

Desertec Tunisia



Context:

In the sands of North Africa, the DESERTEC Foundation's vision for a future where the world's deserts supply clean and sustainable energy to the whole of humankind is beginning to take shape. That future begins in the Saharan deserts of Tunisia with a project called "TuNur".

Using thousands of mirrors to track the Tunisian sun to use its heat to generate electricity, the TuNur Concentrating Solar-thermal Power (CSP) plants will ultimately produce 2 Gigawatts of electricity, roughly double the average nuclear power plant. Project developer Nur Energie and its Tunisian partners, led by Top Oilfield Services, plan to construct the project in several phases. The first phase is expected to begin in 2014 and the first electricity exports are set to reach Europe by 2016 via a new low-loss transmission line to Italy. The project has been designed to reduce water requirements to a bare minimum by using a dry, air-based cooling system.

The DESERTEC Foundation is endorsing TuNur and believes that it can serve as a blueprint for the development of further wind and solar projects in the Sahara. The reasons for this are:

The project will focus on maximizing local value creation in Tunisia. It provides the country with the opportunity to begin building a new industrial sector, bringing investment, jobs, and thus economic development. Investment will mainly benefit the southern and interior parts of the country, which look set to become a priority area for development for the Tunisian government. The number of jobs created directly and indirectly over the project's construction and operational period will come to around 20,000. As well as relying on local partners and management for project development and local engineering firms, the project will also create new manufacturing industries. For example, around 825,000 flat plate mirrors and steel structures known as heliostats will be needed for the 2 Gigawatt project and can be manufactured locally.

TuNur demonstrates DESERTEC's conviction that investing in renewables where those energy sources are most abundant is the most effective way of protecting the climate. In Tunisia, space is more abundant and the solar radiation is up to three times that of Central Europe. Plants built in such optimal locations produce more electricity and have the potential to replace more conventional, carbon-intensive forms of power. TuNur can provide predictable power production to electricity grids with fluctuating energy sources such as photovoltaic and wind power. Using heat storage tanks, TuNur can produce electricity on demand day and night, delivering enough clean electricity to power 700 000 European homes.

Movie



Problem: graphical analysis

Time	P (MW)
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	825
9	1710
10	1920
11	2000
12	2000
13	2000
14	2000
15	2000
16	2000
17	2000
18	1960
19	1920
20	1920
21	1920
22	1730
23	930

- 1) Calculate from the graph the energy delivered in one day. (By performing a graphical integration)
- 2) Why is there no power before 8 am ?
- 3) How do you get energy after 19 pm? (read the context)

