CUMIN – SAMI

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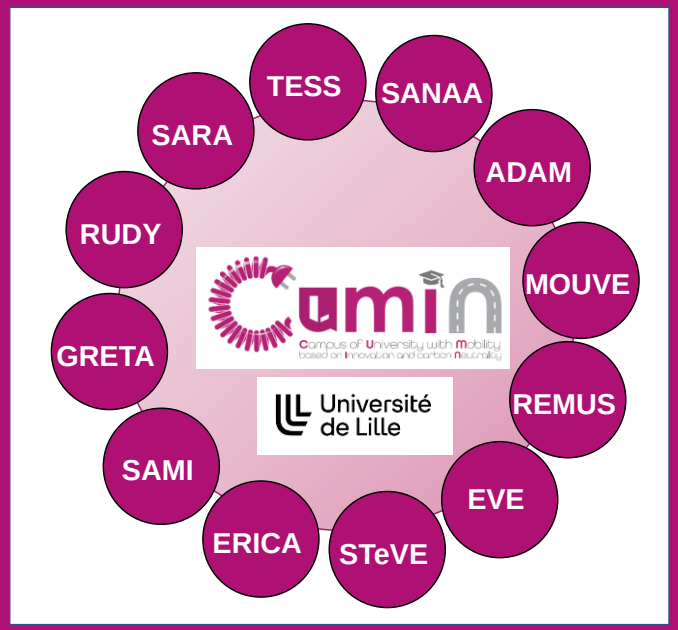


Experimental PV-based charging station for e-bikes

S. Fadili, **H. Ikaouassen**
L. Ferreira, P. Delarue, A. Bouscayrol
F. Bonin, N. Ferlay

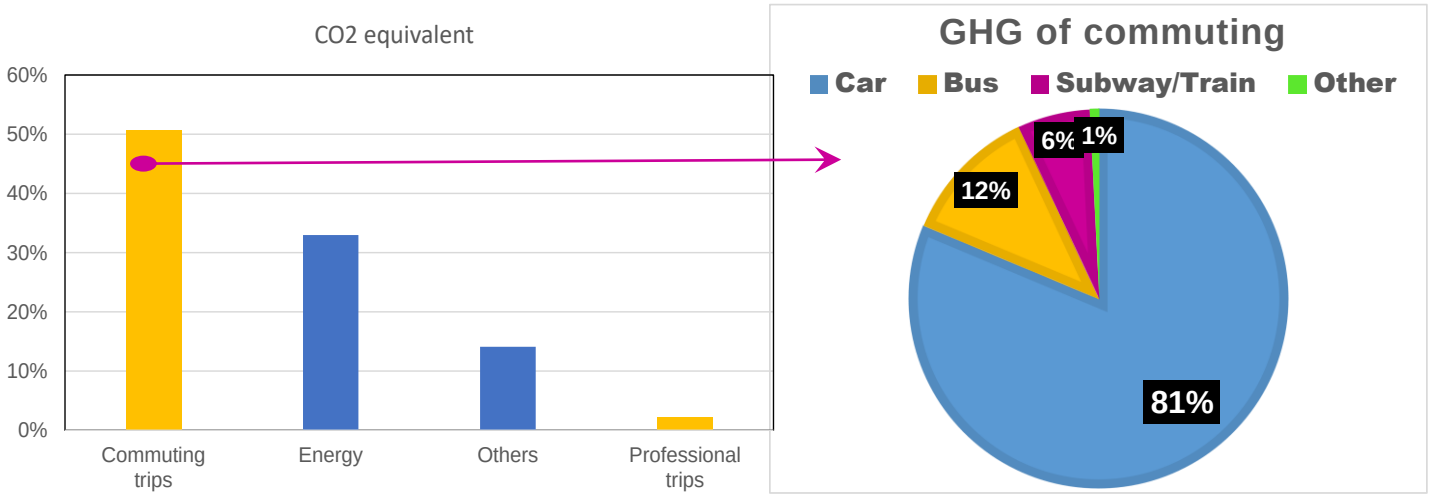
Outline

1. Context and objective
2. Sizing of charging station
3. Experimental performance
4. Conclusion

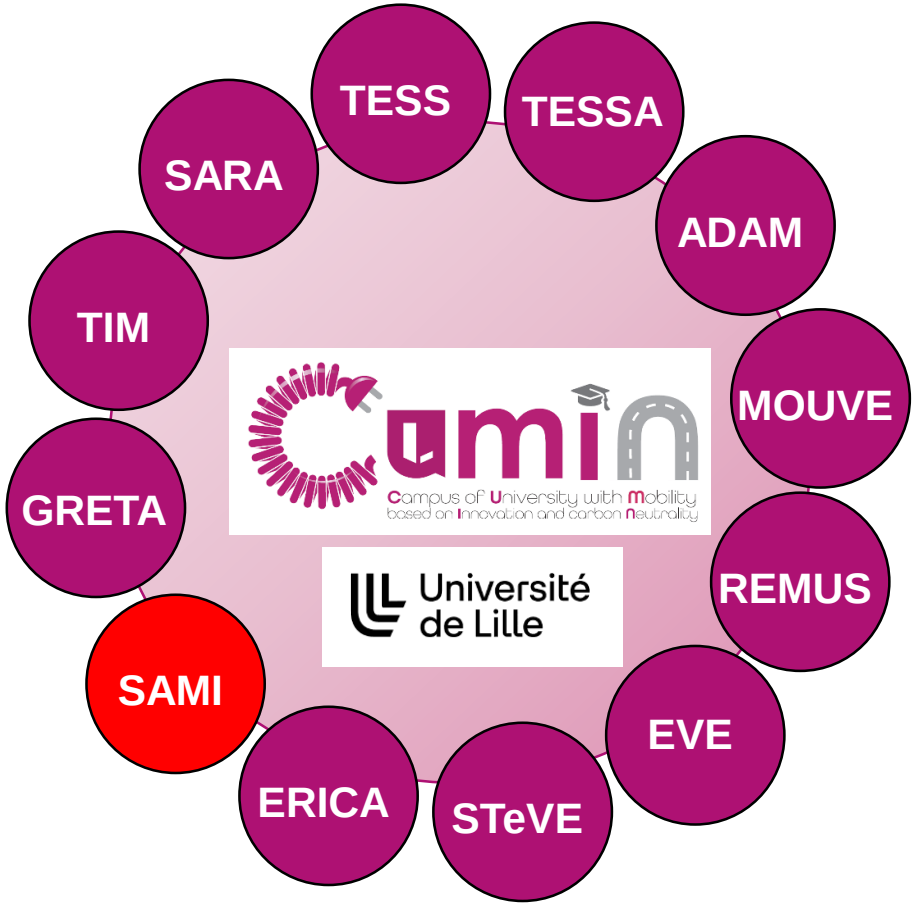
Context

CUMIN: **C**ampus of **U**niversity with **M**obility based on **I**nnovation and carbon **N**eutral

Greenhous Gases of University of Lille in 2020



Is e-bike an alternative?



SAMI: **S**tudy of **A**utonomous charging stations of light e-**M**obility for low environmental **I**mpact

Specifications and objective

Demonstrator of an autonomous charging station for e-bikes, based on solar renewable energy

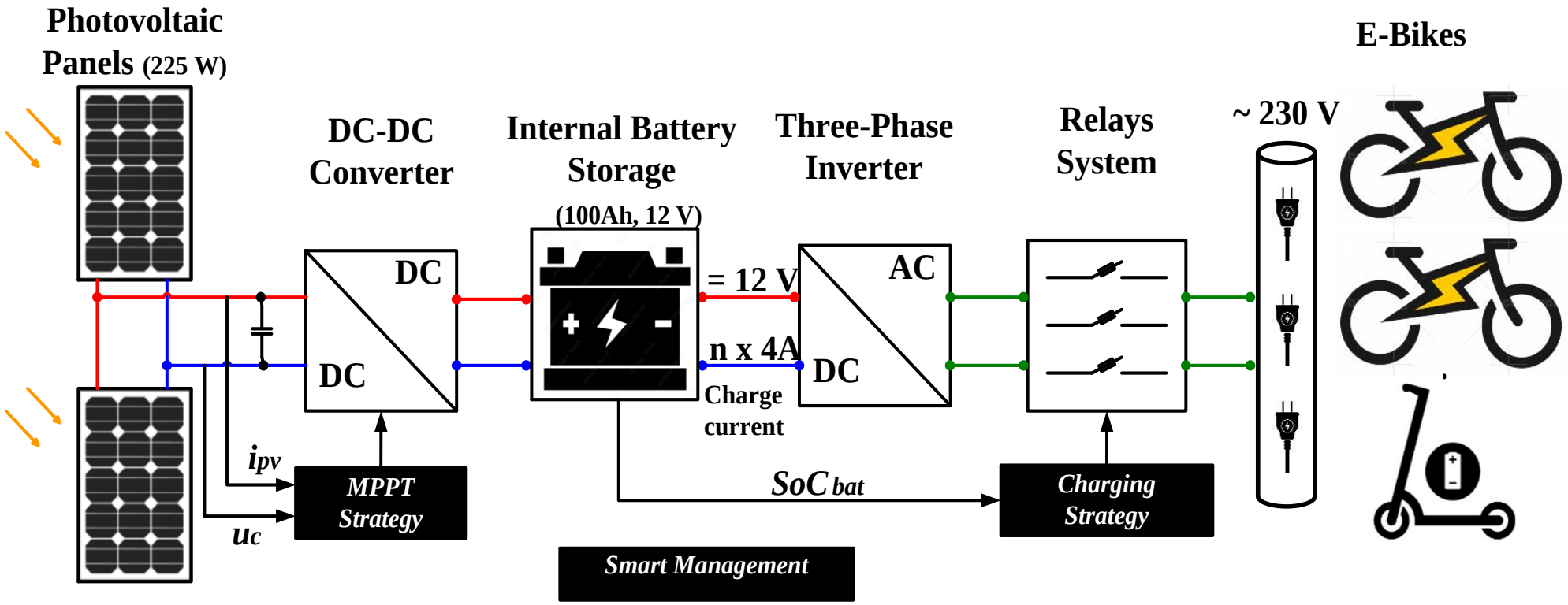
- demonstrator at « cité scientifique » Campus
- charging station completely off-grid
- energy solely provided by photovoltaic (PV) panels
- docking for 3 e-bikes or equivalent
- 2 m² PV panels.

Start-AIRR programme

in collaboration with

Synoptic of the demonstrator

The demonstrator is flexible in terms of sizing, usage and placement and can be extended to fulfill different objectives for different projects.



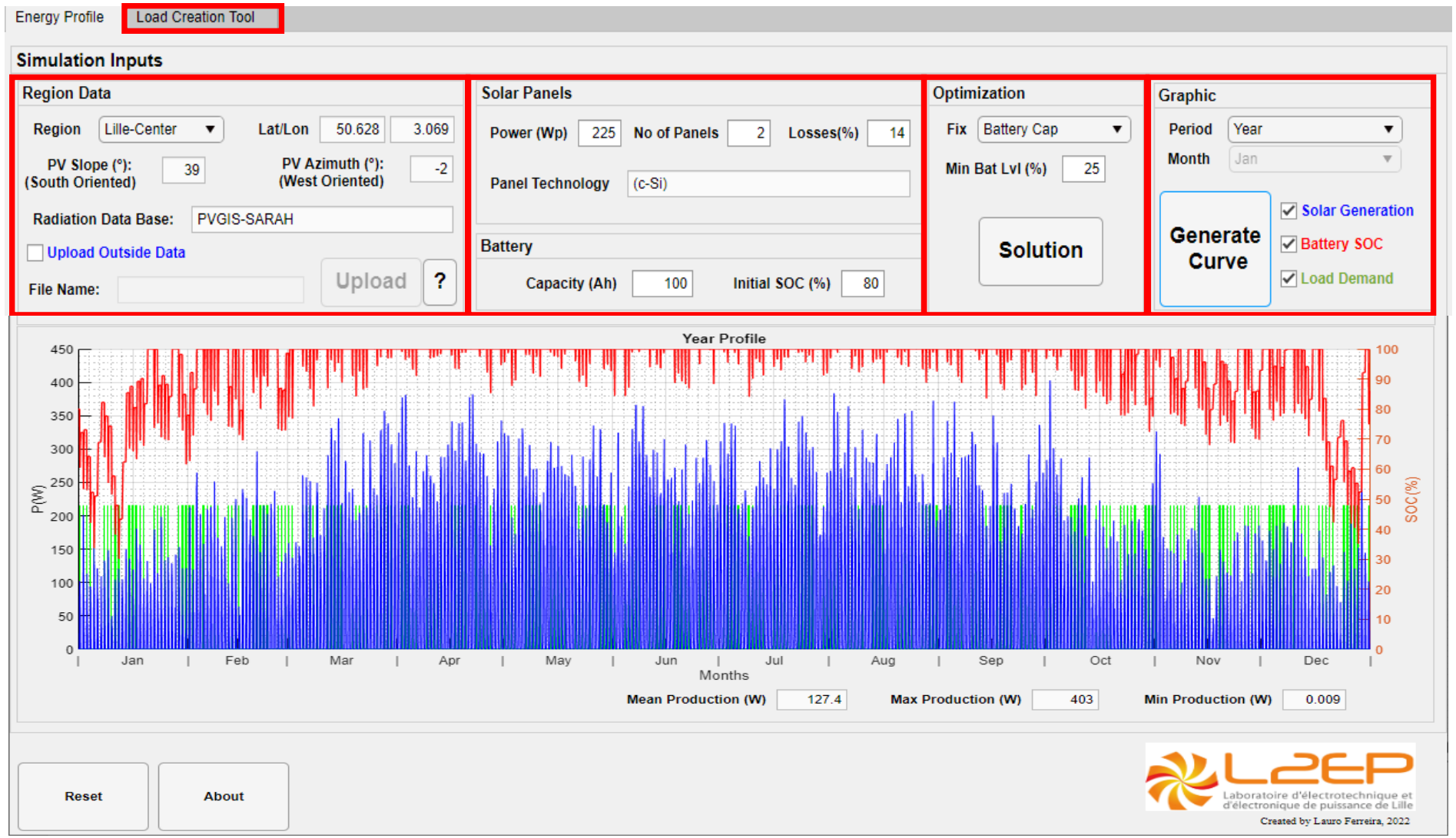
Flexible surface

Adapted storage

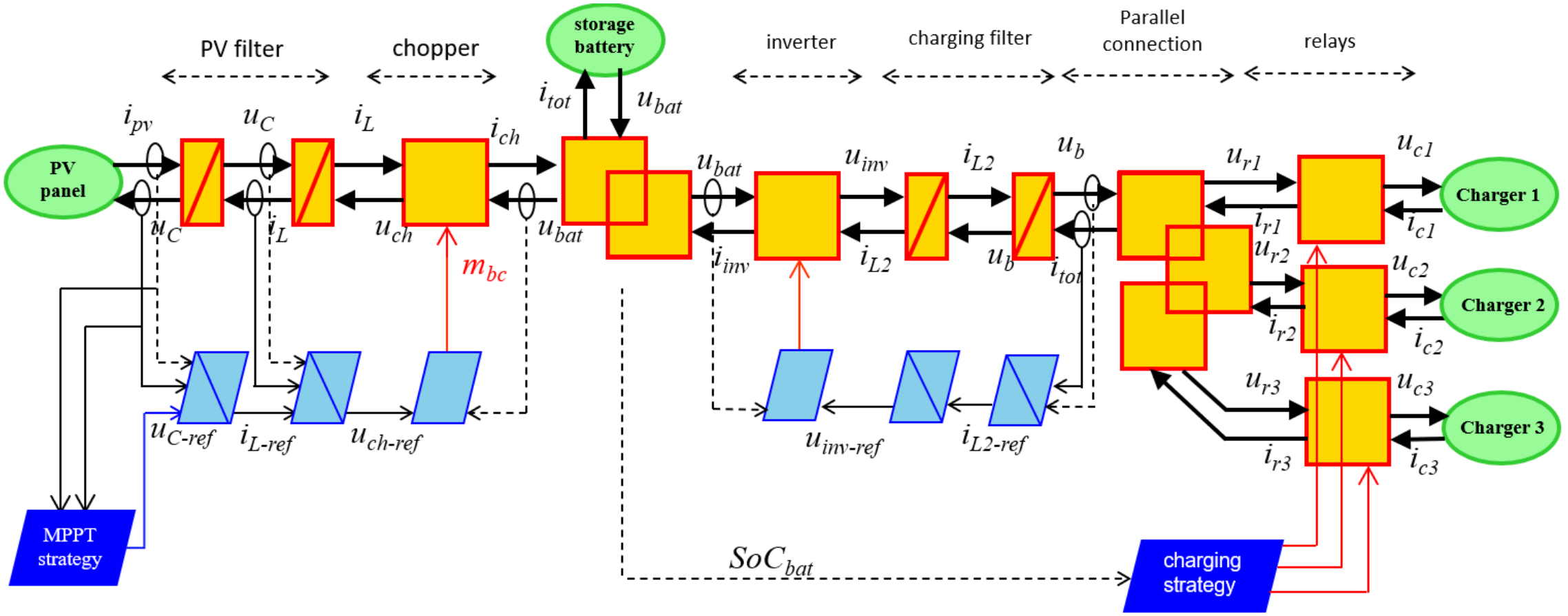
Multiusage system

Sizing of charging station

- Interface tool developed with MATLAB GUI (Graphical User Interface)
- Based on the PVGIS satellite database



Energetic Macroscopic Representation

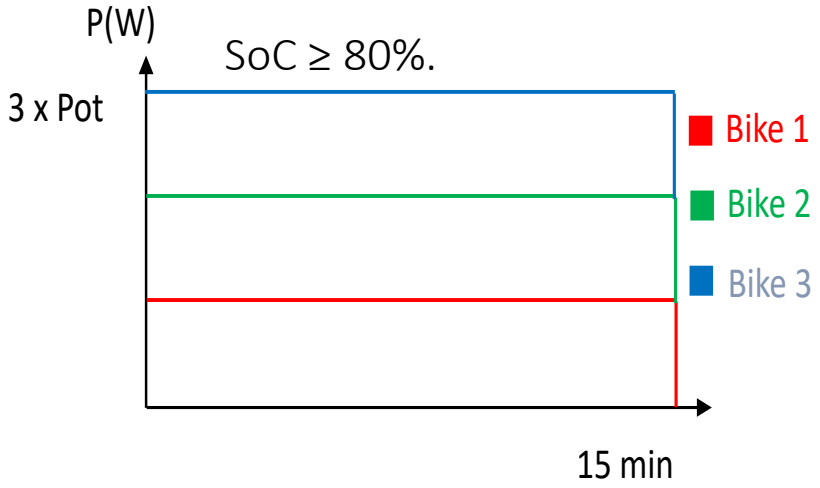


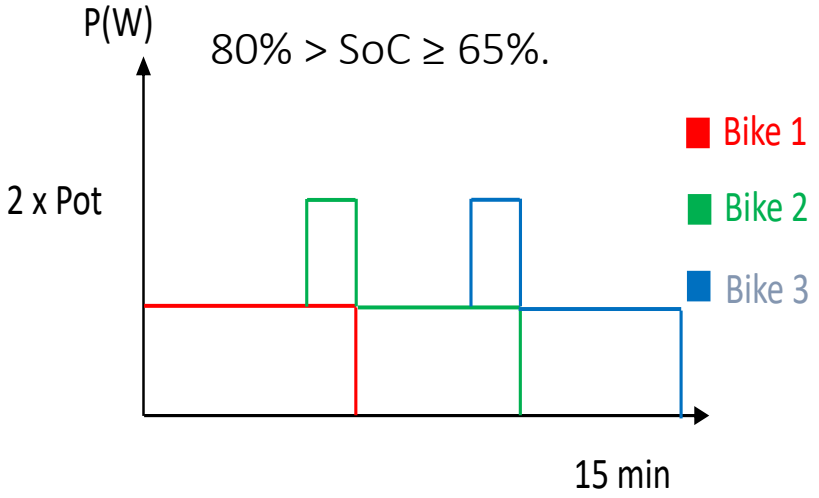
Complex model organization using the EMR formalism

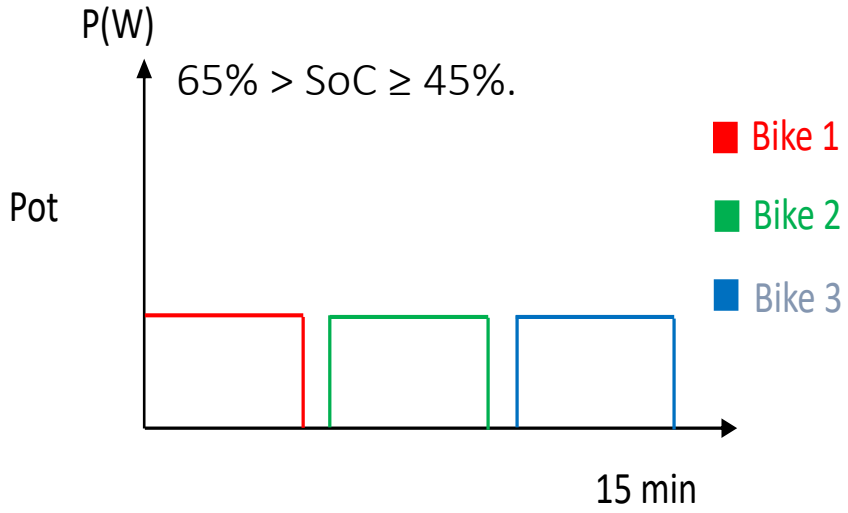
Demonstrator prototype

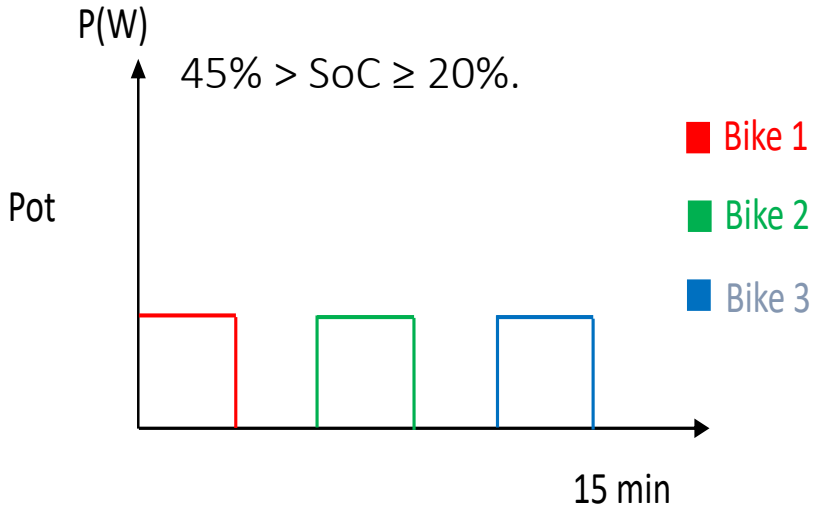
Charging station strategy

- strategy updates every 15 mins
- SoC of the storage battery as input

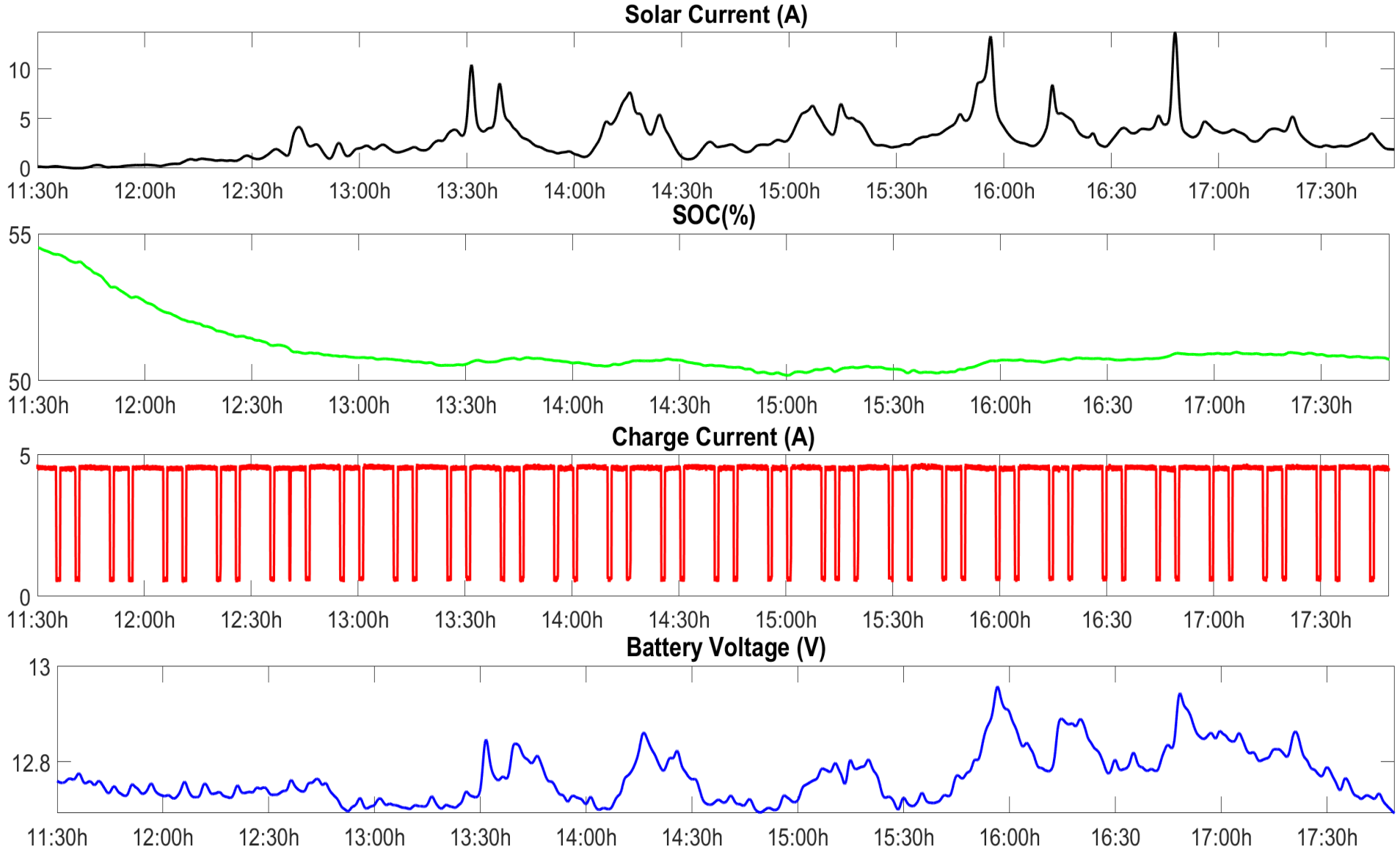








Experimental performance: case study



Conclusion

- Demonstrator at campus ‘Cité Scientifique’

  - Sizing done using a graphical user interface
  - First experimental results for validation of sizing
  - Charging for 3 e-bikes all along the year

- Perspectives

  - more experimental results
  - more optimal energy management strategies
  - prediction of solar irradiance

Fadili, S., Ferreira, L., Delarue, P., Bouscayrol, A., Ikaouassen, H., Bonin, F., Ferlay, N. (2023, October). ***Experimental PV-Based Charging Station for e-Bikes****. In 2023 IEEE Vehicle Power and Propulsion Conference (VPPC) (pp. 1-6).*

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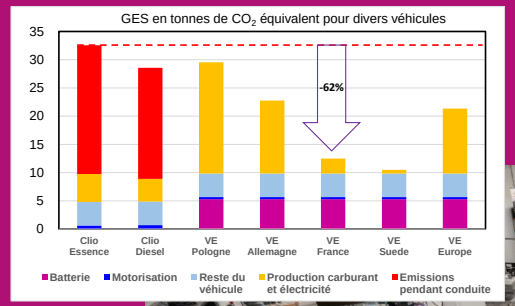

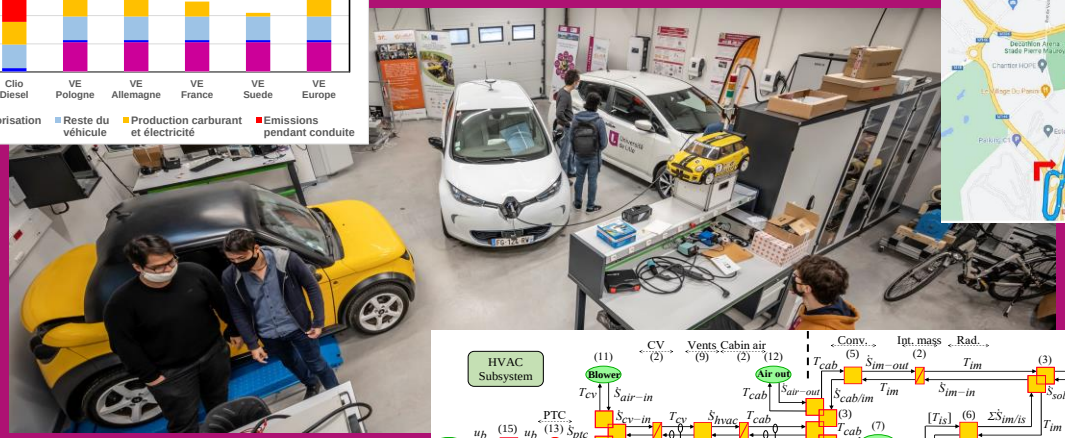

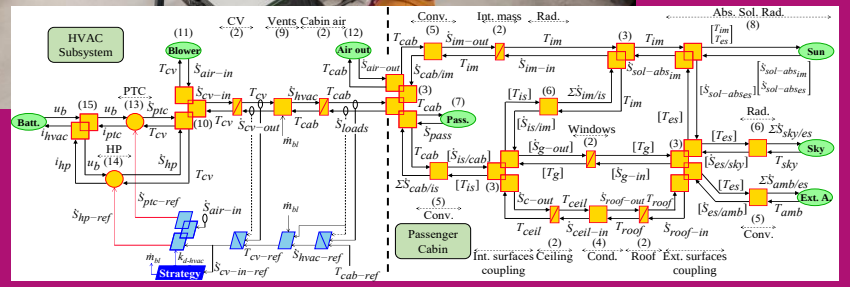

Our university as an exciting living lab towards eco-cities through an innovative transdisciplinary framework !