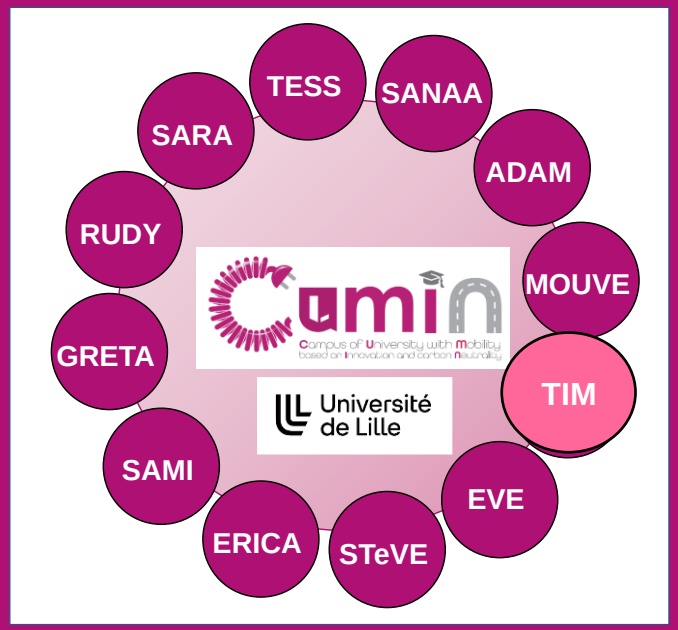
CUMIN - TIM

https://cumin.univ-lille.fr/



Analysis of electric and mechanical braking distribution of EVs

Douaae Belbachir
Enoch Hodonou
Ibrahima Seck

Jean-François Brunel, LaMcube
Walter Lhomme, L2EP

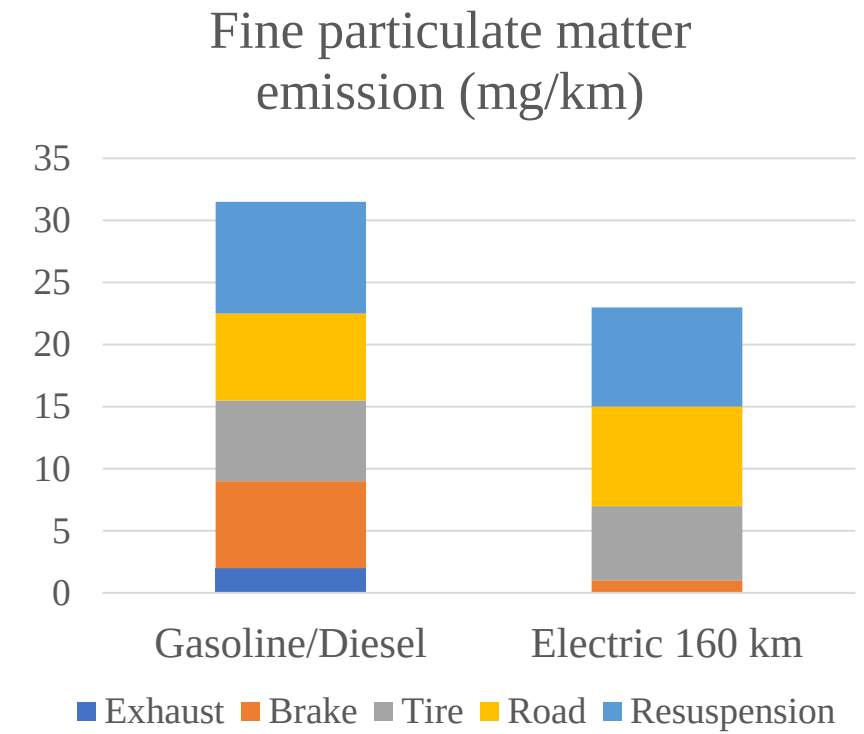
Outline

1. Introduction and context of the project
2. Project objective
3. Data Analysis
4. Conclusion and perspectives

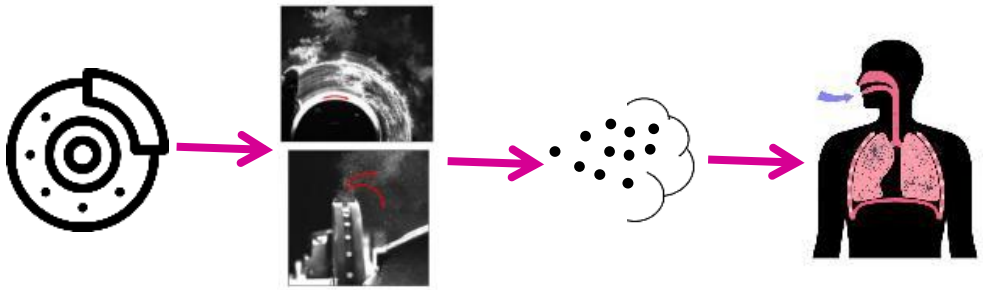
https://cumin.univ-lille.fr/

Introduction and context of the project

Introduction and context of the project:



https://www.actu-environnement.com/ae/news/pollution-air-captation-particules-automobiles-hors-echappement-etude-ademe-39507.php4



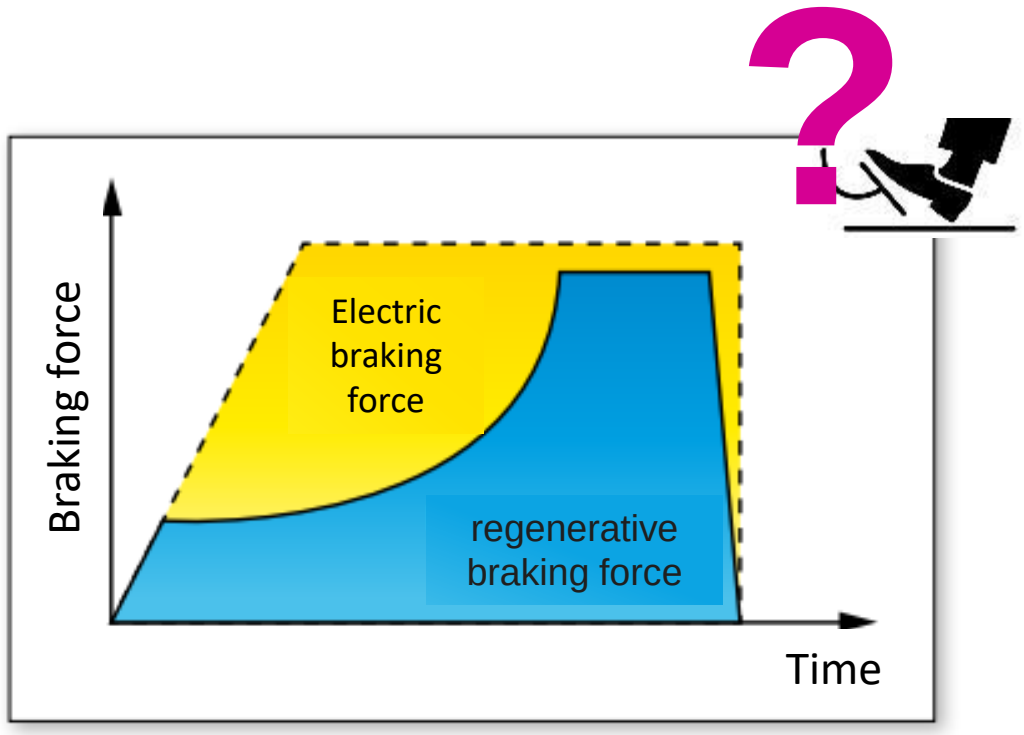
Limitation of Particle Emissions (Braking) of the European Standard:

	Fine particulate matter (PM)
Euro6	4.5mg/km
Euro7	2mg/km

https://cumin.univ-lille.fr/

Project objective

Project objective

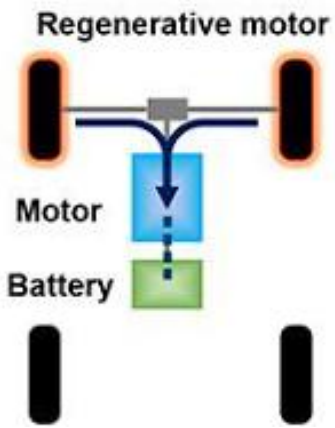


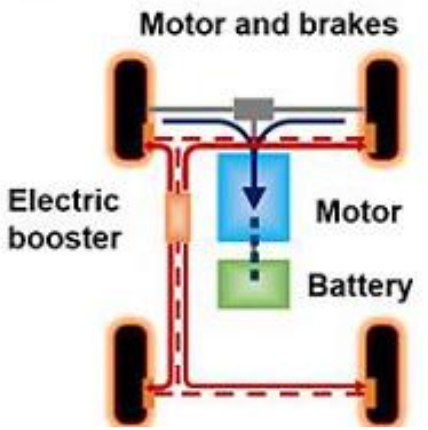
Analyze the distribution of mechanical and regenerative braking

Nissan Leaf

Electric braking

Mechanical braking

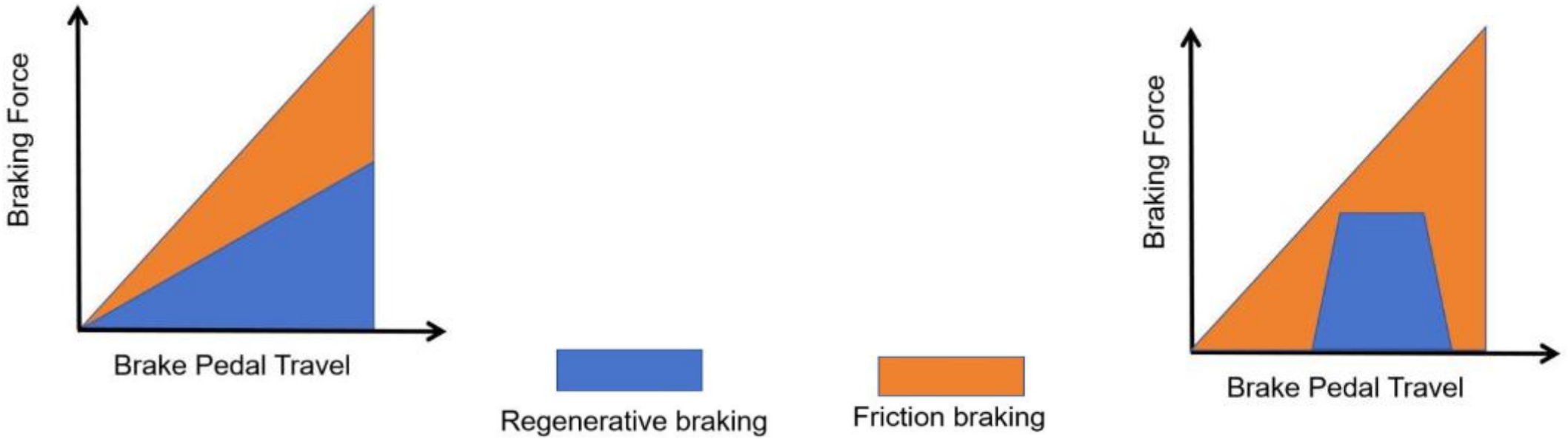




Hybrid braking system:

a: Specific proportional braking torque distribution

b: Optimised proportional braking torque distribution



Braking torque distribution strategies

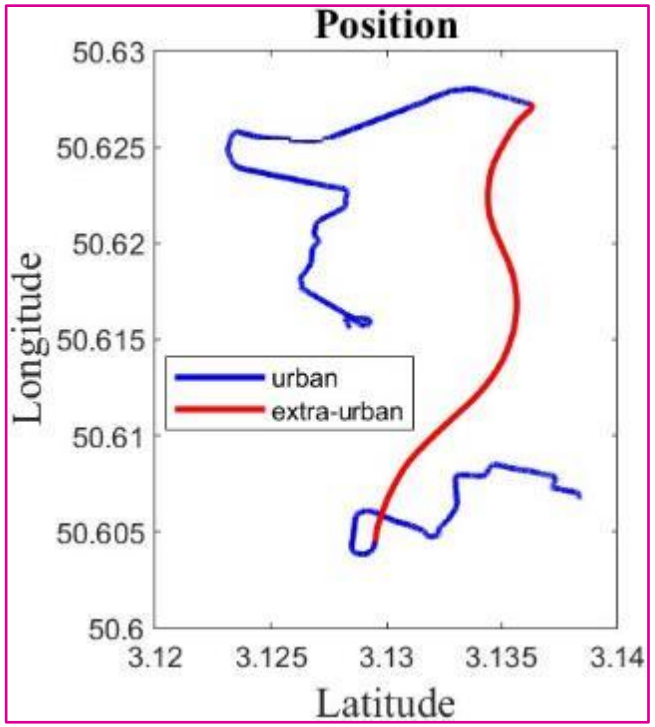
Li, W., Wang, M., Huang, C., & Li, B. (2024). A Survey of Hybrid Braking System Control Methods. World Electric Vehicle Journal, 15(8), 372

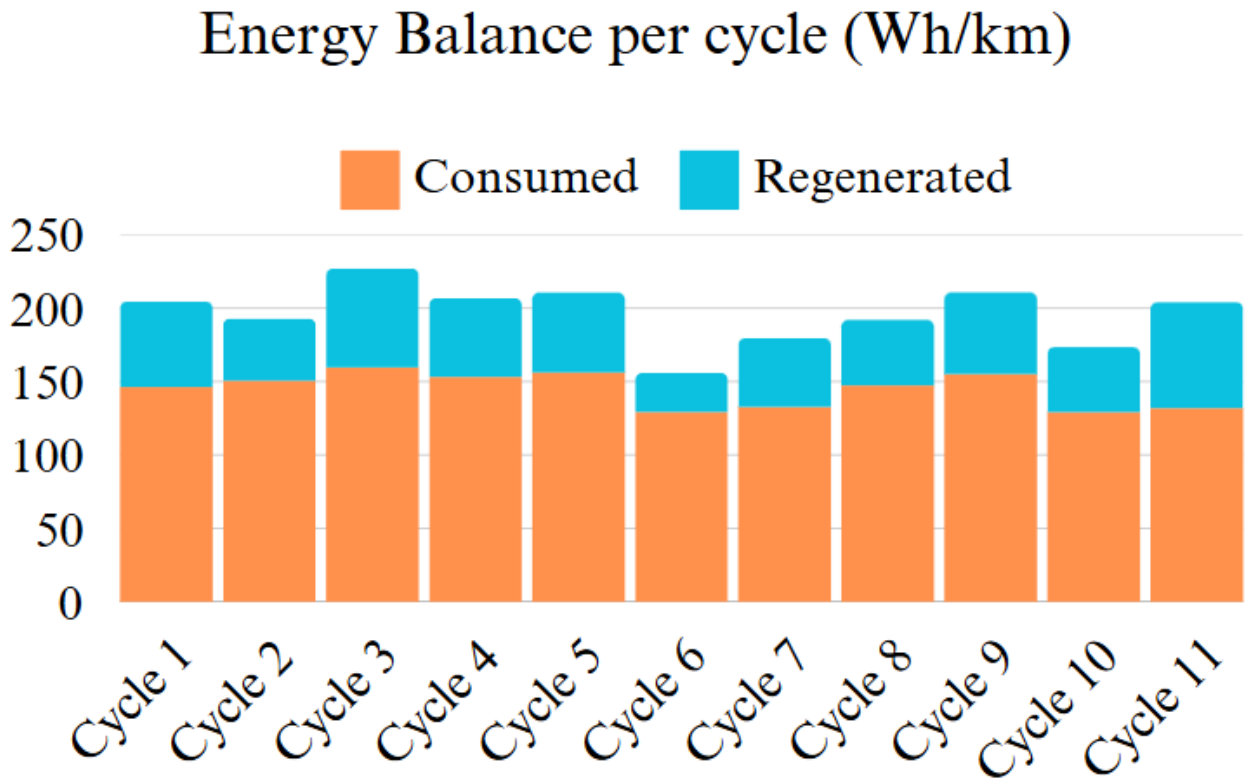
https://cumin.univ-lille.fr/

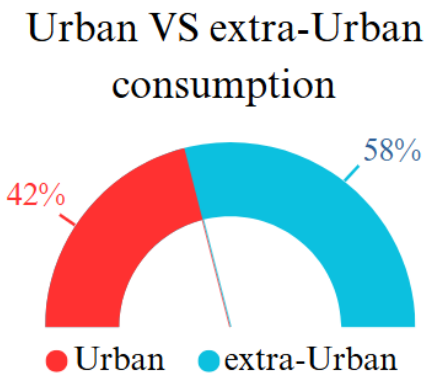
Data analysis

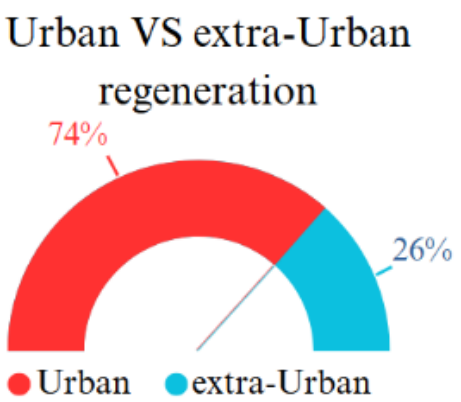
Margaux Lehut Jéhu
Lucie Juncker

Data Analysis



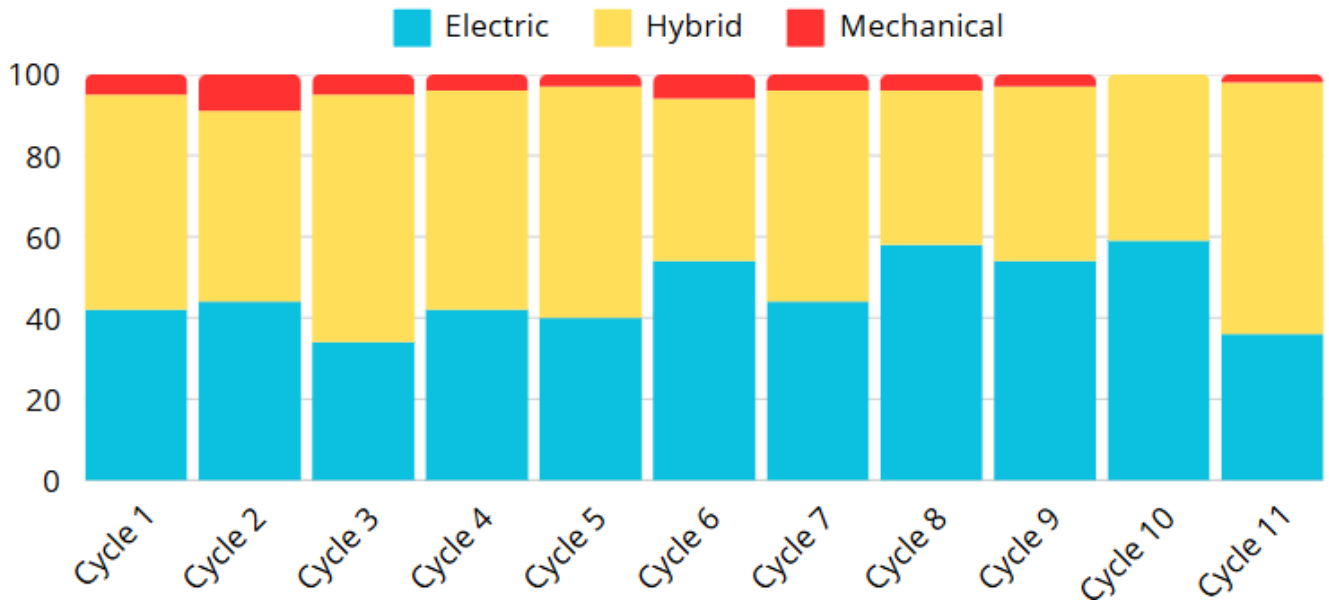




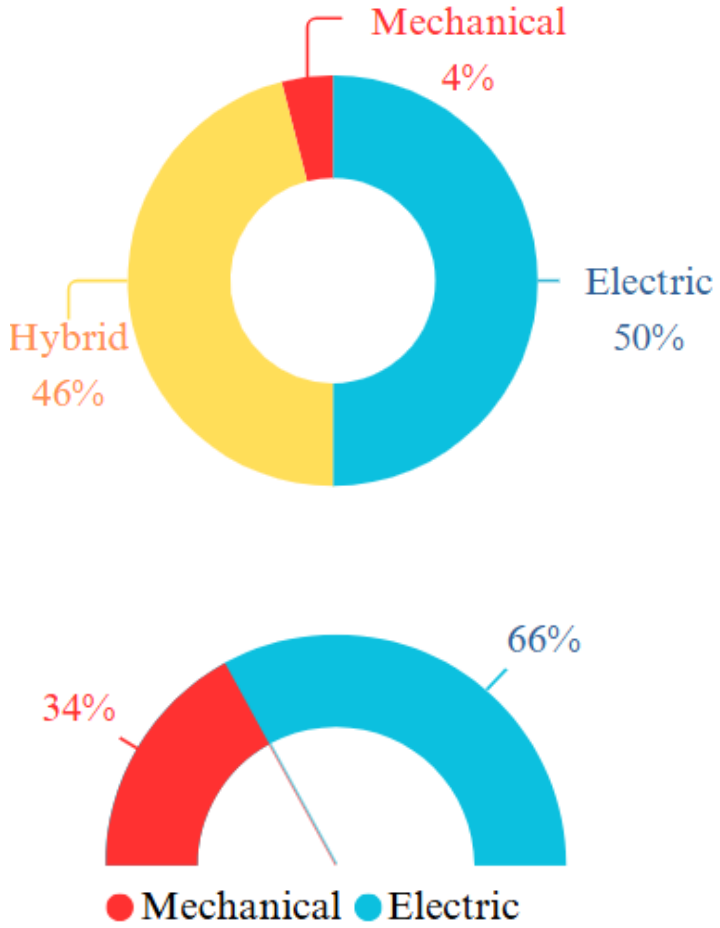


Braking Time Distribution:

- Percentage of Mechanical, Electrical, and Hybrid Braking per Cycle:



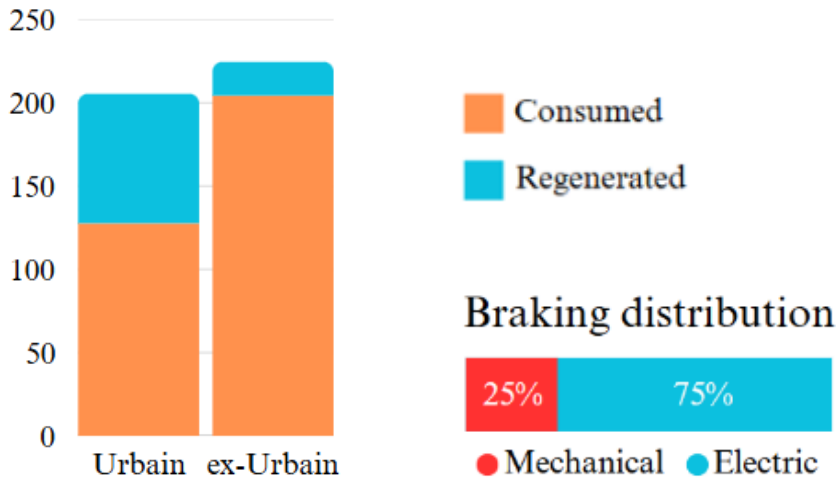
Average Braking Distribution Percentage



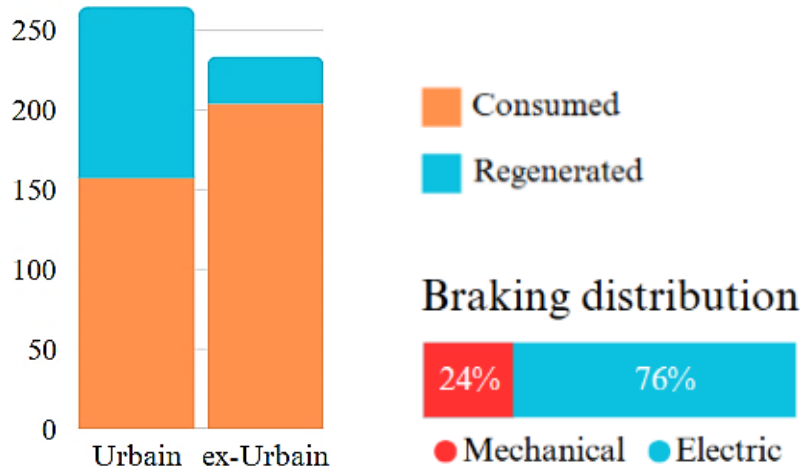
New data: Test

Vehicle mass + 5 people
1850 kg

Energy Balance (Wh/km)



Vehicle mass
+ 5 people
+ 120 kg
2060 kg

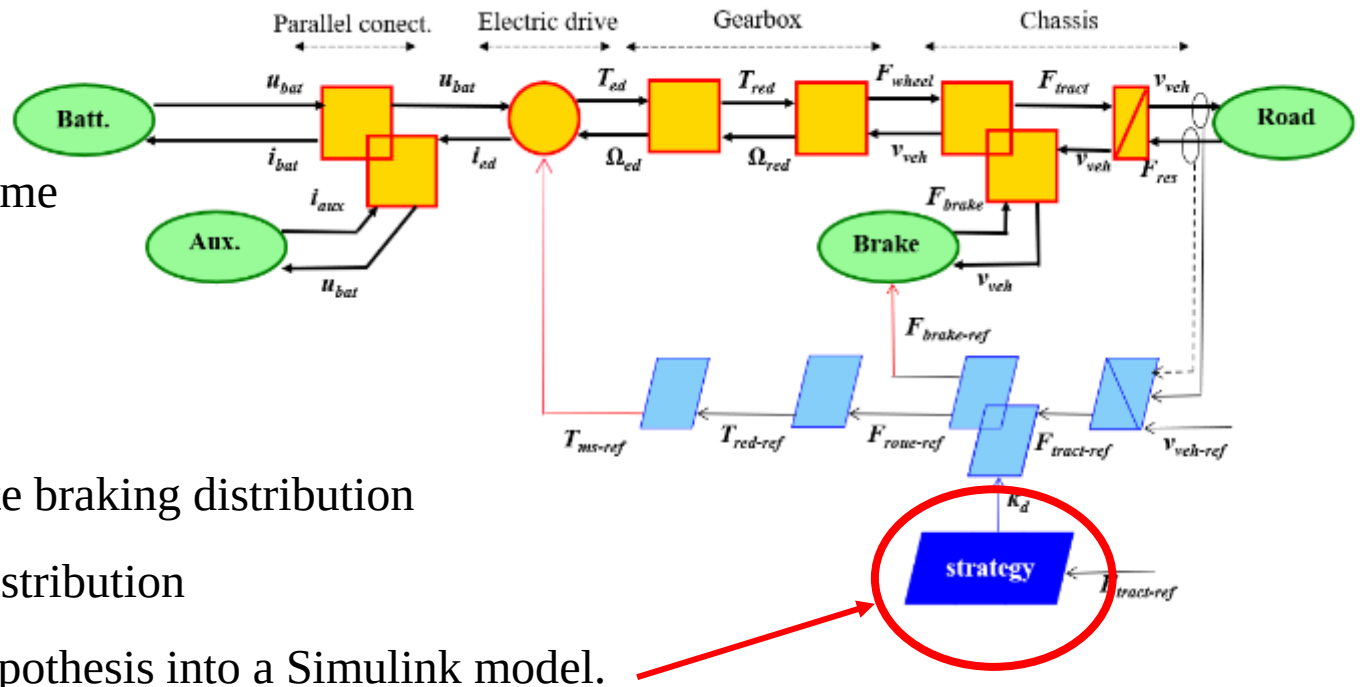


https://cumin.univ-lille.fr/

Conclusion and perspectives

Conclusion:

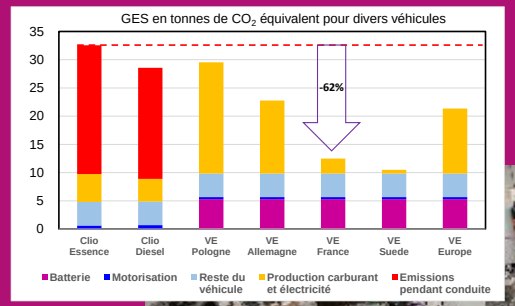
- Analysis of cycle parameters considering:
  - → Urban and extra-urban
  - → Braking time percentage
  - → Vehicle mass
- Hypothesis of braking distribution over Time

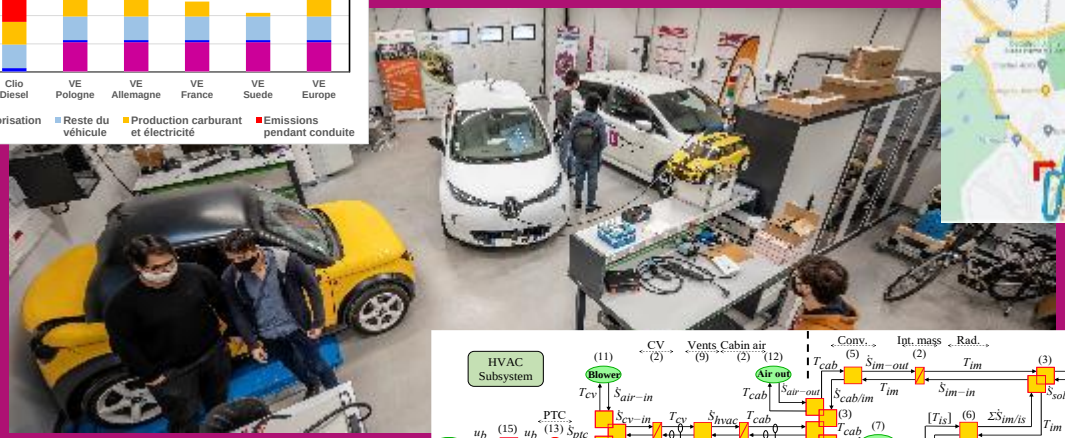


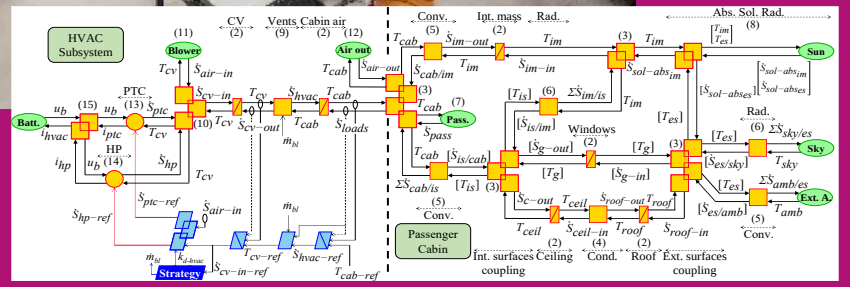
Perspectives:

- Analysis of a high-speed cycle to evaluate braking distribution
- Evolution of the hypothesis of braking distribution
- Integration of the braking distribution hypothesis into a Simulink model.

https://cumin.univ-lille.fr/







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