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## Modified Approach of Total Site Integration for Energy Conservation: A Case Study of Sponge Iron Cluster

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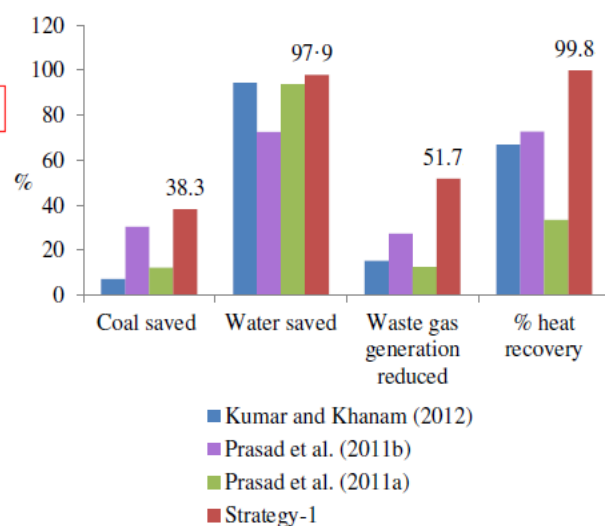
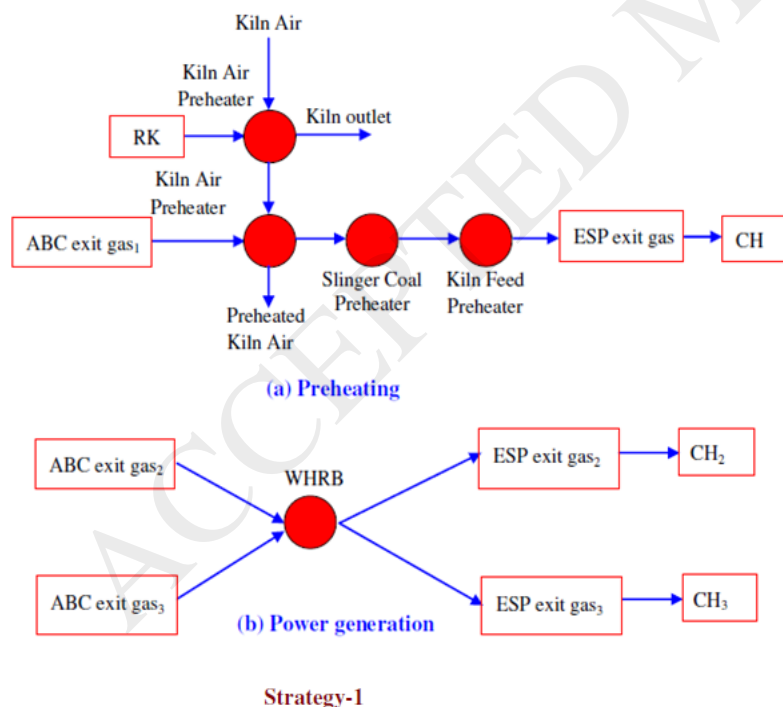
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### Abstract

In the present work, a modified approach to conserve energy in total site of plants of similar type is developed where conventional methods are not applicable. The approach includes iterative method, if utility and process streams are same, as well as non-iterative method, if these are different. Further, if coal is treated as utility and process streams, a revised model to compute its consumption is also proposed. To illustrate the new approach a cluster of three sponge iron plants are considered where two different strategies are proposed. Results show that reduction in coal consumption, predicted for Strategy-1, is higher than that of Strategy-2. Strategy-1 recovers 99.8% of waste heat available in the modified total site. Thus, through Strategy-1 total amount of energy wasted in the cluster is reduced from 43% to 7.6%. Along with this, Strategy-1 reduces waste gas emissions significantly while making sponge iron cluster more environment friendly. Moreover, 97.9% reduction of water in total site is also observed using Strategy-1, which is an added advantage. Results are compared well with that of the published literature. Further, this approach can be applicable effectively in the site of similar plants irrespective of the operating condition.

### Graphical Abstract



Comparative analysis of Strategy-1 with published literature

### Key words

Energy conservation; Total site integration; Iterative approach; Sponge iron cluster

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