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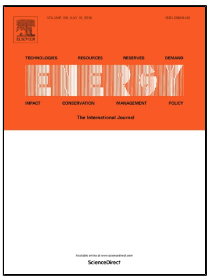

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An energy hub approach for direct interplant heat integration

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Abstract: This paper presents an energy hub approach for direct interplant heat integration using process streams. An energy hub is a geographical center where all process streams from different plants can integrate. Each stream is only allowed to remain in the heat exchanger networks (HENs) in its original plant or be transported into the energy hub to exchange heat with the streams from other plants. Thus, interplant heat integration occurs only in the hub so that the complex pipelines between the plants can be largely simplified. Moreover, when some plants involved in the interplant heat integration are shut down, by using an energy hub, the remaining plants can be easily re-matched in it. A novel superstructure is presented for direct interplant heat integration using an energy hub. We establish a mixed integer nonlinear programming (MINLP) model with an economic objective to make holistic trade-offs between energy saving and capital investments. A literature example is illustrated to demonstrate the capabilities of our hub approach for direct interplant heat integration. Different shutdown scenarios are considered in the case study, and a flexible multipurpose network in the hub is obtained that satisfies the heating and cooling demands in all of the shutdown scenarios.

Keywords: Interplant heat integration; Energy hub; HENs; MINLP model; Shutdown scenarios;

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