

Possible Cooperation between Arab and European Countries in Energy, Water and Environmental Issues

Abstract

The Arab countries, in general, lack energy and water. The average annual rain level in Arab countries is from 5 to 45 mm while in European countries it ranges from 200 to 400 mm. The total internal water reserve is only 100 km³ for Arab countries, while in Europe it may exceed 400 km³; bearing in mind that the world internal water reserve is 43764 km³. Nearly more than 50% of the Arab countries have water availability per capita less than the absolute water scarcity level (200 m³/capita/year) while the rest, except Iraq, are in water scarcity threshold level (1000 m³/capita/year) [1]. In Europe, the per capita water resource is as high as 85478 m³/year (Norway). In fact among the countries with least water resources [2] we have 13 Arab countries (Kuwait, UAE, Qatar, Libya, Saudi Arabia, Jordan, Bahrain, Yemen, Oman, Algeria, Tunisia, Egypt, Morocco and Palestine) where the per capita water resource is ranging from 10 m³/year (Kuwait) to 971 m³ year (Egypt).

On the other hand, the electricity consumption per capita in West Europe per year has never been less than 4000 kWh in 1999 while it is as low as 46 kWh in Sudan. In the majority of the Arab countries, except Arabian Gulf countries (GCC), each person consumes annually only 1200 kWh electricity (on average)! Probably more than one million of Arab citizens (out of ~300 million) have no access to electricity [2].

Furthermore, the European OECD countries are emitting 3800 Mt of CO₂, which is 15.2% of the global emissions (25000 Mt). In 2001, the share of global CO₂ emissions from Middle East is only 4.8% – compared to North America (27.7%), East Europe (12.6%), West Europe (15.6%), Africa (8.8%), central and South America (4.1%), Far East and Oceania (31.5%). According to latest reports, Germany has managed to reduce emissions of CO₂ by – 20%

(compared to the base year), U.K. – 12.5%, Italy – 6.5%, France 0%, Russia – 6%, USA – 7%, Japan – 6% [4]. Moreover, according to Swiss Re [4], in its report on Natural catastrophes and man-made disasters in 2003, nearly 36 natural accidents have occurred in Europe with 424 victims wasting US\$ 2173 million (11.8% share) while in middle east Asia 178 accidents have occurred with 51894 victims costing US\$ 1447 million (7.8% share).

Therefore, cooperation for a mutual benefit between Arab and European countries in the field of energy production using the abundant solar radiation is favorable.

Clean and sustainable energy could be exported to Europe in a form of High Voltage Potential, produced in Arab countries using solar thermal or photovoltaic technology. A part of the produced energy from renewable sources can be used for water desalination in Arab countries. For 65% of water resources are politically in debate with non Arab countries – which may ignite Water Wars.

The Arab countries are characterized and blessed with abundant direct solar radiation, i. e., ranging from 4.1 kwh/m²/day, Mosul, Iraq to 6.7 kwh/m²/day, Nouakchott, Mauritania [5,6]. Even more, the maximum recorded annual mean sunshine duration ranges from 7.5 hrs, Tunis, to 10.7 hrs, Egypt. These figures are larger by, at least, 3 times compared to European Countries [5].

The temporal behavior of electricity demand in Arab and European countries is found to complement each other. Therefore, this vision of cooperation, will enhance the renewable energy utilization worldwide and it will increase to be more than the current level, i. e., 13.8% from the total primary energy supply, where 2.3% come from hydro, 11.0% from com-

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bustible renewable and waste, and only 0.5% are covered by solar (0.039%), wind (0.026%), tide (0.004%), and geothermal (0.440%) sources. The solar power market is already growing, in year 2000 by 1000 MW, for instance, and is expected to be 14000 MW by 2010 and up to 70000 MW in year 2020 [3]. This, of course, will minimize the cost per watt per each renewable energy source, especially solar thermal and photovoltaic ones.

References

- [1] ESCWA, Review of Sustainable Development and Productivities, issue no.1, United Nation, New York, 2003.
- [2] Human Development Report, UNDP, New York, 2002.
- [3] The World Almanac, World Almanac Books, New York, 2004.
- [4] Global Emission Newsletter, Vol. III, No.4, April 2004.
- [5] W. E. Alnaser, et al, First Solar Radiation Atlas for the Arab World, Renewable Energy Vol. 29, 1085-1107, 2004.
- [6] ESCWA, Energy Options for Water Desalination in Selected ESCWA members countries, United Nation, New York, 2001.