

# **Global Initiative For Concentrating Solar Power (CSP)**

**Fred Morse  
Solar Thermal Power Division  
Solar Energy Industries Association  
Washington, DC USA**

**Denver, CO  
31 August 2004**



# Concentrating Parabolic Trough Technology



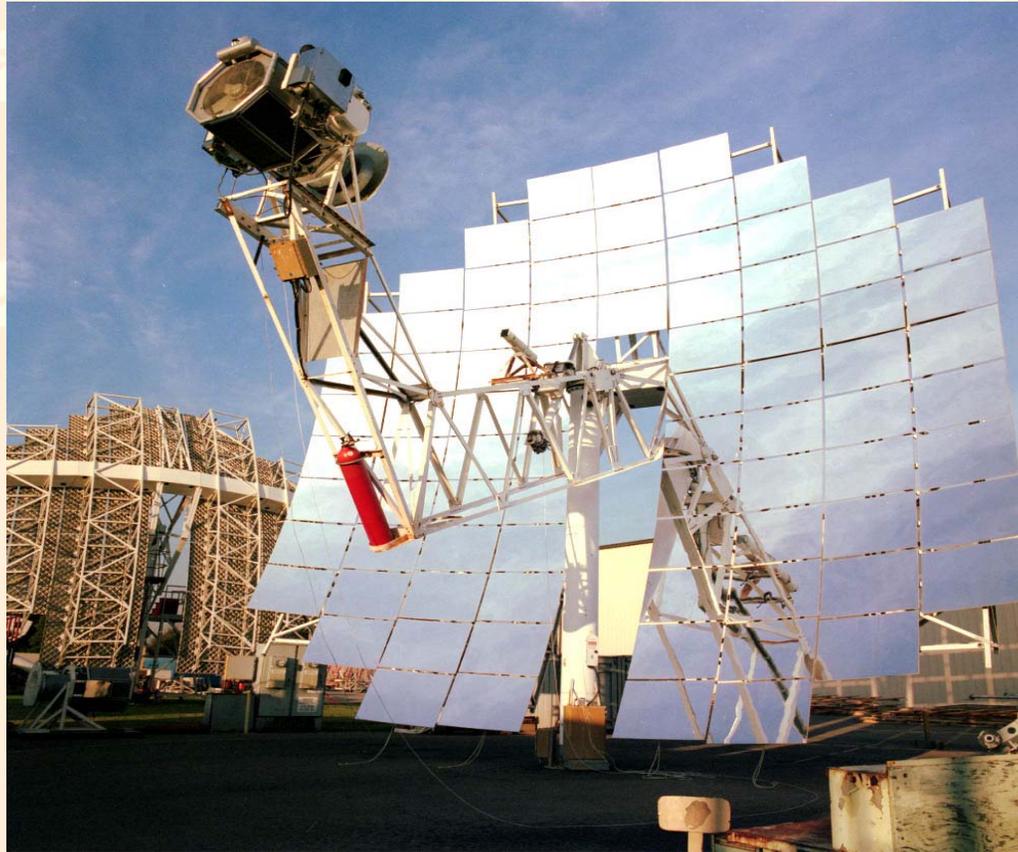
# Concentrating Parabolic Trough Technology



# Concentrating Solar Tower Technology



# Concentrating Parabolic Dish Technology



# Goals of CSP Global Market Initiative



- The objective is to facilitate and expedite the building of 5,000 MWe of CSP worldwide over the next 10 years.
- CSP industry committed to reduce the investment costs of CSP by 50%, thus becoming fully competitive with fossil based mid-load power
- This represents an investment volume of \$10 billion - mainly privately financed
- This initiative will represent the world's largest single program in history for solar electricity.

# CSP – The Other Solar Electric Option

- All concentrate the solar energy to produce steam or electricity directly (dish engine)
- Utility scale – 50 MW and larger
- Lowest cost and largest bulk power producer in the world
- 354 MW working reliably for 15 years
- Produced over 50% of all solar electricity to date
- Firm dispatchable power via hybrid or thermal storage
- Could help meet future capacity requirements and reduce reliance on imported fuels

# Required Policy Framework

- To make the needed long-term investments to achieve lower **costs**, a visible, reliable and growing market for solar thermal power, with normal risk levels, must be established
- The three policy areas that will have greatest impact on that objective are:
  - **Targets and Tariffs**
  - **Regulations**
  - **Financing Mechanisms**

# Targets and Tariffs

**Countries and states participating in the CSP GMI should:**

- **Establish a consistent base of national laws and regulations, such as adequate feed-in tariffs or public benefit charges specifically for CSP.**
- **Establish Renewable Portfolio Standards or similar mechanisms that encourage electricity generation from renewables, specifically CSP.**
- **Make green tariff schemes or certificates applicable to electricity imports from high solar radiation areas in neighboring states and/or countries.**

# Regulations

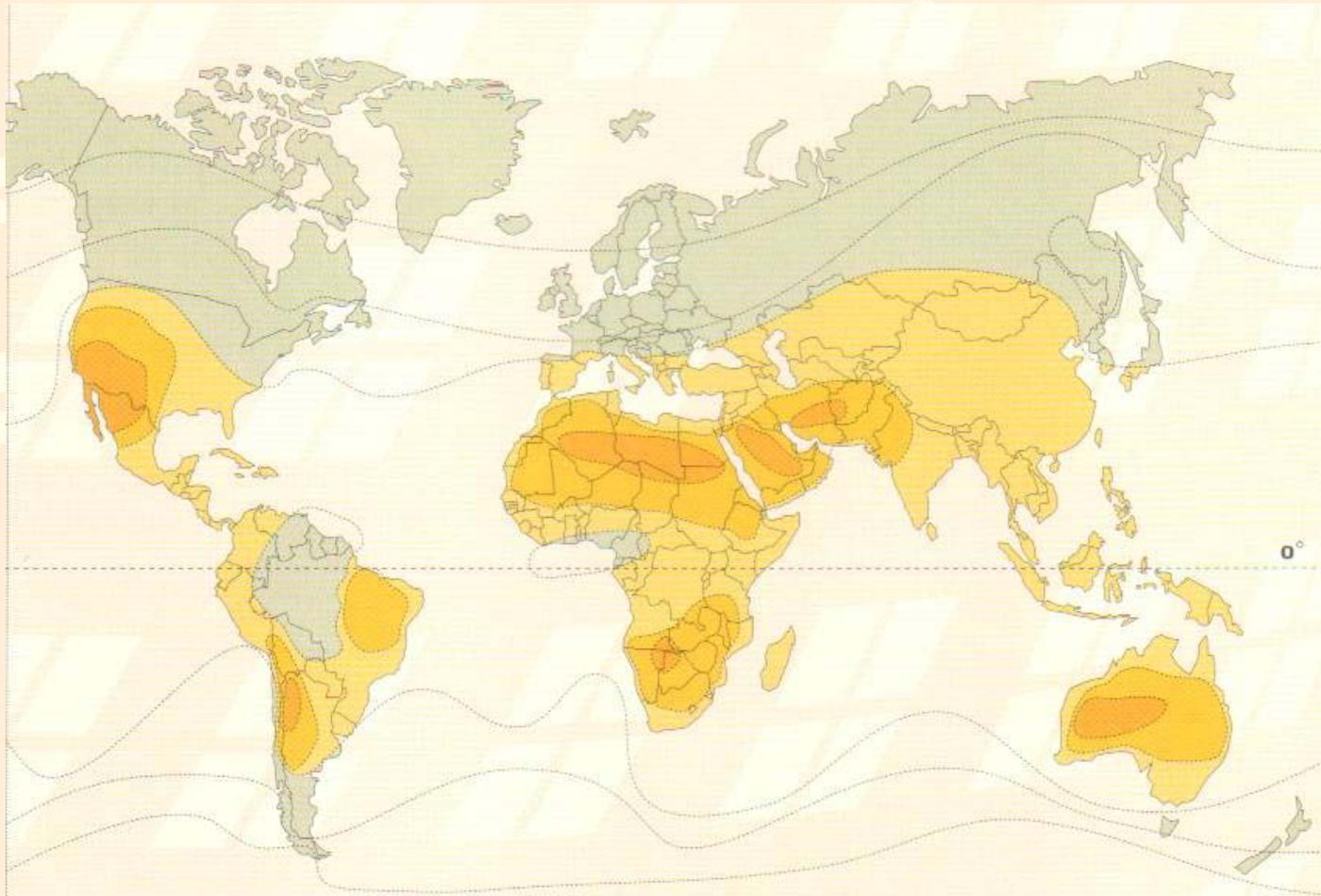
- **Avoid limitations on CSP plant capacity or operating strategies that make the technology introduction more costly.**
- **Remove restrictive laws to interconnection of CSP plants to allow more cost-effective connection to the electric grid.**

# Financing Mechanisms

- **Ensure that the Kyoto instruments such as CDM and JI are applicable to CSP and are bankable.**
- **Institute production tax credits similar to those wind power now enjoys which stimulated the growth of wind power in some countries.**
- **Maintain investment tax credits to support the initial capital investments before CSP plants begin to produce power.**
- **Establish loan guarantee programs**

## Different Countries Have Different Conditions

- **To account for the differences between countries in the development of CSP-related policy instruments and in the intensity of their solar resource, three different regional strategies have been defined for the CSP GMI**



Appropriate for Solar Thermal Power Plants:

■ excellent   ■ very good   ■ good   ■ not appropriate

# Different Strategies for Different Regions

## Region I

- **Region I includes countries and states where most of the required policy elements of the GMI already exist or could reasonably be expected.**
- **Countries in Region I include those in southern Europe (e.g. Spain), southwestern United States (e.g. Nevada) and Israel.**
- **Existing CSP-specific targets with feed-in laws or public benefit charges, both of which rely on the ratepayers, are used to cover the initial price gap.**
- **Political support is still needed to make targets, policies and tariffs stable and predictable so that commercial financing can be secured.**

# Different Strategies for Different Regions

## Region II

- **Region II includes developing countries that are or will soon be connected to Region I countries by a power grid.**
- **Region II includes, for example, Algeria, Morocco and Mexico.**
- **Power from CSP plants built in these countries (higher solar radiation) may be sold to Region I countries and could receive a premium price.**
- **Political initiative is primarily needed for formulating a fair scheme that accounts for both improved tariffs for clean energy generated in the Region II countries and for allowing a benefit from enhanced feed-in tariffs on electricity that is imported into Region I.**



### Projects of Pan-European Interest

Proposed priority axes for electricity interconnections



**Legend**

- UCTE Synchronous Area Boundary
- ▭ Magreb Synchronous Area
- ▭ Mavroq Synchronous Area
- ⊠ Proposed Euro-Mediterranean Electrical interconnections of regional interest
- Existing 400/500 kV line (partial)
- Projected 400/500 kV Line
- Existing 200 kV line (partial)
- Projected 200 kV Line
- 300/330 kV Lines
- 110 kV to 150 kV
- 10 kV to 150 kV projected
- Existing DC line
- Projected DC line
- Existing 750 kV line
- ⊠ Existing power stations (hydro & thermal) in Mediterranean Partner countries
- ↔ Proposed priority axes for electricity interconnections

→ source: Presentation to the Euro-Mediterranean Ministerial Meeting of May 2003.

# Different Strategies for Different Regions

## Region III

- **Region III includes developing countries not interconnected to the grid of Region I countries.**
- **Countries in Region III include Brazil, Egypt, India, Iran, Jordan and South Africa.**
- **Preferential financing in the form of subsidies (which could be grants, soft loans, carbon credits, CDM or green premiums) provided by Region I sources will be required to support the Region III countries' desire for development of clean CSP plants.**
- **In the medium term, the Region III countries will benefit from the closing of the price gap as a result of growing installed CSP capacity in Regions I and II.**

# Inclusion of the CSP GMI in the International Action Program of the Renewables'04 Conference in Bonn



■ The following countries have endorsed the CSP GMI, intend to participate in it and support the inclusion of the CSP GMI in the Action Program of this Conference:

- Algeria
- Germany
- Israel
- Jordan
- Egypt
- Italy
- Morocco
- Spain

■ Additional countries and states are expected, and are welcome, to join the CSP Global Market Initiative.



# If Your Country Wants to Develop Its Solar Energy Resource, Consider Concentrating Solar Power The Option for Large Scale Solar Electricity





# GMI Signing Ceremony, Bonn, Germany June 2004



# EMPower

- To open the market for CSP and grid-connected PV by working with utilities in developed and developing countries to define the price at which they would purchase how many MW for their future demand
- To dramatically reduce the cost of electricity from PV and CSP by aggregating sufficient demand

# Grid-Connected PV



## Relationship between EMPOWER and the CSP GMI

- EMPOWER will create CSP project opportunities – focus on utilities
- The GMI will help move those opportunities into projects – focus on policy and financial needs