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SCORE **LCA**



Monetary valuation of environmental impacts in LCA

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Presentation outline

- **Context & objectives**
- **Monetary valuation for LCA practitioners**
 - ✓ Decision tree
 - Monetary valuation with generic monetarisation factors
 - Monetary valuation with specific monetarisation factors
- **Conclusion**

Context & objectives

Context

- **Monetary valuation** is the **practice of converting social and environmental impacts into monetary units** so that they can be compared against each other and against the costs and benefits already expressed in monetary units
- Monetary valuation has been **used in policy making for decades** mostly in cost-benefit analyses
 - As early as the 30's in the US
 - More recently in the EU: National Emission Ceilings Directive (NECD, 2001)
- Different methods have been developed and used:
 - Market price method
 - Revealed preferences method (hedonistic preferences, travel cost, etc.)
 - Stated preferences method (contingent valuation, choice experiment, etc.)
 - Human capital approach
 - Avoidance method
 - Value transfer
 - Meta-analysis
- More recently (>1990), specific sets of monetary valuation factors have been developed for use in LCA: "LCA applications of monetary valuation" or "sets of monetary valuation factors for LCA": Ecotax, Ecovalue, EPS, EVR, LIME, Stepwise...

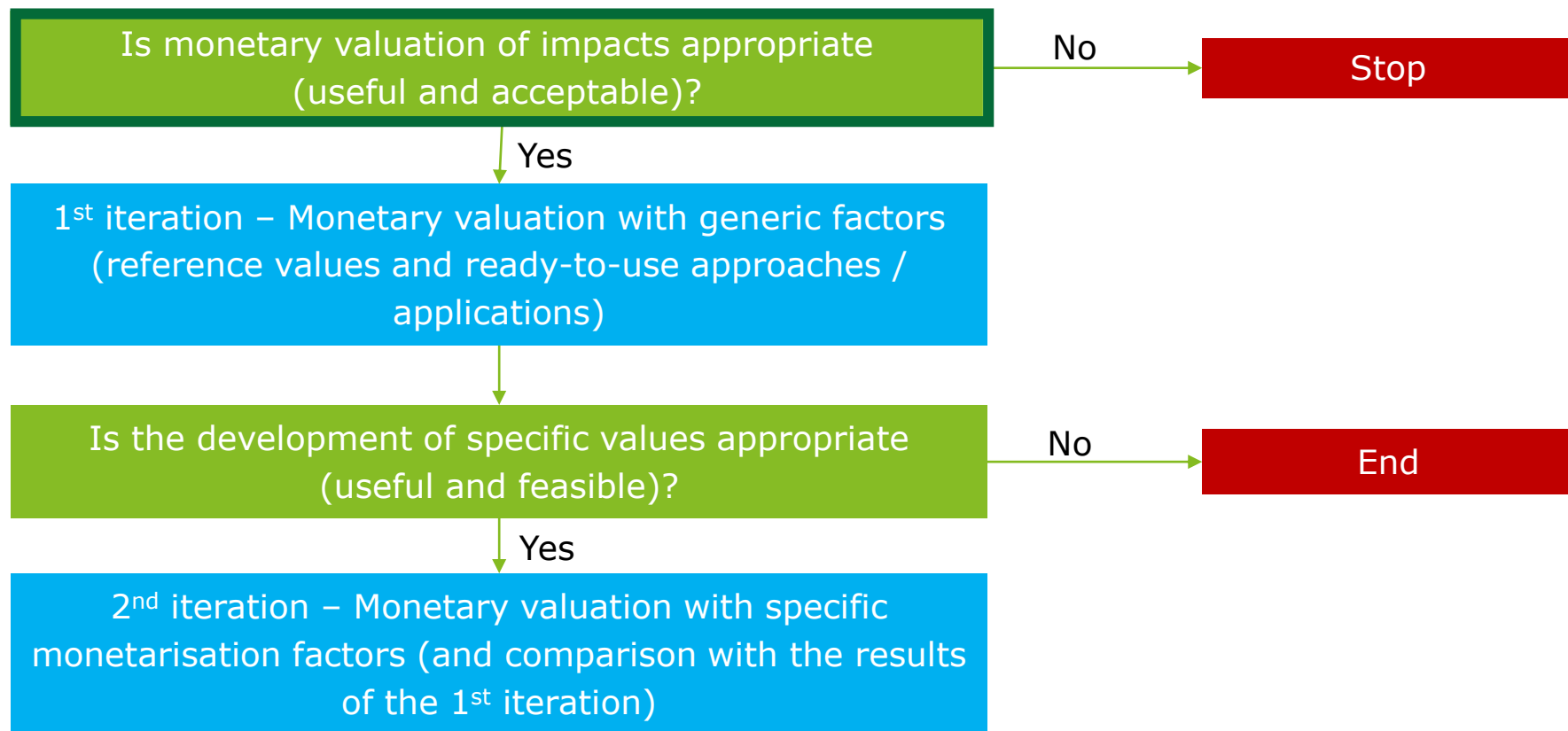
Objectives of the SCORELCA project

- In 2012, first SCORELCA study on monetary valuation: definitions, state-of-the-art, critical analysis and first recommendations
 - Weidema B P, Pizzol M, and Brandão M. (2013). The Use of Monetary Valuation of Environmental Impacts in Life Cycle Assessment: State of the art, strengths and weaknesses. Final report.
- This study is a follow-up study, which main objective was:
 - To provide operational recommendations on how to use monetary valuation to monetize LCA results**
 - *What are the strengths of the various LCA applications of monetary valuation?*
 - *When and how should I implement a contingent valuation, conjoint analysis or hedonic pricing method?*
- Recommendations provided in the form of a decision tree & 9 practical factsheets

Monetary valuation for LCA practitioners

An iterative approach for monetary valuation in LCA

Development of a decision tree to guide LCA practitioners, with two main steps



Is monetary valuation of impacts appropriate (useful and acceptable)?

3 key questions

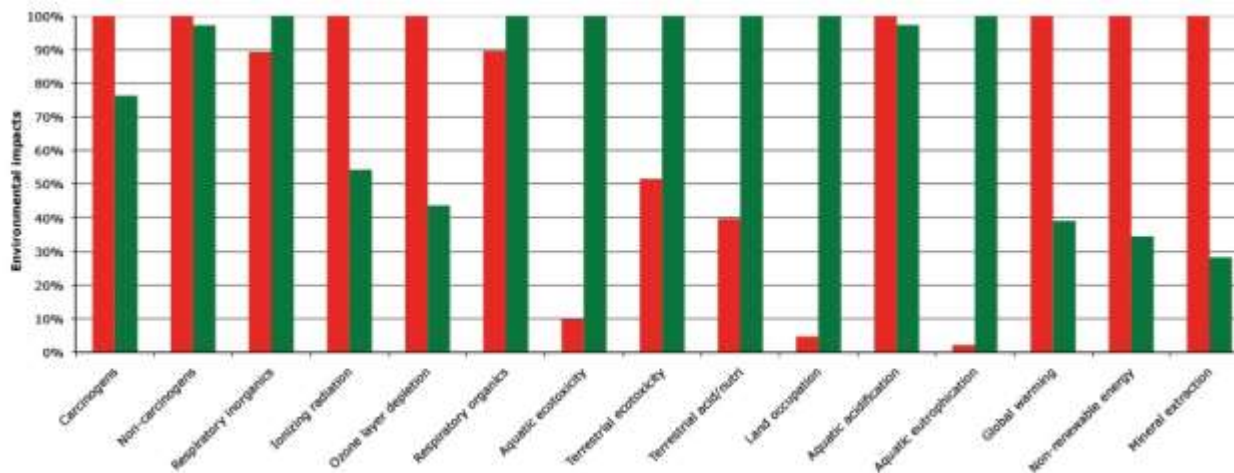
Is monetary valuation acceptable for all stakeholders?

Is there a trade-off?

- Choice between two or more impact categories
- Costs/benefits comparison

Would monetary valuation ease the communication of results?

Example: How to choose between 2 products with more or less good performances depending on different environmental impact indicators?

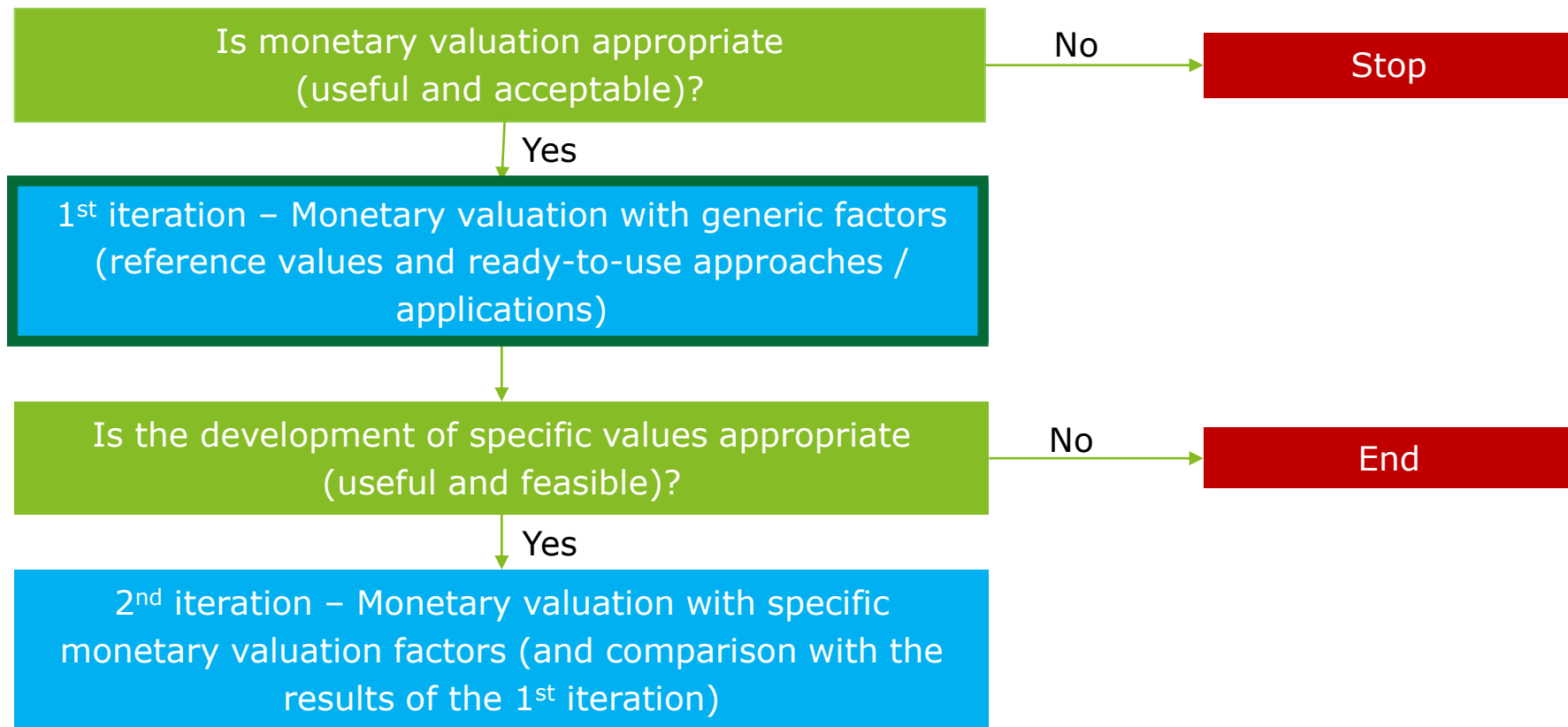


■ Product A
■ Product B

⇒ **Express the impacts in a single unit can be useful!**

An iterative approach for monetary valuation in LCA

1st iteration: monetary valuation with generic factors



1st iteration: Monetary valuation of impacts with generic factors

- Preselection of generic monetary valuation approaches, which are considered as the most relevant and easy to apply in LCA

Monetary valuation of <i>midpoints</i>	Monetary valuation of <i>endpoints</i>
ECOTAX	STEPWISE
ECOVALUE	LIME
EVR	EPS

- Recommendations by area of protection:

Human health: application of the 3 endpoint methods

In some contexts, there are reference values; e.g. VOSL (value of statistical life) used by public authorities. In France:

- Boiteux II report (investment choices for transport) – 1.5 million EUR₂₀₀₀/statistical life
- Quinet report – 3 million EUR₂₀₁₀/statistical life and 115 000 EUR₂₀₁₀/year of statistical life

Ecosystems: use of EPS and LIME

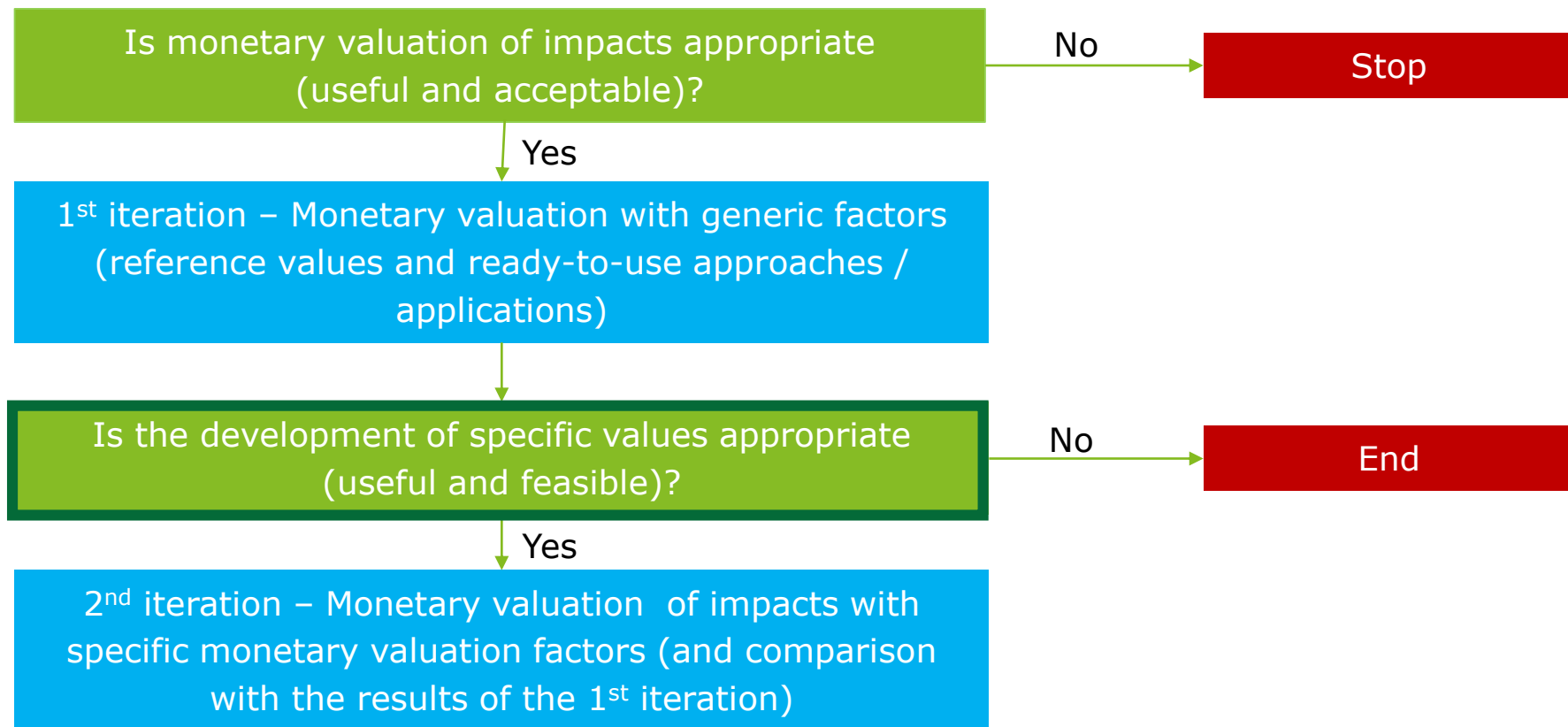
Ressources: lack of robustness for abiotic resources depletion indicators

Most robust methods: LIME and STEPWISE

- In a nutshell: we recommend to use several methods to enhance the robustness of the study conclusions

An iterative approach for monetary valuation in LCA

Is the development of specific values appropriate?



An impact is specific if:

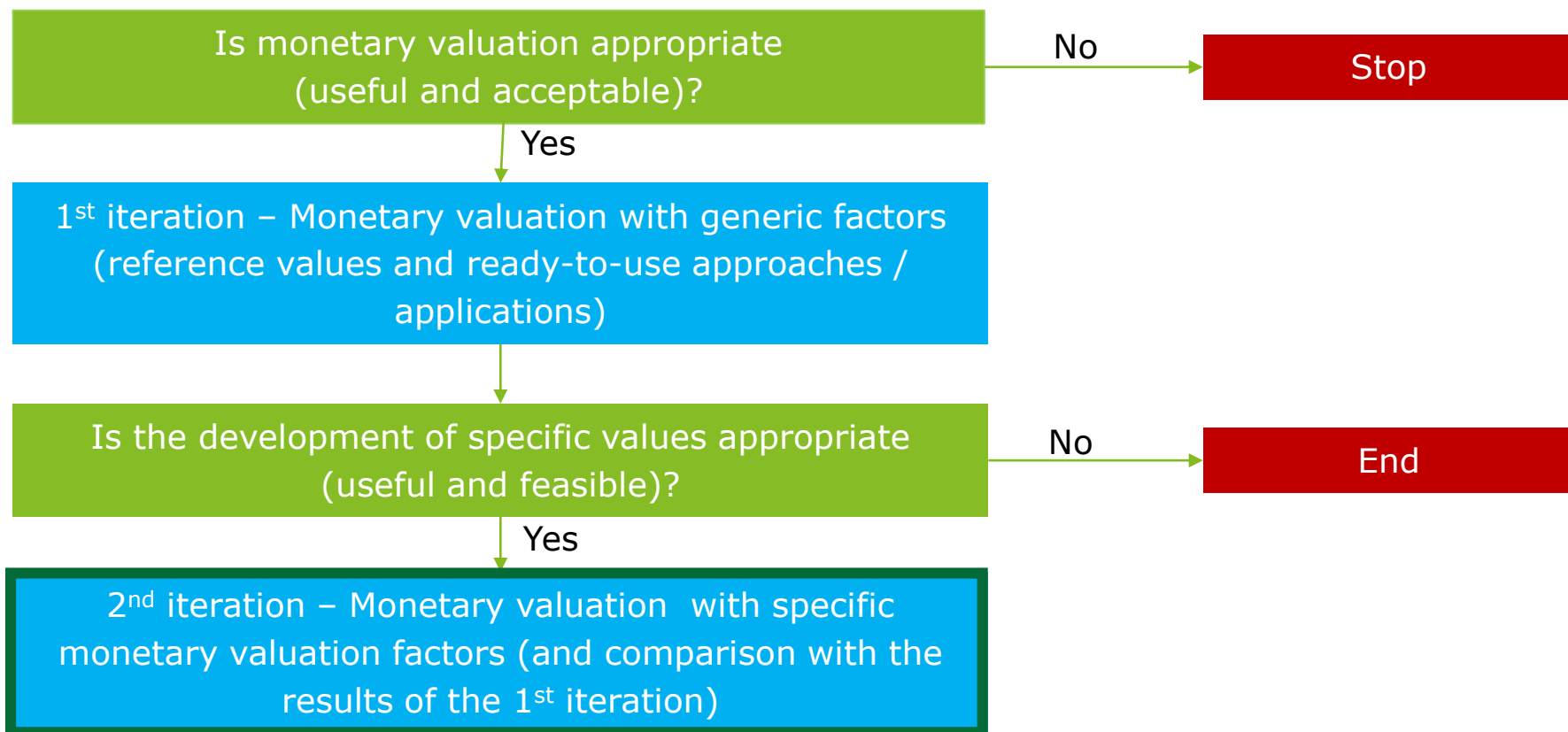
- It is linked to a specific geographic location
- It is associated with life-cycle steps in the foreground
- The stakeholders who might be interviewed can have a motivated opinion on this impact

Examples: impact of a wind farm on a specific landscape, biodiversity in a specific natural reserve, etc.

Recommendation:
Development of specific monetary valuation factors in cases where the existence of specific impacts is confirmed

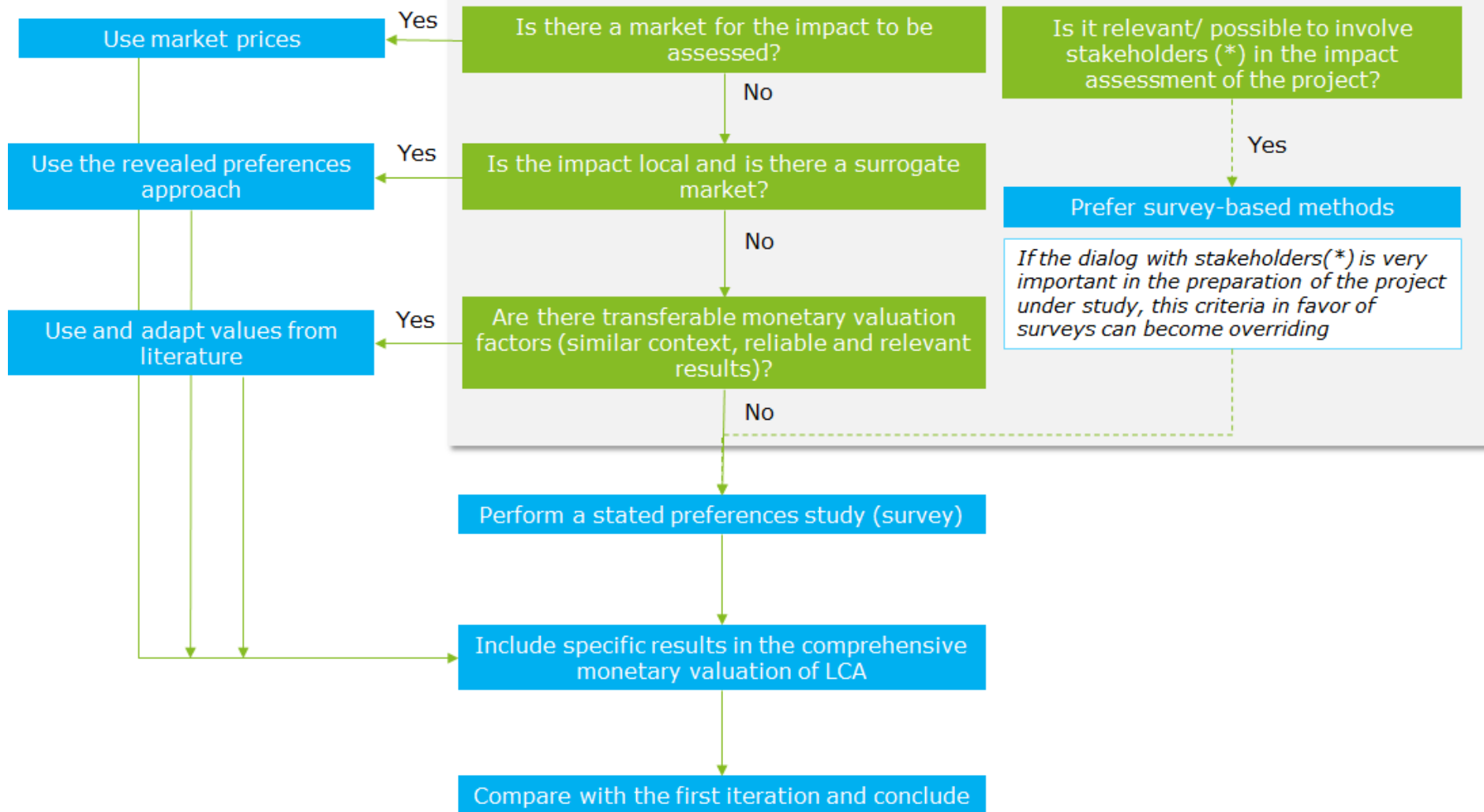
An iterative approach for monetary valuation in LCA

2nd iteration: monetary valuation with specific factors



2nd iteration: Monetary valuation of impacts with specific monetary valuation factors

Trade-off between several factors



Conclusion

In a nutshell

Monetary valuation in LCA should be used if necessary and depending on the objectives of the study

An approach to solve trade-offs

(Readily-available) generic LCA applications of monetary valuation should be used with substantial caution

An approach with a potentially complex implementation, especially when it is decided to develop specific monetarisation factors, which may request time, cost and expertise investments



Thank you for your attention!

Any questions?

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Monetary valuation of environmental externalities, a long-standing practice

Decades of use in public policy analysis

First applications in public policies

- Flood Control Act (US, 1936): “if the benefits to whomsoever they accrue are in excess of the estimated costs”
- (US, 1960s): Applications in other fields: water quality, preservation of natural parks, use of toxic substances, etc.
- (GB, 1961) Costs-benefits analysis for the construction of the M1 highroad (between London and Leeds)

1990's: public policies related to atmospheric pollution in Europe and in the US were subject of cost benefit evaluations

- Clean Air Act Amendments (US, 1990)
- NECD: National Emission Ceilings Directive (UE, 2001)

Few recent examples in France

- Commissariat général du Plan (2001) « Transports : choices of investments and costs of emissions », Boiteux report
- Commissariat Général à la stratégie et à la Prospective (2013) « Socio-economic assessment of public investments », Quinet report

From the end of the 1990's onwards: development of practical implementation on monetary valuation in LCA

What can the monetary valuation of environmental damages be used for?

A few possible applications, depending on different contexts

- **Cost-benefit analysis:** assessing, comparing and justifying public policies (e.g.: policies to reduce greenhouse gas emissions, infrastructure constructions that have an impact on the environment, etc.)
- Assessment study of an ecological disaster to estimate the **compensations** (e.g.: oil spill caused by BP Deepwater Horizon)
- Assessment of the **environmental externalities** of a behaviour, in order to act rationally on its price (e.g.: to fix an environmental tax)
- Using one single indicator in the context of multi-criteria decisions (e.g.: to initiate an eco-design process)

Much reluctance that are ethical, theoretical or practical

Monetary valuation has always been subject to criticism:

- Regarding its underlying principles: Is it relevant, or even ethical, to express in monetary terms the value of everything?
- Regarding its practical feasibility: Is it even possible to give a monetary value to everything?

2 extreme irreconcilable positions

“It is unacceptable to give a price to things that are not economically measurable”

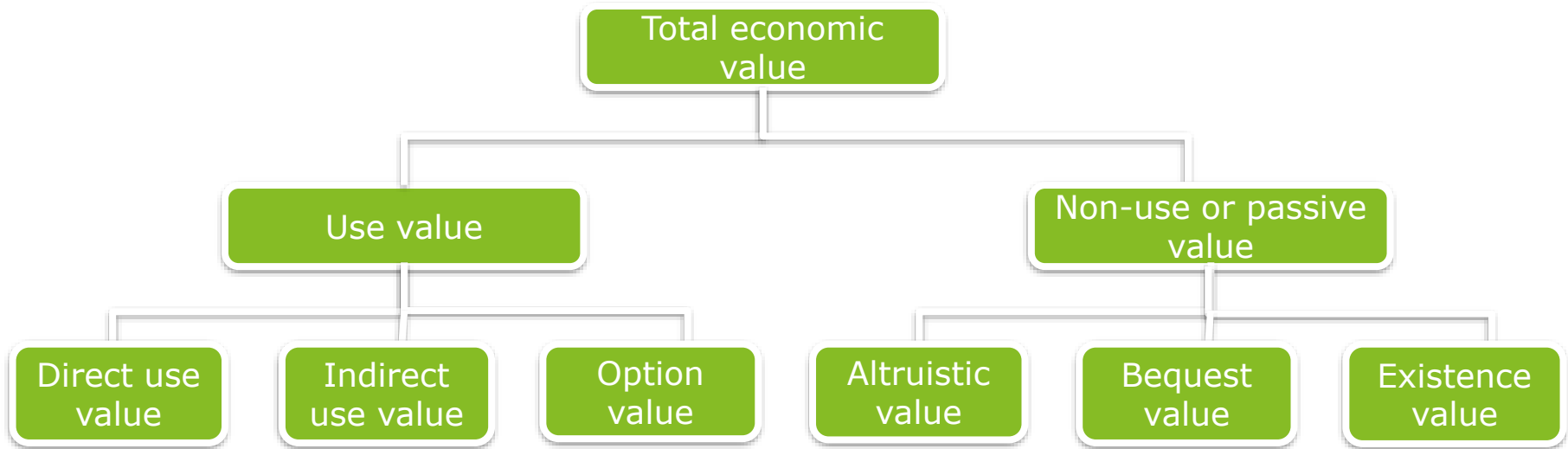
“Nowadays, most decisions are taken based on economic criteria: what is not measured in economic terms is not taken into account”

Theoretical presupposition of monetary valuation

- Monetary values are relevant as comparative basis to evaluate the value of everything
- The general aim is to maximize global social well-being
- Additive accountancy
- Indifference to rights
- Anthropocentric vision of the world

What are we looking for when we monetarise? On which methods can we rely?

- The value of a product/service is the total amount that individuals are willing to pay to get this product/service (or to receive in order to be dispossessed)
- Value has different components:



- There are different methods of monetary valuation:
 - Market price method
 - Revealed preferences method (hedonistic preferences, travel cost, etc.)
 - Stated preferences method (contingent valuation, choice experiment, etc.)
 - Human capital approach
 - Avoidance method
 - Value transfer
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