ECOSOLE

Elevated **CO**ncentration photovoltaic **SO**lar **E**nergy generator
and fully automated machinery
for high throughput manufacturing and testing

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Editorial

Dear readers,
thank you for your interest in the ECOSOLE project and this last issue of the project newsletter, which is also published on the project website http://www.ecosole-project.eu/

In this issue you can read about the project final phase and results. You also find a focus on three of ECOSOLE partners, to know more about what they do and how they contributed to the project results.

Finally, there is a run-down of the project meetings held so far and an article on the closing workshop.

I hope that this final issue of the ECOSOLE newsletter contributes to give you the sense of our efforts and strong commitment in bringing this project to its successful results.

Maurizio Carpanelli
Project Coordinator
maurizio.carpanelli@becar.it

ECOSOLE in brief

ECOSOLE is one of the largest European Demonstration projects in the field of solar photovoltaics, funded by the European Union, under the 7th Research Framework Programme.

ECOSOLE consortium comprised 9 partners from Italy, Spain, Germany, Slovenia and Israel. It involved outstanding industrial leaders and innovative SMEs, as well as distinguished universities.

ECOSOLE tackled the relevant challenge of producing solar electricity at higher efficiency and lower costs.

ECOSOLE TODAY

The Project achieved its expected results. The HCPV solar energy generator wad constructed and validated, while implementing the high throughput manufacturing and testing line.

"The consortium collaborated with a strong commitment and in complete synergy bringing together excellent skills and expertise, finally allowing to reaching the expected results" commented Maurizio Carpanelli, Project Coordinator.

AUREL Spa

AUREL s.p.a. was founded in 1970 by developing the technology of the "thick film" for the production of electronic micro-circuits. Currently a team of specialists, dedicated to the several phases of the project, is able to offer assistance on best use of Thick Film on metal subtrates , SMD, IMS, ensuring a full-service custom design.

Since 40 years, **AUREL** is leader in thick film technology. **AUREL** can design and mass produce Thick Film Hybrid Circuits on Alumina (Al_2O_3) and on Aluminium Nitride (AlN) on complex geometry substrates, also provided with laser made metal coated pass-thru holes. Alumina subtrate high thermal and mechanical stability is extremely suitable for chip & wire components.
The development of thick film technology on metal substrates, applied with screen printing processes, has permitted the realization of high performance devices with interconnection nets directly integrated on metal substrate. This solution assures a better thermal efficiency and a very simple mechanical structure, with significant production boost and cost reduction. This kind of solution is especially suited for the realization of high performance CPV receivers.

ENEA

ENEA - Italian National agency for new technologies, Energy and economic sustainable development - is an Italian public research organisation which performs research activities and provides agency services in support to public administrations, public and private enterprises, and citizens for multidisciplinary mission-oriented researches, results dissemination, technological transfer and training activities.

Brief declaratory of photovoltaic systems and smart grid unit (dte-fsn-fosg)
Some of the main research activities of Photovoltaic Systems and Smart Grid Unit (DTE-FSN-FOSG), located at **ENEA** Research Center of Portici, are targeted at foster and strengthen the competitiveness of PV, CPV technologies and the field national enterprises by focusing mainly on innovative processes and products. Primary lines of activity are as follows: design, development and characterization of PV, CPV and hybrid PV-thermal solar components and systems (i.e., receiver, modules, optics, converter, tracker, etc.); test qualification of PV and CPV components; system design for industrial process heat/cooling and thermal storage; multi-objective optimization strategies for micro grid and smart grid in presence of poly-generation systems and storage; RES penetration into the electric grid and ancillary services; energy performances analysis.

BECAR Spa

BECAR has been developing PV systems and components since the beginning of the century. The activities carried out in Ecosole have been focused on the development of a new HCPV generator made of a big 105sqm pole based tracker carrying 144 high concentration PV modules with single module inverters. The new generator has been optimized for utility scale energy systems to be deployed in high DNI regions of the world. The first prototype has been installed in Monteveglio (Bologna) in Beghelli's Head Quarter. Within Ecosole, **Becar** has also designed and realized the demonstrator of the automatic manufacturing machineries for the HCPV modules fabrication.

Becar is also studying the application of Ecosole technology to the residential PV market with the development of a small scale HCPV generator based on a small, simple low cost tracker.
Becar, the R&D Beghelli group company, has an establishment of researchers, electronics, mechanics and materials engineers and computer experts. It possesses a know-how that is at the cutting edge in the fields of analogue, digital and power electronics, of mechanics and optoelectronics. **Becar** studies and develops lighting, radio communication, power electronics and renewable energy devices.

Past Events/Meetings

WFES 2015 19th-23rd January 2015, Abu Dhabi

Becar presented the ECOSOLE project at WFES in Abu Dhabi from January 19th to January 23rd 2015.
The Ecosole stand was been visited by many exhibition participants coming from abroad and mainly from the Middle East, Africa and India.
On Tuesday 20th Mr. Carpanelli has given a speech within the TechTalk Seminar Programme, with the title: "ECOSOLE: High Effi-ciency, Fast Deployable HCPV Generators for Desert Areas".
The ECOSOLE activities and products have been explained to many interested visitors who have been attracted by the new renewable technology.

8° Technical Committee, 24th February 2015 Monteveglio, Italy

The 8th Technical Committee was held in Monteveglio, Italy, hosted by BECAR. The partners discussed the status, critical issues have been pre-sented and thoroughly evaluated, and the next steps carefully out-lined to ensure the achievement of the project results. The consortium is confident that the project will reach its successful end.

9°Technical Committee, 23th-24th July 2015, Monteveglio, Italy

The 9th Technical Committee was held in Monteveglio, Italy, hosted by BECAR. The partners discussed the status and the next steps to ensure the achievement of the project results were confirmed. During the second day of the meeting, the consortium visited the now operating assembly line.

ECOSOLE closing workshop and Final meeting, 25th-26th January 2016, Monteveglio, Italy

The closing workshop on "CPV potential in the future market" and the Project Final meeting were an opportunity to first discuss the market potential of COV in general and specifically of ECOSOLE project results, and then to assess and celebrate the success of the project and its final results.

Focus

ECOSOLE closing workshop "CPV potential in the future market"

On January 25th, **ECOSOLE** consortium met with industrial and civil society representatives, to discuss the potential of CPV in the market across countries.
We're consuming in 500 years the energy accumulated in 50 millions years. We are facing the need to substitute the fossil sources with renewable sources, considering also that the Paris Climate conference declared global warming limit at 2°C. In numbers, a reduction of use of fossil sources of 50% by 2015 means 58% of renewables as primary source.
Natural sources of energy, such as biomass, waves, even wind, have in general a low (or even negative) energy balance. Solar is the best option we have.

Photovoltaic has indeed been growing exponentially in the last years, thanks to its now limited costs compared to traditional or other renewables solutions. Nevertheless just a small percentage of power generation comes from PV. PV alone, or even coupled with Wind energy generation, cannot in any case compete with the increase of Fossils Fuels Energy generation plants production.
Large CPV plants have been installed across the world, but there has been an evident decrease in the last three years – the industrial panorama is extremely unstable with major player going out of business. But at the same time the technology has continued to improve, now having reached a 46% efficiency peak with IV junction solar cells - the technology is attaining double efficiency than PV systems. Indeed a lot of companies continue working in this sector and the European Commission is still investing in research projects on this technology. CPV is predicted to have a lower cost and a higher competitiveness than PV if installed in high irradiance areas, and CPV produces electricity at a time nearer to the energy demand – reducing also costs of storage; at the same time, CPV requires a reduced use of valuable materials, with a double efficiency in comparison with PV.

In the end, the substitution of fossil sources by CPV would be the perfect choice thanks to the very low quantity of cells needed compared to the PV (1000 times lower cells area is needed for the same output power). Indeed the development of higher efficiency cells and systems and miniaturization will increase the competitiveness of the CPV solution which will become more and more affordable and usable both at utility, commercial and residential level, and, in maturity, at low cost.

The status of market uptake of energy generation from renewables sources, particularly of PV and **CPV,** across countries is analysed – USA, Latin America and Mexico, as well as ASEAN regions. Even if PV is the most adopted and increasing acquiring market, it is perceived that with the right regulatory, policy and financing environment, as well as the promised technological advances, CPV, and particularly HCPV, could be the key answer to the need of energy generation from renewables sources.

ECOSOLE project demonstrated the possibility to produce average efficiency HCPV systems at a reduced cost, with a high throughput manufacturing line. With additional investments, the production line will reach complete industrial production level for utility market. Considering the evolution of the market, a new outlook to have ECOSOLE results reach the market in the very near future, waiting for the maturation of the utility market, is to decrease the scale of the system and make it useful, attractive and easily accessible for the residential and even domestic market. ECOSOLE therefore ends with successful results and a new perspective in the future.

Contacts

Maurizio Carpanelli
Project Coordinator
BECAR SRL
Monteveglio (BO) , Viale della Pace 1, 40050 - Italy
tel. +39 051 6702242
fax +39 051 6702186
e-mail: coordinator@ecosole-project.eu

ECOSOLE on the new social media