



L C I E



Eco-systèmes

recylum

Integration of new EEE end-of-life LCI in a LCA Software



ESR

Summary

► Introduction

1. Contribution of the database to EoL modelling enrichment
2. Main changes in impact results
3. Going further, matching the datasets with the practitioners information

► Conclusion



Introduction

ESR – a WEEE take-back scheme

ESR is the major European collective take-back scheme for WEEE, non for profit and accredited by the French authorities.



Eco-systèmes coordinates the collection, depollution and recycling of **household waste electrical and electronic equipment**.

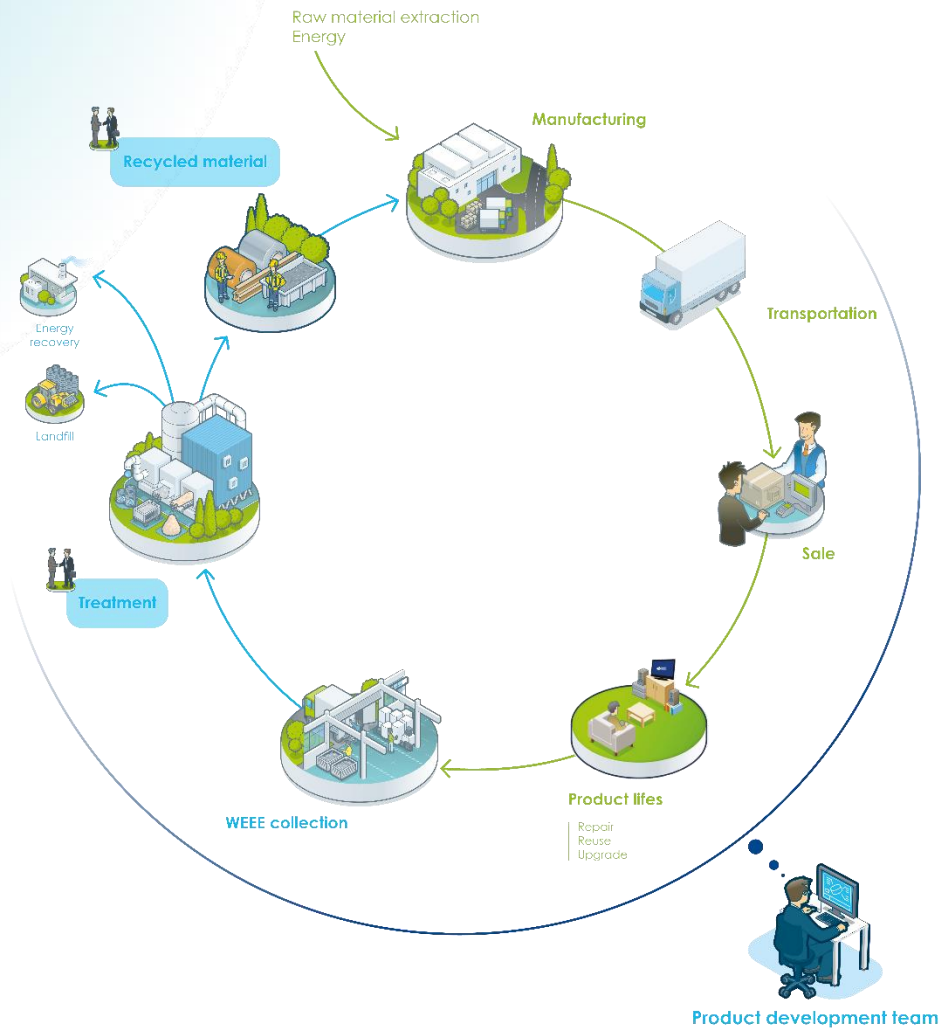
- **2 063 producer members** (75% of market share)
- **22 473 collection** points (distributors, local authorities and social communities)
- **533 000 tons of WEEE collected and recycled in France in 2017**
- **2 110 000 appliances re-used**



Récyllum coordinates the collection, depollution and recycling of used **lamps, fire extinguishers, and professional waste electrical and electronic equipment**.

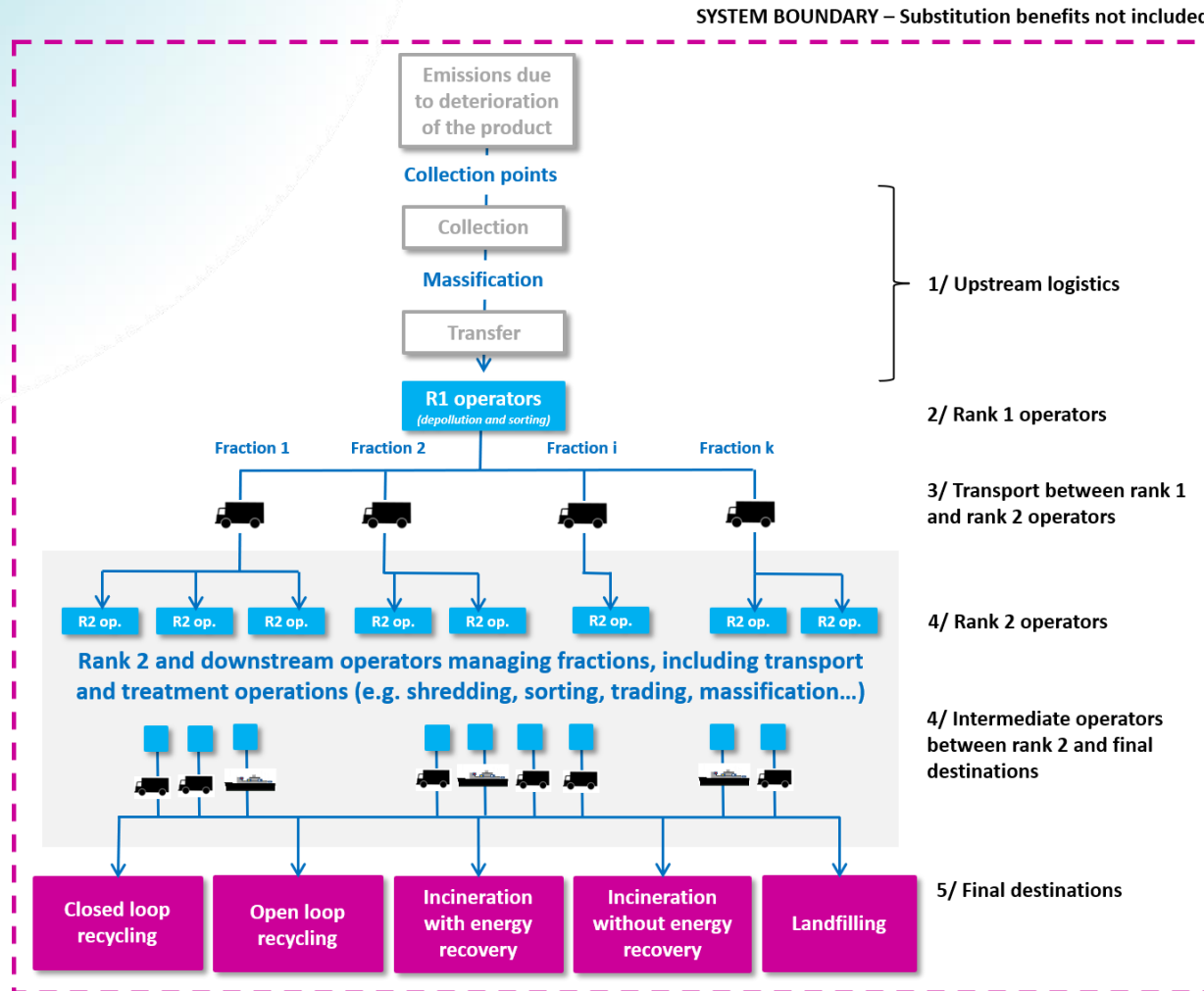
- **Members producers:**
 - 1 233 members for Professional WEEE
 - 767 members for lighting
 - 13 members for fire extinguishers
- **Collection points:**
 - 4 100 points for Professional WEEE
 - 21 800 points for lighting
 - 200 points fire extinguishers
- **Collection results:**
 - 29 100 tons for Professional WEEE
 - 47 millions of lighting
 - 36 700 fire extinguishers

One of our missions: fostering an End-of-Life (EoL) thinking when designing an EEE



EEE EoL LCI database

From collection of WEEE (in France) to final treatment of each fraction



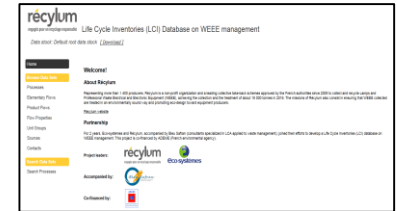
Database release

A database covering the EoL of :

- ▶ All household EEE
- ▶ Most of professional EEE

= 954 LCI in total

- ▶ Freely available on 2 platforms on the LCDN



- Household EEE EoL (except lamps) :
<http://weee-lci.eco-systemes.com>
- Lamps and professional EEE EoL :
<http://weee-lci.recylum.com>

- ▶ Currently under integration in LCA softwares such as:



➔ Example of data integration challenges into EIME

LCIE and EIME

Objectives

LCA and ecodesign software

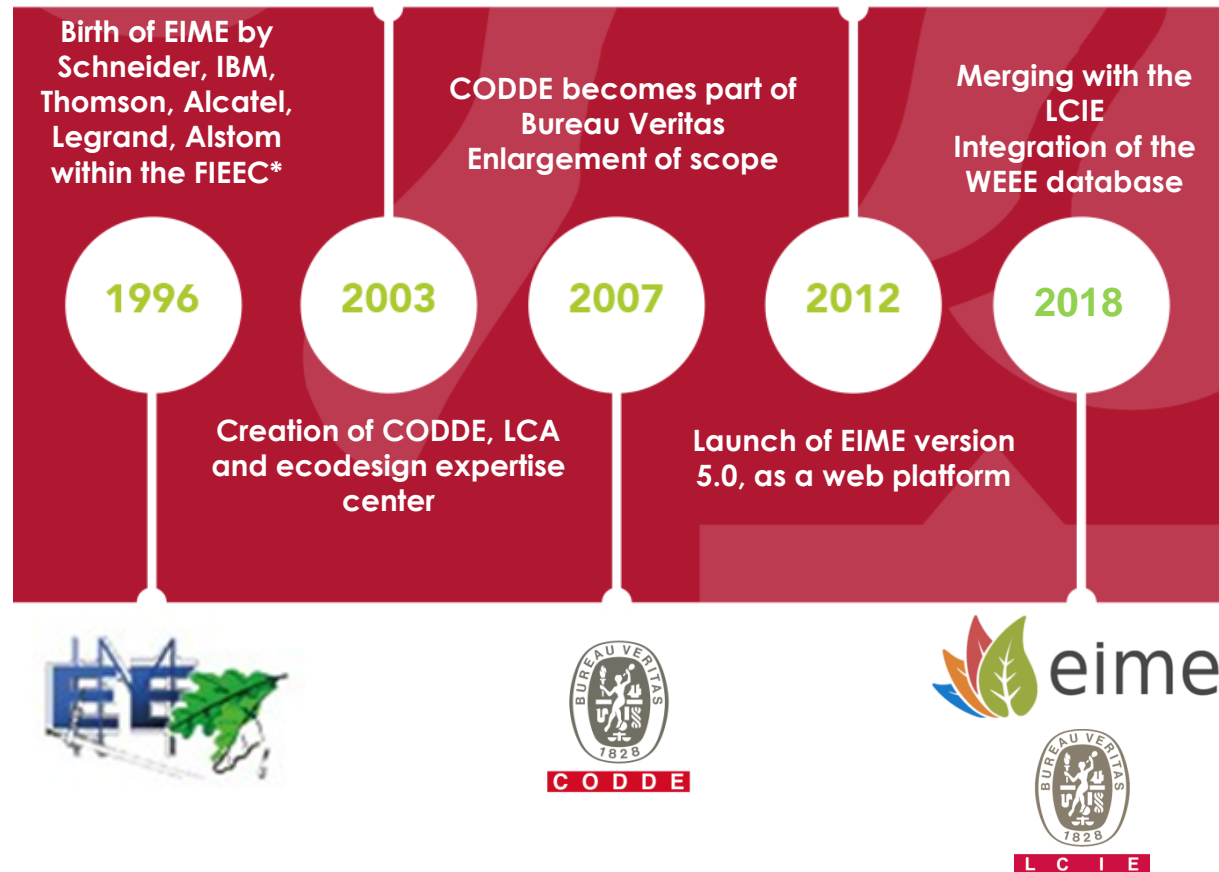
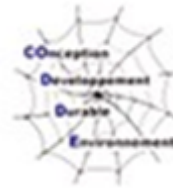
Aiming to be an easy to use, SME-friendly tool

→ Accessible to non-LCA experts

Concepts

Web interface accessible anywhere without installation and maintenance – automatic updates

Specific and generic databases: CODDE, ELCD, ecoinvent, WEEE...



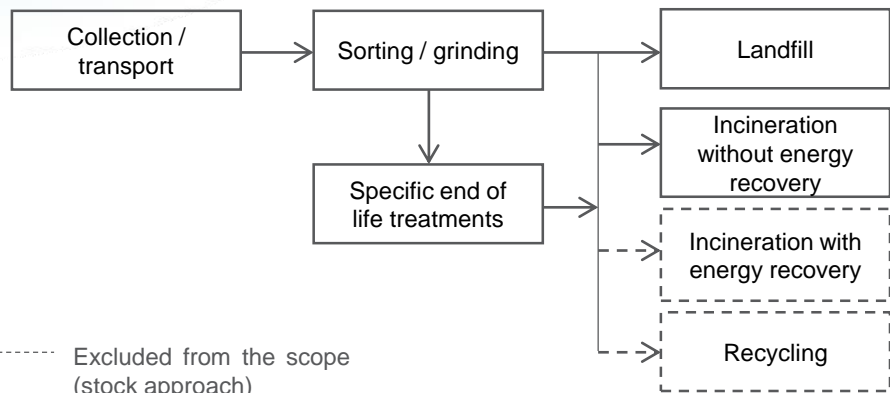


1. Contribution of the database to EoL modelling enrichment

Evolution of the EEE EoL approach

YESTERDAY

From a generic process-based approach



TODAY

To a material-based approach by WEEE streams

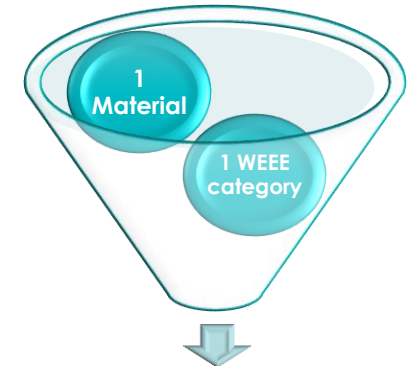
LCI at [material-WEEE category] scale

Ex.: steel in large household appliances, glass in lamps, copper in flat screens...

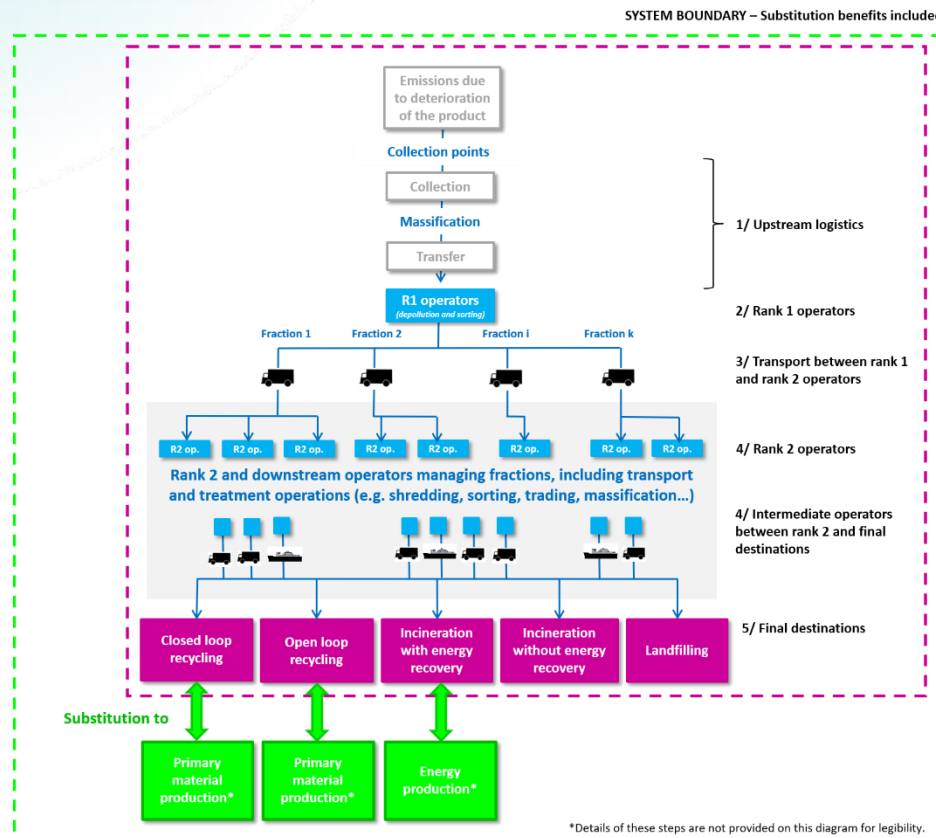
ABS end-of-life in large household cooling appliances	PS end-of-life in large household cooling appliances	Steel end-of-life in large household cooling appliances
ABS end-of-life in small household appliances	PS end-of-life in small household appliances	Steel end-of-life in small household appliances
ABS end-of-life in small professional appliances	PS end-of-life in small professional appliances	Steel end-of-life in small professional appliances
...

A two-levels approach

- 2 LCI for each couple [material-WEEE Category]:
 - 1 LCI « Stock method »
 - 1 LCI « System expansion method »



1 LCI « Stock method »
+1 LCI « System expansion method »

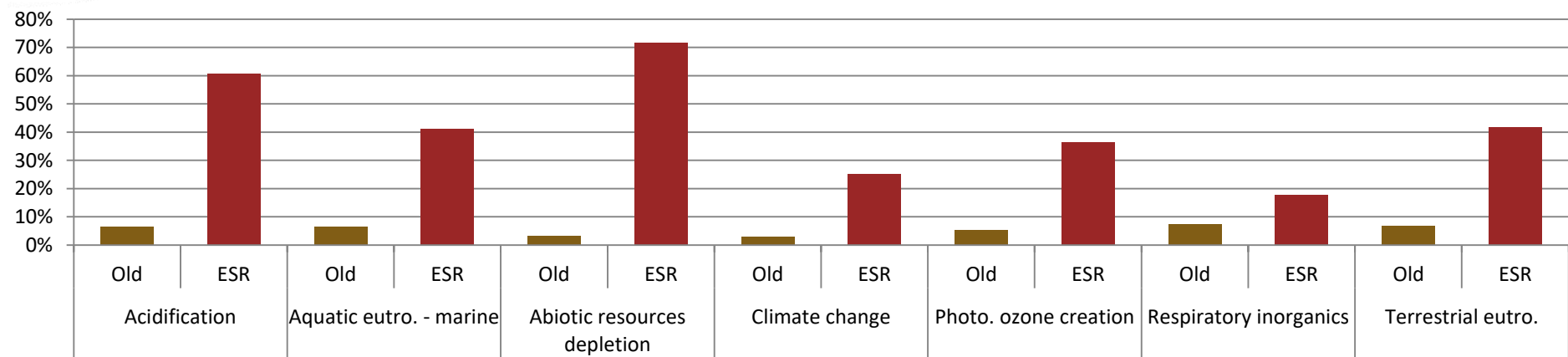
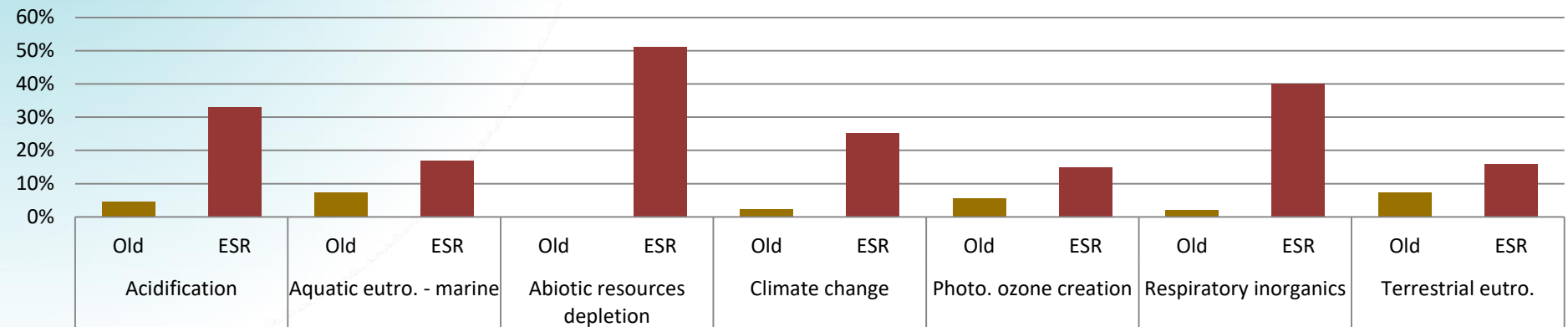




3. Main changes in impact results

Main changes in the impact results

Variations from « old » to « new » EoL modelling

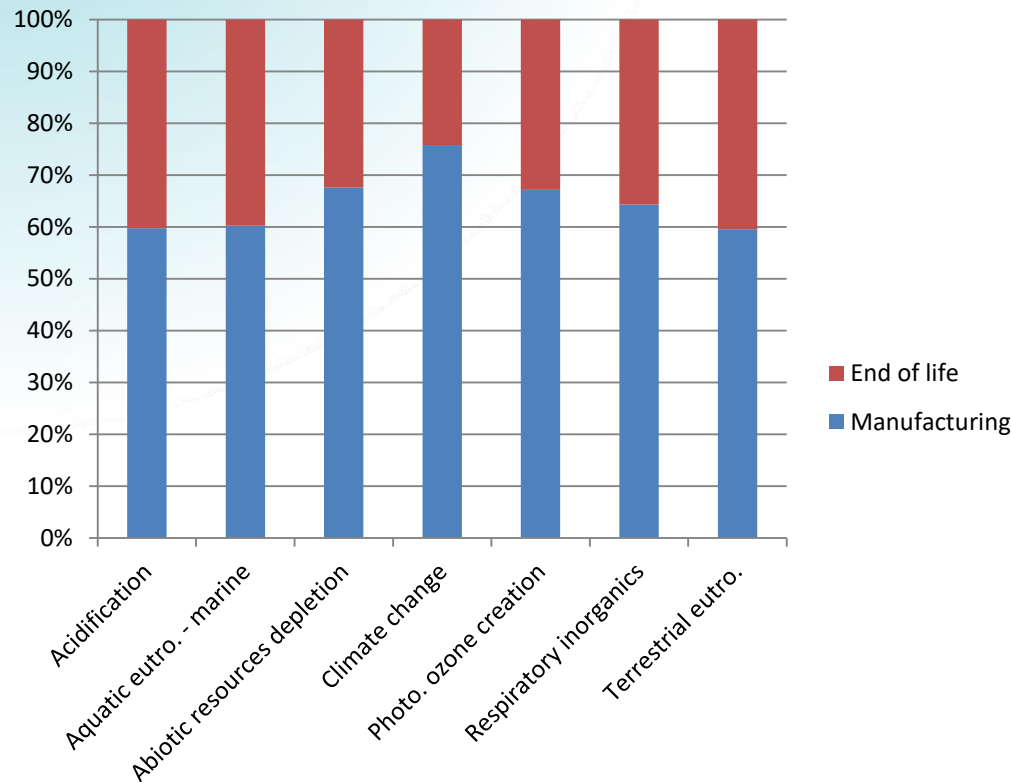


End of life impact of **polycarbonate** (without BFR, density < 1.3), without benefits, Small Professional Elec. Equip.

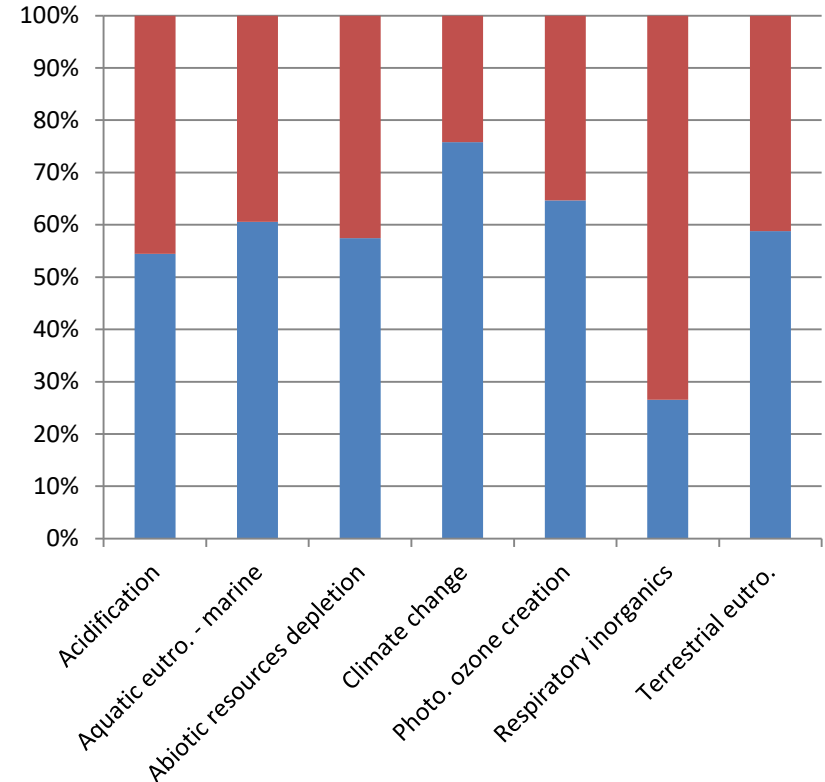
Major evolutions are linked to a better understanding and consideration of EoL steps (collection, depollution, treatment, reprocessing or disposal)

Main changes in the impact results

Balance between manufacturing and EoL impacts



Production and end of life impact of **steel**, without benefits,
Electrical Motors for industrial applications



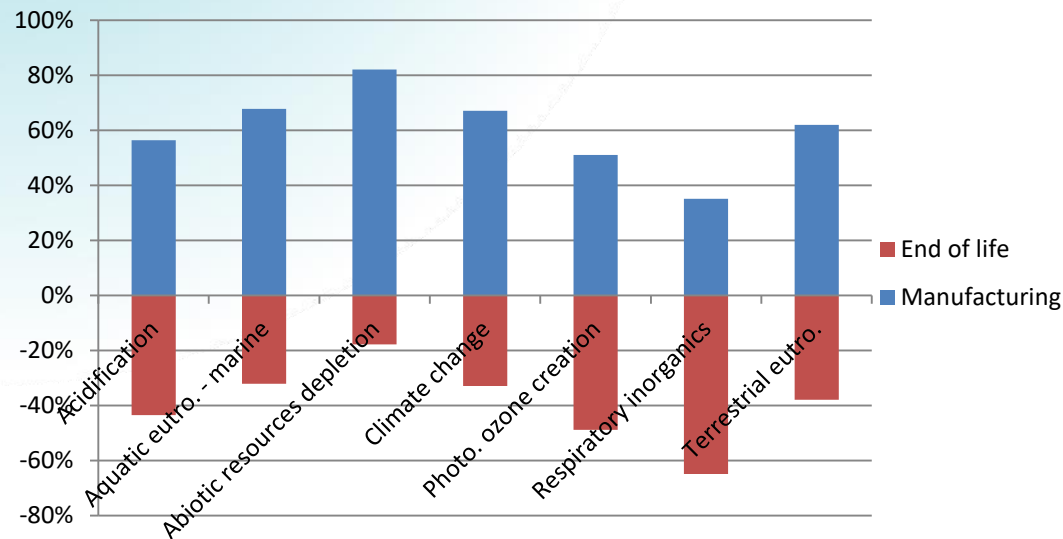
Production and end of life impact of **polycarbonate**, (without BFR, density < 1.3), without benefits, Small Professional Elec. Equip.



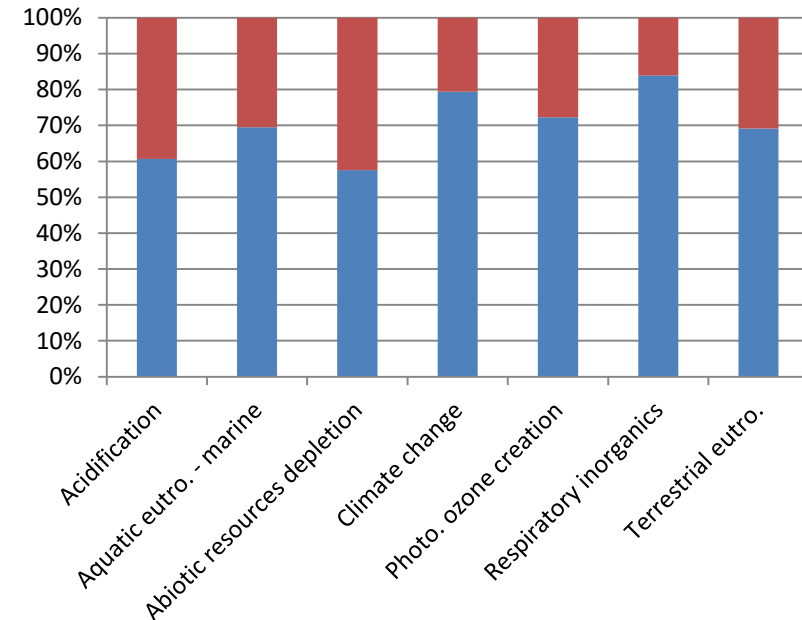
The new LCI allow a comparison of manufacturing and EoL with the same granularity level

Main changes in the impact results

Balance between manufacturing and recycling benefits



*Production and end of life impact of **steel**, benefits included, Electrical Motors for industrial applications*

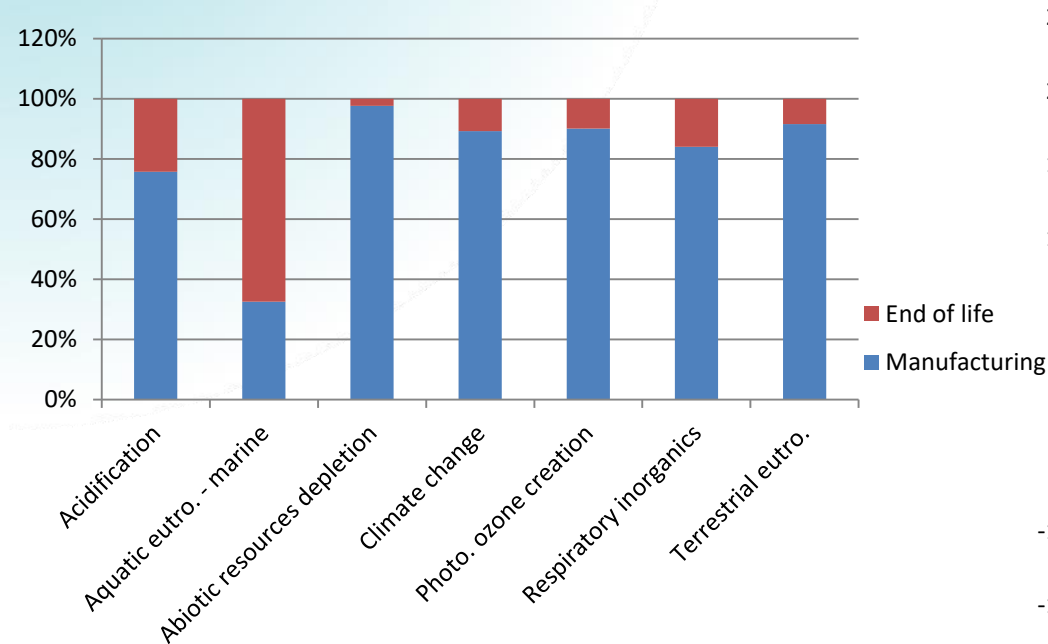


*Production and end of life impact of **polycarbonate**, (without BFR, density < 1.3), benefits included, Small Professional Elec. Equip.*

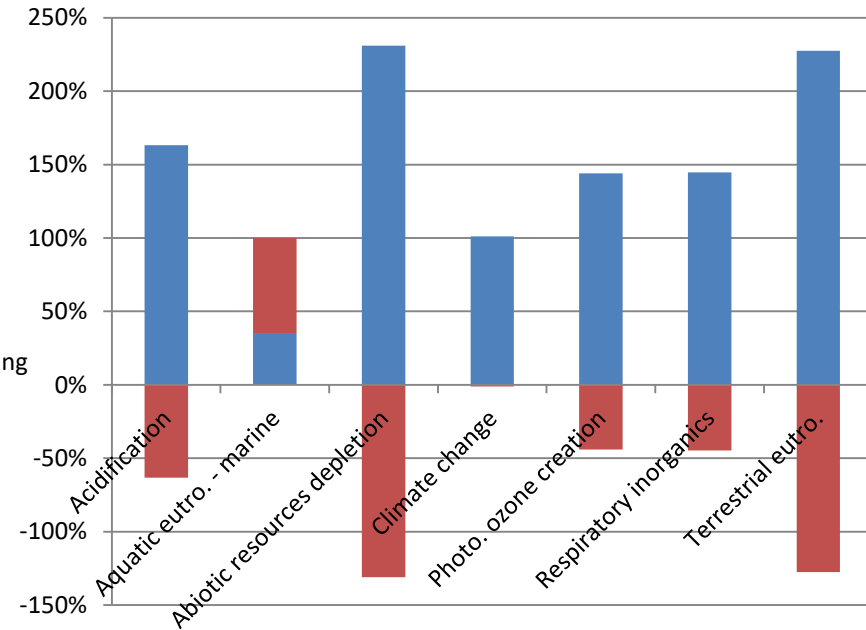
Interesting vision to arise awareness on EoL consideration importance in the design stage to move toward a circular economy

Example on a complete product

EEE product with casing + card (ADSL box)



Manufacturing and end of life impacts, benefits not included



Manufacturing and end of life impacts, benefits included

▶ The importance of end of life is reduced due to the impacts caused by the material transformation (manufacturing processes), but still significant compared to the manufacturing

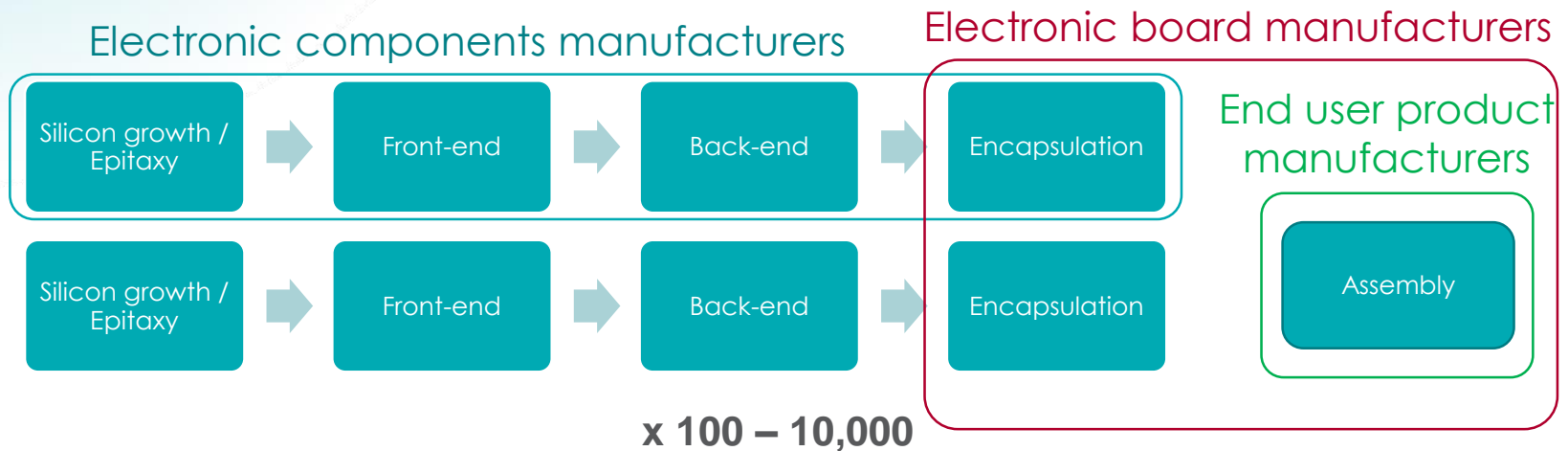


3. Going further, matching the datasets with the practitioners information

Granularity of the datasets and practitioners access to detailed information

▶ A precise knowledge of the Bill of Material ?

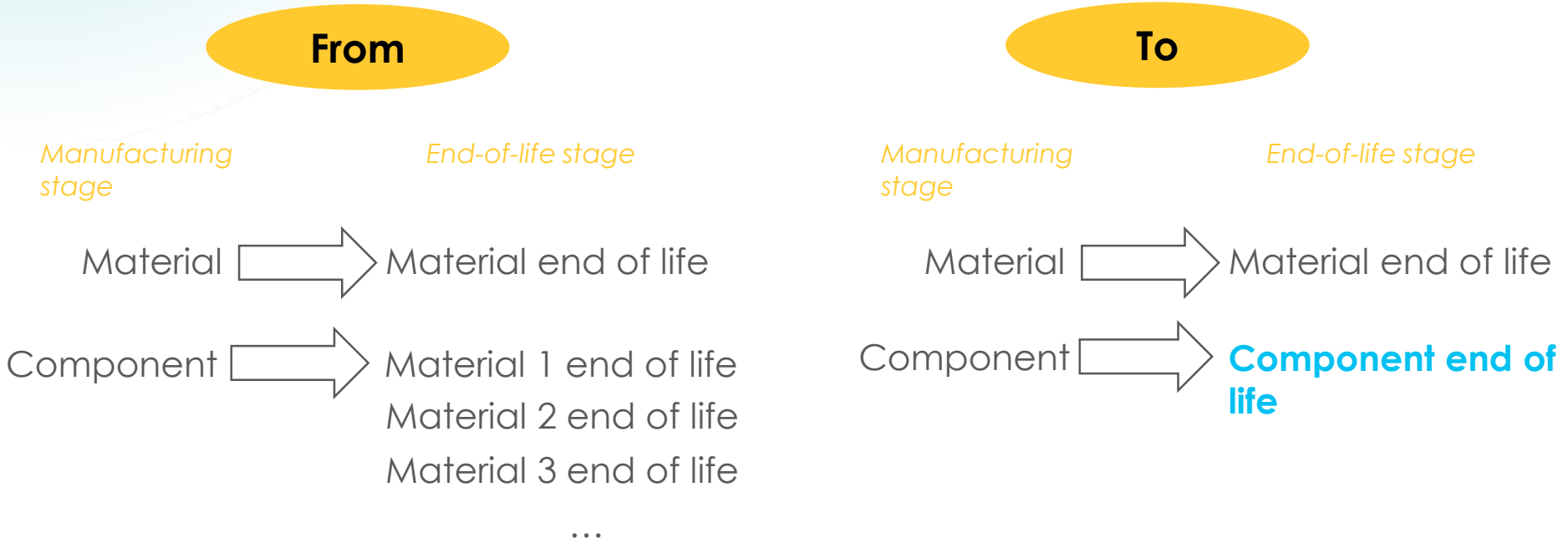
- Example of an electronic board :



- No single actor has a complete knowledge of all materials in an EEE product
➔ **Need for simplification**

Granularity of the datasets and practitioners access to detailed information

➤ Towards an architectural copy of the manufacturing phase?





Conclusion

Conclusion

- An unprecedented database in Europe freely downloadable
 - ➔ *954 LCI covering EEE materials end-of-life*
- Operational data based on feedbacks from the field and organized at material level
 - ➔ *Optimum between representative data and EEE producers constraints*
- Some changes in impacts results resulting from more detailed data
 - ➔ *Better understanding of the impacts of EEE products EoL*
- Data currently under integration into LCA softwares
 - ➔ *Already available in EIME !*



Thank you

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