

Achievements and Plans of the Trans-Mediterranean Renewable Energy Cooperation 'TREC'¹

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The Trans-Mediterranean Renewable Energy Cooperation TREC, the foundation of which was announced at the CoR meeting 2003 in Amman, has been pursuing its goals of development, climate stabilisation and good neighbourhood in the regions surrounding the Mediterranean by means of cooperation for exploiting the tremendous solar energy potentials available in the MENA region. The goals in detail are described in the "Amman 2003 paper" (www.trec-eumena.org). Our main aim is to develop a master plan for the rapid and large scale introduction of solar energy as a clean energy source with permanently sinking costs, and unlimited and inexhaustible reserves, and significant benefits for the MENA countries. The export of clean and affordable power from the excellent solar fields in MENA to the huge power markets in Europe would support global climate stabilisation, the technological and economic development in MENA, and could establish an economic and political partnership for sustainability between Europe and MENA.

The main achievements of the first year:

- Successful presentation of the TREC concept at several conferences, in Germany and in MENA
- Initiation of two major studies on the solar energy potential around the Mediterranean, by means of Concentrating Solar Thermal Power (CSP), and on clean power transmission across the Mediterranean.
- Addition of desalination for MENA, as a sustainable and unlimited source of fresh water, to the power trade with Europe as driving force for renewable energy installations.
- Connecting the TREC goals with the concept of "Community of Water and Energy in the Arc of Crisis", proposed by HRH Prince El Hassan bin Talal in 2001.
- First design of a CSP market introduction master plan: Solar Water for Sana'a
- Active participation in TREC by the MENA countries Morocco, Algeria, Libya, Tunisia, Egypt, Jordan, Lebanon, Yemen, Oman, Bahrain.

Milestones of this first year:

- Funding by the German Ministry of Environment for the two studies proposed by DLR,
- Significant support of the work for these studies by members of TREC
- The TREC meeting with HRH Prince El Hassan bin Talal in Amman, March 2004
- The MENAREC conference in Sana'a, April 2004: an interesting discussion forum on "Regional Co-operation for Renewable Energies", organized by TREC, and significant contributions to the declaration "Sana'a Final Statement on Renewable Energies and Sustainable Development" by a draft from TREC.
- The International Conference on Renewable Energies *renewables2004* in Bonn, June 2004, which included TREC into its International Action Programme, and where TREC was made reference to by several plenary speakers.
- Creation of the concept of "CSP technology bridgehead" for transfer and development of technology to and in the MENA region.

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Steps into the future:

Road map for renewable energies in MENA:

A plan for commercializing the versatile CSP technology for power and desalination is under construction, with 3 important elements: a CSP technology bridgehead, water supply for Sana'a by solar desalination as a light house project, and dissemination of this technology to the full MENA region.

Light House Project for MENA: Sana'a Solar Water from Red Sea

City and region of Sana'a are located in the Sana'a basin, at an elevation of 2200 meters. Population is growing rapidly, with close to 2 Million now and over 3 Million expected in 2020. At present, water is coming from ground water extraction. The extraction rate exceeds natural recharge already now by more than a factor 10. The groundwater in the basin is expected to be depleted between 2010 and 2015. No adequate and easily accessible alternative sources are at hand. Sana'a is outgrowing its natural carrying capacity.

The imminent depletion of the fossil water reserves of Sana'a is a challenge in itself. However, it is also prelude of the coming fresh water crisis in the full MENA region, and of the world energy crisis coming from depletion of global fossil fuel reserves. The Sana'a Solar Water project can solve the Sana'a water problem for ever, and it can help to solve the MENA water problems, the global energy crisis and to avert global climate change. In this sense it is a *World Sustainability Project*.

Objectives of the Sana'a Solar Water project are:

1. Save Sana'a from falling dry
2. Preserve a World Cultural Heritage
3. Make solar desalination a sustainable, secure, abundant and low-cost MENA-wide water resource
4. Make solar thermal power a global, secure, low-cost, and sustainable energy resource
5. Replace global rivalry for resources by intercultural co-operation for sustainability

Tasks to get the Sana'a project going are:

1. Establish the feasibility of the Sana'a Solar Water project
2. Bring Europe and MENA countries into co-operation for the bridgehead
3. Bring MENA into an alliance for CSP technology development through the Sana'a project
4. Invoke world wide support for this world sustainability project

The solar thermal power and desalination plants at the "near by" Red Sea shore line will produce nearly 1 billion m³ per year, in co-generation with power of 25 TWh. Through a pipe line this water will be pumped to Sana'a.

Through this project the talents and labour force of the people of Yemen and of other MENA countries can be employed to build inexhaustible and unlimited sources of fresh water, using water from the sea and energy from the sun. This project may support the development of a knowledge based economy and thus help to narrow the developmental gap between MENA and EU region.

Our studies show that the Sana'a Solar Water project is big enough to achieve solar energy cost reduction to a level that makes it competitive with energy from oil at 30\$/barrel. Most of population in MENA lives at locations near enough to sea shore with good solar radiation. Low-cost CSP technology will make solar energy economically beneficial for all MENA countries. Investments into the Sana'a project are an investment into a key technology for the economic and demographic development of the MENA region.

Europe, the Middle East and North Africa have a unique opportunity to overcome their present separation and create a community of water and energy security.

A MENA bridgehead for CSP technology as start of implementation

The full scale Sana'a Solar Water project needs a careful planning. A bridgehead for CSP technology allows to make use of the lead time needed for big projects and to get started with technology transfer and demonstration immediately. Further, if the MENA region will take profit from these projects for its general industrial and technological development and for creation of jobs then it has to acquire the

capacity of developing, constructing and producing the solar technology. The MENA region will profit from a gateway for the technology to come in, from a center of excellence for further development and dissemination throughout the region, and of human capacity building. The core of the bridgehead should be a 5MW pilot plant with all important technological features. Also at other places such pilot plants could be erected. It would cost around 20 million \$.

The bridgehead should be connected with an already existing technological or scientific institution. The country to host the bridgehead should offer appropriate power and water take-in regulations for the demonstration plant, guarantee easy and unrestricted co-operation with other MENA countries and foreign visitors, and eliminate all administrative obstacles for import/export of solar technology. A location in Jordan is under investigation, where such a project could be started without delays.

Implementation conference MENAREC-2

The MENA Renewable Energy Conference MENAREC, including 18 countries from Morocco to Iran, held at Sana'a in April 2004 has acknowledged the potential of renewable energies for the future of the MENA region, and formulated recommendations in the Sana'a Declaration. Since then fossil energy costs kept growing and water problems mounting. Fresh water scarcity will become the main obstacle for demographic and economic development in MENA. Renewable energies can become a new basis for economic prosperity and political stability in MENA. It is now time to organize their MENA-wide implementation. Further, it provides a field of highly synergetic co-operation between Europe and MENA. To this end TREC has started to initiate a follow-up conference (MENAREC-2) on implementation. We are aiming at April 2005. The government of Jordan has indicated its readiness to host MENAREC-2, and we have some positive reactions from the German government.