

# Performance Evaluation of a Solar Chimney at the Presence of Cold Inflow

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## Abstract

Natural draft and forced draft chimneys are used in many industries to remove dust and dirt, hot gases, and air from the process side to the atmosphere. Among them, the natural draft chimney is operated because of temperature difference between process side and ambient which is known as buoyancy force or stack effect. The process of flow is continuous if the buoyancy or stack effect is present. Solar chimney is a natural draft chimney that is used to generate electricity from solar energy; therefore, solar chimney is also known as solar updraft system. It is an economical and environmentally friendly system to generate electricity. It is also used as ventilation for houses or passive cooling for space. There are numerous works that have been found which discuss the enhancement of solar chimney power plant efficiency. The work also includes the applications of solar chimney and feasibility study of hybrid systems. The researchers used experimental and simulation models for the study of solar chimney performance and its structural design. The performance of the solar chimney model is measured experimentally and theoretically at the presence and absence of cold inflow. It is found that cold inflow may reduce performance of the solar chimney by about 30 to 40%.

**Keywords:** Solar Chimney, Natural Draft Chimney, Renewable Energy, Solar Energy