INTRODUCTION

The 14th Sede Boqer Symposium on Solar Electricity Production inaugurated a precedent that might prove worthwhile to repeat from time to time in future years. Specifically, it included a workshop on a related item – in this instance, Building-Integrated Photovoltaics (BIPV) complete with keynote speaker, Professor Susan Roaf of the Open University, Milton-Keynes, UK and Arizona State University, Phoenix, USA. Although the extent to which BIPV has a significant role in Israel's energy future turned into a hotly debated matter, we are indebted to Dr. Yona Siderer for organizing the workshop; the IEA Task-1 Photovoltaic Specialist Working Group, to which she is Israel's representative, for sponsoring it; to Professor Isaac (Sakis) Meir, head of the Blaustein Institutes' Department of Man-in-the-Desert for co-hosting it; and to the Israel Ministry of National Infrastructures and the Ramat Negev Regional Council for providing financial support. Because the workshop papers were not submitted in written form, a summary of the substantive issues raised was written by Prof. Meir and is appended after Prof. Roaf's presentation.

Keynote speaker for the symposium proper was Prof. Ulrich Bünger of the Norwegian University of Science and Technology, Trondheim, Norway, who reviewed the arguments for the positive side of the debate on the future of hydrogen as an energy storage medium. Prof. Bünger's presentation also generated some healthy discussion among the participants, the text of his presentation and the Q&A session that followed being reproduced here.

Finally, as always, it is with much pleasure that I must thank, in addition to the sponsors mentioned above, the Israel Section of the International Solar Energy Society, the Jacob Blaustein Center for Scientific Cooperation, Ormat Industries Ltd, and Solel Solar Systems Ltd. Without such sponsorship, and without the dedicated leg- and paper-work of Shoshana Dann and Lilian Naaman, and without the technical assistance of Dov Bokobza, Shlomo Kabalo, Vladimir Melnichak and our graduate students, these symposia would not be possible.

David Faiman

Sede Boqer, December 2007.

Ben-Gurion University of the Negev
The Jacob Blaustein Institutes for Desert Research
84990 Sede Boqer Campus, Israel

14th Sede Boqer Symposium on Solar Electricity Production February 19-20, 2007

Sponsored by:

Ben-Gurion University of the Negev.
Blaustein International Center for Scientific Cooperation.
International Solar Energy Society - Israel Section
Ormat Industries Ltd.
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Program

Monday, February 19, 2007

9:45-10:30 Arrival at the Ben-Gurion National Solar Energy Center, Midreshet Ben-Gurion, **Registration**

10:30-11:00 **Opening Greetings**
(Chair: Prof. **David Faiman**, BGU Blaustein Institutes, Sede Boqer)
Dr. Avraham Cohen, Israel Ministry of Science, Culture and Sport
Prof. Moti Herskowitz, Vice President and Dean for R&D, Ben Gurion University
Prof. Yair Zarmi, Albert Katz International School for Desert Studies (Graduate School), Blaustein Institutes for Desert Research, BGU

11:00-12:20 Session 1: Solar-Thermal

(Chair: Prof. Aharon Roy, Ben-Gurion University)

1. *Dry methane reforming in a directly irradiated, carbon particle laden solar reactor*
   Hanna Helena Klein, Rachamim Rubin and Jacob Karni
   Department of Environmental Science and Energy Research, Weizmann Institute of Science, 76100 Rehovot, Israel
2. *SOLEL 6: from prototype to solar field*
   Eli Mandelberg and **Rami Ezer**
   Solel Solar Systems Ltd., POB 811, 99000 Bet Shemesh, Israel
3. *A solar power plant using ORMAT® ENERGY CONVERTER (OEC)*
   Joseph Sinai
   Ormat Ss, Yavne, Israel
4. *A Novel engine powered by water evaporation*
   Steven Wiesner
   Physics Department, Tel Aviv University, Ramat Aviv, 69978 Tel Aviv, Israel

12:20-13:00 Technical Tour – Ben Gurion National Solar Energy Center, New Installations

13:00-14:00 Lunch – Dining Room, High School for Environmental Studies

14:15-15:35 Session 2: Measurement Techniques

(Chair: Prof. Jacob Karni, Weizmann Institute of Science)

1. *Quantifying the flux distribution on a PV module illuminated by the PETAL solar dish*
   Sergey Biryukov
   Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel
2. *Mapping concentrator solar cell properties by localized irradiation at ultrahigh flux*
   Eugene A. Katz, Jeffrey M. Gordon, Wondesen Tassew and Daniel Feuermann
   Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel
3. *High-flux characterization of ultra-efficient commercial 1 mm^2 multi-junction solar cells*
   Omer Korech, Baruch Hirsch, Eugene A. Katz, , and Jeffrey M. Gordon
   Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel
4. *Spectral response of light biased Si solar cell at open circuit*
   Lev Kreinin, Ninel Bordin, and Naftali Eisenberg
   Jerusalem College of Technology, POB 16031, 91160 Jerusalem, Israel

15:35-15:50 Coffee break

15:50-17:10 **Session 3: Concentrator Photovoltaics**
(Chair: Prof. Daniel Feuermann, Ben-Gurion University, Blaustein Institutes)

1. *A linear PV concentrator with uniform flux*
   Ori Roval and **Abraham Kribus**
   School of Mechanical Engineering, Tel Aviv University, Ramat Aviv, 69978 Tel Aviv, Israel
2. *On achieving 1.5 kWp from a 10 cm x 10 cm CPV module at PETAL*
   David Faiman
   Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel
3. *Using CPV solar energy to substitute fossil transportation fuel in Israel with renewable Methanol*
   Dov Raviv and Roy Rosenstreich
   MST Ltd., 8 Heil Hahimush St., 75702 Rishon Lezion, Israel
4. *Rechargeable batteries: Mid-term torecast*
   Samuel de-Leon
   Ministry of Defense, Tel Aviv, Israel

17:10-18:30 Free Time or Tour of the Zin Cliff

18:30-19:30 Festive Dinner - Dining Room, High School for Environmental Studies

20:00-22:00 *Concert*
Asher and Hannah Blachman (Violin and Piano)
Program:

1. **Giacomo Meyerbeer** (1791-1864) — Potpouri of melodies from *Les Huguenots* and *Le Prophète*
2. **Robert Schumann** (1810-1856), **Johannes Brahms** (1833-1897), and **Albert Dietrich** (1829-1908) — **"FAE" Sonata**
3. **W. A. Mozart** (1756-1791) — Sonata in E minor, K304

Tuesday, February 20, 2007

10:00-11:20 **Session 4: Photovoltaic System Issues**
(Chair: Prof. Hans-Georg Beyer, Inst. für Elektrotechnik, Magdeburg)

1. *Calculating the temperature of PV modules from meteorological input data*
   David Faiman
   Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel
2. *Long-term out-door PV testing of stability of plastic solar cells under operational conditions*
   Eugene A. Katz[1], Suren Gevorgyan[1], **Murat S. Orynbayev**[1] and Frederick C. Krebs[2]
   [1]Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben Gurion University, 84990 Midreshet Ben Gurion, Israel; [2] Danish Polymer Centre, RISØ National Laboratory, POB 49, 4000 Roskilde, Denmark
3. *Optimizing solar field design for single axis tracking collectors*
   Dan Weinstock and **Joseph Appelbaum**
   Faculty of Engineering, Tel Aviv University, 69978 Tel Aviv, Israel
4. *Real weather conditions impact on optimally arranged solar array*
   Moshe Averbukh and A. Kuperman
   SCI College of Engineering, Ben-Gurion University of the Negev, Beersheva, Israel

11:20-11:35 Coffee Break

11:35-12:35 **Session 5: Invited Keynote Lecture and Discussion**
(Chair: Prof. Moshe Levy, Weizmann Institute of Science)
Hydrogen: from myth to reality
Prof. Ulrich Bünger,
Norwegian University of Science and Technology, Trondheim, Norway

12:45-13:45 Lunch – Dining room, High school for environmental studies

13:45-15:05 **Session 6: Nanocrystalline and Organic Solar Cells**
(Chair: Prof. David Cahen, Weizmann Institute of Science)

1. *Recent developments in Photovoltaic Dye Cells*
   Jonathan Goldstein, Ilya Yakupov and Barry Breen
   Orionsolar Ltd., AVX Building, 3 Hamarpeh St., Har Hotzvim Technology Park, 91450 Jerusalem, Israel
2. *Influence of the porosity on diffusion and lifetime in porous TiO_2 layers*
   Ashi Ofir[1], S. Dor[1], T. Dittrich[2] and Arie Zaban[1]
   [1]Bar Ilan University, Rmat Gan, Israel; [2]Hahn-Meitner-Institute, Berlin, Germany
3. *Semi-conductor sensitized porous solar cells*
   Gary Hodes
   Dept. of Materials and Interfaces, Weizmann Inst of Science, 76100 Rehovot, Israel

15:05-15:20 Coffee break

15:20-16:40 Session 7: Solar Energy in Use

(Chair: **Prof. Avraham Kribus**, Tel Aviv University)

1. *Shortcut to calculating the avoided fuel consumption of renewable energy systems*
   Aaron Roy
   Dept. of Chemical Engineering, Ben-Gurion University of the Negev, Beersheva Israel
2. *The influence of building integrated photovoltaics on the pattern of net domestic electricity consumption*
   Nico Kreutzer[a], **Hans Georg Beyer**[b] and Ian Knight[a]
   [a]The Welsh School of Architecture, Cardiff University, Wales, UK
   [b]Institut of Electrical Engineering, University of Applied Sciences, Magdeburg-Stendal, D-39114 Magdeburg, Germany
3. *Dirijat – Electrification of a Negev village*
   Ibrahim Yehia
   The Triangle Research Center, POB 67, Kefar Kera, Israel
4. *Matching solar energy technologies with an application*
   David Waimann
   Orionsolar Ltd., AVX Building, 3 Hamarpeh St., Har Hotzvim Technology Park, 91450 Jerusalem, Israel

16:40-17:00 Closing Remarks