energie-
suffizienz

EnSu, die Rolle von Energie-Suffizienz
in Energiewende und Gesellschaft

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David Schöpf, Mirko Schäfer, Frauke Wiese | June 2024 | eceee conference

Searching for energy savings quantifications for the Sufficiency Potential Database

Like looking for a needle in a haystack

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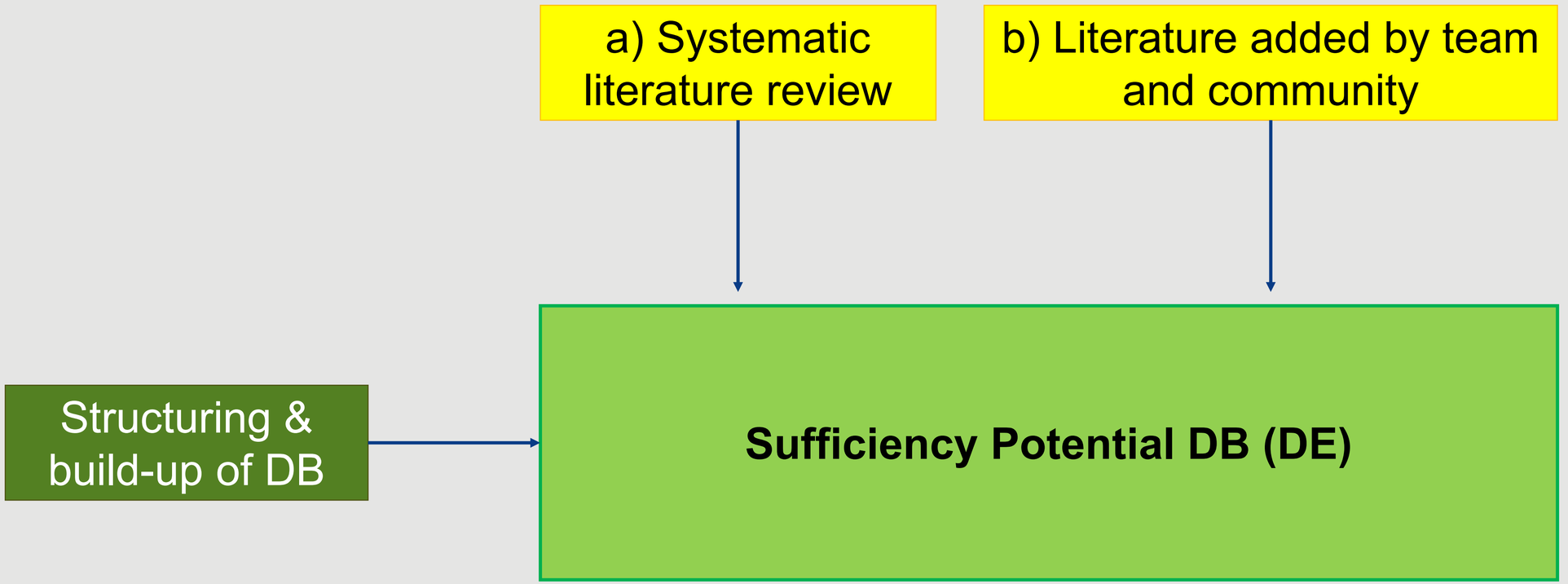
Institut für angewandte Ökologie
Institute for Applied Ecology
Europa-Universität Flensburg
Wuppertal Institut

GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung

AIM

- Building up a sufficiency potential database
  - Freely available
  - Individual policy and measure quantifications
  - Focus on Germany (at first)
- … to show the emission & energy reduction potential of sufficiency
- … so that it is possible to consider sufficiency in scenarios and modelling

PROCEDURE & LITERATURE IDENTIFIED

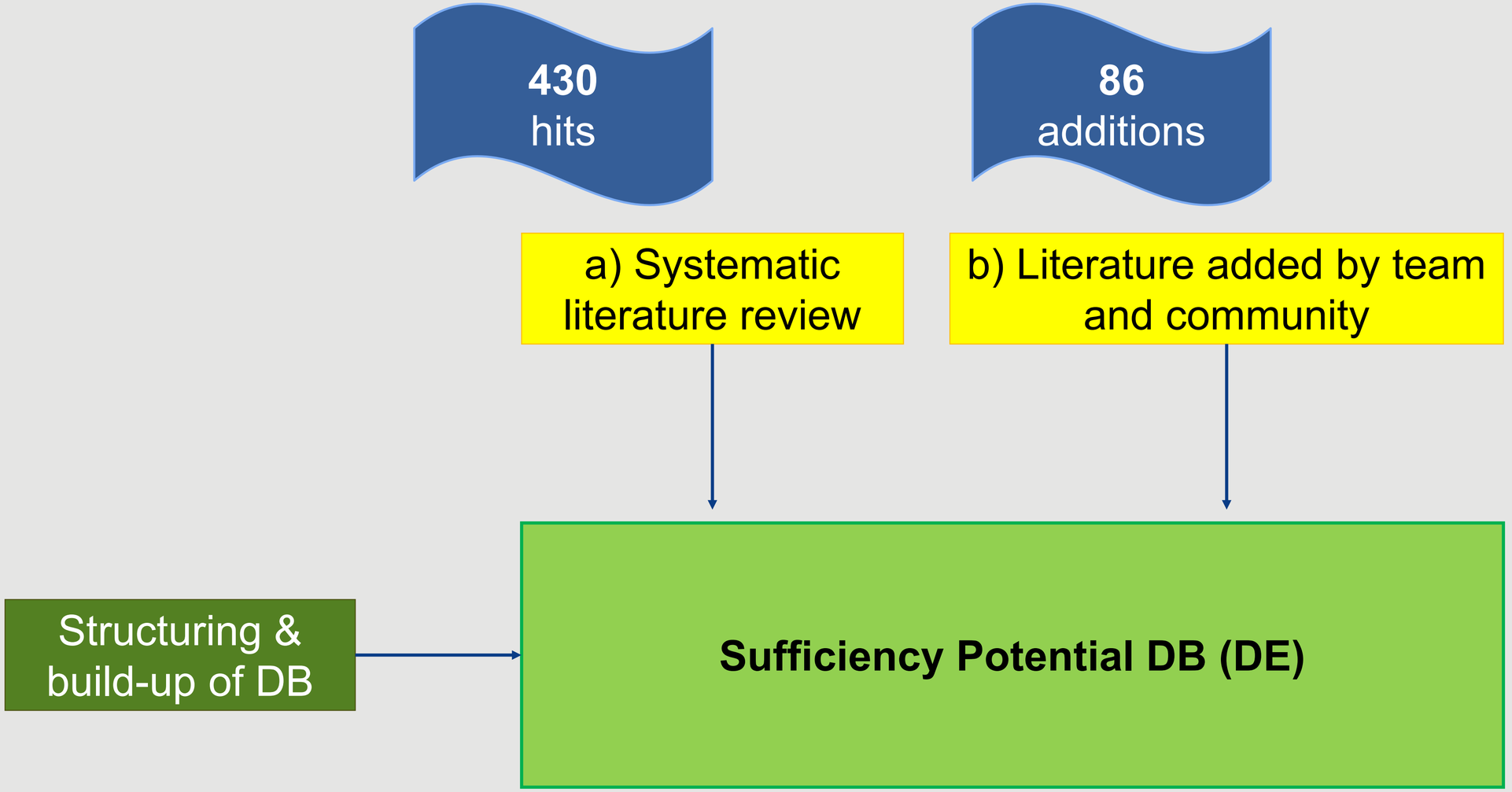


SYSTEMATIC LITERATURE REVIEW

- Search query for Web of Science and Google Scholar (EN + DE)
  - Energy + sufficiency or a description of sufficiency
  - + terms for quantification + Germany
  - Some terms excluded
  - Publication date: 01/2013 - 05/2023

$$\{energy\}\ AND \left\{ \{sufficiency\}\ OR \left\{ \left\{ \begin{array}{c} \{\text{reduc}*\} \\ OR \\ \{\text{absolute reduction}\} \\ OR \\ \{\text{sav}*\} \\ OR \\ \{\text{avoid}\} \end{array} \right\}\ AND \left\{ \begin{array}{c} \{\text{demand}\} \\ OR \\ \{\text{behaviou}*\} \\ OR \\ \{\text{lifestyle}\} \\ OR \\ \{\text{consumption}\} \end{array} \right\} \right\} \right\}\ AND \left\{ \begin{array}{c} \{\text{quanti}*\} \\ OR \\ \{\text{calculat}*\} \\ OR \\ \{\text{empirical}\} \end{array} \right\}\ AND\ \{Germany\}\ NOT \left\{ \begin{array}{c} \{\text{self} - \text{sufficiency}\} \\ OR \\ \{\text{flexib}*\} \end{array} \right\}$$

PROCEDURE & LITERATURE IDENTIFIED



LITERATURE REVIEW

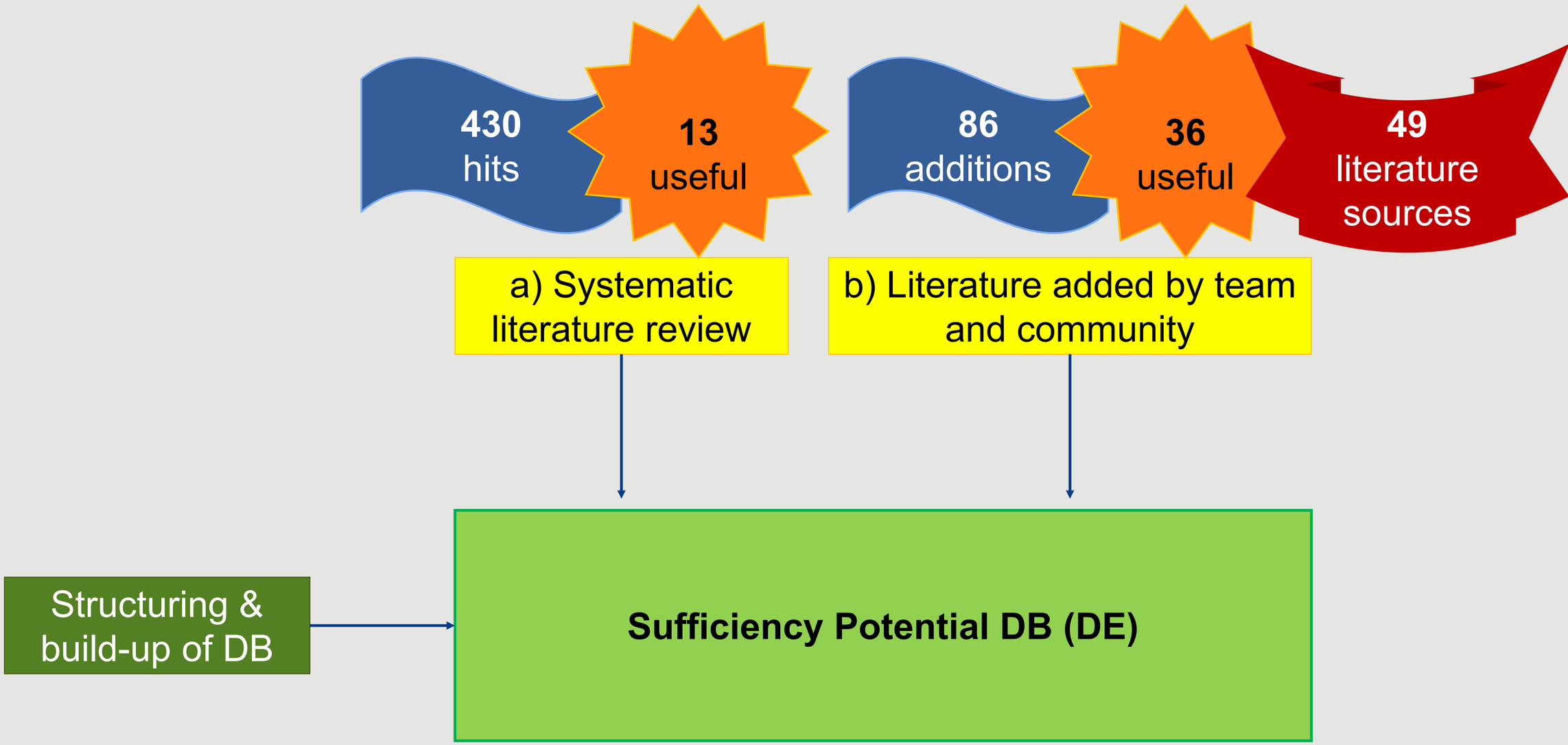
- Main criteria for eligibility:

  - Quantification of **single/specific sufficiency policies or measures** (like car-free city centers, housing swap to reduce per capita living space, vegan meals in canteens, repairing industry for devices etc.)

  - policies or measures **can be implemented**, so the quantification would be an ex-post evaluation, **or** they **can be proposed**, so it would be theoretical/economic/realistic potentials in the future

  - Our geographical focus is **Germany** - but the database can also include European/global/other country-specific data

PROCEDURE & LITERATURE IDENTIFIED



STRUCTURING / BUILD-UP OF DB

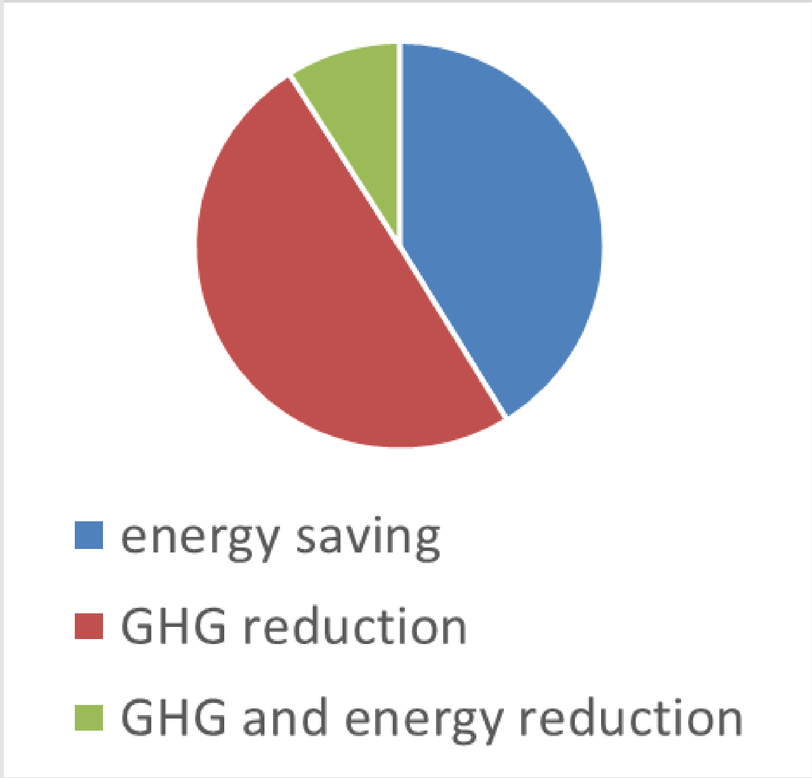
ID	Mitigation strategy (S/E/mixed)	Policy or measure (as described in literature)	Single or combined measure(s)	Clustering	study used for DE	Sector	Target / Policy strategy (acc. to Policy DB)
227	Sufficiency	Public transport partly replaces individual car trans	single	public transport	x	Transport (incl....	T: Reduce motorized...
228	Sufficiency	Car-sharing partly replaces individual car transport	single	car sharing	x	Transport (incl....	T: Reduce motorized...

energy reduction average or only 1 value given	unit energy saving	GHG reduction average or only 1 value given	unit GHG reduction	further parameters like costs, resources, land / water saving,	savings yearly OR cumulative	Year(s) related to quantifications	time horizon of quantified aspect
		14,0	Mt CO2-eq.	land use, material use	yearly	2045	L
		15,2	Mt CO2-eq.	land use, material use	yearly	2045	L

Base year / reference year	Base year / reference year value	Unit base / reference year value	against reference scenario	type of potential (theoretical, technical, economic,	geographical scope	type / quality of data	calculation method (rough): territorial/national
2045	146,9	Mt CO2-eq.	yes	theoretical pot...	Germany	proposal - simulatio...	LCA
2045	146,9	Mt CO2-eq.	yes	theoretical pot...	Germany	proposal - simulatio...	LCA

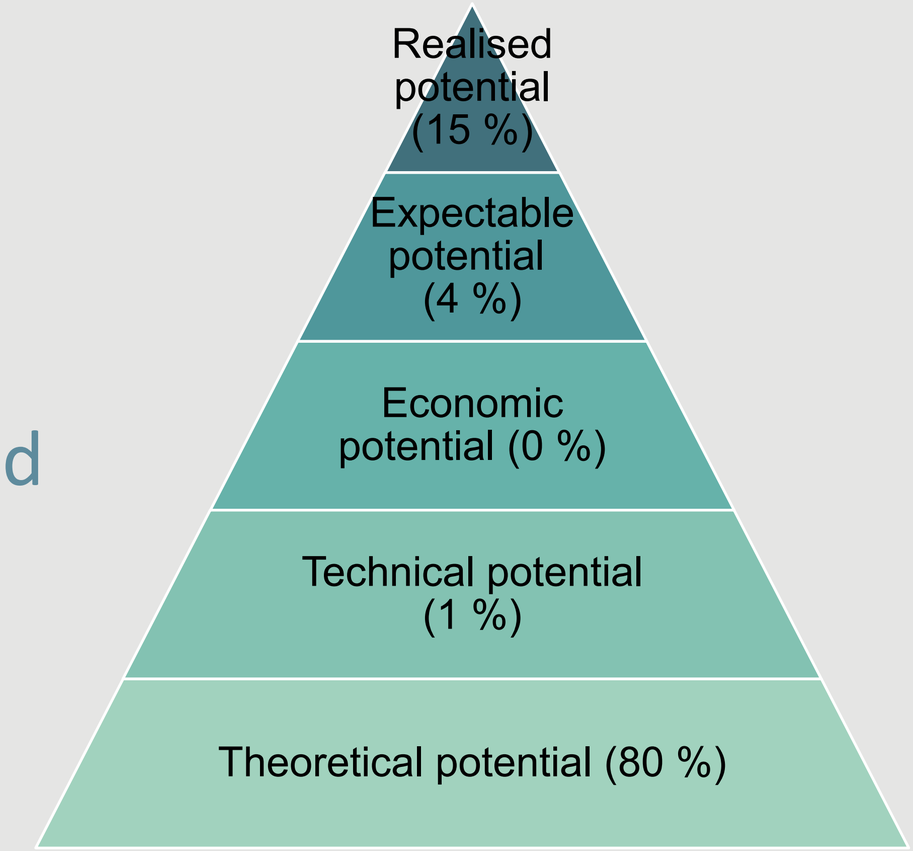
THE DB IN SOME NUMBERS

- 310 entries (measure or measure bundle)
- Most quantify GHG reduction
- Most entries for buildings sector



THE DB IN SOME NUMBERS

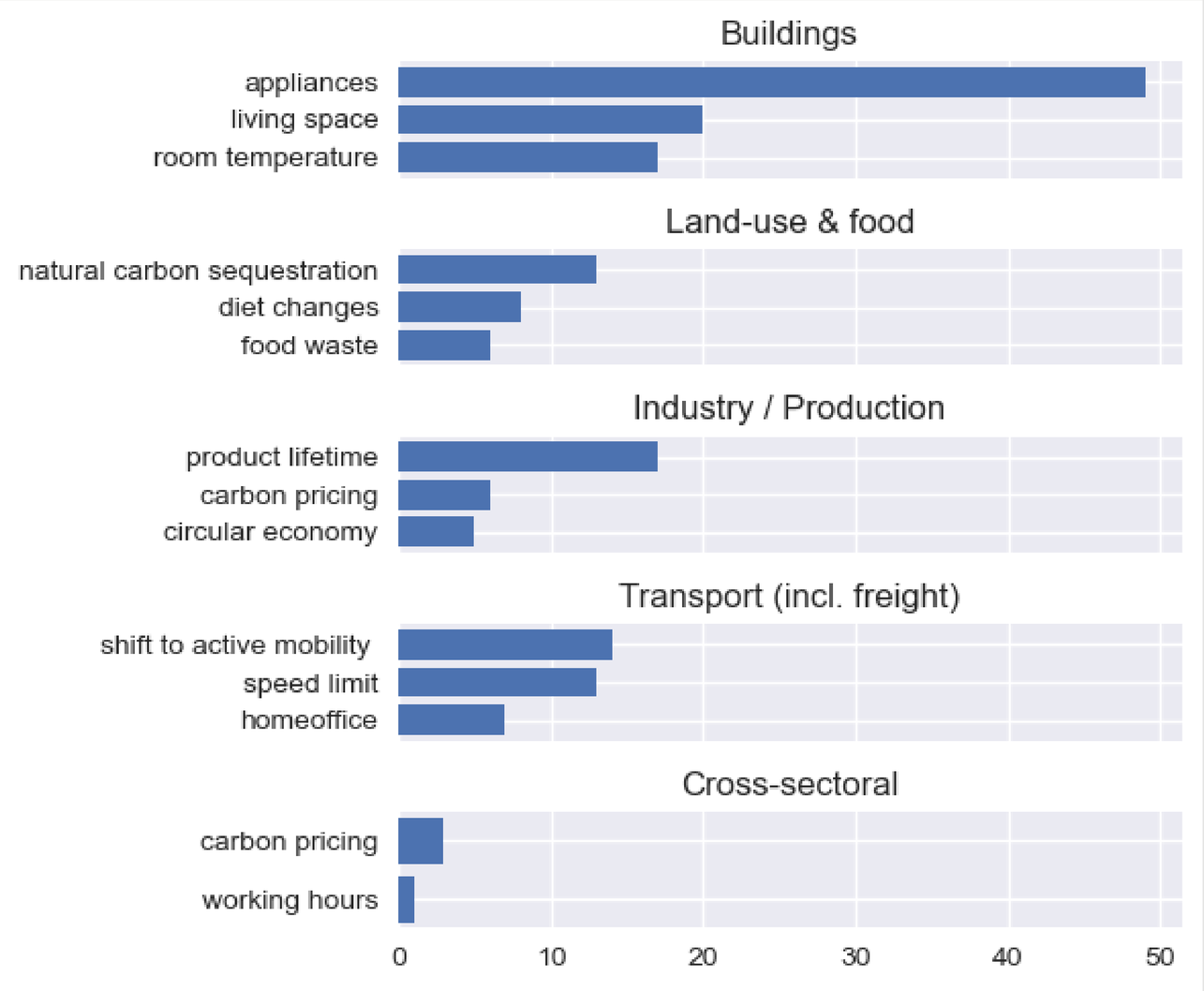
- Mostly theoretical potentials
- Quantifications via simulation (44 %) or estimations (47 %), realised potentials via an ex-post evaluation of implemented data (9 %)
- 80 % territorial GHG / energy savings, 15 % consumption-based GHG / energy savings (with LCA) - 5 % other



Source: adapted from https://www.energysufficiency.org/static/media/uploads/site-8/library/papers/sufficiency-buildings-final__v2.pdf

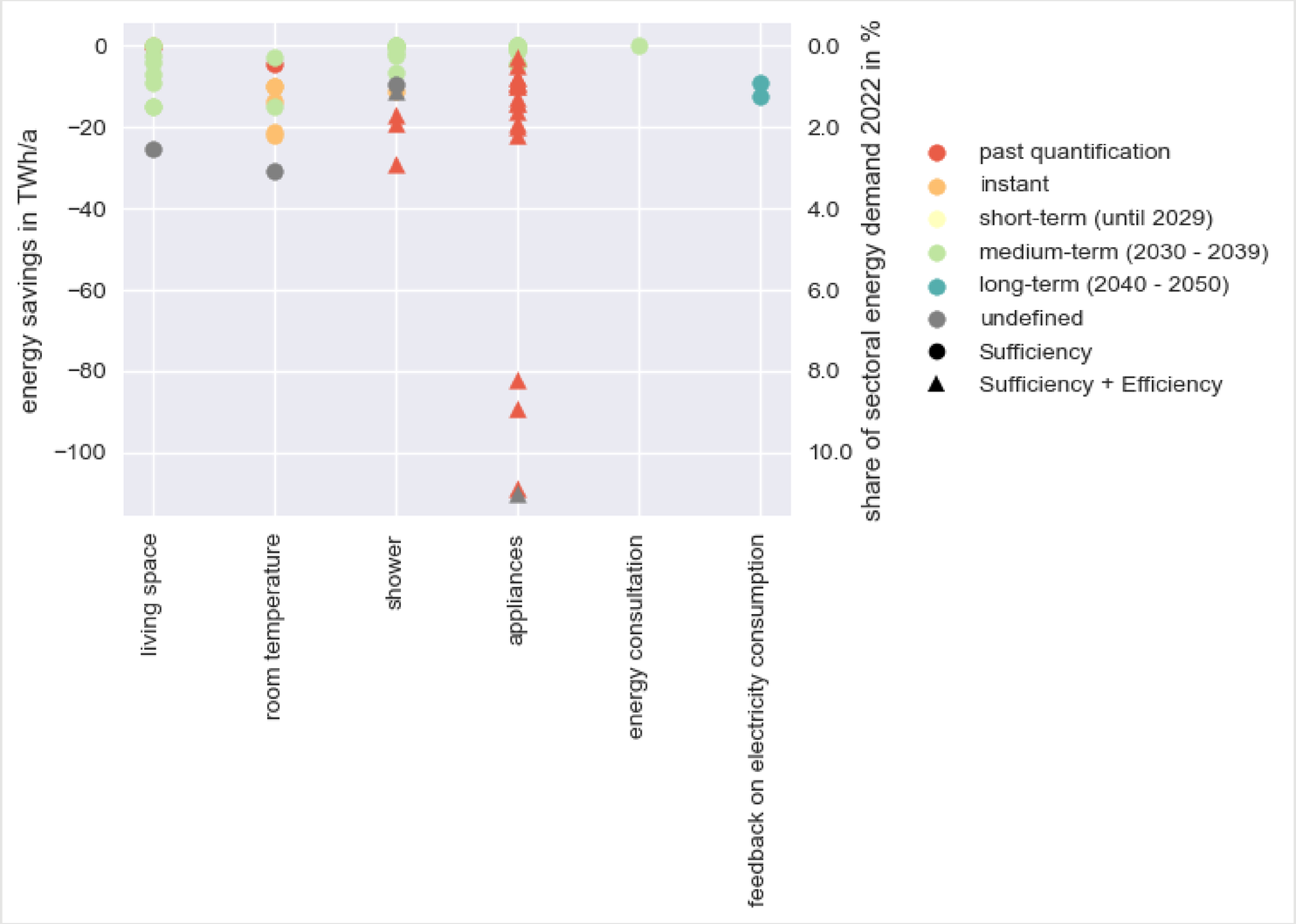
ZOOM INTO THE SECTORS

MEASURE CLUSTERS WITH MOST ENTRIES PER SECTOR



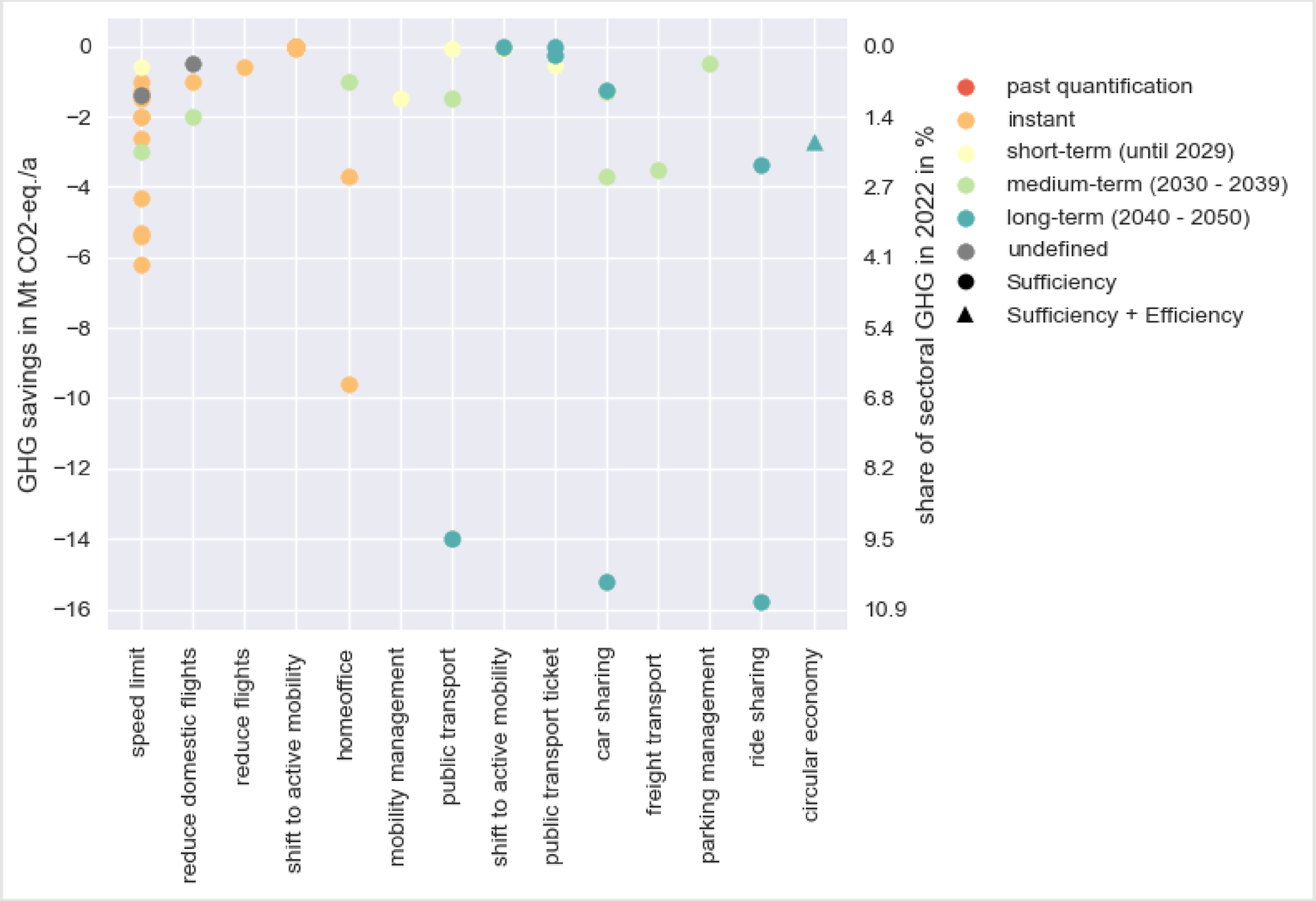
ENERGY SAVINGS IN DB

MEASURES IN BUILDINGS SECTOR PER CLUSTER



GHG SAVINGS IN DB

MEASURES IN TRANSPORT SECTOR PER CLUSTER



DISCUSSION & CONCLUSION

- SLR did not lead to many sources, added literature by us + expert networks was more helpful
- We see that there are data gaps which need to be filled by future research, especially policies and measures on a higher level like sustainable urban development without new sealing or limits to production and consumption
- The database can only be as precise as the data + explanations given in the studies
- The range of saving potentials is high as is the diversity of the data in terms of base year, time horizon and quantification method
- GHG savings are helpful, but modellers mainly need activity data / energy service level indicators or energy savings, so it would be really helpful if more studies also gave results on that

OUTLOOK

Check out the current version!

- We will do more analysis with the data
- We will publish the DB later this year on Zenodo, the OEP and our project homepage

We wish this to be an open knowledge basis further developed by us and the community!

- We will extend the DB with non-German data
- We will host webinars with modellers to advertise the DB
- We call on researchers to quantify more energy (and GHG) savings of sufficiency policies and measures

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THANK YOU!

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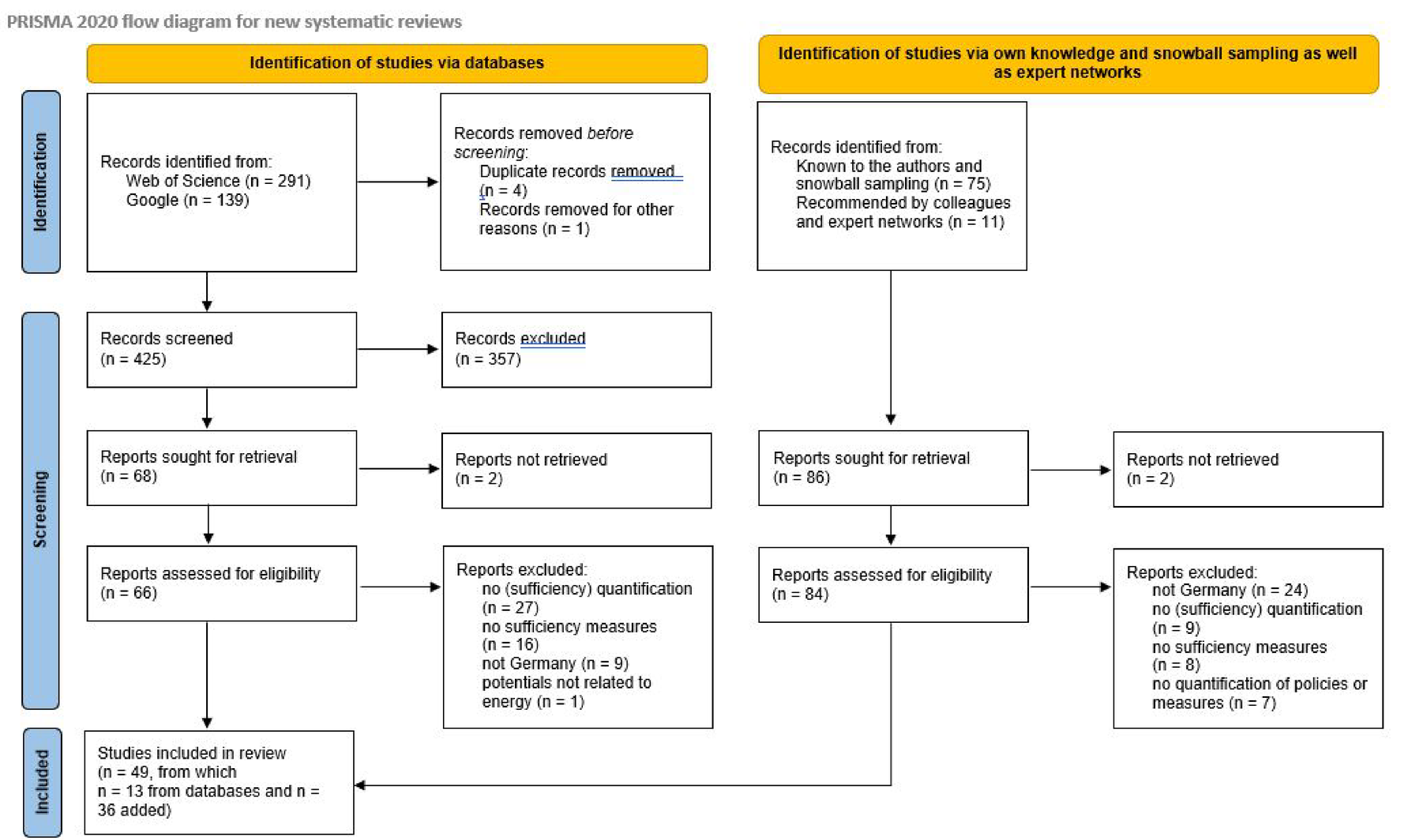
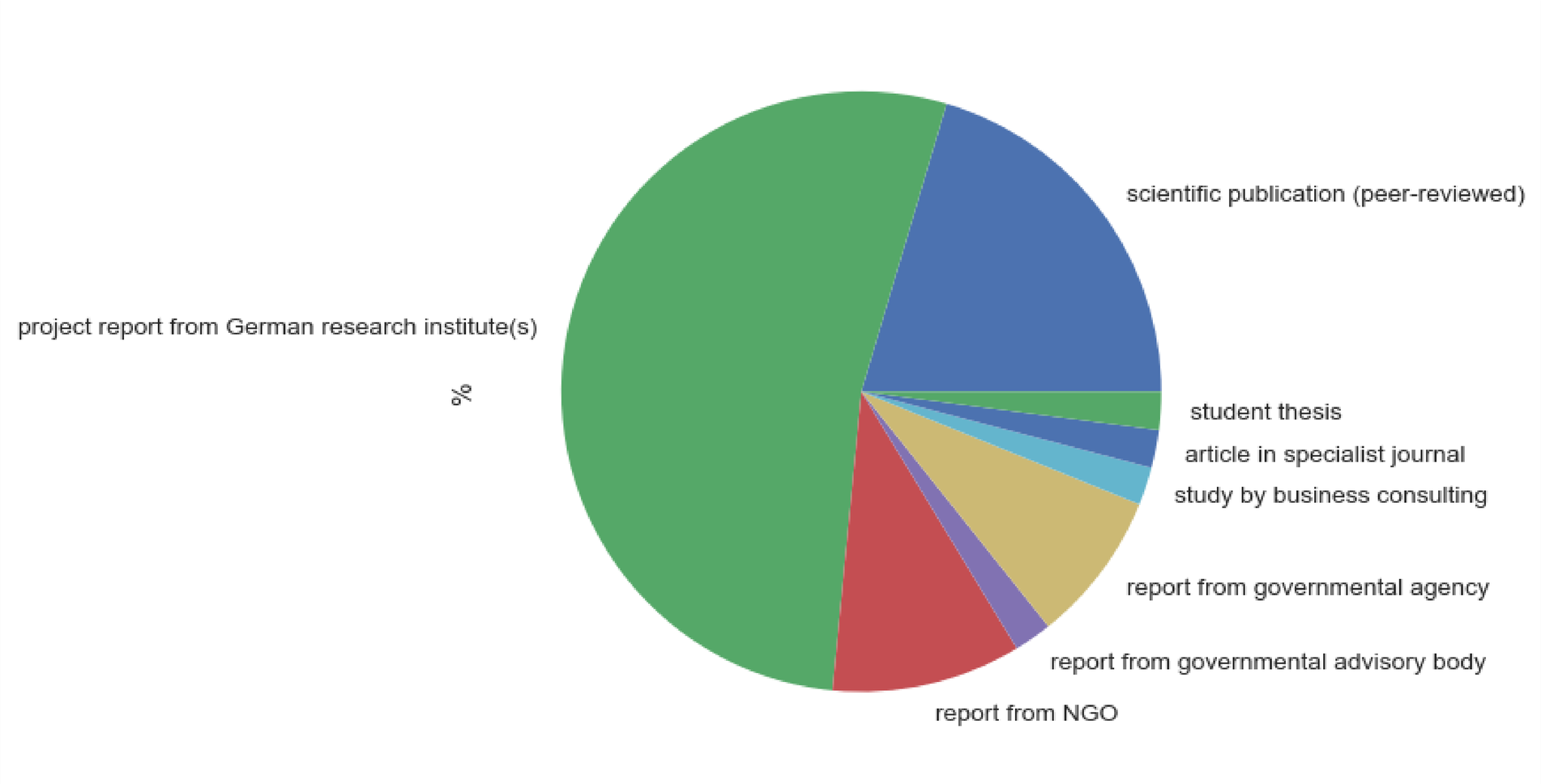
BACKUP

LITERATURE REVIEW



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

OVERVIEW OF USED LITERATURE



- 12 of the studies (24%) commissioned or directly written by German Environment Agency (UBA)