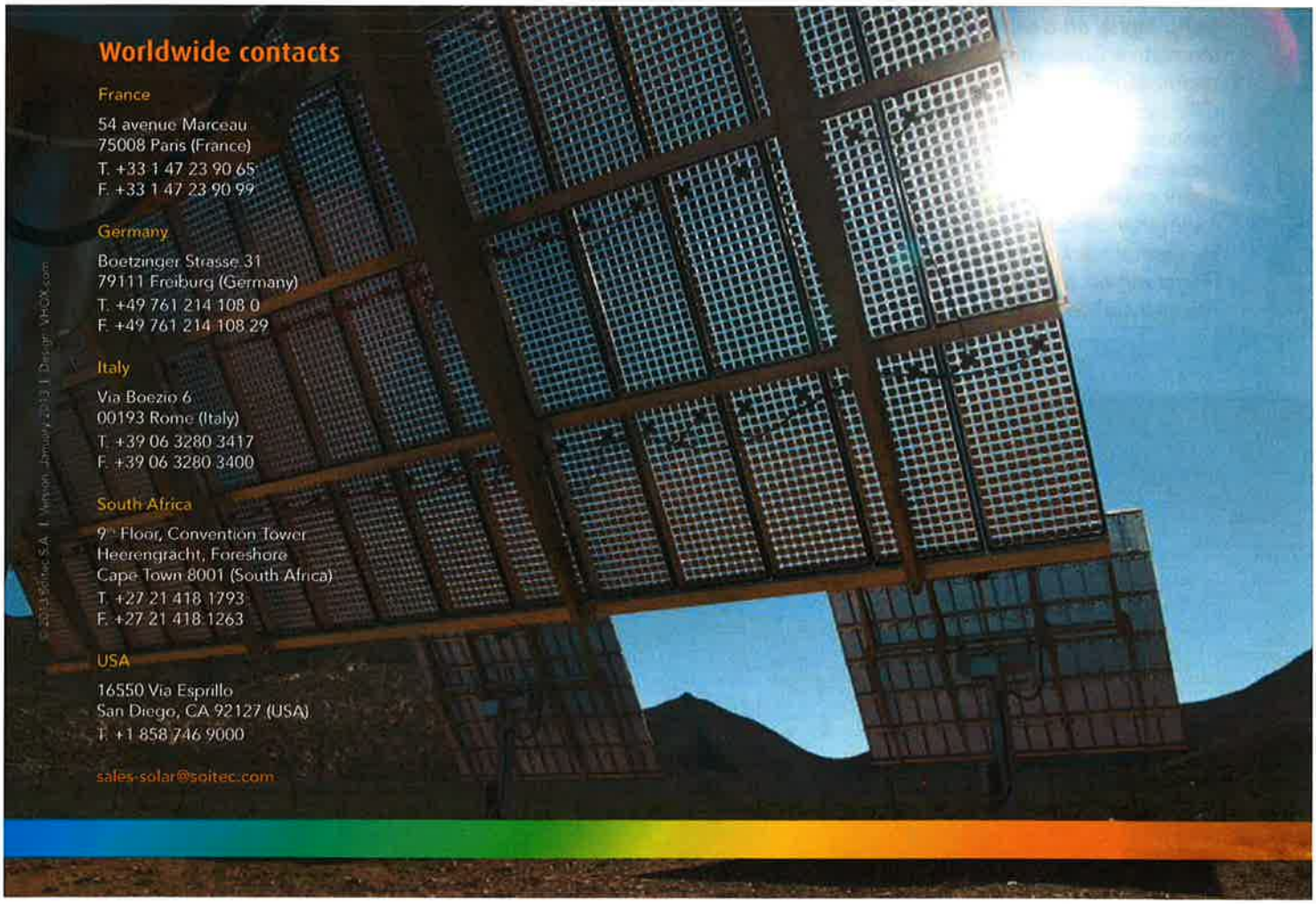
www.soitec.com

Soitec

Utility-Scale Power Plants
Based on Concentrix™ Technology

Concentrator Photovoltaic Power Plants for high irradiation regions

- Highest efficiency, best performance
- Local value, local content, local jobs
- Lowest cost of electricity
- Most environmentally friendly solar technology



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English version

Soitec

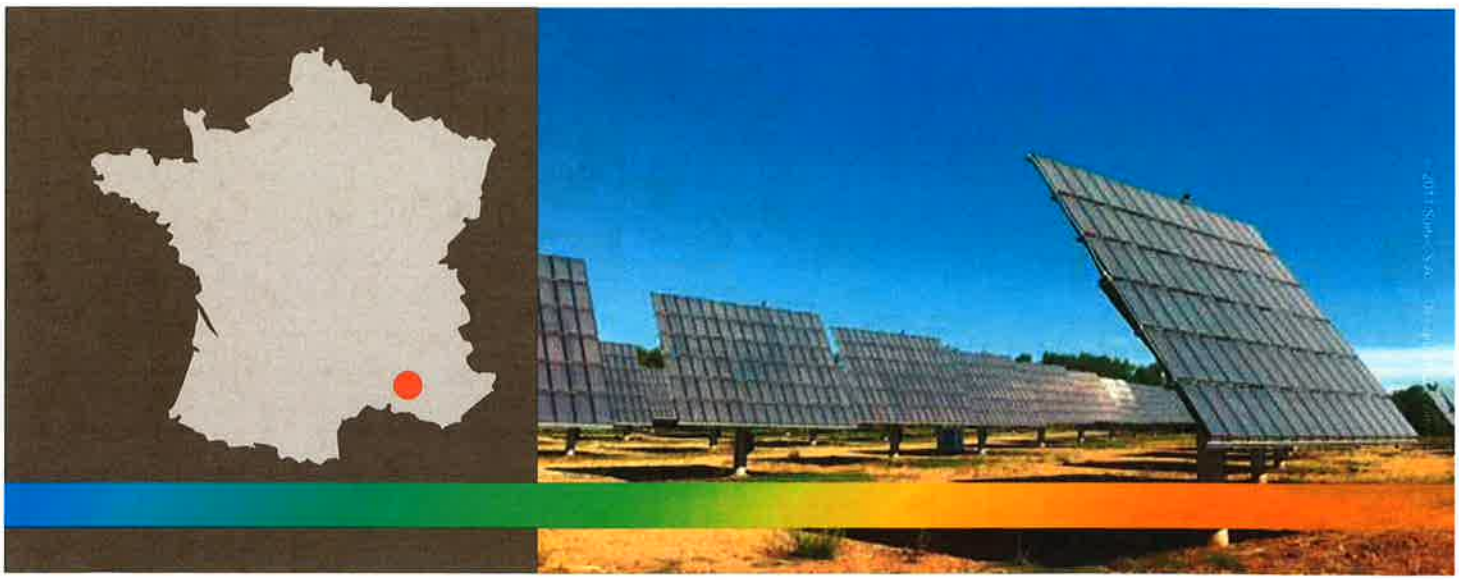
Concentrator photovoltaic power plant in Rians

The power plant

This Concentrating Photovoltaic (CPV) power plant in Rians in the French Provence region is the biggest CPV plant in France in 2011. Based on Soitec's Concentrix™ technology, the plant consists of eighty 32m² CPV systems producing a total of 630kW$_p$. This technology is the most efficient in hot and sunny regions. The plant provides enough power for 300 households.

Location	Rians, Var (France)
Customer	Soitec Solar GmbH
Contract type	Turn key project
Installed systems	80 Soitec CX-P6 systems
Capacity	630kW$_p$*
Site area	1.8 hectare
Grid connection	June 2011
Annual energy yield	1000MWh/year
Number of households	300

** Watt-peak, Standard Test Condition: DNI = 1000W/m², AM1.5D, T_{cell} = 25°C*



www.soitec.com

EN

Soitec

SOLAR ENERGY

SOITEC CPV INSTALLATIONS

A WORLDWIDE TRACK RECORD

8 YEARS
of field experience with the first demo installed in 2005

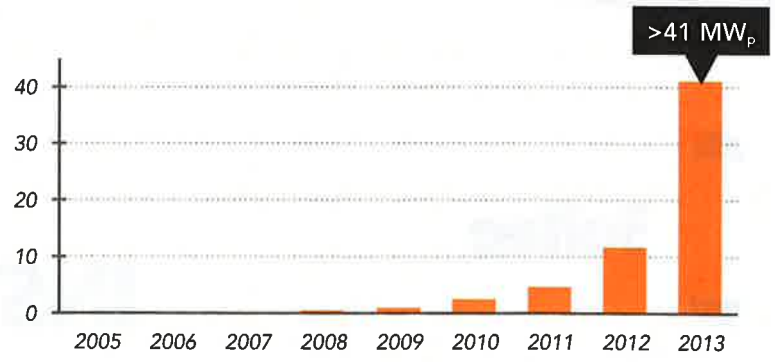
5 YEARS
of commercial CPV Power Plants, with the first installed in 2008

+20 COUNTRIES
where Soitec CPV Systems and Plug&Sun™ are installed

Soitec is an industrial Concentrator Photovoltaic (CPV) Systems manufacturer with more than 41 MW_P installed. The track record of Soitec's Concentrix™ technology goes back to 2005, when the first demo CPV System was installed in Germany.

In September 2013 Soitec celebrated the 5th anniversary of its first commercial CPV Power Plant in Spain. Today CPV installations in more than 20 countries demonstrate the competitiveness of Soitec's products. The Concentrix technology is ready for and has indeed begun utility-scale deployment. The most recent installation is a 2.74 MW_p CPV Power Plant in Hami, China. This installation is the first part of a 20 MW_p project. We are also looking forward to complete our utility-scale CPV project in Touwsrivier, South Africa, where 850 CPV Systems have already been installed.

CUMULATED CAPACITY INSTALLED IN MW_P

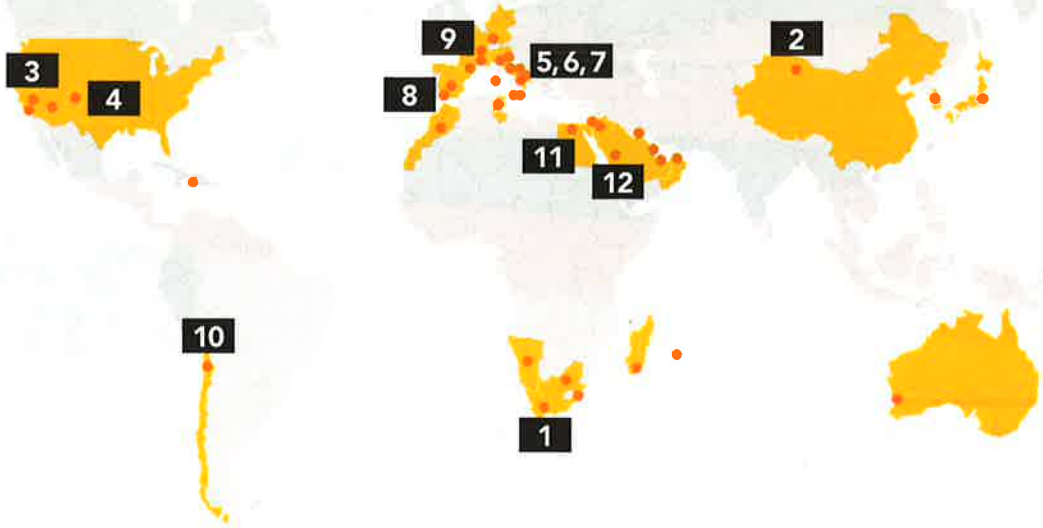


NEWBERRY SPRINGS
California, USA – 1.68 MW$_p$
Installed 2013
60 CX-S530 CPV Systems

LIST OF THE SOITEC CPV INSTALLATIONS

COUNTRY	SITE	YEAR	SIZE
Spain	Puertollano, Casaquemada	2008	0.81 MW$_p$
Egypt	Wadi El Natrun	2010	0.03 MW$_p$
Oman	Muscat	2010	0.01 MW$_p$
Jordan	Shams Ma'an	2010	0.01 MW$_p$
South Africa	Touwsrivier	2010	0.08 MW$_p$
USA	Questa	2010	1.37 MW$_p$
France	Rians, Thémis	2011	0.84 MW$_p$
South Africa	Hazelmere	2011	0.48 MW$_p$
Italy	Santa Lucia, Cerignola and 6 sites	2012	6.11 MW$_p$
Saudi Arabia	Medinah	2012	0.01 MW$_p$
Tunisia	Om Somaa	2012	0.02 MW$_p$
Chile	Atacama Desert	2012	0.06 MW$_p$
Italy	Saletti and 2 sites	2013	2.55 MW$_p$
Kuwait	Kuwait City	2013	0.03 MW$_p$
USA	Newberry Springs	2013	1.68 MW$_p$
Namibia	Rehoboth	2013	0.03 MW$_p$
China	Hami	2013	2.74 MW$_p$
South Africa	Touwsrivier	2013	23.8 MW$_p$
Additional sites in various countries		*2005-2013*	*0.49 MW$_p$*
TOTAL			**41.14 MW$_p$**

WORLD MAP



REFERENCES

TOUWSRIVIER
South Africa – 44 MW_p

23.8 MW_p installed 2013
850 CX-S530-II CPV Systems

UTILITY-SCALE CPV POWER PLANT
The CPV Power Plant is soon to be completed. The grid connection is ready. Commercial operation is expected to begin in June 2014.

HAMI
China – 20 MW_p

2.74 MW_p installed 2013
330 CX-P6 CPV Systems

20 MW_p PROJECT IN HAMI
Focusic has secured a loan from CDB to finance this 20 MW_p project. 2.74 MW_p has already been installed, further 5.8 MW_p is ordered.

NEWBERRY SPRINGS
California, USA – 1.68 MW_p

Installed 2013
60 CX-S530 CPV Systems

MANUFACTURED IN SAN DIEGO
Newberry Solar 1 is the largest CPV Power Plant in California. It is the first with Soitec CPV Modules made in California.

QUESTA

New Mexico, USA – 1.37 MW_p

Installed 2010
173 CX-P6 CPV Systems

SITUATED ON REMEDIATED LAND
The CPV Power Plant owned by Chevron Technology Ventures LLC turns mine tailings into a field for solar energy production.

SANTA LUCIA

Italy – 1.17 MW_p

Installed 2012
74 CX-S420 CPV Systems

FIRST MW-PROJECT IN ITALY
Santa Lucia was the first CPV Power Plant of that size in Italy and paved the way for more CPV projects to come.

CERIGNOLA

Italy – 1.17 MW_p

Installed 2012
74 CX-S420 CPV Systems

STRONG TRACK RECORD IN ITALY
Cerignola is one of 7 Italian CPV Power Plants which use Soitec CX-S420 Systems. All are in the range of 0.5 - 1.17 MW_p.

SALETTI

Italy – 1.16 MW_p

Installed 2013
83 CPV Systems

TRACKERS DEVELOPED IN ITALY
Saletti is one of 4 CPV Power Plants in Italy which combine Soitec CX-M500 Modules with locally developed trackers by Alitec.

PUERTOLLANO

Spain – 0.67 MW_p

Installed 2008
74 CX-P6 CPV Systems

5 YEARS OF HIGH PERFORMANCE
Puertollano is one of the first CPV Power Plants of Soitec's track record. It delivered over 5 years of performance data.

RIANS

France – 0.63 MW_p

Installed 2011
80 CX-P6 CPV Systems

CPV IN THE SUNNY PROVENCE
By the time of installation the CPV Power Plant in the beautiful Provence region was the largest in France.

ATACAMA DESERT

Chile – 0.06 MW_p

Installed 2012
4 CX-S420 CPV Systems

POWERING MINING OPERATIONS
Minera El Tesoro Mining Group and Soitec built up these CPV Systems to power a mining operation in the Atacama Desert.

WADI EL NATRUN

Egypt – 0.03 MW_p

Installed 2010
5 CX-P6 CPV Systems

OFF-GRID POWER FOR IRRIGATION
In the course of the European initiative NACIR, Soitec installed an off-grid CPV Power Plant used for irrigation purposes.

MEDINAH

Saudi Arabia – 0.01 MW_p

Installed 2012
1 CX-P6 CPV Systems

CPV KNOW-HOW TRANSFER
The CPV System at the Medinah College of Technology supports CPV know-how transfer to young Saudi Arabian trainees.

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Version: February 2014
Design: VHOX.com

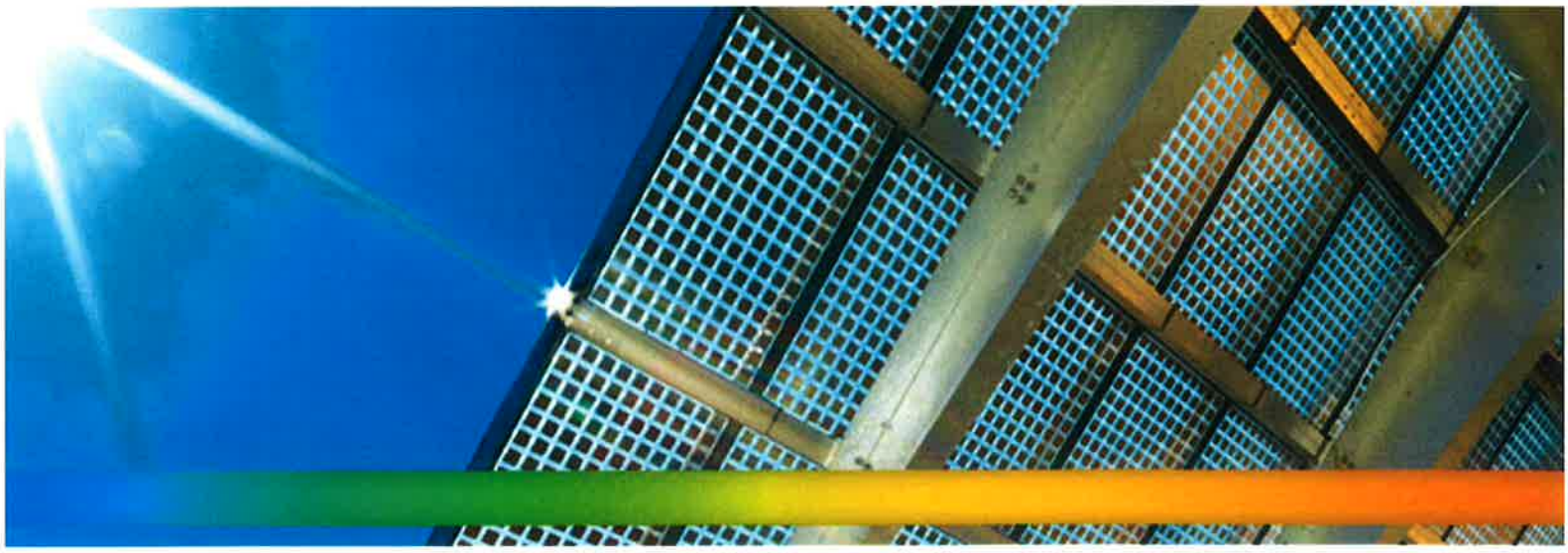
Soitec

Technical Data Sheet

Soitec CX-S530-II CPV System 29.4 kWp

Concentrix™ Technology

C0 - Public



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Date:
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Table of Contents

1 Definitions

1.1 Document Version History

Version	Date	Changes	In chapter
v50	2013-10-16	Component descriptions added	2
		Technical data update	3 - 8
v51	2013-10-23	CX-AD2 technical data update	8
		CX-M500 "IEC and UL certified" added	2.1
v52	2014-01-29	Technical data CX-T030-II_RoW and _US updated	5

1.2 Document Conventions

All units of measurement in this publication are originally metric units. Imperial units are derived from these metric units and are rounded.
The "." is used as a decimal point.

Technical data is subject to change. Images might differ from actual design.

1.3 Abbreviations

Abbreviation	Meaning
AC	Alternating Current
AM	Air Mass
CE	European Commission - Declaration of Conformity
CEC	California Energy Commission
CPV	Concentrator Photovoltaic
CSOC	Concentrator Standard Operating Conditions: 900 W/m^2 DNI, 20 °C ambient temperature, AM 1.5D spectrum, 2 m/s wind speed.
CSTC	Concentrator Standard Test Conditions: 1000 W/m^2 DNI, 25°C cell temperature, AM1.5D spectrum.
DC	Direct Current
DNI	Direct Normal Irradiation
IEC	International Electrotechnical Commission
IP	Ingress Protection
SC	Short Circuit
NEMA	National Electrical Manufacturers Association (USA)
MPP	Maximum Power Point
RoW	Rest of World
UL	Underwriters Laboratories
OC	Open Circuit
SCADA	Supervisory Control And Data Acquisition

2 CPV System Description

Fig. 2-1 Main components of the CPV System

The CPV System consists of the main components:

- CPV Modules
- Tracker
- Tracker Control Unit
- Air Drying Unit

A specific cabling and tubing set completes the CPV System.

Soitec's system integration process ensures that the components fully work together and the CPV System operates safely and reaches its full performance. The CPV System can only be operated with the components described in this document.

The CX-S530-II CPV System comes in different variants. For example there are US- and Rest-of-World variants of the Tracker Control Unit or integrated or centralized variants of the Air Drying Unit.
The following chapters describe the variants of the CPV System main components and provide a guideline on how to select the correct component for a particular power plant project.
Contact Soitec for component availability and questions regarding component selection.

Fig. 2-2 CPV System CX-S530-II, rear view (left), side view (right)

2.1 CX-M500 CPV Module Description

Description One CPV System includes 12 CPV Modules.

A CPV Module consists of solar cell assemblies (SCAs) on the glass receiver plate, and Fresnel lenses on the top lens plate, surrounded by a metal frame. Within one CPV System, DC cables are used to interconnect the CPV Modules. The CPV Module is hollow inside and has an air tube connection point at one end and a membrane permeable to air at the other. A profile rail exists on each side and also in the middle underneath the CPV Module. The profile rail is used for the attachment of the module brackets.

Function CPV Modules generate and output DC power during the day.

Two variants of the CX-M500 CPV Module exist.

CX-M500 with junction box DC connectors (IEC certified).

CX-M500 with pigtail DC connectors (IEC and UL certified).

For CPV System installations in the US, CX-M500 with pigtail DC connectors will preferably be used. Usage of CX-M500 with junction box DC connectors in the US is also possible, it requires however a field certification. For CPV System installations outside the US, both CX-M500 with junction box and pigtail DC connectors can be used.

Aside from the DC connectors and module certifications, the two CX-M500 variants are identical, they share the same mechanical and electrical technical data.
In the long term, Soitec will only provide CX-M500 with pigtail DC connectors.
Contact Soitec for component availability and questions regarding component selection.

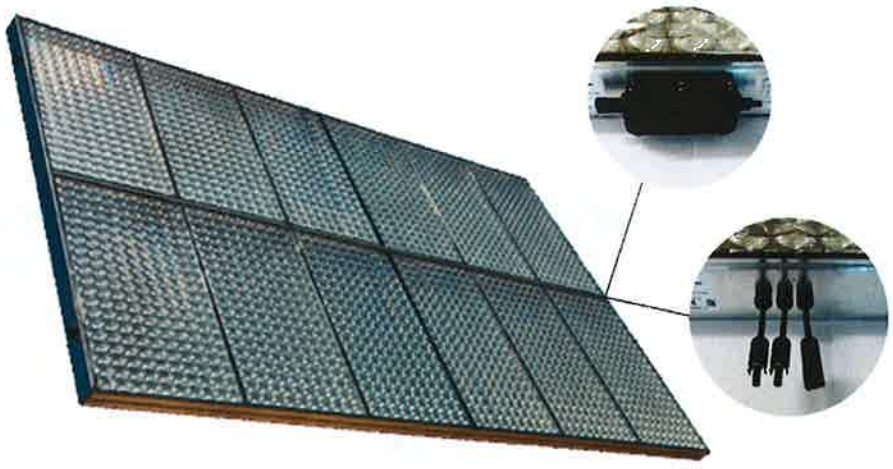


Fig. 2-3 CX-M500 CPV Module and DC connectors. Junction box (above) pigtail (below)

2.2 CX-T030-II Tracker Description

Description The Tracker is a mechanical steel structure consisting of a mast, a drive with azimuth and elevation motors, ribs, stringers, and brackets to secure the CPV Modules.

Function The Tracker performs the following functions:

- Supports the CPV Modules.
- Moves to follow the sun during the day.

The CX-T030_II Tracker exists in two different variants. Both share the same design.

CX-T030-II_US with minor US-specific adaptations of the design addresses the requirements of CPV power plants built in the US.

CX-T030-II_RoW serves power plant installations outside the US.

With both Tracker variants, the full CPV System safety and performance is achieved. Contact Soitec for component availability and questions regarding component selection.

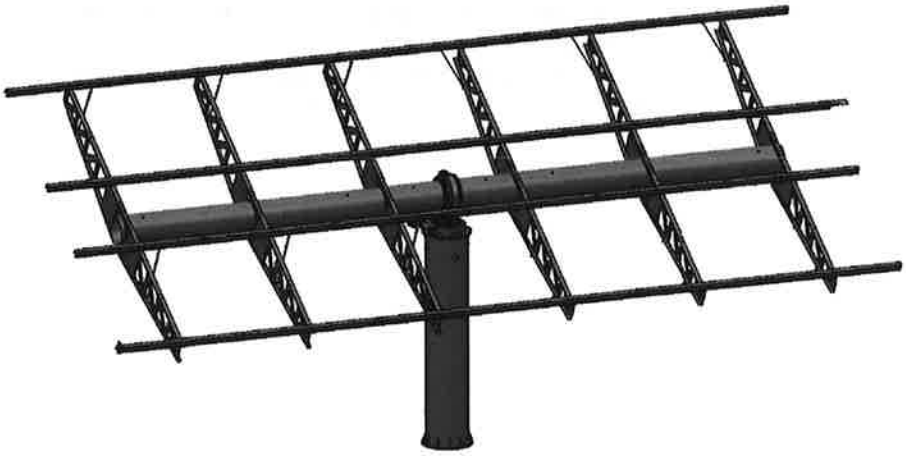


Fig. 2-4 CX-T030-II_US

Fig. 2-5 CX-T030-II_RoW

2.3 CX-TC2 Tracker Control Unit Description

Description

The Tracker Control Unit controls the Tracker movements to enable the CPV System to follow the sun throughout the day. It is also used to monitor and control the CPV System remotely.

The Tracker Control Unit is controlled via the SCADA system from any location within or outside the CPV Power Plant, using communication interfaces.

Function

The Tracker Control Unit performs the following functions:

- Operates the Tracker movement.
- Directs the AC power supply to the motors and other components of the CPV System.
- Measures the DC power output of the CPV System.
- Communicates with the Meteo Analyzer Unit and SCADA System.

The CX-TC2 Tracker Control Unit exists in two different variants.

CX-TC2_US addresses the requirements for CPV power plants built in the US.

CX-TC2_RoW serves power plant installations outside the US.

With both Tracker Control Unit variants, the full CPV System safety and performance is achieved.
Contact Soitec for component availability and questions regarding component selection.

Fig. 2-6 Tracker Control Unit CX-TC2_RoW (left), CX-TC2_US (right)

2.4 CX-AD1 and CX-AD2 Air Drying Unit Description

Description The Air Drying Unit primarily consists of a blower and drier to provide dried air to CPV Modules. A set of tubing goes from the Air Drying Unit to each of the CPV Modules.

Function The Air Drying Unit blows dry air into the CPV Modules to ensure a low relative humidity of air inside the CPV Modules.

There are two different Air Drying Units for the CPV System CX-S530-II.

CX-AD1 reflects an integrated design approach where the Air Drying Unit is installed within the CPV System. It is possible to use one CX-AD1 in one CPV System. Alternatively one CX-AD1 can be shared between a maximum of three CX-S530-II CPV Systems. This approach provides advantages for smaller power plants.

CX-AD2 is foreseen for centralized usage in a power plant where CX-AD2 is installed independently from the CPV Systems. One CX-AD2 can serve multiple CX-S530-II CPV Systems.

For CX-AD1 a CE conformity declaration has been issued by Soitec. For CX-AD2 CE conformity will be declared and it will be also UL listed.
For CPV System installations in the US, the UL listing of CX-AD2 provides an advantage. Usage of CX-AD1 in the US is also possible, requires however a field certification. With both Air Drying Units, the full CPV System safety and performance is achieved.
Contact Soitec for component availability and questions regarding component selection.

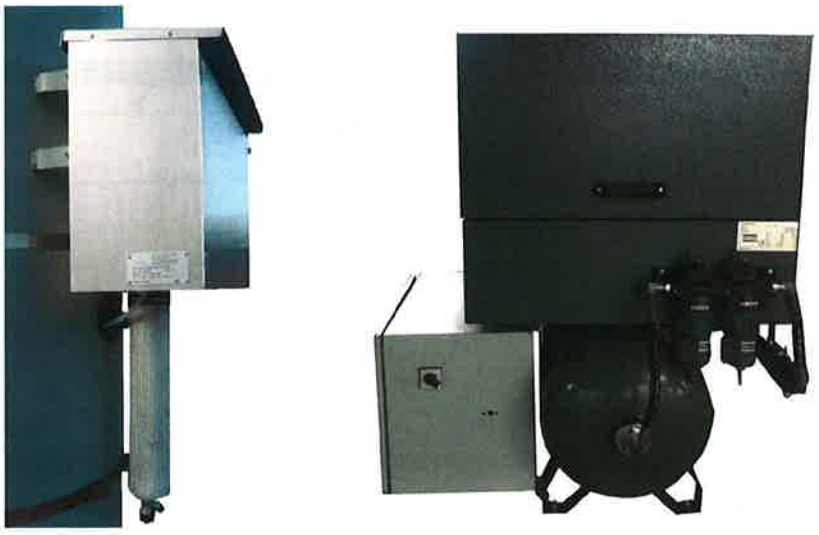


Fig. 2-7 Air Drying Unit CX-AD1 (left), CX-AD2 (right)

3 CX-S530-II CPV System Technical Data

Type	**CX-S530-II**
Number / type of CPV Modules	12 CPV Modules / CX-M500
Certifications, compliance, listings	CE
Aperture area	94 m^2 / 1010 sq ft
Module area	105 m^2 / 1130 sq ft
Array area	110 m^2 / 1180 sq ft
Ground coverage ratio (at horizontal position)	16% with 27 m x 25 m / 89 ft x 82 ft spacing of CPV Systems. (Spacing may differ for particular power plant projects)
Maximum height (at steep; horizontal position)	8.0 m / 26 ft; 4.8 m / 16 ft
Data valid under nominal conditions: DNI=1000 W/m^2, AM1.5D, T_{cell}=25°C	
DC power at MPP (P_{MPP})	29.4 kW_p ± 10% (1) (sum of CPV Modules power)
Data valid under operating conditions: DNI=900 W/m^2, AM1.5D, T_{amb}=20°C, Wind speed=2m/s	
DC power at MPP (P_{MPP})	24.2 kW ± 10% (1)
DC voltage at MPP (V_{MPP})	600 V (1)
DC current at MPP (I_{MPP})	40 A (1)
DC open-circuit voltage (V_{OC})	690 V (1)
DC short-circuit current (I_{SC})	46 A (1)
DC efficiency (aperture)	28.6% (1)

(1) indicative values

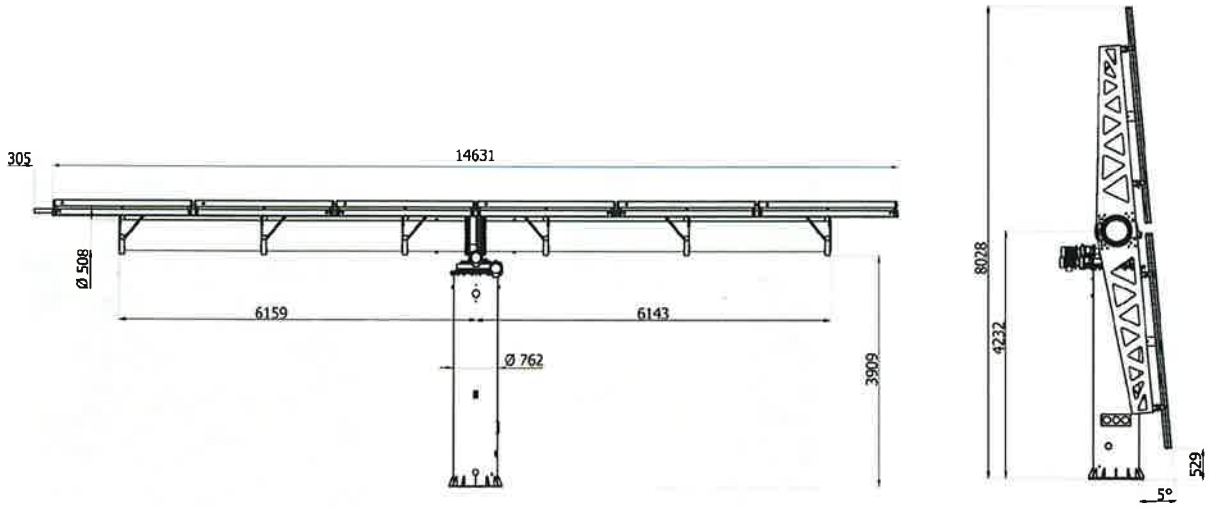
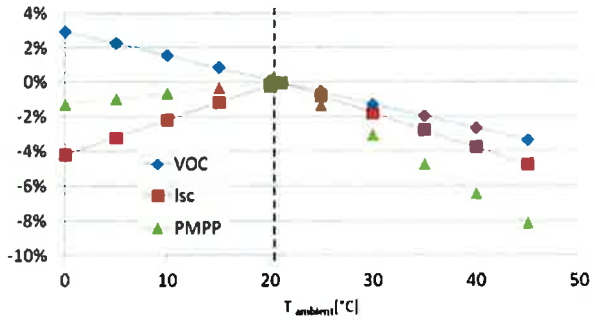


Fig. 3-8 CX-S530-II CPV System dimensions, front view horizontal position (left), side view steep position (right)

4 CX-M500 CPV Module Technical Data

Type	**CX-M500**	
DC connectors type	Junction box	Pigtail
Concentrator type	Point focusing silicone on glass Fresnel lenses	
Concentration ratio	~500	
Certifications, compliances, listings	CE, IEC 62108, IEC 62688 draft, CEC listing	CE, UL 62108, UL SU 8703, IEC 62108, IEC 62688, CEC listing
Dimensions (L x W x H)	3.67 m x 2.39 m x 0.102 m / 12.0 ft x 7.84 ft x 0.335 ft	
Weight	210 kg / 460 lbs	
Solar Cell quantity and type	2400 Triple junction cells per CPV Module	
Solar Cell cooling system	Passive cooling with metal heat sink	
Solar Cell max. temperature	55 K above ambient temperature	
Operating ambient temperature	-20°C to +55°C / -4°F to +130°F	
Temp. coefficient (P_{MMP})	0.06%/K at T_{amb}<21°C/70°F (1); -0.34%/K at T_{amb}≥21°C/70°F (1)	
Temperature coefficient (V_{OC})	-0.14%/K (1)	
Temperature coefficient (I_{SC})	0.20%/K at T_{amb}<21°C/70°F (1); -0.20%/K at T_{amb}≥21°C/70°F (1)	
Temperature coefficient graph (Graph does not include tolerances)		
Data valid under CSTC acc. to IEC 62670-1: DNI=1000 W/m², AM1.5D, T_{cell}=25°C		
DC power at MPP (P_{MPP})	2450 W_p ± 10% (1)	
DC voltage at MPP (V_{MPP})	645 V (1)	
DC current at MPP (I_{MPP})	3.8 A (1)	
DC open-circuit voltage (V_{OC})	740 V (1)	
DC short-circuit current (I_{SC})	4.2 A (1)	
DC efficiency (aperture)	31.8% (1)	
Data valid under CSOC acc. to EIC 62670-1: DNI=900 W/m², AM1.5D $T_{ambient}$=20°C, Wind speed=2m/s		
DC power at MPP (P_{MPP})	2040 W ± 10% (1)	
DC voltage at MPP (V_{MPP})	600 V (1)	
DC current at MPP (I_{MPP})	3.4 A (1)	
DC open-circuit voltage (V_{OC})	690 V (1)	
DC short-circuit current (I_{SC})	3.8 A (1)	
DC efficiency (aperture)	29.0% (1)	

(1) indicative values

5 CX-T030-II Tracker Technical Data

Type	**CX-T030-II**	
Extended type number	CX-T030-II_RoW	CX-T030-II_US
Tracking type	Two-axis tracking, rotational elevation	
Certifications, compliances, listings	CE	(in progress: UL)
Motors type	AC 3-phase; suited for 230V or 208V / 50Hz or 60Hz	
Elevation movement range	5° to 90° (1)	
Azimuth movement range	300°	
Motor protection class	IP 55	
Power consumption typ. / max.	110VA / 810VA respectively 100W / 800W	90VA / 680VA respectively 85W / 670W
Max. tracking wind speed	14 m/s to 18 m/s / 31 mph to 40 mph (varies based upon project site)	
Max. survival wind speed	40 m/s / 90 mph	
Weight Tracker table including drive (without CPV Modules and cabling)	2500 kg / 5500 lbs	2600 kg / 5700 lbs
Weight mast	460 kg / 1000 lbs (for a 3.6 m/12 ft flange mast) (2)	470 kg / 1000 lbs (for a 3.6 m/12 ft flange mast) (2)
Operating ambient temperature	-20°C to +55°C / -4°F to +130°F	

(1) 5° Tracker table steep position
90° Tracker table flat position

(2) mast type and length depends on project soil conditions and foundation.

6 CX-TC2 Tracker Control Unit Technical Data

Type	**CX-TC2**	
Extended type number	CX-TC2_RoW	CX-TC2_US
Certifications, compliances, listings	CE	(in progress: UL 3703, UL 508A)
Tracking modes	Maximum Power Point, Astro- and Sensor-tracking	
Tracker motors drive	AC 3-phase	
Communication interface	Ethernet	
Protection class (if all cables connected and cable glands closed)	IP 65	NEMA 4
Electrical connection (supply)	1-phase; 230V ± 10%, 50 Hz	208V phase-phase or 230V phase-neutral ± 10%; 60 Hz
Power consumption typ-/max. (without motors consumption)	70 VA / 80 VA respectively 20 W / 25 W	70 VA / 80 VA respectively 20 W / 25 W (1)
Max. DC input voltage	800V	1000V
Max. DC input current	60 A	
DC measurement accuracy	± 2%	
Dimensions (L x W x H)	210 mm x 760 mm x 760 mm / 0.69 ft x 2.5 ft x 2.5 ft	200 mm x 760 mm x 760 mm / 0.67 x 2.5 ft x 2.5 ft
Weight	50 kg / 110 lbs	58 kg / 130 lbs
Operating ambient temperature	-20°C to +55°C / -4°F to +130°F	

(1) indicative values

7 CX-AD1 Air Drying Unit Technical Data

Type	**CX-AD1**
System architecture	One CX-AD1 per CX-S530-II or One CX-AD1 shared between max. 3 CX-S530-II
Integration	Fully integrated, single unit design
Certifications, compliances, listings	CE
Communication interface	RS232
Number of air outlets	4
Protection class	IP 03
Electrical connection (supply)	1-phase, 208 V or 230 V ± 10%; 50 Hz or 60 Hz
Power consumption idle typ./max.	9 VA / 11 VA respectively 3 W / 5 W
Power consumption drying typ./max.	140 VA / 190 VA respectively 100 W / 140 W
Power consumption regeneration typ./max.	380 VA / 560 VA respectively 250 W / 380 W
Dimensions (L x W x H)	289 mm x 545 mm x 974 mm / 0.95 ft x 1.79 ft x 3.20 ft
Weight	15 kg / 33 lbs
Noise emission idle	Noiseless (not measurable)
Noise emission drying and regeneration	75 dB(A) (sound power level)
Operating ambient temperature idle and regeneration	-20°C to +50°C / -4°F to +122°F
Operating ambient temperature drying	-20°C to +30°C / -4°F to +86°F

8 CX-AD2 Air Drying Unit Technical Data

Type	**CX-AD2** (1)
System architecture	One CX-AD2 shared between max. 56 CX-S530-II
Integration	Centralized, compressor and pneumatic box
Certifications, compliances, listings	CE (in progress: UL 60335-2-40, UL 474, UL 60730-2-13A)
Communication Interface/Protocol	Ethernet/Modbus via TCP/IP (at pneumatic box)
Number of air outlets	14, each for max. 4 CX-S530-II
Air tubing connectors	Metric
Protection class	IP 55, operation under shelter
Electrical connection (supply)	1-phase, 208 V or 230 V ± 10%; 50 Hz or 60 Hz
Power consumption idle typ.	120 VA respectively 95 W
Power consumption drying typ.	5500 VA respectively 4100 W
Dimensions (L x W x H)	1.58 m x 0.84 m x 1.30 m / 5.18 ft x 2.76 ft x 4.27 ft
Weight	230 kg / 510 lbs
Noise emission idle	Noiseless (not measurable)
Noise emission drying	1 m 71 dB (A), 25 m 43 dB(A)
Operating ambient temperature idle	-20°C to + 55°C / -4°F to + 130°F
Operation ambient temperature drying	-20°C to + 30°C / -4°F to + 86°F

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The most efficient solar generator for clean, off-grid electricity

Soitec Plug&Sun uses field-proven Concentrix technology. The complete system (3 trackers) delivers up to 3.4 kW_p and dual-axis tracking technology ensures constant energy production throughout the day. Coupled to batteries, the system provides electricity 24/7. Designed for easy deployment, Plug&Sun is compliant with local electricity standards to easily connect electrical devices.

High energy production in sunny areas	**30% efficiency modules** using CPV technology **Dual-axis tracking** for constant electricity production throughout the day **Up to 3 times more** energy production compared to same size standard PV
Easy to deploy and portable	**Plug&Play installation** 2.5 hours for setup
Self sustaining	**Autonomous** Batteries for 24/7 use of electricity
Light maintenance	**Robust system** **Reliable design**
Clean energy	No fuel consumption No noise No CO_2 emission

Applications

Up to
18 kWh/day

Specifications

Soitec Plug&Sun™ Components

		Standard	Option
System	Number of trackers	**2**	**+1**
	Maximum DC power	**2.3 kW_p**	**3.4 kW_p**
Central Box	Energy storage capacity	**12 kWh**	**18 kWh**
	Output	120 V / 60 Hz or 220 V / 50 Hz up to 3000 W	
	Input options	Tracker, grid or other generator	
	System monitoring and control	Wireless connection	
Tracker	Type	Dual-axis tracking	
	Module array area	4.2 m^2 (45 ft^2)	
	Maximum height	2.4 m (7.8 ft)	
	Footprint	2.6 m × 2.6 m (8.6 ft × 8.6 ft)	
	Weight	340 kg (750 lb)	
	Wind resistance	Up to 40 m/s	

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