



# TRANSENS

TRANSDISZIPLINÄRE FORSCHUNG ZUR ENTSORGUNG  
HOCHRADIOAKTIVER ABFÄLLE IN DEUTSCHLAND

## Place-sensitive long-term governance of nuclear waste

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EASST/4S 2024, Amsterdam, 16.-19.07.2024

„[The disposal of nuclear waste] is a problem, a task, a project that can to some extent be quantified and thought through, but that in a way is also unimaginable or even incomprehensible. Nevertheless, there is a need for action – in the distant future, but more urgently in the present.” (Smeddinck et al. 2022: 11)

# Long-term stewardship

- U.S. Department of Energy: “longterm stewardship includes, inter alia, land use controls, monitoring, maintenance, and information management.” (US Department of Energy 1999, A-2)
- Consolidating management over all cleanup sites
- Timeframe: 100years
- Institutions as black box (Kuppler & Hocke 2019)
  
- Stewardship „used to explain “soft” or “relational” contracts that are based on trust and cooperation” (Schillemans & Bjurstrøm 2020).

# Long-term Governance (LTG)

- In Germany: 500 years retrievability after closure
- Safety is more than proven technical safety of the repository
  - "Positive error culture" (Sträter 2022)
  - Ability to react to changing context conditions
  - Knowledge transfer



Robust, flexible, learning institutions in functioning governance networks with checks-and-balances

# Why local context? - Place-sensitive LTG

- Infrastructures are designed to be long-lasting and have impact on (cf. Abassiharofteh et al. 2022; Isidoro Losada 2021):
  - Landscapes (i.e., surface facilities of disposal site, transportation, excavation)
  - Socio-economic practices (i.e., creation or loss of jobs, recreation)
- Place attachment = value people attach to a place and the factors that influence it (Mbah/Kuppler 2024); it is formed by memories, wishes, emotions, and personal relations (cf. Kienast et al. 2018; Scannel/Gifford 2010; van Veelen/Hagget 2017)

# Significance of place attachment for nuclear LTG

- Personal significance of a place shapes the extent to which people feel threatened (cf. Manzo/Devine-Wright 2014; Devine-Wright/Batel 2017)
- Individuals with a powerful place attachment react more to spatial change – both positively and negatively (cf. Carrus et al. 2014; Lewicka 2011)
- Place attachment seems to be more pronounced, when governance is perceived as inadequate (Clarke et al. 2018)



Is place-attachment different at different places and does this affect long-term governance of nuclear waste?

# Research design I

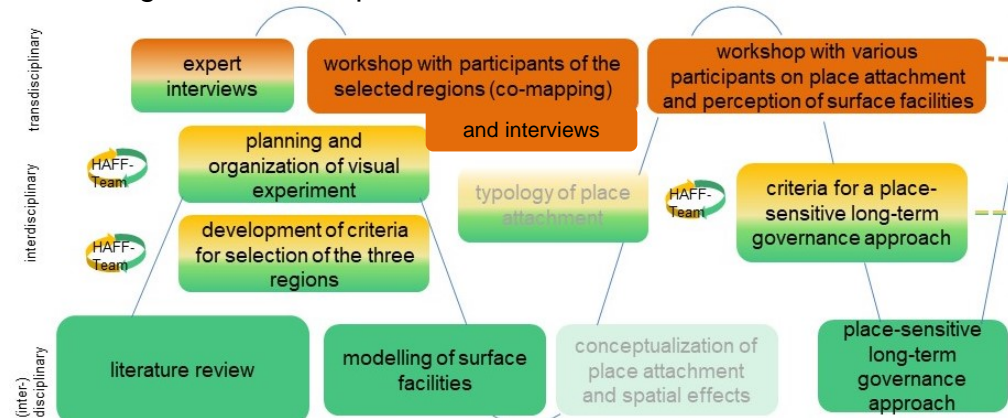
## Aims

- Role of place attachment to further develop a place-sensitive long-term governance approach

## Methods

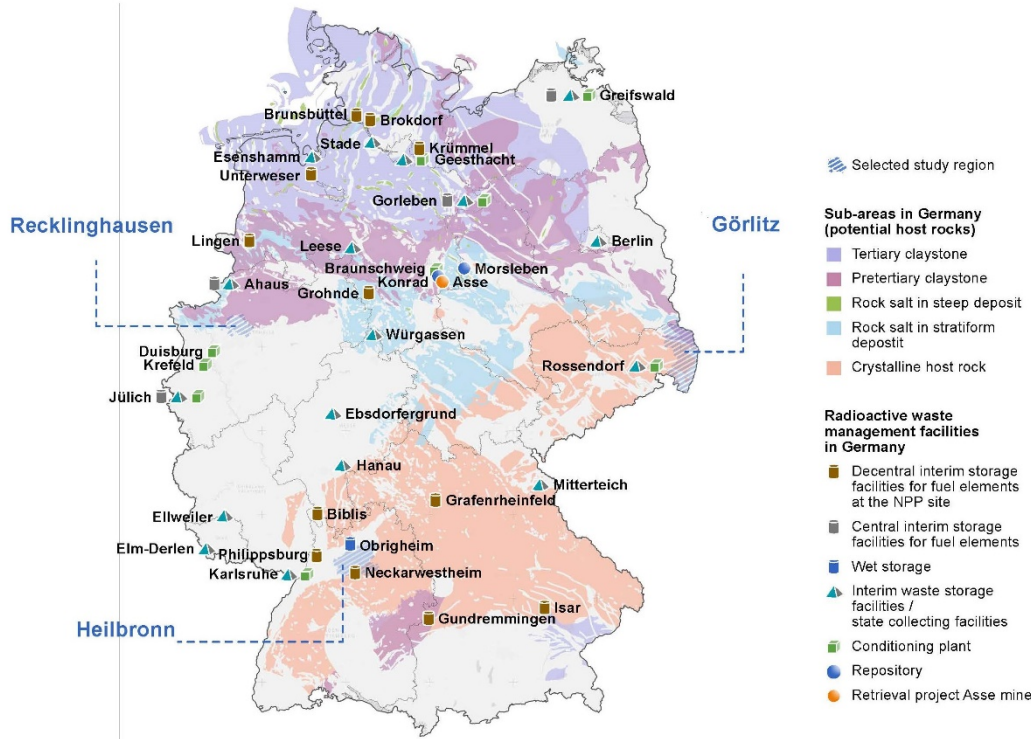
- Interviews, workshops, visualization, questionnaire
  - Analysis of place attachment (3 regions in Germany)
  - Perceptions of surface facilities of a disposal site
  - Communication and participation needs

Fig. 1: Research process



Source: Mbah 2023.

# Research design II – selected regions



Selection based on

- e.g. structural transformation, mining experience, socio-demographic and cultural context (net migration, age structure, religious affiliation)

Source: Sub-areas by BGE mbH, other information by GEOBASIS-DE BKG 2020, Oeko-Institut 2023.

EASST/4S, Mbah & Kuppler, Amsterdam, 19.07.2024



# Empirical findings I – different regional place attachments

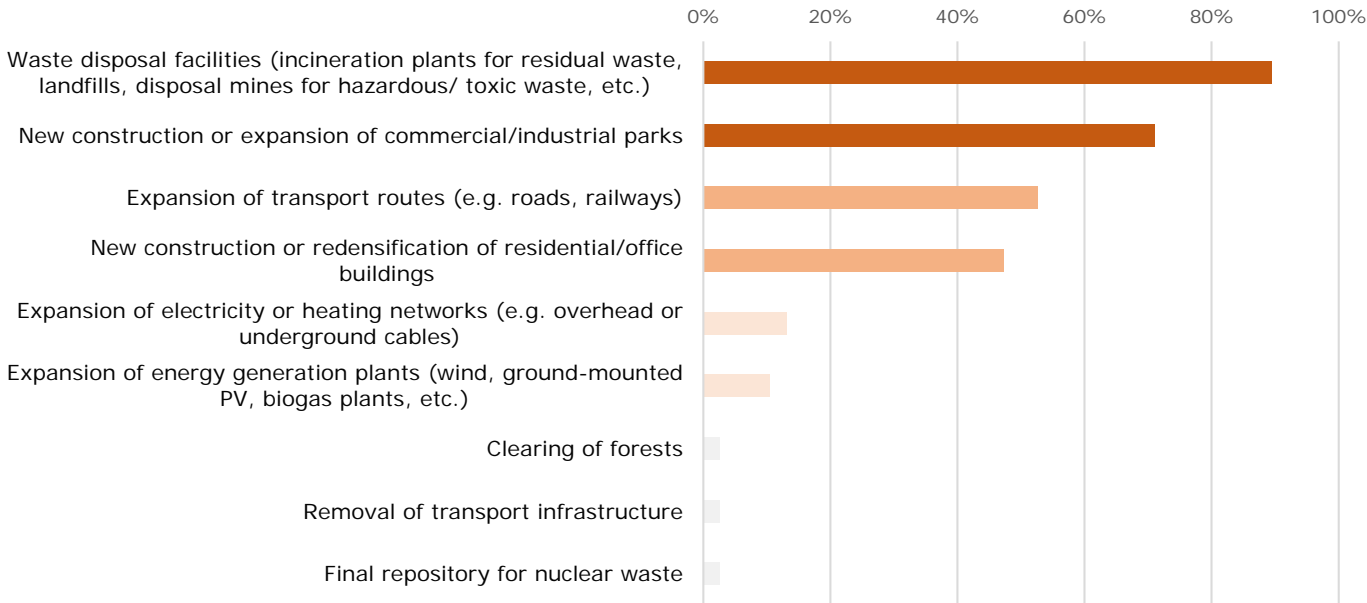
Factors of place attachment	Examples of aspects or expressions of factors	Recklinghausen	Heilbronn	Görlitz
Place-based social interactions	Working place, living place, shopping, recreation, etc.	Urbanised region, many jobs and shopping possibilities	High-quality jobs with modern technology firms. Heilbronn as a larger city	All sites of daily activities at short distances (work, shopping, recreation)
Place definition	Definition as home with reference to landscape characteristics	-	<i>Beautiful landscape, viticulture, wineries</i>	Landscape for recreational activities with many ponds, lakes, and forests
Environmental disruption	Transformations in terms of infrastructure or socio-economic (structural) change	<i>Transformation experience from industrialisation with positive net migration to deindustrialisation with a negative migration trend</i>	-	<i>Vivid transformation experience with many challenges (unemployment, negative net migration, vacancies in city and commercial centres), and on the other hand new recreation areas and a developing tourism sector</i>
Place dependence	Residential/population density, green spaces, accessibility, etc., so aspects which refer to the quality of place in comparison to others	Accessibility and simultaneously multiple burdens (e.g., air pollution, noise)	<i>Nature, and accessibility of cities important ("living where it's nice and the big cities are not far away")</i>	
Place identity	Norms and traditions going back to e.g., religious affiliation, cultural traditions; dialects, etc.	<i>Open and direct mentality, cultural melting pot</i>	<i>Swabian dialect</i>	e.g., the "Cherry Blossom festival," Sorbian culture and borderland region
Collective efficacy	Participant in associations, clubs, or NGOs	-	Many associations (sports, choirs, etc.)	Importance of associations (sports, senior citizens, youth, fire brigade, etc.)
Place bonding	Family networks, friends	Friendships, family, and openness of the people	Friendships, and even family structures extending far back into the past	<i>Family networks and friendships, neighbourhood</i>
Sense of community	Traditional or modern structures of social cohesion in terms of specific needs to help each other	<i>Reliability on miners underground</i>	-	Initiatives for shaping positive regional development

Aspects identified as particularly important in italics.

Source: Mbah & Kuppler 2024, 213.

# Empirical findings II – place attachment and transformations

What changes would you find most disruptive?

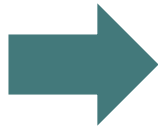


n = 38

- in terms of place attachment, it's not so much about preserving a 'typical' landscape per se, but **about the functions and qualities of the environment**
- crucial factors are the **potential or perceived risks** associated with a project and the **intensity of the intervention** as well as benefits from it

# Conclusion I – role of place attachment

- Facilities for waste disposal are perceived as particularly disturbing → linked with safety issues (fears) and intergenerational justice
- Indications that place attachment may be strongly associated either
  - with social factors of place attachment if experiences with transformation exist,
  - or with landscape factors of place attachment if landscape is important for income generation



Place attachments vary regionally and individually that is why a detailed context analysis is always needed.

# Conclusions II/1 – long-term governance

- Building a repository in an area where many people oppose this alteration of their place can threaten safe and secure disposal of the waste and its active monitoring and control for centuries.
- High degree of vigilance and openness to learn is required with a view to the potential challenges and tasks yet to come.
- It is necessary to give people a chance to make the repository part of their place, which includes conflicts and political debate.

# Conclusions II/2 – long-term governance

- Particularly for long-term communication and knowledge preservation, a long-term repository governance that considers local place attachment would contribute to a governance in which responsibility is taken together. (Mbah & Kuppler 2024)
- This includes „hard“ control as well as „soft“ relations.

# Call for Abstracts: "Beyond short-termism: Strategies and perspectives for the long-term governance of socio-technical change"

TATuP Special topic in issue 34/2 (2025), **Submit your abstract by 12 August 2024**

Editorial Process Outline:

12 August 2024: Submit your abstract

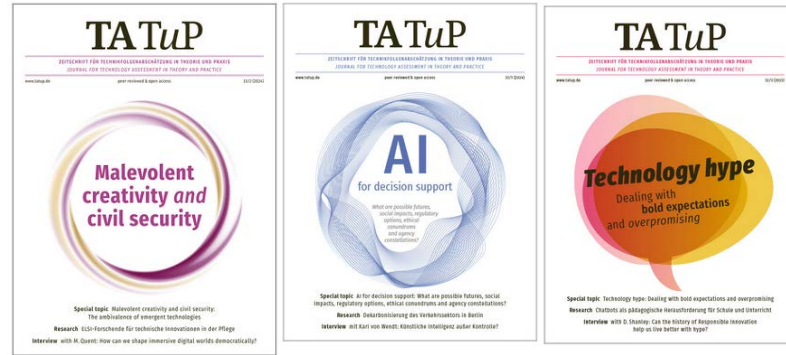
December 2024: Deadline for submission of research articles, followed by peer review

July 2025: Publication (print and online)



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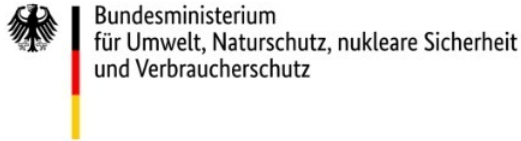
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# References

- Abassiharofteh, Milad, Jessica Baier, Angelina Göb, Insa Thimm, Andreas Eberth, Falco Knaps, Vilja Larjosto, and Fabiana Zebner, eds. 2022. Spatial transformation – processes, strategies, research designs. *Scientific Reports ARL* 19 <[https://www.arl-net.de/system/files/media-shop/pdf/fb/fb\\_019/fb\\_019\\_gesamt.pdf](https://www.arl-net.de/system/files/media-shop/pdf/fb/fb_019/fb_019_gesamt.pdf)> (Accessed February 17, 2023).
- Altman, Irwin, and Setha M. Low. 1992. *Place Attachment*, Boston, MA: Springer US.
- Brown, Greg, Christopher M. Raymond, Jonathan Corcoran. 2015. Mapping and measuring place attachment. In: *Applied Geography* 57, 42–53. doi: 10.1016/j.apgeog.2014.12.011
- Carrus, Giuseppe, Massimiliano Scopelliti, Ferdinando Formara, Mirilia Bonnes, and Marino Bonaiuto. 2014. Place attachment, community identification, and pro-environmental engagement. *Place Attachment Advances in Theory, Methods and Applications* ed. Lynne Manzo and Devine-Wright Patrick, 154-164. Oxfordshire: Routledge.
- Chhotray, Vasudha, Gerry Stoker. 2009. *Governance Theory and Practice*, Houndmills: Palgrave Macmillan.
- Clarke, Darren, Conor Murphy, Irene Lorenzoni. 2018. Place attachment, disruption and transformative adaptation. In: *Journal of Environmental Psychology* (55): 81–89. doi: 10.1016/j.jenvp.2017.12.006
- Devine-Wright, Patrick, and Susana Batel. 2017. My neighbourhood, my country or my planet? The influence of multiple place attachments and climate change concern on social acceptance of energy infrastructure. *Global Environmental Change* 47: 110–120. doi: 10.1016/j.gloenvcha.2017.08.003
- Gailing, Ludger, and Markus Leibenath. 2017. Political landscapes between manifestations and democracy, identities and power. *Landscape Research* 42(1): 337–348. doi: 10.1080/01426397.2017.1290225
- Isidoro Losada, Ana María. 2021. Pfadabhängigkeiten in der Endlagerpolitik. In *Robuste Langzeit-Governance bei der Endlagersuche*, ed. Bettina Brohmann, Achim Brunnengraber, Peter Hocke and Ana María Isidoro Losada, 137-160. Bielefeld: transcript.
- Kienast, Felix, Matthias Buchecker, and Marcel Hunziker. 2018. Generating meaningful landscapes for globalized mobile societies: pushing an international research agenda. *Landscape Ecology* 33. doi: 10: 1669–1677.
- Kuppler, Sophie, and Peter Hocke. 2019. The role of long-term planning in nuclear waste governance. *Journal of Risk Research* 22(11), 1343–1356. doi: 10.1080/13669877.2018.1459791
- Lewicka, Maria. 2011. Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology* 31(3): 207–230. doi: 10.1016/j.jenvp.2010.10.001
- Llewellyn, David H., Melanie Rohse, Rosie Day, and Hamish Fyfe. 2017. Evolving energy landscapes in the South Wales Valleys: Exploring community perception and participation. *Energy Policy* 108: 818–828. doi: 10.1016/j.enpol.2017.04.028
- Manzo, Lynne C., and Patrick Devine-Wright. 2014. *Place Attachment Advances in Theory, Methods and Applications*. Oxfordshire: Routledge.
- Mbah, Melanie, and Sophie Kuppler. 2024. Governing nuclear waste in the long-term: on the role of place. *Historical Social Research Journal* 49 (1), 193-226.
- Mbah, Melanie. 2022. Participation in decision-making processes as a key to a successful long-term governance. In *Technical Monitoring and Long-Term Governance of Nuclear Waste*, ed. Peter Hocke, Sophie Kuppler, Ulrich Smeddinck and Thomas Hassel, 95-110. Baden-Baden: Nomos.
- Mbah, Melanie, and Bettina Brohmann. 2021. Das Lernen in Organisationen: Voraussetzung für Transformationsprozesse und Langzeit-Verfahren. In *Robuste Langzeit-Governance bei der Endlagersuche Soziotechnische Herausforderungen im Umgang mit hochradioaktiven Abfällen*, ed. Bettina Brohmann, Achim Brunnengraber, Peter Hocke, and Ana M. Isidoro Losada, 387-412. Bielefeld: transcript.
- Mihaylov, Nikolay, and Douglas D. Perkins. 2014. Community place attachment and its role in social capital development. In *Place Attachment: Advances in Theory, Methods and Research*, ed. Lynn Manzo and Patrick Devine-Wright, 61-74. Oxfordshire: Routledge.
- Scannell, Leila, and Robert Gifford. 2010. Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology* 30(1): 1-10.
- Smeddinck, Ulrich, Anne Eckhardt, and Sophie Kuppler. 2022. Toward a repository for high-level radioactive waste: Perspectives and approaches. *TaTuP* 31(3): 11–17. doi: 10.14512/tatup.31.3.11
- Smeddinck, Ulrich. 2021. Reversibilität in Entscheidungsprozessen: Warum wir ein lernendes Verfahren brauchen. In *Robuste Langzeit-Governance bei der Endlagersuche: Soziotechnische Herausforderungen im Umgang mit hochradioaktiven Abfällen*, ed. Bettina Brohmann, Achim Brunnengraber, Peter Hocke, Ana M. Isidoro Losada, 349-360 Bielefeld: transcript.
- Sträter, Oliver. 2022. Bedeutung menschlicher Faktoren für eine dauerhafte Sicherheit von Entsorgungsoptionen. In: *Technical Monitoring and Long-Term Governance*, ed. Peter Hocke, Sophie Kuppler, Ulrich Smeddinck, Thomas Hassel, 141-158. Baden-Baden: Nomos.
- van Veelen, Bregje, and Claire Hagggett. 2017. Uncommon Ground: The Role of Different Place Attachments in Explaining Community Renewable Energy Projects. *Sociologia Ruralis* 57(1): 533-554. doi: 10.1111/soru.12128

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für Wissenschaft und Kultur**

Förderkennzeichen: 02E11849A-J