



I have an invitation - an invitation to entrepreneurial companies around the world. This invitation comes from the International Energy Agency's (IEA) Renewable Energy Working Party (REWP) who are driving forward an ambitious market growth strategy for renewable energy.

Behind our efforts lies the goal of key renewable energy technologies becoming value-competitive with conventional energy technologies as quickly as possible. To achieve this we must help create the conditions for the scale of investment needed, and we must help to forge international consensus on the most efficient deployment of that investment.

It is a daunting task, but strong foundations have been laid. For more than twenty-five years the IEA has stimulated international collaboration on energy technology development. The Implementing Agreements devised to support international collaboration have proved effective in promoting links between nations and between research bodies. At the same time, the IEA has established strong working relationships with multi-lateral organisations such as the World Bank and the G8 - now also convinced of the need to accelerate market growth for the renewables.

Until now, our efforts have primarily focused on R&D. Industrial collaboration has played a critical role here, and there are many examples of fruitful partnerships with companies who are involved in technology development. The SolarPACES program provides good examples of far-sighted companies who have participated in joint initiatives. Like Schlaich Bergermann und Partners featured on page 2, this may be through co-operation within specific Tasks. Another approach is for business consortia themselves to be contracting parties to the Implementing Agreements - an approach which has worked well for SolarPACES in the case of Australia and the UK.

As we enter this new phase of market development, business opportunities are escalating. We are committed to mobilizing the investment needed, and we are building a consensus around the world as to how this will happen. To be successful, our strategy must result in feasible and attractive business opportunities for the most innovative, entrepreneurial and far-sighted businesses. It is for this reason that I extend a special invitation to private sector organisations to take an active role in shaping and implementing the IEA's Renewable Energy Market Acceleration Initiative.

Dr. Roberto Vigotti
Chairman, IEA Renewable Energy Working Party

ACCELERATING RENEWABLES: the IEA initiative wins support



The Indian Minister of Power, Mr. S. Prabhu, announced new policy goals for the deployment of renewable energy in India as he opened the IEA supported Workshop on Renewable Energy Market Deployment held in India in February (see page 4).
photocredit: J. Hooff

Too little, too late - or a radical shift which could transform the development of renewable energy globally? One thing is certain - the International Energy Agency's (IEA) Renewable Energy Working Party has risen quickly to the challenge of spearheading the Renewable Energy Market Acceleration Initiative, now under discussion around the world.

In 1999, IEA Ministers directed the IEA to develop concrete proposals to accelerate the growth of markets for renewable energy. Behind the emphasis on market stimulation lie some sobering statistics. An overall energy demand growth by 57% over twenty years, accompanied by a 60% growth in CO₂ emissions is just one of the projections in the IEA's "World Energy Outlook 2000" reference scenario. While new and renewable energy sources are projected to increase rapidly, their existing small base of 2% contribution would only increase to 3%. Meanwhile Middle East OPEC countries may provide 41% of world oil in 2020, rising from 26% in 1997. These facts "sound important alerts" says IEA Executive Director, Robert Priddle. It is in this context that the Renewable Energy Unit has begun to develop options for market acceleration, directed by the IEA's Renewable Energy Working Party (see Editorial).

If markets for renewables are to develop rapidly, international collaboration is critical. Only large-scale demand can bring down prices, and only international efforts can create a pro-renewable trading environment. The IEA is uniquely placed to help leverage new international market-focused initiatives, and is adopting a systematic and strategic approach to the problem. Rick Sellers of the Renewable Energy Unit explains some of the background thinking:

"Our ultimate aim is to achieve demonstrable competitiveness with conventional technologies. To achieve this we must first focus on technologies with potential large-scale markets. Then we need to assess the scale of market demand required to make them value-competitive, and estimate the scale of investment necessary to achieve competitiveness. We can then focus our energies on a strategy to mobilize that investment".

Rick confirms that the key countries invited to join the initiative may be IEA members or developing countries: the criteria for participation is the necessary commitment, economic resources, renewable expertise and market potential. Those joining the Initiative are invited to commit themselves to establishing comprehensive national strategies to establish strong markets, and modifying policy frameworks to spur market growth. He underlines the importance of the international dimension:

"It is crucial to facilitate the flow of experience, technology and investment. Many countries, North and South are individually investing in renewables' deployment, but linking the strategies of leading market countries and their renewable deployment investments produces more rapid and efficient commercialization, and is at the heart of the IEA's mission. Moreover, there is now a growing body of national experiences in targeting learning investments and designing government procurement programs. It is crucial that success stories are shared rapidly."

This new focus on market development has many implications for existing IEA Implementing Agreements which in the past have focused primarily on R&D.

Michael Geyer, Executive Secretary of IEA SolarPACES is convinced that the Initiative is a timely development for Concentrating Solar Power technology:

"All our experiences in SolarPACES indicate that market-focused action is now crucial. While it is of vital importance to continue the critical work of technology development, R&D needs to be market focused and demand led. Thanks to more than 20 years collaboration, we already have concentrating solar power (CSP) technology in which we are confident - technology which can provide the cheapest form of solar electricity on the planet. What is needed now are reliable markets. It is urgent that the conditions for these markets are rapidly put in place."

SolarPACES has already established something of a track record in market focused initiatives. Of particular note is the START mission programme, the first mission to Egypt having laid the foundations for the Global Environment Facility (GEF) supported 135 MWe Integrated Solar Combined Cycle plant at Kuraymat now in progress. With fourteen members now collaborating in SolarPACES, Michael is quietly confident about the prospects for further CSP project is the coming years:

"CSP technology is uniquely suited to integration with conventional thermal power plants - making it a front runner when additional multi-megawatt capacity should be provided from renewable sources. From the projects we are tracking within SolarPACES, we can say that there is a potential of nearly 3000 MW installed capacity by 2010. The IEA's Market Initiative will undoubtedly support the realization of these projects, in turn laying a firm foundation for a maturing, independent industry".

INDUSTRY *focus*

Efficiency, beauty and ecological safety - these are the values which underpin the work of Schlaich Bergermann und Partner (SBP), the Stuttgart based civil and structural consultant engineering company. With a technical staff of around 50, the main business of SBP is structural engineering of bridges, wide span light weight roofs, high-rise buildings, buildings and large steel/glass structures. The prize-winning company can point to a global showcase of past projects - from the Ting-Kau Bridge in Hong-Kong to an Olympic roof in Montreal; from a stadium in Zaragoza to glass facades in the Bugis Junction hotel, Singapore. The company's work is especially well-known in Germany - of particular note is their involvement in the Dome in Neckarsulm and the Parliament Building in Bonn.

Expertise in structural engineering provides the foundation for SBP's involvement in solar engineering, and building on this SBP have developed special capabilities in solar systems engineering. Over some 20 years the company has developed a unique solar systems team of physicists, civil, structural, electrical and mechanical engineers - a team with extensive experience of national and international projects. As well as carrying out design and testing work with wind, PV and low temperature heat systems, the solar engineering team has had wide-ranging involvement in concentrating solar technology.

SBP designed, erected commissioned and tested a first solar chimney test facility in Spain, and have carried out design studies for trough collector systems.

Schlaich Bergermann und Partner

Meanwhile, drawing on the company's core competence in structural engineering, the solar team have developed the metal stretched/stressed membrane technology which makes a key contribution to the design of both heliostats and parabolic dishes. One application is in central receiver systems - and SBP have designed, constructed and tested 46 m² and 150 m³ stressed metal membrane heliostats with optical qualities. The application for which the company is perhaps best known, however, is in Dish-Stirling systems, where parabolic dishes concentrate solar radiation onto a focal point where the solar heat-exchange of a Stirling engine is located.

Actively involved in SolarPACES Tasks I and III, SBP collaborates with national and international solar research institutions and solar test facilities in Spain, Israel, the US and Germany. SBP currently leads the EURODISH project (see page 3), which aims to reduce cost reduction for Dish-Stirling systems.

SBP partner Wolfgang Schiel is clear about his company's long term interest in solar systems:

"The provision of electricity in developing countries will have to increase drastically during the next decades to improve living standards. Environmental concern about pollution and CO₂ emissions is becoming a driving force in the selection of suitable technologies to meet this need. Thanks to long-term investment, SBP can now act as a strategic partner in the drive to bring clean energy solutions to the earth's sun-belt regions."

EUROTrough and EURODish promise lower solar power costs

Concentrating solar power (CSP) systems already provide the cheapest solar electricity in the world in California, but new developments in Europe show good prospects of further cost reduction. Now well under way, the advances represented by **EUROTrough** and **EURODish** are the fruits of close collaboration of European organisations enabled through financial support from the European Commission under the Joule III Programme. An integral part of SolarPACES Task 1 - which focuses on CSP systems - the projects contribute to the maturity of both distributed generation and central generation systems. Prospective markets in both Southern Europe and North Africa have triggered significant commercial interest in the projects.



EUROTrough

The "EUROTrough" parabolic trough collector (above) has been developed for various applications in the 200-400°C-temperature range in solar fields up to the hundreds Megawatts range. As well as supporting solar thermal electricity generation in co-generation plants, EUROTrough is also well suited for solar thermal process heat applications.

The design of the new support structure of the collector included concept studies, wind tunnel measurements, finite elements method (FEM) analyses and resulted in a structure with a central framework element. This torque box design has lower weight and less deformation of the collector structure than the other designs considered - hence it will be possible in future to connect more collector elements on one drive. This results in fewer drives and interconnecting pipes, thus reducing the installation cost and thermal losses. Through reducing material usage further weight reduction will be possible.

The EUROTrough project has been performed by the EUROTrough consortium partners from Spain, Germany, and Greece: Instalaciones Abengoa, S.A. (INABENSA); - Schlaich Bergemann und Partner (SBP); Fichtner Solar GmbH; FLABEG Solar International; Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR); Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) and the Centre for Renewable Energy Sources (CRES).

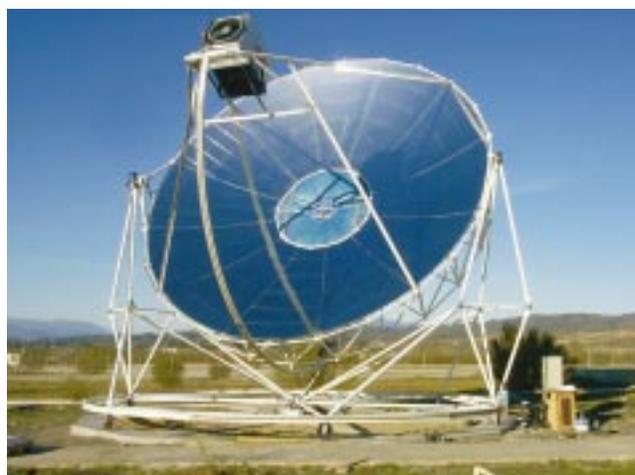
Market studies on CSP in the Mediterranean region have shown that EUROTrough systems may be well-placed to integrate renewable energy into electricity grid development in southern Europe and N. Africa. Partners in EUROTrough are involved in recent project developments in Greece and Spain and expect to play key roles in supplying the future market. The suppliers, the manufacturers and the users of the technology will finally be from the customer countries in the Mediterranean region, ensuring high added value in the respective target countries.

EURODish

Of all concentrating technologies, parabolic dishes can achieve the highest levels of solar concentration and consequently the highest temperatures. The dish/Stirling systems pioneered by Schlaich Bergemann und Partner (see Industry Focus, page 2) have been among the most successful dish systems and are well suited to distributed and off-grid electricity generation. The further developments represented by the EURODish project are focused on bringing down costs.

Two EURODish prototypes are being tested within the project, and the first of these (see below) started operation at the PSA on February 9 2001. This 10 kW dish/Stirling system was developed by Schlaich, Bergemann und Partner (SBP), SOLO, Mero, K&S, Ciemat, DLR and Inabensa. The concentrator shell is made of light weight resin reinforced plastics with thin glass mirrors glued onto the front surface. The Stirling engine is the SOLO V161 with a number of improved features and components. The system, specially suited for single unit erections because of its quick and easy mounting procedure, is fully automated and can be remotely controlled and accessed.

This first prototype has already achieved the project goal of reducing costs to \$5000 per kW. System testing at the PSA will be completed by July 31 2001.



CSP for Morocco

Morocco's long-standing goal of exploiting the nation's solar resource through CSP came a step closer to reality in March 2001. A meeting between ONE (the Moroccan Electricity Office), the World Bank and Fichtner/DLR Consultancy was held on 22 and 23 March, finalising the details of a formal "Request for Project" (RFP) to be submitted to the Global Environment Facility (GEF). Financial support from GEF would ensure viability of a CSP plant, and the RFP is the trigger for a procedure designed to realise a full-scale plant.

Indian CSP project well under way

Commercial interest in India's prospective CSP project at Mathania was very much in evidence at the "Pre-Bid" Conference held at the end of November 2000, attended by companies interested in bidding to supply the 140 MW dual-fuel solar-naphta thermal power plant. Since then the process of developing a GEF-supported CSP plant has moved further forward with the selection of three consortia as pre-qualified bidders. The selection was made in Jaipur on 13 and 14 February by the Rajasthan State Power Corporation, assisted by KFW and the Fichtner/DLR Consultancy.

IEA /India Workshop on RE Market Deployment

As part of the drive to accelerate market development of renewables (see feature on page 1), the IEA held a workshop on this subject in New Delhi on 18-20 February 2001. An outcome of India's participation as an observer to the Renewable Energy Working Party, the workshop was co-organised with the Indian Ministry of Non-Conventional Energy Sources (MNES), the Confederation of Indian Industry (CII) and the Climate Technology Initiative (CTI). A primary aim was to stimulate policy dialogue between the IEA members, the Government of India and representatives of the Indian energy industry. The IEA delegation was led by Roberto Vigotti, Chairman of the Renewable Energy Working Party and included three representatives of IEA Implementing Agreements, with SolarPACES represented by Executive Secretary Michael Geyer.

India is emerging as a world leader in the diffusion and development of several RE technologies including wind power, biomass power and solar photovoltaics - as well as setting up one of the first GEF-funded concentrating solar power plants. Meanwhile, policies to accel-

erate market deployment of renewable energy to support this growth are being formulated. Highlights of the "Policy Statement on Renewable Energy" being drafted by the Ministry of Non-conventional Energy Sources were presented during the workshop. This first attempt by India to develop a comprehensive renewable energy policy will encompass policy goals as well as identifying mechanisms to achieve them. In this context the Workshop was particularly timely and well-received by the Indian authorities.

SolarPACES Diary

The 60th meeting of the SolarPACES Executive Committee will be held in Cuernavaca, Mexico from 6-8 May. The 61st meeting will be held in Johannesburg on 18 and 19 September 2001, while the 62nd meeting in Madrid will be on 21 and 22 April 2002. Meanwhile, Task meetings are scheduled for 19th and 20th June 2001 in Köln, Germany. These will be followed by a Solar Thermal Colloquium organised by DLR in Köln on 21st June.

SolarPACES Symposium 2002

The biennial SolarPACES Symposium will take place next year in Switzerland from 4-6 September 2002. Held in Zurich, the Symposium will provide a focus for reporting the latest developments in concentrating solar power as well as solar chemistry. For further information contact Aldo Steinfeld: aldo.steinfeld@psi.ch.

SolarPACES Executive Secretary changes

In December 2000 Wilfried Grasse stepped down as Executive Secretary of IEA SolarPACES, having performed the key managerial function for the IEA Program since it was initiated in 1977 as SSPS (Small Solar Power Systems). During an extensive career in solar technology development within DLR, Wilfried's wide ranging international responsibilities included the funding and later the Co-Directorship of the PSA. His complementary national and international roles converged to provide breadth and continuity to CSP development, and supported the growth of SolarPACES membership from four countries in 1986 to fourteen in 2000.

Wilfried hands over the role of Executive Secretary to Michael Geyer, the current DLR (Deutsches Zentrum für Luft und Raumfahrt e.V) team leader at the PSA (Plataforma Solar de Almeria) in Southern Spain (see contact details below).



SolarPACES NEWS

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SolarPACES is a program of the **International Energy Agency** focusing on concentrating solar power and solar chemical energy systems. As of March 2001 the participating members are:

Australia, Brazil, Egypt, European Commission, France, Germany, Israel, Mexico, Russia, South Africa, Spain, Switzerland, United Kingdom, United States.

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