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Sustainability in Vehicle Repair & Replacement

A Project Study @ Technische Universität München
Center for Energy Markets

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Project Study Context & Scope

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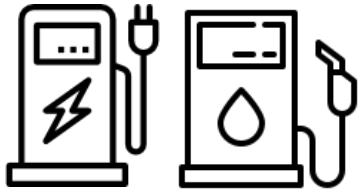
Context:
Repair vs. Replace Study

What is already there?
- ✓ “Repair or Replace” study investigating emissions of repairing or replacing defined damaged vehicle parts of a VW iD.3 BEV

What is still missing?
- ✓ Further drive concepts → addressed in this project study: ICV
- ✓ Further vehicles → addressed in this project study: VW Golf 8
- ✓ Further damage → addressed in this project study: underbody

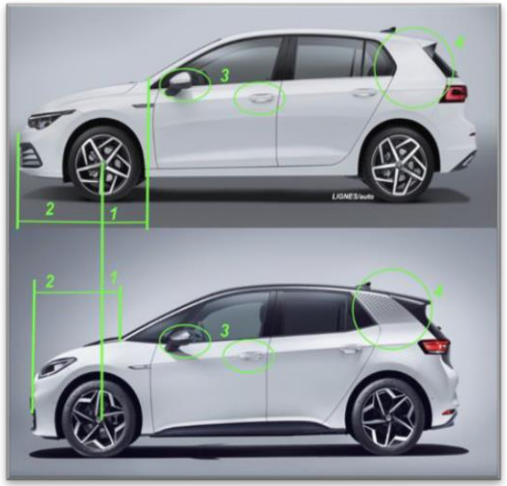
Source: https://www.azt-automotive.com



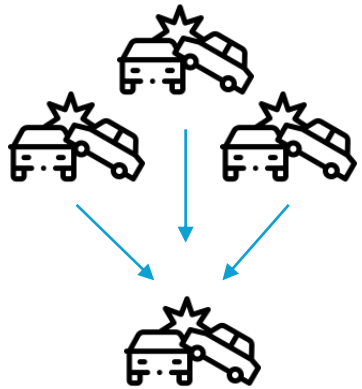
Scope:
Representative Scenarios

Scenario Requirements
- ✓ Typical vehicles: Volkswagen Golf 8 is used as a comparison vehicle for the Volkswagen iD.3 examined in the study
- ✓ Typical claims: Given by damage patterns relevant for insurers

Scenario Definition
- ✓ Front bumper: typical in third party liability motor insurance
- ✓ Windshield: typical in partial comprehensive motor insurance
- ✓ Front door: typical in fully comprehensive motor insurance
- ✓ Underbody: noticeable relevance in BEV insurance claims



Source: https://lignesauto.fr/?p=14212



Analysis of the scenarios using an LCA (ecological assessment)

Project Study Key Results

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Most parts:
BEV & ICV comparable

Front Bumper, Front Door, and Windshield
- ✓ Well comparable LCA results between BEV and ICV due to similarity
- ✓ Material and size of the examined parts are approximately the same
- ✓ Work steps and repair processes are identical (besides HV specifics)

CO2 footprint in typical scenarios comparable between BEV and ICV

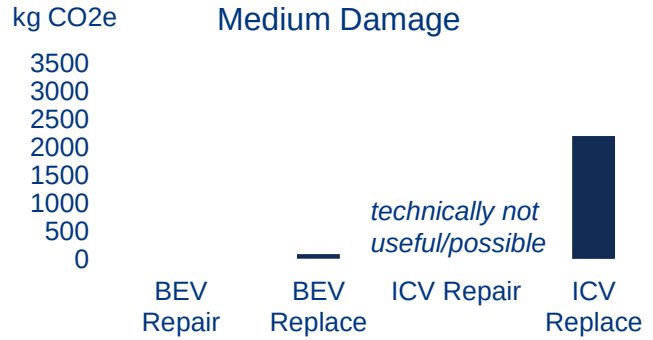
Underbody:
Difference between BEV & ICV due to high voltage battery

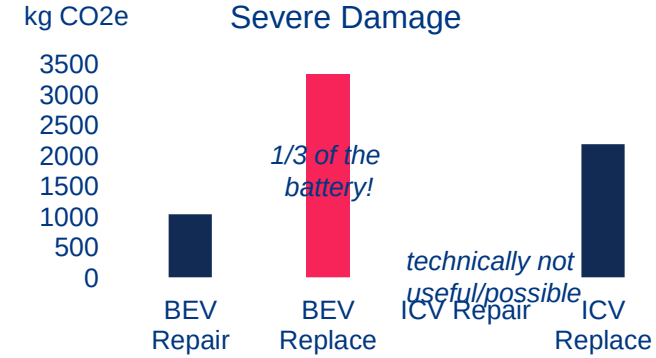
Minor Damage
- ✓ BEV: scratches on battery protection plate → technically no repair needed
- ✓ ICV: scratches on the exhaust system → technically no repair needed
- → No further deepening due to lack of technical relevance

(manufacturers' specifications critical, especially if there is no protection plate)

Medium Damage
- ✓ BEV: medium dent on battery protection plate → repair or replace possible
- ✓ ICV: medium dent on catalytic converter → replacement needed
- → Increased ICV footprint due to precious metals in the catalytic converter
- → Lower BEV footprint can be further decreased by repairing the plate

Severe Damage
- ✓ BEV: partial intrusion (1/3) into vehicle battery → repair or replace possible
- ✓ ICV: severe damage to the exhaust system → replacement needed
- → Even with partial battery replacement, the BEV footprint is greatly increased





BEV & ICV are comparable if no high-voltage parts are damaged
Damage to the battery can cause significant CO2 emissions

THANK YOU