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FUTURE OF THE SOLAR POND RESEARCH AND APPLICATION

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The Salt Gradient Solar Pond (SGSP) which is considered as the most important type of the solar pond has three clear different salinity layers of saline water solution: the upper convective, gradient conduction and the storage convective zones. The solar radiation is collected as heat at the storage zone with efficiency of about 25% where the gradient conduction zones is considered as natural insulated zone. The SGSP can be considered as one of very optimistic solutions to the energy and environmental problems. It is cost effective, easy to construction and operation, no heat storage required and environmental friendly. Extensive theoretical and experimental researches have been done since around sixties of the last century. Excellent agreement between the theoretical and experimental results is obtained. Many SGSP from few square meters to 210000 square meters have been constructed in different places in the world. It is concluded that the SGSP has high potential for different applications particularly for space heating and desalination throughout the year. Computerised design tools are obtained to design the solar pond required for any required application. Temperature up to 100°C can be obtained at hot climates and up to 80°C at cold climates. But the main problem of the SGSP is to keep the stability of the gradient zone all the time, so that saline water solution and fresh water need to be injected at the storage and upper zones respectively continuously. To avoid such problems solar pond without salt gradient are developed such as solar pond in which the water is covered by Gelatine, Paraffin, or other cleared materials where interested results are obtained. For future, it is suggested that large areas of SGSP need to be constructed for different purposes for the desalination purpose. Also, to continue with the extensive theoretical and experimental research on solar pond without salt gradient, even solar pond probably cannot compete with the cost of the conventional energy due to the low energy prices at the time being, but the solar pond can be one of very optimistic solution to the sever environmental problem which is facing the world. All these aspects would be discussed through this paper.

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