

The Global Market Initiative (GMI) for Concentrating Solar Power (CSP)

**Frederick H. Morse
Morse Associates, Inc.
Washington, DC**

**ASES Conference
Portland, OR
13 July 2004**



Concentrating Parabolic Trough Technology



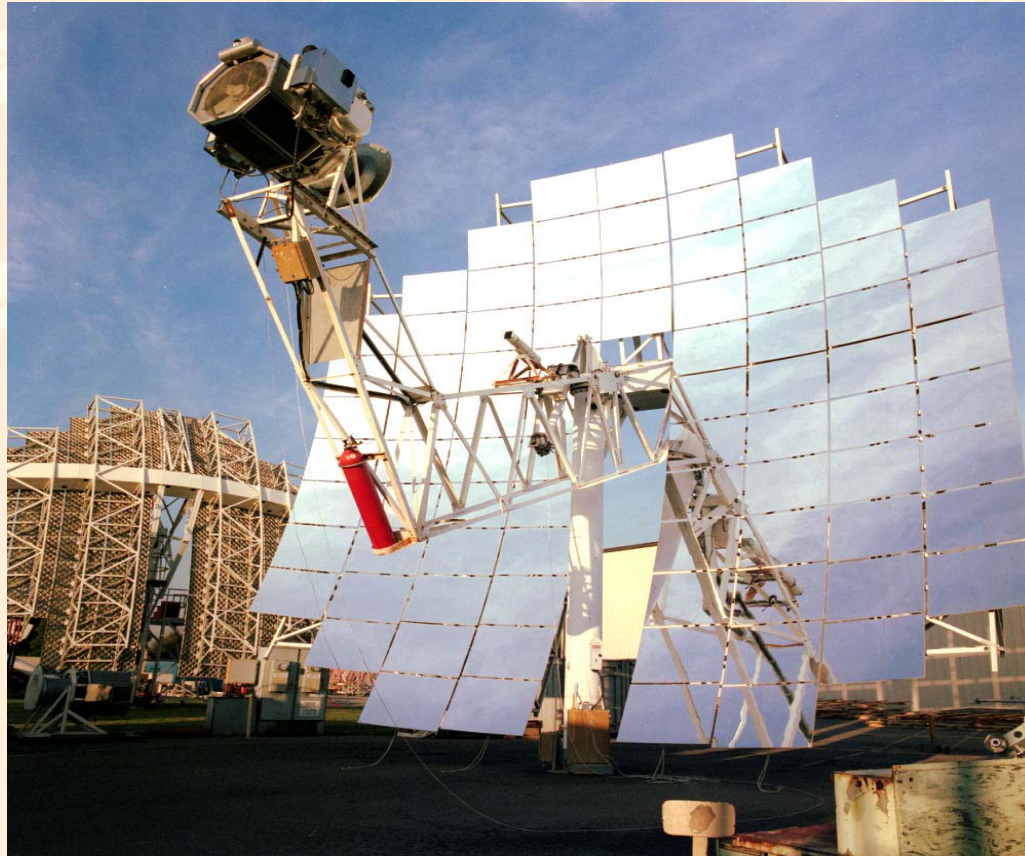
Concentrating Parabolic Trough Technology



Concentrating Solar Tower Technology



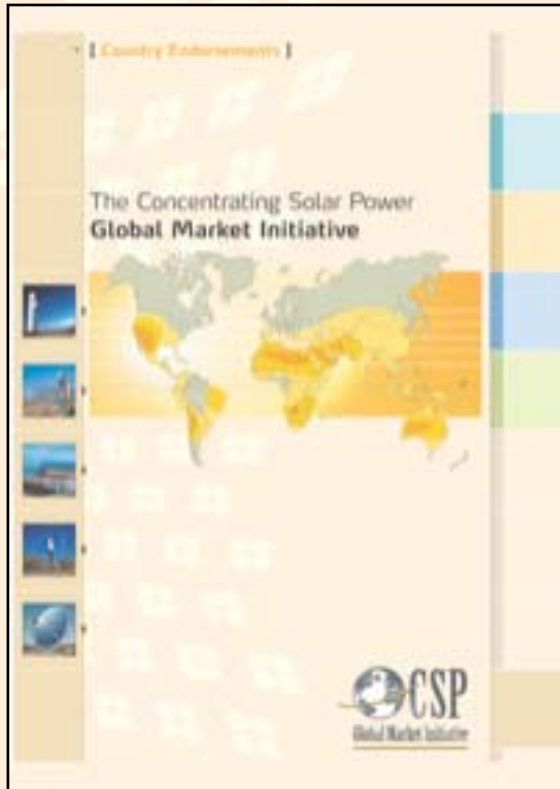
Concentrating Parabolic Dish Technology



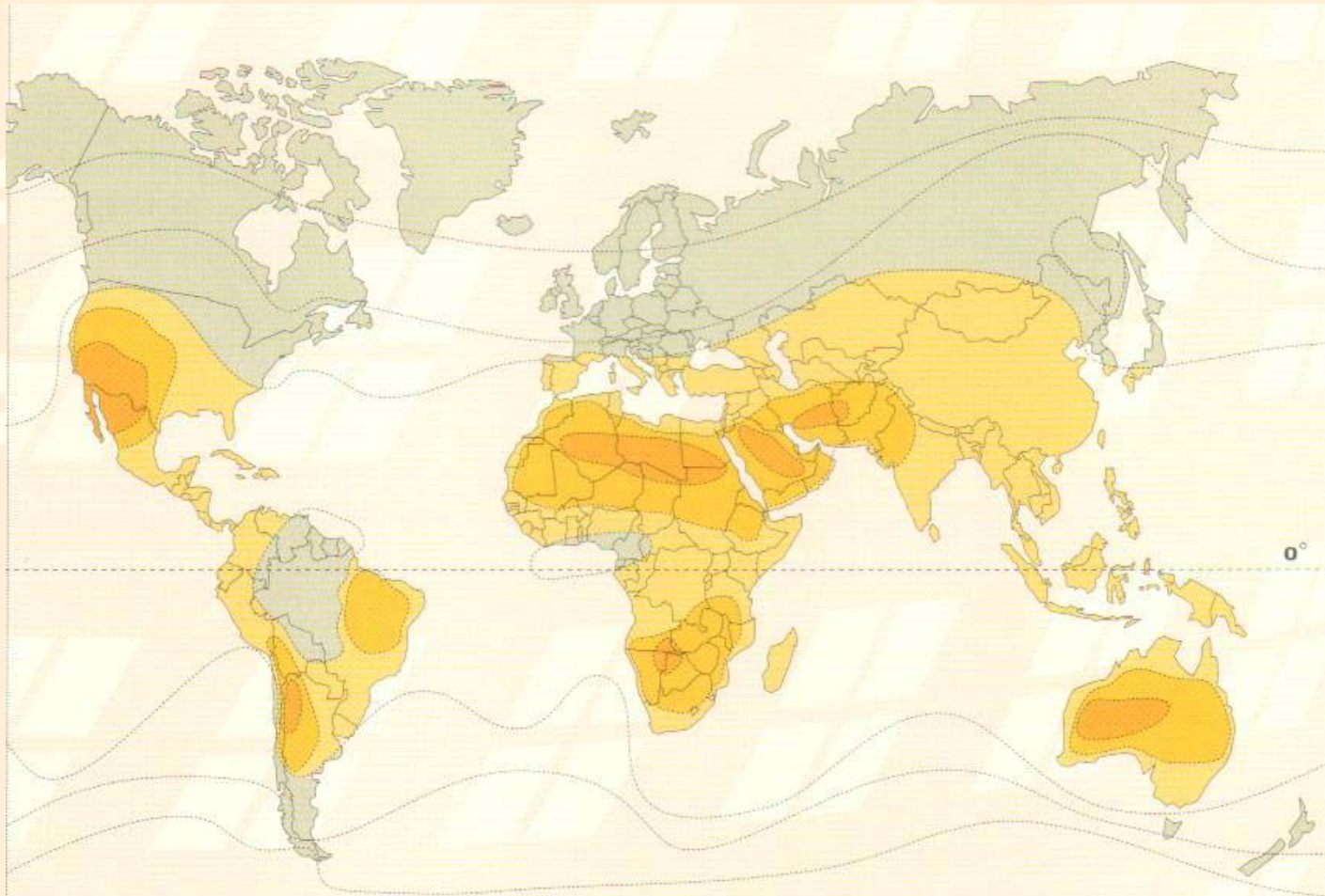
CSP – The Other Solar Electric Option

- 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

Goals of CSP Global Market Initiative

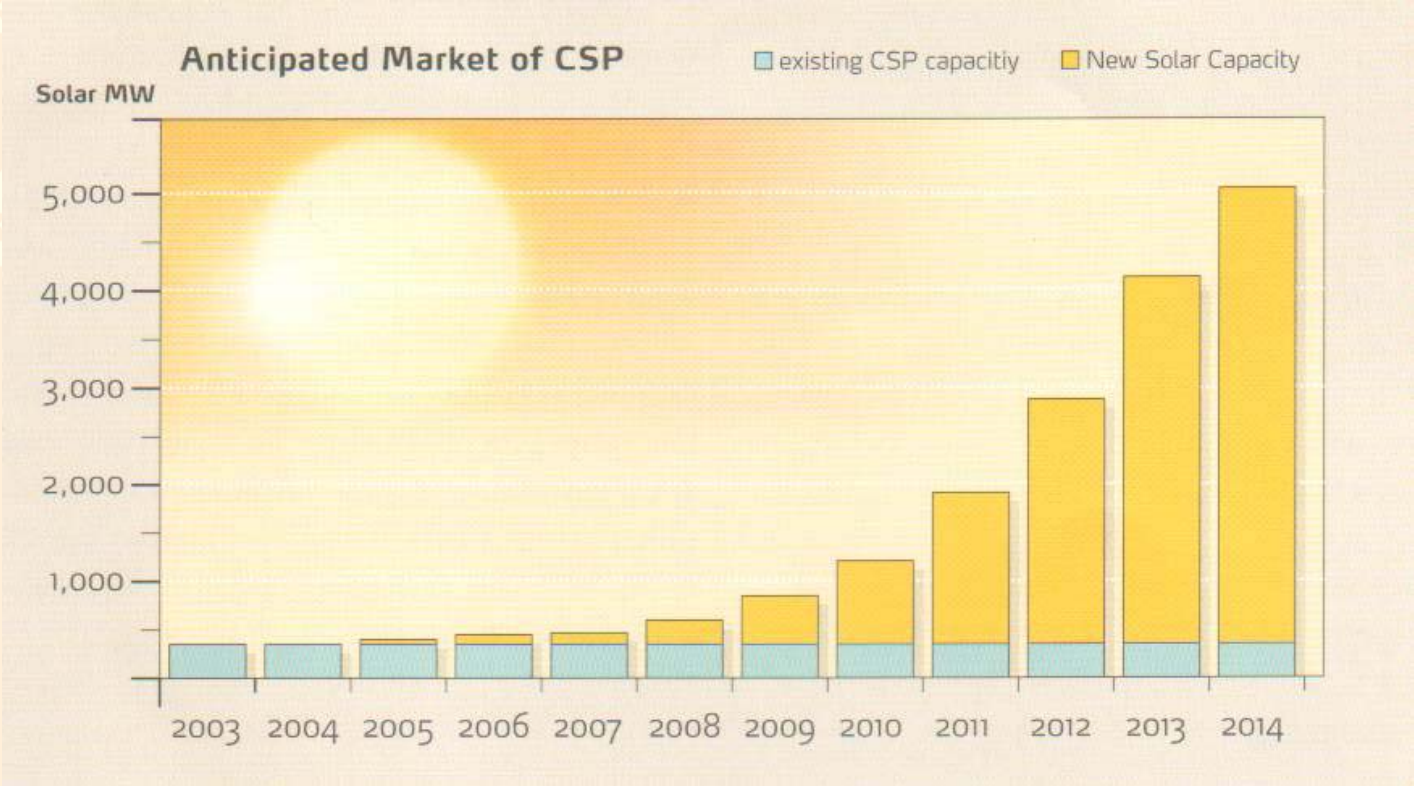


- The objective is to facilitate and expedite the building of 5,000 MWe of CSP worldwide over the next 10 years.
- CSP industry committed to reduce the investment costs of CSP by 50%, thus becoming fully competitive with fossil based mid-load power
- This represents an investment volume of \$10 billion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



Appropriate for Solar Thermal Power Plants:

■ excellent ■ very good ■ good ■ not appropriate



Process

- The Idea – Kearney and Morse in 2001, initial work supported by small GEF grant
- Conference In Berlin, Germany in 2002 hosted by the German Ministry for the Environment, the German Development Bank, UNEP and GEF
- Conference in Palm Springs, California in 2003 hosted by same plus US DOE the CEC on the invitation of the Governor
- Renewables 2004 Conference in Bonn, Germany in 2004

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**

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



→ 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.**

Renewables 2004 Conference, Bonn, Germany June 2004



The CSP GMI was included 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
- Spain
- Egypt
- Italy
- Morocco

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



GMI Signing Ceremony, Bonn, Germany June 2004



Next Steps

- Form an Advisory Council of participating countries and states within the IEA SolarPACES Program
- Formalize management group
- Approve action plan and budget
- Begin work to accelerate CSP projects in participating countries and states, e.g., the 1000 MW CSP Initiative in the SW

**Message to 154 Countries:
If Your Country Wants to Develop Its Solar Energy
Resource, Consider Concentrating Solar Power;
The Option for Large Scale Solar Electricity**

