

AIR TECHNOLOGY AUSTRALIA



High concentration Photovoltaic System

**Let's take
the power from the sun
and begin to clean the world!**



Beghelli

www.airtechnologyaustralia.com.au

“The human species has a remarkable record of ingenuity and problem solving. The same spirit that took man to the moon must now be harnessed to free future generations from crippling ecological debt.”

*James P. Leape
Director General, WWF International*

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Beghelli around the world

Founded in 1982 by Gian Pietro Beghelli, the Beghelli Group is an Italian and European emergency lighting leader that also operating in the fields of energy saving lighting, renewable energies and electronic domestic, industrial and urban safety & security systems. The company's strategy is based on its ability to interpret market requirements.

Over the years, investments in product quality and the Beghelli brand name recognition - familiar to some 92.9% of the Italian population (Doxa source) - have contributed to establishing the Group's name in its traditional business guaranteeing the success of new product launches.

In addition to exploiting the very high growth potential in Italy, the Beghelli Group has introduced international initiatives aimed at increasing exports.



Beghelli Canada
Markham, Ontario



Beghelli USA
Miramar, Florida



Beghelli Mexico
Querétaro, México



Beghelli S.p.a.
Monteveglio, Italy



Beghelli Crespellano
Crespellano, Italy



Elettronica Cimone
Pievepelago, Italy



AIR TECHNOLOGY AUSTRALIA



Beghelli Präzisa
Dinslaken, Germany



Beghelli Elplast
Brno, Czech Republic



Beghelli China
Yizheng,
People's Republic of China



Beghelli Polska Sp.
Rybnik, Poland



Beghelli Asia Pacific
Kowloon, Hong Kong

Fields of interest

Emergency Lighting

Emergency lighting is the Group's traditional segment and enjoys a prominent position of technological and commercial leadership. Beghelli manufactures a wide range of self-powered and central battery powered emergency lighting fixtures and systems. Particular emphasis is given to products with centralised via BUS or radio and self-diagnostic systems, which are the most advanced solutions to system testing and maintenance requirements, and in compliance with current industry standards.



Lighting

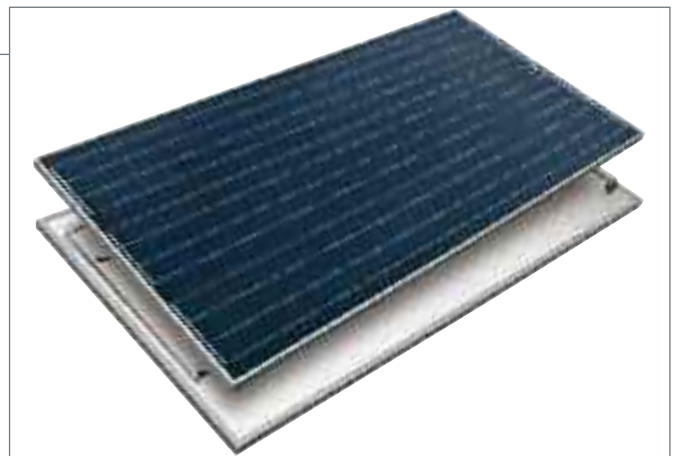
This area includes lighting products mainly aimed for commercial and industrial purposes, with technological solutions aimed to high-saving energy levels. Products available include units for outdoor and indoor use, mainly manufactured in thermoplastic and recess mounted metal for industrial applications. Beghelli's technological solutions favor use of energy-saving electronic ballasts aligned to the current EU directives and international standards in the lighting industry.



Renewable energy

"PlanetSun" is the Beghelli photovoltaic program, whose motto is "The Energy of the Future for the Future of our Children". The solutions portfolio covers a wide range of advanced products to build a roof or ground mounted photovoltaic plant:

- Solar Gate control panels
- 4 different control and supervision panels
- Spread Spectrum radio control technology
- GSM or RS485 communication
- Anti theft system
- DC/AC solar inverters
- 2-18 kW transformerless inverters, with FHDSSS radio control
- PV modules
- 280 Wp multicrystalline silicon module
- Photovoltaic-solar thermal systems
- Hybrid modules: electricity and warm water output
- Hydronic unit with accumulation tank and radio control interface
- High concentration photovoltaic
- High-end technology: triple junction cells, 1000+ optical concentration, 2 axis solar tracking system



Safety

Home automation systems, like Intelligent Beghelli, integrate anti-intrusion, tele-assistance, and technical and environmental alarm devices, which also connect clients to the Beghelli SOS Center. These systems are based on an advanced completely wireless technology that enables the deployment of all the system's components without any connection to the power line, with long lasting autonomy.



Tele-assistance, urban safety and security

These devices for domestic and industrial applications connect the user with equipment able to manage emergencies and provide tele-assistance. The Beghelli Group's experience in safety & security systems and its attention to increasingly knowledgeable consumers have encouraged Beghelli to develop new sales initiatives that include a combined supply of industrial and domestic goods and services.

Beghelli also provides the newest GPS satellite technology in such a way that its consumers can get any assistance anywhere, even outside their households. Consequently Beghelli presents itself as a trendsetter with the latest innovation and technologies to fully meet the demands and needs to the customers.



Consumer products

Safety for environment and people: these are Beghelli consumer division keywords driving the research and development of innovative products dedicated to everyday life.

Energy saving light bulbs, personal safety portable or fixed devices and high efficiency rechargeable batteries are just some of the product categories available all built under our commitment for a better life in a healthier world.



Sustainable Globalisation

The third industrial revolution will be based on the distributed and interconnected production of renewable energy

It is by now widely accepted that we have to think about energy issues in a new way, worthy of the 21st century. The second half of the last century saw an exponential increase in global energy consumption. The overall use of energy has grown by a factor of 1.5 and greenhouse gas emissions by a factor of 1.4. There are a variety of estimates for the coming 10 to 15 years, but none of them are reassuring. The common denominator is always the need to create renewable energy sources to gradually replace fossil fuel consumption. Among these is the sun, which gives the Earth 1,000 W/sqm every year, ready for use and storage. According to scientists like **Zhores Alferov**, Nobel Prize winner in Physics, an industry founded on the use of solar energy should not be considered as no more than a safe and reliable choice, but rather as the only possible alternative for the human race over the long term.

According to **Jeremy Rifkin**, economic advisor to the EU and several of its member states, energy, the economy and ecology must grow in parallel. The main characteristics of the third industrial revolution are distributed energy production and innovation in computer technology to gather together all the small scale energy sources and make them available as a single stream for use by all. Industrial facilities are already in possession of new technologies, especially as regards solar energy, aimed at achieving parity between the cost of photovoltaic energy and grid energy. To achieve this revolutionary – and yet essential – change, we must set in motion a cultural revolution: to move away from geopolitics based on nation states competing for resources, to a bio-politics which gives priority to the environment in which we live.



Global policy reactions

The technological development of the last century has undoubtedly enabled to achieve high levels of life quality. The focus of this multi-faceted development has always been energy production, that, despite the enormous progress in terms of research and innovation, has never fully released fossil fuels. Oil, gas and coal are now being low: in addition to not being renewable, the high emissions to air that the combustion of these materials causes, are causing a dramatic alteration and degeneration of our planet

and the natural balance of all living species, including humans. It's time to choose new energy supply systems, to stop these changes that otherwise would lead to a slow but progressive destruction.

In recent years, have been identified alternative energies which share two basic constraints:

- The absence of harmful emissions to environment
- The easy availability, without shortage problems

UE Targets for 2020

- + 20%** efficiency of energy consumption
- 20%** CO2 emissions
- + 20%** renewable energy production

Kyoto Targets

Overall, the developed countries (included in Annex I to the Framework Convention) are committed collectively to reduce their emissions of greenhouse gases in the period 2008 - 2012, for a **reduction in total emissions of at least 5% compared to 1990 levels.**

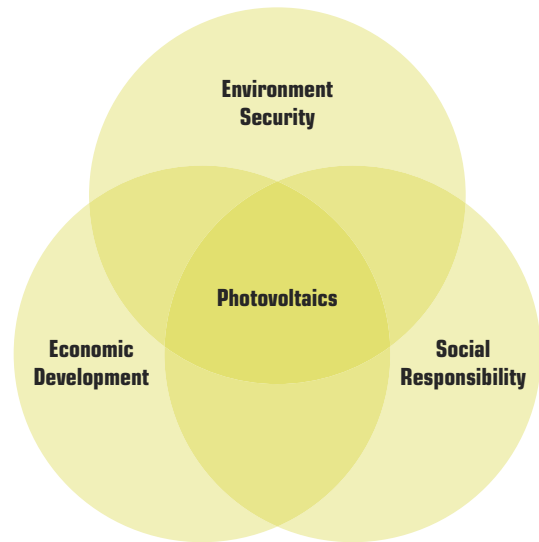
Between 2008 and 2012, states that **were EU members before 2004 should collectively reduce their greenhouse gases emissions by 8%**. Member States which joined the EU after this time undertake to reduce their emissions by 8%.



The photovoltaics world market

Photovoltaic is a practical technology to ensure a secure, prosperous and sustainable future.

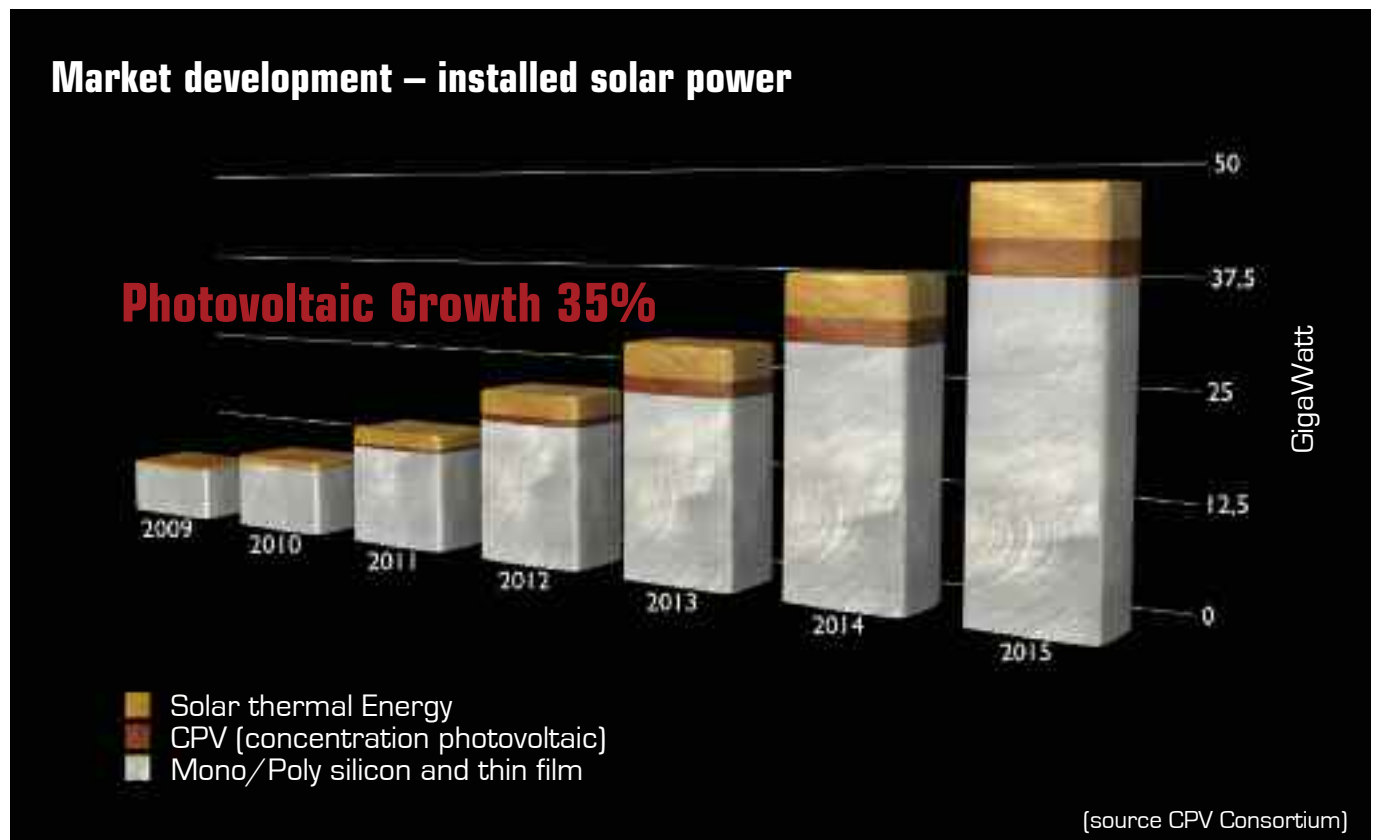
The awareness of a possible ecological disaster has finally created a common sentiment to think about energy in a different way. The second half of the twentieth century has seen an exponential growth of global energy consumption. The overall use of energy increased by 1.5 times and emissions of greenhouse gases increased by 1.4 times. The need gradually replace the fossil fuel plants has led the institutions and regulatory bodies to support renewable energy production.



The analysis of the European Photovoltaic Industry Association

The study "SET For 2020", hosted by EPIA in close collaboration with strategic management consulting firm AT Kearney, is based on interviews conducted in Europe and other parts of the world, to about 100 key people from the world industry, research institutions, utilities, organizations.

"SET For 2020" study takes into account different PV development scenarios in Europe, concluding that the most ambitious is not only attainable but is also the most desirable. The analysis shows that, from 1%, the PV will be able to cover 12% of EU electricity demand in the European Union by 2020.



Concentration photovoltaic market

Economics and ecology:

4 GWp installed over the next 5 years

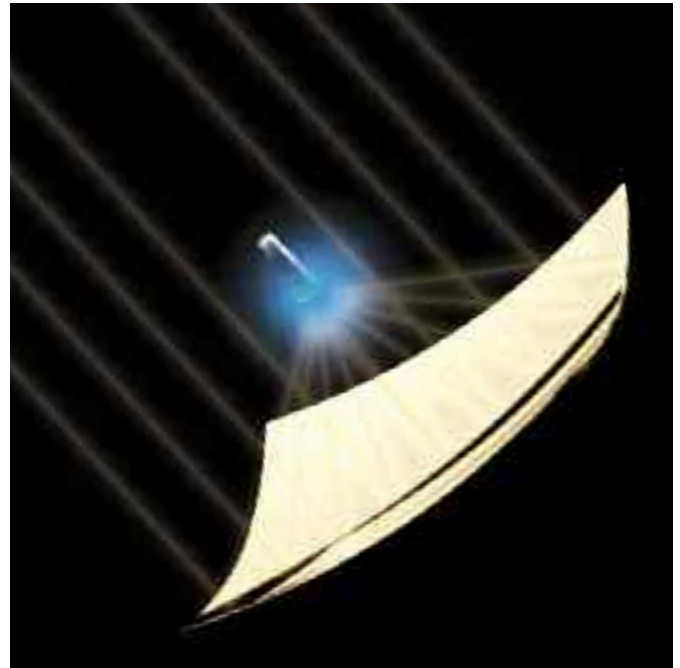
The market for CPV / HCPV (Concentration PV/ High concentration photovoltaic), thanks to the already excellent performance of the system, the ability to work more efficiently at high temperatures, the special cells that can transform 40% of solar radiation into electricity, is expected to have a very high growth.

It is estimated that in the medium term, in systems installed in areas with strong sunlight, the costs of energy production will be in line with those of more traditional power production (coal, heavy oils,...).

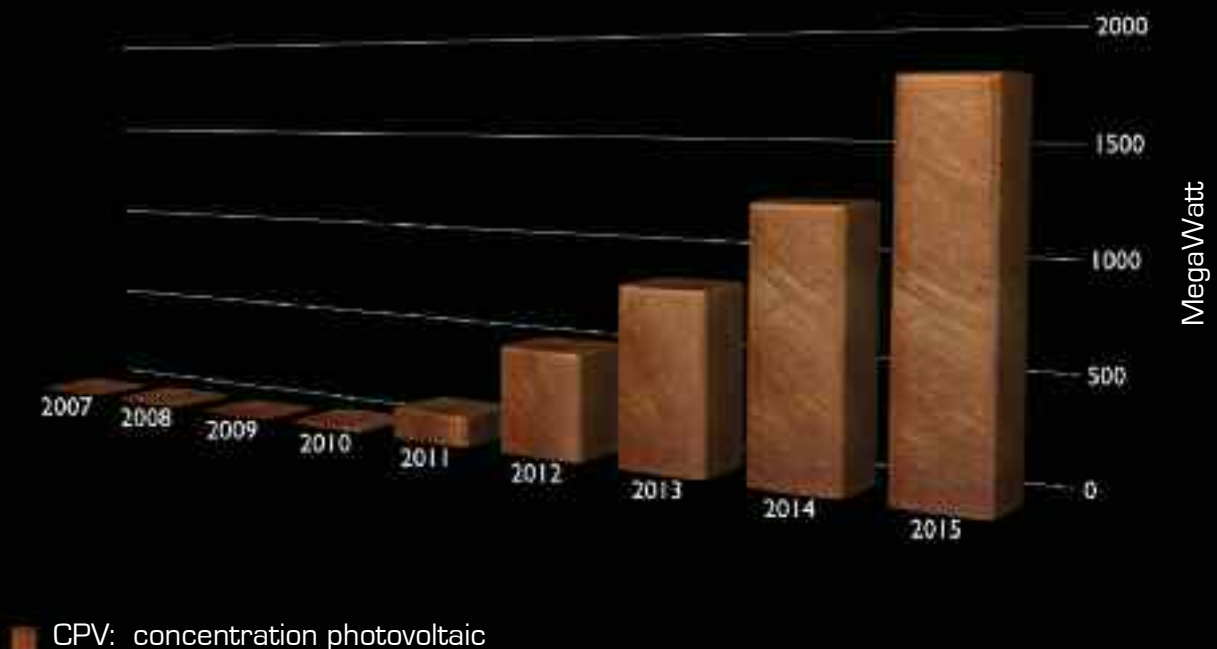
Thanks to the HCPV technology it is possible to fix a 5 years time target to reach the grid parity (HCPV energy production cost equal to purchasing energy cost) in certain European southern regions. (In Europe the typical cost of energy for a small to medium user is 0.16 euro/kWh).

It is an important first step that will revolutionize the significance of energy; it will combine economy and ecology, creating systems that will no longer need to be subsidized from governments.

Prudential forecasts show more than 4GWp installed over the next five years in the world, with an expected annual growth of 75% !



CPV: installed power outlook



[source CPV Consortium]

3 technologies for a new plan

Triple junction cells, high concentration system and staet of the art solar tracking

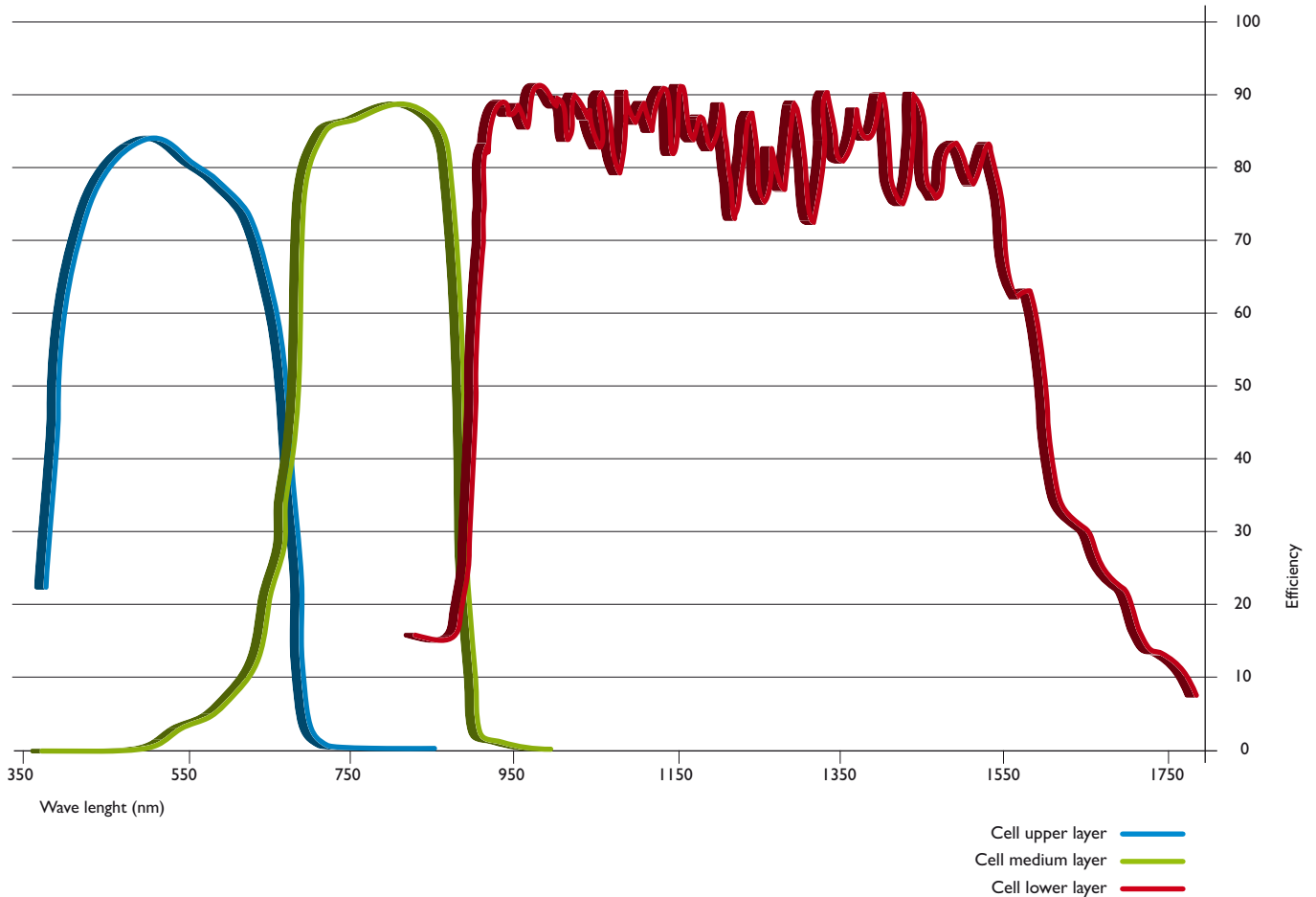
1 TRIPLE JUNCTION CELLS

The great progress of microelectronics applied to Aerospace engineering is the key to the exploitation of solar energy at low cost. Progress in this electronics field are extraordinary, and may lead to the birth of an industry that transforms the solar energy into electricity through the use of semiconductors.

This technology uses semiconductor cells with conversion efficiencies exceeding 39% today. It is assumed, in the near future, to achieve an efficiency of 55-58%, more than double of the most advanced silicon cells. Beghelli has improved for terrestrial uses the technology already used on satellites.

The need to obtain maximum performance with minimal surface, has allowed to conceive of new generation of microcells made of materials belonging to the III and V series of the elements' periodic table.

The multi-junction cells are produced from a wafer of germanium with thickness of a tenth of a millimeter on which many III-V elements layers, such as gallium, arsenic and Indium are deposited by epitaxial growth. In this way you build a stack of three semiconductor junctions, each sensitive to a different portion of the solar spectrum making it possible a solar conversion efficiency up to 39% when a traditional silicon cell reaches 16%.

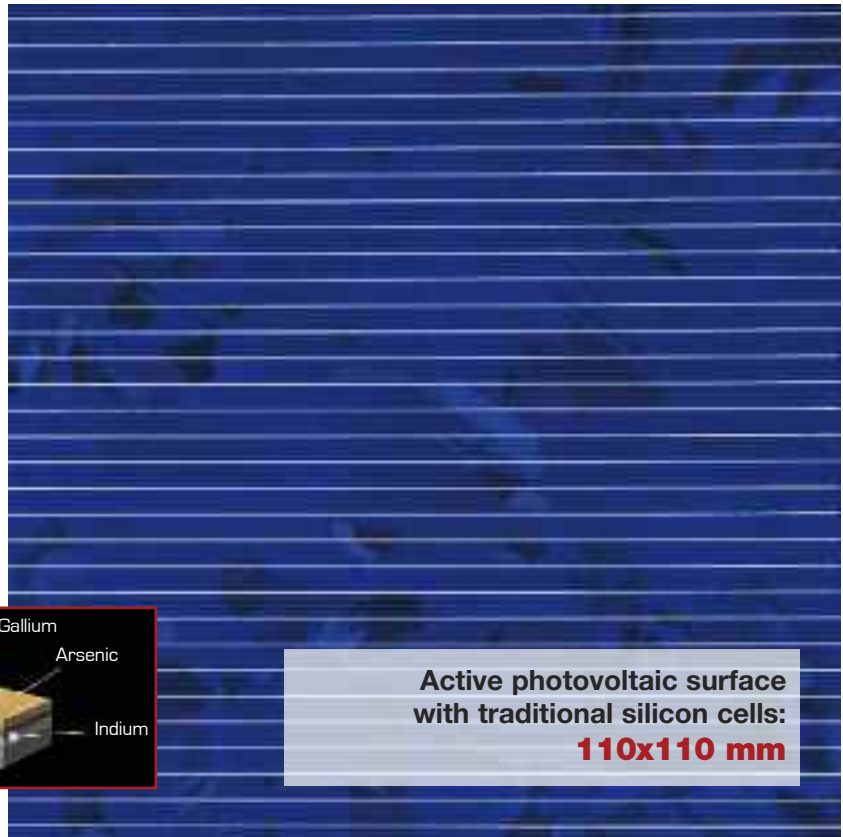
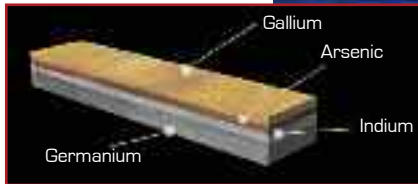


Twice the energy with less than 0,1 % of the active surface

Dimensional comparison, for the same power output, between flat silicon cells and multiple junction cells mounted on a system with a 500 times concentration factor



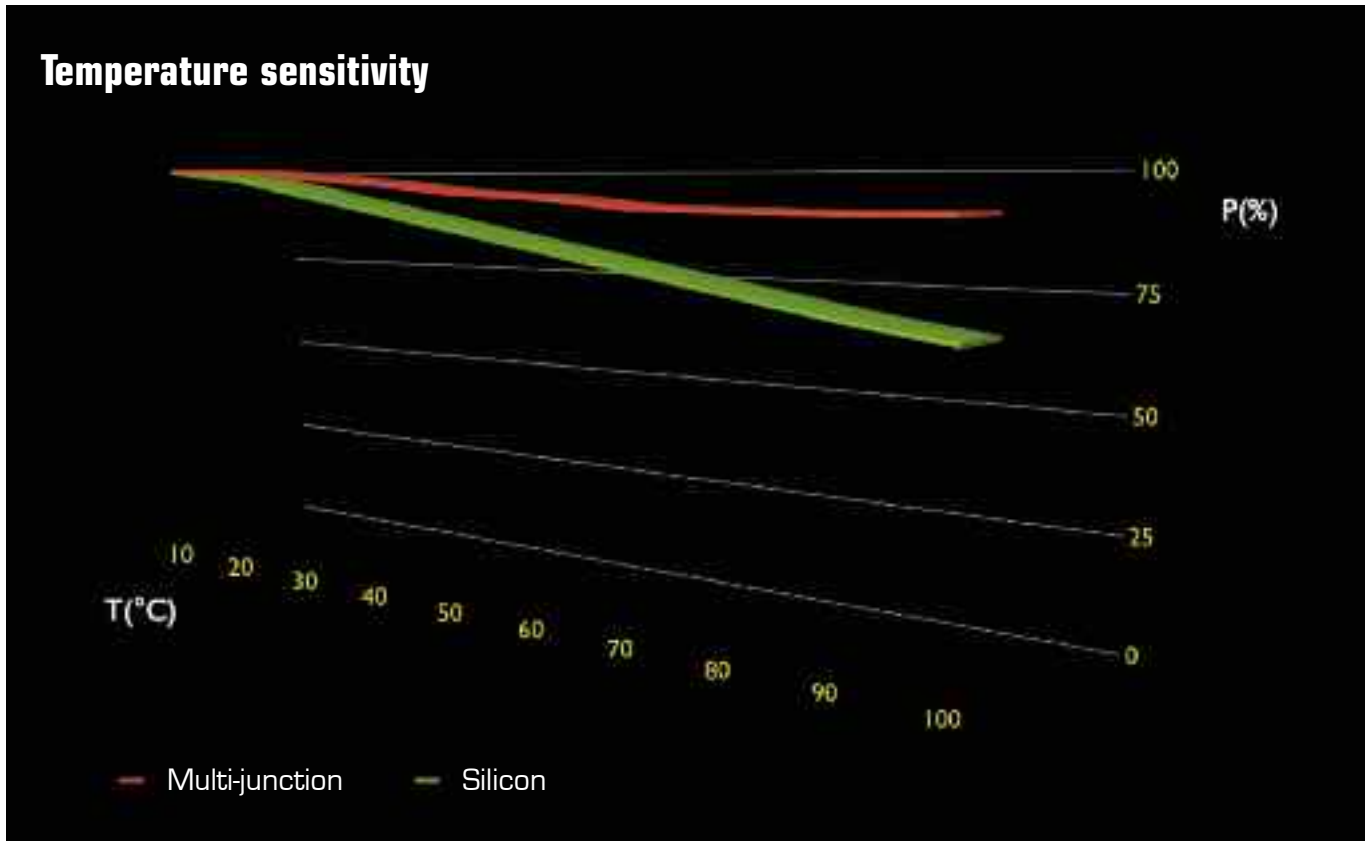
active surface of a triple junction cell: **3x3 mm**



Active photovoltaic surface with traditional silicon cells: **110x110 mm**

For the good performance of a high concentration photovoltaic system it is mandatory the performance of the semiconductor at high temperatures.

The Beghelli triple-junction elements, have extremely high resistance to high temperatures with a lower performance decay in function of temperature compared to traditional silicon cells.

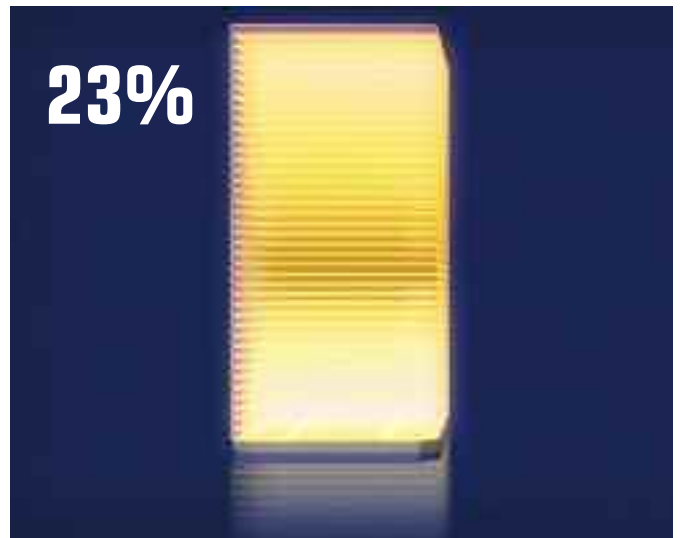
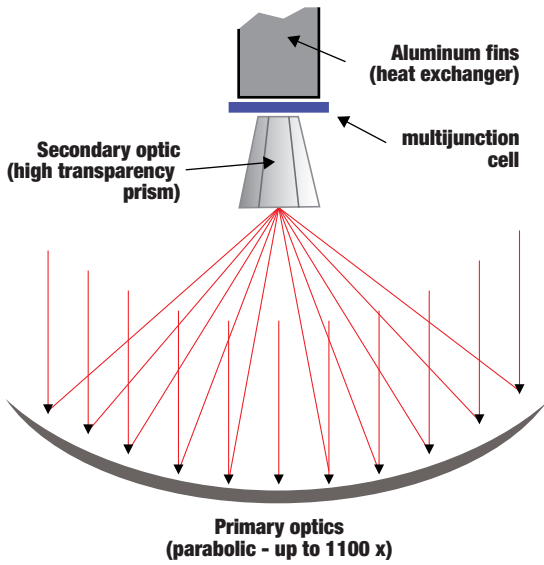


2 DOUBLE CONCENTRATION TO MULTIPLY ENERGY OUTPUT

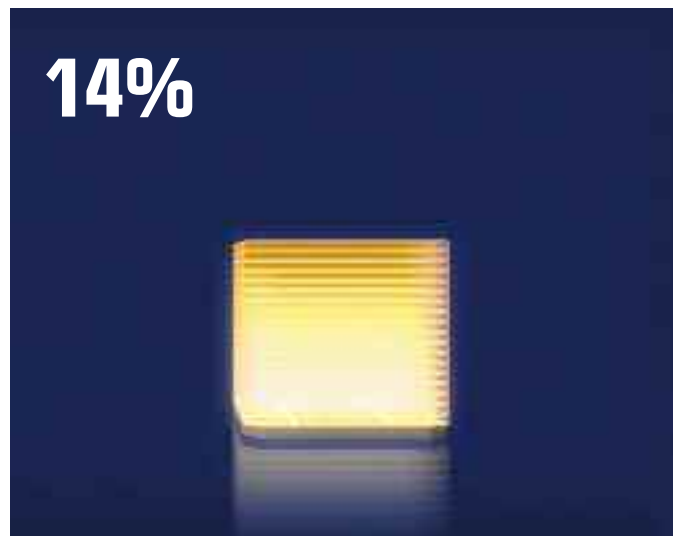
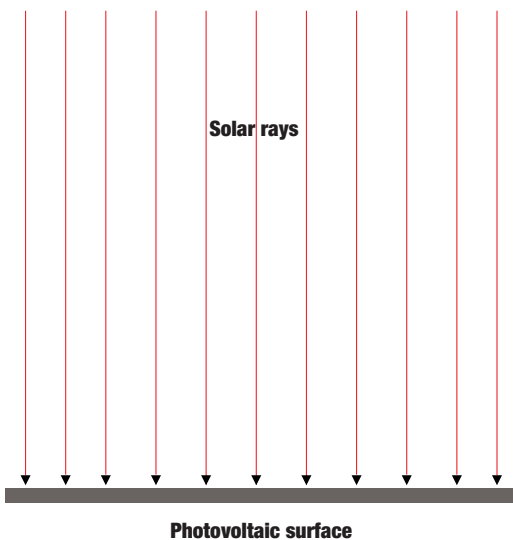
The multi-junction cells made with the three-layer system allows miniaturization of sensing area, considerably reducing costs. The part of semiconductor where the sun light is converted in electricity is reduced infinitely, leaving room for optical concentration system. Assuming a concentration factor of 500 times **(the actual Lifetree Beghelli concentration factor is 1,000+ times)**, to obtain the same amount of energy output of a 100 mm diameter triple-junction wafer cell you should cover an entire

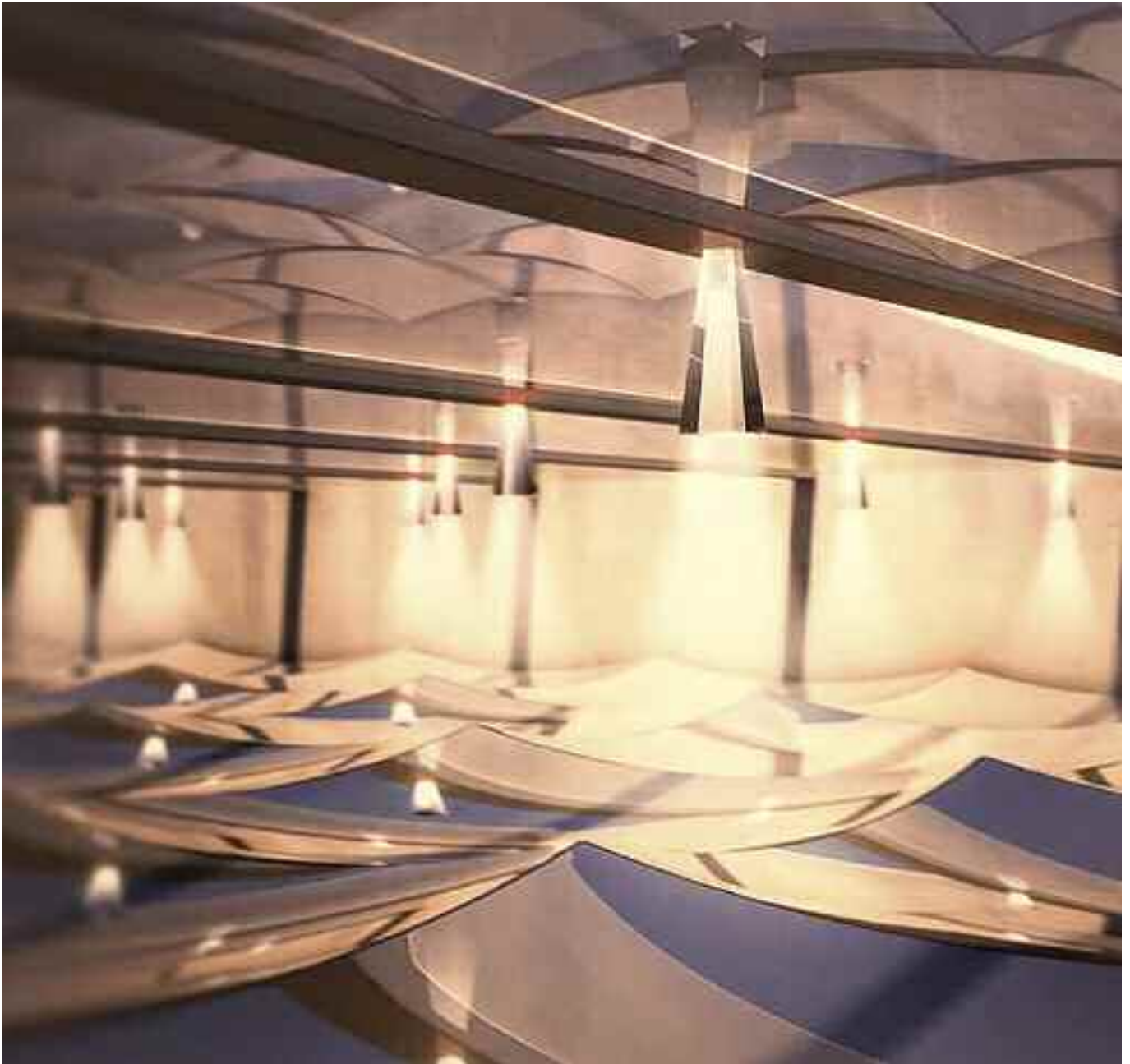
football field with traditional polysilicon modules. The Beghelli optical system produces a very high geometrical concentration factor and has been designed with such precision to minimize losses and ensure a real high concentration factor. Each optical unit is composed of a high reflective mirror and a secondary optic crystal element designed to further enhance the overall performance.

LifeTree System efficiency



Traditional Silicon System efficiency



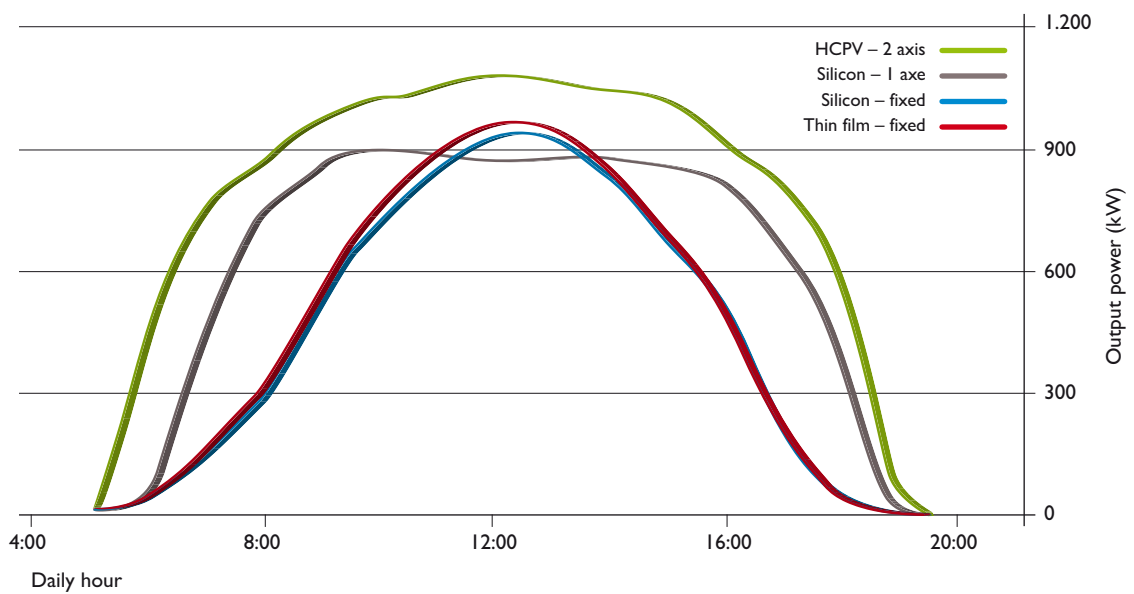
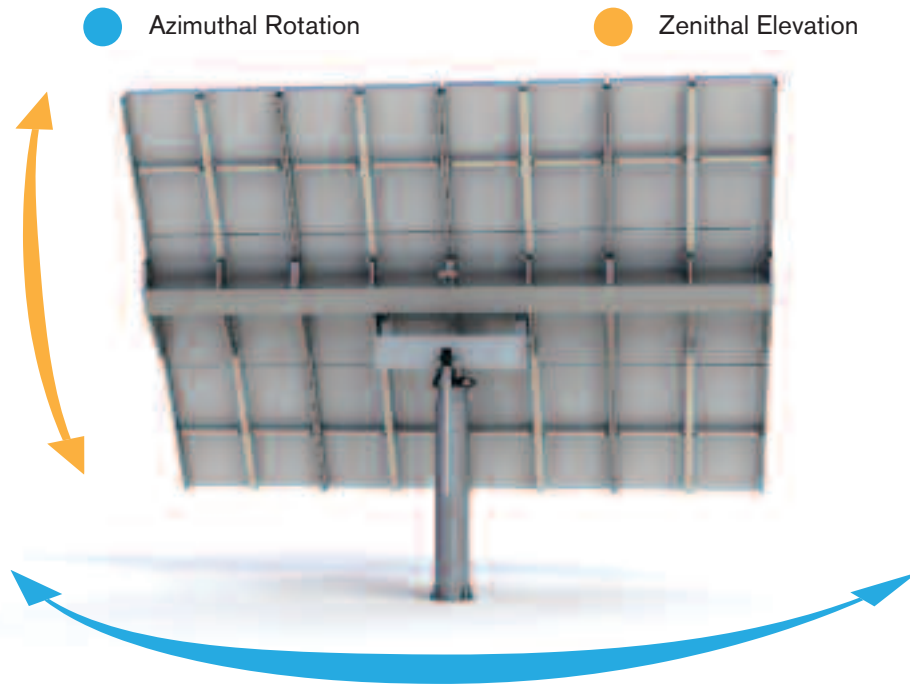


The LifeTree system is constructed to operate at very high efficiency and at sunlight intensities which are 1000+ TIMES GREATER than those feasible with traditional silicon cells

3 TWO AXIS SOLAR TRACKING SYSTEM

The Beghelli Lifetree uses a **state of the art 2 axis tracking systems**: azimuth and elevation rotation. The accuracy of solar tracking is ensured by an astronomical clock together with an integrated Solar cam Both instruments

provide a very high accuracy (0.1 °) and a great reliability. The movements are performed with the use of brushless electric engines designed to properly work for the longlife of the system.

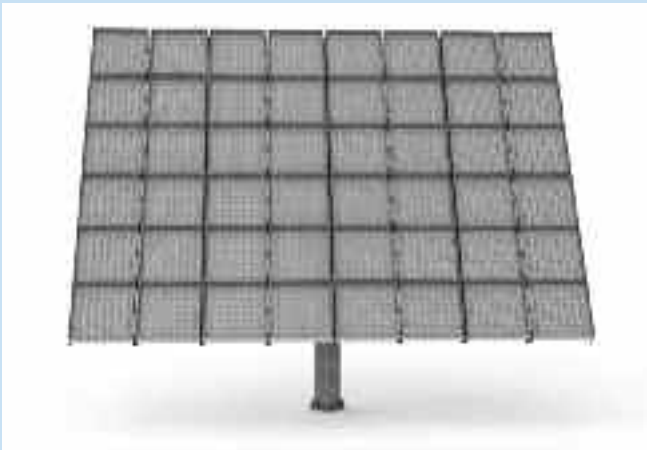


Daily solar tracking movements

Azimuthal Rotation



8 a.m.



12 a.m.



18 p.m.

Zenithal Elevation



8 a.m.



12 a.m.



18 p.m.

High concentration photovoltaic system: where it better performs

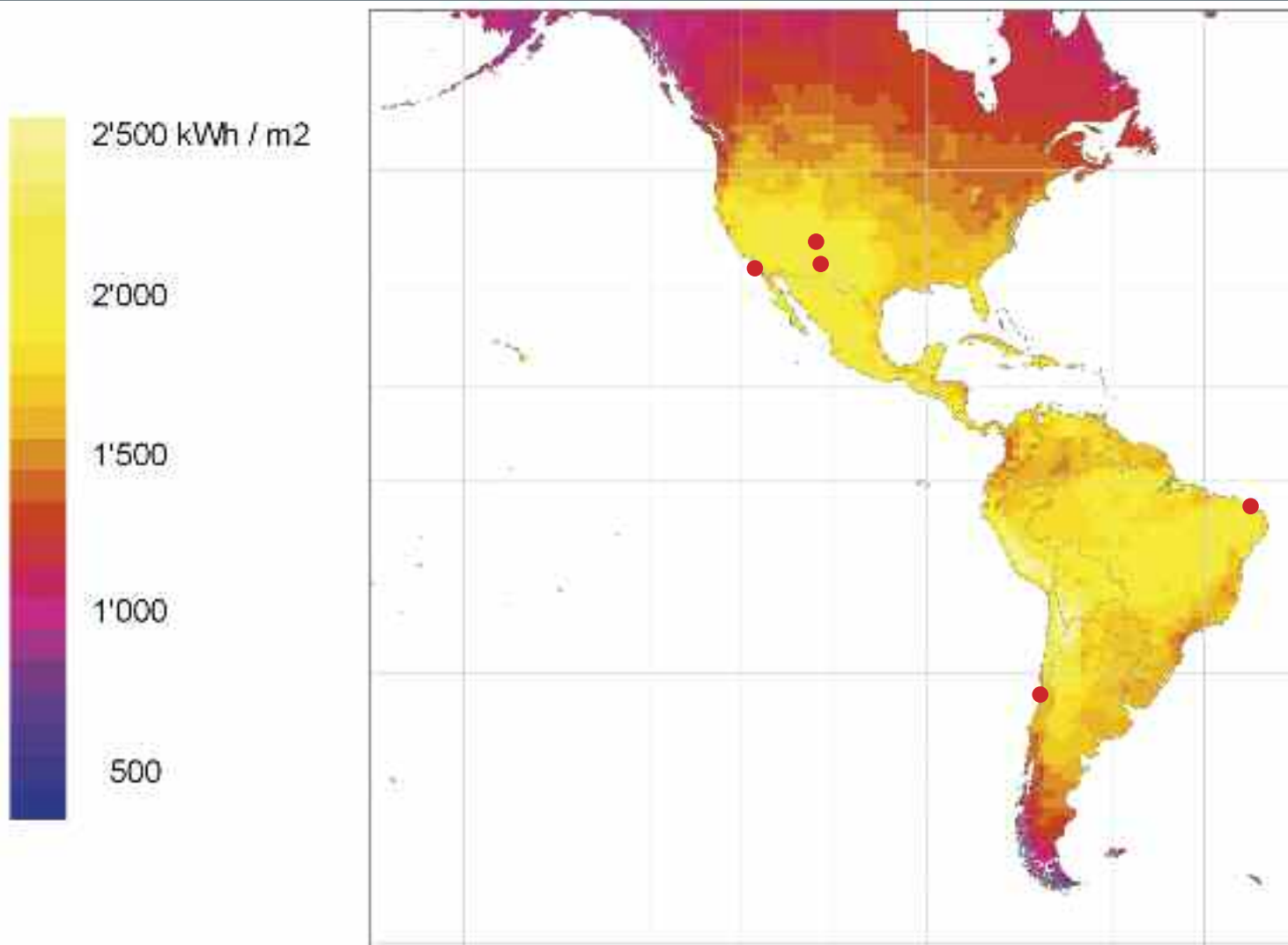
High concentration photovoltaic modules (HCPV) transform sunlight directly into electric power, the indirect component of radiation is not used. From the geographical point of view, HCPV better performs in high sun irradiated areas - which covers 78% of dry land and 90% of the world's population.

Advanced optical design studies for solar concentration, a selection of suitable materials such as triple-junction cells from the aerospace industry, the positioning accuracy and durability of all the moving parts, are the strength of this project.

The concentration systems exploit only the direct component of sunlight. The diffuse component varies according to latitude, altitude and morphological characteristics and heat and humidity of the various geographical areas of installation.

The most suitable areas for concentration photovoltaic systems are the ones where the global irradiation is greater than 1650 kWh/sqm/year and the DNI (Direct nominal irradiation) is prevalent.

YEARLY SUM OF GLOBAL IRRADIANCE



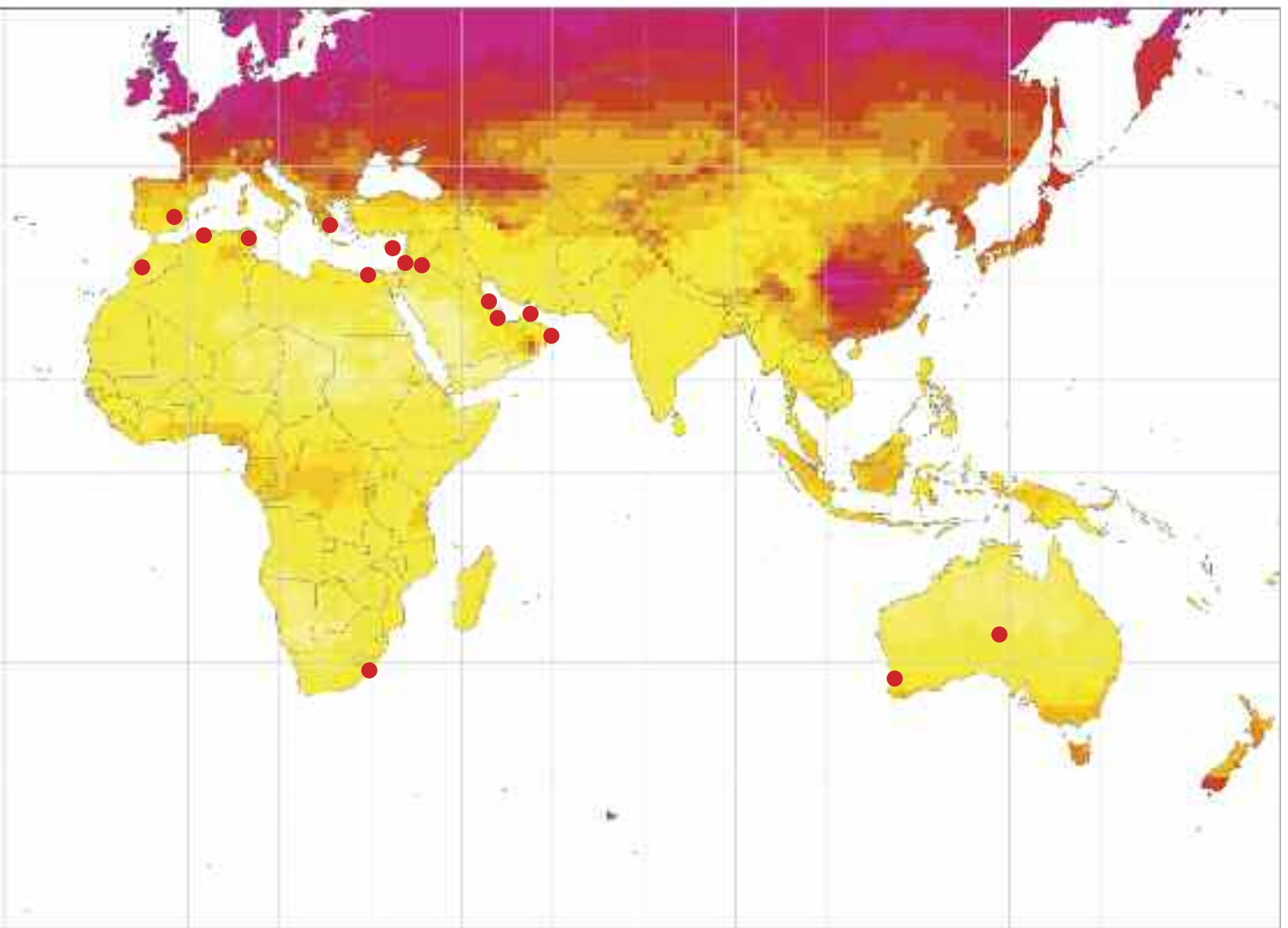
Map Source: Meteonorm 6.0 - www.meteonorm.com

AIR TECHNOLOGY AUSTRALIA

ANNUAL ESTIMATED ELECTRICAL PRODUCTION (kWh/kWp) - Source: NASA

Country	City	Life Tree energy yield	Fixed crystalline PV yield
ALGERIA	Algeri	1764	1554
AUSTRALIA	Alice Springs	1923	1714
AUSTRALIA	Perth	1643	1539
BAHREIN	Manama	1981	1681
BRASIL	Fortaleza	1581	1571
CHILE	Santiago	1897	1708
CYPRUS	Nicosia	1760	1542
EGYPT	Il Cairo	1710	1565
GREECE	Athens	1445	1348
ISRAEL	Tel Aviv	1664	1529
JORDAN	Amman	1656	1532

Country	City	Life Tree energy yield	Fixed crystalline PV yield
MOROCCO	Casablanca	1866	1632
OMAN	Muscat	2068	1744
QATAR	Doha	1966	1679
SPAIN	Valencia	1811	1561
SOUTH AFRICA	Johannesburg	1840	1702
TUNISIA	Tunisi	1687	1500
UAE	Dubai	1816	1610
USA	Albuquerque	1794	1652
USA	Phoenix	1858	1654
USA	San Diego	1776	1598



uncertainty 10% - Period: 1981 - 2000 - grid cell size: 1°

LifeTree, The Energy Multiplier

The very high efficiency of multiple junction cells is not enough by itself to enable us to achieve grid parity. Producing renewable energy at the same cost as grid power means:

high efficiency systems at a very low price point.

Multiple junction cells (III - V) are obviously much more expensive than silicon cells, but they can handle very high concentrations of sunlight. The Beghelli optical system, refined with the latest generation software, yields a very high geometrical concentra-

tion factor and has been designed so as to reduce losses to a minimum, thus resulting in an extremely powerful actual concentration factor. Each single optical unit is composed of a concentrating mirror with surface treatment for very high reflectivity to guarantee outstanding output.

The high concentration factor (1000+ times) together with high efficiency multi-junction cells guarantee a module efficiency of more than 23% !



A high actual concentration factor, combined with the greater conversion efficiency of multiple junction cells, result in the LifeTree module's final efficiency of more than 23%

Light environmental footprint

High concentration PV systems (HCPV) represent a great way to generate renewable energy with sustainability and utmost respect for the environment. A primary factor that allows this objective, concerns the energy break even point, better known as the Energy Payback. This value is the relationship created between the energy consumed for the realization of the system and the energy generated after by the system itself. After just six months, the Beghelli LifeTree system, has already produced all the energy that was spent for its construction,

instead of the two years of the traditional silicon modules. Roughly, a HCPV system is composed by 47% steel, 30% aluminum, 20% glass and only 3% by non-recyclable materials. Furthermore, considering the problem of global warming and tropical areas desertification, the HCPV systems allows a dual use of land: it doesn't create permanent shadows, thus preserving natural ecosystems, allowing both cultivation and animal grazing near the systems.



97% recyclability !

Energy Payback in just 6 months!

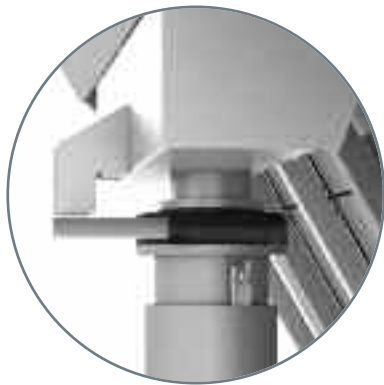
**Lack of permanent shadow,
no desertification !**

Beghelli LifeTree, the technology

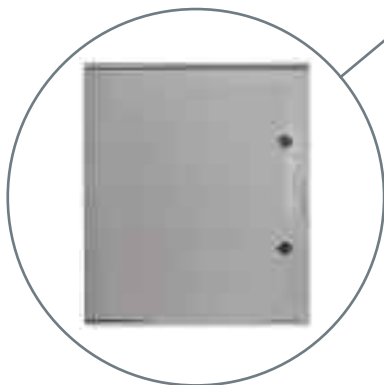
The high-tech Beghelli Lifetree is the result of numerous studies in various fields. It is just enough to highlight the individual components to obtain a overall picture of efficiency, innovation and reliability, for people and the environment.



*Zenithal
elevation engine*



*Azymuthal
rotation engine*



*Control box. Includes engines
and solartracking control,
monitoring system and alarm.*



Integrated DC/AC inverter

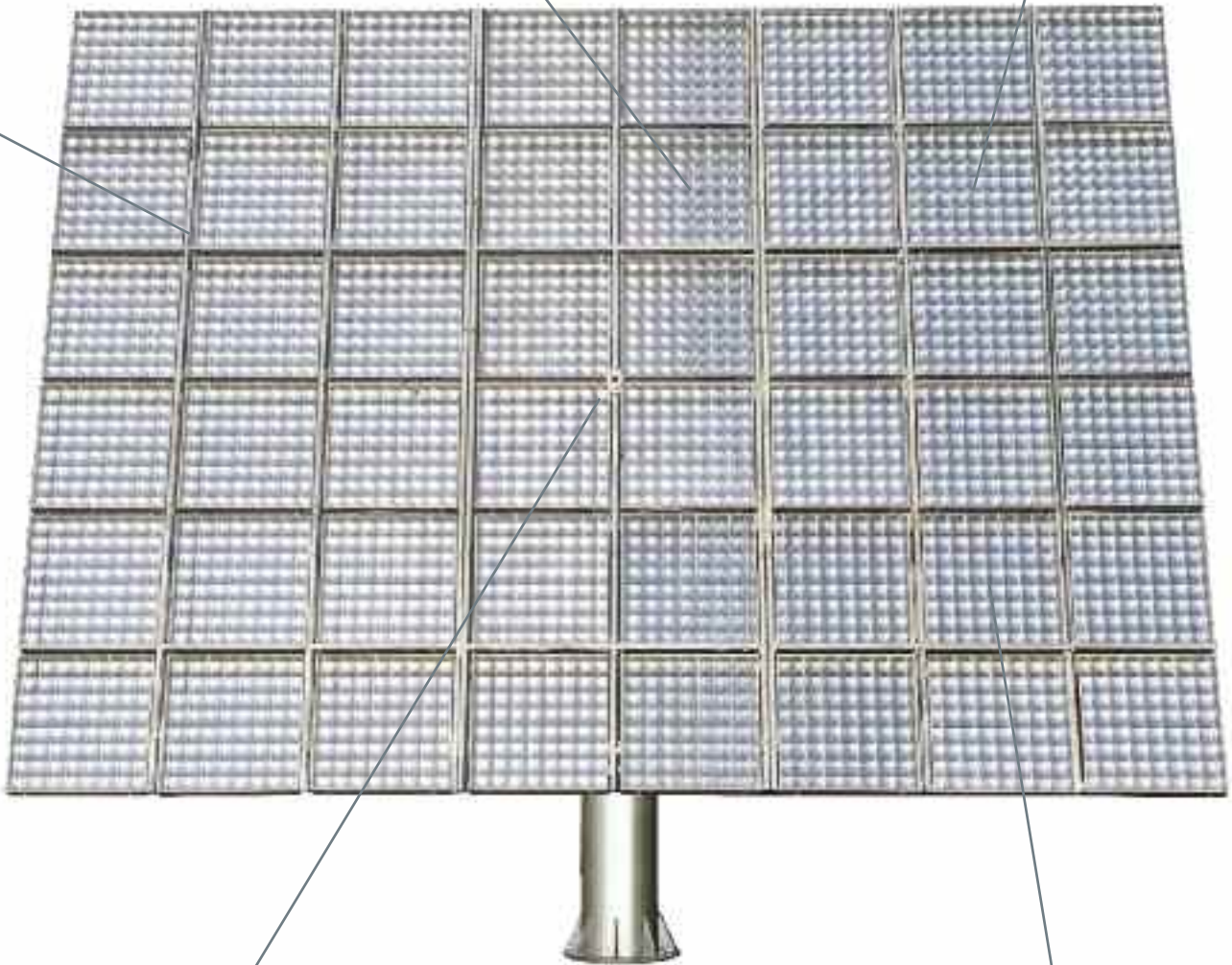
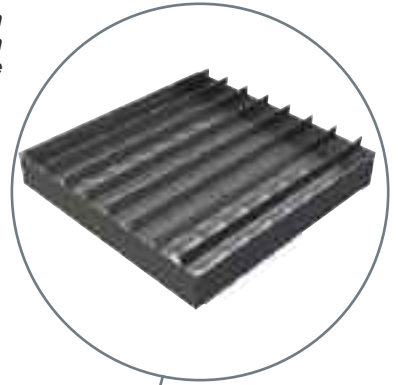


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concentrating area



Single high concentration photovoltaic module



Solar camera
(part of the overall tracking system)



Aluminium heat exchanger

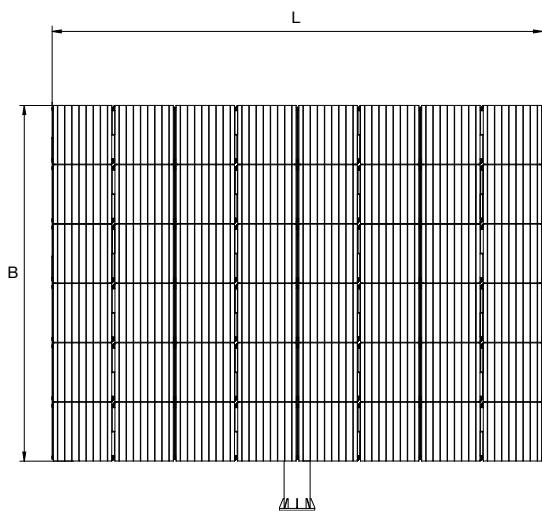


**LifeTree
48 modules**

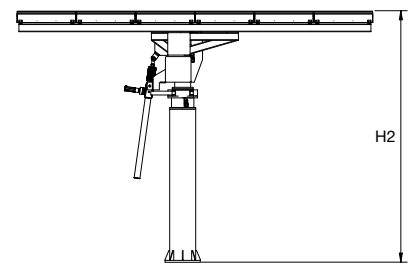
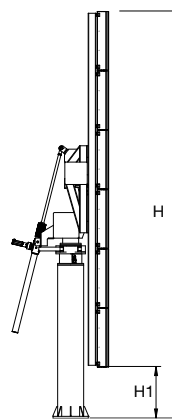


- Intelligent solar tracking system for application on the ground with the capability of 48 modules
- bi-axial tracking system handles both azimuth and zenith movements
- Electric brushless motors driven by integrated electronic control
- Size: 7670x5560 mm
- Supporting structure in galvanized steel
- Modules are installed and lined up on the supporting structure from the manufacturer
- Highly accurate bi-axial solar tracking (tracking error less than 0.1°)
- Weight 3900 Kg.

Like any high concentration PV generators the module must always be kept perfectly orthogonal to the sun rays. The Beghelli LifeTree solar tracker has an automatic control system that continuously keeps the system aligned to the sun with an angular accuracy better than 0.1 degrees. The system is designed for an operational lifetime of at least 20 years with minimal maintenance. The structure is galvanized steel and has been calculated to withstand the wind force up to 30 m / sec. Each of the 48 solar modules is equipped with its own inverter. The modules are independent and therefore reduce the dangerous mismatching effect which would be inevitable if you use a single inverter. Energy yield is the highest in all operating conditions. The optimal combination of information technology, electronics and mechanics ensure very high levels of accuracy at competitive costs.



DIMENSIONS (mm)				
L	B	H	H1	H2
7670	5560	6360	800	3930



Technical Details

Peak power (Pmax)	8160 Wp @ 900W/mq DNI AM1.5
Ambient temperature	-40C +85°C
Weight	3.900 Kg

Order Code	Description
15811	LifeTree HCPV 8,16 kWp



Tracking system with solar camera



2 axis solar tracking structure equipped with azimuthal and elevation brushless motors

Technical Details

Material	Galvanized steel
Weight	2.364 Kg

Single photovoltaic module



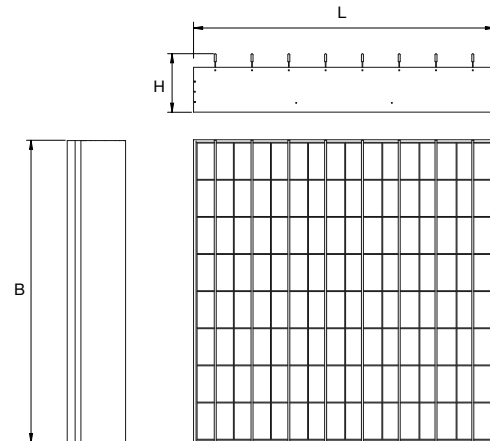
- High concentration photovoltaic solar module, using multi-junction III-V cells (Ge, As, In, Ga)
- Module efficiency higher than 23%
- Body and passive cooling system are made out of extruded aluminium
- The total weight of the module can be compared to traditional polycrystalline silicon systems
- Angle of acceptance 1° (±0.5°)

LifeTree is composed of 48 Beghelli photovoltaic modules, each with independent inverter with radio communication capability. Each module takes advantage of multi-junction solar cell technology (III-V semiconductors), with a yield conversion more than 37%. Each module is made of 64 solar cells, each with its own bypass diode which ensure the module's operation even in the event of single cells failures.

The use of aluminum both for the frame and for the heat exchanger permits a total weight comparable to that of a traditional silicon module.

This excellent result makes it possible to build compact and easy to handle high concentration solar modules.

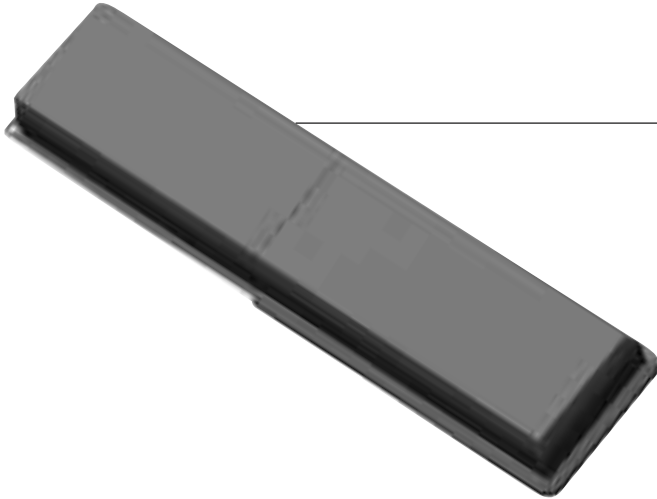
DIMENSIONS (mm)		
L	B	H
918	918	174



Technical details

Peak power (Pmax)	170 Wp @ 900W/mq DNI AM1.5
MPP voltage	176 V
Open circuit voltage	198 V
MPP current	0.96 A
Short circuit current	1.1 A
Size	915x912x177 mm (0.835 m ²)
Ambient temperature	-40C +85°C
Module efficiency	23%
Weight	32 Kg

Single module solar inverter (DC/AC)



- 230 V ac output current
- 95% efficiency
- High reduction of mismatching effect
- No system's partial shadowing problems

Each high concentration module has its own high efficiency inverter. This allows the maximum possible energy yield of the HCPV generator, since every single module is independent and there is no problem of module shadowing, mismatching or misalignment. Each module inverter is a complete DC/AC grid connected converter with 230V single phase output, efficiency greater than 95%. The inverters are connected to the three phase junction box for the connection to the HCPV generator to the 400V grid.

HCPV generator AC output

three phase 400V system
four wires (R, S, T + neutral conductor) + protection earth conductor
nominal AC power 8.16 kW

Technical details

	Unit	value
Nominal DC input voltage	Vcc	176
PV voltage range, MPPT (Input voltage range)	Vcc	130÷200
Max DC input voltage	Vcc	250
Nominal input current	A	0.96
Max input current	A	1.5
Nominal input power	W	170
Max input power	W	200
Nominal output power	W	160
Output voltage 0	Vac	230
Output current	A	0.69
Max output shortcircuit current	A	1.5
AC frequency	Hz	50 +/- 2%
Power factor		0.99
Max efficiency	%	95
European weighted efficiency	%	93
Consumption in standby mode (night mode)	W	0.2W
Size	mm	t.b.d.
Operating temperature	°C	-20 ÷ +60
Weight	Kg	t.b.d.
MTBF	hours (a 20°C)	t.b.d.
Firmware version		t.b.d.
Brand		Beghelli S.p.A.
Model		t.b.d.



Control and supervision board



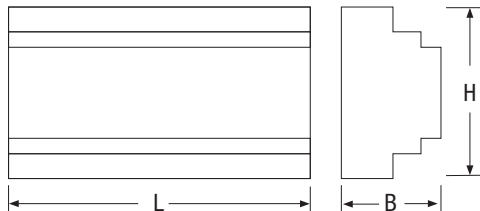
- **Control of one or more HCPV systems**
- **Radio controlled communication between the HCPV systems**
- **Overall control and remote supervision**
- **Solar DATA Gate radio transmission system**

DIN rail installation device for supervision of one or more trees. The device communicates by radio with the trees and using the built-in GSM modem can be remotely connected to the customer supervisory systems. The GSM modem can send SMS alert messages.

With this device you can monitor the power generated from the system and analyze the proper functioning of every tree and every module.

The supervising unit comprises the following elements:

- **GSM communication device**
manages the delivery of SMS messages
- **Solar DATE Gate radio transmission system**
handles the communication between the controller and inverter with a FH- DSSS 2.4 GHz radio waves.
- **LCD color Display**
allows data plant viewing and production efficiency. Control and parameters setting.



• Dimensions (mm) •		
L	B	H
160	75	90

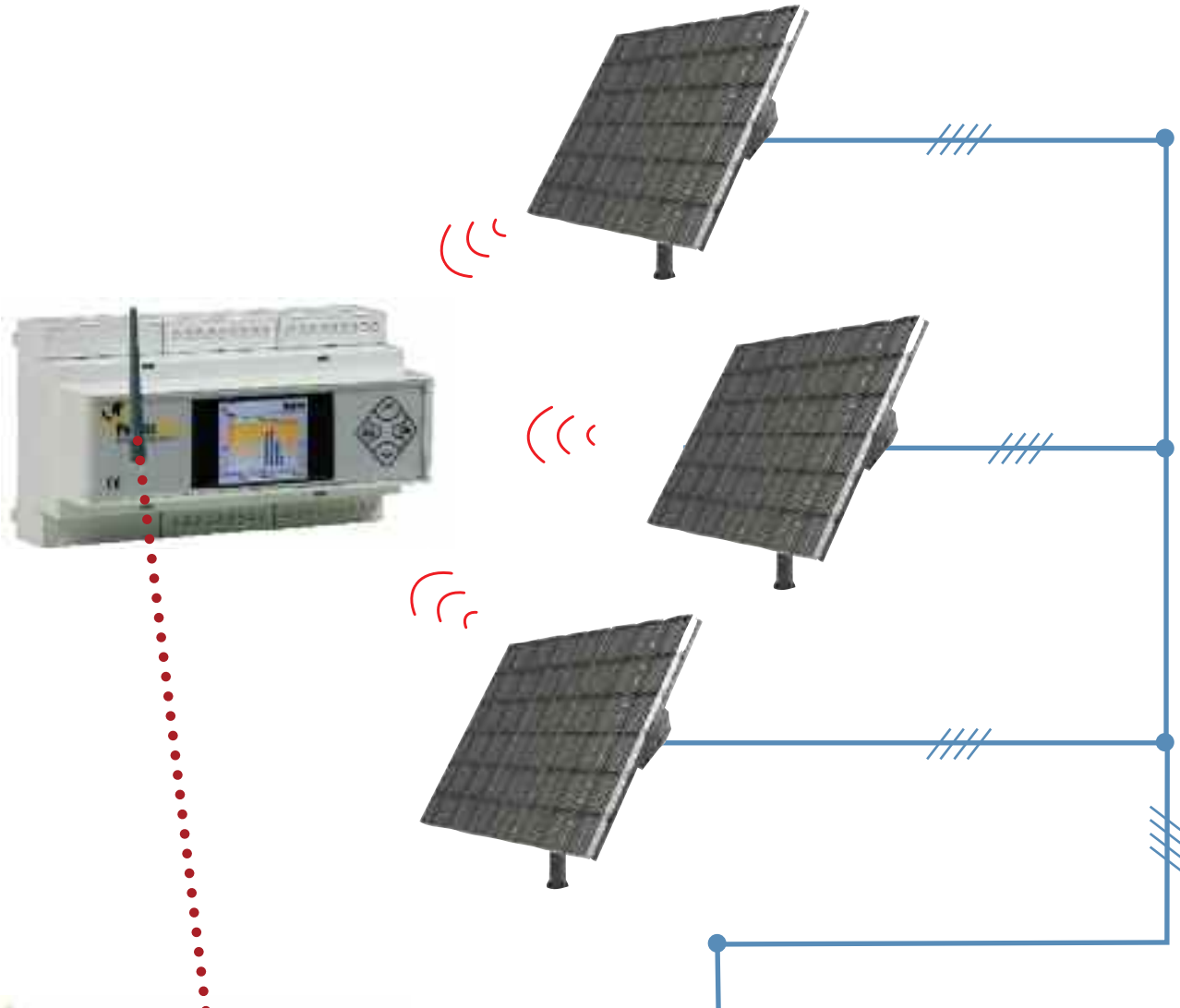
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SELF-MONITORING PERFORMANCE WITH SMS REPORTING

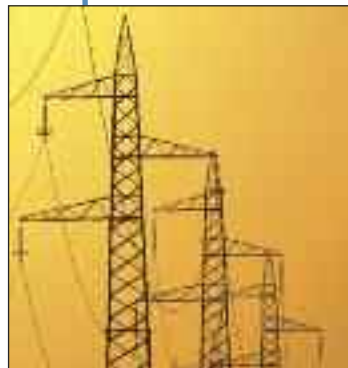
To monitor and control the production yield, the unit supervisor performs a comparison on the production efficiency of each inverter and analyses the whole system's performance. In case of anomalies, the system automatically send a system fault SMS. The same message appears with the FotoVisual software

-))) Solar DATA Gate Beghelli FH-DSSS Radio Transmission
- GSM Transmission



PC CONTROL SYSTEM WITH FOTOVISUAL SOFTWARE

The HCPV system can be monitored with a personal computer (running the Fotovisual software) which can be locally (via radio or RS485 cable) or remotely (via GSM) connected to the supervision unit



SECURE CONNECTION TO THE PUBLIC GRID

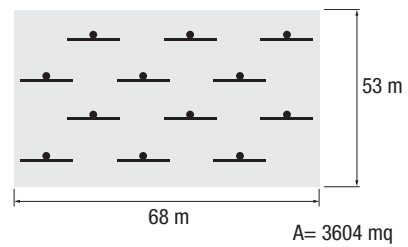
The Anti Islanding System (SPI), integrated into each single tree performs following functions: monitoring line with minimal controls and maximum voltage, minimum and highest frequency and derivative of frequency. In case of failure or malfunction of the public grid, SPI disconnects the PV system from the grid.

The importance of a correct layout

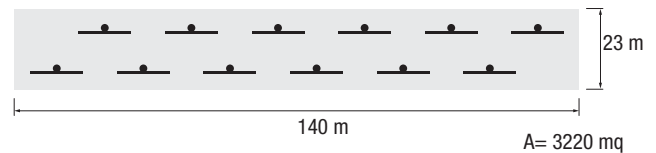
When designing a solar tracking PV plant it is necessary to pay particular attention to the distance between the individual system. The presence of shadows on the solar modules can compromise the system's energy efficiency, especially for concentration photovoltaic systems which use only the direct portion of sunlight.

The distance between the systems must therefore be such to ensure the absence of "reciprocal" shadows for the whole year. For example, a perfectly flat and squared land is the most limiting case, on the other hand an east/west oriented rectangular, and perhaps inclined towards south/north land increases the number of possible installed systems..

On a square and flat land can be inserted approximately 30 systems per hectare. This value can grow significantly (50 and more) on an inclined and rectangular land accepting even a small percentage of shade. Beghelli LifeTree, developed with single module microinverter reduces this "mismatching"damaging effect ensuring good returns even in suboptimal conditions. Here we propose as an example, the characteristic data installation of three locations where energy efficiency and installed capacity varies depending on the layout of the systems.



LifeTree - 48 modules for 8,16 kWp



Sample of 12 Beghelli LifeTree PV plant

Highlighting of different needed surface depending on different layouts.

Site	East-West row pitch	North-South row pitch	East-West distance	North-South distance	Life Trees per hectare	Peak Power	MWh per hectare	Yield
			m	m		kWp	MWh	KWh/KWp
Bologna	1,6	1,8	12,8	9,0	87	708	716	1.011
	2,0	1,6	16,0	8,0	78	638	613	961
	3,0	2,0	24,0	10,0	42	340	382	1.124
	3,0	3,0	24,0	15,0	28	227	267	1.177
Athens	1,6	2,0	12,8	10,0	78	638	855	1.341
	1,6	1,8	12,8	9,0	87	708	919	1.298
	2,0	3,0	16,0	15,0	42	340	487	1.431
	3,0	3,0	24,0	15,0	28	227	333	1.470
Tunisi	1,8	1,6	14,4	8,0	87	708	1.006	1.420
	2,6	1,6	20,8	8,0	60	490	721	1.471
	2,8	1,6	22,4	8,0	56	455	673	1.478
	3,0	2,6	24,0	13,0	32	262	441	1.686





**Let's take the power from the sun
and begin to clean the world!**

Beghelli

www.beghelli.com

BEGHELLI SpA - Via Mozzeghine, 13/15 - 40050 Monteveglio (BO) - Italy - Tel. +39 051 9660411 - Fax +39 051 9660444

www.airtechnologyaustralia.com.au