



**efeu**

Efficient Energy Use

# Integrated design and operation optimization of energy systems under dynamic conditions and uncertainties

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## Objectives

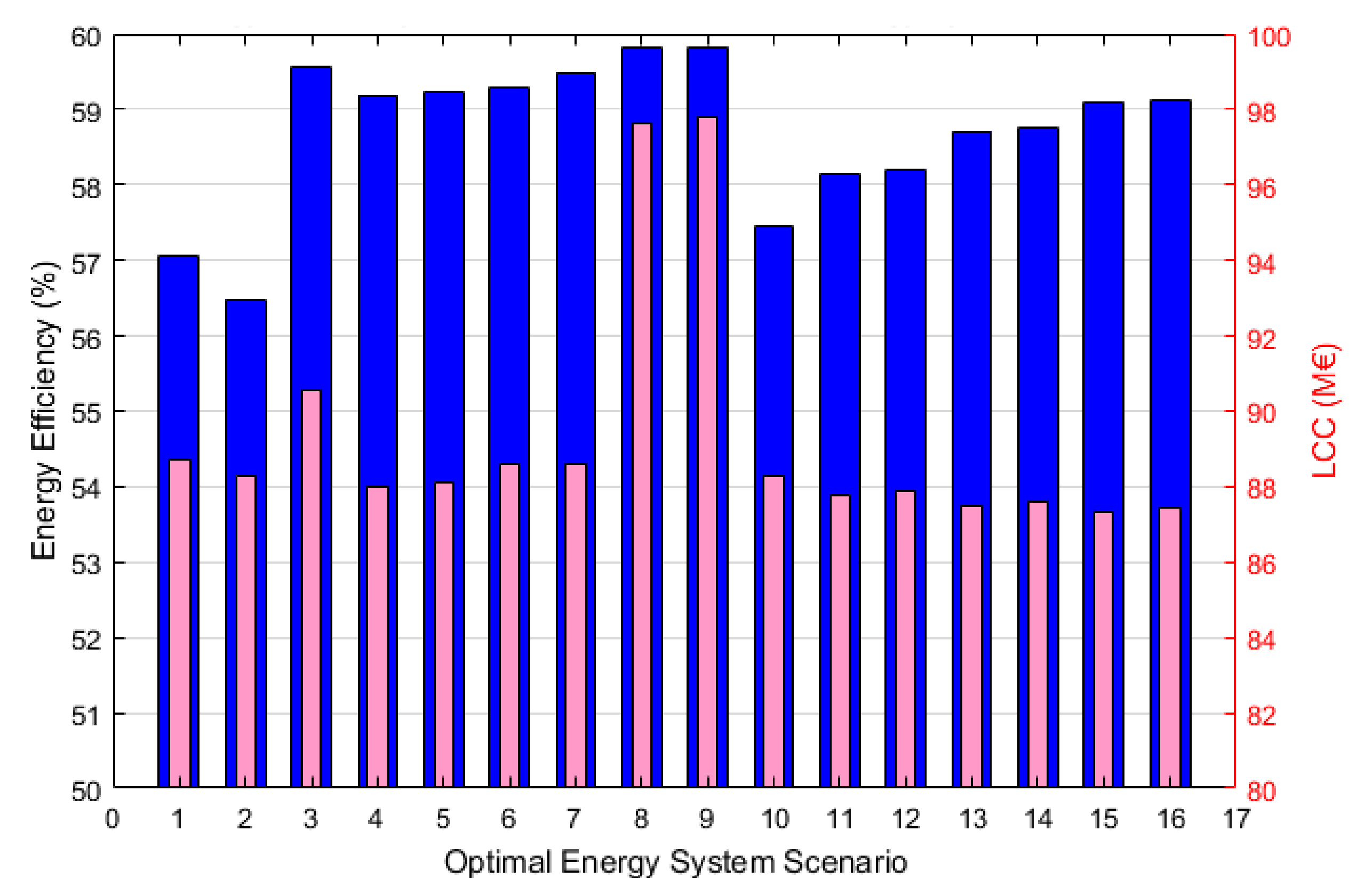
- To integrate and optimize the design and operation of general energy systems under dynamic conditions and uncertainties, focusing on **(waterborne and road) vehicle** applications.

## Approaches

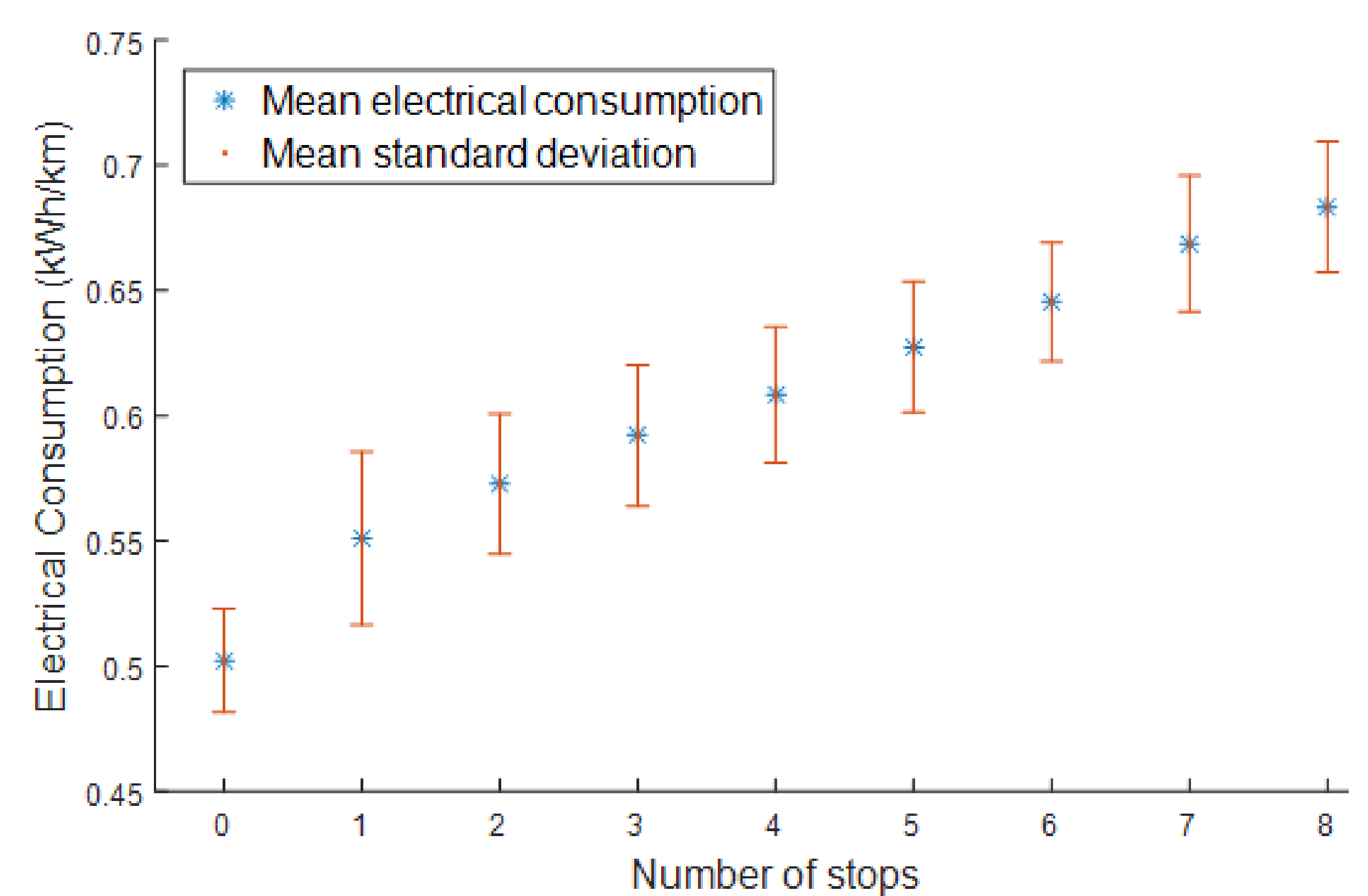
- **Dynamic multi-objective decision making (D-MODM)** platform for conceptual optimization of energy system design and operation
- **System-level energy flow simulation platform** to combine real dynamic operations and uncertainties into energy system design and operation
- **Data-driven statistical methods** to evaluate and improve the energy system design and operation in terms of operation cycles, component uncertainties, ...

## Potential Applications

- Full-scale dynamic simulation and optimization of energy system throughout their life cycles with respect to **energy efficiency, emission, and costs**
- Optimal energy system design, retrofit and operation
- Integrated vehicle electrification and hybridization
- Intelligent vehicle fleet management
- Statistical evaluation and improvement of vehicle energy systems



a) Evaluation and comparison of ship energy system design scenarios, w.r.t. energy efficiency and LCC



b) Statistic representation of energy consumption of a public bus under real operation

