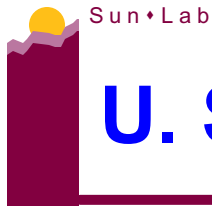


# SolarPACES

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- SolarPACES (Solar Power and Chemical Energy Systems) is the International Energy Agency's (IEA's) working group in CSP
  - 14 participating countries include both technology suppliers and potential market countries:
    - Australia, Brazil, Egypt, European Union, France, Germany, Israel, Mexico, Russia, South Africa, Spain, Switzerland, United Kingdom, and United States
    - Algeria, Italy, Belgium, Morocco, and India considering membership
  - Specific Tasks include:
    - I. Electric Power Systems
    - II. Solar Chemistry Research
    - III. Technology and Applications
  - Participation in specific activities is voluntary and takes many forms:
    - Information sharing
    - Task sharing
    - Cost sharing
  - U. S. international CSP activities are managed via SolarPACES
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# U. S. Roles

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- DOE/Lab Roles
  - ExCo Chairmanship (Tyner; previously Burch)
  - Operating Agent, Sector Leader, and Technical Roles
  
- U. S. Industry Role on ExCo
  - Dale Rogers (Boeing), Bill Gould (Nexant), Bob Liden (SES), and Gilbert Cohen (Duke) rotate ExCo representation
  - Regular ExCo attendance
    - Generally two 3-day meetings/year plus occasional (rare) other meetings
    - Tyner serves as alternate
  - Representation of national interests, not individual companies
  - Provide cost of travel and time (no reimbursement)

# IEA/SolarPACES Objectives

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- Objective 1: Support technology development by leveraging national resources
  - International R&D cooperation
  - Increased industrial participation
- Objective 2: Support market development to reduce hurdles to commercialization
  - Market identification and assessment
  - Strategies for multinational projects and World Bank support
  - Financial engineering and international cooperation
  - Intellectual property protection
  - Promotion of regulatory action to reduce non-technical hurdles
- Objective 3: Expand awareness of CSP potential to address energy and environmental issues
  - Membership expansion
  - Information dissemination
  - Teaming with other IEA and international organizations



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## Task I:

# Concentrating Solar Power Systems

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**TASK I** addresses the design, testing, demonstration, evaluation, and application of concentrating solar power systems, including parabolic troughs, power towers, and dish/engine systems. The focus of our efforts is on ultimate application of complete systems and the needs associated with getting them to the marketplace ...

**Craig E. Tyner**

Operating Agent, Task I

**62nd ExCo Meeting**

Aguadulce (Almeria), Spain

April 23-25, 2002

- Sector 1: Central Generation Systems (Manuel Romero, CIEMAT)
- Sector 2: Distributed Generation Systems (Wolfgang Meike, PAWA)
- Sector 3: CSP Market Development (Tom Mancini, Sandia)



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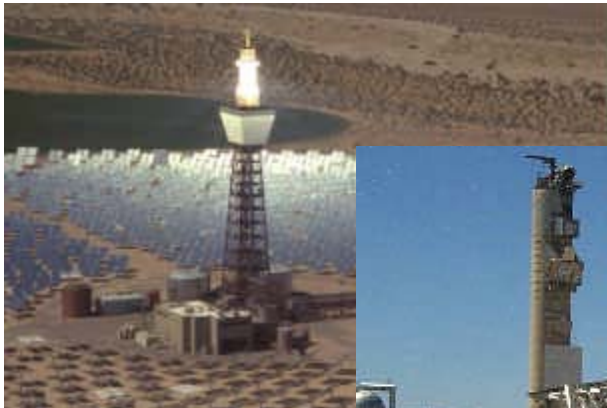
# Task I: Overview

## ■ Sector 1: Central Generation Systems

- DISS
  - EuroTrough
  - USA Trough
  - Solar Two final evaluation
  - Solar Gas Turbine with Tower Reflector
  - SOLGATE Project
- 
- THESEUS
  - PS10 and Solar Tres
  - South Africa activities

Hardware Development

Projects in Planning



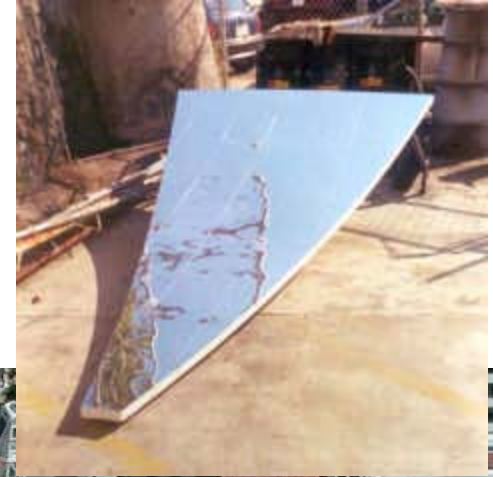
# Task I: Overview

## ■ Sector 2: Distributed Generation Systems

- EuroDish
  - 10-kW Remote Power Project
  - SAIC 25-kW Dishes
  - Boeing/SES 25-kW Dishes
  - Nevada 1-MW Dish Project
  - Parabolic Dish Technology in Mexico
- 
- Reliability database

Hardware Development

Analyses





# Task I: Overview

## ■ Sector 3: CSP Market Development


- START Missions
- Emerging Market Opportunities in Egypt, Morocco, Mexico, India, Brazil, Spain, South Africa, United States, Australia...
- Technology roadmapping
- Identification and Evaluation of Market Barriers
- Database of Project and Market Opportunities
- CSP Executive Conference Sponsorship

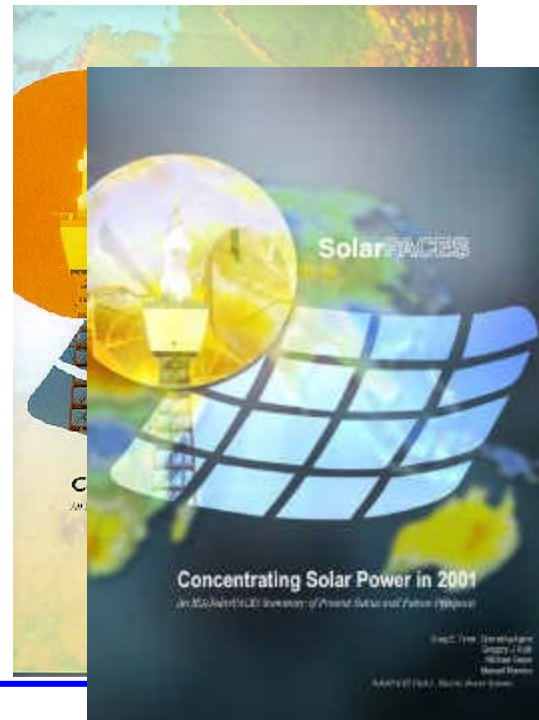


**Mexican Renewable Energy Meeting**

**Renewable Market Development**

- June 21 and 22, 2001
- Inform High-Level Government Officials
- Create a dialogue for Renewables Utilization in Mexico
- Mr. Gray Lowrey, Sandia, represented SolarPACES
- Presentation of information on
  - Grid-connected Concentrating Solar Thermal Power
  - SolarPACES and who we are, what role do we serve
  - Successes of CSP, highlighted with examples
  - Existing and planned projects around the world
- Presentation and Conference Report provided to Secretary

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# Proposed CSP Projects Worldwide: Potential U. S. Industry Participation

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- GEF/WB Supported Trough Projects (\$50M each)
  - Mexico (RFP on the street for solar option to combined cycle plant)
  - India (RFP on the street)
  - Egypt
  - Morocco
  - Also Brazil (study only); South Africa (negotiating)
- Spanish Opportunities under Solar Premium
  - 170-MW (equivalent) trough (Solar Millennium)
  - 15-MW trough (EHN w/ Duke Solar)
  - 10-MW air tower (PS10 w/ Abengoa (Solucar))
  - 40-MW (equivalent) molten salt tower (Solar Tres w/ Boeing, Nexant)
- Other
  - 100 to 500-MW Israeli troughs
  - 100-MW South African tower (and dishes...)
  - 200-MW Australian Solar Chimney
  - \$100M new Italian CSP program





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# SolarPACES Objectives and Structure 2002-2006

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- Continued technology development cooperation
  - International cooperation will be helped by international projects
  - International projects may lead to specific cooperative technical activities
  - Provide technical information to developers
- Cooperation on major project development and implementation
  - Spain, GEF, South Africa, Italy?
  - More partners means more equity opportunities, more risk sharing, better access to project opportunities in partners' countries
  - Work more closely with World Bank and GEF
- Restructuring of START missions to address other situations
  - Not just developing-country focus
  - Be a resource for those seeking information
  - Provide project facilitation support
  - Develop models for in-country project development/support
  - Provide forums for education on in-country development, finance, etc.
- Cooperative activities to address market barriers
  - Provide missions to Governments
  - Highlight in-country teaming, leadership, jobs, content, etc.
  - Develop models for sustainable in-country activities
  - Help make CSP Projects happen

# Summary of Key Issues

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- Value/Benefit of Activities
  - Leveraged technology development
  - International awareness – technology, markets, project opportunities
  - Project opportunities for U. S. industry
- Outcomes Achieved
  - Significant technology leverage
  - Greatly expanded international interest and opportunities in CSP
  - Numerous ongoing projects with significant potential for U. S. industry
- Funding Sources and Budgets
  - DOE funds membership fee (\$11k/yr) and lab travel (\$30-40k/yr)
  - No specific technology funding (several cooperative activities)
  - Industry funds their participation (ExCo, project development), and have some international contracts (e.g., Nexant in Spain, South Africa; SES)
- Issues
  - Travel constraints
  - CSP program viability