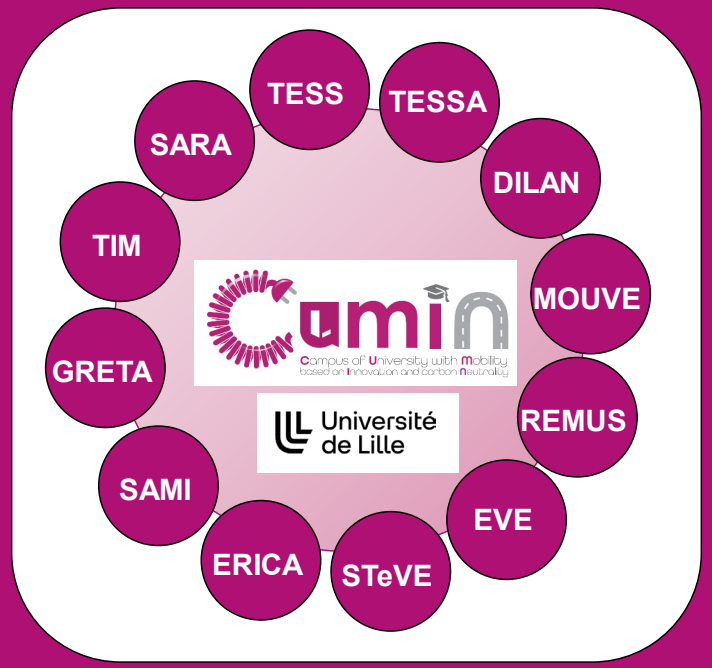
https://cumin.univ-lille.fr/

Campus of University with Mobility based on Innovation and carbon Neutrality

Annual workshop 2025



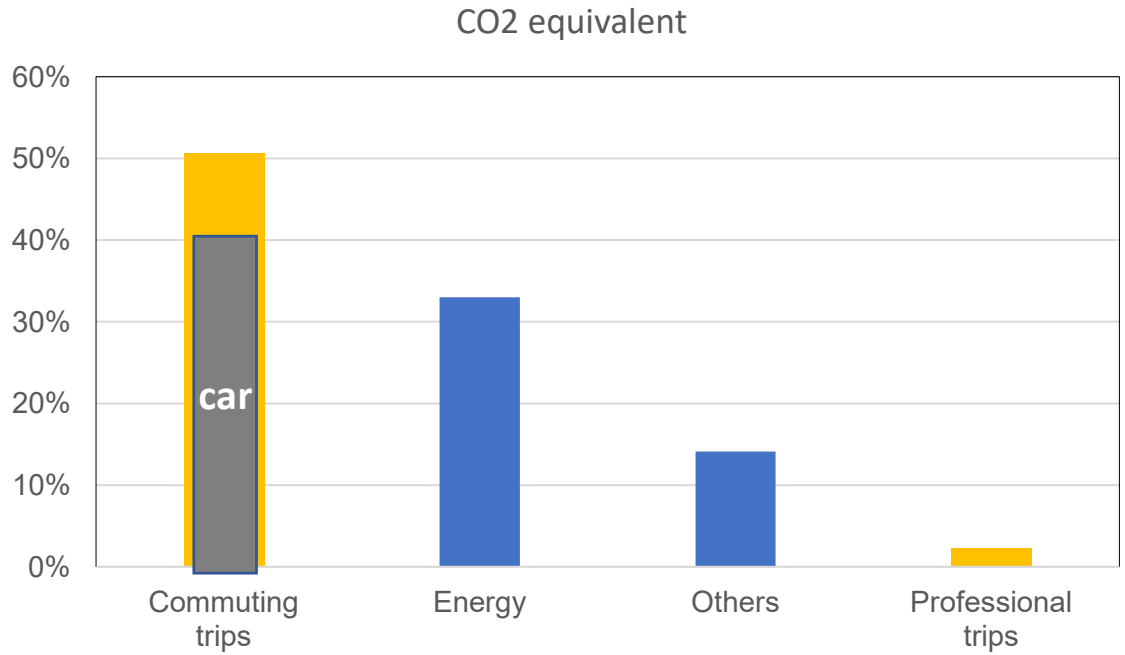
Pr. A. Bouscayrol
(ST, L2EP)

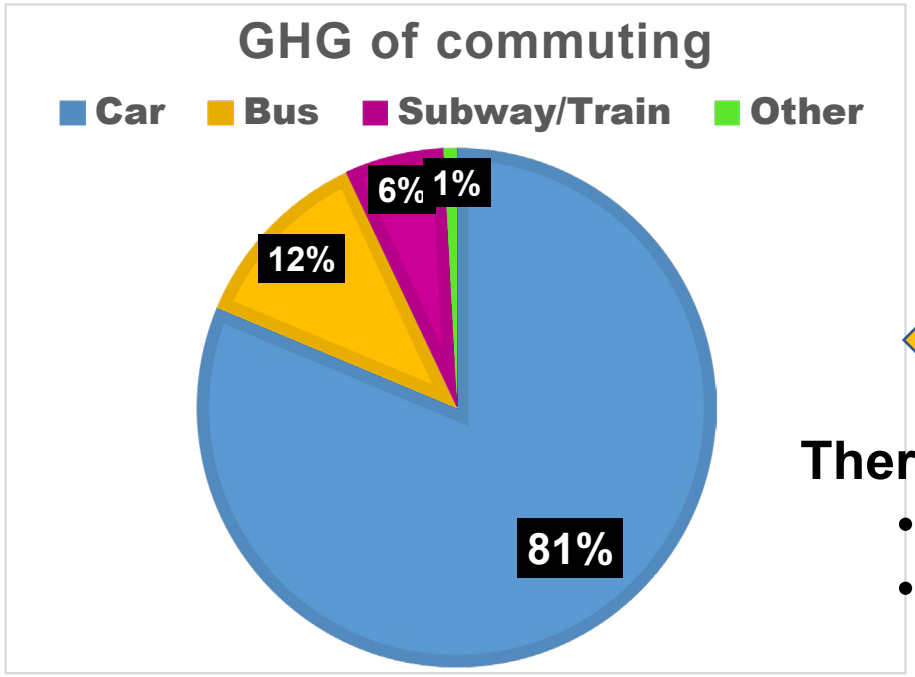
Pr. E. Castex
(SHS, TVES)

University carbon footprint

Université de Lille

In 2020
74 000 students
7 000 staff members
Green House Gases (GHG) 52 000 tons CO2eq





Thermal cars

- only 24% of km
- but 81% of GHG

e-mobility transition?

Thermal vehicles = 41% of the GHG of the University

How to motivate commuters with thermal vehicle to switch to low-carbon alternative?

[ADEME 2022]

	TV 1 person	TV 2 persons	EV 1 person	EV 2 persons	bus GNV*	subway	bike
kgCO2eq / km	0,22	0,11	0,1	0,05	0,12	0,03	0
GHG saving	reference	50%	55%	**77%**	45%	**86%**	**100%**

* Natural Gaz Vehicle

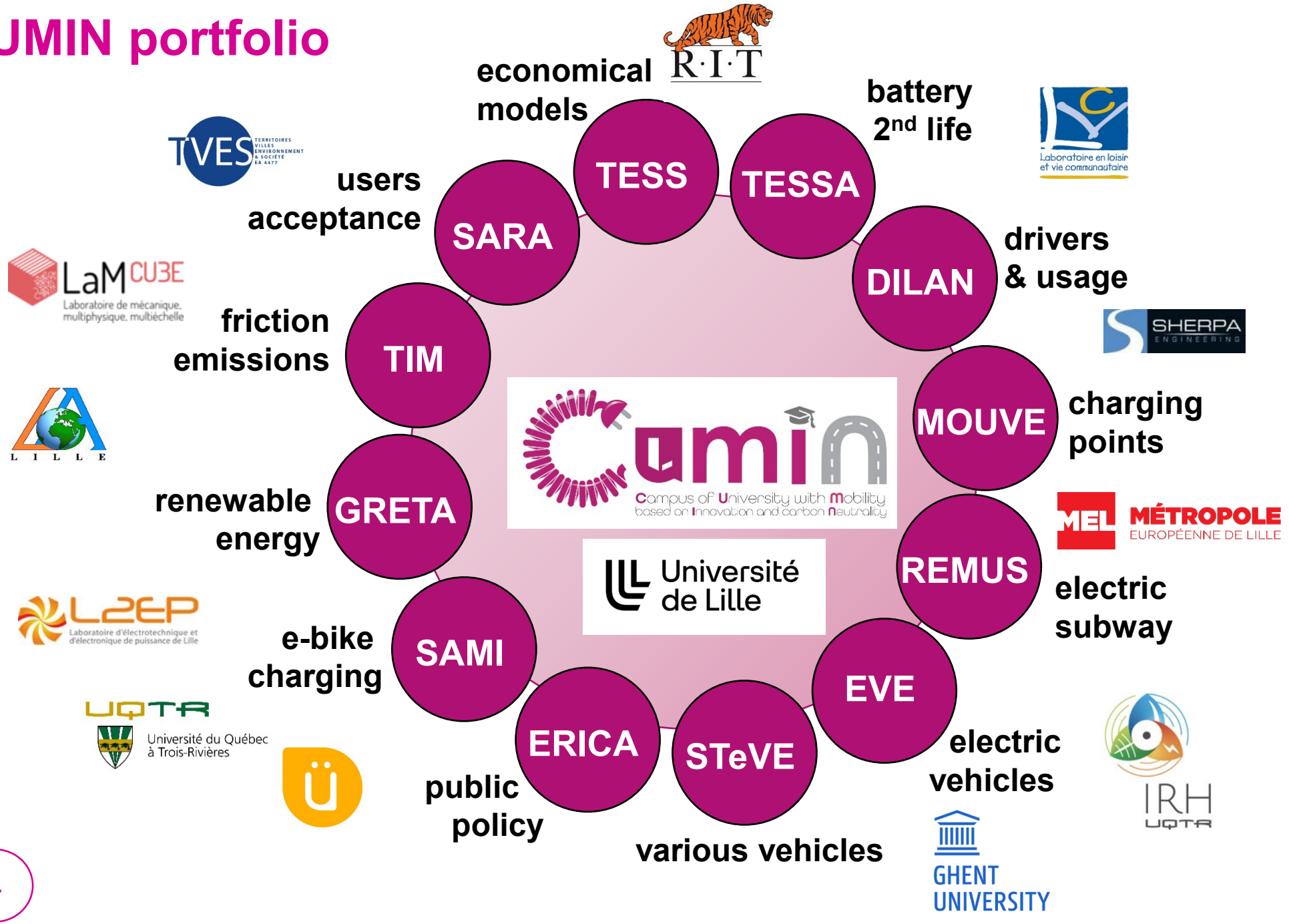
5 000 Thermal Vehicles (TV)

Which distribution?

Which incentives?

Which constraints? Which cost? Which technologies?

CUMIN portfolio



Funding

I-SITE Université Lille Nord-Europe
Université de Lille
MESHS Lille Nord de France
MEL Métropole Européenne de Lille
Région Hauts-de-France
l'Europe s'engage en Hauts-de-France avec le FEDER
Liberté • Égalité • Fraternité République Française
bpifrance
Agence Nationale de la Recherche ANR
Investir l'avenir
Union Européenne

Supports

MEGEVH French network on HEVs
COMASUS Continuum de l'énergie
Panda
ce2i convertisseur d'énergie Intégré Intelligent
ELSAT2020

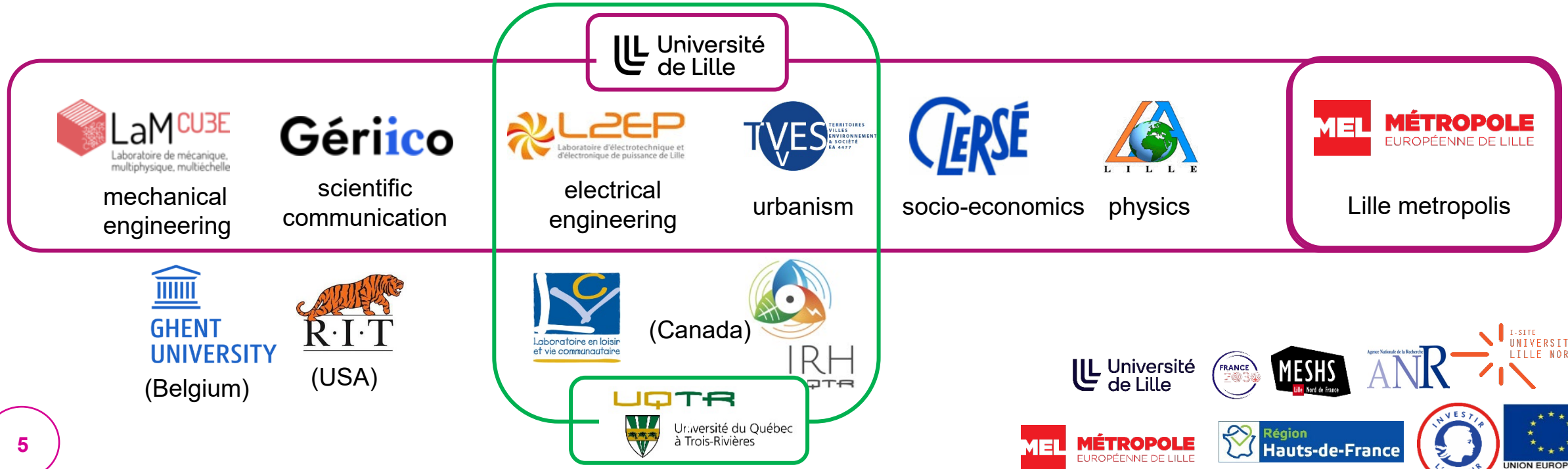
Interdisciplinary programme

Campus of
University with
Mobility based on
Innovation and
Neutrality in carbon

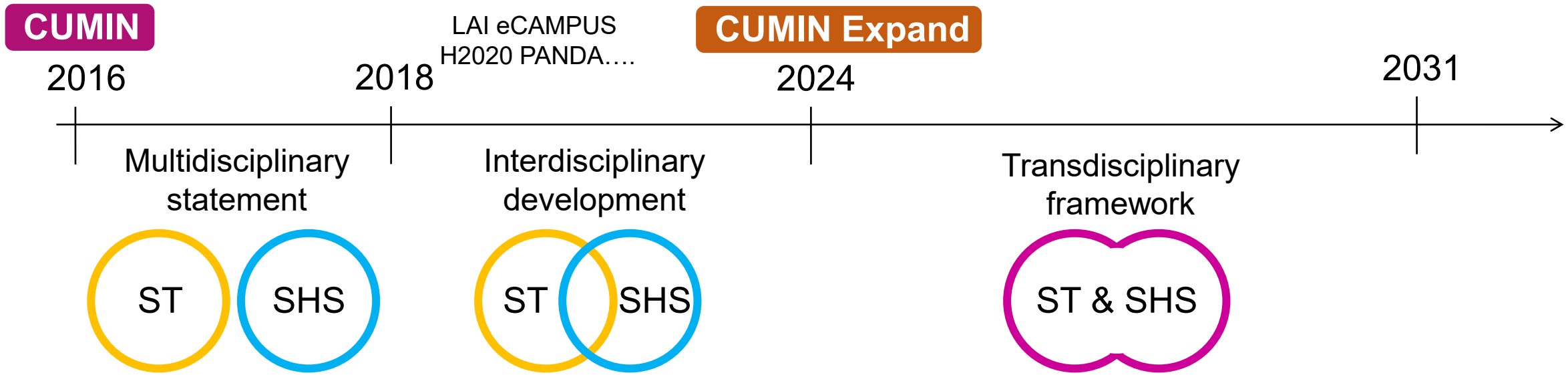
Development of interdisciplinary flexible methods and tools for e-mobility transition as an alternative to thermal cars with the campus « Cité Scientifique » as demonstrator

From innovative technical solutions….

… to socio-economic urban mobility plans



From multidisciplinary to transdisciplinary



3 ST Labs + 3 SHS Labs (person.months: 55% ST + 45% SHS) / (Gender balance: 43%F + 57%M)

Scientific outcomes

A unique interdisciplinary approach

from theory to experimentation

from experimentation to theory

Flexible methods and tools

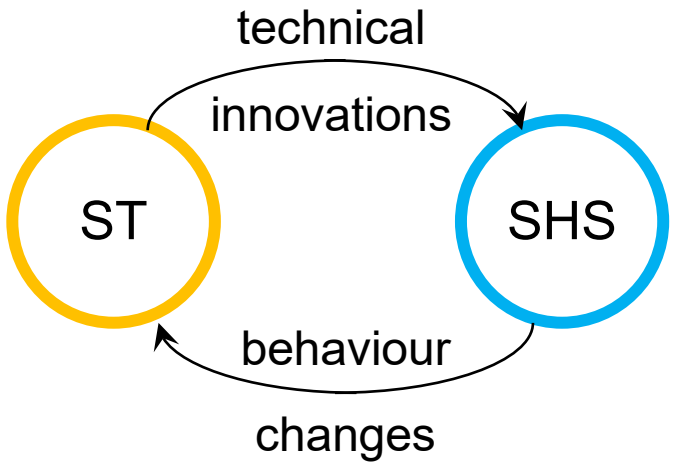
with different spatial

and temporal layers

Accurate and reliable results

with validation and

good understanding



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Accurate energy consumption for comparison of climate change impact of thermal and electric vehicles

A. Desreveaux [a,*], A. Bouscayrol [a], R. Trigui [b], E. Hittinger [c], E. Castex [d], G.M. Sirbu [e]

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[b] Univ Eiffel, Univ Lyon, ENTPE, LICIT-ECO7, F-69675, Lyon, France
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ARTICLE INFO

Handling Editor: X. Ou

Keywords:
Electric vehicle
Conventional vehicle
Life cycle assessment
Global warming potential
Vehicle simulation

ABSTRACT

Performing a climate impact assessment of vehicles is essential for comparing different powertrain options during an entire vehicle life. Life Cycle Assessment (LCA) is used to estimate these effects over a vehicle's lifecycle, including manufacturing, usage, and end-of-life phases. LCA comprises several indicators, such as the Global Warming Potential (GWP). Generally, LCA or GWP studies use manufacturer-reported standard cycle data to estimate the energy consumption of vehicles. In this article, we develop diesel, gasoline, and electric vehicle simulation tools using the Energetic Macroscopic Representation formalism to evaluate that practice. These simulations are validated with actual, measured driving cycles. The simulations are then used to compare the calculated GWP from real, measured driving cycles relative to standard driving cycles used as industry benchmarks. The results show that standard driving cycles consistently underestimate the benefit of switching from fossil fueled vehicles to electric vehicles. Finally, a sensitivity analysis of the battery life duration is included in this work. It shows that the replacement or second life of batteries is also a key parameter in the GWP advantages of electric vehicles.

Societal outcomes

Université de Lille

Contribution of CUMIN:

- Ecologic Transition Plan of University of Lille (2023-2033)
- 3 committees on « Sustainable Development Goals » among 7
- Transition week (24-28 March) workshops & vehicle tests

Demonstrator for:

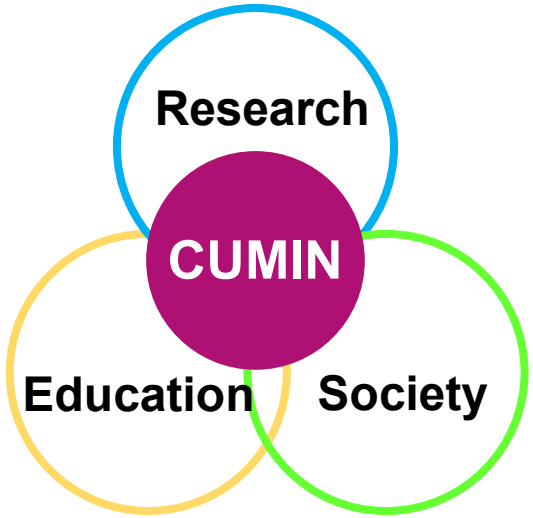
- Lille European Metropolis
- Other international campuses
- Other cities
- etc.

MEL MÉTROPOLE EUROPÉENNE DE LILLE

Campus Living Lab

Methods & tools ?

Education outcomes



eV platform visits
(Univ, IUT, Polytech'Lille, Centrale Lille, ENSAM)

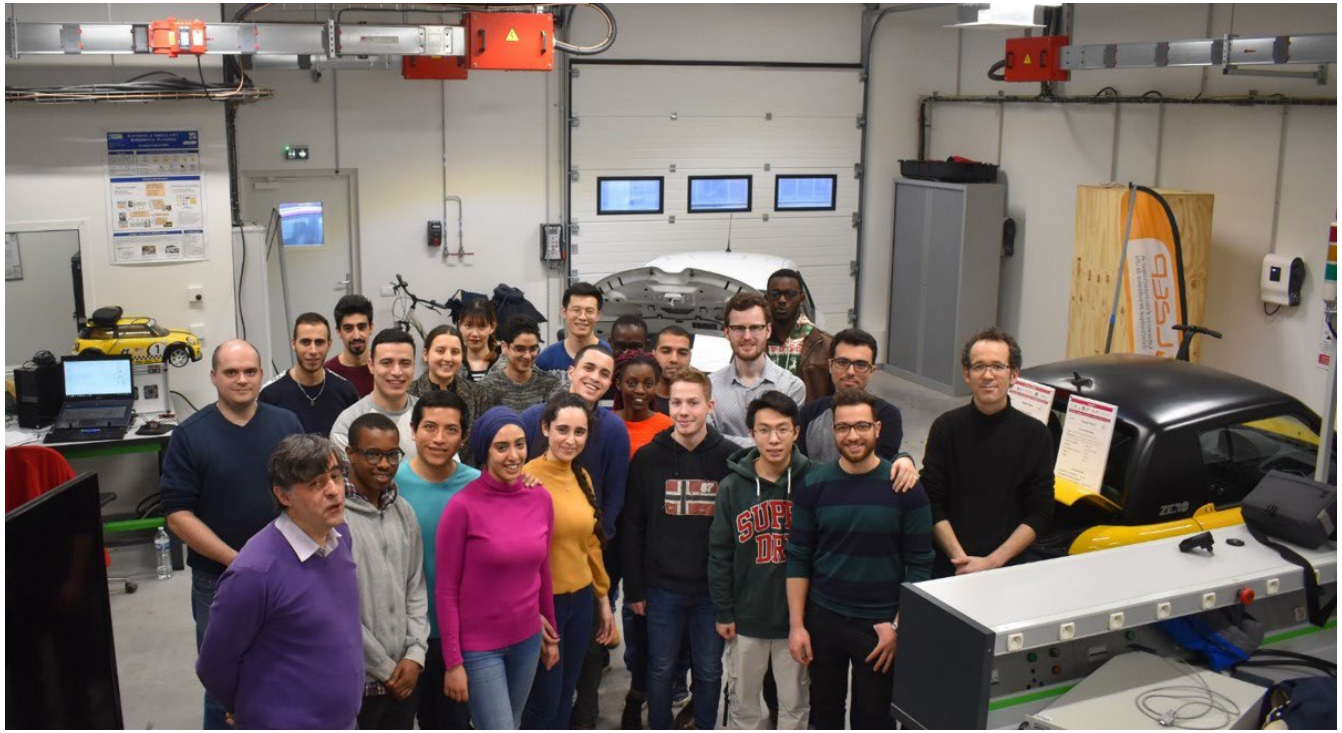
Various projects
(Bachelor, Master, ST & SHS)

Lectures & seminars
(Master ST & SHS)

A transversal doctoral unit
« Green Mobility » (ST & SHS)

Co-supervised PhD theses

- **6 defended**
- **6 on-going**



PhD defended and positions

Anatole DESREVEAUX 2020 “Energy consumption of EV”
CUMIN-EVE, L2EP/TVES/UGE
Funding Region Haut-de-France

Associate Professor @ CNAM Paris

Julia FROTTEY 2020 “Charging deployment”
CUMIN-MOUVE, TVES/L2EP
Funding Region Haut-de-France

Researcher @ INRS Canada

David RAMSEY 2022 “HVAC consumption of EV”
CUMIN-EVE / eCAMPUS, L2EP/IRH
Funding Region Haut-de-France / UQTR

Engineer @ EDF

Ayoub AROUA 2023 “scaling of EVs”
CUMIN-STeVE, L2EP/Univ. Ghent
Funding iSITE ULNE

Post-Doc @ L2EP / SNCF

Florian TOURNEZ 2023 “EV testing”
CUMIN-DILAN, L2EP/VALEO
Funding H2020 PANDA (Europe)

Research Engineer @ L2EP

Ryan O BERRIEL 2023 “Subway energy”
CUMIN-REMUS, L2EP/MEL
Funding MEL

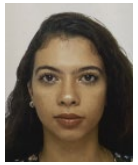
Engineer in Chile

On going PhD students

Alla NDIAYE 2025 "Charging & battery Ageing"
CUMIN-MOUVE/TESSA, L2EP/TVES/Univ. Lyon
Funding Univ. Lille

Eugenie MASCLEF "e-mobility Living Lab"
CUMIN-SARA, TVES/L2EP
Funding Univ. Lille

Salma FADILI "Fast charging station"
CUMIN-MOUVE, L2EP/Sherpa
Funding ANRT / Sherpa



Swapnil REVANKAR "Charging in Winter "
CUMIN-MOUVE / eCAMPUS, L2EP/IRH/
Funding Region Hauts-de-France, UQTR

NEW **Martin CHAUD "**2nd Life battery"
CUMIN-TESSA, L2EP/RIT/TVES
Funding France 2030 – WILL chair, Region Hauts-de-France

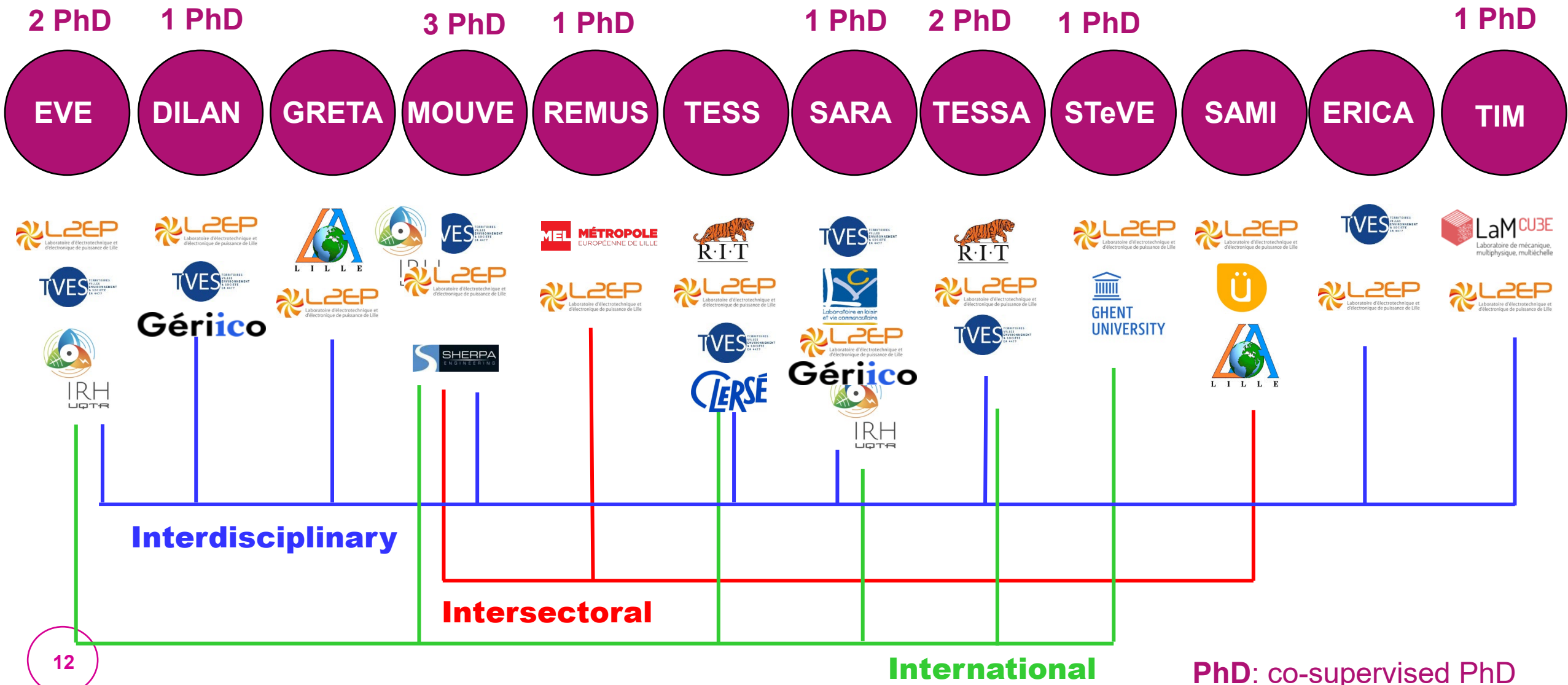
NEW **Margaux LEHUT-JEHU** "EV braking optimisation"
CUMIN-TIM, LaMcube/L2EP
Funding Region Haut-de-France, ADEME

PhD Defence March 18th2025
If validated by University

CUMIN Projects

Conditions:

1. Contribution to CUMIN with 2 CUMIN members
2. Intersectoral or Interdisciplinary or International (H2020 / Horizon Europe)

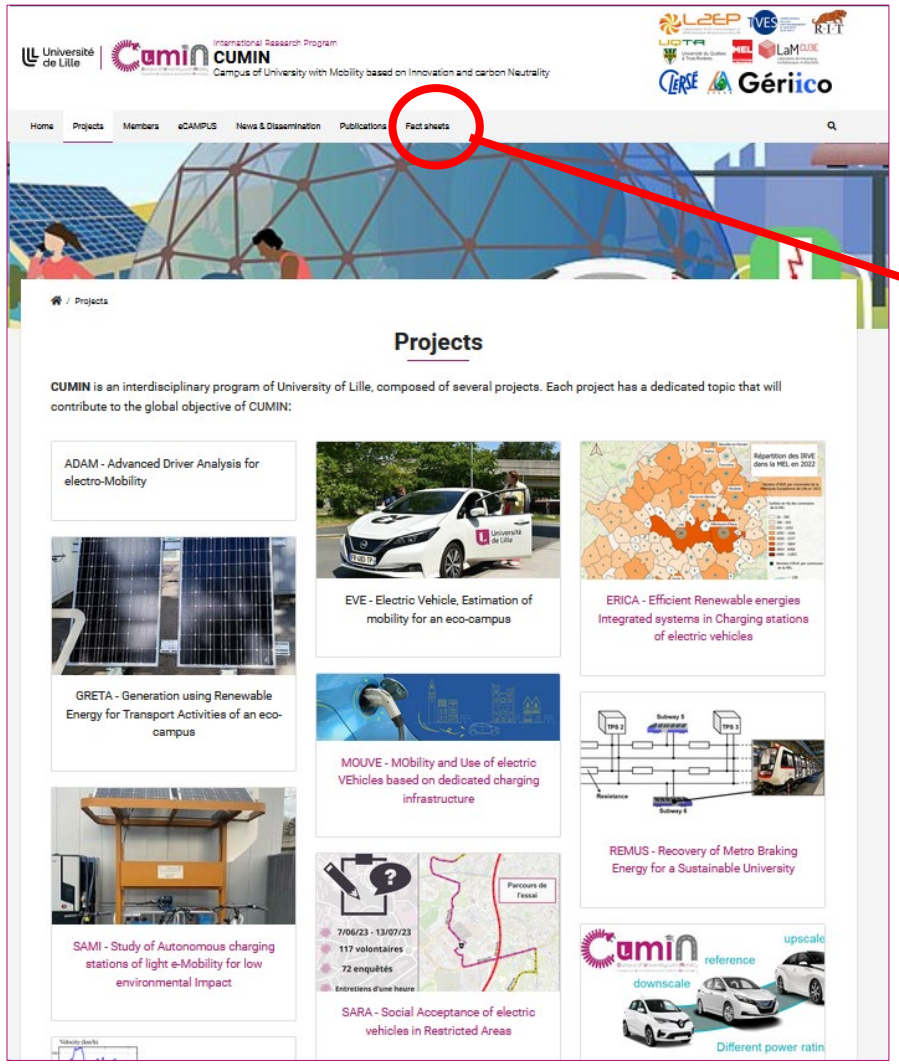


PhD: co-supervised PhD

CUMIN website

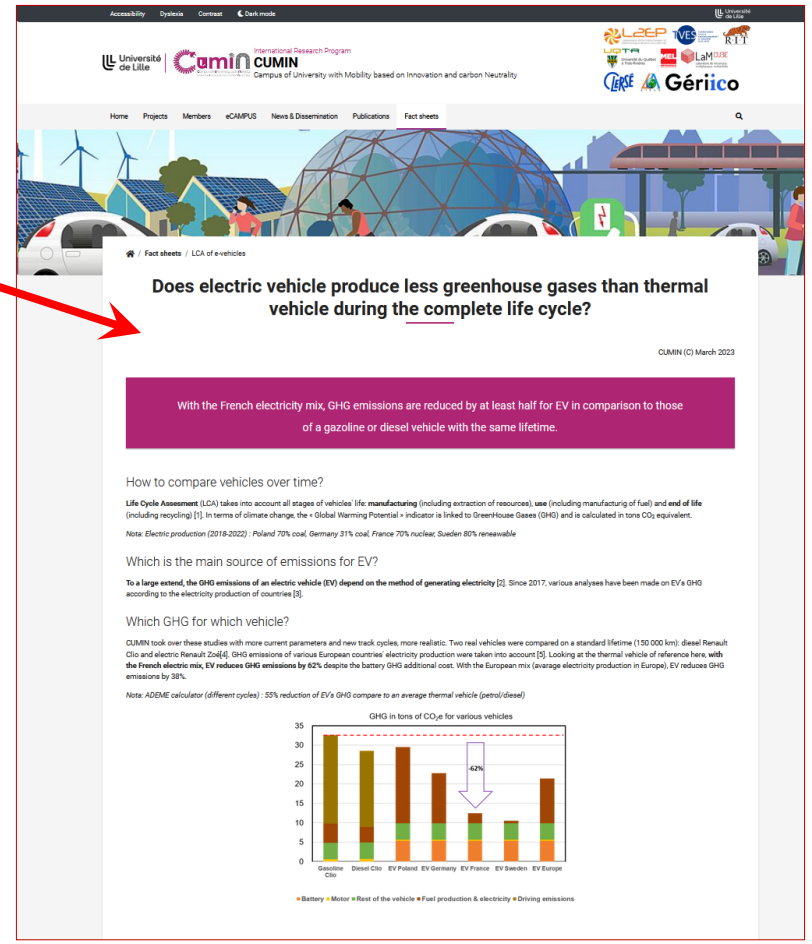
https://cumin.univ-lille.fr/

CUMIN projects description



Informative 1-page factsheets for a broad (French and English):

- GHG of University of Lille
- Life cycle impacts of electric and thermal vehicles
- Impact of teleworking
- Ecologic transition plan of University of Lille



CUMIN annual workshop 2025

	Wednesday 12 February 2025, Lilliad, Amphi B	
13:30	Welcome coffee	
14:00	CUMIN	**A. Bouscayrol, E. Castex** (L2EP/TVES, ULille)
14:30	SARA: Driving test	**L. Juncker, E. Castex, A. Bouscayrol** (TVES/L2EP, ULille)
14:45	SARA: open data platform on e-mobility	**Q. Pochet, A. Fraisse, A. Bouscayrol** (GERiiCO/L2EP, ULille)
15:00	GRETA: solar energy potential	**N. Ferlay** (LOA, ULille),
15:15	EVE: Nissan Leaf consumption	**A. K. Bensadoun, A. Djemadi, C. Plomion** (Master VIE)
15:30	**Coffee break**	
15:45	DILAN: Driving In the Loop	**F. Tournez, W. Lhomme, A. Bouscayrol** (PANDA/L2EP, ULille)
16:00	DILAN: Road Runner	**I. Boukadia, I. Jamal Eddine** (Master VIE)
16:15	STEVE: Scaling Laws/for EVs	**A. Aroua et al.** (UGhent/L2EP, ULille)
16:30	**Coffee break**	
16:45	TIM: Hybrid braking	**M. Lehut, J.-F. Brunel, W. Lhomme** (L2EP, LamCube, ULille)
17:00	TIM: Hybrid braking	**D. Belbachir, E. Hodonou, I. Seck** (Master VIE)
17:15	eCAMPUS: general presentation	**A. Groleau et al.** (LAI eCAMPUS, ULille/ Univ Trois Rivières)
17:30	eCAMPUS: Nissan leaf charging	**S. Revankar et al.** (eCAMPUS/L2EP, ULille/ IRH Univ 3 Rivières)
17:45	**End of the day**	

	Thursday 13 February 2025, ESPRIT, amphi ATRIUM	
12:30	Lunch - Barrois	
14:00	CUMIN & SDG chair	**A. Bouscayrol, B. Lemaire-Semail** (L2EP, ULille, Chaire ODD TE)
14:15	REMUS: CO2 of commuting	**C. Mayet, C. Brocart et al.** (L2EP, ULille, MEL)
14:30	REMUS: Tramway energy consumption	**I. Chbiki, F. Mamou, N. Ouazil** (Master, VIE, MEL project)
14 :45	REMUS: emulation of subway carroussel	**L. Stassin, C. Mayet** (L2EP, Univ. Lille, MEL)
15 :00	EVE: Bus energy consumption	**D. Akli, C. Bathat, M. Leklou** (M2, VIE, MEL project)
15:15	**Coffee break**	
15:30	TESSA presentation	**E. Hittinger, R. German, E. Caxtex** (RIT/L2EP/TVES, ULille)
15:45	TESS: Leaf cost	**M. Lehut, A. Bouscayrol, E. Hittinger** (L2EP, ULille, RIT)
16:00	TESSA: battery charging	**A. Ndiaye, R. German et al.** (L2EP, ULille, AMPERE Univ. Lyon)
16:15	TESSA: battery ageing	**M. Chaud, R. German et al.** (L2EP, TVES, ULille, RIT)
16:30	**Coffee break**	
16h45	MOUVE: fast charging strategies	**S. Fadili et al.** (Sherpa/L2EP, ULille)
17:00	MOUVE: fast charging station	**B. Catrice, G. Houadenou, B. Makoso Pambou** (M2, VIE)
17:15	MOUVE: bidirectional charging station	**F. Djouab, T. Kadour, V. C. Nguyen** (M2, VIE)
17:30	Visit of eV Platform	
18:00	**End of the seminar**	

24 presentations by
Professors, Associate Professors,
Engineers, PhD students, Master students
(a strong value chain!)

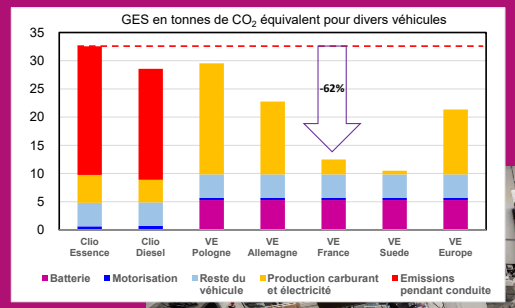
in hybrid mode with Canada and USA

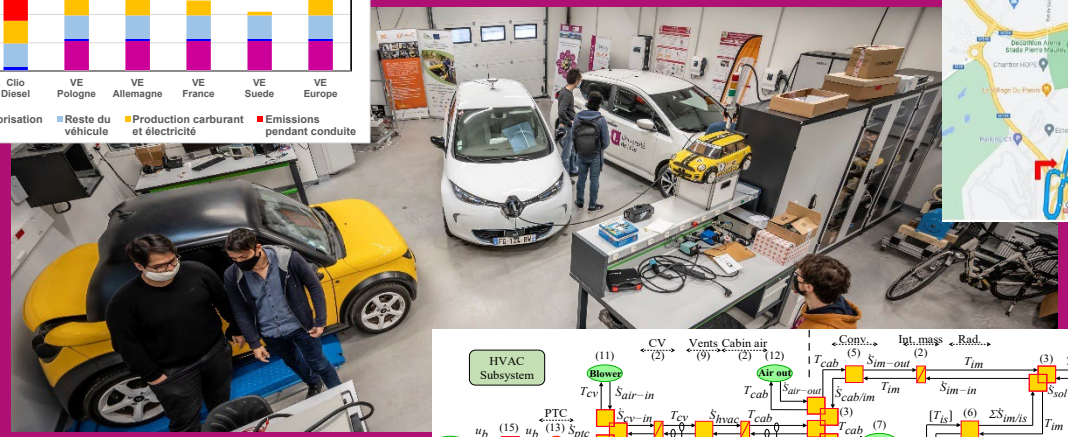
pdf soon @
https://cumin.univ-lille.fr/

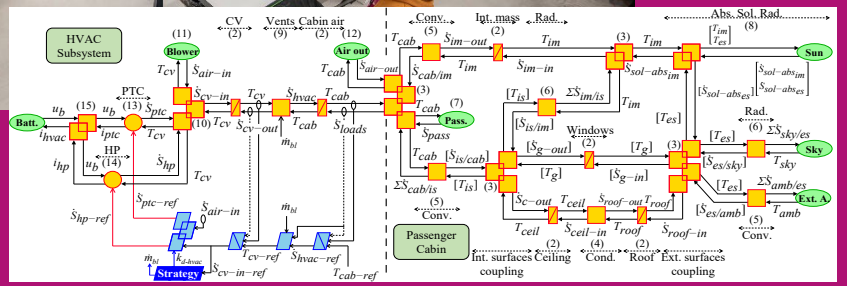
Thanks for our supports

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

Call-CDP 2023







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