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NESPRESSO

Comparative life cycle assessment of a cup of espresso made using a packaging and distribution system from Nespresso Espresso and three generic products

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Context

- Nespresso works at understanding and reducing its environmental impacts
- Three competitors launched their own coffee capsules, compatible with Nespresso machines
- Nespresso wants to know the environmental impacts (LCA) of these four systems for both internal (strategic decision) and external (public disclosure) communication

Goal and scope

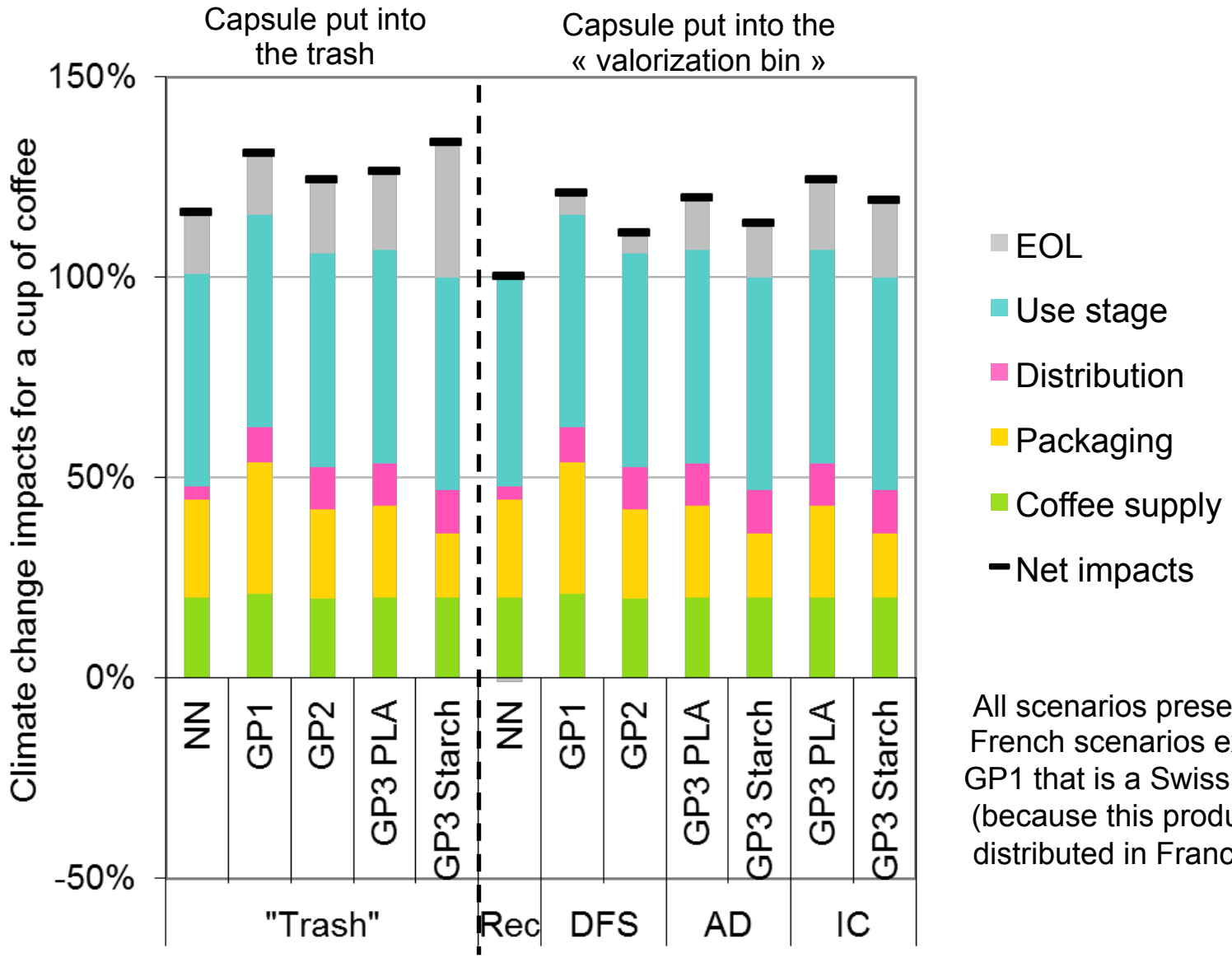
- Assess the environmental impacts of four capsule systems on the entire life cycle, for:
  - Nespresso Espresso (in Aluminium, CH & FR markets)
  - Generic product 1 Espresso (in plastic, CH market)
  - Generic product 2 Espresso (in plastic, FR market)
  - Generic product 3 Espresso (in bioplastic, FR market)
- A special attention is given to the packaging production and packaging end-of-life scenarios, as these are often the core questions
- Assess the influence of several key variables (scenarios, sensitivity and uncertainty analysis)
- Identify scenarios and threshold where one type of capsule is more advantageous
- The study has been critically reviewed by a panel of four external experts
- The executive summary can be found at: http://www.nespresso.com/ecolaboration/article/2/2103/valutazione-del-ciclo-di-vita.html

Key data and assumptions, product systems

	Nespresso Espresso	Generic product 1	Generic product 2	Generic product 3
Product needed for FU	**One capsule** A fraction of a Nespresso machine Essenza, of a cup, and of a dishwasher			
Coffee supply	5.3 g/capsule	5.6 g/capsule	5.2 g/capsule	5.3 g/capsule
	The same generic coffee is considered for all scenarios			
Packaging	**Capsule in Aluminium** mass: ~1.1 g/capsule + sleeve + secondary packaging	**Capsule in PP** mass: ~1.5 g/capsule + surpackaging + sleeve + secondary packaging	**Capsule in PP** mass: ~1.7 g/capsule + surpackaging + sleeve + secondary packaging	**Capsule PLA/starch** mass: ~4.4 g/capsule + overwrap + sleeve + secondary packaging
Production centre	Based on data for the Nespresso production centre of Orbe			
Distribution (CH and FR markets)	Orbe to consumer: 30% by shops, 70% by post shipment	Production centre in Switzerland, distribution: 100% supermarket	Production centre in France, distribution: 100% supermarket	
Use stage	2 coffees/day per machine (6 y) Production and use of the machine, cup and dishwasher			
End-of-life	Trash / Incineration / Landfill			
	Recycling	Direct Fuel Substitution (DFS)		Industrial compost / Anaerobic digestion

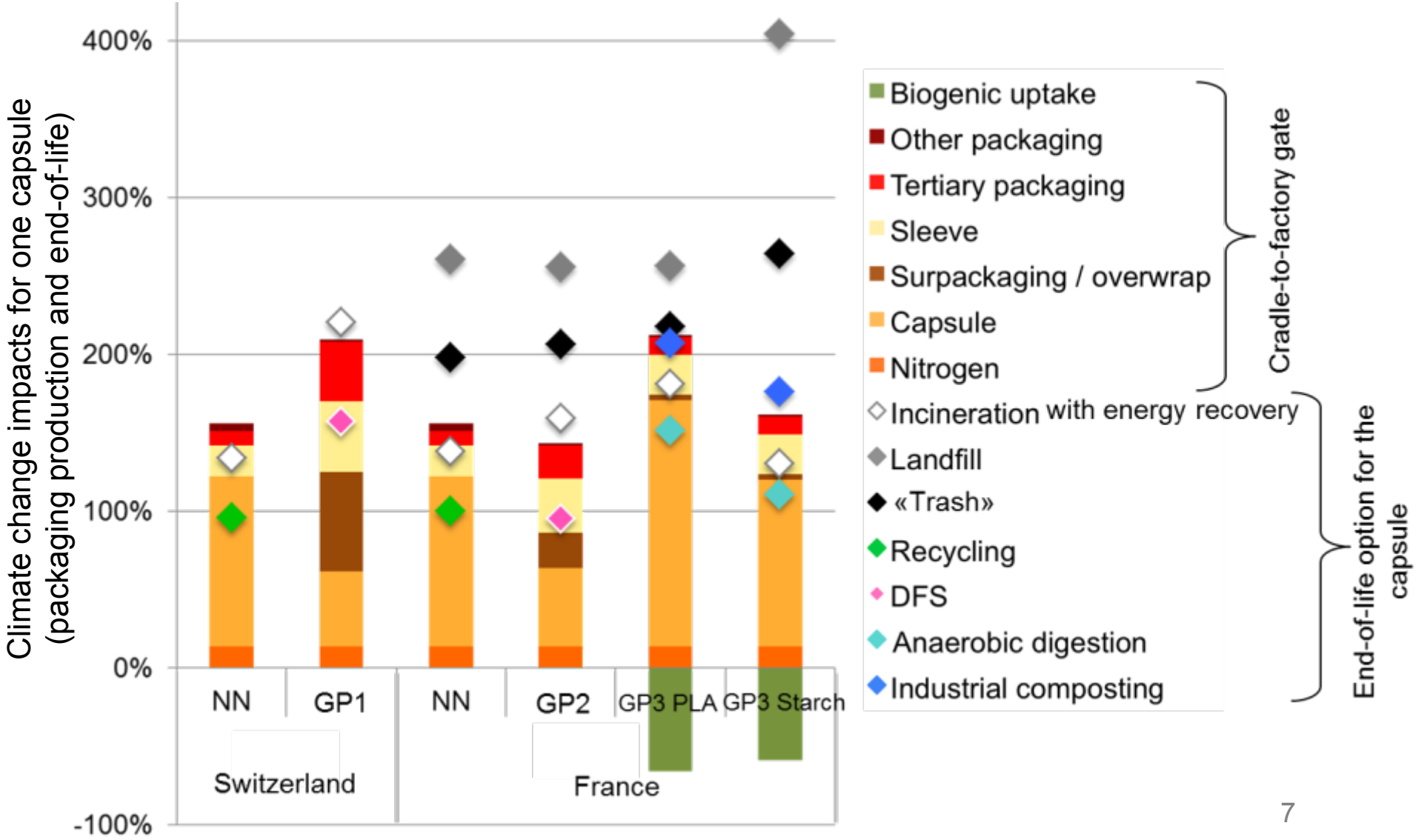
Product systems boundaries

Climate change (kg CO_2-eq/cup of coffee)



All scenarios presented are French scenarios except for GP1 that is a Swiss scenario (because this product is not distributed in France today)

Climate change (kg CO_2-eq/cup of coffee): *focus packaging*



Sensitivity analyses

- Scenarios:
  - PLA / starch for GP3 bioplastic capsule
  - End-of-life scenarios
- Assumptions
  - N_2 and CO_2 in generic product capsules
  - Production centre
  - Shopping travel to supermarket
- Water
  - Irrigation water for maize (bioplastic)
  - Water evaporated from reservoirs
  - Damage assessment of turbined water
- Compost
  - Agricultural yield increase
  - Carbon storage
  - Ammonia direct emissions
- Recycling: foundry efficiency
- Methodological choice: ReCiPe LCIA method

No influence on final conclusions

Conclusions

- Product learnings
  - The most impacting stages of the life cycle of a cup of coffee are the coffee production, the packaging production and the use stage
  - Regarding climate change, if the capsule is recycled, a Nespresso cup of coffee has a lower impact than a generic product cup of coffee. The same conclusion can be made for resources use and human health impacts. There is no clear best coffee capsule system regarding impacts on ecosystem quality and water consumption
- Methodological learnings
  - Packaging system
  - Bioplastics
  - End-of-life

Thanks for your attention

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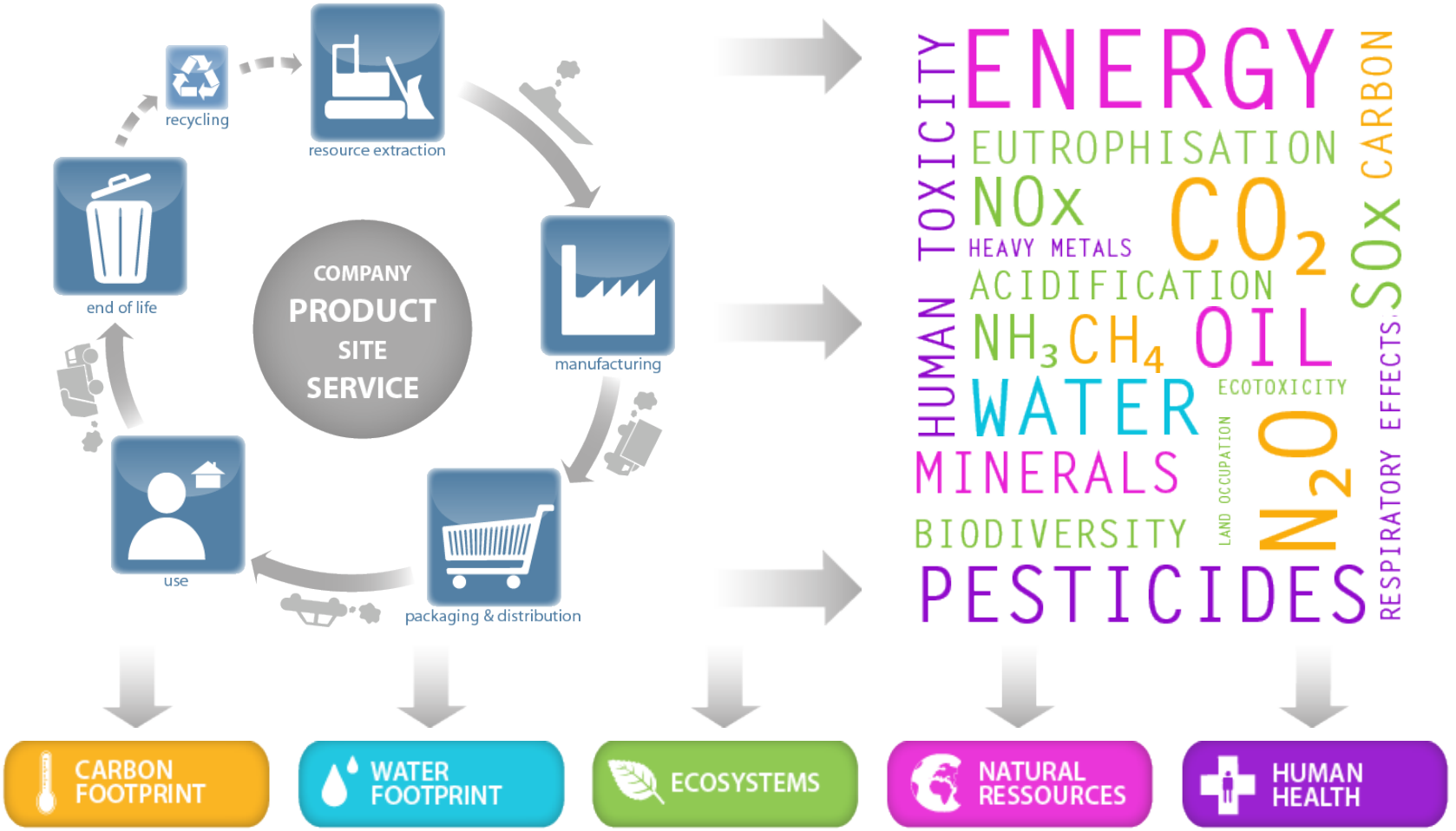
Introduction to LCA

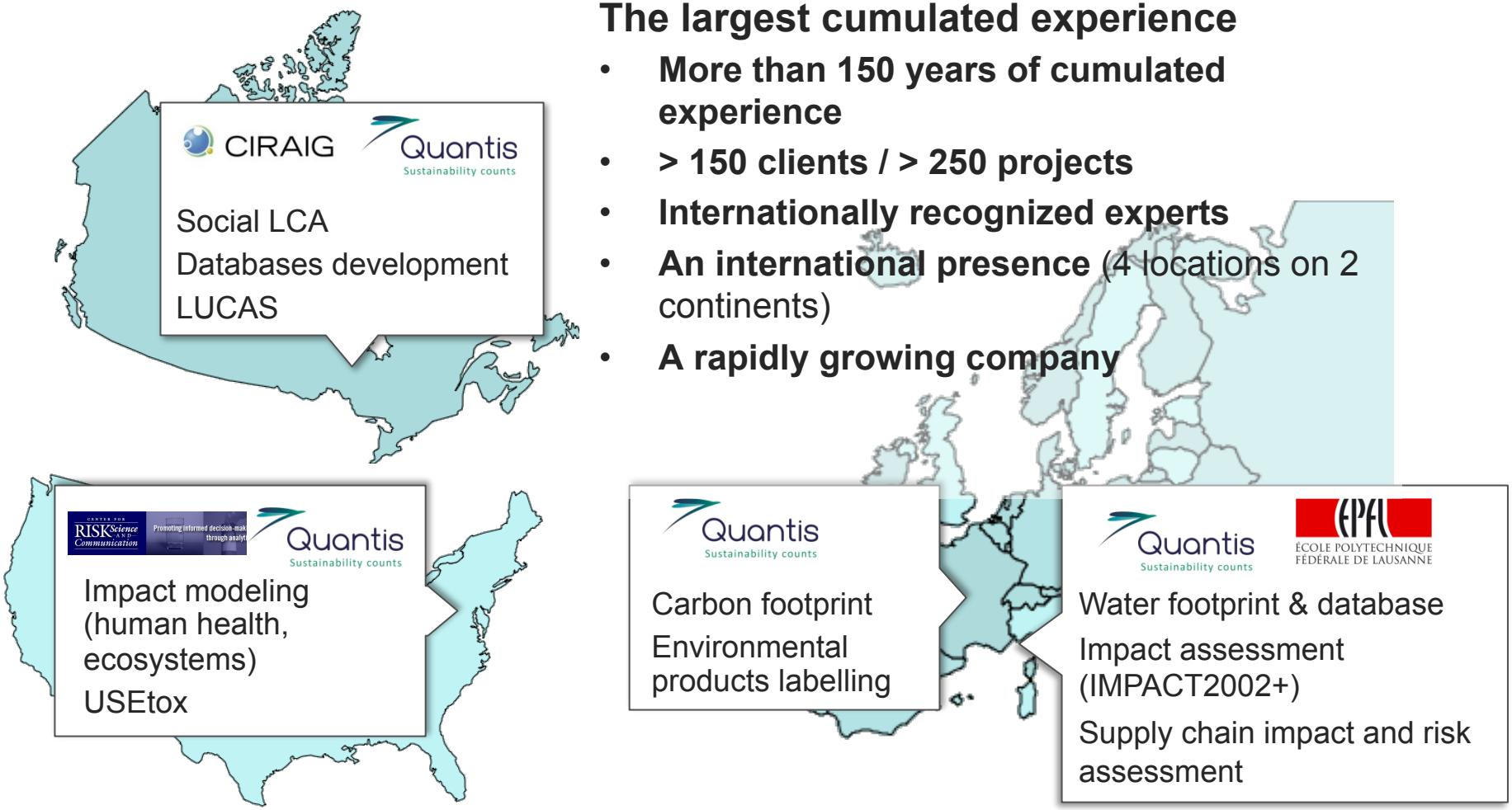
LCA – synthetic indicators for decision making



Deliver **synthetic indicators for decision** with a science-based aggregation

Some words about Quantis

Quantis: a leader in Life Cycle Assessment



The largest cumulated experience

- **More than 150 years of cumulated experience**
- **> 150 clients / > 250 projects**
- **Internationally recognized experts**
- **An international presence** (4 locations on 2 continents)
- **A rapidly growing company**

Our specific positioning

In addition to **carbon footprint**

- Impacts on **ecosystems** and **human health**
- Impact on water resource « ***water footprint*** »
- **Integrated company-site-product assessment** with allocation keys to analyse rapidly the environmental impacts of an important amount of products (environmental labelling)
- Generic database for thousands of products **Environmental labelling**, **Water DataBase**
- Development of **LCA and eco-design tools Operational tools for your company**

MULTI-CRITERIA

MULTI-LEVEL

Our know-how: Life Cycle Assessment

LCA is a method which allows one to assess, with scientific rigor and an objective approach, the environmental impacts of a company, a product, a service, or an industrial process

- **Assess** to **understand**
- **Understand** to **act**
  - Prioritize actions
  - Optimize impacts
  - Establish a strategy
  - Manage risks
- **Understand** to **communicate**
  - Respect legislation
  - Obtain a competitive edge
  - Motivate internally