

(reprinted with permission from Modern Power Systems, May 2008)

Luminaries in the desert limelight

How many times have you heard it? 'The amount of solar energy falling on a square of the Sahara only so many kilometers by so many kilometers would be enough to supply the energy demand of the entire planet...' It's long been a favourite, plonking assertion by solar energy buffs. To which, of course, the reply is always 'Yes, yes, we know. Now go away and let us get on with digging up the fossil fuels that actually run the world'.

But what if we really could capture desert sunlight on a large scale, as a usable resource? A dedicated group of influential enthusiasts is trying to make this possibility a reality. Luminaries already involved include former executive director of the United Nations Environment Programme Klaus Töpfer, former UN assistant secretary-general Anders Wijkman, Prince Hassan bin Talal of Jordan, the Club of Rome and the World Future Council - serious players with a serious purpose. The concept they are developing is impressively ambitious, but by no means fantastic. *Clean Power from Deserts*, a report by the German Aerospace Centre, is subtitled 'The DESERTEC Concept for Energy, Water and Climate Security'. The report, commissioned by an initiative of the Club of Rome called 'Trans-Mediterranean Renewable Energy Cooperation', or TREC, was presented to the European Parliament in the autumn of 2007. A second edition has just been published in March 2008.

The core of the concept is to generate electricity by means of concentrating solar thermal power (CSP) plants in North Africa, and send this electricity into the European transmission network by means of high-voltage direct current (HVDC) lines across the Mediterranean. According to concept proponents, the technologies required are already proven, if not hitherto combined in precisely this way. They concede that the total investment will be both large and uncertain, as will the risks. On the other hand, they point to projects such as those for natural-gas pipelines thousands of kilometers long, crossing terrain both difficult and politically volatile, which have nevertheless been undertaken with success.

But the DESERTEC concept is by no means merely technological. As the rubric TREC, 'Trans-Mediterranean Energy Cooperation', indicates, the concept envisages wide-ranging economic, political, diplomatic and social reciprocity as a concomitant of the technological undertaking. Concept advocates use the acronym EUMENA, signifying European Union - Middle East - North Africa, to designate the potential participating beneficiary regions. They identify a range of benefits. The EU would gain access to a major supply of clean non-fossil-fuel electricity; some of this electricity could also benefit countries south and east of the Mediterranean. Countries exporting electricity would receive appropriate payments, potentially in the increasingly desirable euro. CSP generators could incorporate and drive substantial non-fossil-fuel desalination units, to deliver much-needed fresh water south and east of the Mediterranean.

All the participants could gain shares of credits for reducing greenhouse gas emissions. Establishing such a significant additional and alternative source of electricity would reduce vulnerability to disruption or price increases for imported natural gas, especially within the EU. Constructing, operating and maintaining such a vast array of high-tech facilities would create an upsurge of employment, much of it in parts of the world in need of more rewarding jobs.

The obstacles nevertheless remain daunting. At the moment those most actively involved in developing the concept are mostly academics rather than entrepreneurs. They are, however, beginning to attract the attention of relevant governments and corporations. On 28 March this year the Italian embassy in Berlin played host to an international conference exploring 'German-Italian Cooperation for the Development of Renewable Energies in the Mediterranean', centred on the DESERTEC concept. Participating speakers came not only from Germany and Italy but also from Morocco and Libya, from the Club of Rome, and from universities and research institutes both north and south of the Mediterranean, as well as from the International Energy Agency, Siemens, E.On, ENI and ENEL.

Topics included the solar resource base around the Mediterranean, and the status of technologies to capture it for electricity and desalination - those technologies already available or in advanced development, particularly CSP; possibilities for transport links across the Mediterranean, particularly HVDC, including a so-called 'European SuperSmart Grid'; and issues relating to security and environment impacts. Much of the day's discussion focused on the knotty problem of eliciting support from the investment community and attracting the necessary finance. An early requirement would be to identify and characterize the various categories of risk arising, and to establish appropriate arrangements to manage such risks - not only technical but financial, political and indeed environmental. Extensive documentation is available for free download from the TREC/DESERTEC website <<http://www.desertec.org/index.html>>. Further meetings are already scheduled, seeking to create a functioning support organization to advance the concept from theory to practicality.

One further intriguing question also remains, not only unanswered but thus far essentially unasked. How would a vast hookup like that envisaged for DESERTEC fit with the structure and operation of the present pan-European electricity network? Then again, how compatible might it be with a more decentralized system incorporating a growing proportion of smaller-scale and on-site generation? At first glance, the DESERTEC concept looks the absolute antithesis of any move toward smaller-scale, more local generation using renewables and cogeneration in optimized local systems. Yet DESERTEC and local systems share one attribute that could even make them effectively complementary: both entail a dramatic rethink of assumptions about the traditional synchronized AC electricity system, at either end of the scale. As vast concept and local concepts together challenge the traditional mindset, they might even reinforce one another. Electricity has more surprises in store.

(c) Walt Patterson 2008