Production plant energy efficiency improvement and CO2 emissions reduction through waste heat recovery

Record number : OPR-1034

Overview

RESEARCH DIRECTION

Mikhail Sorin, Professeur - Department of Mechanical Engineering

INFORMATION

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie chimique et de génie biotechnologique
Département de génie mécanique

LEVEL(S)

3e cycle

LOCATION(S)

Campus de Sherbrooke

Project Description

Methodology
1. Data collection of the existing factory. The following are the key data: flow rates and temperatures of all liquid and gas streams in the plant, quantity of heat and the temperature of waste thermal energy sources, for example presses, and the annual consumption of natural gas and electricity for the plant.
2. Targeting. This procedure quantifies the minimum annual energy consumption required by the factory and determines the total surface area of direct and indirect heat exchangers that must be added to the plant's existing heat exchange network. The targeting procedure is based on the intermittent pinch method, developed by the group of Pr. Sorin of the Université de Sherbrooke.
3. Generation of topologies and design scenarios. i.e. heat network retrofit of the existing plant. The intermittent pinch method will also make it possible to define modifications to the existing heating network and allow for the integration of complementary equipment, encompassing scenarios for the arrangement of hot and cold currents (the topology of the energy system), making it possible to meet the targets defined in step 2 in one year.
4. Thermo-economic optimization allowing the choice of topology and determining the optimal heat transfer equipment, including dimensions, to be added to the existing network. The objective function to be minimized is a net present value which essentially depends on both the investment costs of the equipment to be added as well as the energy consumption.

Discipline(s) by sector

Sciences naturelles et génie

Génie chimique, Génie mécanique

Funding offered

Yes

$ 40 000

Partner(s)

Bridgestone

The last update was on 23 October 2025. The University reserves the right to modify its projects without notice.