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Monetary valuation of environmental impacts in LCA

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Presentation outline

- **Part 1 – Introduction to monetary valuation**
 - ✓ Historic
 - ✓ Objectives
 - ✓ Methods
- **Part 2 – Monetary valuation for LCA practitioners**
 - ✓ Decision tree
 - Monetary valuation with generic monetarisation factors
 - Monetary valuation with specific monetarisation factors
- **Conclusion**

Part 1

Introduction to monetary valuation

- Monetary valuation of environmental damages:
what is it?
Since when has it been used?
- Monetary valuation, **why** (not)?
- Monetary valuation, **how**?

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”

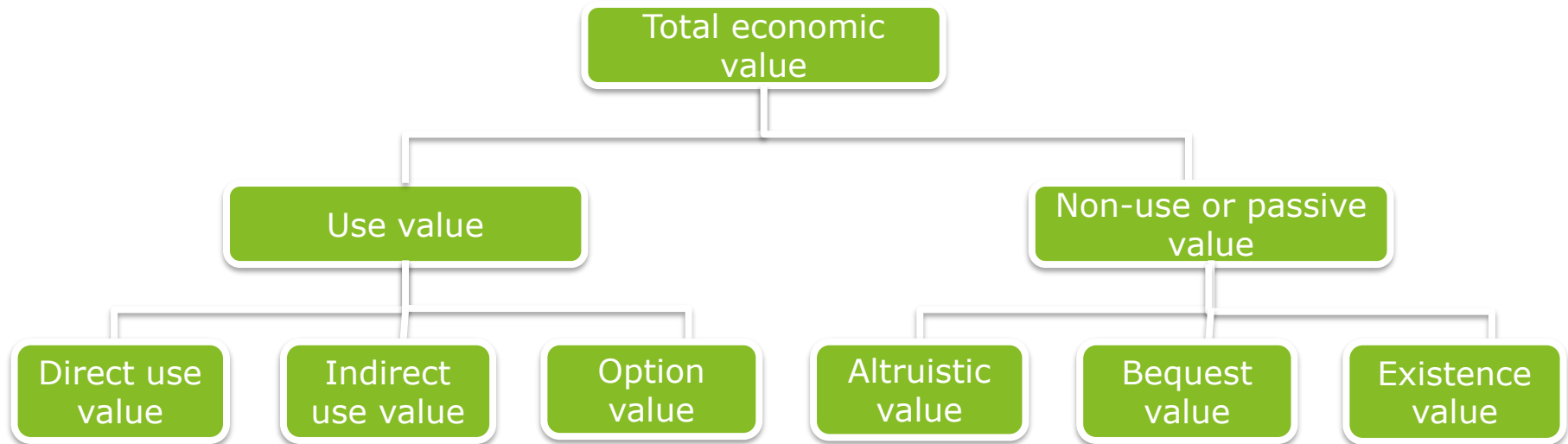
“Nowadays, most decisions are taken based on economic criteria: what is not measured in economic terms is not taken into account”

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:



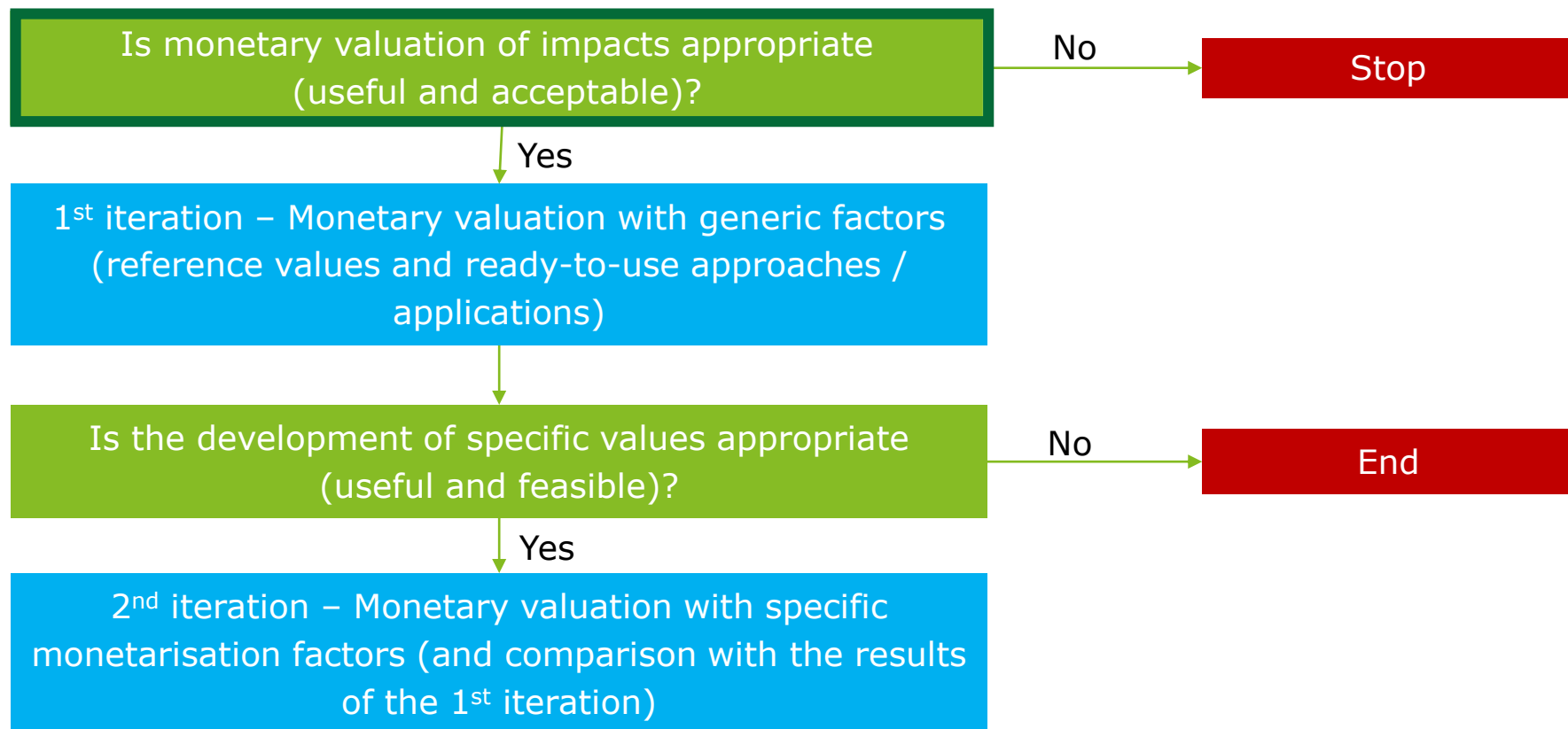
- There are different methods of monetary valuation:
 - Market price method
 - Revealed preferences method (hedonistic preferences, travel cost, etc.)
 - Stated preferences method (contingent valuation, choice experiment, etc.)
 - Human capital approach
 - Avoidance method
 - Value transfer
 - Meta-analysis

Part 2

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

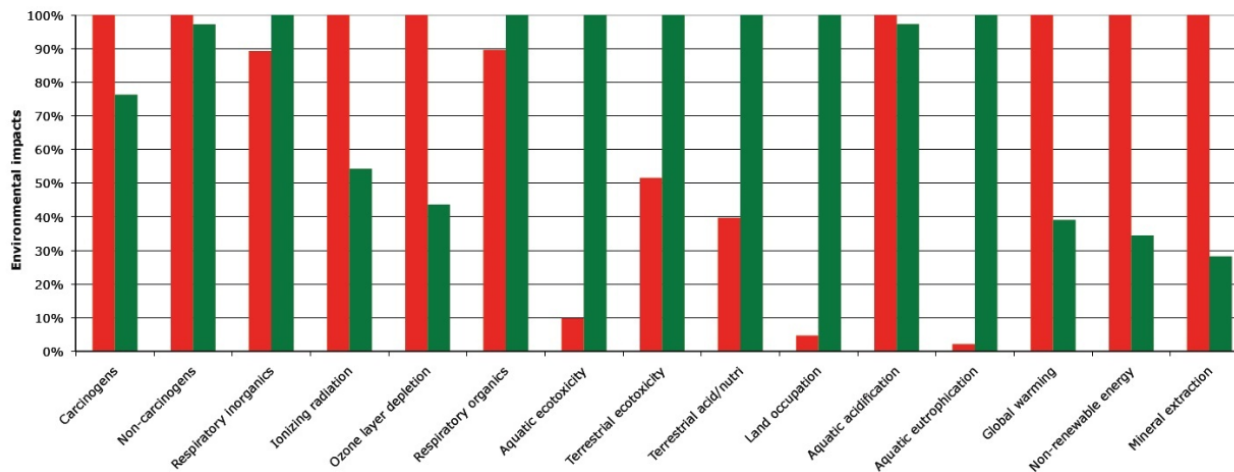
Is monetary valuation acceptable for all stakeholders?

Is there a trade-off?

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

Would monetary valuation ease the communication of results?

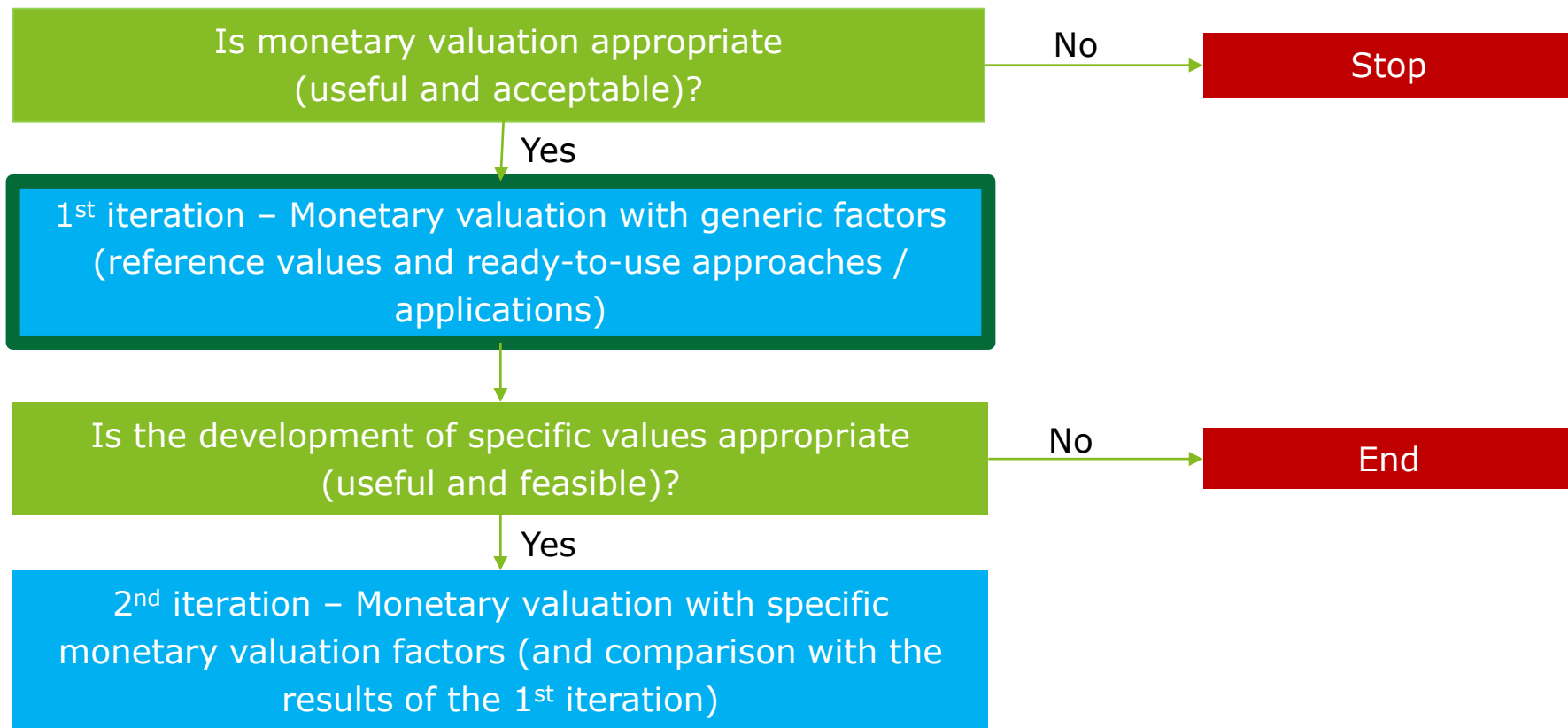
Example: How to choose between 2 products with more or less good performances depending on different environmental impact indicators?



■ 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 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 – 1.5 million EUR₂₀₀₀/statistical life
- Quinet report – 3 million EUR₂₀₁₀/statistical life and 115 000 EUR₂₀₁₀/year of statistical life

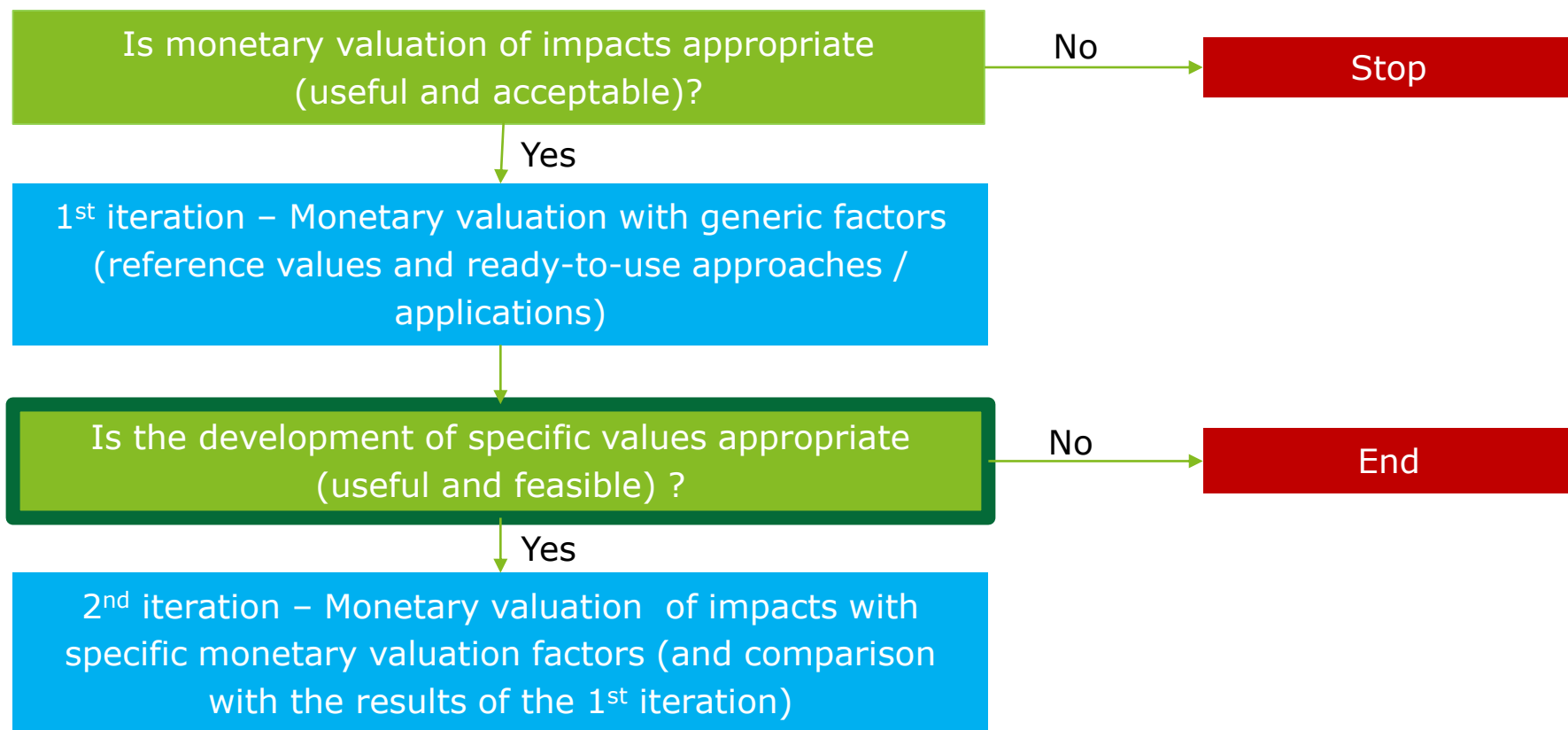
Ecosystems: use of EPS and LIME

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



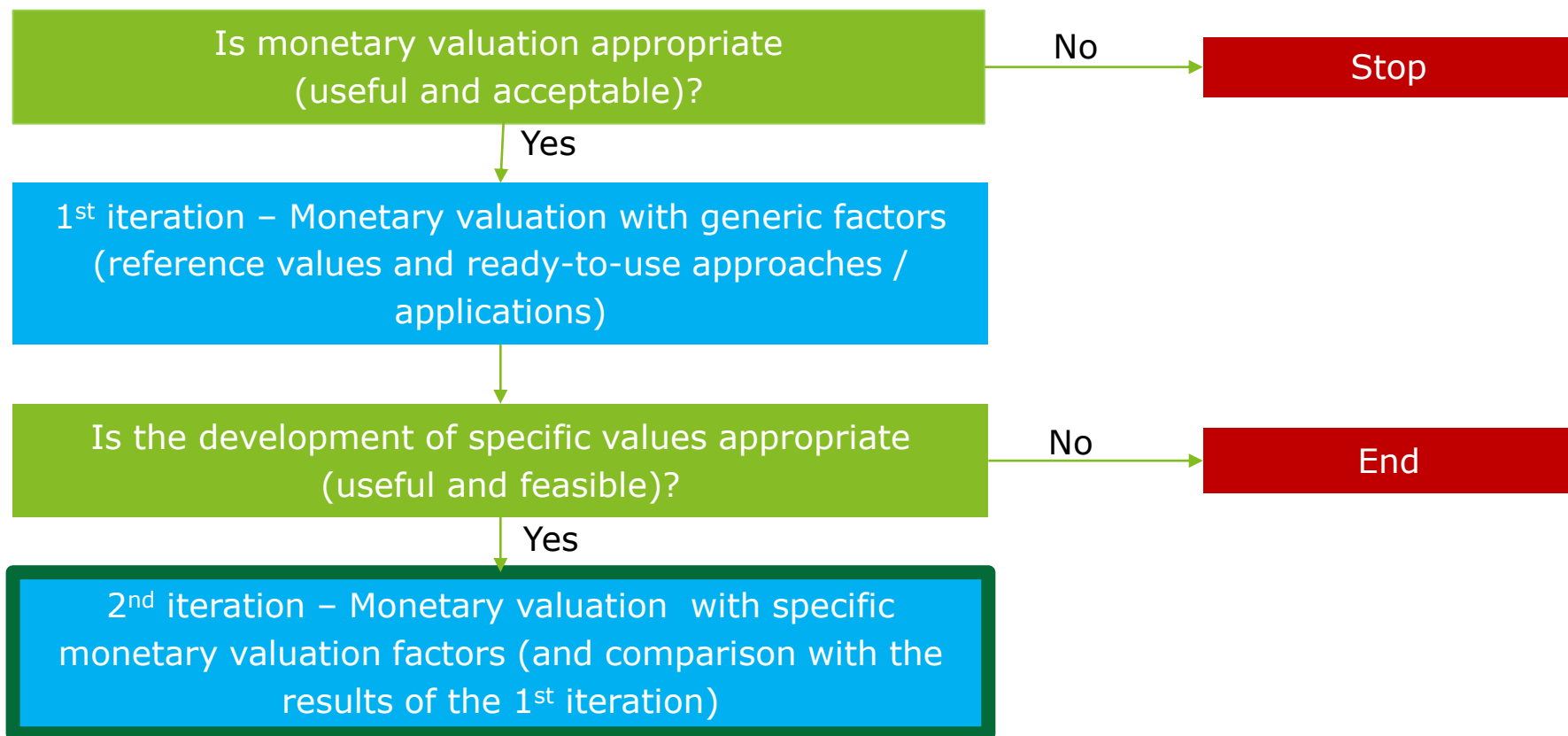
An impact is specific if:

- 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.

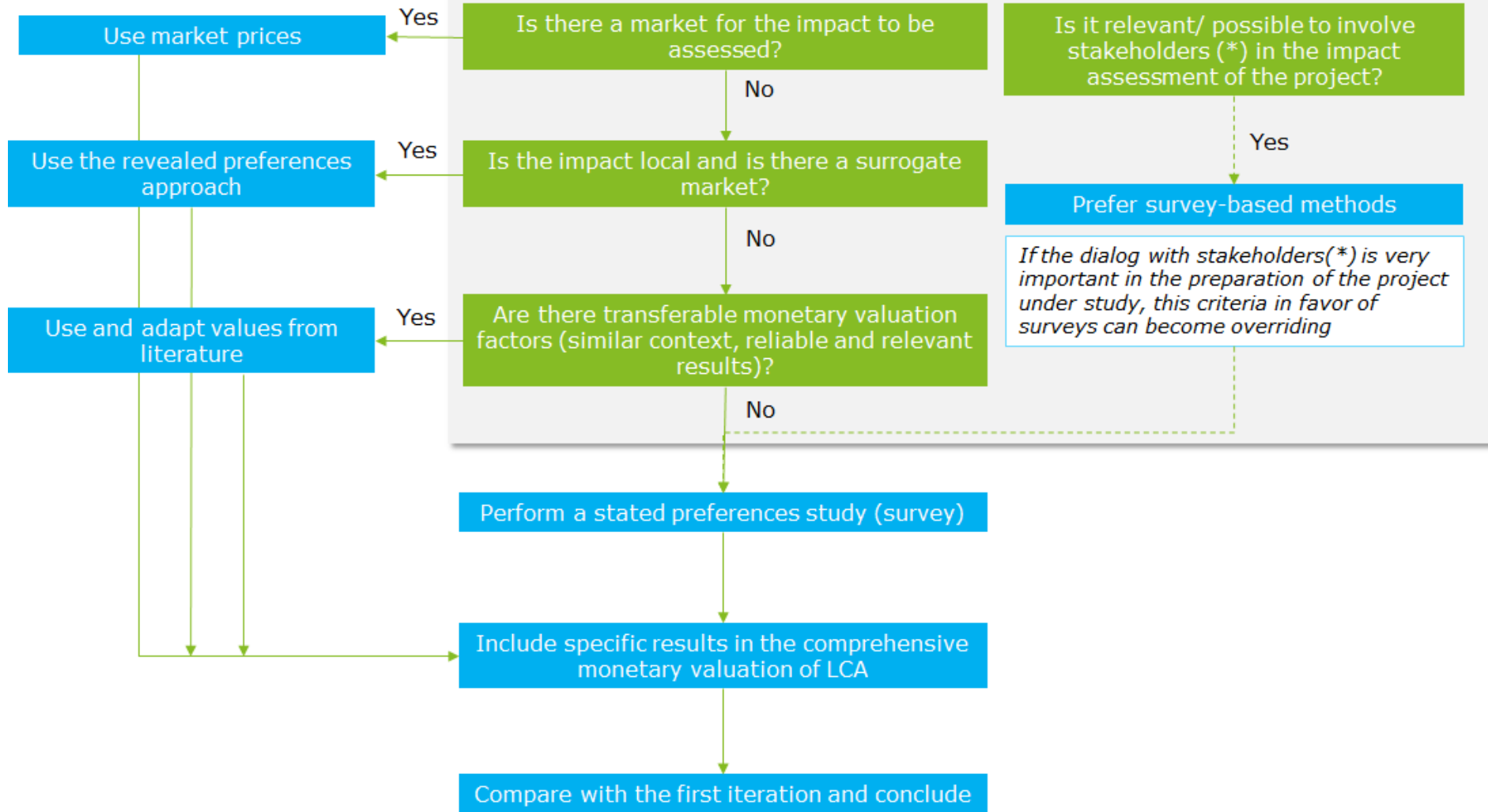
Recommendation:
Development of specific monetary valuation factors in cases where the existence of specific impacts is confirmed

An iterative approach for monetary valuation in LCA



2nd iteration: Monetary valuation of impacts with specific monetarisation 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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