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## Numerical Investigation of the Crosswind Effects on the Performance of a Hybrid

### Cooling-Tower-Solar-Chimney System

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#### Abstract

The hybrid cooling tower solar chimney is a hybrid system capable of simultaneously dumping waste heat from a coupled thermal power plant and generating electricity from the self-induced updraft. To investigate the influences of crosswind and ambient pressure on the system's thermal performance, a three dimensional model that considered the ambience was developed. Numerical analysis results indicated that the self-power-generation capacity of the HCTSC system decreased with the increasing crosswind velocity, reaching its minimum when the crosswind velocity reached 8 m/s. On the other hand, the turnabout for the heat dissipation capacity was 4 m/s, below which the heat dissipation rate decreased with the increasing crosswind speed and above which it did the reverse. A further

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