1 2 90

UNIVERSIDADE D COIMBRA

ENCONTRO EFS 22

ALUNOS ♦ EMPRESAS

Adaptive Energy Management Strategies for Electric Bus Fleets

Jônatas Augusto Manzolli

Second Year PhD Student

Received Bachelor degree in Electrical Engineering in 2017 at the University of Campinas (Brazil) and Master degree in Energy for Sustainability in 2020 at the University of Coimbra. Main research interests: Operational Research, Optimization, Electric Mobility, and Artificial Intelligence.

Supervisors: Prof. Carlos Henggeler Antunes (DEEC-UC), Prof. João Pedro Trovão (University of Sherbrook)

Motivation and Objectives

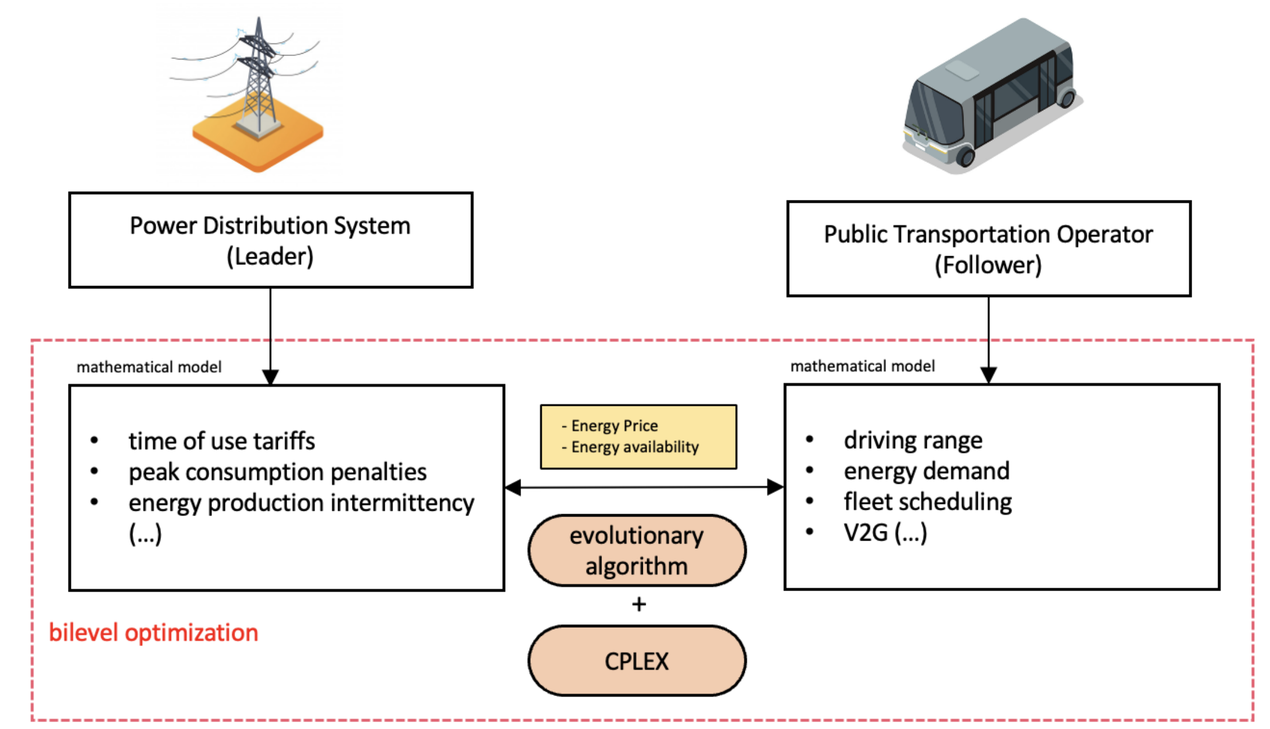
Infrastructural and operational limitations are still the main barriers to adopt electric buses in our cities massively. In this sense, this project aims to develop a new framework to better integrate electric bus systems and electric grid, considering charging scheduling, operational constraints and participation in V2G schemes.

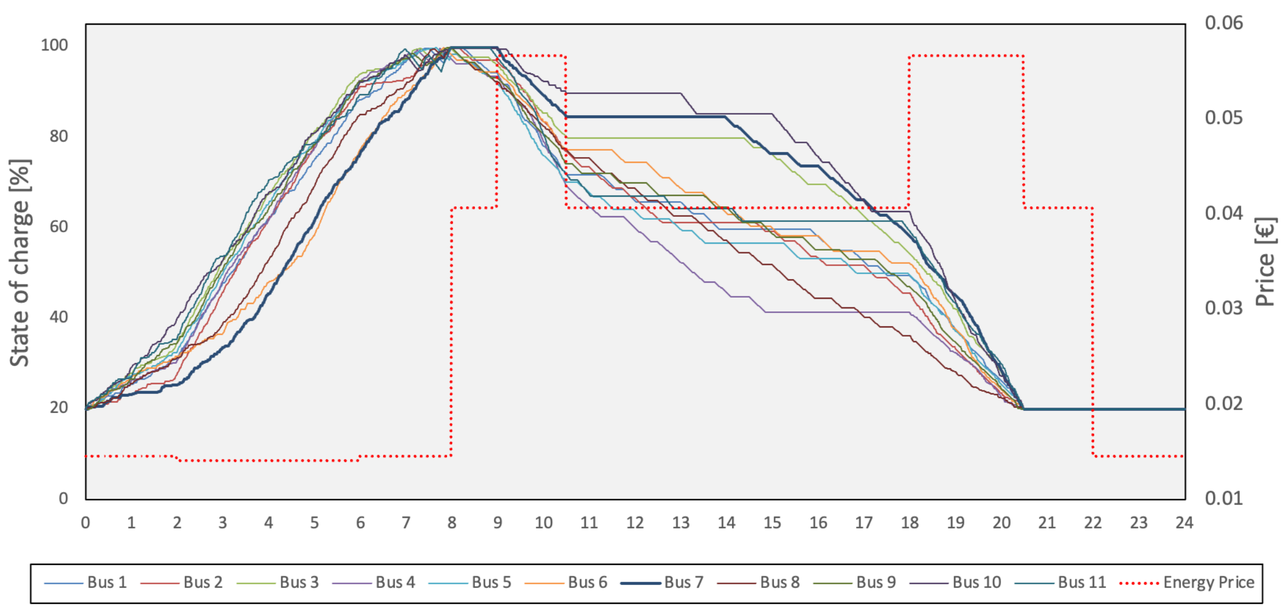
Work plan

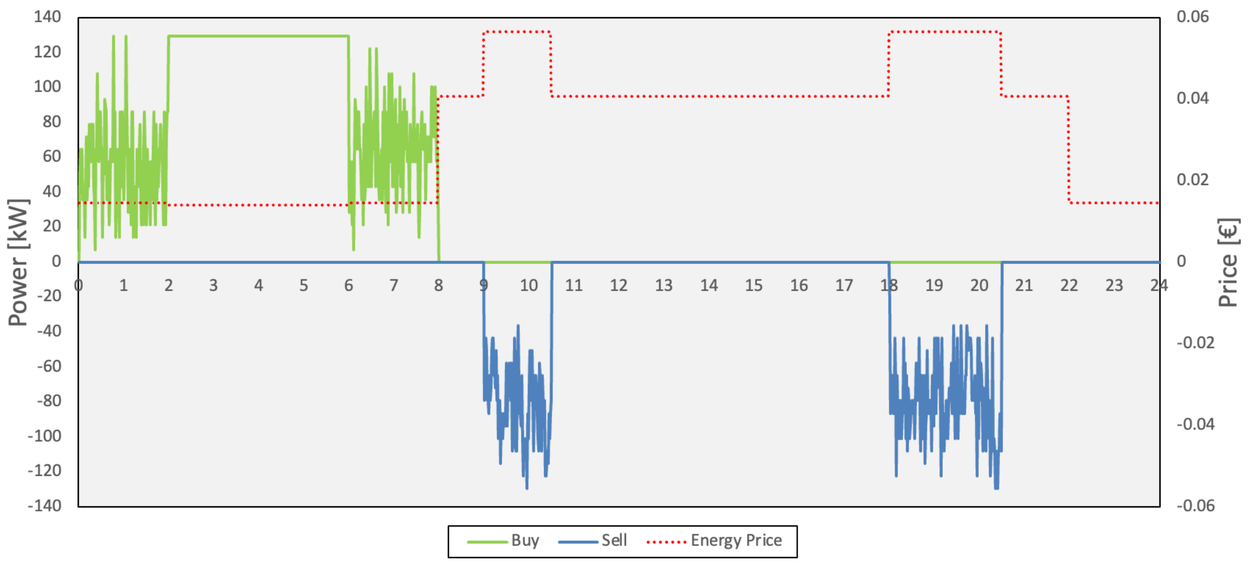
- ✓ Design an bilevel optimization model to manage electric bus fleet operation considering grid interaction and operational constraints.
- ✓ Combine mathematical programming and artificial intelligence in hybrid approaches to deal with complex combinatorial and dynamic model features.

Results

- ✓ Sensitivity analysis evaluates the possibilities of energy trading by assessing the battery replacement price decline and intraday energy price variation.
- ✓ Results indicate that it will be economically viable to perform bidirectional energy transactions shortly, considering the replacement battery cost reduction expected in the next years.







ENERGY FOR SUSTAINABILITY

1 2 90

UNIVERSIDADE D COIMBRA

MIT Portugal

FCT Fundação para a Ciência e a Tecnologia