

ENEA - Ben Gurion University of Negev Joint Laboratory on Solar and Alternative Energies

Activity report 2010

1. Activities carried out in 2010

The ENEA - Ben Gurion University of Negev Joint Laboratory on Solar and Alternative Energies intends to contribute to overcome the current limits to the development and diffusion of solar technologies: low efficiency/density power (W/m^2); high costs and availability of raw materials for PV applications; low production throughput unable to sustain an increasing market; energy production discontinuity.

In January 2010 a general document was drawn up between ENEA and BGU, outlining scope and areas of collaboration of the Joint Laboratory. Four thematic areas of interest were selected:

- Solar Devices;
- Solar systems & BOS;
- Smart grid Management;
- Innovative storage.

The following R&D fields of activity were also identified:

- Improvement of existing technologies;
- Advanced Solar Technologies;
- Experimentation and Characterization;
- Modelling (Optical, Electrical, Thermal and Mechanical).

Following the Feb. 2010 meeting in Jerusalem, BGU and ENEA have signed a 5-year agreement to:

- Host at the BGU Research Centres suitably qualified Italian Post-doctoral, Doctoral, and Masters-level visitors for 3-6 month periods;
- Set up joint R&D activities on the aforementioned topics of common interest concerning Solar and Alternative energies;
- Organize and carry out joint scientific meetings, training programmes, workshops.

In a joint work meeting in Jerusalem and in further interactions among the Steering Committee members of the two organizations, technical and practical issues were discussed in order to set the collaboration under way. In particular:

- a) the following areas of common interest were identified, and documents and ideas on activities carried out by the two organizations were circulated :
 - Nanowires and nanostructures;
 - Optics and systems for very high-level concentration;
 - Smart grids;
 - Interfaces in thin film solar cells (TCO, organics, etc.);
 - Storage technologies (to smooth out intermittencies on the grid, applications to automotive, etc.);

- Material and devices characterization.
- b) Characteristics and procedures for the assignment of grants to Italian researchers were agreed upon (see § 4). Following these, seven candidates from Italy have applied for such visits, and, following a selection procedure taken at BGU, three laboratories were selected to host three suitable candidates. Unfortunately, only one of the selected applicants (Dr. Antonio Carella) eventually agreed to go to Israel this year and will be arriving at BGU on Oct 2010 to investigate degradation of organic solar cells in collaboration with Dr. Rafi Shikler of the dept. of Electrical and Computer Engineering.
A second call for selecting other visiting researcher will be issued in connection with the 2011 spring semester. ENEA will check on the availability of candidates already selected and will provide further candidates by January 2011.
- c) To establish closer relations and initiate collaboration, mutual visits were planned for ENEA and BGU scientist. In particular:
- BGU's Prof. David Faiman, Director of The Ben-Gurion National Solar energy center and the head of the BGU-ENEA committee, will visit ENEA premises on Oct. 2010;
 - A group of ENEA researchers will visit BGU immediately after the Nov. 2010 event in Tel Aviv ("Italian-Israeli Forum on Science and Technology"), and a joint workshop is being organized. The workshop will include short presentations of researchers in the field of solar energy from both institutions, visits to selected laboratories in BGU's Be'er Sheva campus, as well as to the National Solar Energy Center at BGU's Sede Boker campus;
 - A further, possibly larger meeting will be organized in conjunction with the 17th Sede Boqer Symposium on Solar Electricity Production, which will take place in October 2011.
- d) Meetings and discussions were carried out in the two organization, to illustrate the contents of the agreement and discuss opportunities for collaboration among permanent BGU and ENEA researchers/scientists. In ENEA, the following laboratories were involved:
- Advanced Technologies for Energy and Industry (Casaccia Research Centre);
 - Renewable Sources (Casaccia);
 - Materials Technologies (Casaccia) ;
 - Photovoltaic Technologies (Portici);
 - Nanomaterials and Devices (Portici).

2. Expenses incurred in 2010

ENEA

In the year 2010 the following expenses are foreseen:

Participation of ENEA researchers in the Joint Workshop scheduled to take place in November 2010 (travel and subsistence): ~ € 8,000

Partial reimbursement for the participation of ENEA members of the Steering Committee in the same Workshop: ~ 1,500

Note: Flight expenses for Steering Committee member are already covered by the Italian Ministry of Foreign Affairs to allow participation in the Second "Italian-Israeli Forum on Science and Technology".

BGU

Dr. Antonio Carella's visit (Oct 2010-April 2011) to investigate degradation of organic solar cells in collaboration with Dr. Rafi Shikler of the dept. of Electrical and Computer Engineering, including transportation, fellowship, bench fee and overhead - € 30,000

Nov. 2010 Joint workshop at BGU - € 1,000.

3. Plan of activities and expenses for 2011

For 2011, the following activities will be put into action:

- R&D activities to be carried out at BGU premises by the grant holder(s) already selected. For this purpose, more detailed work programme(s) are currently under definition;
- Selection of a further group of Italian grant holders and start up of residencies. To achieve better results and smooth out obstacles that have appeared so far, the process of recruitment, selection and enrolment of grant holders will be re-discussed among the partners;
- Collaborative work among research groups in ENEA and BGU. In order to facilitate the set up of such activities the workshop scheduled for next November has been organized;
- Joint workshop in Italy in the spring of 2011, to illustrate activities and results to the Italian scientific community and discuss the objectives for future industrial research proposals;
- Joint meeting in Israel, to be organized in conjunction with the 17th Sede Boqer Symposium on Solar Electricity Production (Oct. 2011).

Expenses (ENEA)

The exact budget of expenses for 2011 will be drawn up after the upcoming workshop between ENEA and BGU, and decisions will have been taken on collaborative activities and the organization of joint meetings in the coming year.

As a general figure, an expense of ~ € 25,000 can be foreseen for travel and subsistence of Italian researchers to Israel and/or materials and other items needed for collaborative research.

Expenses (BGU)

Research visits of ENEA young researchers, according to the guidelines below, including BGU costs - € 50,000

Mutual visits, including Oct. 2011 workshop in conjunction with the 17th Sede Boqer Symposium on Solar Electricity Production, and other costs for establishing collaborative research effort (such as costs for writing joint proposals etc.) - € 10,000.

4. Implementation process for the grants

The following "rules of conduct" were agreed upon:

1. BGU will accept one post-doctoral "ENEA Fellow" per year. The grant for such a Fellowship will be 30 000 Euros (which includes round-trip travel expenses between Italy and Israel and one round-trip home leave during the one-year period).

2. Alternatively, 2 ENEA Fellows may come for periods of 6-months each. In such cases the Fellowship will amount to 15 000 Euros (which includes only one round-trip between Italy and Israel).
3. If no suitable post-doctoral applicant is available, BGU will accept up to 4 “ENEA PhD Trainees” per year, each for a 3-month period. Such Trainees must be currently enrolled towards a PhD degree at an accredited Italian university. ENEA PhD Trainees will receive a grant of 7 500 Euros (which includes round-trip travel expenses between Italy and Israel).
4. If no suitable PhD Trainees are available, BGU will accept up to 6 “ENEA MSc Trainees” per year, each for a 3-month period. Such Trainees must be currently enrolled towards an MSc degree at an accredited Italian university. ENEA MSc Trainees will receive a grant of 5 000 Euros (which includes round-trip travel expenses between Italy and Israel).
5. BGU will accept a mix of Fellows and PhD and MSc Trainees, provided that the total amount in annual grants does not exceed 30 000 Euros.
6. ENEA will take care of the selection of candidates. In principle, young researchers that either have a previous experience in ENEA (graduation thesis, previous grants, etc.) or that are involved in common projects/activities with Italian partners will be favoured in the assignment of grants.
7. For each candidate, ENEA will provide a CV and will agree with BGU upon a programme of activities.
8. BGU estimates the total annual cost of these Fellowships/Traineeships as 60 000 Euros. This estimate is arrived at as follows: 28 800 (1-year Post-doc); 1 200 (Travel); 7 800 (BGU personnel – technicians, supervisor’s time, etc.); 4 200 (Equipment, consumables, etc.); 10 200 (BGU travel, mutual visits, collaborative research and workshops); 7 800 (overhead). These cost estimates may need appropriate revision in the event that the expenses incurred in hosting, say 6 MSc Trainees would substantially exceed those of hosting a single Post-doctoral Fellow. If such a situation arises, it may be necessary to reduce the total number of trainees that are accepted each year. The present budget breakdown is also only indicative, in the light of the instability in currency exchange rates. In addition, travels’ costs may be slightly increased, if necessary, or distributed differently over the period.

The following points should be noted: (1) The size of the ENEA Fellowship is calculated according to the *largest* post-doctoral fellowships that BGU currently awards (i.e 28 800 Euros, plus 2 round-trip economy class air tickets); (2) The sizes of the MSc and PhD traineeships are calculated according to *parallel grants* that Israeli graduate students would receive at each of these levels respectively. (3) MSc and PhD Trainees may enrol in any of the graduate-level courses that are given at the Albert Katz International School for Desert Studies. These courses are given, in English, on BGU’s Sede Boqer campus, and credit for them may be transferred to the Trainee’s home university.