

Sustainability and Future Trajectories: How is Prospectivity Integrated into Life Cycle Sustainability Assessment?

Urte Brand, Juan Camilo Gómez, Hauke Lütkehaus, Veatriki Papantoni, Mareike Tippe, Christian Pade, Matthias Oswald, Thomas Vogt

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Session MO.3.B: Prospective Life Cycle Sustainability Assessment of Energy Technologies

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DLR Institute of Networked Energy Systems



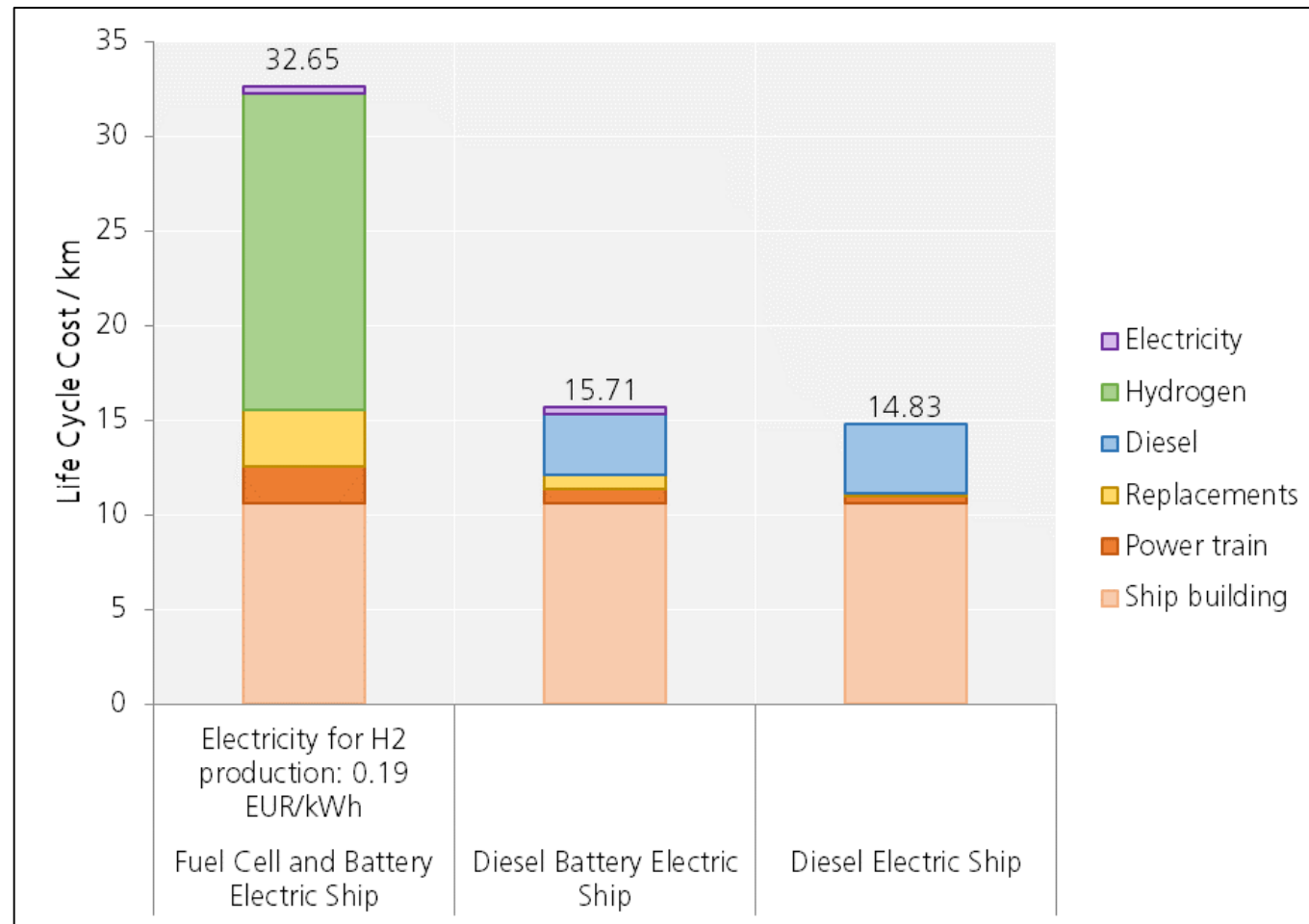
Knowledge for Tomorrow



Motivation

Example: LCC of ships with different propulsion systems

Life cycle costs of a ship incl. fuels/electricity (End-of-Life excluded)

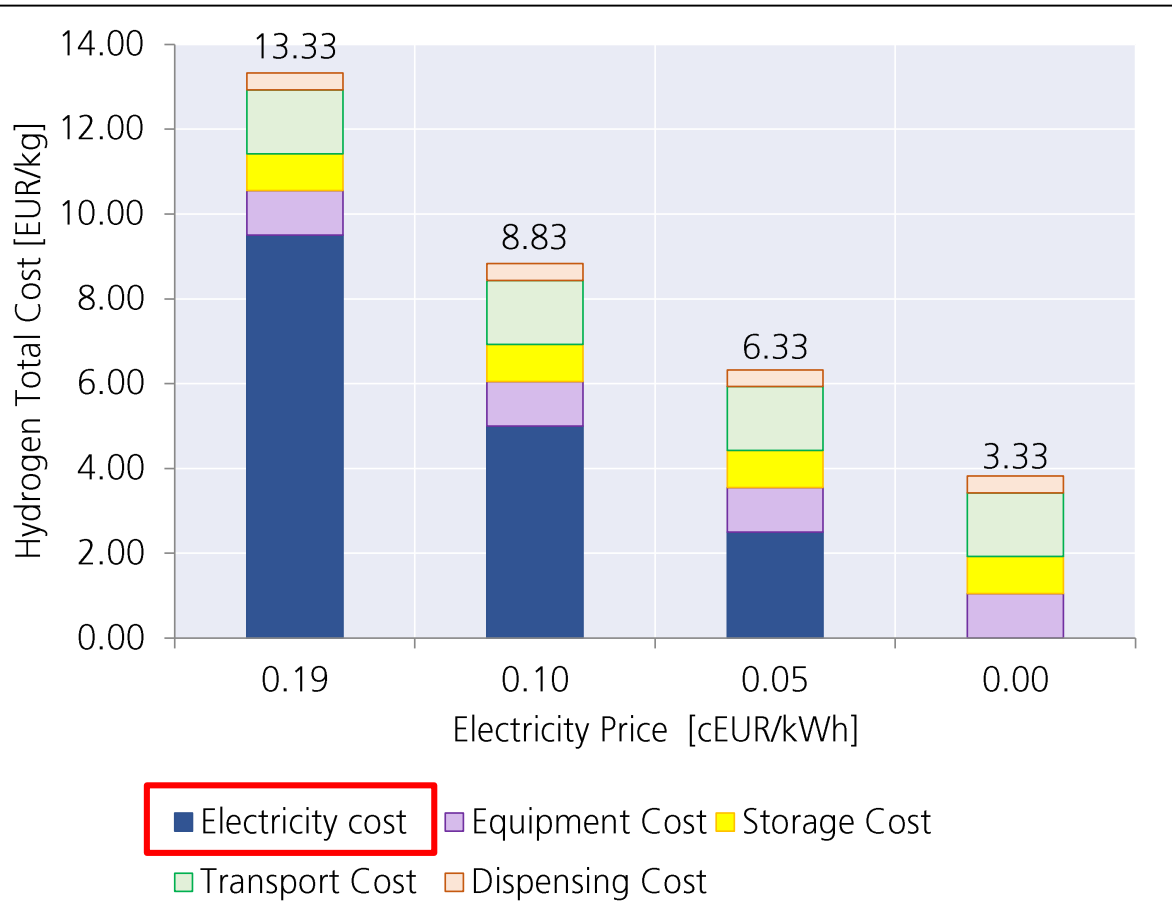


Source: based on Gomez Trillos 2020

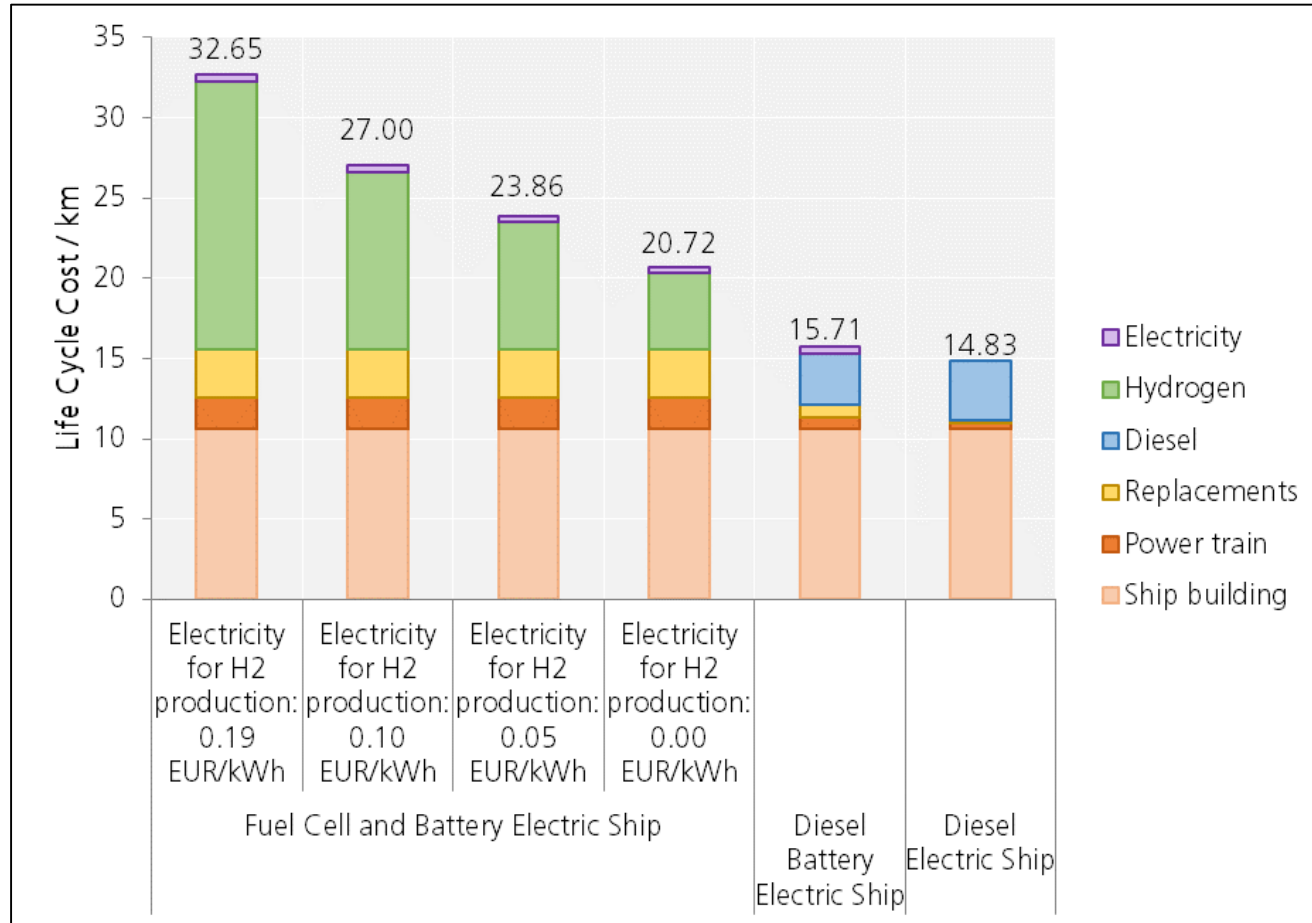
Motivation

Example: LCC of ships with different propulsion systems

Future estimated production costs for Power-to-Hydrogen



Life cycle costs of a ship incl. fuels/electricity (End-of-Life excluded)



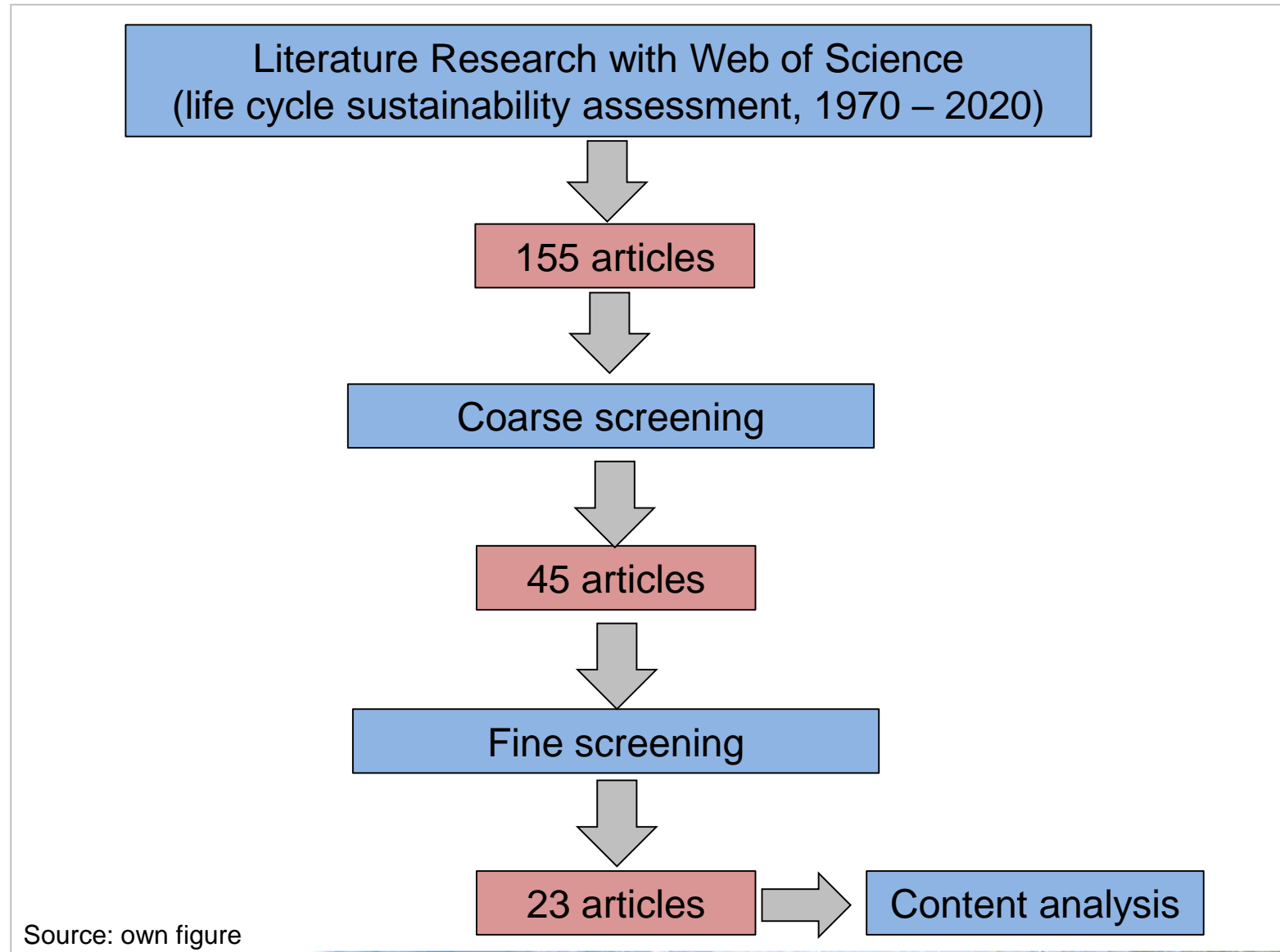
Motivation

Review of LCSA articles with prospective elements to clarify following aspects:

- Motivation to apply prospective LCSA
- Type of prospective data applied
- Commonly used prospective methods
- Optimisation potential formulated by the authors

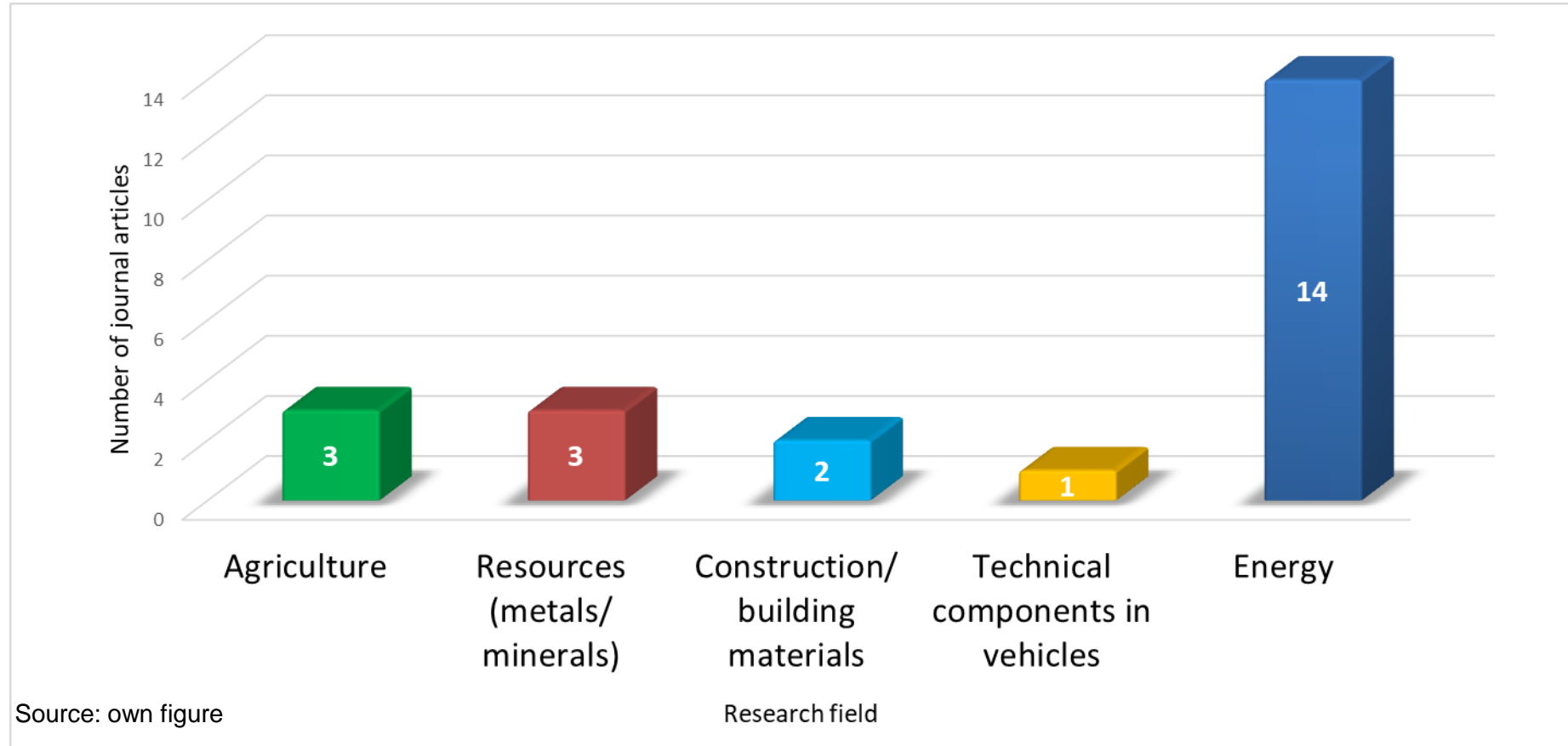


Methodology – Review of LCSA Articles



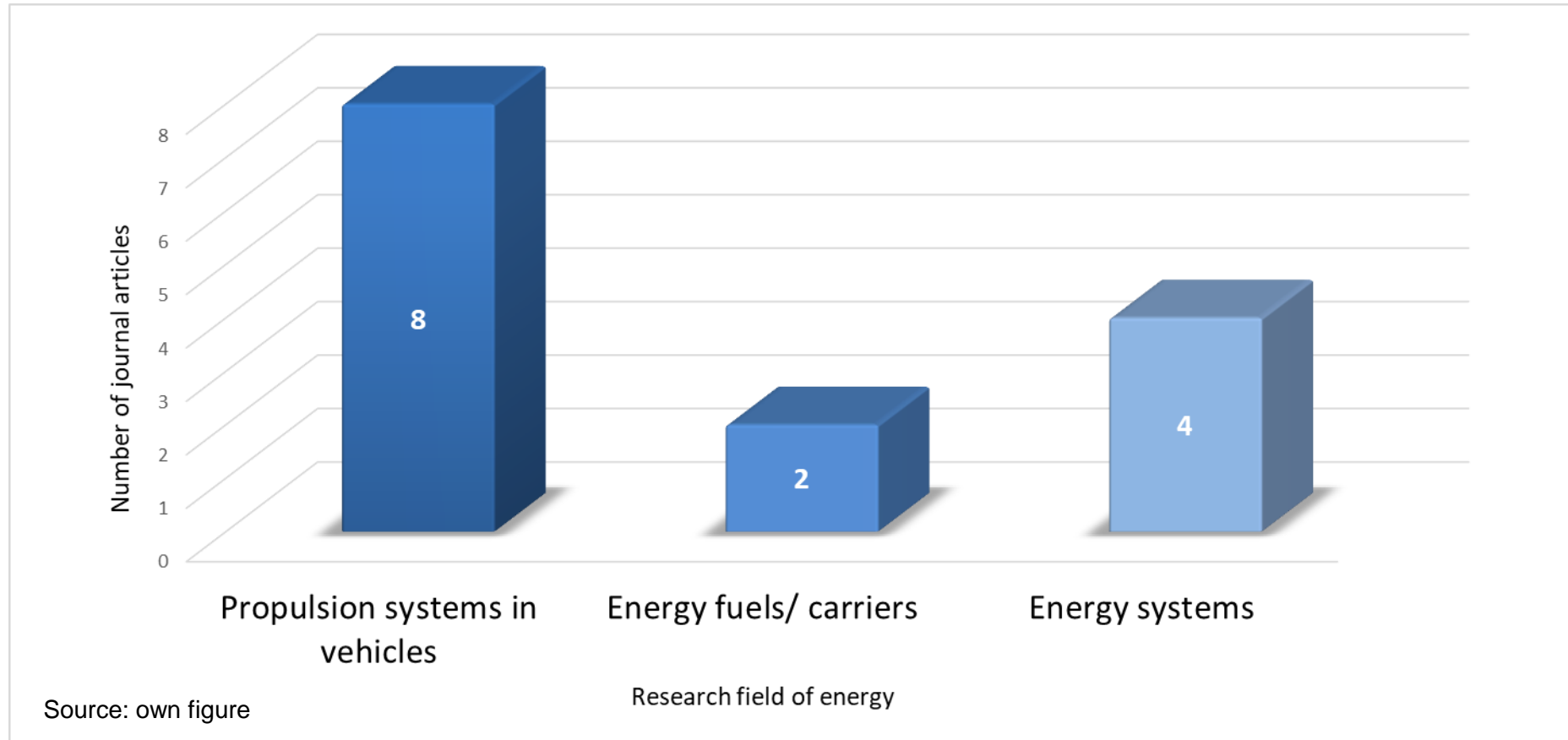
Results – Review of LCSA Articles

Research fields of analysed articles (n=23, no multiple entries)



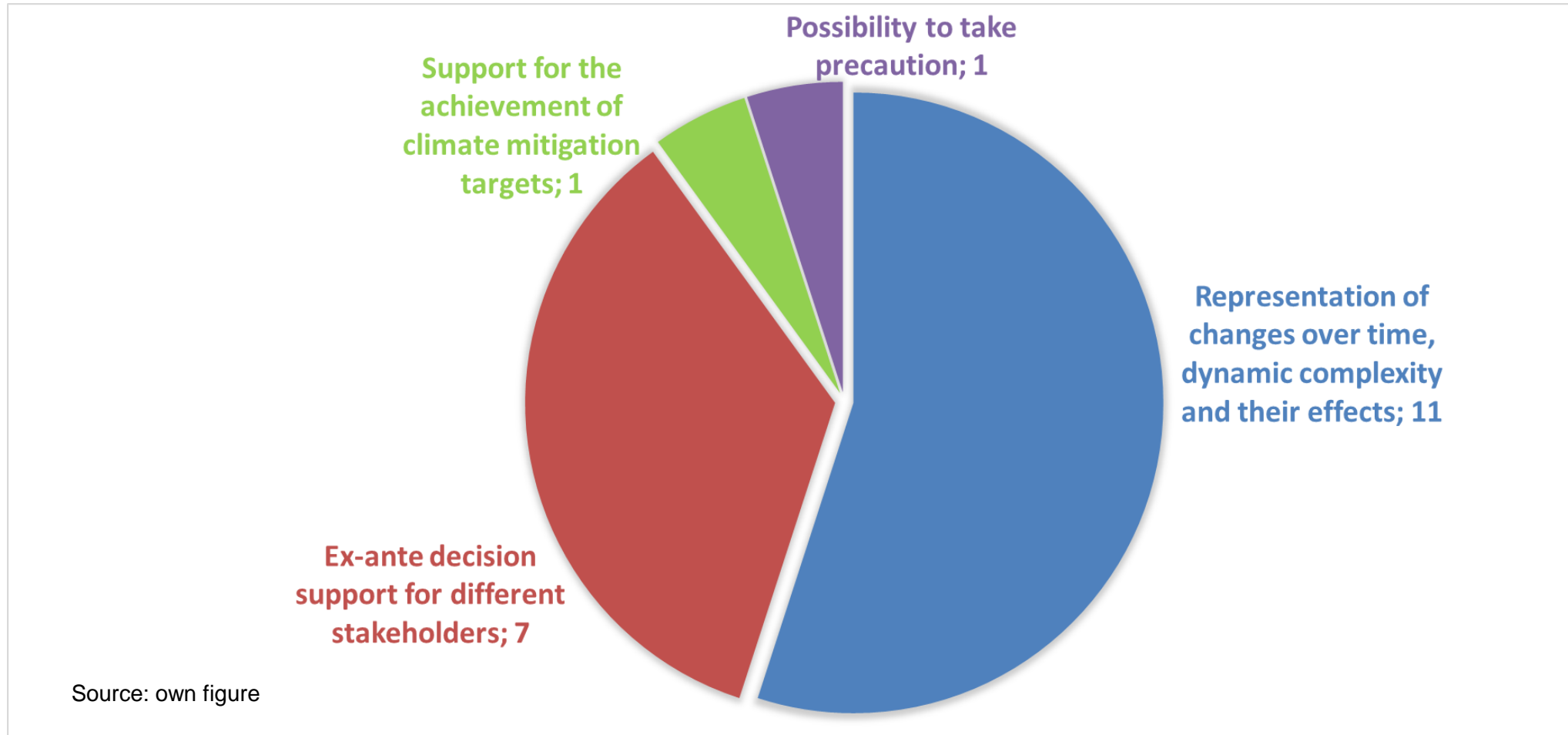
Results – Review of LCSA Articles

Sub categories in the research field of energy (n=14, no multiple entries)



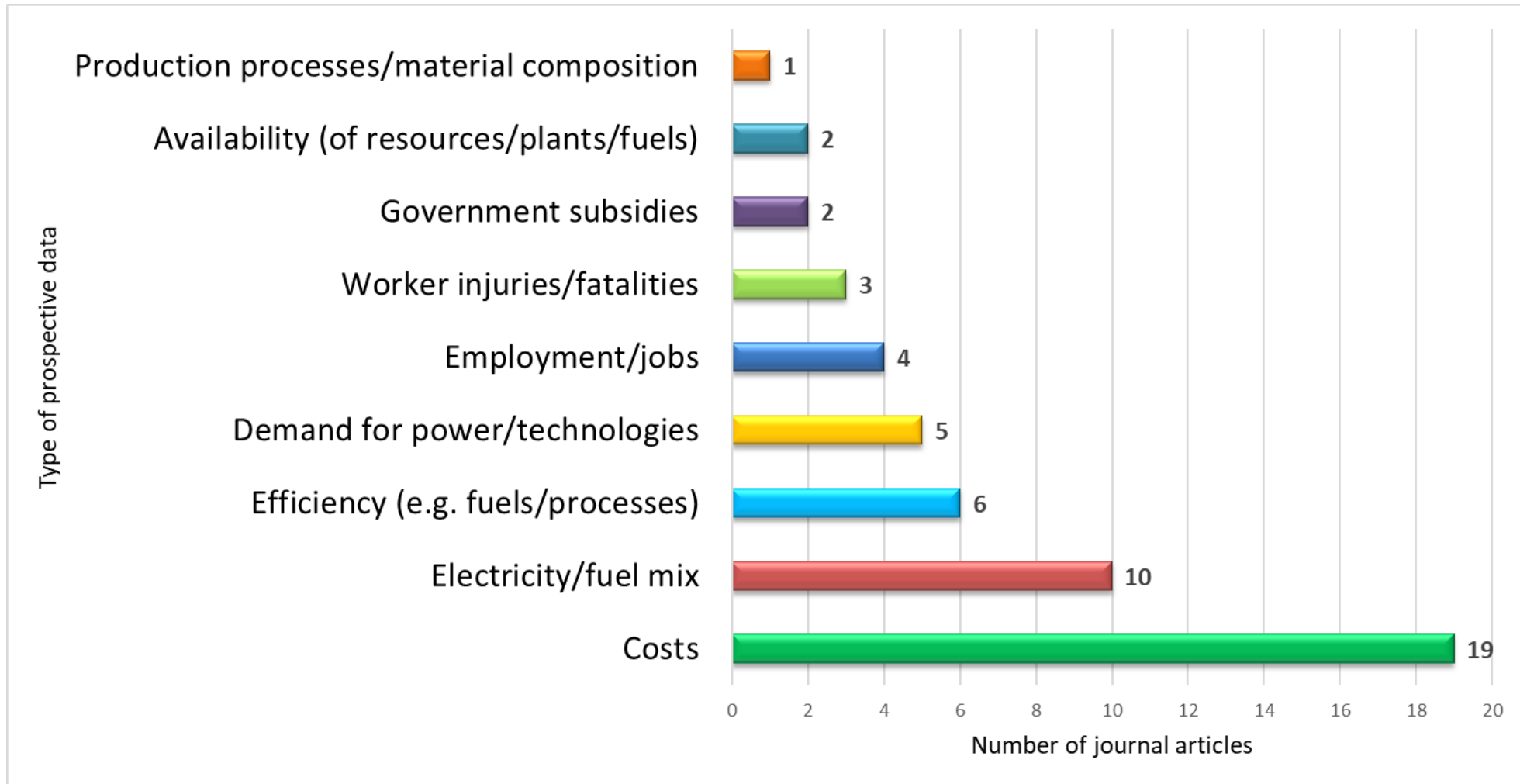
Results – Review of LCSA Articles

Motivation of authors to apply a prospective LCSA
– research field of energy (n=14; multiple entries)



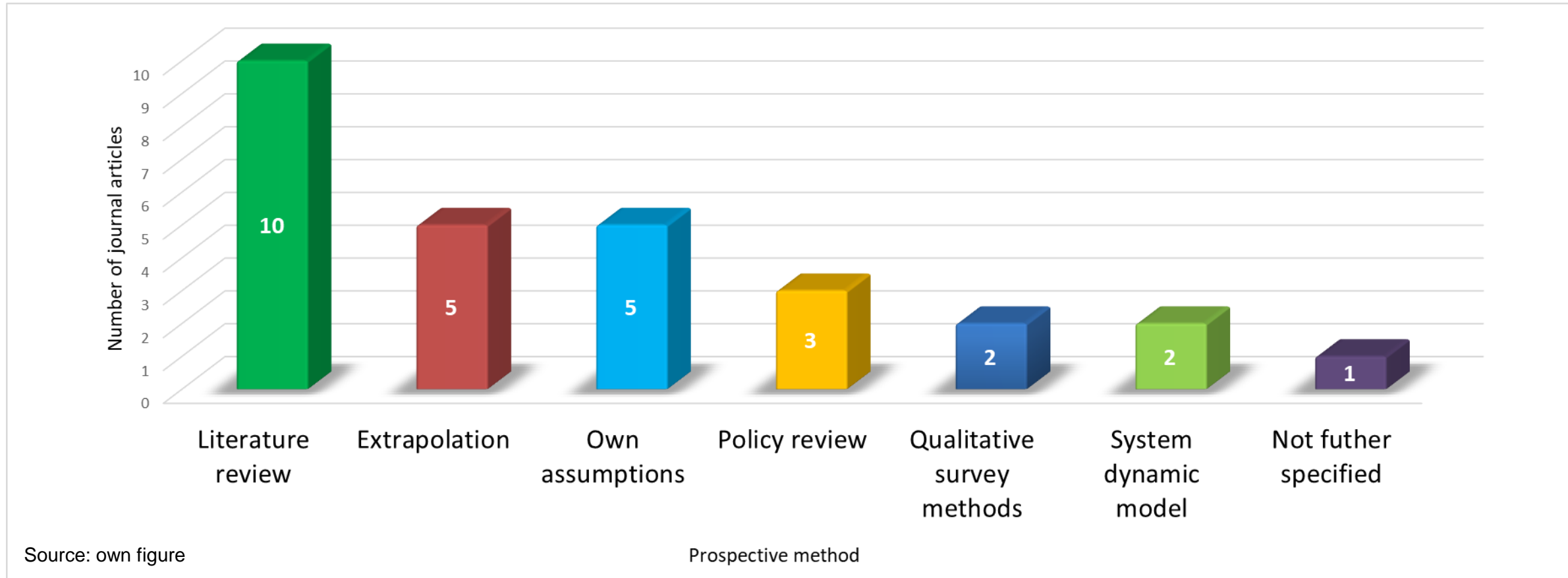
Results – Review of LCSA Articles

Type of prospective data
– research field of energy (n=14; multiple entries)



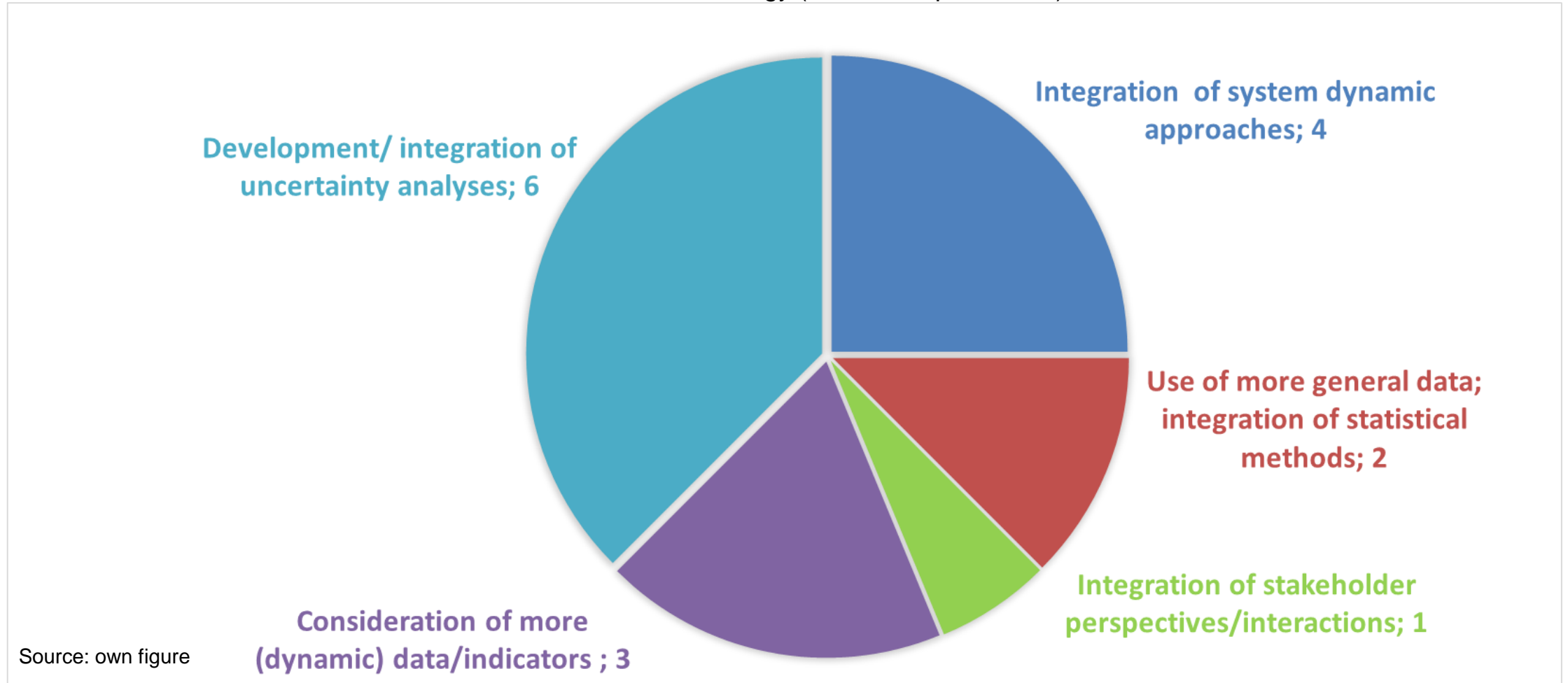
Results – Review of LCSA Articles

Prospective methods applied
– research field of energy (n=14; multiple entries)



Results – Review of LCSA Articles

Optimisation potential mentioned by the authors
– research field of energy (n=14; multiple entries)



Own Conclusion and Outlook

- Development of a systematic approach of prospective LCSA
- Integration of uncertainty analyses (depending on different sources of uncertainty)
- Application of prospective LCSA on different case studies and identification of optimisation potentials

Today's LCM session:

- Environmental consequences of future bioenergy deployment pathways (*T. Gibon*)
- Energy storage with less metal scarcity? Prospective life cycle assessment of lithium-sulfur batteries with a focus on mineral resources (*S. Wickerts*)
- Prospective life cycle assessment of hydrogen produced through solid oxide electrolysis (*D. Iribarren*)
- Prospective LCA and LCC applied on different Power-to-Gas technologies (*J. C. Koj*)



Thank you for your attention

Dr Urte Brand
Deutsches Zentrum für Luft- und Raumfahrt
German Aerospace Center
Institute of Networked Energy Systems
Department of Energy Systems Analysis
Team Leader “Energy Scenarios and Technology Assessment”
Phone +49 441 99906-116
Mail: urte.brand@dlr.de



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