Optimization of Solar-Assisted Absorption Cooling Systems
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Objective
Optimization of environmentally friendly solar-assisted single-effect water/LiBr absorption cooling systems using West Lafayette, Indiana Weather data.

Approach
- Multi-objective optimization based on mathematical programming.
- Introduces Pareto optimality.
- The optimization problem is formulated as a bi-criterion nonlinear programming problem (NLP) that seeks minimization of the total cost and the associated environmental impact of the cooling system.
- Life cycle assessment identifies and locates the environmental burdens.
- The optimization tools generate design alternatives and select the best based on the environmental and total cost constraints.

Impact
- The decision maker is able to evaluate all optimal trade-off designs that help him/her to make rational decisions.
- Provides quantitative environmental impact comparison of the cooling system designs.

Selected Publications

Solar thermal collectors:
- Flat plate collectors (FPC)
- Evacuated tube collectors (ETC)
- Compound parabolic collectors (CPC)

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Solar assisted cooling

Pareto Designs for each Collector

STC = System total cost
GWP = Global Warming Potential

The cooling subsystems GWP for Pareto design A, B, and C

Selected Publications