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Title: Using latent heat from a water purification system to improve the performance of an absorption heat transformer

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PRESENTATION CONTENT

- Introduction
- Methodology
- Results
- Conclusions
- References

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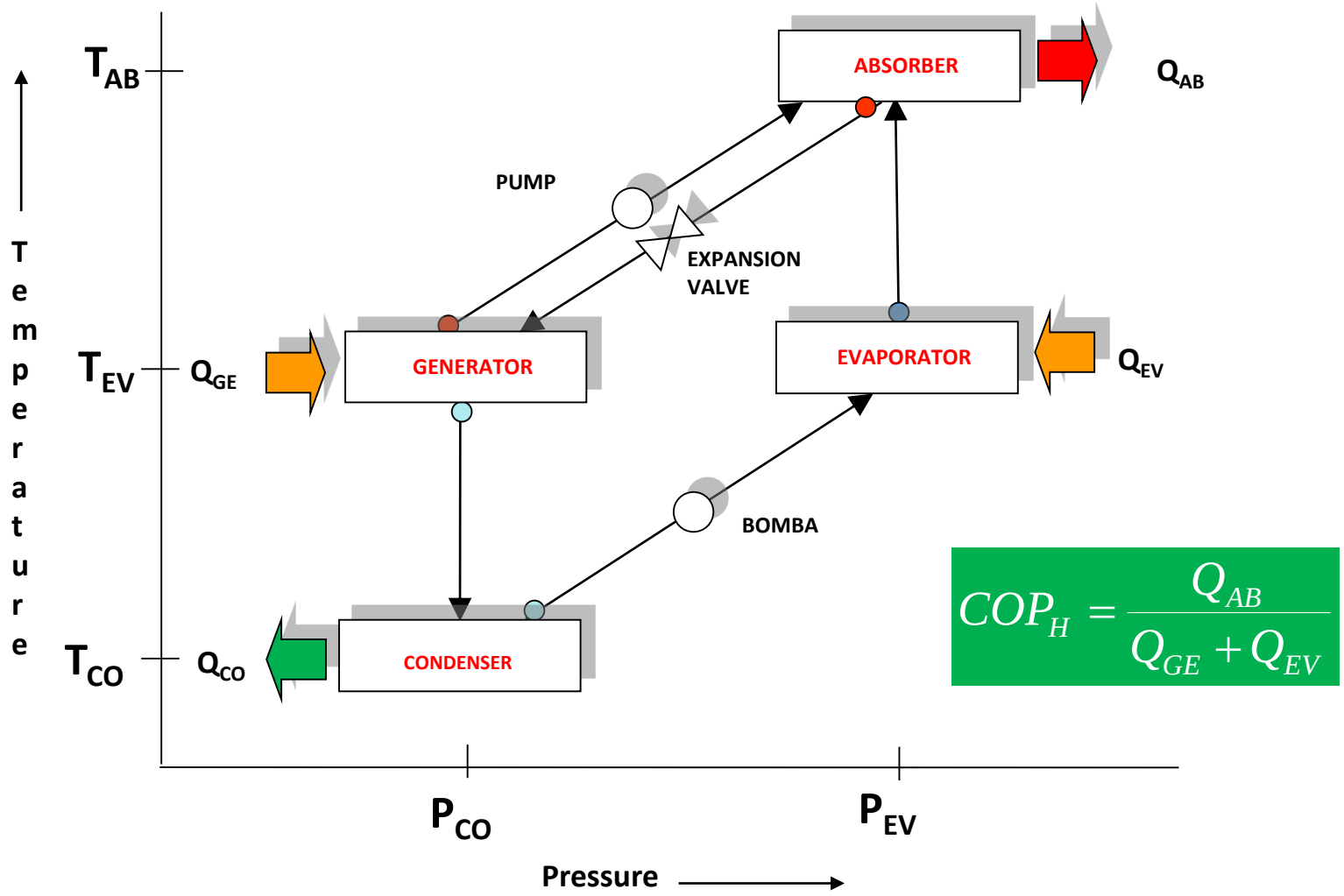
INTRODUCTION

Absorption Heat Transformer

They use a small amount of mechanical energy, which is required for process pumps	The working fluids they use have no adverse effects on the environment	Its main components are not sophisticated, as in the case of compressors	They are easy to design, since it is only necessary to know the thermodynamic properties of the working mixture.

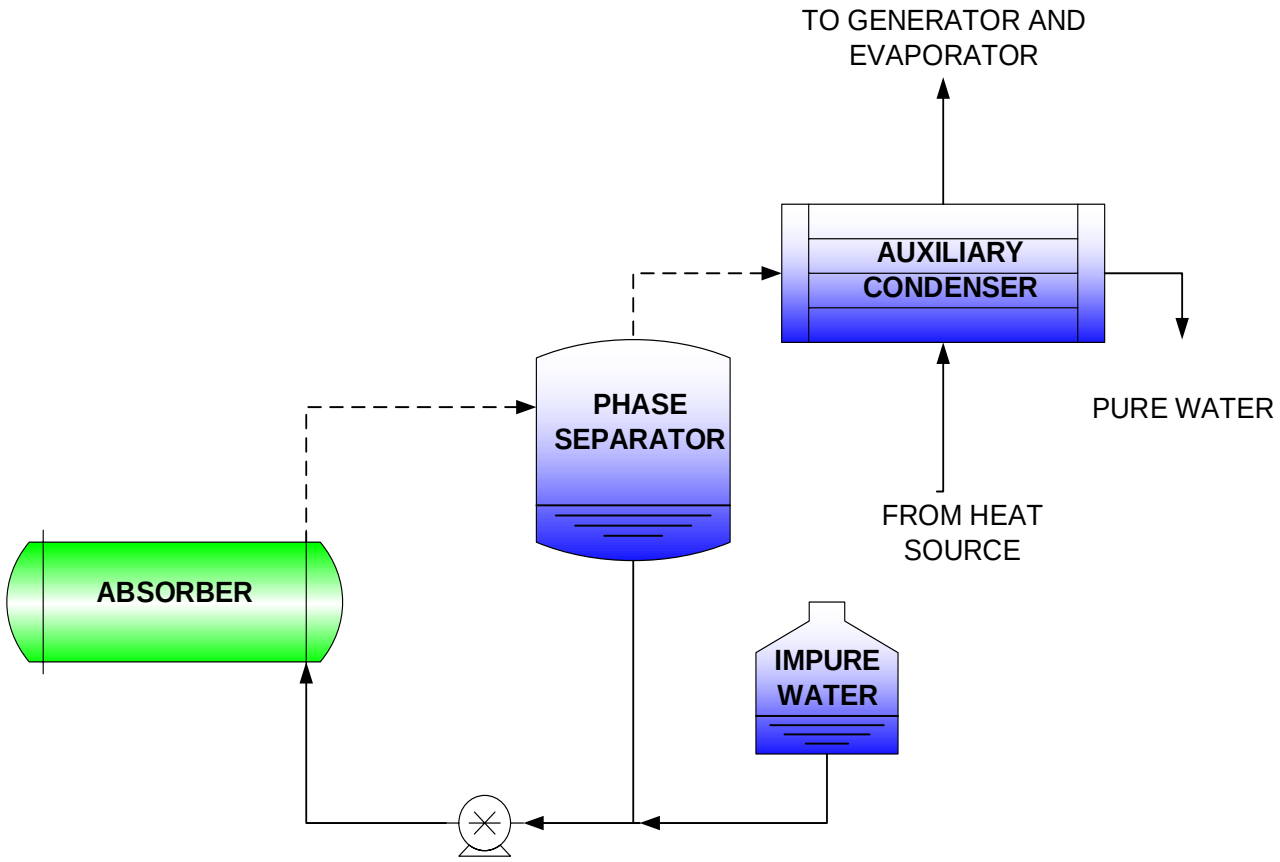
INTRODUCCIÓN

Absorption Heat Transformer Cycle

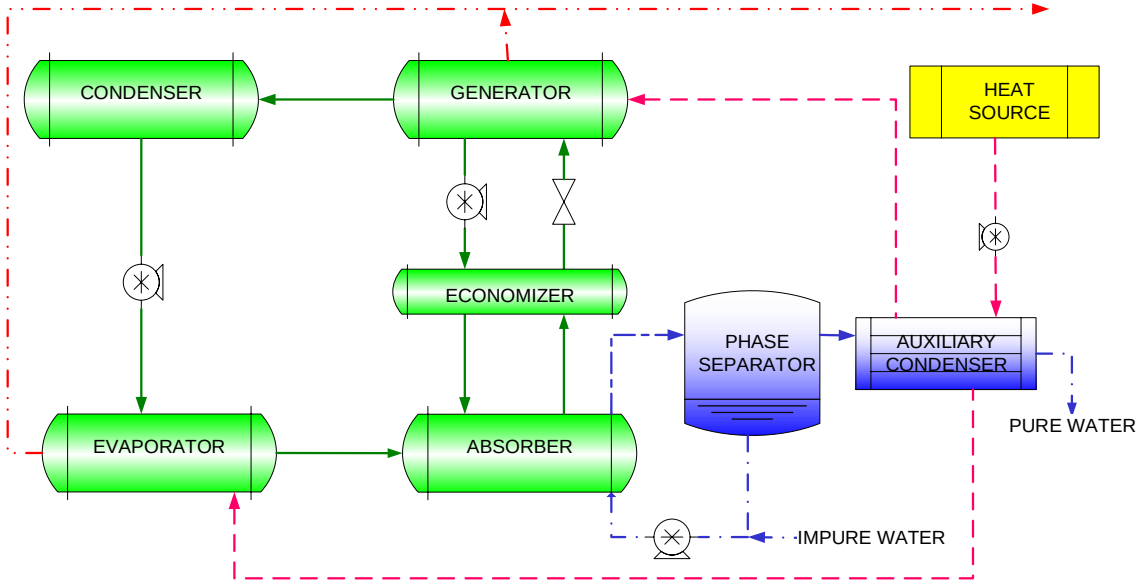


$$COP_H = \frac{Q_{AB}}{Q_{GE} + Q_{EV}}$$

WATER PURIFICATION PROCESS

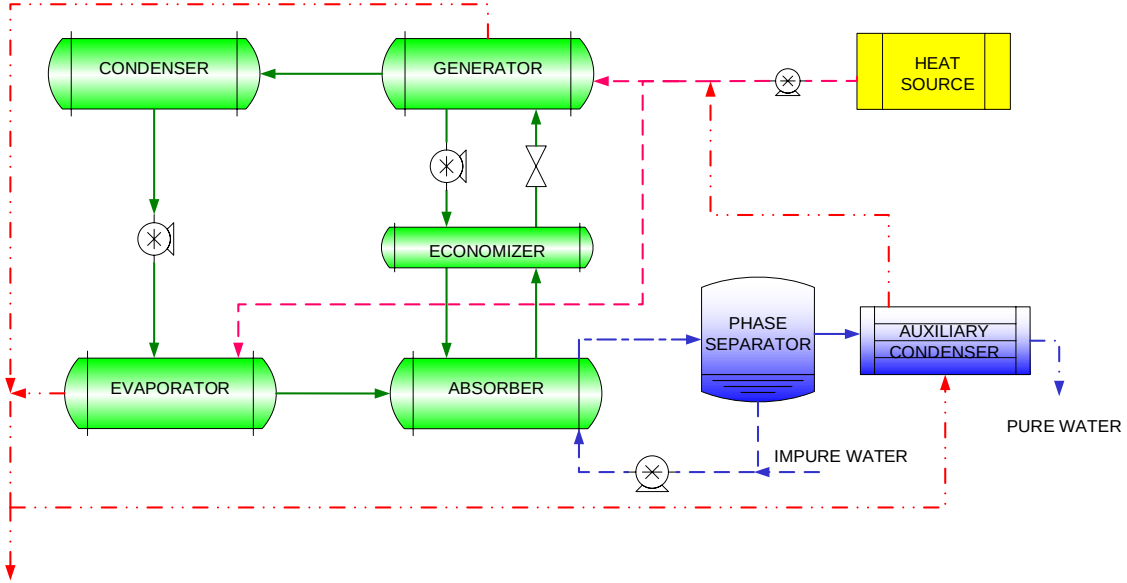


CASES OF HEAT RECYCLING



CASE I

CASE II



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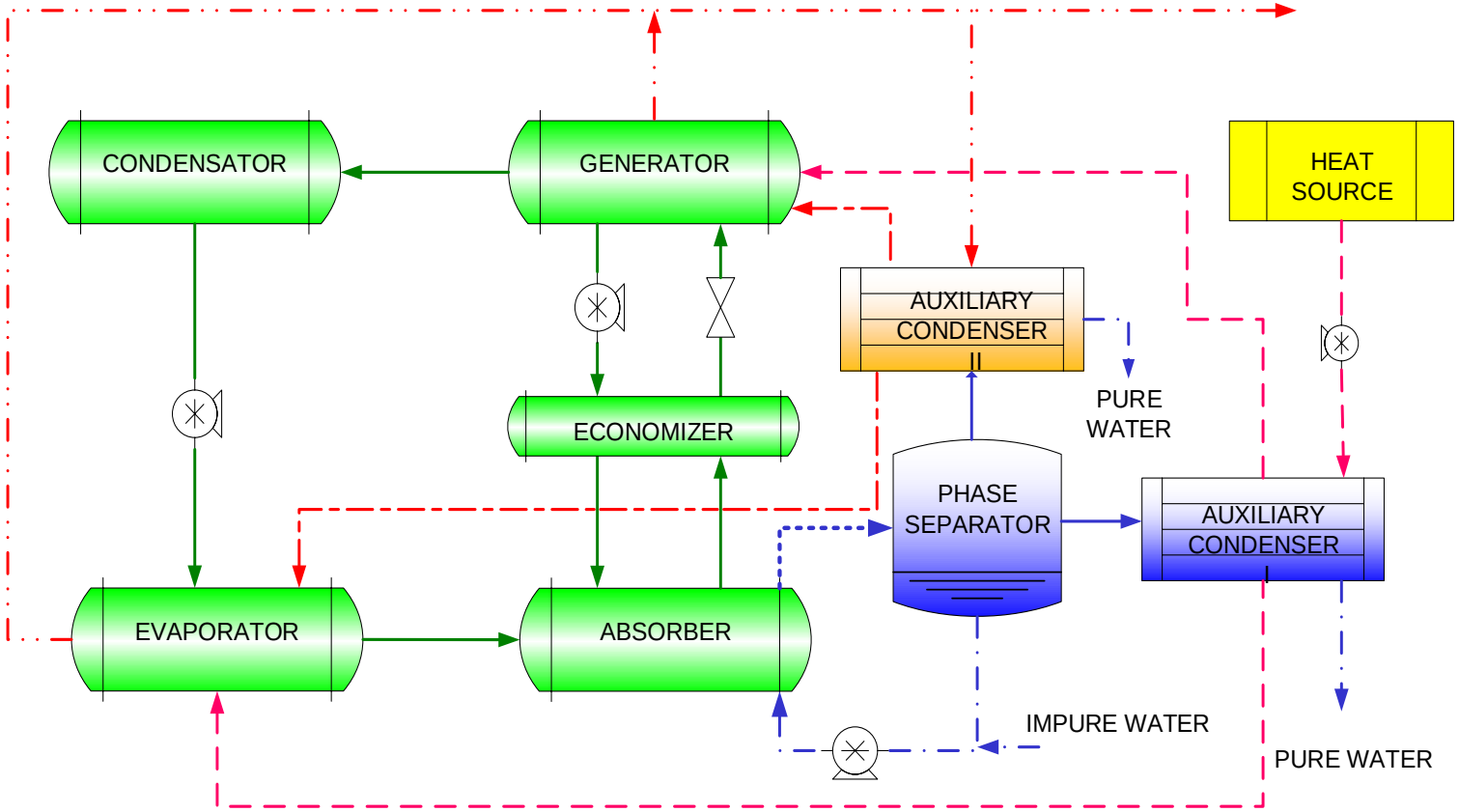
PROPOSAL: HEAT RECOVERY CONBINATION



METHODOLOGY

Amount of energy recycling to the AHT $Q_{REC} = \eta Q_{AB}$

Where η is defined as: η is a constant with a value of 0.877 $\eta = \frac{\Delta H_V}{\Delta H_V + \Delta H_S}$

Energy balance in the heat source $Q_{HS} = m_{HS} Cp \Delta T_{HS}$

Increased in a quantity ΔT_N $\Delta T_N = \eta COP_{ET} \Delta T_{HS}$

- New temperatures in the evaporator and generator $T_{EV,N} = T_{EV} + \alpha \Delta T_N$ $T_{GE,N} = T_{GE} + \alpha \Delta T_N$

New COP for combination recycling $COP_N = \frac{COP_{ET}}{1 - \beta \eta COP_{ET}}$

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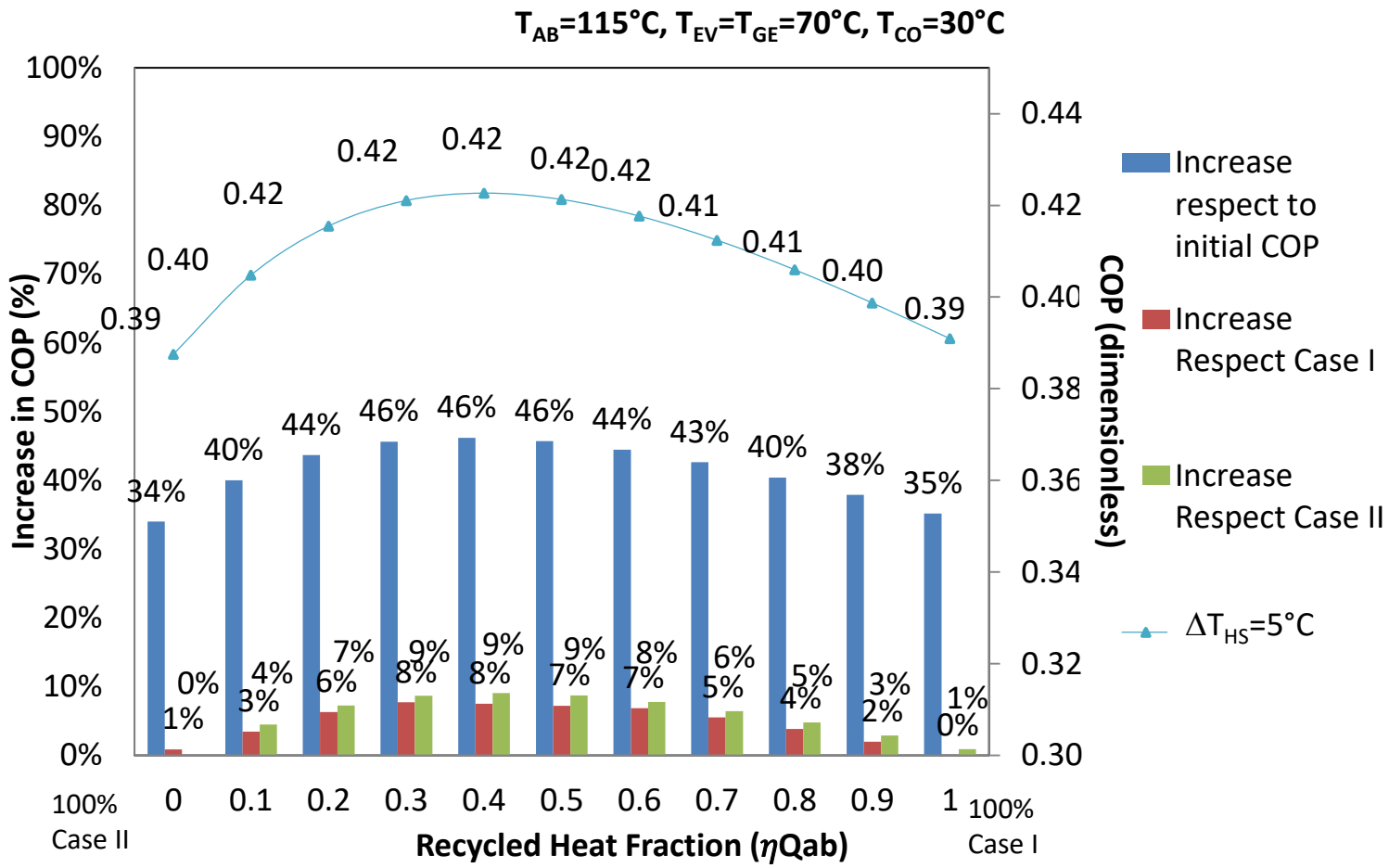
RESULTS



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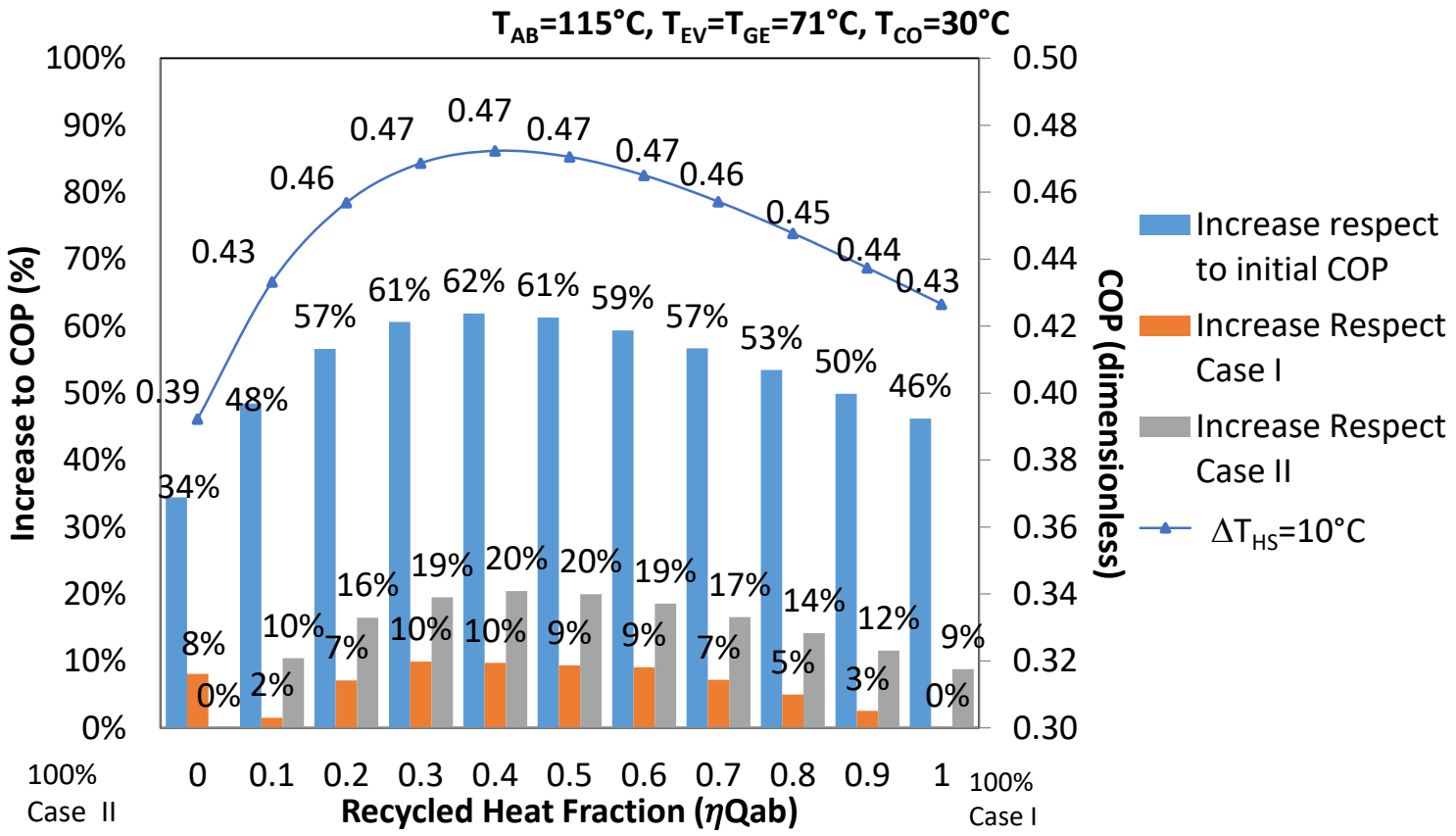
RESULTS



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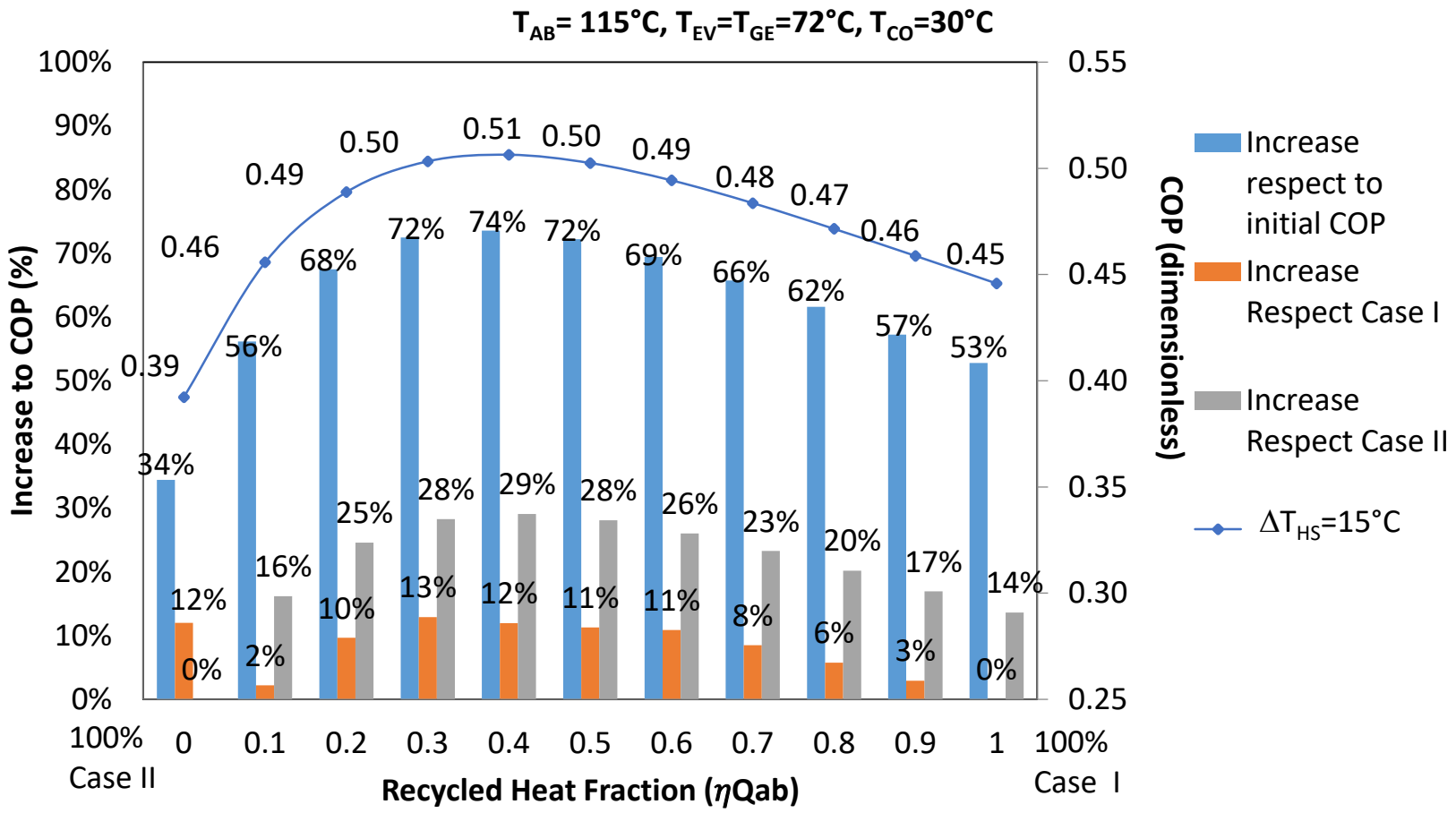
RESULTS



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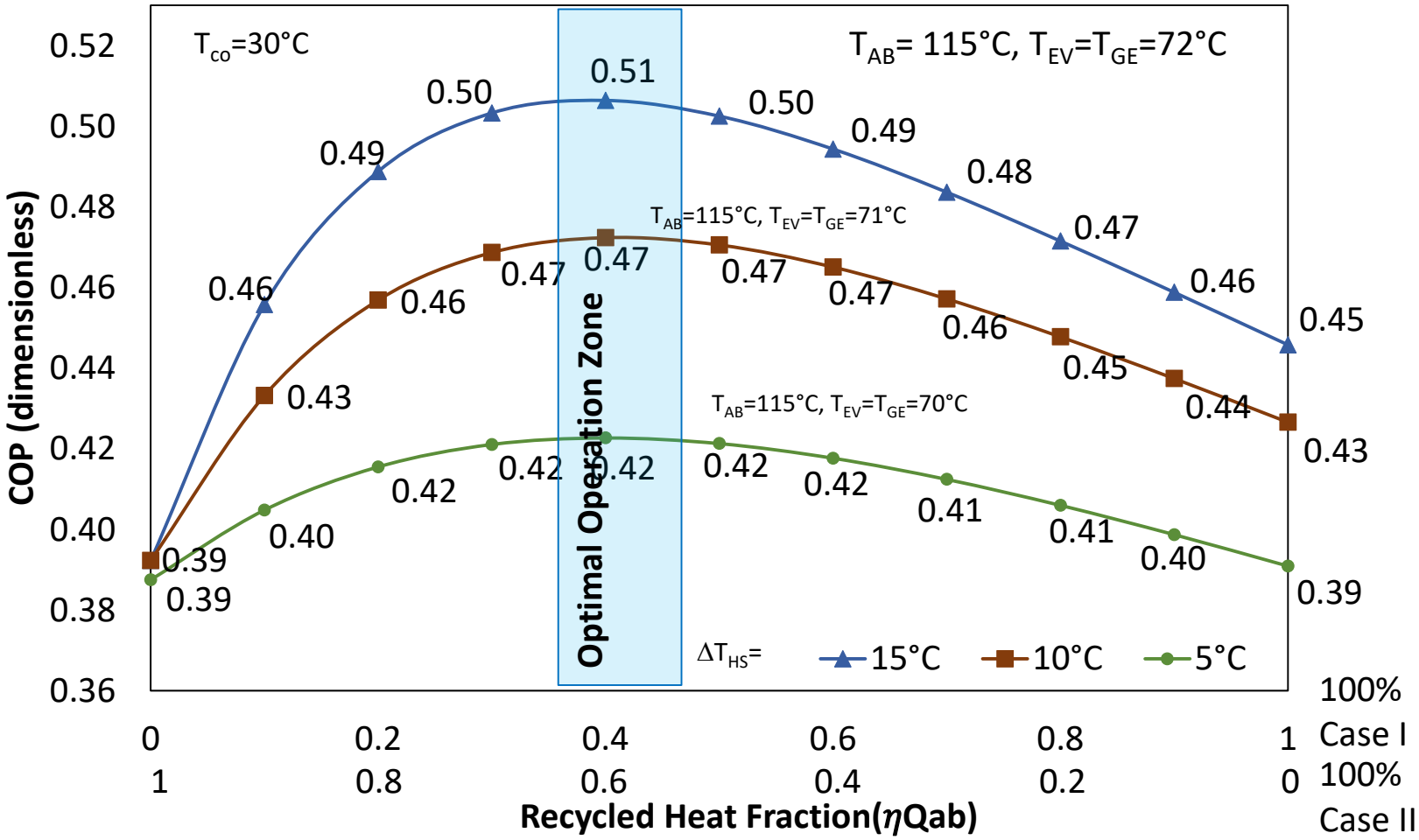
RESULTS



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CONCLUSIONS

1. Adding an auxiliary condenser II to the water purification circuit integrated to a thermal transformer increases the COP_H values

2. The COP_{WP} increases with the latent heat of the purified water, which depends on the quality of the impure water and the atmospheric pressure

3. When heat is recycled, COP increases from 46% to 74%.

4. Combining 40% to Case I and 60% to Case II is the best option

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