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Retrofit of a Multiple Operating Case Heat Exchanger Network using Simulated Annealing

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Goals

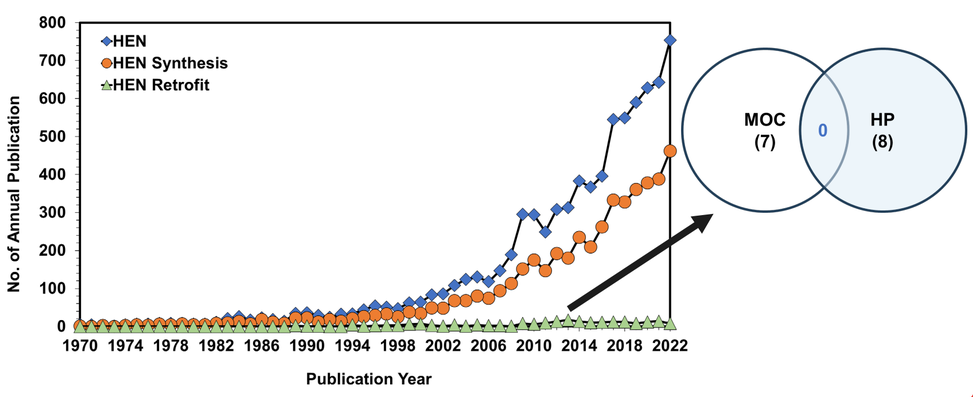
- To develop a mathematical programming method for retrofit.
- To integrate heat pump (HP) and thermal energy storage (TES).

Problem

Deep decarbonization for all sectors, can be achieved by **increasing energy efficiency measures (EEMs)**.

Retrofitting a process is challenging due to additional constraints.

Limited studies are found on MOC HEN retrofit, especially with HP integration.



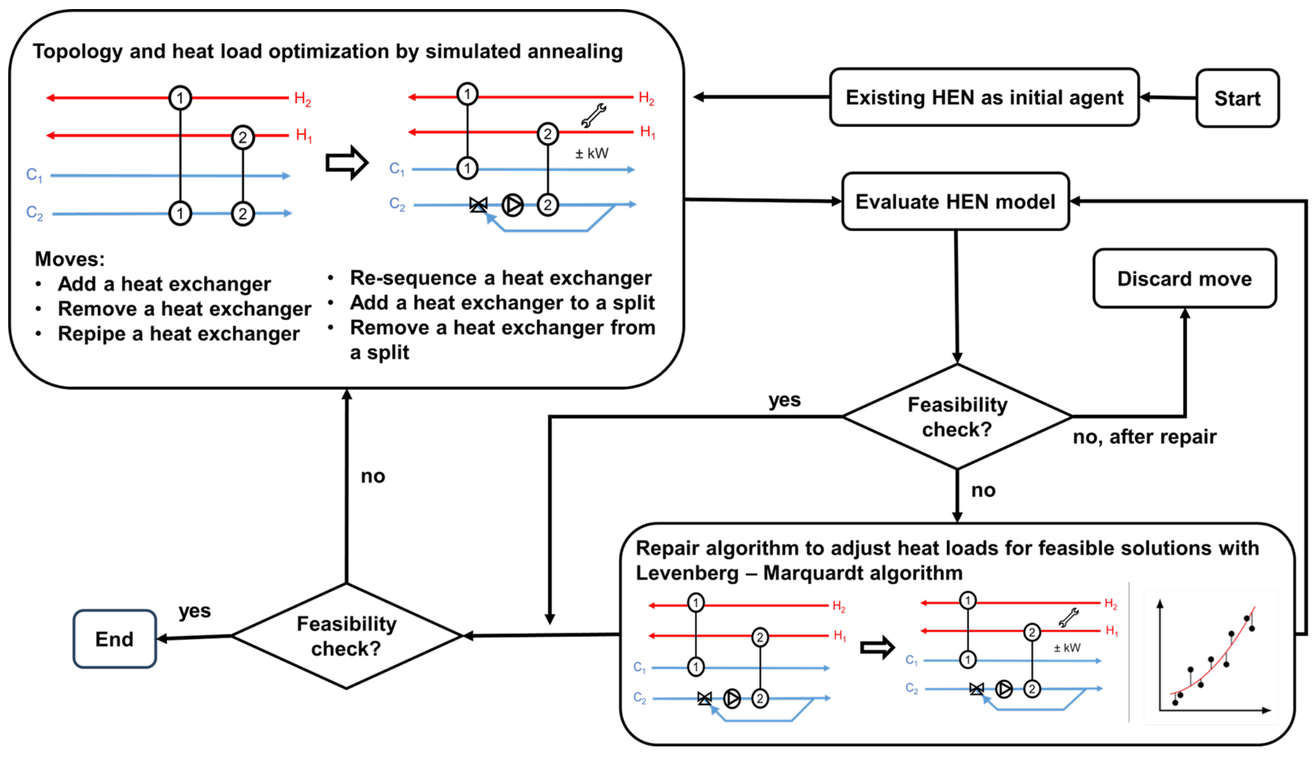
Case Study

Case study for MOC HEN retrofit (Zweifel Pomy-Chips AG)

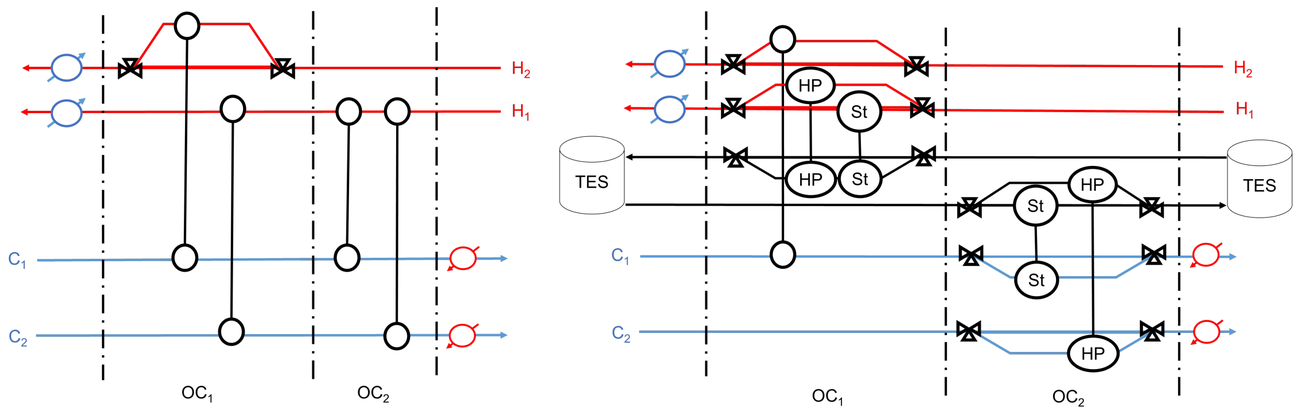
Production for regular and cractiv chips.

Methods

- **Simulated annealing** for topological optimization and **repair algorithm** for feasibility checks for HEN with and without HP/TES integration.



- **Expected results:** Optimal HEN structures with the total annual cost (TAC), greenhouse gas (GHG) emissions, and computational time (CT).



without HP/TES | with HP/TES

Conclusions

- Retrofitting existing processes is necessary to achieve the target net zero carbon emissions.
- In dealing with complex HEN problems, simulated annealing can provide near-optimal solutions at a feasible time.

Core partners

Associate partners

Cooperative partners: