

# Solar Updraft Tower In Al-Ain

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## Situation

In recent years, the UAE has taken significant steps to protect the environment, such as building shams solar tower in Abu-Dhabi. The main source of air pollution in the UAE is the oil and gas industry, followed by the power and transportation sectors. [1] So, our main purpose is to find way to produce an environmentally friendly power source, such as power plants.

## Problems

- The concentration Solar Power Potential in the UAE is much less than many other countries. (Fig. 1)
- UAE has a very humid weather
- Non-renewable energy sources will approximately wear off within the next 14 years. [2]
- The price of non-renewable source will continue to rise, as they become no longer as easy accessible source
- The United Arab Emirates is the 7<sup>th</sup> highest country in terms of energy consumption per capita.[3]

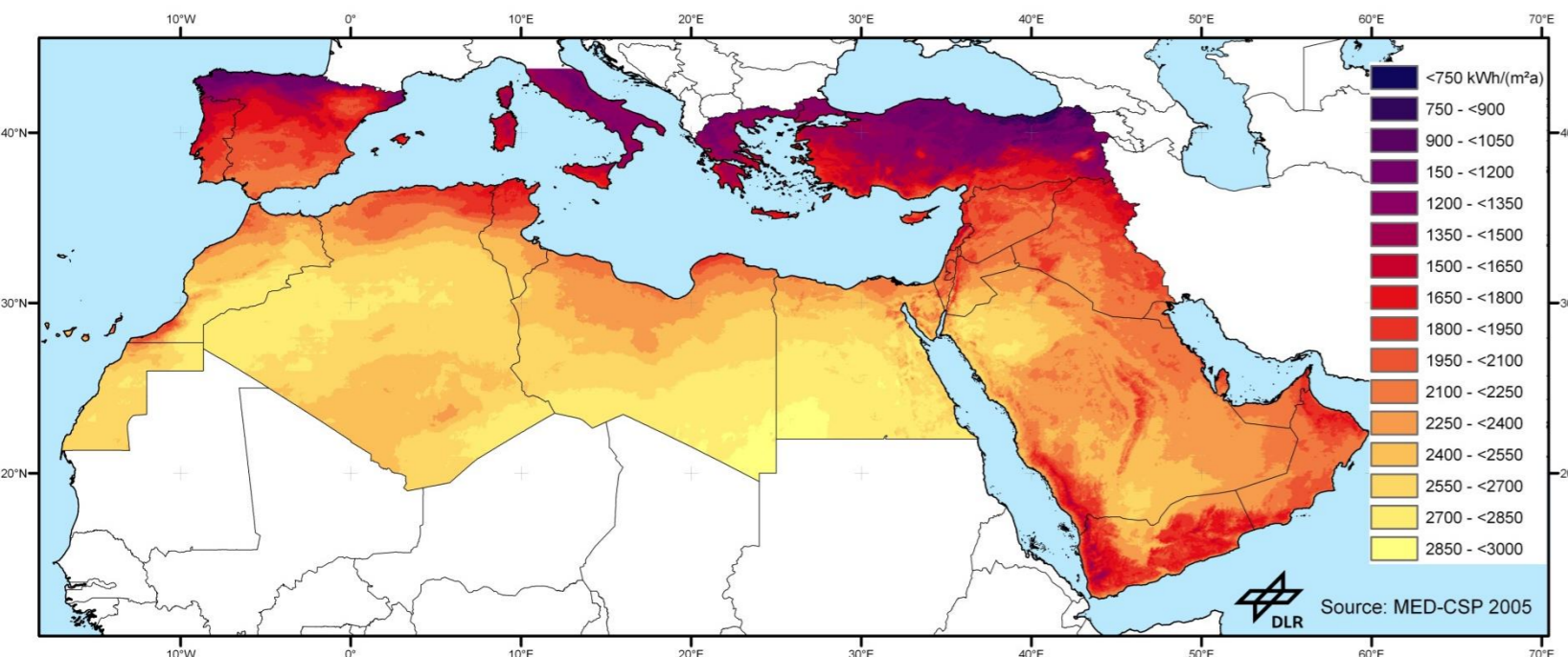


Figure1: Global concentration Solar Power Potential [4]



Figure 2: Energy consumption statistics in the UAE [5]

## Solution

To solve this problem we have to build a Solar Updraft Tower in Al-Ain. Solar updraft tower: It converts the sun rays to electrical power through many processes. (Fig 3)

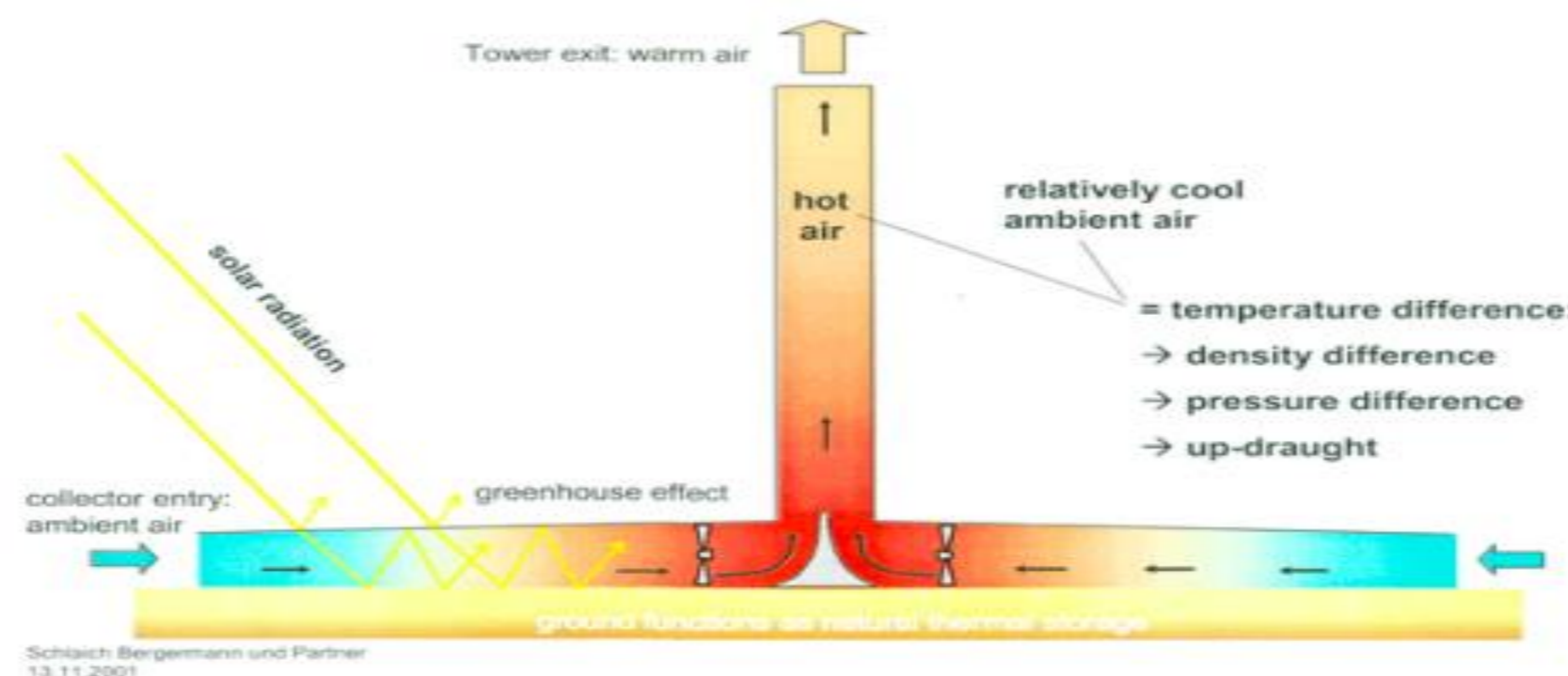


Figure 3: steps of the process [6]

Collectors: Heat up the flowing air.  
Turbines: Converts the mechanical energy to shaft work.  
Generator: Converts the shaft work to Electrical Ac power.  
Converting the alternating current (AC) to direct current (DC).

## Evaluation

Comparing the Solar Up Draft tower with a regular power station:

Advantages:

- decreases the air pollution and the emissions
- works efficiently even during the night
- provides the loads with the needed power, efficiently

Disadvantages:

- Regular power stations are more efficient
- Solar panels are easily broken
- Large surface area required

## Conclusion

Although power stations that use fuels and gases are more efficient than our Solar Updraft Tower, our design still can provide the loads with the needed power. It's true that our project is mainly located in Al-Ain and it is only one tower in one specific area, however it will have a huge positive effect on the environment.

### References:

- [1] <http://www.globaltrade.net/f/market-research/text/United-Arab-Emirates/Environmental-Technologies-Pollution-Control-Equipment-in-UAE.html#>
- [2] S. Carty, "Non renewable resource," LoveToKnow Corp, P.3, December 22, 2013. [online] Available: [https://greenliving.lovetoknow.com/Non\\_Renewable\\_Resources](https://greenliving.lovetoknow.com/Non_Renewable_Resources). [Accessed: December 10, 2014]
- [3] <http://gulfnews.com/business/economy/uae-s-per-capita-energy-consumption-among-the-highest-1.1171313>
- [4] <https://jime.ieej.or.jp/htm/english/2012/0727.htm>
- [5] <http://www.tradingeconomics.com/uae-s-per-capita-energy-consumption-kwh-wb-data.html>
- [6] [http://green.blogs.nytimes.com/2010/01/06/new-life-for-solar-updraft-technology/?\\_r=0](http://green.blogs.nytimes.com/2010/01/06/new-life-for-solar-updraft-technology/?_r=0)