

A Solar Bridge for Research Infrastructures

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Global, international cooperation is the basis of our large-scale HEP facilities and already at times of the cold war the HEP community was able to foster international cooperation also in political areas far beyond physics. Gerhard Knies, a former physicist at DESY, applied the HEP- community's spirit of cooperation to the renewable energy sector in 2009, when he initiated the DESERTEC foundation. Today, this idea is still a valid option to provide low-cost sustainable power for future research facilities.

His aim was to transfer the knowledge and the financial power of the industrial countries to the sunbelt of North Africa to produce solar power at large scale. In return, North Africa was prepared to sell low-cost renewable power to Europe transmitted by High Voltage Direct Current (HVDC) lines. It was thought as a win-win concept on many levels, not only in the areas of energy and environment, but especially as incentive to the African countries to reduce the gradient of wealth and the pressure for migration by providing new jobs and perspectives to their young generation [1,2].

Today, 12 years later, the DESERTEC idea has sprouted into many individual projects worldwide. Next to electricity many different forms of energy export including prominently "green" hydrogen are aimed for. For short and medium distances, the direct cable connection (HVDC) still remains the most efficient and economic option for power transfer. Renewable solar and wind power generation is booming in North African and Arabian Countries [3,4]. However, large scale power transfer across continental borders is still in its infancy. The reason for the reluctance of investors are political difficulties, the requirement of multinational contracts and the chicken and egg problem: Transmission lines for export will only be built where sufficient power generators for supply as well as demand are ensured –and vice versa.

To get over the chicken and egg problem we propose that the HEP community initiates a HVDC line from North Africa to the European Grid, e.g. from Tunisia to Italy or from Morocco to Spain, so that European Large Scale Infrastructures (including possibly also smaller research centers and universities) can profit from low-priced African solar power. We believe that the community, especially CERN, has sufficient political connections to convince its member and associated member states to proceed with such a cable. In recent years the SESAME light source in Jordan [5] is an excellent modern example not only for powering an accelerator infrastructure with solar power, but more importantly, that the HEP community was able to convince the political leaders to leave deadlocked historical paths behind and take innovative and cooperative directions into a future of cooperation.

References:

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- [4] Abu Dhabi To Have Cheapest Solar Power Ever —1.35 Cents Per Kilowatt-Hour Clean Technica, May 2020, <https://cleantechnica.com/2020/05/06/abu-dhabi-will-have-the-cheapest-solar-farm-ever-built/>
- [5] CERN COURIER, "A recipe for sustainable particle physics" 11 March 2020, <https://cerncourier.com/a/a-recipe-for-sustainable-particle-physics/>

Primary authors: Prof. DUEREN, Michael Johannes (Justus-Liebig-Universitaet Giessen (DE)); Mr HAMPP, Johannes (ZEU, Univ. Giessen)

Presenter: Prof. DUEREN, Michael Johannes (Justus-Liebig-Universitaet Giessen (DE))

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