# SolarPACES 2009 Program

15 - 18 September 2009

Berlin, Germany

SolarPACES

Concentrating Solar Power and Chemical Energy Systems

Hosted by

DLR

Supported by

ESTELA

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Platinum Sponsor

Solar Millennium

# PROGRAM
15 September 2009

**All plenary sessions will be broadcasted live on video in the room BERLIN-PEKING. If the room BERLIN-BERLIN exceeds full capacity during these sessions, we kindly request that student participants and any latecomers proceed to BERLIN-PEKING.**

## Session Tue-1-Plen
Tuesday, 15 September 2009

### 9:00-10:30 am Opening Session
Room: BERLIN-BERLIN
Moderator: Robert Pitz-Paal, Conference Chair, 2009 / German Aerospace Center, DLR

| Panelists | From | Presentation Title |
|---|---|---|
| Robert Pitz-Paal, Conference Chair, 2009 | German Aerospace Center, DLR | Welcome Address by the Chairman |
| Matthias Machnig, State Secretary | Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, BMU | CSP - A Future Leading Market in the Energy Sector? |
| Bruno Schmitz, Head of Unit New and Renewable Energy Sources | DG Research, European Commission | The European Dimension of CSP |
| Frank Wilkins, CSP Team Leader | U.S. Department of Energy | The Role of CSP in the US |
| Richard Jones, Deputy Executive Director | International Energy Agency, IEA | The Role of CSP in IEA Climate-Change-Mitigating Scenarios |
| Thomas R. Mancini, Chairman SolarPACES | SolarPACES | Welcome Address by the SolarPACES Chairman |
| José A. Nebrera, President | European Solar Thermal Electricity Association, ESTELA | Welcome Address by the ESTELA President |
| Christian Beltle, CEO | Solar Millennium AG | Welcome Address by the Platinum Sponsor |

**10:30-11:00 am Coffee Break**
Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Tue-2-Plen
Tuesday, 15 September 2009

### 11:00 am-12:30 pm Plenary Session: CSP for the MENA Region
Room: BERLIN-BERLIN
Chair: Albrecht Kaupp, Manager of the Indo German Energy Programme Deutsche Gesellschaft für Technische Zusammenarbeit, GTZ

| Speaker | From | Presentation Title |
|---|---|---|
| Ralf Christmann, Research and Development in the Field of Renewable Energies | Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, BMU | Mediterranean Solar Plan - Strategy and Status |
| Mohamed El Sherif, Senior Energy & Business Development Expert | Egyptian Ministry of Trade and Industry | Mediterranean Solar Plan - MENA Perspective |
| Abderrahim el Hafidi, Director of Electricity and Renewable Energies | Ministry of Energy, Mines, Water and Environment - Morocco | New Developments in the Field of Renewable Energies in Morocco |
| José Luis García, Clean Energy Projects Campaigner | Greenpeace Spain | Global Concentrating Solar Power Outlook 2009: The Greenpeace view |
| Ernst Rauch, Head of the Meteorological Risks Department | Munich Reinsurance Company AG | Solar Power from the Deserts: An Industrial Initiative to Combat Climate Change - A Reinsurer's Perspective |

**12:30-2:00 pm Lunch Break**
Lunch will be served in the Dining Area at the rear of the hotel.

## Session Tue-3-Plen
Tuesday, 15 September 2009

### 2:00-4:00 pm Plenary Session: CSP Markets Worldwide
Room: BERLIN-BERLIN
Chair: Dr. Nikolaus Benz, Managing Director / SCHOTT Solar CSP GmbH

| Speaker | From | Presentation Title |
|---|---|---|
| Thomas Maslin, Senior Analyst, North America Solar Power Advisory | Emerging Energy Research | Foundation for Concentrating Solar Power in the US Market Environment and Competive Strategies |
| Luis Crespo, General Secretary | PROTERMOSOLAR | The Market for Concentrating Solar Power in Spain |
| Vittorio Brignoli, Energy Expert | ERSE S.p.A. | The Market for Concentrating Solar Power in Italy |
| Olaf Goebel, Senior Project Manager | MASDAR | The Market for Concentrating Solar Power in the MENA region |
| Yogi Goswami, Professor of Mechanical Engineering | University of Florida | The Market for Concentrating Solar Power in India |
| Zhifeng Wang, Director of the Laboratory of Solar Thermal Power and Professor | Institute of Electrical Engineering - Chinese Academy of Sciences, IEE - CAS | The Market for Concentrating Solar Power in China |
| Wes Stein, Project Manager | Commonwealth Scientific and Industrial Research Organisation, CSIRO | Exciting Times for CSP Research and Markets in Australia |

**4:00-4:30 pm Coffee Break**
Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Tue-4-Plen
Tuesday, 15 September 2009

### 4:30-6:00 pm Panel Discussion: CSP Financing
Room: BERLIN-BERLIN
Moderator: Paolo Frankl, Head of the Renewable Energy Division / International Energy Agency, IEA

| Panelists | From |
|---|---|
| Rosa Tarragó, Senior Project Manager | KfW Bankengruppe |
| Thomas Rueschen, Global Head of Asset Finance & Leasing | Deutsche Bank AG |
| Gus Schellekens, Director Sustainability and Climate Change | PricewaterhouseCoopers, PWC |
| Pierre Audinet, Senior Energy Economist | World Bank |
| Jenny Chase, Lead Analyst, Solar | New Energy Finance |
| Henner Gladen, Board Member | Solar Millennium AG |

**6:00-7:00 pm Happy Hour Bar**
The Happy Hour Bar is located in the Sponsoring and Networking Area, in front of the Room BERLIN-BERLIN.
We wish to thank EDF for their sponsorship of the Happy Hour Bar.

**7:00-11:00 pm Welcome Reception**
The Welcome Reception will take place in the Room BERLIN-BERLIN.
We wish to thank Saint-Gobain Solar for their sponsorship of the Welcome Reception.

# PROGRAM
16 September 2009

## Session Wed-1-Plen
Wednesday, 16 September 2009

**8:30-10:00 am Panel Discussion:** CSP Project Development Challenges

Room: BERLIN-BERLIN Moderator: Fred Morse, Senior Advisor USA / Abengoa Solar S.A.

| Panelists | From |
|---|---|
| Santiago Seage, Chairman and CEO | Abengoa Solar S.A. |
| José A. Nebrera, General Manager | ACS Cobra |
| Christian Beltle, CEO | Solar Millennium AG |
| Cayetano Hernández Gonzálvez, Director of Markets and Prospects | Iberdrola S.A. |
| Gilbert E. Cohen, Senior Vice President | Acciona S.A. |

**10:00-10:30 am Coffee Break**
Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Wed-2-Plen
Wednesday, 16 September 2009

**10:30 am-12:00 pm Panel Discussion:** Venture Capital Approaches

Room: BERLIN-BERLIN Moderator: Kevin Chen, Green Power Market Development / Google Inc.

| Panelists | From |
|---|---|
| David Mills, Chief Scientific Officer | Ausra Inc. |
| Bill Gross, Chief Executive Officer | eSolar Inc. |
| Arnold Goldman, Chairman | BrightSource Energy, Inc. |
| Dermot Liddy, COO | Tessera Solar International |
| Andrew McMahan, Technology and Project Development | SkyFuel Inc. |

**12:00-1:30 pm Lunch Break**
Lunch will be served in the Dining Area at the rear of the hotel.



**Attention: Room Change!**

## Session Wed-3-A
Wednesday, 16 September 2009

**1:30-3:30 pm Parabolic Trough Collectors**

Room: BERLIN-BERLIN 3

Topic Chairs: Eckhard Lüpfert, Eduardo Zarza

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Eckhard Lüpfert | Solar Trough Mirror Shape Specifications |
| O | 2 | Nicole Janotte | Quasi Dynamic Analysis of Thermal Performance of Parabolic Trough Collectors |
| O | 3 | Heiko Schenk | Pressure Drop Analysis of Steam Generation Parabolic Trough Plants |
| O | 4 | Diego A. Arias | Pumping Power Parasitics in Parabolic Trough Solar Fields |
| O | 5 | Cheryl Kennedy | Advanced Mirrors for Concentrating Solar Power |
| O | 6 | Gregory Shoukas | A Rapid Methodology for Determining Accurate Parabolic Trough Intercept Factors |
| P | 1 | Cheryl Kennedy | Development Path for an Advanced Solar Selective Coating |
| P | 2 | Jürgen Rheinländer | Parasitic Losses in Parabolic Trough Collector Fields for Direct Solar Steam Generation |

## Session Wed-3-B
Wednesday, 16 September 2009

**1:30-3:30 pm Modeling**

Room: BERLIN-PEKING

Topic Chairs: Nate Blair, Jürgen Dersch

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Roberto Calvo | Production Risk Analysis in Commercial Plants |
| O | 2 | Christoph Richter | Methods for Reducing Cooling Water Consumption in Solar Thermal Power Plants |
| O | 3 | Peter Viebahn | The Potential Role of CSP in the Future Technology Development Scenarios, Cost Development and Life Cycle Inventories until 2050 |
| O | 4 | Patrick Griffin | Software for Design, Simulation, and Cost Estimation of Solar Thermal Power and Heat Cycles |
| O | 5 | Reiner Pawellek | EbsSolar - A Solar Library for Ebsilon®professional |
| P | 1 | Giorgos Patrianakos | Simulation of a Solar Thermal Reactor for Methane Decomposition |
| P | 2 | Yolanda Gutiérrez Seco | Modularization: A Key Factor for the Definition of the Optimum Plant |

## Session Wed-3-C
Wednesday, 16 September 2009

**1:30-3:30 pm Commercial Projects in the World**

Room: BERLIN-BERLIN 2

Topic Chairs: Klaus Hennecke, Mark Mehos

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Olaf Goebel | Shams One 100 MW CSP Plant in Abu Dhabi |
| O | 2 | Georg Brakmann | Construction of ISCC Kuraymat in Egypt |
| O | 3 | Ulf Herrmann | Commissioning Process of the Solarfield of Andasol 1 & 2 |
| O | 4 | Valerio Fernández-Quero | PS10, the First Year Operation Experience |
| O | 5 | Cayetano Hernández Gonzálvez | Iberdrola Renewables and the Solar Thermal Technologies |
| O | 6 | Axel Funke | Challenges for EPC Projects of Large Scale Solar Thermal Power Plants |
| O | 7 | Samer Zureikat | 100MW CSP Plant, Ma'an, Jordan |

**3:30-4:00 pm Coffee Break**
Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Wed-4-A

Wednesday, 16 September 2009

### 4:00-6:30 pm Central Receiver Power Plants

Room: BERLIN-BERLIN 2

Topic Chairs: Reiner Buck, Greg Kolb

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Wenfeng Liang | Automatic Heliostat Positioning Offset Correction Strategies in a Solar Power Tower Plant |
| O | 2 | Mathieu Vrinat | Experimental Qualification of a High Temperature Air Solar Absorber Based On a Compact Heat Exchanger Technology |
| O | 3 | Francisco Ramos | A New Powerful Tool for Heliostat Field Layout and Receiver Geometry Optimization: NSPOC |
| O | 4 | Elon Silberstein | Brightsource Solar Tower Pilot in Israel's NEGEV Operation at 130 bar @ 530°C Superheated Steam |
| O | 5 | Juan Ignacio Burgaleta | Operative Advantages of a Central Tower Solar Plant with Thermal Storage System |
| O | 6 | Yutaka Tamaura | Demonstration of Tokyo Tech Beam Down Solar Concentration Power System in 100 kW Pilot Plant |
| P | 1 | Tobias Hirsch | The Virtual Institute for Central Receiver Power Plants (vICERP) |
| P | 2 | Achim Hofmann | Optical Quartz Windows for High Concentrated Thermal Power Plants |
| P | 3 | Bakhodir Nasirkhodjaev | New Concept of Solar Tower Plant Design |
| P | 4 | Peter Schwarzbözl | Visual HFLCAL - A Software Tool for Layout and Optimisation of Heliostat Fields |
| P | 5 | James Spelling | Evaluation of a Combined Cycle Setup for Solar Tower Power Plants |
| P | 6 | Minoru Yuasa | Tokyo Tech Multi Tower Beam Down System |
| P | 7 | Zhiyong Wu | Numerical Simulation of Convective Heat Transfer Between Air Flow and Ceramic Foams for Optimizing Solar Receiver Performances |

## Session Wed-4-B

Wednesday, 16 September 2009

### 4:00-6:30 pm Energy Storage

Room: BERLIN-BERLIN 3

Topic Chairs: Nathan Siegel, Rainer Tamme

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Sergio Relloso | Experience with Molten Salts Thermal Storage |
| O | 2 | Robert Bradshaw | Development of Molten Nitrate Salt Mixtures for Concentrating Solar Power Systems |
| O | 3 | Carsten Bahl | Concrete Thermal Energy Storage for Solar Thermal Power Plants and Industrial Process Heat |
| O | 4 | Rocío Bayón | Explaining the Experimental Behavior of a 100 kW Thermal Storage System with Nitrate Salts As PCM |
| O | 5 | Doerte Laing | Thermal Energy Storage for Direct Steam Generation |
| O | 6 | Stefan Zunft | High Temperature Heat Storage for Air Cooled Solar Central Receiver Plants: A Design Study |
| O | 7 | Greg Glatzmaier | Nanoscale Materials Modeling for Improved Heat Transfer and Storage Fluids |
| P | 1 | Qiang Peng | Thermal Decomposition and its Thermodynamic Analysis of Molten Nitrate Salts |
| P | 2 | Xavier Py | Low Cost Recycled Material for Thermal Storage Applied to Solar Power Plants |
| P | 3 | Lloyd Brown | Multivalent Metal Oxides for Thermochemical Energy Storage |
| P | 4 | Andreas Hauer | Compact Thermal Energy Storage: Material Development for System Integration |
| P | 5 | Tania Ritchie | High Temperature Thermal Energy Transfer Research at CSIRO |

## Session Wed-4-C

Wednesday, 16 September 2009

### 4:00-5:30 pm Policy and Marketing

Room: BERLIN-PEKING

Topic Chair: Ralf Christmann

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Albrecht Kaupp | The Mediterranean Solar Plan: A Balancing Act Between Vision and Ground Realities |
| O | 2 | Nikolaus Supersberger | Energy Scenario Analysis of the Iranian Energy System: Role of Renewable Energies |
| O | 3 | Carlos Ramos | Potential Assessment of Concentrating Solar Technologies for Electricity Generation in Mexico |
| O | 4 | Rainer Aringhoff | American Greening? The American Recovery and Reinvestment Act. Bright Future for CSP or: Do We Get Stuck in the Details? |
| P | 1 | Arno A. Evers | Direct Solar Hydrogen - The Next Steps |
| P | 2 | Keith Lovegrove | The Concentrating Solar Thermal Program in the New Australian Solar Institute |
| P | 3 | Britt Childs Staley | Juice from Concentrate: Reducing Emissions with Concentrating Solar Thermal Power |

## Session Wed-4-C

Wednesday, 16 September 2009

### 5:30-6:30 pm Water Desalination and Detoxification

Room: BERLIN-PEKING

Topic Chair: Julián Blanco

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Elena Guillen | Solar Desalination by Air Gap Membrane Distillation: the Medesol Project |
| O | 2 | Patricia Palenzuela | Preliminary Analysis of the Coupling of MED Desalination Units to Parabolic Trough Solar Power Plants |
| O | 3 | Kai-Dieter Schmitz | Techno-Economic Evaluation of the Cogeneration of Solar Electricity and Desalinated Water |
| O | 4 | Philipp Stukenbrock | Small Solar Thermal Power Plants for Desalination Processes |
| P | 1 | Ernest Kazarian | Solar System of Disinfecting of Medical Waste |
| P | 2 | Perla Hernández | Design, Construction and Test of a Photocatalytic CPC for Degradation of Emergent Polluting Agents |

## 6:30-7:30 pm Happy Hour Bar

The Happy Hour Bar is located in the Sponsoring and Networking Area, in front of the Room BERLIN-BERLIN.

We wish to thank Kraftanlagen München GmbH for their sponsorship of the Happy Hour Bar.



## 7:30-9:30 pm Berlin Sightseeing Tour

Discover Berlin's most famous sights on a two-hour guided tour through the German capital. On-site registrations will be accepted through September 15th at the Info Desk.
The buses will depart from the rear entrance of the hotel. Please be there and ready to leave by 7:30 pm.
The tour will end at the hotel at approximately 9:30 pm.

## Session Thu-1-Plen

Thursday, 17 September 2009

### 8:30-10:00 am Panel Discussion: Production Capacities for Key Components Supply

Room: BERLIN-BERLIN Chair: José A. Nebrera, President / European Solar Thermal Electricity Association, ESTELA

| Speaker | From |
|---|---|
| Samuel Faellman, Director Technical Sales and Proposals | Siemens AG |
| Avi Brenmiller, President & CEO | Solel Solar Systems Ltd. |
| Nikolaus Benz, Managing Director | SCHOTT Solar CSP GmbH |
| Axel Buchholz, Managing Director | FLABEG GmbH |
| Josep Ubach, Head of Process Engineering R&D | RIOGLASS SOLAR S.A. |
| Klaus Behnke, Head of Division | MAN Turbo AG |

**10:00-10:30 am Coffee Break**

Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Thu-2-A

Thursday, 17 September 2009

### 10:30 am-12:30 pm Central Receiver Power Plants

Room: BERLIN-BERLIN 2

Topic Chairs: Reiner Buck, Greg Kolb

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Dominique Goffe | The Benefits of Coupling a Linear Fresnel Field with an Overheating Central Receiver |
| O | 2 | Steffen Ulmer | Automated High Resolution Measurement of Heliostat Slope Errors |
| O | 3 | Craig Tyner | eSolar's Power Plant Architecture |
| O | 4 | Steve Schell | Design and Evaluation of eSolar's Heliostat Fields |
| O | 5 | Jens Kunert | Dimensioning Heliostat Drives Considering Dynamic Wind Loads |
| P | 1 | Jesús Fernández-Reche | Degradation Analysis of AISI 316 Ti Stainless Steel Subjected To Thermal Cycling Under Concentrated Solar Radiation |
| P | 2 | José González Aguilar | Mini Tower Solar Field with an Integrated Optical Waveguide Receiver for Chemical Demonstrators |
| P | 3 | Mónica Álvarez-Lara | Alloys Selection for Molten Salts Central Receivers for Solar Power Plants |
| P | 4 | Thomas Roos | Modifications to 25m$^2$ Target-Aligned Research Heliostat Mirror Panels |
| P | 5 | Konstantin Geimer | Innovative Volumetric Absorber Structures for Solar Tower Power Plants |
| P | 6 | Spiros Alexopoulos | Simulation Results for a Hybridization Concept of a Small Solar Tower Power Plant |

## Session Thu-2-B

Thursday, 17 September 2009

### 10:30 am-12:30 pm Linear Fresnel Collectors

Room: BERLIN-BERLIN 3

Topic Chairs: Markus Eck, Andreas Häberle

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Cesare Silvi | The Pioneering Work On Linear Fresnel Reflector Concentrators (LFCs) in Italy |
| O | 2 | Markus Eck | Linear Fresnel Collector Demonstration at the PSA - Operation and Investigation |
| O | 3 | Jürgen Dersch | Comparison of Linear Fresnel and Parabolic Trough Collector Systems: System Analysis To Determine Break Even Costs of Linear Fresnel Collectors |
| O | 4 | Gabriel Morin | Comparison of Linear Fresnel and Parabolic Trough Collector Systems – Influence of Linear Fresnel Collector Design Variations on Break Even Cost |
| O | 5 | Max Mertins | First European Linear Fresnel Power Plant in Operation – Operational Experience & Outlook |
| O | 6 | Manuel Collares-Pereira | Etendue Matched Fresnel Concentrators |
| P | 1 | Francisco Ortiz Vives | New Flexible Hose System – Extensionflex® Connection to Linear Fresnel |
| P | 2 | Markus Hoyer | Performance and Cost Comparison of Linear Fresnel and Parabolic Trough Collectors |
| P | 3 | Daniel Chemisana | A New PV/Thermal Concentrating System for Architectural Integration |
| P | 4 | Werner Platzer | Parameter Identification Technique for the Determination of Optical Efficiency of Concentrating Collectors |
| P | 5 | Anna Heimsath | Linear Fresnel Collectors – Optical Measurements and Raytracing for Collector Design Optimization |
| P | 6 | Daniel Kögler | Evaluation of Usable Secondary Effects of Linear Fresnel Collector Operation |
| P | 7 | Christian Zahler | Mirroxx Fresnel Process Heat Collectors for Industrial Applications and Solar Cooling |

## Session Thu-2-C

Thursday, 17 September 2009

### 10:30 am-12:30 pm Resource Assessment

Room: BERLIN-PEKING

Topic Chairs: Richard Meyer, David Renne

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | A. David Pozo-Vazquez | Forecasting Solar Irradiance Using NWP Models: An Evaluation Study in Andalusia (Southern Spain) |
| O | 2 | Luis Martin Pomares | Comparison of Statistical Predictive Techniques Applied on Time Series of Half Daily Clearness Index |
| O | 3 | Annette Hammer | Direct Normal Irradiance for CSP Based on Satellite Images of Meteosat Second Generation |
| O | 4 | Martín Gastón | A New Adaptive Methodology of Global to Direct Irradiance Based on Clustering |
| O | 5 | Martín Gastón | Comparison of Global Irradiance Forecasting Approaches |
| O | 6 | Richard Meyer | Towards Standardization of CSP Yield Assessments |
| P | 1 | Carsten Hoyer-Klick | Mesor Management and Exploitation of Solar Resource Knowledge |
| P | 2 | Lourdes Ramírez | Comparison and Fitting of Several Global to Beam Irradiance Models in Spain |
| P | 3 | Rakel Gastesi | A New BSRN Station in the North of Spain |
| P | 4 | Benedikt Pulvermüller | Analysis of the Requirements for a CSP Energy Production Forecast System |
| P | 5 | Carlos M. Fernandez-Peruchena | Assessment of Models for Estimation of Hourly Irradiation Series From Monthly Mean Values |

**12:30-2:00 pm Lunch Break**

Lunch will be served in the Dining Area at the rear of the hotel.

## Session Thu-3-A

Thursday, 17 September 2009

### 2:00-3:30 pm Parabolic Trough Collectors

Room: BERLIN-BERLIN 2

Topic Chairs: Eckhard Lüpfert, Eduardo Zarza

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Margarita M. Rodríguez-García | First Experimental Results of a Solar PTC Facility |
| O | 2 | Gema San Vicente | Surface Modification of Porous Antireflective Coatings for Solar Glass Covers |
| O | 3 | Michael Wittmann | Some Aspects on Parabolic Trough Field Operation with Oil as a Heat Transfer Fluid |
| O | 4 | Roman Bader | Optical Design of a Novel 2 Stage Solar Trough Concentrator Based on Pneumatic Polymeric Structures |
| P | 1 | Stephanie Meyen | Optical Characterisation of Reflector Material for Concentrating Solar Power Technology |
| P | 2 | Adel Daw Naser | Levelized Energy Cost of a 50 $MW_e$ Parabolic Trough Plant with a Molten Salt Heat Storage System in Libya |
| P | 3 | Francisco Ortiz Vives | New Flexible System Rotationflex for Parabolic Trough Collector |

## Session Thu-3-B

Thursday, 17 September 2009

### 2:00-3:30 pm Modeling

Room: BERLIN-BERLIN 3

Topic Chairs: Nate Blair, Jürgen Dersch

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Manuel Blanco | Preliminary Validation of Tonatiuh |
| O | 2 | Manuel Silva | Sensitivity Analysis of CSP Plants in Spain Using EOS |
| O | 3 | Jérémie De la Torre | Design Optimization of Concentrating Solar Power Plants Using Monte Carlo Methods |
| P | 1 | María Isabel Roldán | Thermal Analysis of a Solar Furnace Receiver |
| P | 2 | Alexander Dvoretsky | Computer Simulation of the Flux Distribution on Receiver Surfaces |
| P | 3 | Javier García-Barberena | Analysis of the Influence of Operational Strategies in Plant Performance Using Simulcet©, a Simulation Software for Parabolic Trough Power Plants |

## Session Thu-3-C

Thursday, 17 September 2009

### 2:00-3:00 pm Resource Assessment

Room: BERLIN-PEKING

Topic Chairs: Richard Meyer, David Renne

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Franz Trieb | Global Potential of Concentrating Solar Power |
| O | 2 | Marcel Šúri | Comparison of Direct Normal Irradiation Maps for Europe |
| P | 1 | Christian Breyer | Global Energy Supply Potential of Concentrating Solar Power |
| P | 2 | Sara Moreno | Comparison of Methodologies to Estimate Direct Normal Irradiation From Daily Values of Global Horizontal Irradiation |
| P | 3 | Benedikt Pape | Soiling Impact and Correction Formulas in Solar Measurements for CSP Projects |
| P | 4 | Norbert Geuder | Precise Measurements of Solar Beam Irradiance Through Improved Sensor Calibration |
| P | 5 | Carsten Hoyer-Klick | Characteristic Meteorological Years from Ground and Satellite Data |

## Session Thu-3-C

Thursday, 17 September 2009

### 3:00-3:30 pm Grid Integration and Transmission

Room: BERLIN-PEKING

Topic Chair: Chuck Kutscher

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Michael Wittmann | Methodology for Optimized Operation Strategies for Solar Thermal Power Plants with Integrated Storage |
| O | 2 | Marion Schroedter-Homscheidt | Nowcasting and Forecasting of Solar Irradiance for Solar Energy Electricity Grid Integration |

### 3:30-4:00 pm Coffee Break

Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Thu-4-A

Thursday, 17 September 2009

### 4:00-6:30 pm Parabolic Trough Collectors

Room: BERLIN-BERLIN 2

Topic Chairs: Eckhard Lüpfert, Eduardo Zarza

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Thomas Kuckelkorn | Advances in Receiver Technology for Parabolic Trough Collectors - A Step Forward Towards Higher Efficency and Increased Lifetime |
| O | 2 | Johannes Pernpeintner | Combined Measurement of Thermal and Optical Properties of Receivers for Parabolic Trough Collectors |
| O | 3 | Klaus-Jürgen Riffelmann | Heliotrough - A New Collector Generation for Parabolic Trough Power Plants |
| O | 4 | Kathleen Stynes | Feasibility Study of the Distant Observer Method for Rapid Optical Characterization of Parabolic Trough Solar Fields |
| O | 5 | Mahmood Yaghoubi | Thermoeconomic Analysis of Parabolic Trough Collector Integration into Combined Cycle System (ISCCS) |
| O | 6 | Antonio Luis Avila Marin | Theoretical Analysis on the Influence of Selective and Antireflective Coatings on PT Overall Efficiency |
| P | 1 | Ruud Dekkers | Financing of Solar Power Plants During and After the Credit Crunch |
| P | 2 | Mahmood Yaghoubi | Shiraz Solar Power Plant Construction and Performance |
| P | 3 | Ahmet Lokurlu | Solar Cooling - Simulation and Measurement |
| P | 4 | Klemens Schwarzer | Technical Improvement of a Small Modular Parabolic Trough Collector |
| P | 5 | Aránzazu Fernández-García | A Small Sized Parabolic Trough Collector for Supplying Thermal Energy At Up To 250ºC. Capsol Project |
| P | 6 | Randy Brost | Skytrough Optical Evaluations Using VSHOT Measurement |

# PROGRAM
17 September 2009

## Session Thu-4-B
Thursday, 17 September 2009

### 4:00-6:30 pm Emerging Concepts
Room: BERLIN-BERLIN 3
Topic Chairs: Abraham Kribus, Christoph Richter

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Massimo Falchetta | Design of the Archimede 5 MW Molten Salt Parabolic Trough Solar Plant |
| O | 2 | Lars Schnatbaum-Laumann | Biomass Utilization for Co Firing in Parabolic Trough Power Plants |
| O | 3 | Matthew Orosz | Small Scale Solar ORC System for Distributed Power |
| O | 4 | Christoph Prahl | A New Concept for Linear Concentrating CSP Collectors |
| O | 5 | Clifford Ho | Experimental Validation of Different Modeling Approaches for Solid Particle Receivers |
| O | 6 | Inmaculada Cañadas | Technical Feasibility of Aluminium Foaming with Concentrated Solar Energy |
| O | 7 | John Pye | Coupling Supercritical and Superheated Direct Steam Generation with Thermal Energy Storage |
| P | 1 | José Antonio Vélez Godino | Biomasol Project: Solar Thermal Technology Hybridization with Biomass Combustion |
| P | 2 | Florian Remann | Solar Absorption Cooling of the Inlet Air for a Gas Turbine |
| P | 3 | Anton Neuhäuser | Solar Polygeneration with Concentrating Collectors |
| P | 4 | Cara Libby | Integrated Solar Cycles for Natural Gas Plants |
| P | 5 | Cara Libby | Integrated Solar Cycles for Coal Plants |
| P | 6 | Inmaculada Cañadas | Reduction of Synthetic Mineral Hematite to Magnetite with Solar Energy |
| P | 7 | Michael Hartl | Inflatable Solar Concentrator |

## Session Thu-4-C
Thursday, 17 September 2009

### 4:00-6:30 pm Solar Fuels
Room: BERLIN-PEKING
Topic Chairs: Tatsuya Kodama, Christian Sattler

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Sylvain Rodat | Co-Production of Hydrogen and Carbon Black From Solar Thermal Methane Splitting in a Tubular Reactor Prototype |
| O | 2 | Christian Wieckert | Experimental Investigation of Solar Steam Gasification of Carbonaceous Feedstocks |
| O | 3 | Alfonso Vidal | Upscaling of a 500 kW Solar Gasification Plant for Steam Gasification of Petroleum Coke |
| O | 4 | Anton Meier | Solar Thermal Dissociation of Zinc Oxide - Reactor Modeling and Optimization for Scale Up |
| O | 5 | Martin Roeb | Test Operation of a 100 kW Pilot Plant for Solar Hydrogen Production from Water On a Solar Tower |
| O | 6 | Nobuyuki Gokon | Internally Circulating Fluidized Bed Reactor with $NiFe_2O_4$ Particles for Thermochemical Water-Splitting |
| O | 7 | Robbie McNaughton | Improving Efficiency of Power Generation From Solar Thermal Natural Gas Reforming |
| P | 1 | Irina Vishnevetsky | Borone, Zinc, Tin and Cadmium as Candidates for Thermal Chemical Redox Cycles for Solar Hydrogen Production |
| P | 2 | Rebecca Dunn | Ammonia Receiver Design for the New 'Big Dish' |
| P | 3 | Peter Loutzenhiser | Kinetic Analysis of $CO_2$ Splitting Via Two Step Solar Thermochemical Cycles with Zn/ZnO and FeO/$Fe_3O_4$ Redox Reactions |
| P | 4 | Bunsen Wong | Solar Production of Hydrogen Using a Cadmium Based Thermochemical Cycle |
| P | 5 | Nathan Siegel | Solar Fuel Production through the Thermochemical Decomposition of Carbon Dioxide |

## Pre-Dinner Welcome

7:30-8:30 pm at the Ullsteinhalle; Adress: Markgrafenstrasse 19 A, 10888 Berlin

The Pre-Dinner Welcome and the Conference Dinner will take place at the Ullstein-Halle in Berlin. Transportation to the Hall has been arranged, starting at 6:30 pm. Please meet at the rear entrance to the hotel, where buses will be waiting to bring you to the Dinner venue. Please make sure to wear your conference badge, as there will be a door check to ensure that only participants with badges are admitted.

We wish to thank the Australian Trade Commision (Austrade) for their sponsorship of the Pre-Dinner Welcome.

Australian Government
Australian Trade Commission

## Conference Dinner

8:30-11:30 pm at the Ullsteinhalle; Adress: Markgrafenstrasse 19 A, 10888 Berlin

The festive Conference Dinner will take place immediately following the Pre-Dinner Welcome, and will include the award ceremony for the SolarPACES Lifetime Achievement Award.
Please see that you are wearing your badge, as there will be a door check to ensure that only participants with conference badges are admitted to the Dinner.

## After-Dinner Party

11:30 pm-2:00 am at the Ullsteinhalle; Adress: Markgrafenstrasse 19 A, 10888 Berlin

The evening will be rounded out with music, drinks and snacks in the foyer.

After the Dinner, buses will return participants to the conference venue. Buses will leave the Ullsteinhalle at 11:45 pm, and then approximately every half-hour. The last bus will leave at 2:00 am.

## Session Fri-1-A

Friday, 18 September 2009

### 8:30-10:30 am Parabolic Trough Collectors

Room: BERLIN-BERLIN 2

Topic Chairs: Eckhard Lüpfert, Eduardo Zarza

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Jorge Vazquez | First Commercial Application of Senertrough Collector: High Performance at Reduced Cost |
| O | 2 | Jan Fabian Feldhoff | Steam Temperature Stability in a Direct Steam Generation Solar Power Plant |
| O | 3 | Greg Glatzmaier | Modeling Hydrogen Occurrence in Parabolic Trough Power Plants |
| O | 4 | Rainer Kistner | Analysis of the Potential for Cost Decrease and Competitiveness of Parabolic Trough Plants |
| O | 5 | Carsten Holze | Numerical and Experimental Investigation of Innovative Parabolic Trough Collector Field Configurations |
| P | 1 | Jesús Fernández-Reche | Photogrammetric Inspection of the Low Cost Parabolic Trough Collector Prototype Capsol I |
| P | 2 | Carsten Holze | Conception, Design and Test of an Innovative Light Weight Parabolic Trough Collector |
| P | 3 | Dirk Krüger | Experiences with Solar Steam Supply for an Industrial Steam Network in the P3 Project |
| P | 4 | María José Montes | Proposal of an Integrated Solar Combined Cycle System Using Direct Steam Generation Technology |
| P | 5 | Josep Ubach | Rioglass Solar's Glass Tempered Solar Mirrors, a Successful Approach |

## Session Fri-1-B

Friday, 18 September 2009

### 8:30-9:30 am Facilities, Controls

Room: BERLIN-BERLIN 3

Topic Chair: Diego Martínez

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Matthias Schopf | Optimization Opportunities for Therminol® VP-1 Heat Transfer Fluid in Concentrating Solar Power Facilities |
| O | 2 | Massimo Falchetta | Control and Automation of the Archimede Molten Salt Operated Solar Field |
| O | 3 | Christoph Prahl | Advances in Optical Measurement Techniques for Solar Concentrators |
| P | 1 | Clifford Ho | Hazard Analyses of Glint and Glare from Concentrating Solar Power Plants |
| P | 2 | Markus Eck | Test and Demonstration of the Direct Steam Generation (DSG) at 500°C |
| P | 3 | Javier Llorente | New Solar Concentrator Coupled with a Fluidized Bed Reactor |
| P | 4 | Claudio Estrada | Sizing and Performance Analysis of a 2-MWth Experimental Solar Heliostat Field in Sonora |

## Session Fri-1-B

Friday, 18 September 2009

### 9:30-10:30 am Flux and Temperature Measurements

Room: BERLIN-BERLIN 3

Topic Chair: Tim Wendelin

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Enric Mateu Serrats | Towards the Standardisation of Accelerating Ageing Tests Procedures for Solar Power Concentrator Reflectors |
| O | 2 | Thomas Roos | A Cold Water Calorimeter for the Characterisation of a Compound Parabolic Concentrator |
| P | 1 | Jesus Ballestrin | A Solar Blind IR Camera Prototype |
| P | 2 | Cristobal Villasante | Characterization of Solar Collectors for Electricity Production by Software Enhanced Lasertracking Techniques |
| P | 3 | Philip Gleckman | High Heat Solar Flux Scanner |

## Session Fri-1-C

Friday, 18 September 2009

### 8:30-10:30 am Solar Fuels

Room: BERLIN-PEKING

Topic Chairs: Tatsuya Kodama, Christian Sattler

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Martin Roeb | Development of a Two Chamber Receiver Reactor for the Solar Decomposition of Sulphuric Acid |
| O | 2 | Mark Allendorf | Phase Equilibrium Modeling of $CO_2$ and $H_2O$ Splitting by Ferrites |
| O | 3 | Tatsuya Kodama | Thermochemical Two Step Water Splitting by Zirconia Supported Ferrites and its Foam Device for Solar Demonstration |
| O | 4 | Christos Agrafiotis | On the Modeling of Solar Monolith Reactors for Hydrogen Production |
| O | 5 | Tarek Kandiel | Photocatalytic Hydrogen Production over Platinized Biphasial Nanocrystalline Anatase/Brookite Titanium Dioxide |
| P | 1 | Marc Chambon | Reaction Kinetics of Volatile Oxides Water Splitting Cycles for Solar Hydrogen Production |
| P | 2 | Eric Coker | Thermochemical Cycles for $H_2$ and CO Production: Some Fundamental Aspects |
| P | 3 | Robin Taylor | Solar Thermochemical Hydrogen Production Via Sulfur Ammonia Cycle |
| P | 4 | George Karagiannakis | Materials for Sulphuric Acid Decomposition in Solar Aided, Sulphur Based, Thermochemical Cycles for Hydrogen Production |
| P | 5 | Antonio Lopez Martínez | Test Bed for Solar Hydrogen Demonstration Project in Solar Tower Plants |
| P | 6 | Yutaka Tamaura | Development of Reactive Ceramics with High $O_2$ Releasing Reactivity in Two Step Water Splitting Reaction |
| P | 7 | Hiroshi Kaneko | Solar $H_2$ Production with Rotary Type Solar Reactor in International Collaborative Development Between Tokyo Tech (Japan) and CSIRO (Australia) |

### 10:30-11:00 am Coffee Break

Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Fri-2-A

Friday, 18 September 2009

### 11:00 am-12:30 pm Central Receiver Power Plants

Room: BERLIN-BERLIN 2

Topic Chairs: Reiner Buck, Greg Kolb

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Robin Taylor | Low Cost Glass Reinforced Concrete Heliostats |
| O | 2 | Peter Schwarzbözl | The Solar Tower Jülich - A Research and Demonstration Plant for Central Receiver Systems |
| O | 3 | Nils Ahlbrink | Transient Simulation of Solar Tower Power Plant with Open Volumetric Air Receiver |
| O | 4 | Ralf Uhlig | Development of a Broadband Antireflection Coated Transparent Quartz Window for a Solar Hybrid Microturbine System |
| P | 1 | Peter Heller | Development of a Solar Hybrid Microturbine System for a Mini Tower |
| P | 2 | Stefano Giuliano | Analysis of Solar Hybrid Gas Turbine Cogeneration Systems with Absorption Chillers in Hot and Dry Climates |
| P | 3 | Francisco J. Collado | Design of Solar Tower Plants Heliostat By Heliostat |
| P | 4 | Yutaka Tamaura | Development of Tokyo Tech Beam Down Solar Concentration Power System (Tokyotech Cosmo Masdar Project) |

# PROGRAM
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## Session Fri-2-B
Friday, 18 September 2009

### 11:00 am-12:30 pm Modeling
Room: BERLIN-BERLIN 3
Topic Chairs: Nate Blair, Jürgen Dersch

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Robert Pitz-Paal | Heliostat Field Optimization for High Temperatur Solar Chemical Reactors |
| O | 2 | Pierre Garcia | Validation of DinaCET Computational Scheme Using Nevada Solar One Power Plant Data |
| O | 3 | Adrien Toutant | Numerical Analisys of High Temperature Pressurized Air Solar Receiver |
| O | 4 | Clifford Ho | Tools for Probabilistic Modeling of Concentrating Solar Power Plants |

## Session Fri-2-C
Friday, 18 September 2009

### 11:00 am-12:30 pm Dish/Engine Systems
Room: BERLIN-PEKING
Topic Chairs: Charles Andraka, Peter Heller

| Type | No. | Author | Presentation Title |
|---|---|---|---|
| O | 1 | Irene Ordoñez | Life Cycle Environmental Impacts of Electricity Production by Dish/Stirling Systems in Spain |
| O | 2 | Charles Andraka | SOFAST: Sandia Optical Fringe Analysis Slope Tool for Mirror Characterization |
| O | 3 | Keith Lovegrove | A New 500 m$^2$ Paraboloidal Dish Solar Concentrator |
| O | 4 | Mohamed Abbas | Techno Economic Analysis of Solar Dish Stirling Technology for Decentralized Electricity Generation in Algeria |
| P | 1 | João Pinho | Efficiency Evaluation and Economic Feasibility of Small Dish Stirling Power Systems in Brazil |
| P | 2 | Vittorio Brignoli | An Easy Software To Estimate the Production of the Eurodish Solar Generator in Italy |
| P | 3 | Moises Murillo | Optical Characterization and Heat Flux Distribution Assessment of the 10 kW Seville Parabolic Dish/Stirling |
| P | 4 | Moises Murillo | A Proposal for Reducing Spillage of Concentrated Heat Flux in a Parabolic Dish/Stirling |

**12:30-2:00 pm Lunch Break**
Lunch will be served in the Dining Area at the rear of the hotel.

## Session Fri-3-Plen
Friday, 18 September 2009

### 2:00-3:30 pm Plenary Session: Trends in CSP Technology
Room: BERLIN-BERLIN Chair: Robert Pitz-Paal, Conference Chair, 2009 / German Aerospace Center, DLR

| Speaker | From | Presentation Title |
|---|---|---|
| Eduardo Zarza, Head of Solar Concentration Systems Unit | Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, CIEMAT | Linear Concentrators |
| Greg Kolb, Distinguished Member of Technical Staff | Sandia National Laboratories | Point Focus Systems |
| Rainer Tamme, Head of Department Thermal Process Technology | German Aerospace Center, DLR | Storage Systems |
| Gilles Flamant, Director | CNRS-PROMES | Solar Chemistry |

**3:30-4:00 pm Coffee Break**
Coffee breaks can be enjoyed in the New World, Orient, and Sponsoring and Networking Areas.

## Session Fri-4-Plen
Friday, 18 September 2009

### 4:00-5:00 pm Closing Session
Room: BERLIN-BERLIN Chair: Robert Pitz-Paal, Conference Chair, 2009 / German Aerospace Center, DLR

| Speaker | From | Presentation Title |
|---|---|---|
| Manfred Becker, Laudator | | Technical Achievement Award Laudatio & Lecture |
| Robert Pitz-Paal, Conference Chair, 2009 | German Aerospace Center, DLR | Conference Highlights |
| Conference Chair, 2010 | | Announcement of the next Conference |
| Robert Pitz-Paal, Conference Chair, 2009 | German Aerospace Center, DLR | Farewell |

Saturday, 19 September 2009

## Technical Tour to Jülich

The meeting point for the Technical Tour is in the lobby of Hotel Berlin, Berlin at 5:00 am. A bus will provide transportation to the airport. Flight departure is at 6:50 am from the airport Berlin-Schönefeld. For the airport check-in, ID Card is required. The tour will end at approximately 5:30 pm in Cologne center and/or main train station.