

EMR Interreg project Light Vehicle 2025

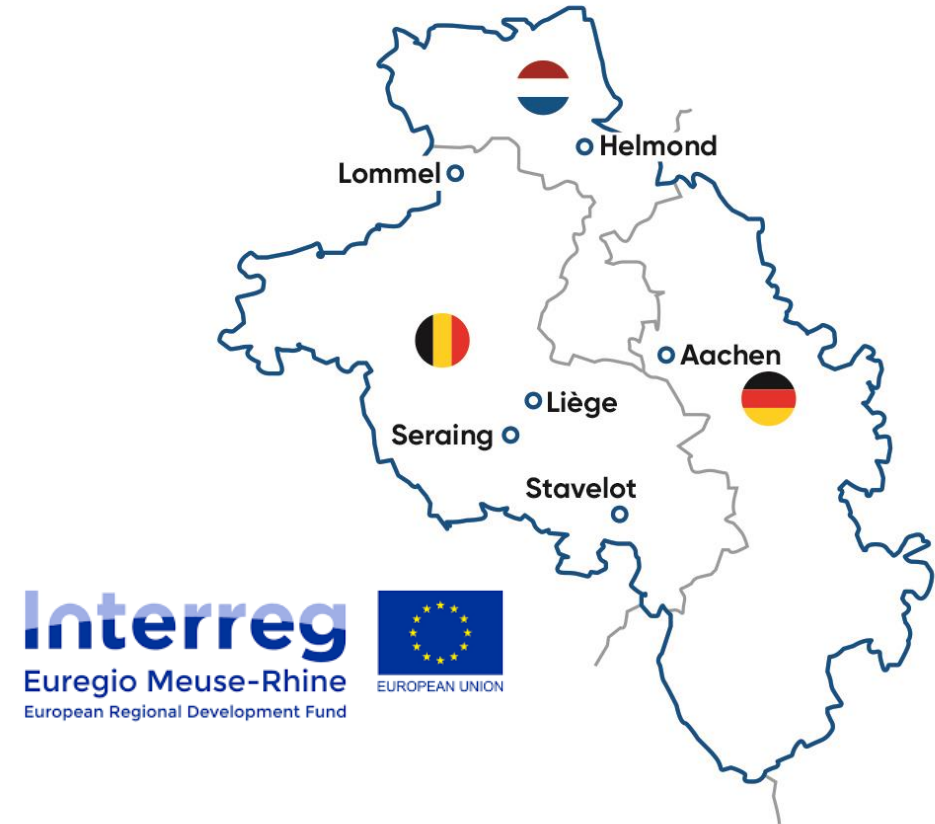
**Presentation for the course of
Vehicle Architecture & Components
MECA0063-1**

source: © sdecoret / www.fotolia.com

Shoulder to shoulder across borders

Euregio support in cross-border cooperation with Interreg

- Until the year 2020, the Program Interreg VA Euregio Meuse Rhein (EMR) invests **96 million euros** in **cross-border cooperation** in the Program Area.
- This area entails roughly the square between Eindhoven, Leuven, Cologne and Trier, an area with almost 5.5 million inhabitants.
- Through the Interreg Projects the European Union directly invests in the **economic development, innovation, the territorial development and social inclusion and education** of this cross-border region.



Interreg is funding the project „Light Vehicle 2025“ in the Euregio Meuse-Rhine

The Euregio Meuse-Rhine

- Many highly **innovative, leading companies** (especially **SMEs**) active in **lightweight, electric mobility and autonomous driving**
- **Attractive region** for automotive business: many representatives along the **entire automotive value chain**, from the raw material producer over technology development to production, from research and development to industrial OEM
- Various OEMs of established and newly established companies are present in the region: Ford, Daimler, BMW (Mini), StreetScooter, e.GO, NedCar, VDL, ADDAX, etc.
- Large multinational chemical companies are present in the region and are very active in the field of composite materials: DSM, Sabic, Lanxess, Covestro, Solvay, ArcelorMittal, Aperam, etc.
- Intermediates like Alro or Schumag, Tier 1s like Punch Powertrain, BOSAL, Tenneco, Tier 2s like ANL Plastics, Zweko, Hercorub, VCST, etc.



The value chain is not yet very developed in the Euregio and many SMEs are still unknown in the region

Light Vehicle 2025: Who are we?

Project Partners



Co-Financers



Ministerie van Economische Zaken

provincie limburg



Provincie Noord-Brabant



Wallonie

„Light Vehicle 2025“ is an EU-funded Automotive cross-border project (by Interreg) in the Euregio Meuse-Rhine

Light Vehicle 2025: Goals

- ✓ Identify and connect companies in the Euregio
- ✓ Connect the competences in workshops/seminars/symposium/match-making events
- ✓ Provide gap analysis on technologies and on training possibilities
- ✓ Raise awareness of coming market requirements
- ✓ Delivering 3 Demonstrators (Analysis - concept - design - manufacturing – testing)
- ✓ Building a Virtual Technology Center on automotive engineering for the future, including a who-is-who database
- ✓ Inspire cooperation and cross-border clusters
- ✓ Stimulate knowledge transfer
- ✓ Provide an up-to-date worker and engineer training framework

Why Lightweight?

- Creating the future in automotive with **lightweight materials and design.**
- Safer, lighter, more fun to drive, environmentally friendly thanks to material savings, **reduced fuel consumption** and **CO₂ emissions**, increase in range.
- **Cost-efficiency** in **high-volume production** cycles thanks to new progresses in manufacturing technologies.



source: © sdecoret / www.fotolia.com

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Need for lighter cars

EU Target 2021
95g CO₂/km
(4.1l/100km petrol)

Penalty of **95€** for
each g/km of target
exceedance

Emission target set
according to average
vehicle mass

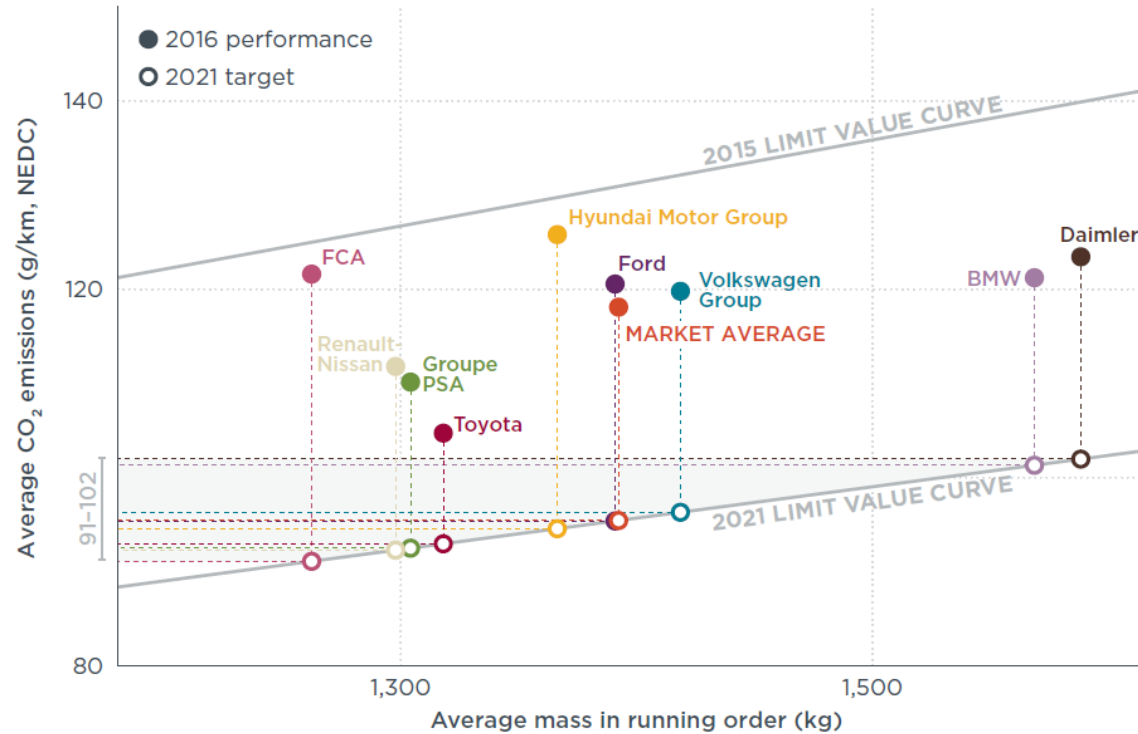


Figure 2. Average CO₂ emission values and vehicle mass of major manufacturer groups in 2016.⁵ Hypothetical 2021 targets are based on average 2016 mass. Limit value curve for 2015 included for reference.
Source: ICCT 2018

**Life Cycle
Assessment** and
Recycling

Preserving **safety**:
crashworthiness, fire,
etc.

Preserving **comfort**
and **NVH**
performance

Source: European commission

Enhancing **vehicle dynamics**
and **driving performance**

Means of light weighting

Material substitution

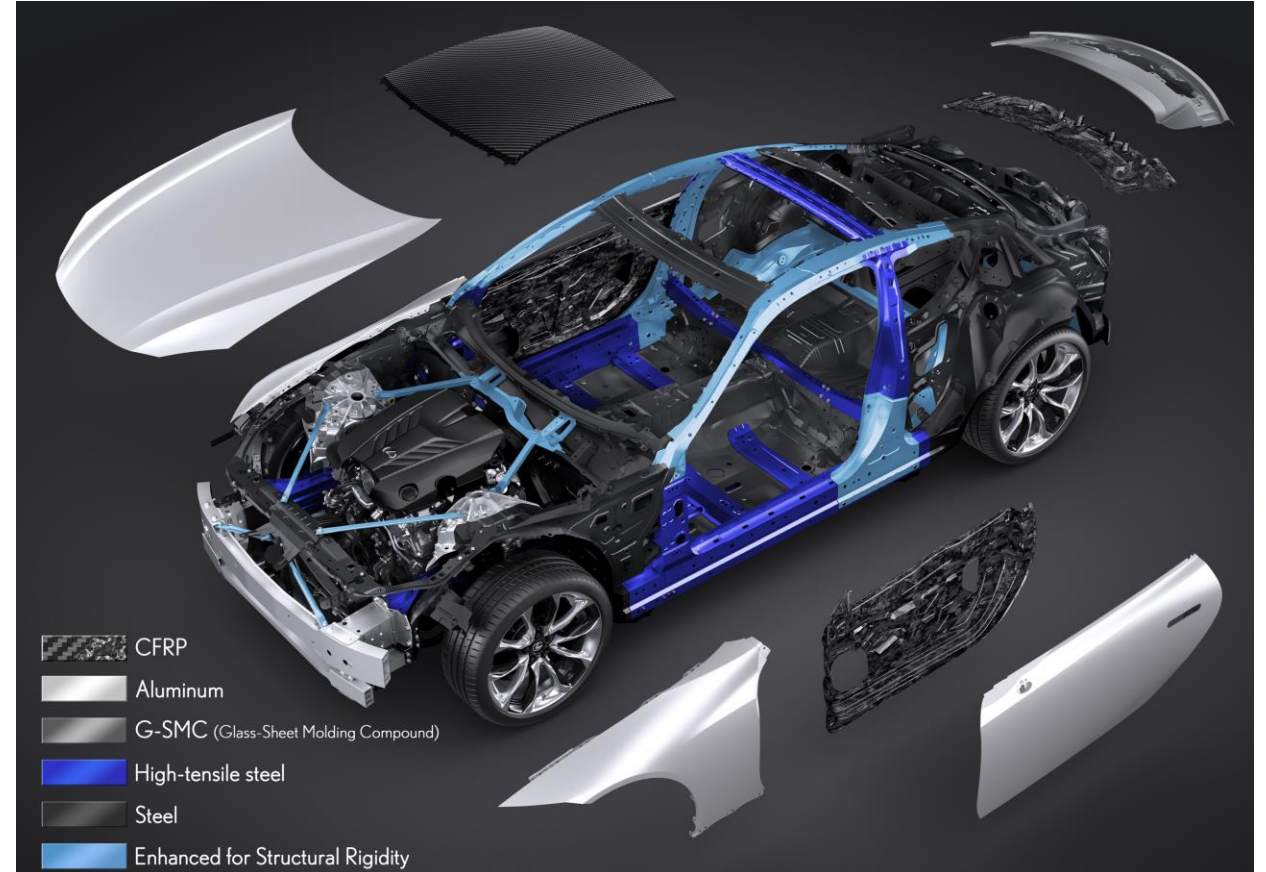
- High Strength Steel, Aluminum, Magnesium
- Composites and plastics
- Multi-material solutions

Effective re-design

- Take full advantage of new materials
- Multifunctional design

New production processes in place of traditional ones

- Control cost
- Control indirect CO₂ emissions (grey energy)
- Save raw materials

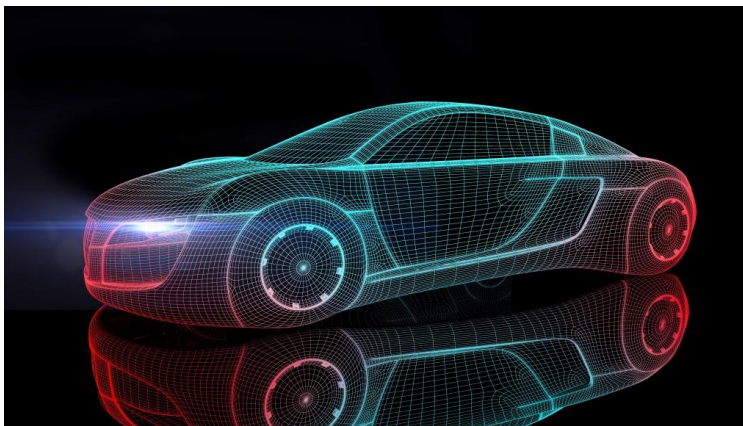


Source: altairenlighten.com

Light Vehicle 2025 Demonstrators

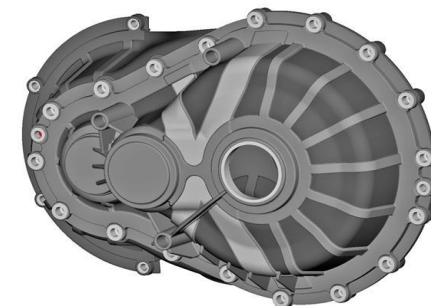


Body
e.g. lightweight door



Suspension
e.g. rolling bar

E-Powertrain
e.g. gearbox housing



Energy storage
H₂ tank



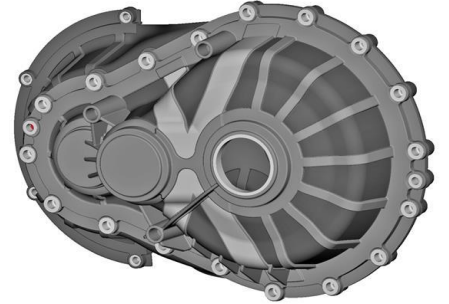
Light Vehicle 2025 Demonstrators



Body
e.g. lightweight door

- ☐ CAD, CAE
- ☐ Material development
- ☐ Process simulation
- ☐ Prototyping
- ☐ Testing

E-Powertrain
e.g. gearbox housing

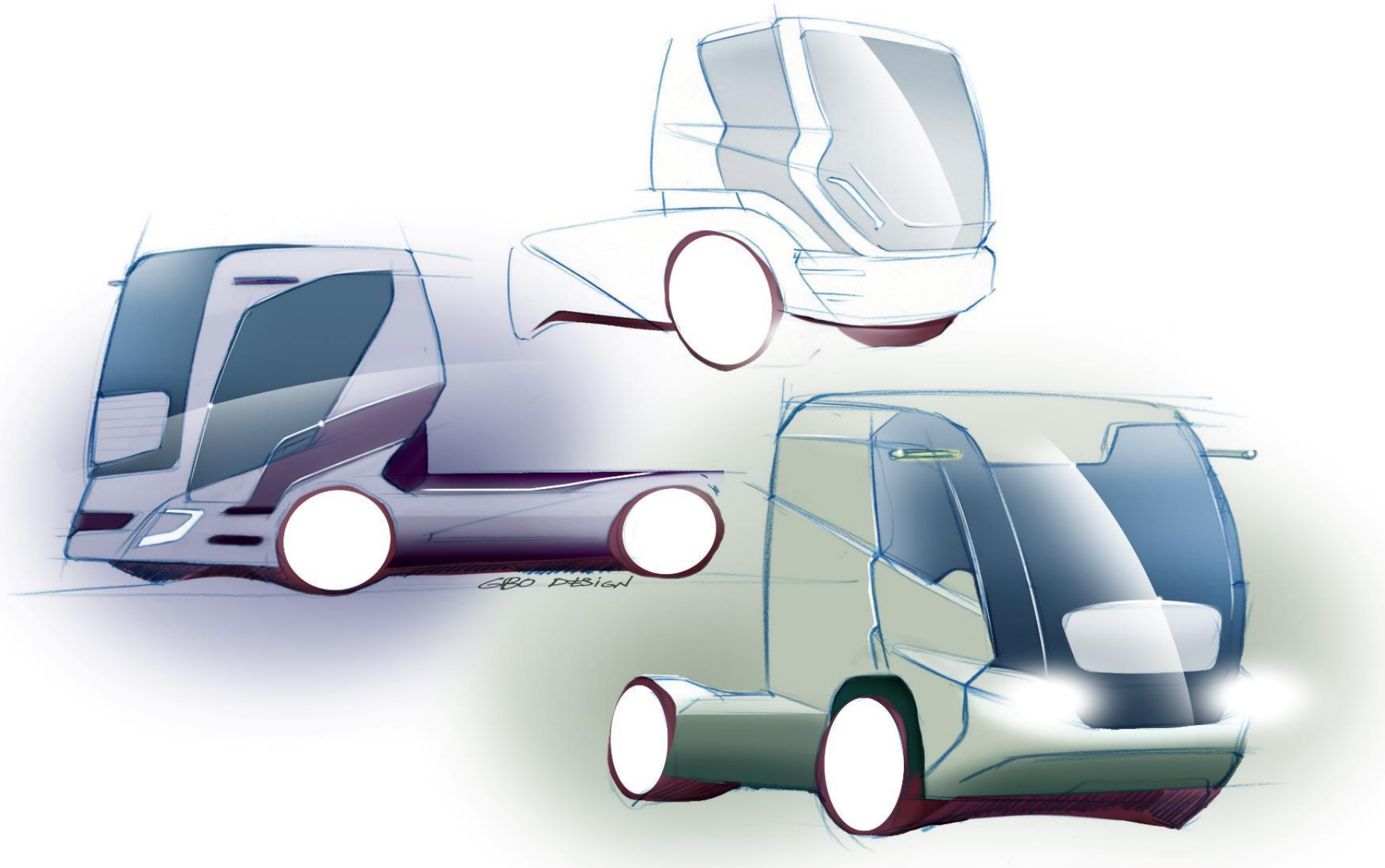


Suspension
e.g. rolling bar

Energy storage
H₂ tank



Truck door demonstrator







fx	A	B	C	D	E	F	G	H	I	J	K
1	Part	Sub part	Name	Material	Dimensions in mm(l x w x h)	Weight in grams	Manufacturing method 1	Manufacturing method 2	Finish	Mounted on main part	Amount
2	1	1	Door frame	Steel	1630 x 970 x 90	17410 grams	Pressed	166 spot welding points	Carpaint	-	1
3	1	2	stalen scharnier	Steel	210 x 90 x 20	1496 grams	Iron casting	10 holes, 6 threaded	Carpaint	Four screws	2
4	1	3	zwart staaltje 1	Steel	115 x 30 x 2	57 grams	Pressed	Attached screw is welded	Black paint	Two screws	1
5	1	4	zwart staaltje 2	Steel			Pressed		Black paint	Two screws	1
6	1	5	Handvat deur	ABS	267 x 118 x 60	512 grams	Injection moulding			Two screws	1
7	1	6	Bitumen mat	Bitumen							1
8	1	7	Glas begeleiding 1 buiten	ABS	690 x 50 x 2	146 grams	Injection moulding	-	-	Two screws	1
9	1	8	Glas begeleiding 2 buiten	ABS	720 x 60 x 2	144 grams	Injection moulding	-	-	Clicked on begeleiding 1	1
10	1	9	Glas begeleiding 3 buiten	ABS	680 x 50 x 4	102 grams	Injection moulding	-	-	Three screws	1
11	1	10	Glas begeleiding 1 binnen	Steel / Rubber	870 x 12 x 22	200 grams	Die cutting and bending	Rubber extrusion	-	Pressed	2
12	1	11	Glas begeleiding 2 binnen	Rubber	2125 x 94 x 13	760 grams	Rubber extrusion	-	-	Pressed	1
13	1	12	afdichting deur cabine	Rubber	1140 x 12 x 18	126 grams	Rubber extrusion	-	-	Glewed	1
14											
15											
16											
17			Spot welding points:	166							
18			Outside door	41							
19			inside door	125							
20											
21											

+ ☰ Main door ▾ Inner panel ▾ Glass ▾ Spoiler ▾ Mirrors ▾

Body weight: 27,9 kg

Glass and Rubbers: 17,5 kg

Interior panel: 8 kg

Mirrors: 6,1 kg

Total door weight: 59,5 kg

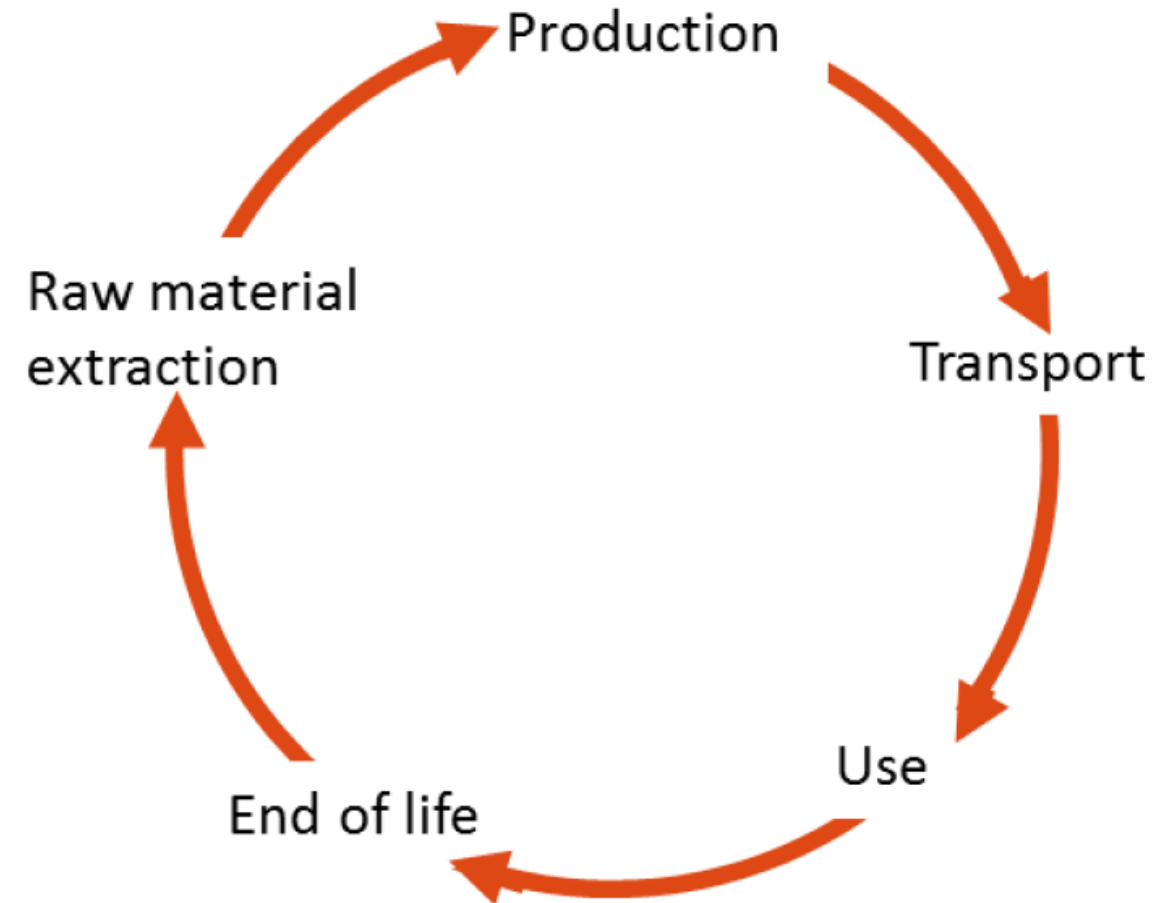


Demonstrator Consortium

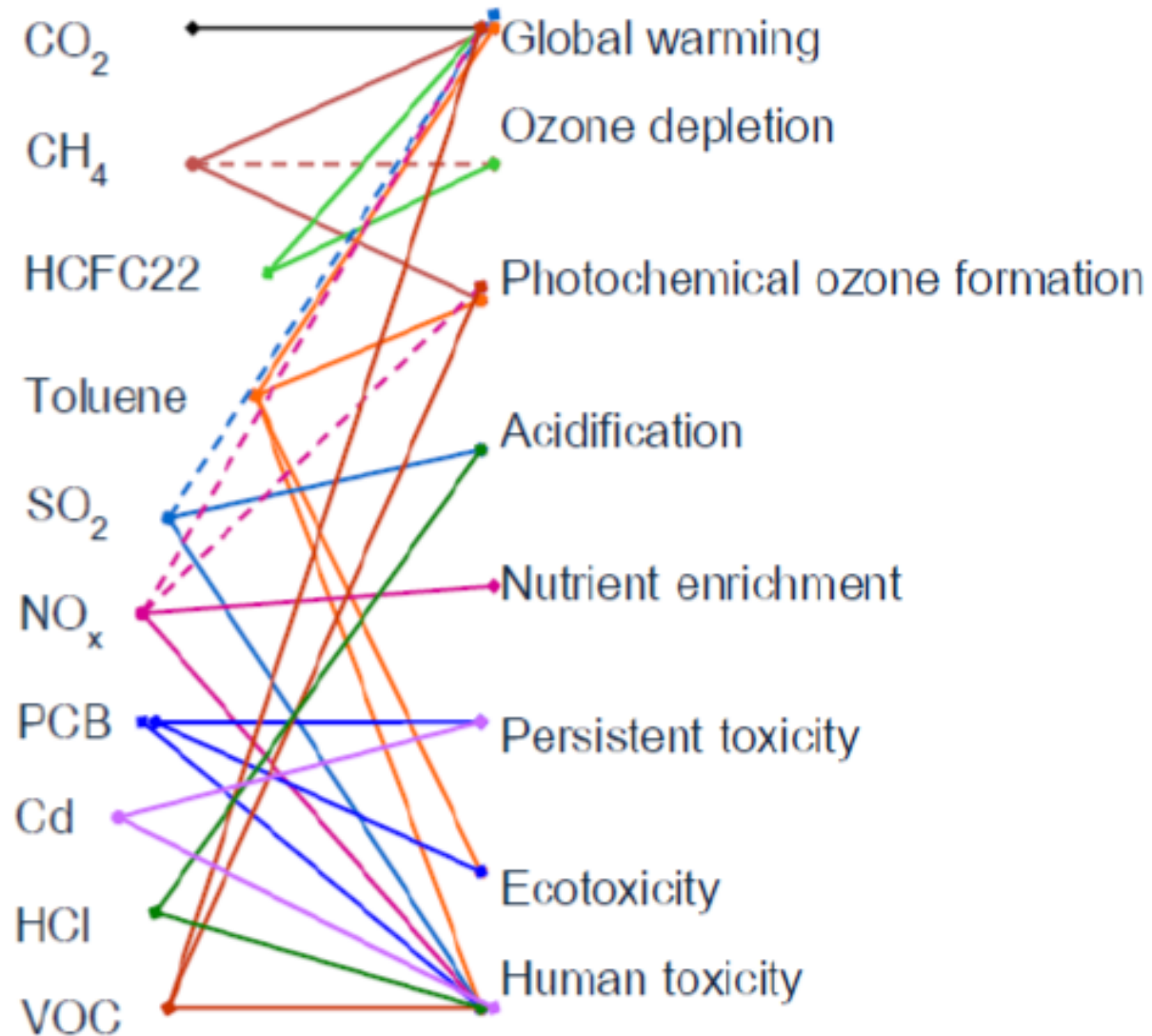


Life Cycle Assessment (LCA)

- Studies all the environmental aspects and potential impacts associated with all the stages of a **product's** life from cradle to grave, i.e. from raw material extraction to end of life.
- **Product** = product, activity, system or process



Impact categories (LCA)



	A	B	C	D	E	F	G	H	I	J	K
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+
Main door
Inner panel
Glass
Spoiler
Mirrors

New concept



Requirements/Things to take under consideration

1. Robomould technology?
2. Types of glass to be used regular and/or dark tinted variant?
3. Interior wise: kind of foam in middle. Touch and display possibilities?
4. Will the door be frameless? Window guidance?
5. HMI opportunities on the dark tinted window? Communication with other road users?
6. Exterior mirrors will be replaced by camera's? Point of attachment? Projection of information?
7. Soft close system for the hinges of the new door?