



Outline for an
Apollo-Programme

DESERTEC

TREC
Clean Power from Deserts
Trans-Mediterranean
Renewable Energy Cooperation
An Initiative of The Club of Rome

From the White Book
“Clean Power from Deserts”
to an
Apollo-Programme *DESERTEC*
for
Energy, Water and Climate Security

Elements of an action program
proposed by The **Club of Rome/TREC**
and
endorsed for discussion by
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1. A new Paradigm: Global Eco-Security

Expectations for the future of mankind are increasingly dominated by unpleasant predictions and scenarios for climate change, for exhaustion of fossil fuels and of other resources, for extinction of species and human over-population of planet Earth. With fossil fuels as main sources for our energy we are demolishing the basis for our survival. The carrying capacity of our planet may be barely sufficient to support 5 billion people, but population number is driving towards 10 billion. At the same time climate change and shortages of energy sources are driving that already-stretched carrying capacity further down. This is a severe global crisis. Now, we begin to realize:

We are in the middle of a defence situation against global climate change.

We need a transition from fossil fuels to clean and inexhaustible forms of energy if we want to avoid becoming victims of climate change and of energy and water shortage. Not only do we need to safeguard the current carrying capacity against further degradation, we have to expand it to accommodate 10 billion people on Earth, until 2050. Therefore:

We need a defence and recovery strategy, defence and recovery measures, and a defence and recovery budget.

It is now too late to achieve the required U-turn with a business oriented slow transition to low/no carbon technologies. Now we need additional strong and determined emergency measures led by a global eco-security policy.

**A world of 10 billion people can only survive
as a community for global eco-security.**

To this end its regions have to cooperate.

2. The message of the White Book: there is a way

The strong and determined additional efforts that are needed become feasible if countries from sun-belt and technology belt join their forces. Together they have all that is required. Here is the encouraging message of the White Book:

The European, Middle Eastern and North-African electricity supply system can be decarbonised by at least 90% within 5 decades, if these regions combine the energy potential of deserts and present technological capacities of Europe.

Solar energy in deserts is abundant and clean. The sun radiates onto the deserts of the Earth 700 times as much energy as mankind is using. In half a day deserts receive the annual global consumption. This is why the "Clean Power from Deserts" concept, developed by the Trans-Mediterranean Renewable Energy Cooperation TREC, is so important. We now know that there is a way for ending – not for stopping abruptly though, as we might wish to be able to do - climate change, and for avoiding energy and water shortage. Clean power can be generated in deserts and can be transmitted to over 90% of world population. The White Book describes realistic pathways towards this goal. Mankind now needs to embrace this opportunity as a means of survival, and not merely as business case for investors – even though it will become a very big business opportunity, may be even the largest one the world ever has seen.



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3. From the White Book to an Apollo program EUMENA-DESERTEC

The aim of the proposed EUMENA-DESERTEC programme is to bring the currently unused solar energy “reserves” of deserts into service for energy and water security in the EUMENA region and for global climate security, by tapping into them with the most appropriate technologies. Solar radiation in deserts can best be utilized by Concentrating Solar Thermal Power (CSP) technology. Wind resources of deserts will be exploited where possible, but the overwhelmingly large source is solar radiation, particularly in the Sahara. To this end the following has to be accomplished:

1. Facilitation of large-scale production of CSP technology (wind power technology is already produced at large scale).
2. Large-scale deployment of CSP plant in desert regions
3. Creation of a low-loss (HVDC) transmission grid connecting Europe with MENA
4. Integration of clean power from deserts into MENA and European power markets.

Because of the fact that the EUMENA-DESERTEC programme is one of the few defence measures that can be taken now against further wrecking of the carrying capacity of our Earth, then a EUMENA-wide cooperation for shaping and implementing such programme is a “must”. To this end we propose as a roadmap

7 measures for building the “Solar Powerhouse Desert”

1. EU countries or EU as a whole should invite MENA countries to organize an energy, water and climate security alliance, or a **EUMENA solar energy alliance**, for the fast and efficient use of their technologies and desert energy resources.
2. One way of doing this is to call for a **DESERTEC kick-off conference** to which the important stakeholders from science and technology, from industry, from finance and from politics should be invited. The German Association for the Club of Rome in cooperation with the Hannover Industrial Fair is offering to host such an event, from April 22-24, 2008. Members of EU Parliament and Commission will be invited. We encourage interested supporters to contact us.
3. European and MENA countries should set up a EUMENA-wide expert team for **planning a HVDC transmission grid**, as backbone for energy and climate security.
4. EU and MENA countries should set up an **infrastructure fund** for financing the grid, since it does not only serve commercial interests of energy business but also public duties for energy and climate security. Its installation therefore must not be guided primarily by business interests.
5. They should set up a **programme for fast technology introduction** that allows to make promising and nearly market-ready technologies competitive with local fossil power generation costs, within less than (about) 7 years. After that, capacity expansion and decarbonisation will be driven by economics. In the picture of the Apollo program: take-off is in 7 years, the flight to decarbonisation goals may then take 30 to 40 years.
6. There should be a **EUMENA Clean Energy Advisory Board** that gives recommendations to all governments for



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- a) a fast deployment strategy
- b) a fast integration of clean power from deserts into European markets
- c) high participation of MENA countries in technology production.

7. There should be **lighthouse projects** for power generation and seawater desalination, of reasonable size (1 GW) to trigger local capacity building, and to solve burning or avoid looming problems, like solar power and water production for Sana'a and Gaza.

The turn-around manoeuvre can be achieved in 7 years

We estimate that such EUMENA-DESERTEC programme can be launched within 7 years by a **kick-off fund of about 10 billion €** for infrastructure and fast introduction of new technologies. Further costs will be refinanced by the revenues from power and water sales. Also the estimated 10 billion Euro kick-off money will pay back within a few years by the savings as compared with rising costs for power from fossil fuels and to exploding costs of climate change damages. The numbers of 10 bn Euro and 7 years depend on many parameters that might change in the coming years, so they may rise or fall. But these values give an indication of what is needed to achieve the turn-around for avoiding a disaster. In any case, the costs of the EUMENA-DESERTEC programme are minute as compared to the costs of energy and climate insecurity. How much may a lifeboat cost?

The way how to spend the estimated 10 billion € has to be optimized. The fund may be used for the following:

1. Support for technical, economic, environmental and political assessment studies for the first HVDC transmission lines from MENA to European countries (e.g. 10 transmission lines with up to 2 GW capacity, each) including erection of the corresponding power generating capacities, possibly supported by EU development funds.
2. Establish the necessary political, legal, regulatory and economic framework for long-term power purchase agreements (PPA) between EU and MENA countries for solar electricity from MENA. These agreements should hold for about 25 years, should be guaranteed by the EU and cover the cost of production and transport and a reasonable return on equity. This is necessary to trigger private investment, for at least a total of 20 GW capacity.
3. Support for planning and construction of the HVDC interconnecting grid as a piece of infrastructure for European energy security.
4. Support for construction of CSP pilot plants for MENA countries, for the setting up local component development and production capacities, and for the initial market expansion of CSP for power generation and seawater desalination.

Our offer to EUMENA:

If you put 10 bn € on the table, then we know how to put you on a road leading EUMENA out of the energy, water and climate crisis, by means of the 7 measures and within 7 years !

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