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# « EMR-based simulation of an e-bike charging station »

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# EMR based simulation of an e-bike charging station

- Outline -

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**Introduction**

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**Sizing**

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**EMR of the system**

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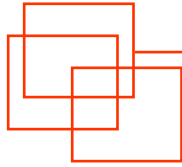
**Conclusion**



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# « Introduction »

# EMR based simulation of an e-bike charging station



## Specifications

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- ➔ Build a demonstrator of an autonomous charging station for light electric vehicles, based on renewable energy.

### Demand

- The demonstrator would be placed at « cité scientifique » Campus.
- The charging station is completely off-grid.
- The energy needed is provided solely by photovoltaic panels.
- Docking for 3 e-bikes or equivalent.
- Room for 2 m<sup>2</sup> of PV panels.

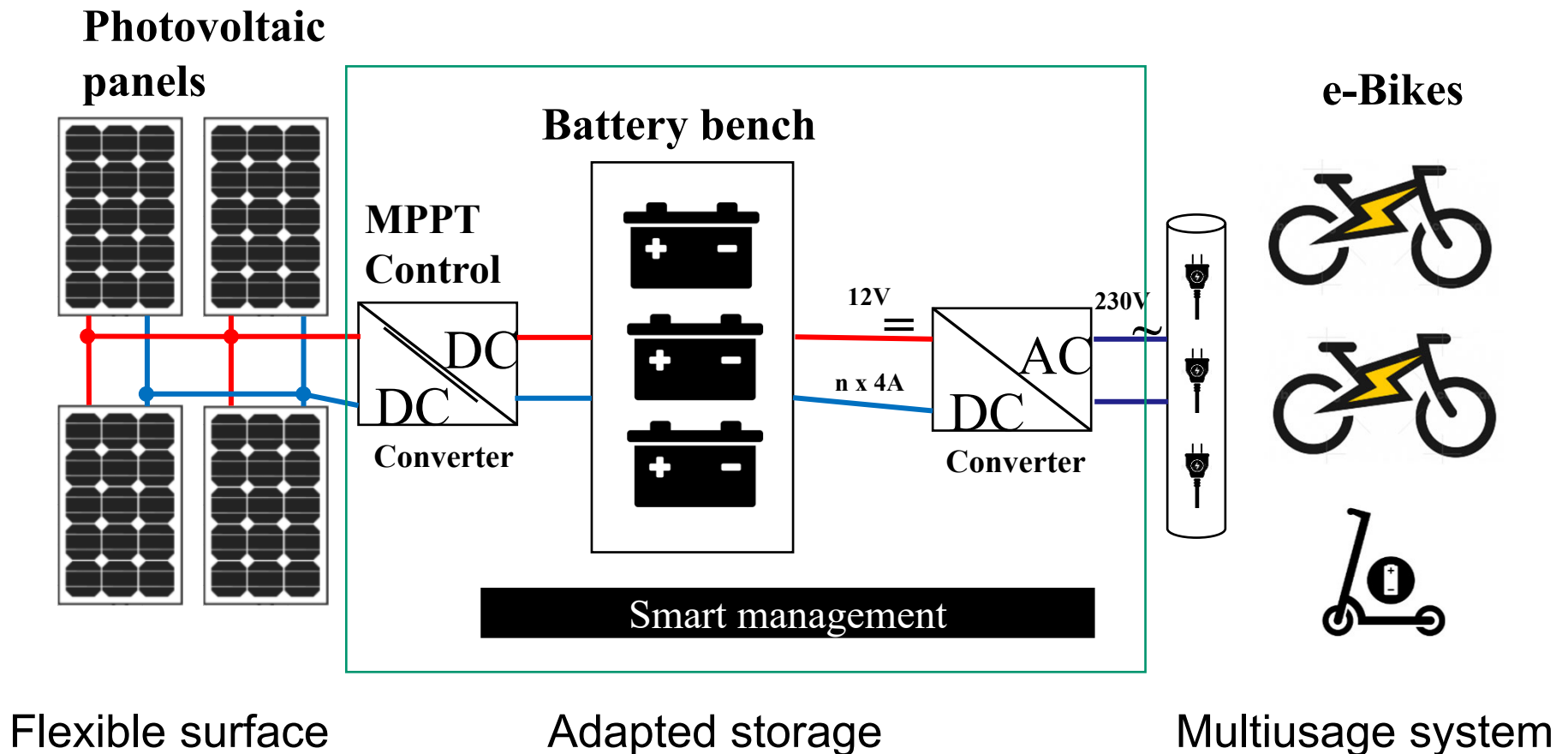
# EMR based simulation of an e-bike charging station

## Synoptic of the demonstrator

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





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# « Sizing »

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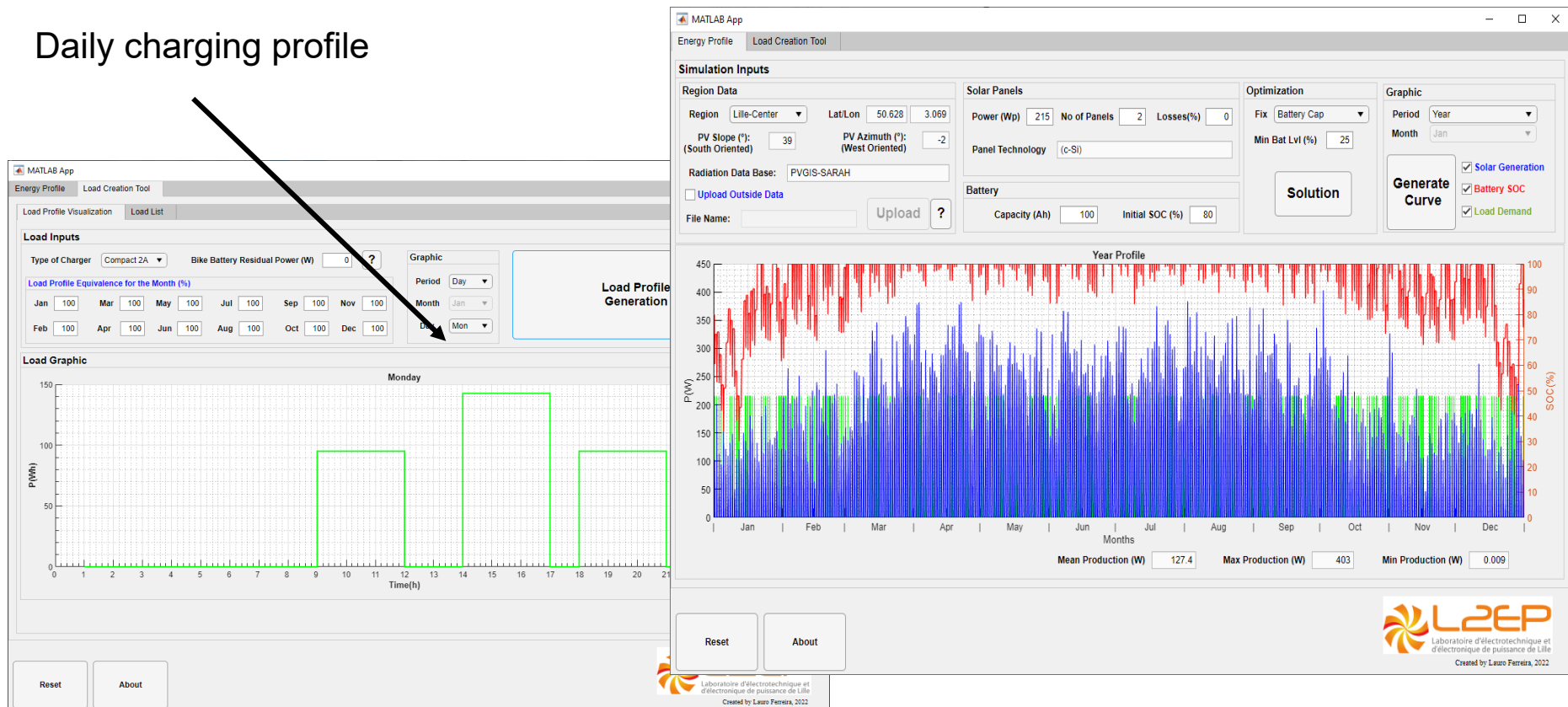
## System sizing

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

Daily charging profile



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## Interface usage

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### Load Profile creation tool

Energy Profile **Load Creation Tool**

**Simulation Inputs**

Region Data	Solar Panels	Optimization	Graphic
Region: Lille-Center Lat/Lon: 50.628, 3.069 PV Slope (°): 39 PV Azimuth (°): -2 Radiation Data Base: PVGIS-SARAH <input type="checkbox"/> Upload Outside Data File Name: <input type="text"/> Upload ?	Power (Wp): 225 No of Panels: 2 Losses(%): 14 Panel Technology: (c-Si) Battery Capacity (Ah): 100 Initial SOC (%): 80	Fix: Battery Cap Min Bat Lvl (%): 25 <b>Solution</b>	Period: Year Month: Jan <b>Generate Curve</b> <input checked="" type="checkbox"/> Solar Generation <input checked="" type="checkbox"/> Battery SOC <input checked="" type="checkbox"/> Load Demand

Irradiation Data  
Input

System  
Characteristics

Optimized definition  
of parameters

Output  
Customization

European  
Commission - PVGIS





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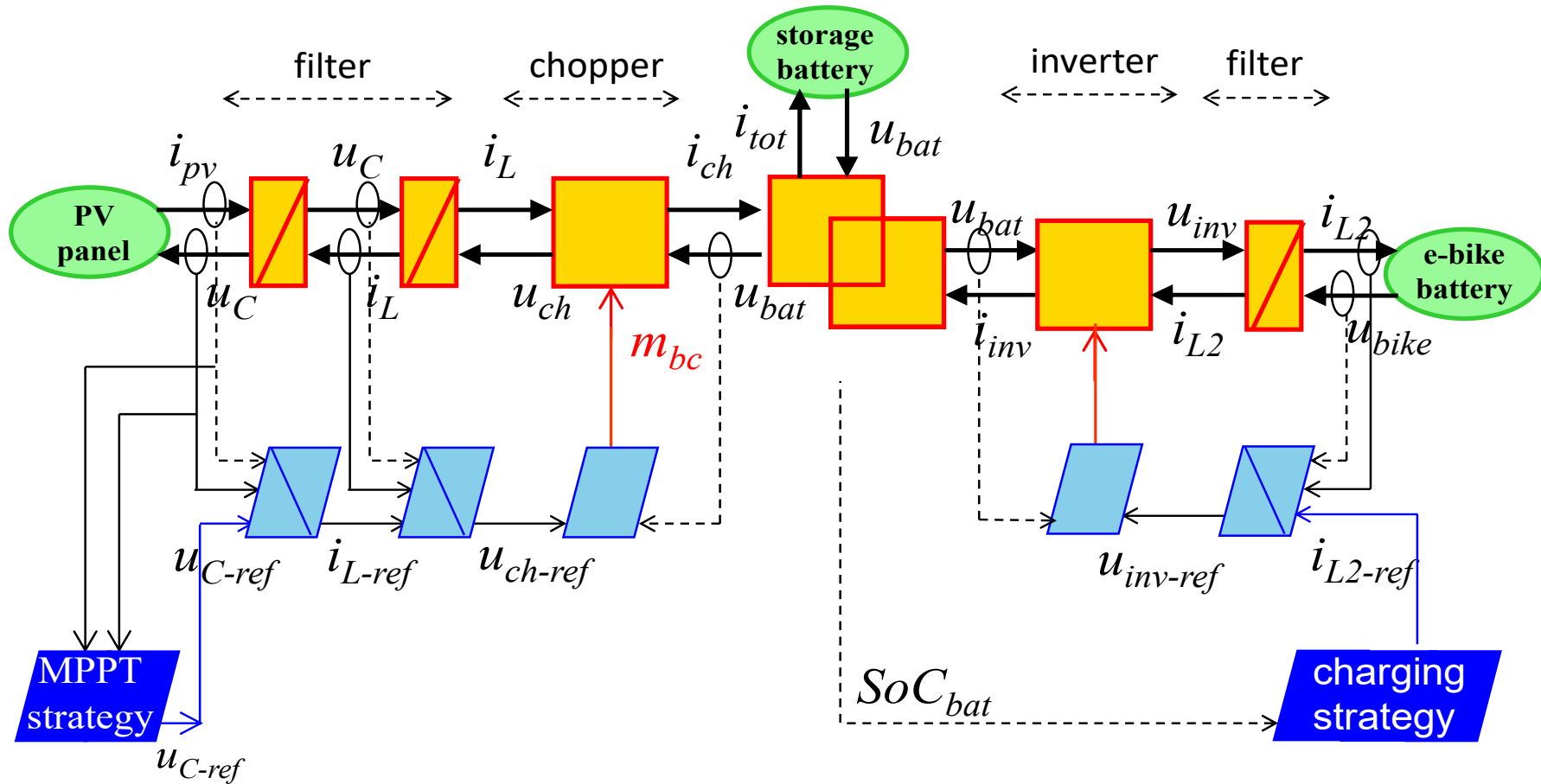
**« EMR of the system »**

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EMR

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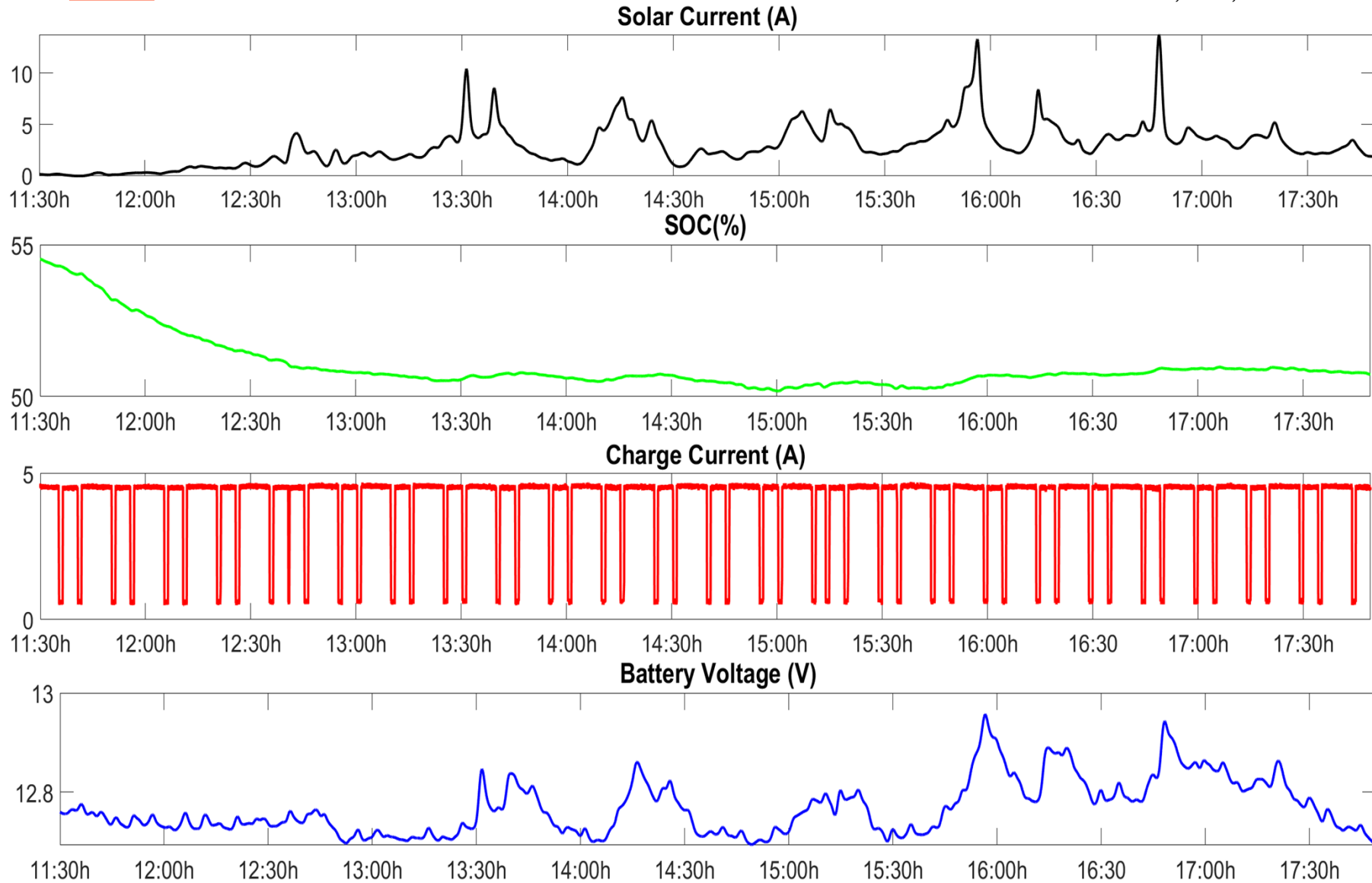


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## Simulation results

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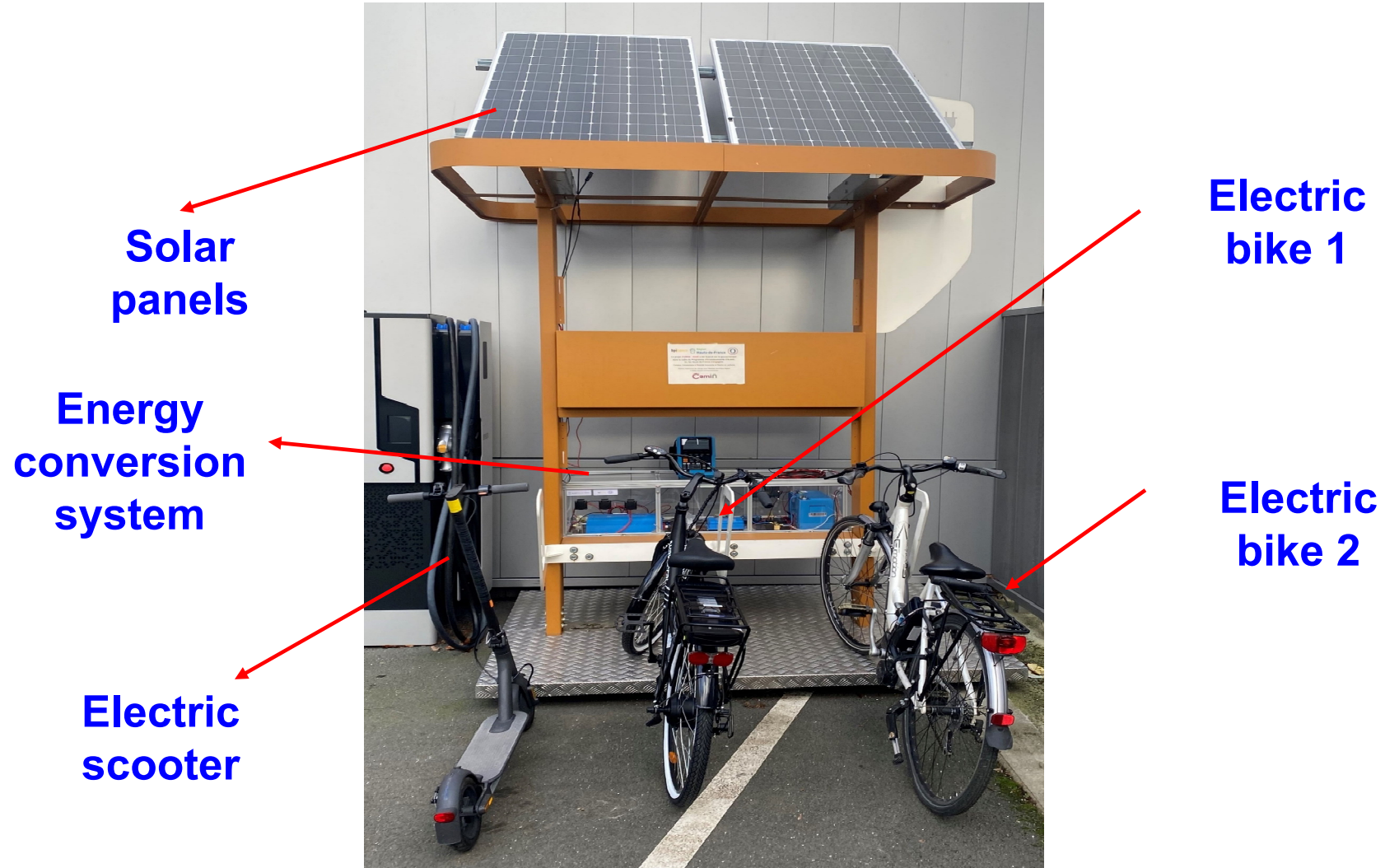


# EMR based simulation of an e-bike charging station

## Final prototype

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**« Conclusion »**

- A demonstrator is built at campus 'Cité Scientifique'
- Sizing is done using a graphical user interface
- EMR was used to simulate the system
- The results show the sizing is correct