



Newsletter N4

July 2016

BSQ Solar and REPHLECT selected for the Inpho Venture Summit 2016

Bordeaux, July 31st 2016



BSQ Solar is one of the 20 companies selected to present its products and business plan at the 2016 edition of the Inpho Venture Summit. The Inpho Venture Summit is held every two years in Bordeaux at the magnificent Place de la Bourse just by the Garonne River.



This event, organized by the French CEA (Commissariat à l'Énergie Atomique) with the support of Blumorpho, gathers large companies, VCs and start-ups to meet to develop collaborations while exchanging on key bankable challenges to invest in.

<http://www.inpho-ventures.com/>

In this edition, the selected companies will get the opportunity to pitch in front of international investors such as Panakes Partners, Aster Capital, Robert Bosch Venture Capital, Samsung Ventures, NEST Ventures, Total Energy Ventures, Wellington Partners, EDF Energies Nouvelles, First Solar, Schneider, Legrand or the European Investment Fund. Among the key speakers this year will feature the famed CEO of Tesla Motors, Mr. Elon Musk. The event will be chaired by Mr. Georges Ugras, the Managing Director of IBM Venture Capital.

They are looking for the game changers in energy efficiency, mobility and autonomous vehicles, digital medicine and telecom.



The event will be closed by a gala dinner held at the Château Pape-Clément (Pessac), the oldest wine estate in Bordeaux, founded in 1300 by Bertrand de Groth and presented to his brother Pope Clement V.

This is indeed a great opportunity for BSQ to present its HCPV technology and products, and its REPHLECT initiative!

BSQ Solar to install at MASDAR City

Abu Dhabi, June 26th 2016



BSQ Solar has signed an agreement to supply and install a 100kW HCPV demonstration plant at MASDAR City. The plant will be completed in the 2nd half of 2017.

Masdar City is a planned city project in Abu Dhabi, in the United Arab Emirates. Its core is being built by Masdar, a subsidiary of Mubadala Development Company, with the majority of seed capital provided by the Government of Abu Dhabi. Designed by the British architectural firm Foster and Partners, the city relies on solar energy and other renewable energy sources. Masdar City is being constructed 17 kilometres south-east of the city of Abu Dhabi, beside Abu Dhabi International Airport.



Masdar City today hosts the headquarters of the International Renewable Energy Agency (IRENA). The city is designed to be a hub for cleantech companies. Its first tenant was the Masdar Institute of Science and Technology, which has been operating in the city since it moved into its campus in September 2010.

As designed, the city would be home to 45,000 to 50,000 people and 1,500 businesses, primarily commercial and manufacturing facilities specializing in environmentally friendly products. In turn, more than 60,000 workers are expected to commute to the city daily. Final completion is estimated to happen by 2030.



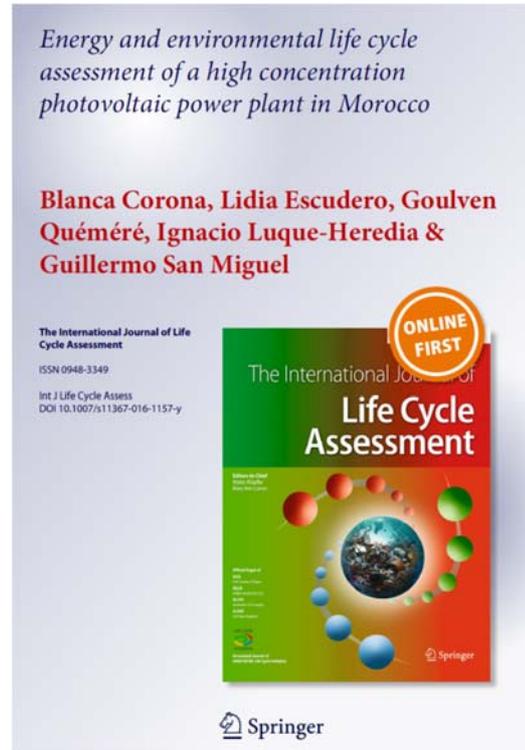
BSQ's HCPV in the International Journal of Life Cycle Assessment

June 30th 2016

On June 30th the technical paper "Energy and environmental life cycle assessment of a high concentration plant in Morocco" was published online by the International Journal of Life Cycle Assessment. It contains the results of the collaboration between the Department of Chemical and Environmental Engineering of the

Universidad Politécnica de Madrid and BSQ Solar.

The aim of this paper is to evaluate the environmental impact of a BSQ Solar HCPV plant located in Morocco by determining the impact of this technology on a wide range of environmental categories.



<http://link.springer.com/article/10.1007/s11367-016-1157-y>

A complete life cycle inventory was gathered for the case of a 1MW BSQ Solar HCPV power plant installed in Casablanca (Morocco) (DNI 1834kWh/m²yr.). The system was evaluated using a cradle to gate approach. Cumulative energy demand (CED) and energy payback time were determined for different life expectancy scenarios (EPBT) (between 20 and 30 yrs.).

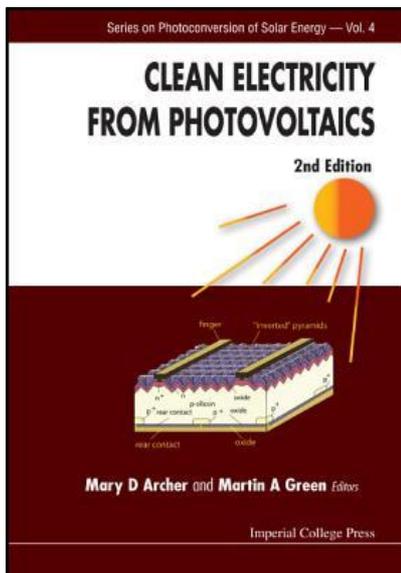
In a conservative 20 yr. lifetime scenario for the plant, the results showed an EPBT of 0.862 years when recycling benefits are accounted for. This value ranks first and much ahead among all PV technologies. The main environmental impacts are as follows: climate change 53.3 kg CO₂ e.q./MWh, freshwater eutrophication 28.3 g P e.q./MWh, human toxicity 44.1 kg 1.4-DB e.q./MWh, freshwater ecotoxicity 1.20 kg 1.4-DB e.q./MWh and marine ecotoxicity 1.20 g 1.4-DB e.q./kWh.

The results of these analyses are expected to contribute to a better environmental design of the power plant, and its manufacturing and support optimum deployments in Morocco as foreseen within the REPHLECT initiative.

BSQ authors chapters in two PV & HCPV textbooks

Two important textbooks in the field of PV and HCPV recently published include chapters co-authored by Dr. Ignacio Luque Heredia, Director General of BSQ.

Firstly, the second edition of *Clean Electricity from Photovoltaics*, published by Imperial College Press, provides an updated account of the underlying science, technology and market prospects for photovoltaics.



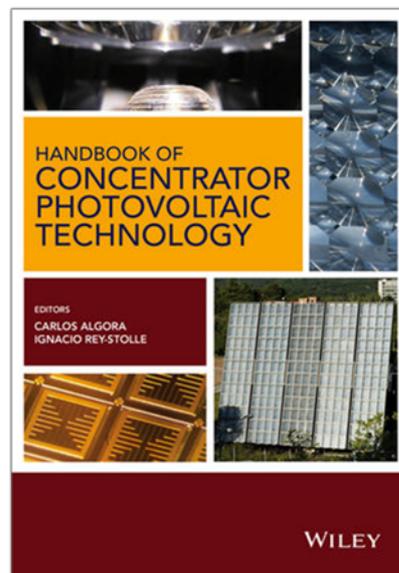
<http://www.worldscientific.com/worldscibooks/10.1142/p798>

The book is edited by Professors Martin Green and Mary Archer. Martin Green, one of the fathers of modern photovoltaics, is Scientia Professor at the University of New South Wales in Australia, and Fellow of the Royal Society of London. Lady Archer is a former Fellow and Lecturer in Chemistry at the University of Cambridge. She currently sits on the Chemistry

Advisory Board in the Chemistry Department at the University of Cambridge.

The book's 708 pages are organized in 14 chapters covering PV technology topics such as crystalline silicon cells, thin films, CdTe, Cu(In,Ga)Se₂, III-V Multijunctions, organic cells, dyes and perovskites, quantum well cells, PV modules, PV business and the limits to PV conversion by several well-known experts such as Michael Grätzel, Dieter Bonnet, Werner Schock Jenny Nelson, Arnulf Jäger Waldau or Masafumi Yamaguchi, many of these holding Becquerel or Cherry prizes in PV research.

Professor Antonio Luque and Ignacio Luque-Heredia (father and son team) authored the chapter on Concentrator Photovoltaics. An 80-page review on the design principles and technology of CPV systems, ranging from the cells, optics, heat management, modules and trackers, and ending with an explanation of CPV rating and performance standards, the industry status and cost projections.



<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1118472969.html>

The other relevant publication with BSQ's participation is the *Handbook of Concentrator Photovoltaic Technology* published by Wiley & Sons. With its 772 pages, it is probably the most extensive overview written on CPV technology up to date. In its 14 chapters it covers the fundamentals of solar radiation, solar cells, concentrator optics, modules and trackers; all aspects of characterization and reliability; case studies based on the description of actual

systems and plants in the field; environmental impact, market potential and cost analysis.

The book is edited by CPV specialists, Carlos Algora and Ignacio Rey-Stolle –professors at the well-known Institute of Solar Energy at the Polytechnic University of Madrid (IES-UPM).

Ignacio Luque-Heredia and Pedro Magalhães, having both worked previously at CPV tracker specialist company InSpira, get again together with Matt Muller from the US National Renewable Energy Laboratory to provide a 43 page chapter on CPV Tracking and Trackers, covering topics such as design specs, a taxonomy of tracker architectures and structural considerations related to trackers, tracking control and accuracy measurement, manufacturing and field works and international standards related to sun tracking.

Javier Bernabé, joins REPHLECT as Quality Management Consultant

March 3rd, 2016



Javier Bernabé has recently joined the REPHLECT project to lead the implementation of a quality and an environmental management system following the ISO9001:2015 and ISO14001:2015 standards respectively. This will cover the newly designed RML (Receiver Manufacturing Line) and the MAL (Module Manufacturing Line) and Javier will manage the process till the realization of the corresponding audits and the final attainment of the ISO certificates which are two important REPHLECT milestones.

He brings into the project his extensive knowledge based on more than 30 years in the field of quality management, and following the wide set of industry standards.

Javier holds a degree in Quality Management and Engineering from CONFEMETAL (Spanish Association of Metal Industries). He is also a qualified and certified auditor who carries out ISO certification processes according to the following standards: ISO9001 (Quality Management System), ISO14001 (Environmental Management System) and OHSAS 18001 (Occupational health and Safety Management System).