# Renault Group

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**The importance of polymers in automotive transport. Management of substances & their replacement**

JUNE 6TH 2024

# Summary
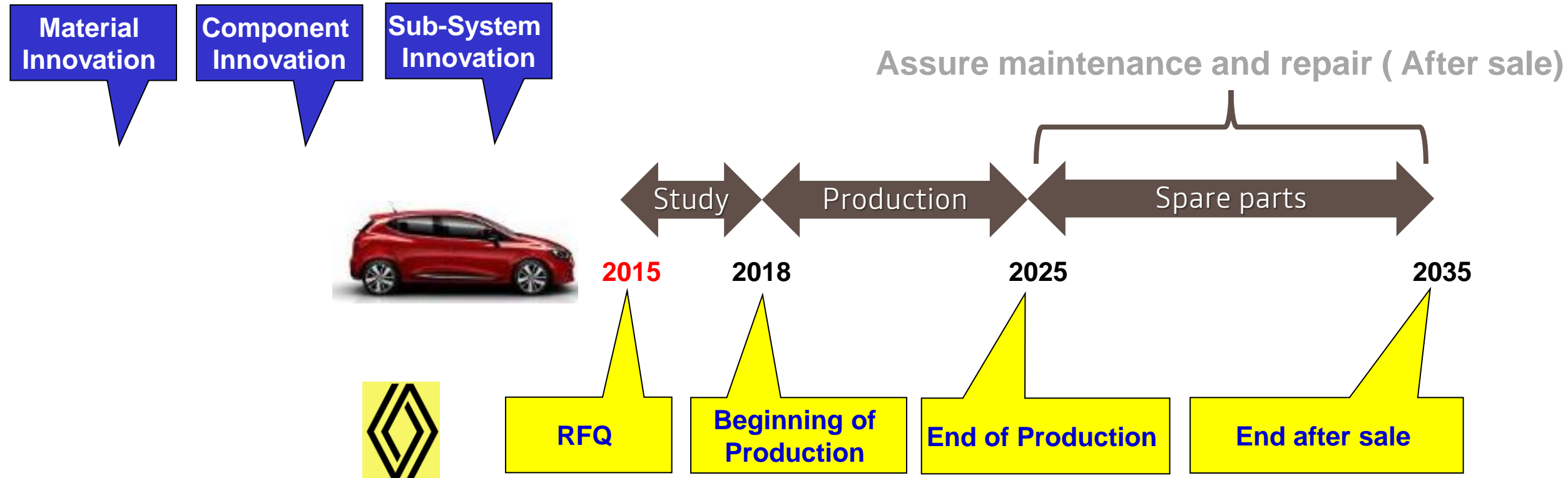
Renault Confidential C

# 01

## Project management in automotive industry

Example Renault

# INDUSTRIAL TIME : SCHEDULE OF A CAR PROJECT (EXAMPLE RENAULT)

Material & substances management:
Prepare substances bans at an early stage
➔ look for a long term visibility

**Material Innovation**

**Component Innovation**

**Sub-System Innovation**

Assure maintenance and repair ( After sale)

Study ⟷ Production ⟷ Spare parts

**2015**     **2018**     **2025**     **2035**

**RFQ**

**Beginning of Production**

**End of Production**

**End after sale**

# 02

## Material & Substances management

Example of polymers

# POLYMERS IN AUTOMOTIVE

**Polymers : - 20% weight**
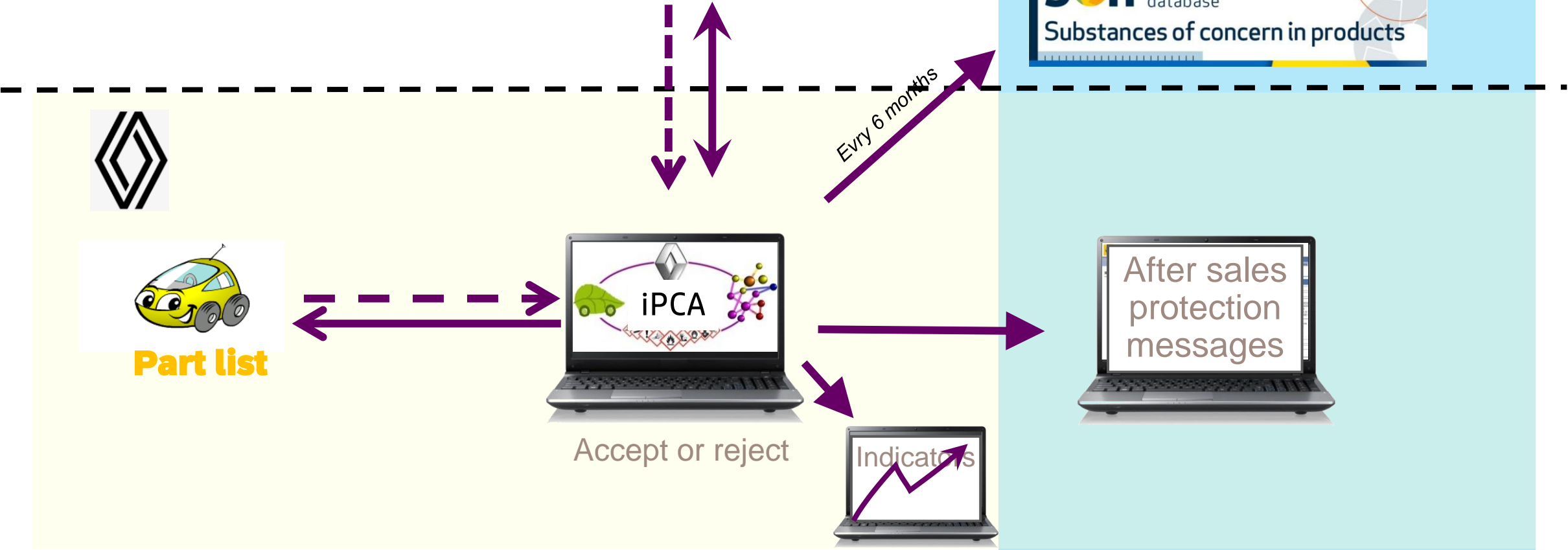**Thermoplastics : ~14%**
**Elastomers + Composites : ~6%**



Pie chart:
- PP, 36%
- PU, 24%
- PA, 11%
- PET, 6%
- ABS, 5%
- PE, 4%
- PMMA, 3%
- PVC, 3%
- Other, 5%

# AUTOMOTIVE SUBSTANCES TOOLS

**IMDS**

gadsl
global automotive declarable substance list

MATERIALDATA SYSTEM

Since 2000

## Regulatory declarations

Renault Group
GROUPE MARQUES INNOVATION ENGAGEMENTS FINANCE TALENTS MEDIA

**Réglementation Reach**
Pour une utilisation responsable de nos produits

ECHA
EUROPEAN CHEMICALS AGENCY
**SCIP** database
Substances of concern in products

Evry 6 months

Part list

iPCA

Accept or reject

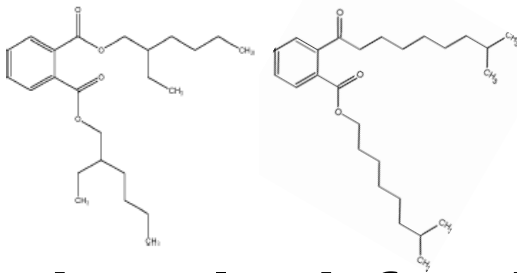Indicators

After sales protection messages

# REPLACEMENT OF SUBSTANCES IN POLYMERS: LIVED EXAMPLES
## Intermediate replacement will have to be improved again

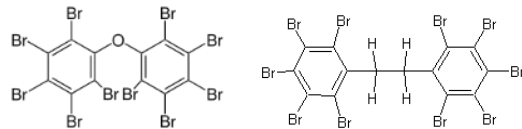- **The replacements are better\* for the health and of the environment**
  - Plasticizer
    - DEHP ➔ DINP ➔ DIDP ➔ DINCH



Citrate
Adipates
Stearates …

- **Others look for themselves**
  - Brominated flame retardant
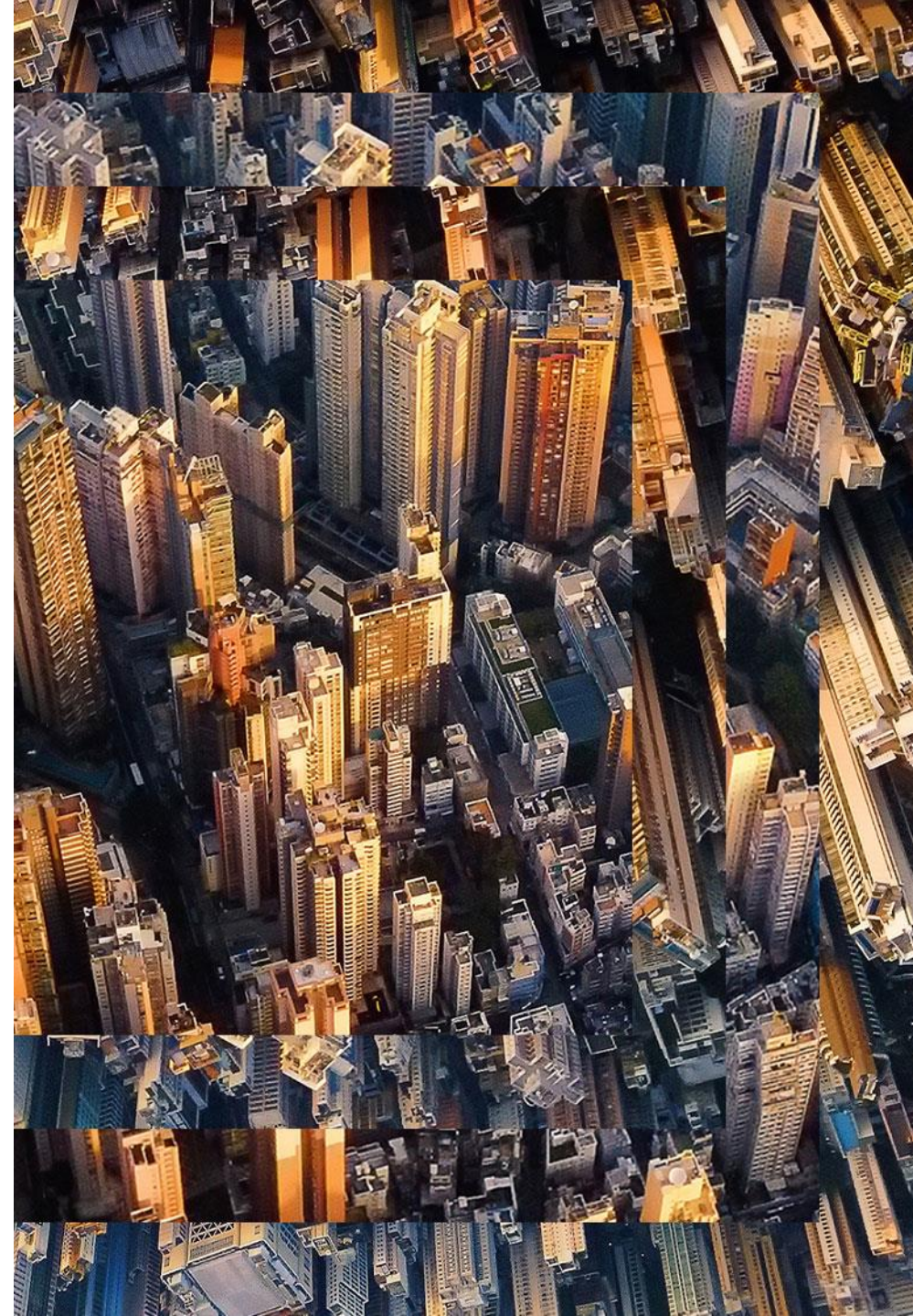    - DecaBDE ➔ EBP ➔ ATH



ATH
Phosphor …

\*in coherence with the current knowledge
Who allow to estimate the protection of the health and the environment

# 03

**Innovation & Substances management**

# LOOK BACK IN 2019: CrVI REPLACEMENT

**ECHA** — EUROPEAN CHEMICALS AGENCY

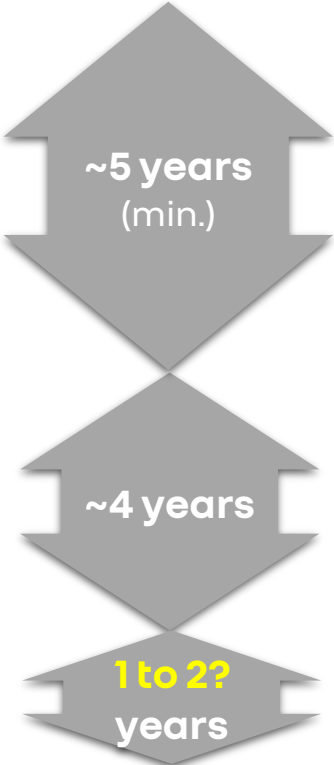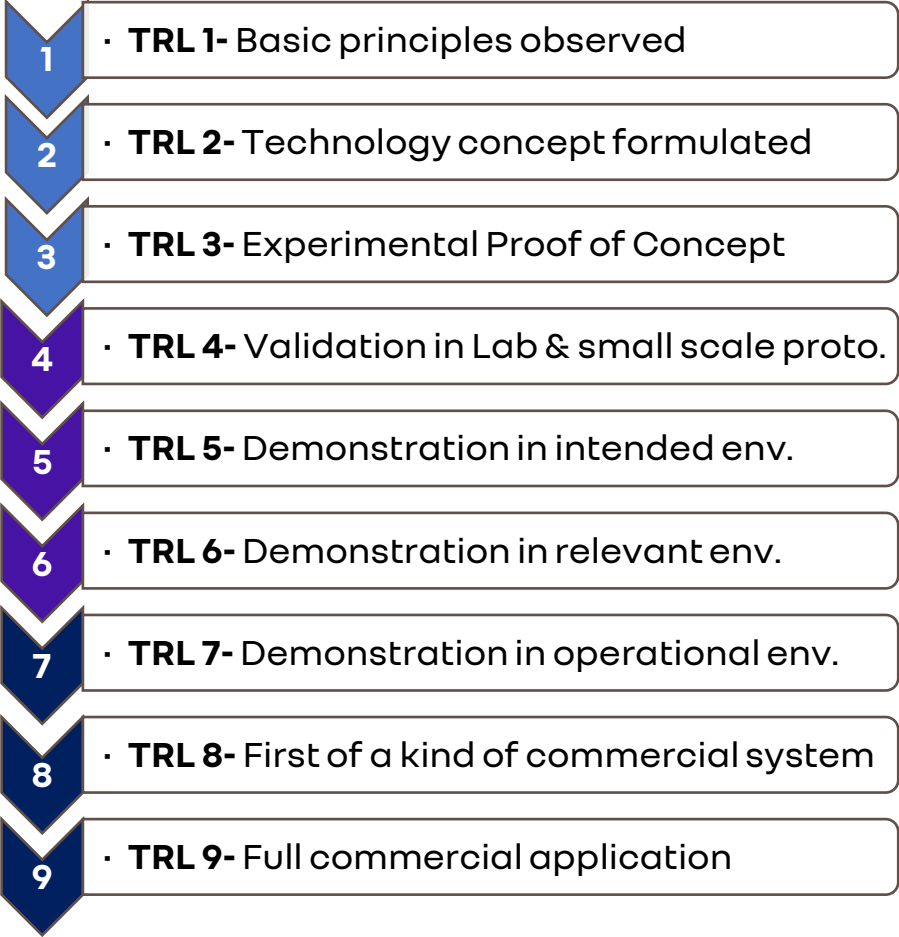## Learnings from Finnish CrVI workshops

### Successful substitution needs

- Co-operation in the whole supply chain
  - The needs of the (ultimate) customers are the key
  - All actors need to understand the needs

- Active company or institution with sufficient resources to take the lead on the substitution project
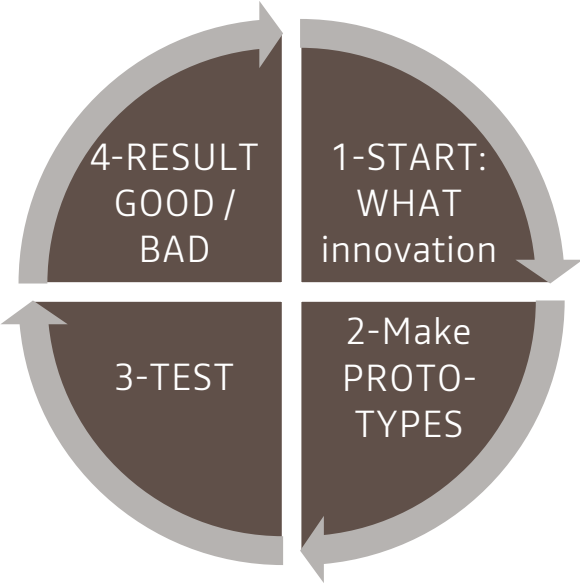
- Innovation funding

### Possible obstacles Customer approval

- Alternative should perform better or be cheaper
- Difficulty to provide comparable test data to show performance
- Several substitutes for one application
  - Makes things technically complex and expensive
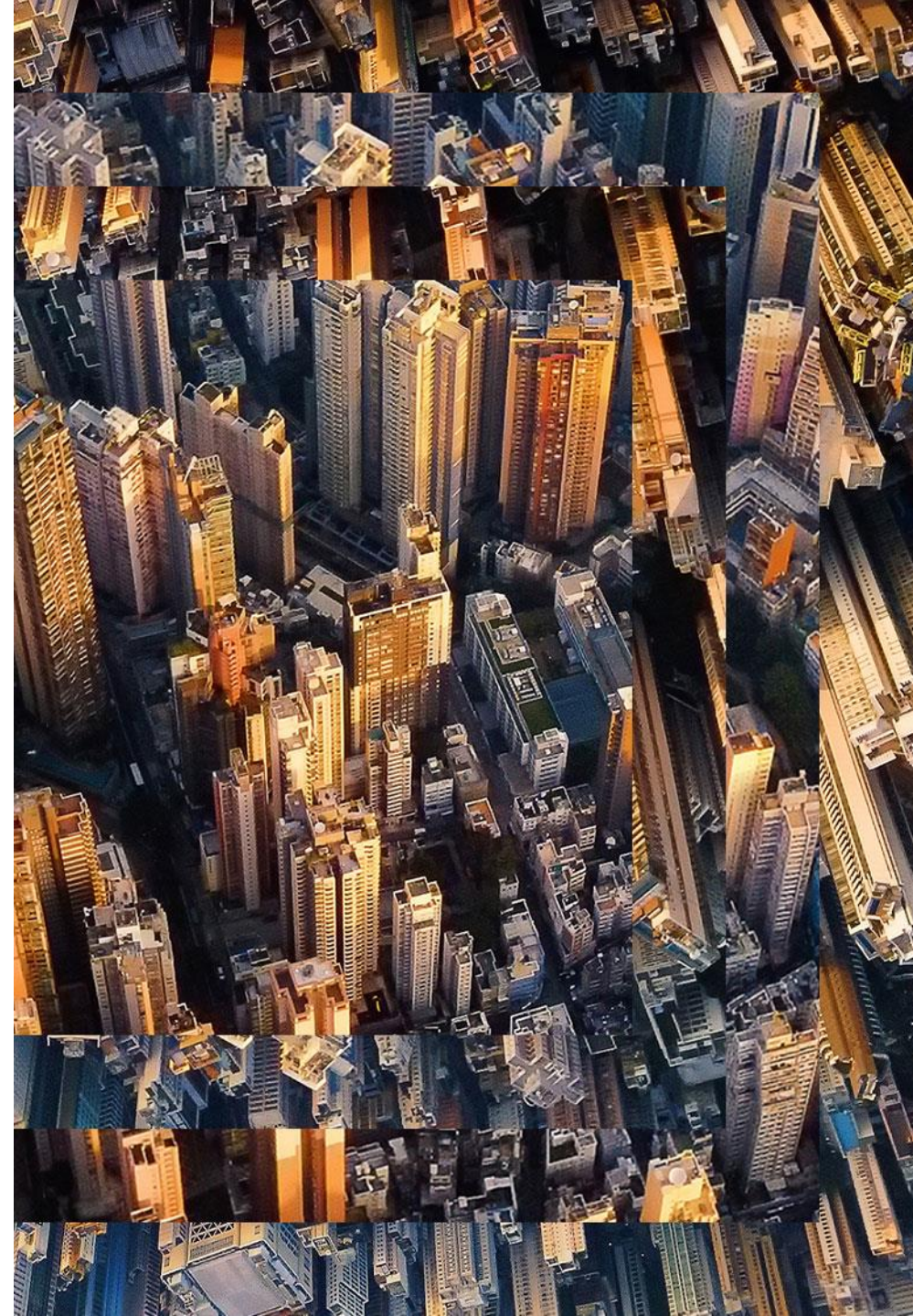
# REPLACEMENT REQUIRES INNOVATIONS – LEAD TIME

**RESEARCH**

**DEVELOP**

**DEPLOY**

- 1 · **TRL 1-** Basic principles observed
- 2 · **TRL 2-** Technology concept formulated
- 3 · **TRL 3-** Experimental Proof of Concept
- 4 · **TRL 4-** Validation in Lab & small scale proto.
- 5 · **TRL 5-** Demonstration in intended env.
- 6 · **TRL 6-** Demonstration in relevant env.
- 7 · **TRL 7-** Demonstration in operational env.
- 8 · **TRL 8-** First of a kind of commercial system
- 9 · **TRL 9-** Full commercial application

**~5 years (min.)**

**~4 years**

**1 to 2? years**

Simplified image of a work to be done at EACH TRL STAGE

4-RESULT GOOD / BAD

1-START: WHAT innovation

3-TEST

2-Make PROTO-TYPES

**04**

# Organisation of automotive industry to replace substances under REACH

# SUSTAINABLE SUBSTITUTION CRITERIA:
Remplace a substance by an other less toxic

**4 CRITERIA:**

1. Toxicity known

2. Regulation profile known

3. Not meet REACH-SVHC criteria

4. Industrially available & usable

**Proposed Criteria: Sustainable chemicals used in the Automotive Industry should...**

➢ ...have a complete registration and toxicological profile according to regulatory request. Relevant data gaps (e.g. no testing on the substitute) should be highlighted.

   ➢ Substance/substitute should not have same or similar **adverse effects** to the original substance

      ➢ Assessment results are needed about whether the substitute has the same hazard/toxicological profile (classification by analogy approaches or QSAR is possible) and verification by testing.

   ➢ Substance/substitute should be "**less hazardous**" than the original substance (to be defined case by case), **see Annex 1** for a ranking proposal.

➢ ...have a listing in all **mandatory global chemical inventories** (e.g. TSCA, IECSC, KECI, ENCS, PICCS...), s**ee Annex 2** for more information.

   ➢ If not, the producer will inform about known potential duties as importer or to the importer with relevant data.

➢ ... not be already prohibited/restricted or intended to be prohibited/restricted for its automotive use, and not be listed on GADSL/GLAPS.

   ➢ Note: They still can be regarded as sustainable if the properties don't meet the SVHC criteria and are not expected to meet them because all relevant test data according OECD guidelines are available (Klimisch 1 and/or 2).

➢ ...be available or have the potential to be made available in **amounts** sufficient to supply customers' needs.

➢ ...fulfil typical **technical**- and **supply**-related **customer requirements**.

AUTOMOTIVE INDUSTRY GUIDELINE ON

**REACH**

VERSION 4.0

https://www.acea.auto/publication/updated-automotive-industry-guideline-on-reach-published/

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# SUBSTITUTION IN PARTS: PROPOSAL OF PROCESSES

**Case 1:**
➜ replace a substance by an other substance.
simplest one

€
⏱

**Case 2:**
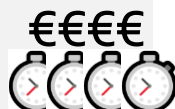➜ reformulate the material. = change multiple substances
more standard one

€€
⏱⏱

**Case 3:**
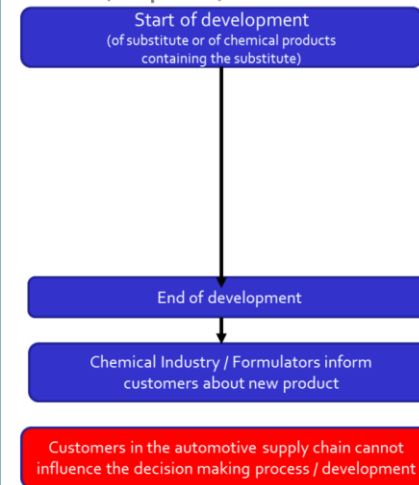➜Change the kind of material, in general need to redesign the component.

€€€
⏱⏱⏱

**Case 4:**
➜Redesign the part
Multiple impacts on the function implics possible impact on other parts
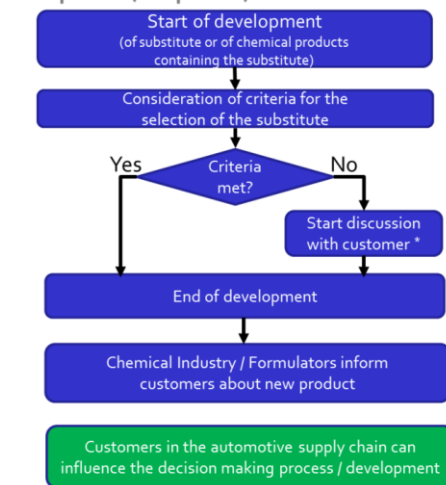**Unrealistic at a large scale.**

€€€€
⏱⏱⏱⏱



AUTOMOTIVE INDUSTRY GUIDELINE

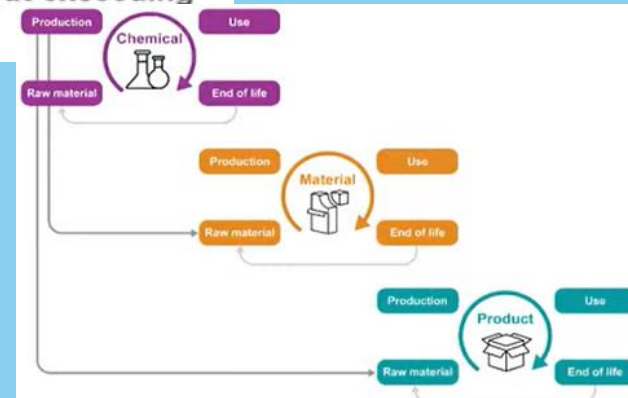Current (simplified) Standard Process / Proposed (simplified) Standard Process

**for other cases:**
**Is « Safe & Sustainable by Design » appropriate ?**



The **ambition of the SSbD** is to move from relative (safer and more sustainable) to **absolute (safe and sustainable)** improvements ensuring that chemicals and materials are produced and used **without exceeding acceptable boundaries**
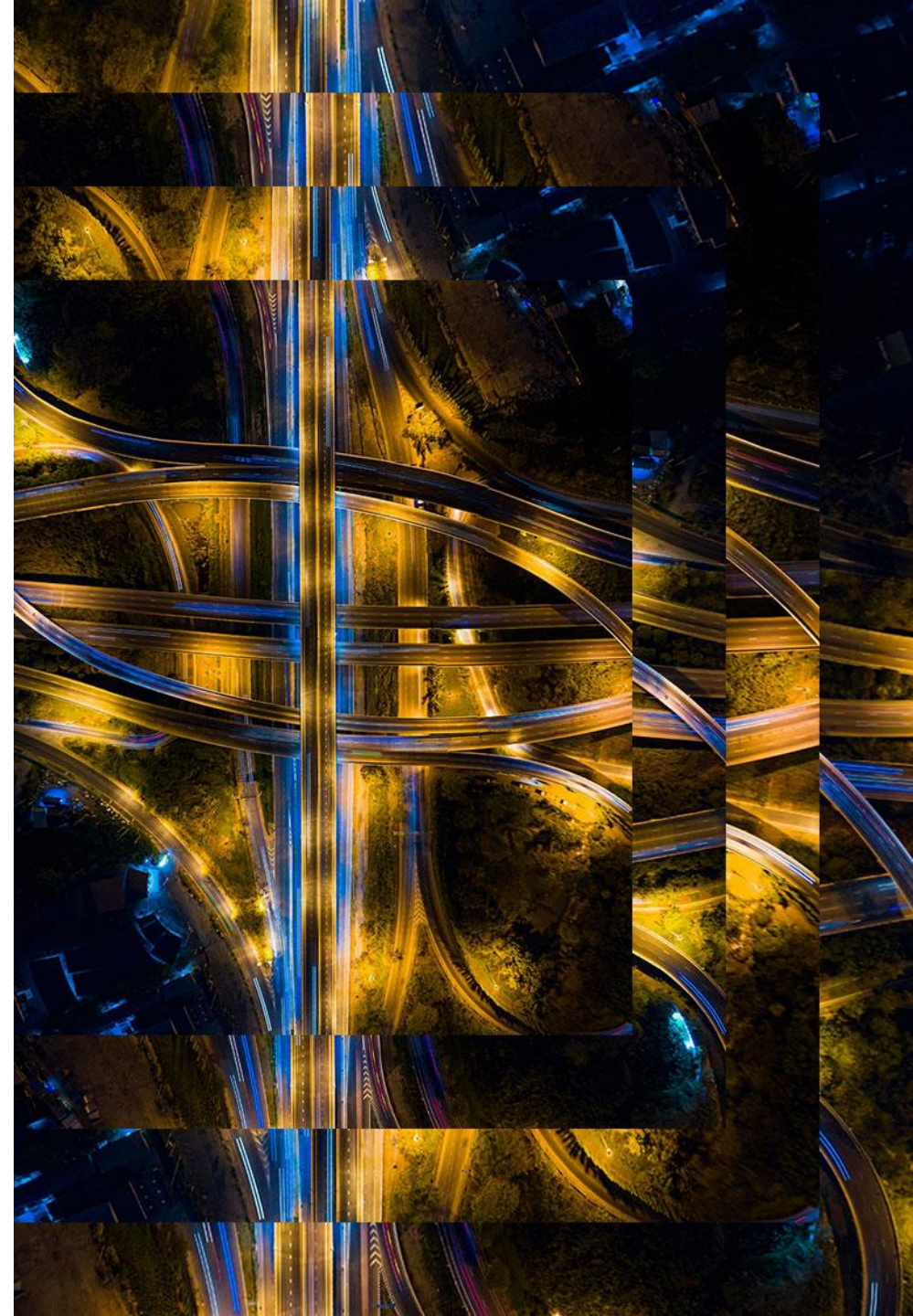
# PFAS EXAMPLE: APPROACH & CHALLENGES

**Green Techno**

| 11 | MAIN DOMAINS OF STUDY (use cases) | USAGE |
|---|---|---|
| 1 | **Rechargeable Battery Cells** (Low & High voltage) | Electrodes, edge coating, electrolytes, separator, seals |
| 2 | **H2 Fuel Cells** | Proton Exchange Membrane, electrodes, Gas diffusion layer (humidifier), H2 sensor.. |
| 3 | **Electrical/Electronic components** (Low & High Voltage) | Semiconductors, sensors, PCB, passive components, poly-switches, buttons, wiring harnesses, connectors, displays.... |
| 4 | **Distribution networks** (Aerodynamic & Hydraulic) | Fuel, oil, urea, braking fluid, refrigerant, H2.... |
| 5 | **Lubricants** | Oils, greases |
| 6 | **Membranes & Filters** | Breathable membranes in Elctronical Control Units, filters.... |
| 7 | **Anti-Friction** (materials & coatings) | Bearings, bushings, .... |
| 8 | **Sealings** (static & dynamic) | |
| 9 | **Absorbants & Textiles** | |
| 10 | **Fastenings & related coatings** | Screws, nuts, clips.... |
| 11 | **Hard Chrome plating** | (process) |

- Each domain with a Vehicle Transversal Approach by Domain

1. **Precise identification** of use of de PFAS **(Product & Process)**

2. **Study Substitution or Technological Alternatives considering :**
   1. **Maturity / industrial implementation**
   2. **Large scale availability**
   3. **Durability** of the solutions

3. Identification of **« Essential Uses » & Control of PFAS emissions** over the **entire life cycle** of products

4. **Help of authorities NEEDED:**
   - For inventory of PFAS
     - An official regulatory list of PFAS with their CAS Number
     - The obligation to declare PFAS : to help end users to have all the information

ACEA - European Automobile Manufacturers' Association
CLEPA - European Association of Automotive Suppliers

# 05

## CONCLUSION

# SUMMARY & CONCLUSION

## SUMMARY

- **REACH is a powerful tool to improve health and environment**

- **Automotive industry is managing material & substances a proactive way**

- **Replace materials / substances at a large scale is nevertheless a challenge**

- **Restrictions** must be seen as an **effective and proportionate** response to challenges about health & environment, economic & industrial.

## CONCLUSION

- **COLLABORATIVE WORK is needed to provide a robust, shared and transparent roadmap on the reality of alternative solutions and large-scale availability dates.**

Thank you