Entering the 21st Century

IEA/SolarPACES Strategic Plan

SolarPACES

International Energy Agency
Solar Power and Chemical Energy Systems
www.solarpaces.org

Since 1977, our SolarPACES team has pursued a focused program of research and development in the field of solar power and chemical energy systems. Systematic development of three plant types - troughs, towers, and dishes - has led to the ever-increasing ability of **concentrating solar power (CSP) systems** to harness solar energy for production of electricity and chemicals and other uses with efficiency, reliability and cost-effectiveness.

Applications of CSP (previously known as solar thermal power) are now commercially feasible from a few kilowatts to hundreds of megawatts, and plants totalling 350 MW have been in operation in California since the 1980s. Plants can function in grid-connected, standalone or remote applications and are suitable for hybrid operation, particularly with natural gas. They are applicable in all global regions having high direct normal solar insolation, including large areas of North and South Africa, Australia, China, India, the Mediterranean region, the Middle East, the southwestern United States and Central and South America. Commercial solar plants have achieved costs of about 12 US cents per kWh; the potential for cost reduction will ultimately lead to prices as low as 5 US cents per kWh.

It is clear that the technologies are now ready for full-scale market introduction, and SolarPACES is poised to play a key role in this new phase. To facilitate the entry of CSP to the international energy market, SolarPACES must, however, broaden its focus. Looking ahead strategically, we will continue to cooperate intensively on research and technology development; but we will also initiate activities to support project development, to tackle non-technical barriers, and to build awareness of the relevance of concentrating solar power applications to current problems of energy and the environment.

Our vision within the IEA/SolarPACES community is that by 2010, concentrating solar power plants will make a significant contribution to the delivery of clean, sustainable energy services in the world's sun-belt.

Recognizing both the environmental and climatic hazards we face in the coming years and the continued depletion of the world's most valuable fossil energy resources, high temperature concentrating solar technologies can provide crucial solutions to energy problems within a short time frame.

Electric power production from CSP plants is nearing cost-effectiveness and will be among the early opportunities for the technology to enter the market place. We expect that success in entering this market will reduce costs and help pave the way for more concentrating solar technologies and processes capable of producing gaseous and liquid fuels and chemicals to penetrate a much broader range of markets, including the transportation and chemical sectors of the world economy.

OBJECTIVES AND STRATEGIES

The following objectives, and related strategies to help us achieve those objectives, are planned to expand our IEA/SolarPACES role from one which has been focused largely on technology development to one addressing the full range of activities necessary to overcome barriers to large-scale adoption of CSP.

Objective 1:

Support **TECHNOLOGY DEVELOPMENT** by leveraging national resources for research and development through international cooperation. These core SolarPACES activities remain of utmost importance to improving the competitiveness of CSP.

Strategies:

- ***Continue intensive cooperation among SolarPACES members in research, development and demonstration*** through cost, task and information sharing activities.
- ***Emphasize continued development*** of advanced components and alternative system designs to reduce future system costs.
- ***Continue longer-term research*** on advanced fuels, chemicals, and other technologies for the future.
- ***Facilitate increased industrial participation*** in development and demonstration projects.

Objective 2:

Support **MARKET DEVELOPMENT** to reduce financial, political, market and institutional hurdles to commercialization of CSP.

Strategies:

- ***Sponsor market identification and assessment studies*** to analyze potential customer requirements and establish early economic applications and long-term opportunities relative to competing conventional and renewable technologies.
- ***Develop and implement strategies for early multinational projects.*** Offer and provide SolarPACES expertise in combination with international financial community and host country support for select projects.
- ***Actively support project evaluations and development by the World Bank*** (and similar agencies) through cost-shared international reviews, partnerships with the Bank, and sponsorship/support of specific projects.
- ***Pursue financial engineering of projects*** in developing countries. Engage specialized financial expertise to assist in financial formulation of international CSP projects.
- ***Facilitate expanded international industrial cooperation*** by pursuing opportunities to bring together international partnerships of industrial concerns, including also financing institutions.
- ***Intensively pursue protection of intellectual property*** developed through SolarPACES activities. Engage appropriate international legal advisors to develop processes to make this a selling point for SolarPACES activities, rather than a drawback.
- ***Identify and promote regulatory action on non-technical competitiveness issues,*** including tax equity, conventional energy subsidies, externalities, and market entry incentives.

Barriers to commercialization of Concentrating Solar Power

In addition to the technical hurdles we have focused on for the past two decades, we are facing numerous non-technical barriers. To achieve our vision we must overcome obstacles and threats, and we must meet a number of critical challenges.

Obstacles and threats:

- ***Energy market deregulation and low energy prices,*** including a market-push toward use of the least-cost power option, while ignoring the cost of external environmental impacts of competing technologies.
- ***Industry and financial community uncertainty*** about cost, performance, and reliability.
- ***Perceived risks*** of high capital-cost projects.
- ***Intellectual property protection*** issues.
- ***Funding decreases*** in national concentrating solar R&D programs.

Challenges:

- ***Establishing appropriate market entry incentives,*** including equitable taxation relative to conventional energy products, carbon taxes or renewable energy tax credits, and Global Environmental Facility (GEF) support.
- ***Removing legislative and regulatory barriers*** to the supply of concentrating solar power to the grid.
- ***Increasing support for the development of effective tools*** for assessing the true value of renewable technologies including externalities.
- ***Improving the attractiveness of investment opportunities*** in concentrating solar power systems.

Objective 3:

Expand **AWARENESS OF THE POTENTIAL** of CSP (including long term fuel supply and the potential of solar chemistry) to address the energy and environmental problems that the world faces.

Strategies:

- ***Expand SolarPACES membership***, particularly to lesser developed countries in the world's solar belt. Actively promote formalized industrial and user partnering with SolarPACES.
- ***Establish an information dissemination program*** to contact governments, financial institutions and developers. For example, establish "road shows", poster sessions, elevator speeches, etc., and aggressively pursue opportunities to promote the technology through international non-solar (i.e., financial, environmental, third-world development) conferences, workshops, governments and international agencies, etc.
- ***Team with IEA and other international working groups*** (photovoltaics, wind, geothermal, etc.) to bring a unified message on renewables to appropriate governments, agencies, financial institutions, etc.

The Future

As we have continued over the past two decades to pursue a focused program of research and development, the know-how we in SolarPACES have developed has positioned CSP on the brink of commercialization. To enter the international energy market, however, we must broaden our efforts to address the many economic and political barriers faced by any emerging technology. This plan represents SolarPACES' commitment to play an active role in co-ordinating and integrating our national efforts to promote and implement the many approaches required to help concentrating solar technologies achieve their potential to provide clean, economical energy throughout the world's solar belt.

This plan addresses both near and longer term opportunities and challenges. As the future unfolds, however, new opportunities and challenges will appear; we must be prepared to modify our direction to meet them. Strategic planning within SolarPACES will thus remain a continuous process, calling for review of our plans on a regular basis.

SolarPACES Members (March 2000):
Australia, Brazil, Egypt, European Commission (DG XII and TREN), France, Germany, Israel, Mexico, Russia, South Africa, Spain, Switzerland, United Kingdom, United States

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