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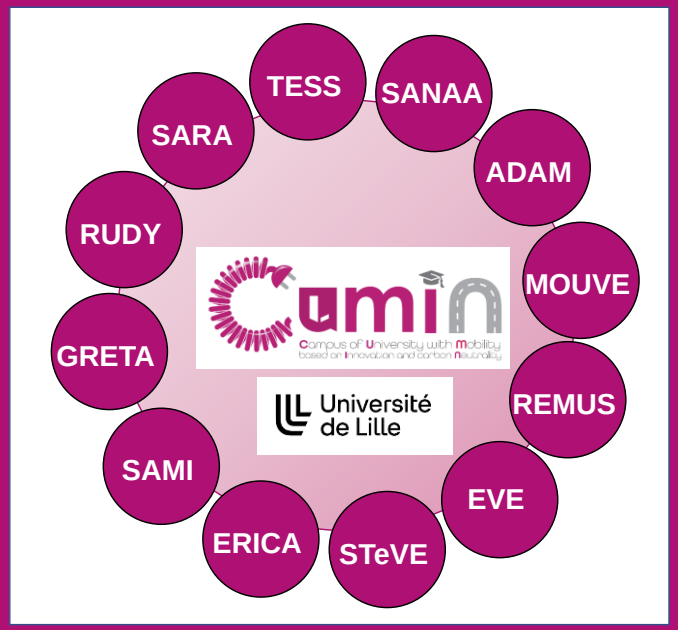

CUMIN – MOUVE

Simulation of a fast-charging station connected to the grid for EV

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M2-VIE

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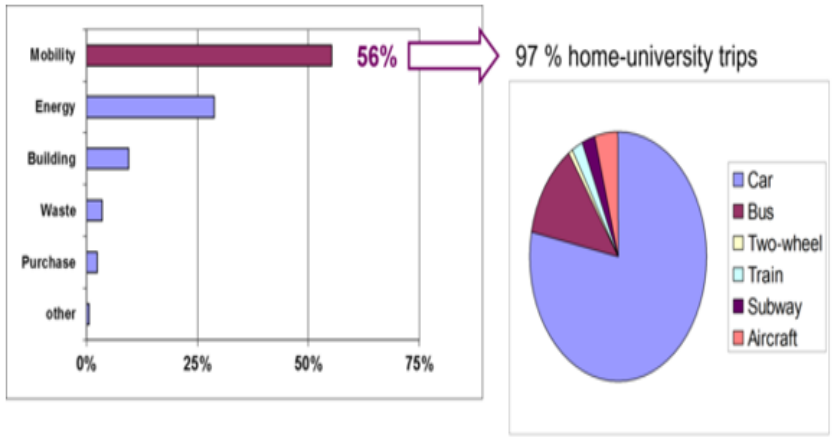
Outline

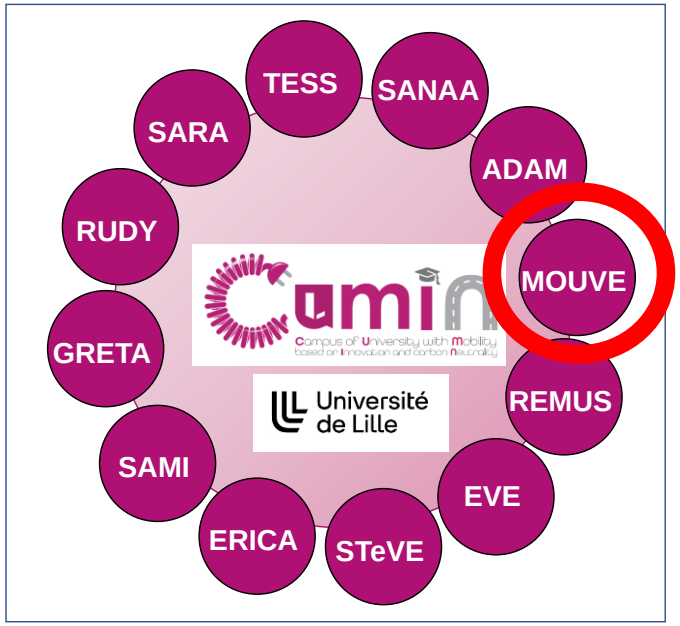
1. Context and objective
2. Structural diagram and components dimensions
3. Scenario
4. Simulation results
5. Conclusion and perspectives

Context and objective

The carbon footprint of the University of Lille shows that 56% of greenhouse gas emissions are attributed to mobility. Out of this total, 97% are due to daily home-to-university commuting..



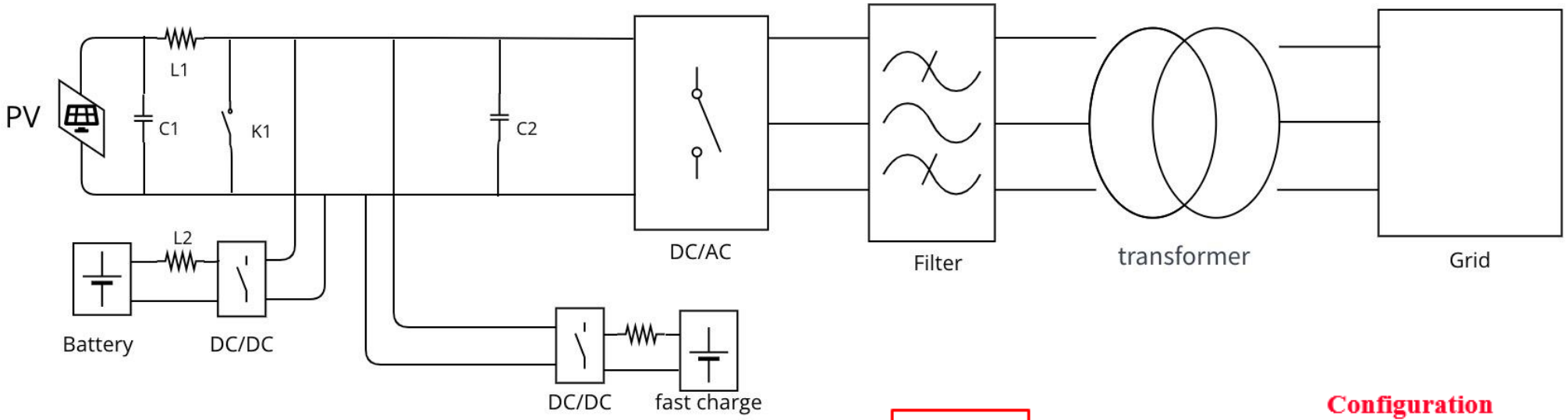
Greenhouse gases emissions of the campus Cité Scientifique/CUMIN

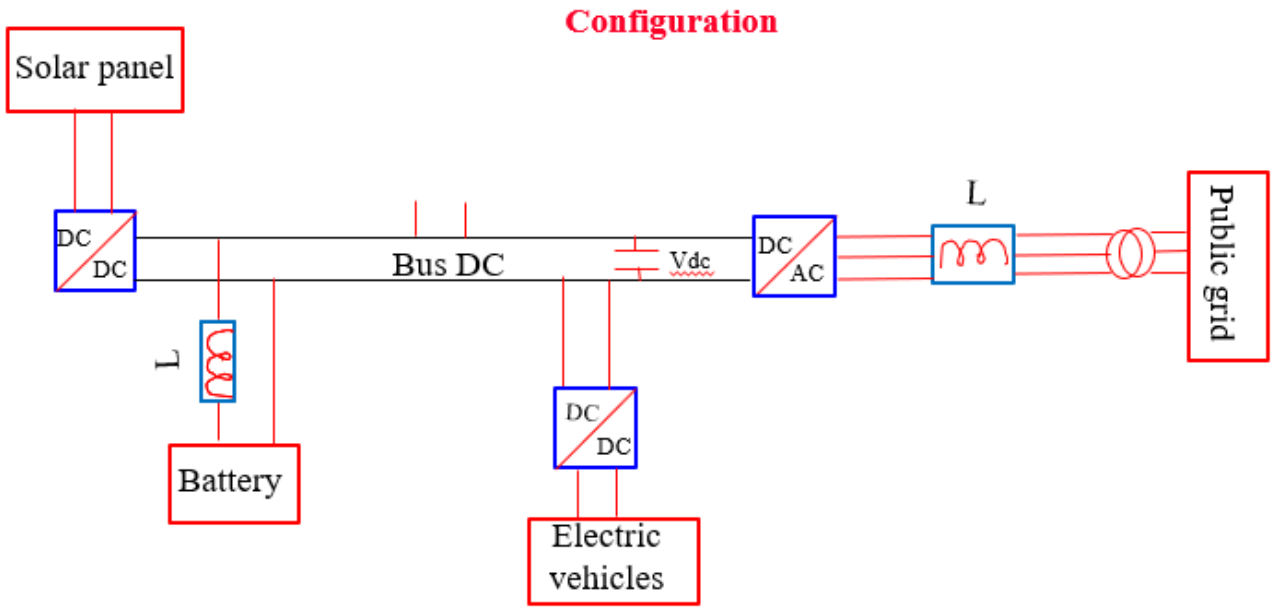


MObility and Use of electric VEhicles based on dedicated charging infrastructure

Objective : Optimization of electrical grid utilisation

Structural diagram and components dimensions





Structural diagram and components dimensions

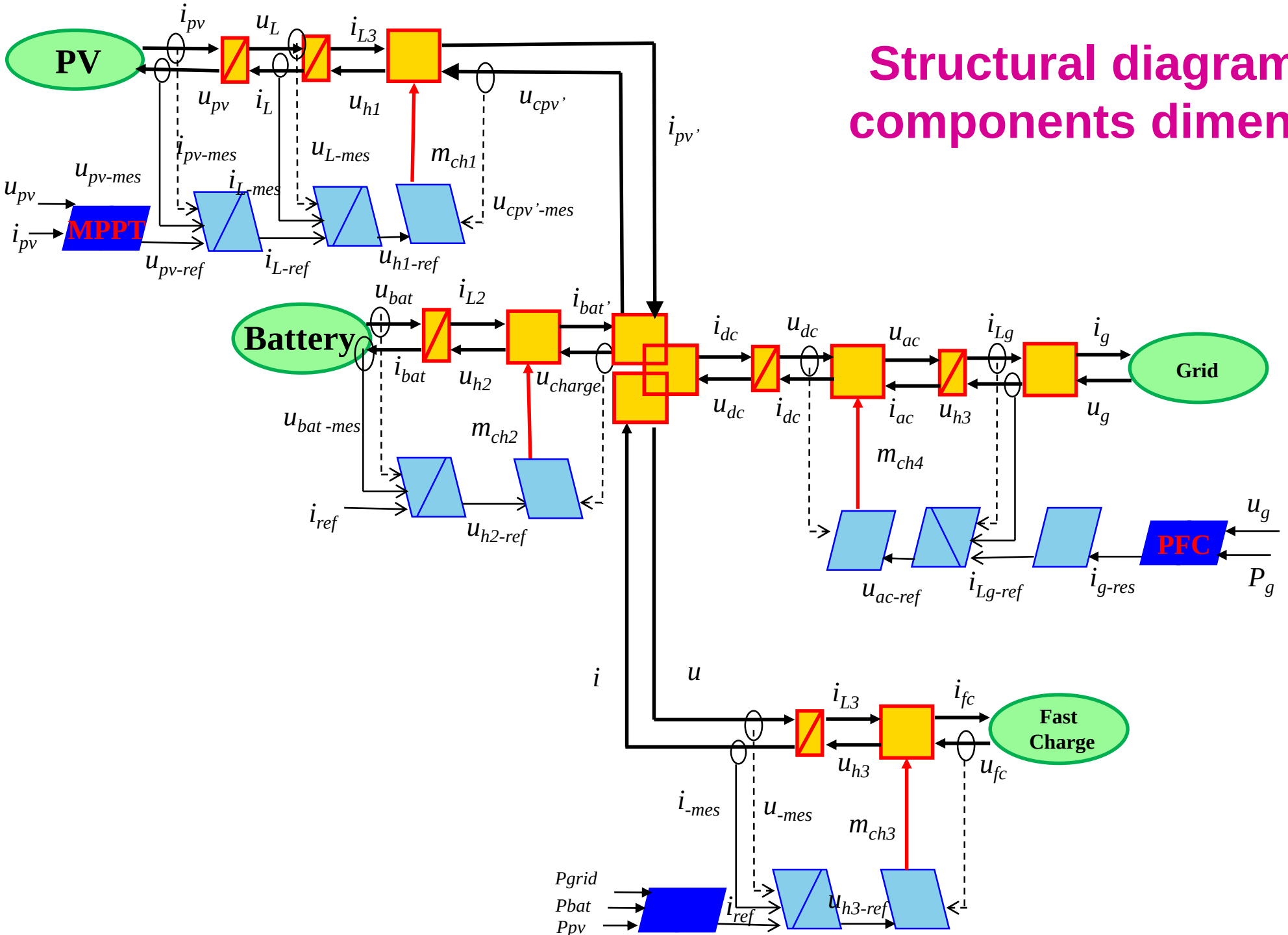
Name	Symbole	Valeur
Rated Power	Pn (kWc)	16
Maximum Voltage	Vmpp (V)	360
Maximum Current	Impp (A)	47,24
Open Circuit Voltage	Voc(V)	43,4
Short-Circuit Current	Isc (A)	12,56
Number of panels in series	Ns	10
Number of panels in parallel	Np	4
Surface	S	80m²

Solar panel
DUALSUN 425 Wc Monocrystalline

Nom	Symbole	Valeur
Battery Type	Lithium ion NMC	
Capacity	Capacity(Kwh)	40
Nominal voltage	Un (V)	360
Number of module in series	Ns	192
Nomber of module in parallel	Np	24
Lifetime	Year	8-10
Total mass	M(kg)	295

Battery vehicle
Nissan LEAF ZE1 MY

Structural diagram and components dimensions



Scenario

Time(s)	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h
Radiation (W/m^2)	200	400	600	600	800	1000	1000	800	600	600
Energe PV (Kwh)	0.5	2.4	5.5	5.5	9.8	15.4	15.4	10	5.5	5.5
Energy Battery (Kwh)	22.5	20.6	17.5	17.5	--	--	--	13	17.5	--

Need	40kWh
Battery	80kWh
Grid	17kWh

Simulation results

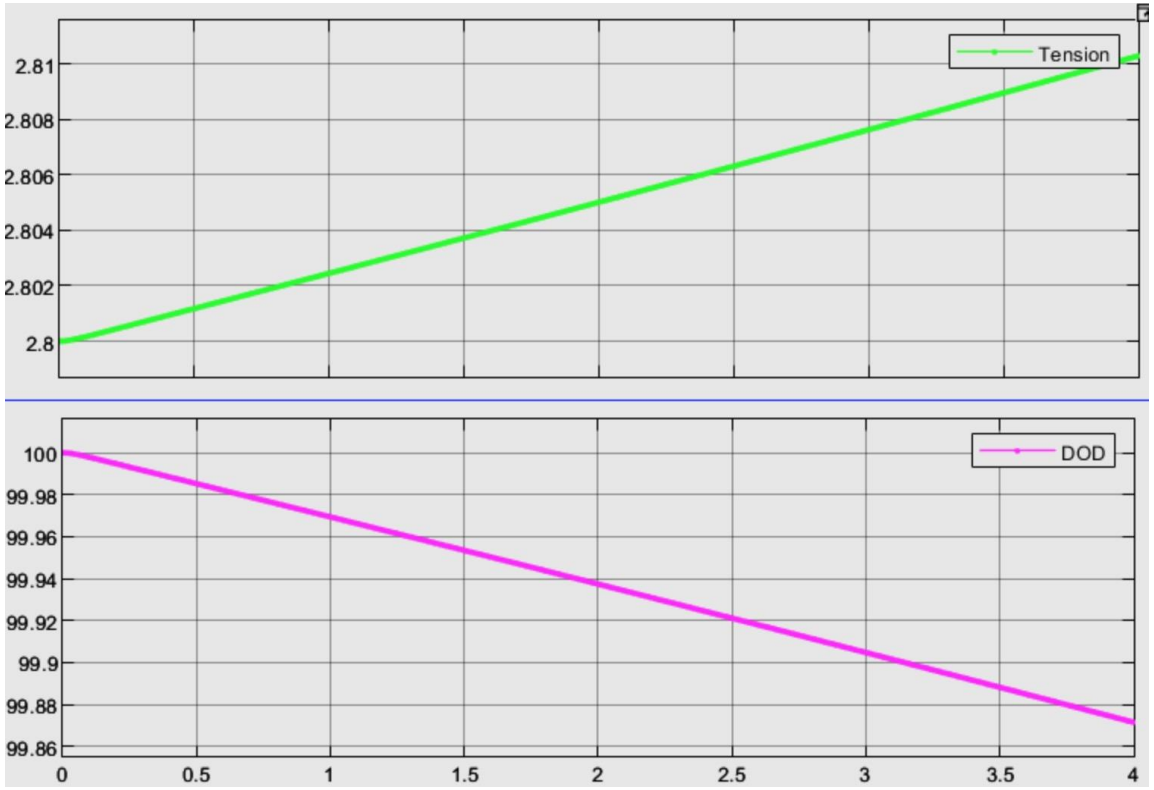


Figure of the voltage and DOD

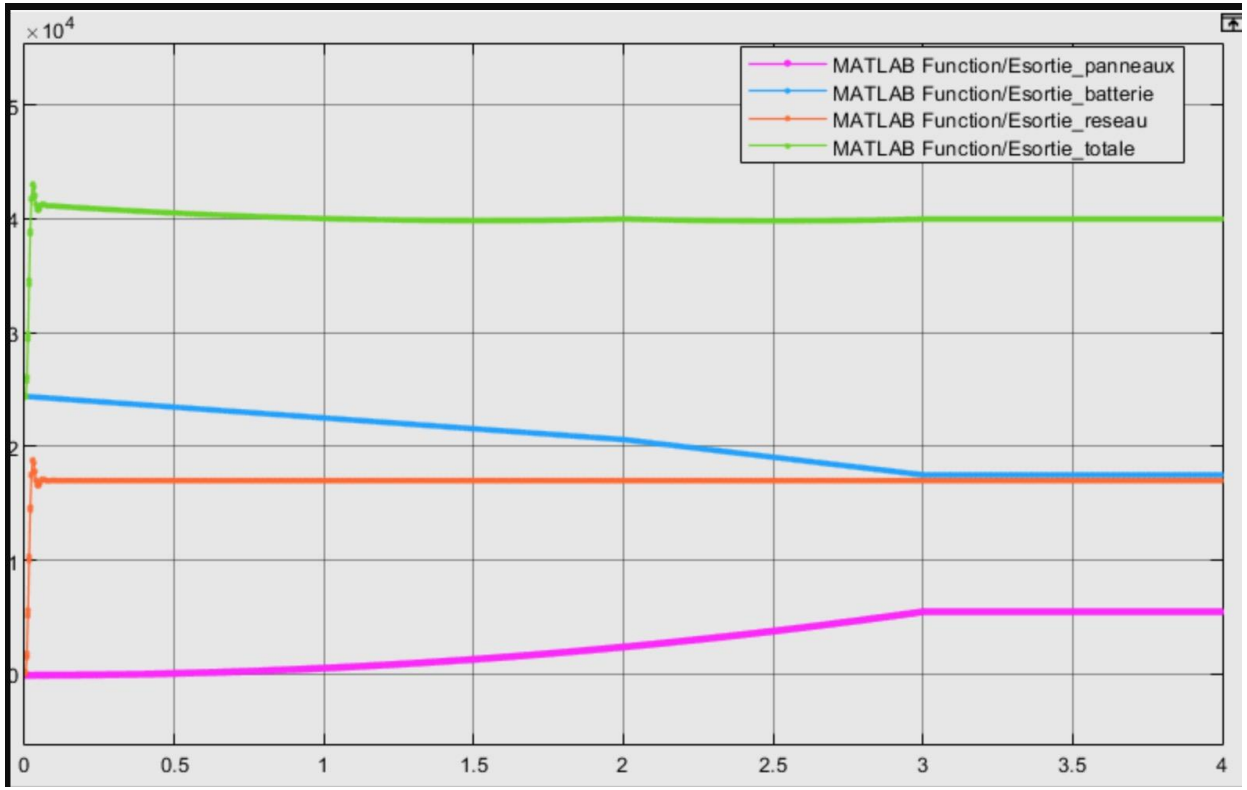


Figure of the results simulation

Conclusion and perspectives

Conlusion

- Simulation of fast charging stations
- An energy management strategy at the PV level by the MPPT
- An energy management strategy between network, battery and PV

Perspectives

- The integration of a second terminal for normal charging
- Study the feasibility of injection into the network
- Vehicle-To-Grid(V2G)

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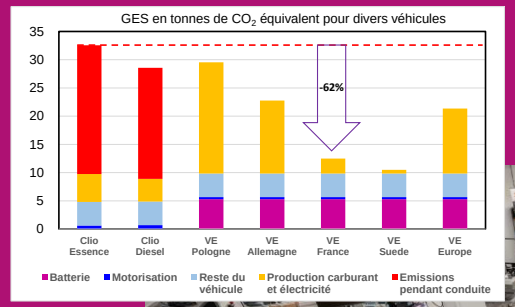

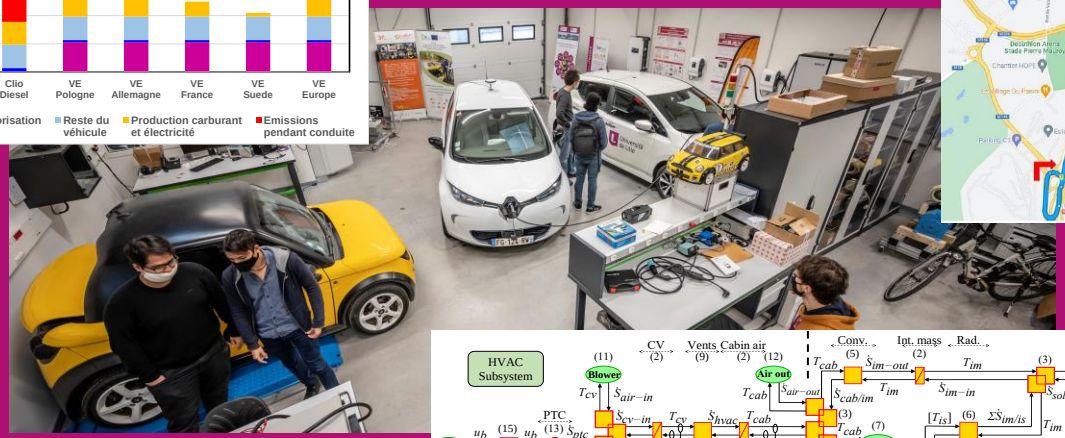

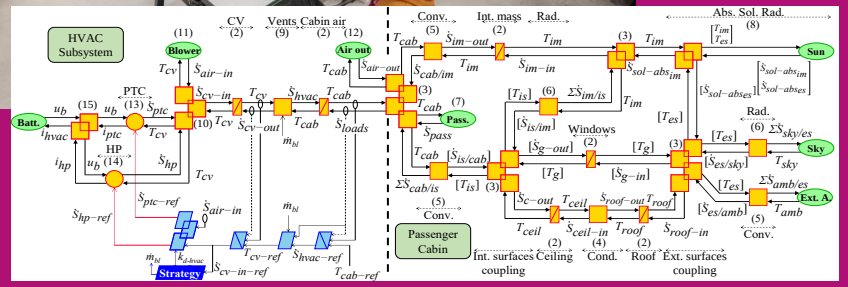

Our university as an exciting living lab towards eco-cities through an innovative transdisciplinary framework !