TASK 10 – URBAN SCALE PV APPLICATIONS

Fig. 1 - Task 10 Kick-Off Meeting, Vienna, Austria.

OBJECTIVE

The objective of Task 10 is to enhance the opportunities for wide-scale, solution-oriented application of PV in the urban environment as part of an integrated approach that maximizes building energy efficiency and solar thermal and photovoltaics usage. Value analysis, policy incentives, analysis tools as well as system design and integration that have proven successful in the participating countries will be developed to the extent possible into a uniform international set of tools for the global market. This will be accomplished through:

- making connections between the building design and development industry;
- deriving recommendations for stakeholders to remove barriers to mass market uptake of photovoltaics;
- developing system components, design and applications with the largest global market penetration potential, including aesthetic values as well as the mechanical and energy related values;
- expanding successful tools (models, roadmaps, guides, system integration, etc.) and analysis relevant to the needs of the emerging global markets;
- identifying gaps in currently available information and developing products to fill those gaps;
- developing materials and holding events targeted at meeting the needs of specific groups of stakeholders; and
- providing continuous communication, promotion and education throughout the period of the task.

In line with the objectives, the short term goal (5 years post) of the Task is to have a clear definition of the global market and all associated values, resulting in stakeholders considering urban scale PV in their respective spheres of activities. The Task's long term goal (10 years post) is for urban-scale PV to be a desirable and commonplace feature of the urban environment in IEA PVPS member countries. The final planning for Task 10 occurred during 2003, with final approval to start the task in January 2004. The task will require a 5 year period to complete.

APPROACH

There will be four subtasks in Task 10. The total range of deliverables has been designed comprehensively to include and meet the various needs of the stakeholders who have been identified as having value systems which contribute to urban-scale PV. The deliverables are designed to optimise usefulness to the stakeholders and have multiple communication and promotion scenarios. Although each of the deliverables is a separate product which can be developed relatively independently from all the other deliverables, the relationship between deliverables will be cross-referenced or databased as appropriate. Through developing and producing these deliverables, Task 10 will contribute to achieving the vision of mainstreaming urban-scale PV. The comprehensive list of targeted stakeholders is:

- **Building Sector:** builders and developers, urban planners, architects, engineers, permit and code authorities;
- **End-Users:** residential and commercial building owners;
- **Government:** supporting, regulatory and housing agencies;
- Finance and Insurance Sector: Banks, insurance companies, loan for houses
- **PV Industry:** system manufacturers, PV system supply chain, retail sector;
- **Electricity Sector:** network and retail utilities; and
- **Education Sector.**

SUBTASK 1: Economics and Institutional Factors

This subtask seeks to provide opportunities for stakeholders to look beyond a single-ownership scenario to the larger multiple stakeholder value. In this way, utility tariffs, community policy, and industry deployment strategy can be used to create circumstances which combine all stakeholder values to the PV system investor through sustained policy-related market drivers. Activities wil include:

- developing a value matrix of stakeholders by the extended value stream beyond the economic market drivers (the market drivers will be included), allowing individual stakeholders to realise a full set of values;
- deriving recommendations to stakeholders for removing barriers to mass market uptake of PV;
- building upon existing lessons learned with financing, policy, environmental and rate structure issues by analysing the economic contribution of these market drivers and developing best practice scenarios;
- promoting trans-boundary transfer of lessons learned; and
- identifying participating country industry roadmaps and produce guide for roadmap development.

SUBTASK 2: Urban Planning, Design and Development

This subtask focuses on infrastructure planning and design issues needed to achieve the vision of a significantly increased uptake of PV in the urban environment. The subtask will integrate PV with standard community building practices by:

- developing guidance for integrating PV into standard whole building design models, rating tools, and building development practices. Emphasis will be placed on the building integration properties of PV for efficiency gains.
- integrating PV and the whole community energy infrastructure element into urban planning practices through a guide providing processes and approach for setting quantifiable urban-PV goals and objectives in the planning process. Architectural considerations such as building aesthetics, land use, shading, and urban renewal opportunities for BIPV will be included as planning elements. Additionally, community energy use forecast and planning impacts related to the whole building approach and coordinated utility or community system load control to increase demand reduction and increase PV capacity value.

SUBTASK 3: Technical Factors

This subtask concentrates on technical development factors for mainstream urban-scale PV. Large-scaled urban integration of BIPV systems faces technical challenges related to synergetic use as building material and for energy supply purposes. Other challenges involve the potentially negative impact on the grid and obstacles posed by the regulatory framework. The aim of this subtask is to demonstrate best practices and to advocate overcoming those barriers associated with extensive penetration of BIPV systems on urban scale. Activities include:

- identifying the building material and energy use synergies of PV and of BOS as well as updating the existing Task 7 database of products and projects for BIPV. A major aspect of the building integration will be building energy management integration and coordinating energy use with lighting and HVAC systems to assure demand reduction and capacity value;
- identifying existing codes and standards applicable to urban scale PV and the needs for developing new codes and standards. Both electrical and structural codes will be evaluated as related to buildings. Network codes and standards will be evaluated in a separate activity. This work will build upon work initiated in Tasks 5 & 7;
- analysing electricity network effects, benefits, impacts, and issues. Interconnection, operational effects, and market issues will be included;
- expanding the market-driven approach to research and development to the global market by i) establishing a benchmark of current system component cost and market penetration relationships; ii) testing benchmark relationships with existing and potential future system designs, applications, building integration and operational economics; and iii) documenting relationship between research investment in system component development and market penetration; and
- reviewing certification practices and defining harmonized standard test procedures transferred to the relevant stakeholders and standard committees.

The deliverables focus on the broad set of stakeholders required to achieve the vision such as the building product industry, builders, utilities and PV industry.

SUBTASK 4: Targeted Information Development and Dissemination

This subtask will carry out the information dissemination of all deliverables produced in Task 10. As activities develop in other subtasks, subtask 4 will review to assure the results are useful to the targeted stakeholders. Participating countries will be encouraged to translate documents and workshop materials. This task will also organise countries to host technical development and education workshops. The subtask will also prepare mass/multi-market promotional material about urban-scale PV and will update existing PV education tools. An innovative deliverable will involve holding a marketing competition for urban-scale PV with the winner of the competition announced at a forum on PV for the venture capital sector. Market research for the purpose of understanding and targeting stakeholder perceptions will also be part of this subtask. Finally, this task will be responsible for continuous outreach to stakeholders for input and participation in the task.

INDUSTRY INVOLVEMENT

An integrated multidisciplinary approach involving all stakeholders will be used in carrying out the work in Task 10. The PVPS Programme will be the managing Implementing Agreement for

the Task, but to assure the results contribute effectively to wider whole-of-building integrated urban-scale efforts, the Task will actively coordinate with several IEA Implementing Agreements. The approach recognizes that optimising good design and solar thermal and PV potential and maximizing their synergies will require cooperation of a number of the Implementing Agreements (particularly the Photovoltaic Power Systems Programme, the Solar Heating and Cooling Programme, and the Energy Conservation in Buildings and Community Systems Programme). To assure coordination, implementing agreement liaisons will be established in order to participate in Tasks and Subtasks (and potentially activity level endeavours) contained in other implementing agreements. In addition to coordination and inclusion of other multidisciplinary implementing agreements, the Task will include stakeholder expertise from participating countries to develop deliverables. Every Task meeting will include a stakeholder workshop.

The comprehensive list of targeted stakeholders is:

- **Building Sector:** builders and developers, urban planners, architects, engineers, permit and code authorities;
- **End-Users:** residential and commercial building owners;
- **Government:** supporting, regulatory and housing agencies;
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KEY DELIVERABLES (PLANNED 2004)

- A workshop targeted at Architects and Students, Vienna, Austria, Feb 2004.
- Oral Paper presentation at the Paris PV Conference June 2004.
- Architects and Builders workshop for French stakeholders during the Paris Conference, June 10, 2004.
- Brochure/flyer for outreach to stakeholders.
- Task 10 website with front end for stakeholder outreach and Task 10 participants password accessible working platform.

TABLE 1 LIST OF PARTICIPANTS AND THEIR ORGANISATIONS

COUNTRY	PARTICIPANT	ORGANISATION
Australia	Mr. David Crossley	Energy Futures Australia Pty Ltd.
Austria	Mr. Reinhard Haas Mrs. Assun Lopez-Polo	Institute of Power Systems and Energy Economics Energy Economics Group Vienna University of Technology
Canada	Mr. Josef Ayoub	NRCan/CANMET Energy Technology Centre – Varennes
Denmark	Mr. Kenn Frederiksen	Energimidt Erhverv A/S
France	Mr. Marc Jedliczka Mr. Bruno Gaiddon	HESPUL
Italy	Mr. Francesco Groppi Mr. Gianluca Tondi	CESI S.p.A. ETA Renewable Energies
Korea	Mr. Suk-Hyung Lee	Daegu City Gas Co., Ltd.
Portugal	Mrs. Maria João Rodrigues	Center for Innovation Technology and Policy Research Instituto Superior Têcnico (Technical University of Lisbon)
Swedan	Mr. Mats Andersson	Energibanken AB
Switzerland	Mr. Peter Toggweiler	Enecolo AG
USA	Ms. Christy Herig	Segue Energy Consulting/Subcontractor to National Renewable Energy Laboratory

TABLE 2 – MEETING SCHEDULE (2003 AND 2004 PLANNED)

TASK 10 MEETING	DATE	PLACE
Planning Meeting	20-21 March 2003	Feusisberg SZ, Switzerland
Planning Meeting	18-19 September 2003	Copenhagen, Denmark
1st Technical Experts	12-13 February 2004	Vienna, Austria
2nd Technical Experts	Week 41 October 2004	Florence, Italy