

Overview of international activities  
in the context of vehicle LCA harmonisation  
- 2023 Update

UNECE GRPE IWG A-LCA

Brussels

2023-10-17/18



# Overview of current activities

## Activities with vehicle component focus

| Activities   | Scope        |                      |              |             | Status  | Web link  |
|--|--------------|----------------------|--------------|-------------|---|---|
|  | Vehicle type | Techn. level         | Region       | Impact cat. |   |   |
| EU battery regulation Art.7                                  | all          | battery              | EU           | GWP         | carbon footprint methodology final draft 06/2023        | <a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1542">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1542</a>   |
| Global Battery Alliance (GBA) GHG rulebook                   | all          | battery              |              | GWP         | published   | <a href="#">Greenhouse Gas Rulebook - Generic Rules - Greenhouse Gas Generic Rule - Global Battery Alliance Consultations</a>   |
| Japan Battery (PCR)  | all          | battery              | Japan        | GWP         | draft ver.1.0 published 04/2023 by METI                 | <a href="https://www.meti.go.jp/shingikai/mono_info_service/chikudenchi_sustainability/pdf/04_06_01.pdf">https://www.meti.go.jp/shingikai/mono_info_service/chikudenchi_sustainability/pdf/04_06_01.pdf</a>   |
| c-PCR Batteries and parts thereof (International EPD system) | tbd          | battery              | global       | tbd         | formation of working group                              | <a href="#">PCR Library   EPD International (environdec.com)</a>  |
| CatenaX rulebook   | all          | components           | Germany / EU | GWP         | published (v2.0), stakeholder feedback process starting | <a href="https://catena-x.net/fileadmin/user_upload/Standard-Bibliothek/Update_September_2023/CX-0029-ProductCarbonFootprintRulebook-v2.0.0.pdf">https://catena-x.net/fileadmin/user_upload/Standard-Bibliothek/Update_September_2023/CX-0029-ProductCarbonFootprintRulebook-v2.0.0.pdf</a> |
| WBCSD A-PACT Guidance  | LDV          | components / vehicle |              | GWP         | working on alignment with TfS, Catena-X and GBA         | <a href="https://www.wbcds.org">https://www.wbcds.org</a>   |



# Overview of current activities

## Regional activities with vehicle focus

| Activities  | Scope        |                      |         |                 | Status  | Web link  |
|---|--------------|----------------------|---------|-----------------|---|---|
|   | Vehicle type | Techn. level         | Region  | Impact cat.     |   |   |
| CATARC lifecycle carbon emission accounting standard                                    | LDV          | vehicle / components | China   | GWP             | methodology under review  | <a href="https://wiki.unece.org/download/attachments/172852238/LCA-01-07r1_China_CATARC%20presentation%20LCA%20Research%20Progress%20of%20CATARC%2020221027%20update.pdf?api=v2">https://wiki.unece.org/download/attachments/172852238/LCA-01-07r1_China_CATARC%20presentation%20LCA%20Research%20Progress%20of%20CATARC%2020221027%20update.pdf?api=v2</a> |
| PFA LCA guidelines  | LDV          | vehicle / components | France  | 7 (incl. GWP)   | technical paper published   | <a href="https://pfa-auto.fr/wp-content/uploads/2023/04/DT_Me%CC%81thodologie_2023_V15_ENGLISH.pdf">https://pfa-auto.fr/wp-content/uploads/2023/04/DT_Me%CC%81thodologie_2023_V15_ENGLISH.pdf</a>   |
| VDA LCA guidelines  | LDV, HDV     | vehicle              | Germany | 5 (incl. GWP)   | published & no further development                                    | <a href="https://webshop.vda.de/VDA/en/vda-900-100-082022">https://webshop.vda.de/VDA/en/vda-900-100-082022</a>   |
| JAMA LCA guideline  | all          | vehicle              | Japan   | GWP (pot. more) | new version in 03/2024 with third party certification                 |   |
| TranSensus LCA  | all          | vehicle              | EU      | n.n.            | first deliverables available, e.g. SotA report for LCA and S-LCA      | <a href="https://lca4transport.eu">https://lca4transport.eu</a>   |
| <b>GREET</b><br>(Argonne Institute delegated by US Dept. of Energy)                     | LDV, HDV     | vehicle              | US      | GWP             | published, enhancement / extension ongoing with IEA, final by 12/2024 | <a href="https://www.anl.gov/greet">Argonne GREET Model (anl.gov)</a>   |
| <b>Korean Green NCAP</b><br>(KATRI delegated by Korean Ministry of Transport)           | tbd          | vehicle              | Korea   | GWP             | under development   |   |
| <b>French Eco Bonus</b><br>(French Ministry of Economy & Ministry of Energy transition) | M1 (EV)      | vehicle              | France  | GWP             | in force since 10/2023  | <a href="https://www.economie.gouv.fr/particuliers/bonus-ecologique">https://www.economie.gouv.fr/particuliers/bonus-ecologique</a>   |

all: LDV, HDV & category L vehicles

GWP: Global Warming Potential



# Overview of current activities

Customer information oriented activities and overarching activities

| Activities   | Scope                   |   |         |                  | Status  | Web link   |
|--|-------------------------|---|---------|------------------|---|--|
|  | Vehicle type            | Techn. level  | Region  | Impact cat.      |   |  |
| Green NCAP LCA                                       | LDV                     | vehicle   | EU & UK | GWP              | interactive online LCA tool available for consumers                                 | <a href="https://www.greenncap.com/">https://www.greenncap.com/</a>  |
| EPD PCR busses<br>(International EPD system)         | HDV (bus)               | vehicle   | global  | 8<br>(incl. GWP) | PCR 2016:04 Public and private passenger buses and coaches (2.0.2)<br><br>published | <a href="#">PCR Library   EPD International (environdec.com)</a>   |
| EPD PCR pass. cars<br>(International EPD system)     | LDV                     | vehicle   | global  | 8<br>(incl. GWP) | expected publication 02/2024  | <a href="#">PCR Library   EPD International (environdec.com)</a>   |
| EPD PCR vehicles<br>(Korean Ministry of Environment) | LDV<br>(up to 3,5 t)    | vehicle   | Korea   | 7<br>(incl. GWP) | published & under revision  |  |
| Carbon Border Adjustment Mechanism (CBAM)            | all<br>(cross sectoral) | raw material, electricity and "simple finished goods" | EU      | GWP              | stepwise implementation (linked to ETS Free Allowance phaseout) as from 01/2026     | <a href="#">EU carbon border adjustment mechanism: Implications for climate and competitiveness   Think Tank   European Parliament (europa.eu)</a> |
| UNECE GRPE IWG A-LCA                                 | all / tbd               | vehicle   | global  | GWP (tbd)        | work ongoing in 7 subgroups   | <a href="#">Automotive - Life Cycle Assessment (A-LCA) - Transport - Vehicle Regulations - UNECE Wiki</a>  |



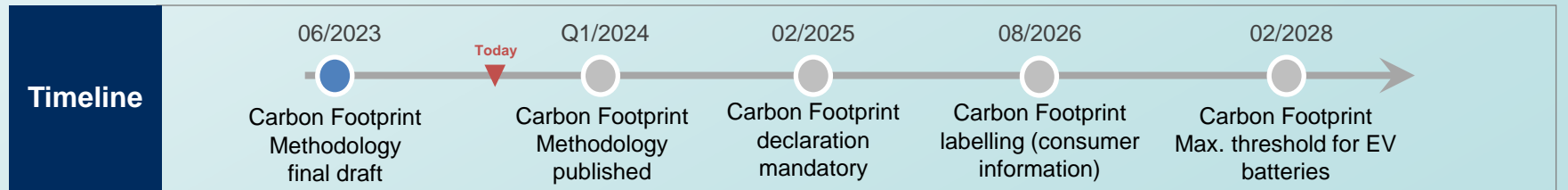
# EU Battery Regulation

## Introduction

- ❑ **EU Battery Regulation: introducing battery sustainability requirements**
- ❑ Article 7 of the new EU Battery Regulation introduces requirements on the Carbon footprint of EV batteries
- ❑ The A-LCA shall align as much as possible with the Battery Regulation CFP methodology developed to avoid fragmentation.

| Background         |                                |
|--------------------|--------------------------------|
| Involved actors    | EU COM / JRC                   |
| Phase              | Final                          |
| Region/Country     | EU                             |
| Related to         | Battery                        |
| Impact Category    | Climate change [kg CO2eq]      |
| Website/regulation | <a href="#">(EU) 2023/1542</a> |
| Vehicle type       | N/A                            |
| Responsible expert | Bruno Li Pira                  |

| Details  |
|--|
| <p><b>New Batteries Regulation in the EU focuses on sustainable and circular battery practices.</b></p> <ul style="list-style-type: none"> <li>○ Aims to reduce carbon footprint, minimize harmful substances, and promote recycling.</li> <li>○ Regulation targets electric vehicles, light transport, and industrial batteries for carbon footprint limits.</li> <li>○ Stricter recycling and recovery targets for critical raw materials will be introduced.</li> <li>○ Consumers can replace portable batteries in electronic products, promoting re-use and reducing waste.</li> </ul> <p><b>Battery Regulation Article 7 (Carbon Footprint requirements):</b></p> <ul style="list-style-type: none"> <li>○ Carbon footprint declaration requirements</li> <li>○ Gradual implementation dates for carbon footprint declaration based on battery type.</li> <li>○ Labeling and performance class requirements for batteries, also with staggered start dates.</li> <li>○ Maximum life cycle carbon footprint threshold and its application to different battery types</li> </ul> |



## Outlook

- EU COM to publish Carbon Footprint calculation methodology in Q1 2024
- Application to begin in February 2025



# French Ecological Bonus

## Introduction

- ❑ Publication of French Décret/Arrêté modifying the conditions of eligibility of Ecological Bonus for new electrical vehicles in France
- ❑ Introduction of an environmental scoring (upstream carbon footprint for a vehicle) based on a proposed formula
- ❑ No Link to UNECE A-LCA

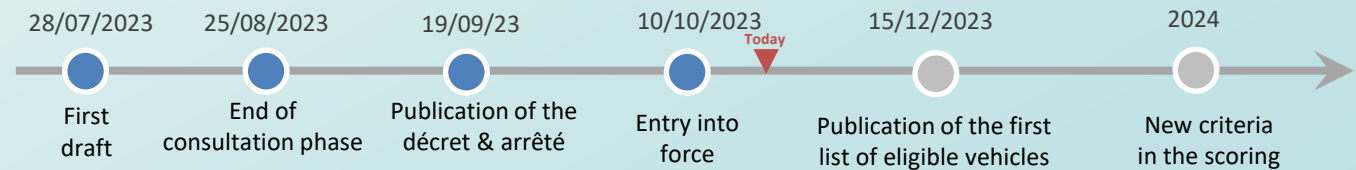
### Background

|                     |   |
|---------------------|---|
| Involved actors     | French Ministry of Economy & ministry of energy transition  |
| Phase               | Entred into force on 10/10/2023   |
| Region/ Country     | France  |
| Related to          | EV  |
| Impact Category     | Global Warming Potential => CO2eq   |
| Website/regulation  | <a href="https://www.economie.gouv.fr/particuliers/bonus-ecologique">https://www.economie.gouv.fr/particuliers/bonus-ecologique</a> |
| Vehicle type        | Electric Vehicle category M1 only   |
| Responsible experts | Emmanuelle Kobialka   |

### Details

- **Vehicle concerned : M1 vehicle only** (mass running order < **2400kg**), Documentations have to be made for **all Type-Variation (MODM\* max)**.  
→ Files to be submitted to **ADEME** by the car manufacturers (first opening of the platform 10/10/2023) and response within max 2 months. Derogation afterwards only.
- **Environmental score : Minimum of 60 points / 80 points max**. Score is only conditioned by a carbon footprint threshold of the vehicle. A specific calculation method is defined by the “décret”. Derogation are possible (LCA study)
- **Threshold to be reached** depend on 2 types of vehicle defined:  
Type 1 : 5 passengers and + / trunk 200L and + / Electric range 170km and + → **< 14.25t CO2eq**  
Type 2 : “Other vehicles” → **< 8.75t CO2eq**
- **Formula EC version\*\***  $EC_{version} = EC_{ferreux} + EC_{aluminium} + EC_{AM} + EC_{batterie} + EC_{ATI} + EC_{transport}$   
→ Carbon Footprint steel + aluminium + other materials + battery + manufacturing + transport
- **Tables of carbon emission factor reference values** in the annexe of the “arrêté” for each categories and given by region or country (steel/alu/other mate/battery/plant/transport)

### Timeline



### Outlook

- The “décret & arrêté” will be updated next year with the introduction of new criteria concerning recycled and bio-based materials and the reparability of the battery (criteria not described at this stage yet)



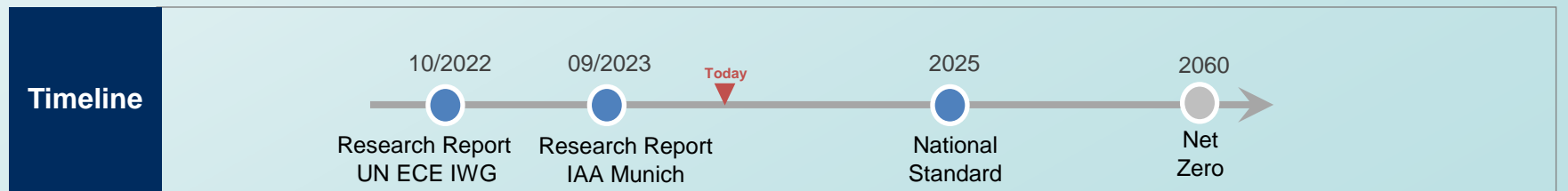
# CATARC LCA

## Introduction

- **China Low Carbon Action Plan (CALCP)– LCA vehicle methodology under review is a non - governmental research program initiated and organized by the China Automotive Carbon Digital Technology Center Co., Ltd (subcompany of CATARC).**

| Background          |   |
|---------------------|---|
| Involved actors     | CATARC, car companies, parts companies, universities, research institutes   |
| Phase               | Research  |
| Region/ Country     | China   |
| Related to parts    | Vehicle & Parts   |
| Impact Category     | GWP   |
| Website/regulation  | <a href="https://wiki.unep.org/download/attachments/172852238/LCA-01-07r1_China_CATARC%20presentation%20LCA%20Research%20Progress%20of%20CATARC%2020221027%20update.pdf?api=v2">https://wiki.unep.org/download/attachments/172852238/LCA-01-07r1_China_CATARC%20presentation%20LCA%20Research%20Progress%20of%20CATARC%2020221027%20update.pdf?api=v2</a> |
| Vehicle type        | Passenger vehicle   |
| Responsible experts | Torsten Kosmehl   |

| Details  |
|--|
| <ul style="list-style-type: none"> <li>○ Since 2018, China Automotive Data Co., Ltd. organized the establishment of the World Automotive Life Cycle Joint Research Working Group and initiated the "China Automotive Low-Carbon Action Plan (CALCP)". It has been accounting and publishing research for four consecutive years</li> <li>○ Research work ongoing and lead by Automotive Carbon Digital Technology Center Co., Ltd</li> </ul> <p>Non-Governmental secondary databases in place:</p> <ul style="list-style-type: none"> <li>○ China Automotive Life Cycle Database (CALCD) - Carbon emission factor database</li> <li>○ China Industrial Carbon Emission Information System (CICES) – Launched Dec, 2021</li> <li>○ LCA Scope: Parts Production, Vehicle Production, Use Phase , Transport / logistic (tbc)</li> </ul> |



### Next steps /Outlook

- CATARC to build a comprehensive data system. The goal is to convert industry standards into national standards by 2025\*

\*Info Dr. Zhao (CATARC) - Minutes of the German-Chinese workshop - ad hoc group decarbonization



# JAMA LCA guideline

## Introduction

- JAMA have established Automotive LCA in 2011 for JAMA internal use.
- Renew JAMA LCA to achieve Carbon Neutral society working together with all stakeholders

### Background

|                     |  |
|---------------------|--|
| Involved actors     | JAMA, JAPIA, JABIA, JATMA, AIST,           |
| Phase               | End of Drafting                            |
| Region/Country      | Japan                                      |
| Related to parts    | Vehicle                                    |
| Impact Category     | GWP  |
| Website/regulation  | N/A at the moment                          |
| Vehicle type        | All  |
| Responsible experts | JAMA LCA Expert Group Chair ; Isao TABUSHI |

### Details

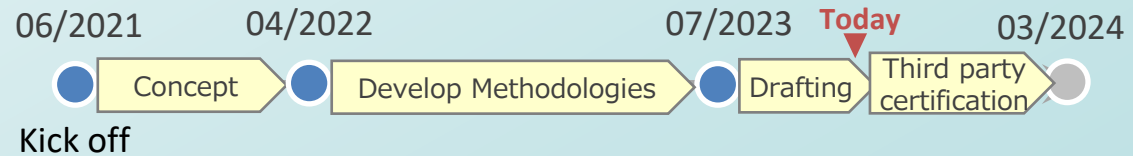
#### ➤ Objectives

1. Toward carbon neutral society, identify pain points for auto industry by LCA, create better cycle for economy and environment, propose policy to government.
2. Make policy to conduct fair evaluation of environmental activity by automotive industry and propose policy to each government not only Japan, but also other countries.

#### ➤ Target

1. Develop automotive LCA methodology to evaluate environmental activity with fairness
2. Incorporate it into global harmonization by aligning with ministry.
3. Clarify LCA pain points for automotive product, request support from government and relevant industries

### Timeline



### Next steps /Outlook

- Third party certification with critical review





# PFA LCA Guidelines

## Introduction

- French Automotive Platform methodological recommendations to conduct a LCA to a vehicle or a vehicle equipment
- LCA approach proposed in the PFA LCA guidelines is the Attribute Approach
- No direct Link to UNECE A-LCA except the participation of 2 Car Manufacturers (STELLANTIS & RENAULT GROUP) as members of OICA

### Background

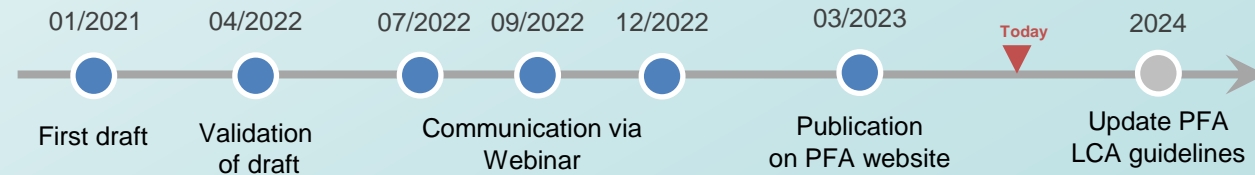
|                     |  |
|---------------------|--|
| Involved actors     | French Automotive Platform<br>Car Manufacturers : STELLANTIS / RENAULT GROUP<br>Suppliers : Michelin / VALEO / FORVIA / PO /   |
| Phase               | Published  |
| Region/Country      | Europe / France  |
| Related to          | Vehicles & parts   |
| Impact Categories   | <b>7 impacts categories :</b><br>Acidification (AP)/Eutrophication (EP) /GWP100 years/Photochemical Ozone Creation Potential /Abiotic depletion (elements) / Metal depletion / Primary Energy Demand |
| Website/regulation  | <a href="https://pfa-auto.fr/wp-content/uploads/2023/04/DT_Me%CC%81thodologie_2023_V15_ENGLISH.pdf">https://pfa-auto.fr/wp-content/uploads/2023/04/DT_Me%CC%81thodologie_2023_V15_ENGLISH.pdf</a>    |
| Vehicle type        | Vehicles M1 & N1 or parts  |
| Responsible experts | Emmanuelle Kobiakka  |

### Details

- Description of LCA Methodology and its potentials applications
- Description of LCA Recommendations :
  - Functional Unit: **use of one complete vehicle or a part over 15 years & over xx kkm** depend on segment (details on table)
  - Scope '**cradle to grave**' for a vehicle, or for a part system boundaries detailed ,
  - Impact categories following characterisation method CML, & Recipe
  - Recommendations for Life Cycle Inventory especially on materials / upstream and downstream logistic / driving stage (WLTC data for Europe) / production of fuel or electricity / maintenance / **End of life cut-off approach**
- Description of Interpretation of data & findings formalization of results should allow to identify the impacts of each phase of the life cycle

| Segment         | Mileage (k km) | Lifespan |
|-----------------|----------------|----------|
| A-SEGMENT       | 150            | 15 years |
| B-SEGMENT       |                |          |
| C-SEGMENT       | 225            |          |
| D-SEGMENT       |                |          |
| E-SEGMENT       | 270            |          |
| F-SEGMENT       | 270 / 300      |          |
| CDV / VAN1-VAN2 |                |          |

### Timeline



### Outlook

- Expected outcome : source of proposition for UNECE sub groups
- Activity ongoing next year (2024) with updating probably on biogenic Carbon recommendations



# TranSensus LCA



## Introduction

- Aims to develop a baseline for a European-wide harmonised, commonly accepted and applied single life cycle assessment (LCA) approach for a zero-emission road transport system.
- funded by EU commission as CSA (Coordination and Support Action)

### Background

|                    |   |
|--------------------|---|
| Involved actors    | consortia: industry (8) and scientific (11)                       |
| Phase              | Conceptualise LCA approach  |
| Region/Country     | EU  |
| Related to         | ZEV, battery  |
| Impact Category    | "all" (tbd) ecol.+social  |
| Website/regulation | <a href="https://lca4transport.eu/">https://lca4transport.eu/</a> |
| Vehicle type       | LDV, HDV  |
| Responsible expert | Diana Bartaune  |

### Details

#### Objectives:

- Conceptualise and demonstrate a single, European-wide real-data LCA approach for zero-emission road transport, ensuring consistency, robustness, transparency and confidentiality needs
- Harmonisation of methodologies, tools and datasets
- Elaborate an ontology and framework for a European-wide LCI database
- Conceptualise LCI data management and update along the life cycle and along the supply chain
- Paving the way for LCA-based product and business development
- Consensus building across all stakeholders
- Defining and providing recommendations and guidelines for the fast uptake of a single LCA approach
- Identifying synergies and transfer potential towards non-road applications

#### Timeline



#### Next steps

- Report about State-of-the-Art for LCA and S-LCA will be published soon



**BACK UP**



# List of abbreviations

| Abbreviation | Meaning  |
|--------------|--|
| IWG VIAQ     | Informal Working Group - Vehicle Interior Air Quality                          |
| PEFCR        | Product Environmental Footprint Category Rules                                 |
| CATARC       | China Automotive Technology and Research Center                                |
| JAMA         | Japan Automobiles Manufacturers Association                                    |
| PFA          | Plateforme Automobile (French association of the automotive industry)          |
| VDA          | Verband der Automobilindustrie (German association of the automotive industry) |
| GBA          | Global Battery Alliance  |
| CBAM         | Carbon Border Adjustment Mechanism   |
| GWP          | Global Warming Potential   |
| GHG          | Green House Gas  |
| LDV          | Light Duty Vehicle   |
| HDV          | Heavy Duty Vehicle   |
| WBCSD        | World Business Council For Sustainable Development                             |