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Concentrating Solar Energy for Steam Generation and its Application in Mega Kitchens

Gangesh Chawla, Pushpal Tayal, J.P. Kesari

Delhi Technological University, Delhi

India is vast country with many mega kitchens where cooking for large number of people is done. This requires a lot of fuel to burn to cook food on daily basis. Most large kitchens use LPG as fuel.The same can be achieved using a Scheffler dish based heating system, wherein the conversion of water to steam would occur by using solar heat. This system would require large initial investment, but it would be compensated with a short payback period, leading to increased profits due to decreased operating costs. Also, this system would be non-polluting leading to less stress on the environment. The major drawback in the operation of this system is the availability of sun only in day hours, whereas the food is being cooked in the early morning before the sun and in the evening after the sun has set and also the rainy days. This could be tackled in two ways, First by integrating the Scheffler dish based heating system with the existing LPG supply, so that LPG can be used at times when there in not apt solar energy, and Second, by stimulating the storage of solar power. This paper presents three case studies where the Concentrated Solar Power system has been implemented for mass cooking used in BrahmaKumaris region of Mount Abu, Temple of Shirdi and Shrine of Tirupati. Estimation of daily savings of fuel and costs is also done. Finally, the annual saving is estimated on implementation of a hypothetical Scheffler-based heating system. The break-even point is calculated which shows that the recovery period would be small i.e. around 3-4 years leading to faster recovery of costs and reduced costs. This paper shows that the implementation and faster recovery of costs would lead to a reduction in operating costs and maintenance costs.

Direct steam age coupled is a promising sunlight based energy innovation, which can decrease the developing reliance on petroleum derivatives. It can possibly affect the force age area just as modern areas where critical amounts of cycle steam are required. Contrasted with ordinary concentrated sunlight based force frameworks, which utilize manufactured oils or liquid salts as the warmth move liquid, direct steam age offers an occasion to accomplish higher steam temperatures in the Rankine power cycle and to decrease parasitic misfortunes, accordingly empowering improved warm efficiencies. Nonetheless, its pragmatic usage is related with non-trifling difficulties, which should be tended to before such frameworks can turn out to be all the more financially serious. In particular, significant warm energy measures happen during stream bubbling, stream buildup and warm energy stockpiling, which are exceptionally intricate, multi-scale and multi-material science in nature, and which include stage change, flimsy and fierce multiphase streams within the sight of form heat move. This paper surveys our present agreement and capacity to anticipate these cycles, and the information that has been picked up from test and computational endeavors in the writing. Notwithstanding regular steam-Rankine cycles, the chance of executing natural Rankine cycle power blocks, which are pertinent to bring down working temperature conditions, are likewise thought of. This grows the concentration past water as the working liquid, to incorporate refrigerants moreover. All in all, critical advancement has been accomplished in this space, yet there remain difficulties in our ability to plan and to work elite and ease frameworks viably and with certainty. Of interest are the stream systems, heat move coefficients and weight drops that are capable during the warm cycles present in direct steam age frameworks, remembering those happening for the sun powered gatherers, evaporators, condensers and pertinent energy stockpiling plans during warm charging and releasing. A short diagram of some energy stockpiling choices are additionally introduced to rouse the incorporation of warm energy stockpiling into direct steam age frameworks.

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