# INDUSTRIAL OPPORTUNITIES FOR SOLAR TOWER TECHNOLOGIES IN ISRAEL

M. Epstein and I. Hodara

The Solar Research Facilities Unit
The Weizmann Institute of Science
Rehovot, Israel

## 1. Introduction

In the Northern Negev area a great number of energy intensive chemical industries are concentrated. The Dead Sea Works, the Rotem Fertilizers Industries and the chemical plants of the Ramat Hovav complex consume between them about 1000 MW energy in various forms. We estimate that the rate of industrial steam consumption alone will reach this value following the expansion of existing plants and the building of new ones.

As a result of intensive R&D efforts around the world and in this country as well, Solar Tower Technologies are gradually gaining status as a viable option of clean energy supply to industry. However, the demonstration of solar technology as a dependable and economical source of energy to industry under real operating conditions and on an industrial scale is still lacking.

A unique situation exists in the Northern Negev that creates an opportunity to demonstrate on an industrial scale different solar technologies. Solar tower plants can be incorporated with the existing conventional power plants of various industries benefiting from the existing infrastructures and highly skilled manpower.

Based on the operating experience gained at the Weizmann Institute's Solar Tower, we present here a few techno-economic case studies taking the energy requirements of the Dead Sea Works as an example.

## 2. Energy requirements of the Dead Sea Works

The Dead Sea Works is a major consumer of various kinds of energy. They consume currently 75 MW electricity and about 120 000 tons/y of residual fuel oil to produce 240 tons/h of high temperature steam and to supply heat to directly fired rotary kiln furnaces. Part of the steam operates a 22 MW steam turbine.

The energy needs of the Dead Sea Works will increase considerably with the operation of the magnesium metal production plant currently under construction. The plant will consume 30 000 tons/y for carnallite dehydration and about 60 MW electricity for the melting of carnallite and electrolysis.Part of the increase in the energy demand will be covered by the new 110 MW Diesel plant that has been recently purchased.

## 3. Potential applications of solar tower technology

3.1. The production of high temperature steam
3.2. Operation of high temperature gas turbine
3.3. Hydrotreating