



The **ENTRIA** and **TRANSENS** research projects in Germany combining technical and social aspects of radioactive Waste Management

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ENTRIA (2013-2018)

- 13 partners (mostly from academia)
(natural sciences, engineering, social sciences and humanities)
- Disciplinary and cross-disciplinary research on RWM options
- Disciplinary and cross-disciplinary education
- Outreach activities

Transversal Project 1: Synthesis, Coordination and Communication

Advisory Board

Professionals

Vertical Project 5:

Vertical Project 6:

Vertical Project 7:

Expert
Committees

**Final Disposal in
Deep Geological
Formations without
Arrangements for
Retrieval**

**Disposal in Deep
Geological
Formations with
Arrangements for
Monitoring and
Retrieval**

**Prolonged surface
(or near-surface)
storage**

Institutions

Transversal Project 2: Technology Assessment and Governance

Politicians

**Transversal Project 3: Ethical and Moral Justification,
Legal Prerequisites and Implications**

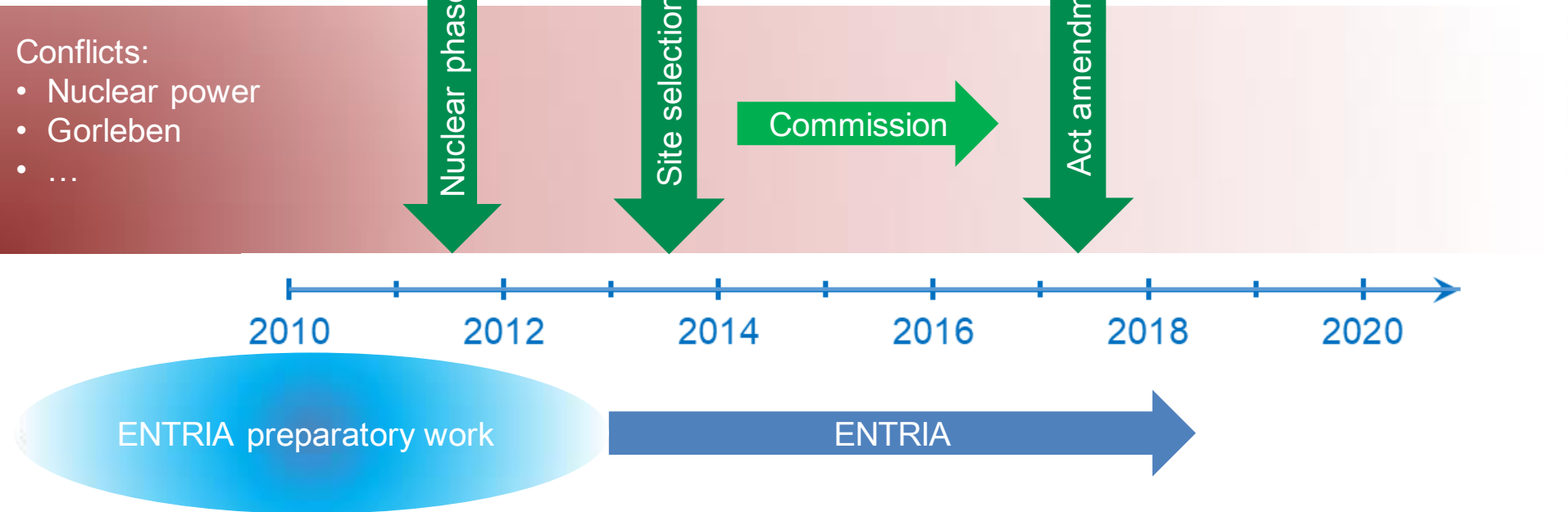
Interested
Public

Transversal Project 4: Interdisciplinary Risk Research



Interdisciplinary research

- Interdisciplinarity amongst natural scientists and engineers: well established and expected in RWM R&D
- Within ENTRIA:
 - Also amongst disciplines “far from each other”, i.e. “technicians” (natural scientists, engineers, mathematicians) and “non-technicians” (from social sciences and humanities)
 - Differences concerning scientific methodology and mindset, terminology, publication culture, formats for presentations and discussions etc.
 - Variety of high-quality results and products
 - Interdisciplinary education of young scientists



Project evolution in an evolving societal environment

- Both ENTRIA & Commission concerned with RWM options and sociotechnical issues
 - Risk of “instrumentalization”
 - Necessity: Credibly communicate the nature of academic research and its role in society: No contract research, no political advice
 - However, ENTRIA was open for exchange and discourse
 - Various project modifications
- Interaction with Society:
 - About 100 outreach activities for various target groups: Lecture events, educational opportunities, interviews, ...
 - Appearances in political contexts (commission, parliamentary committees)
 - Citizens’ forum as first transdisciplinary experiment

Project outcome and impact

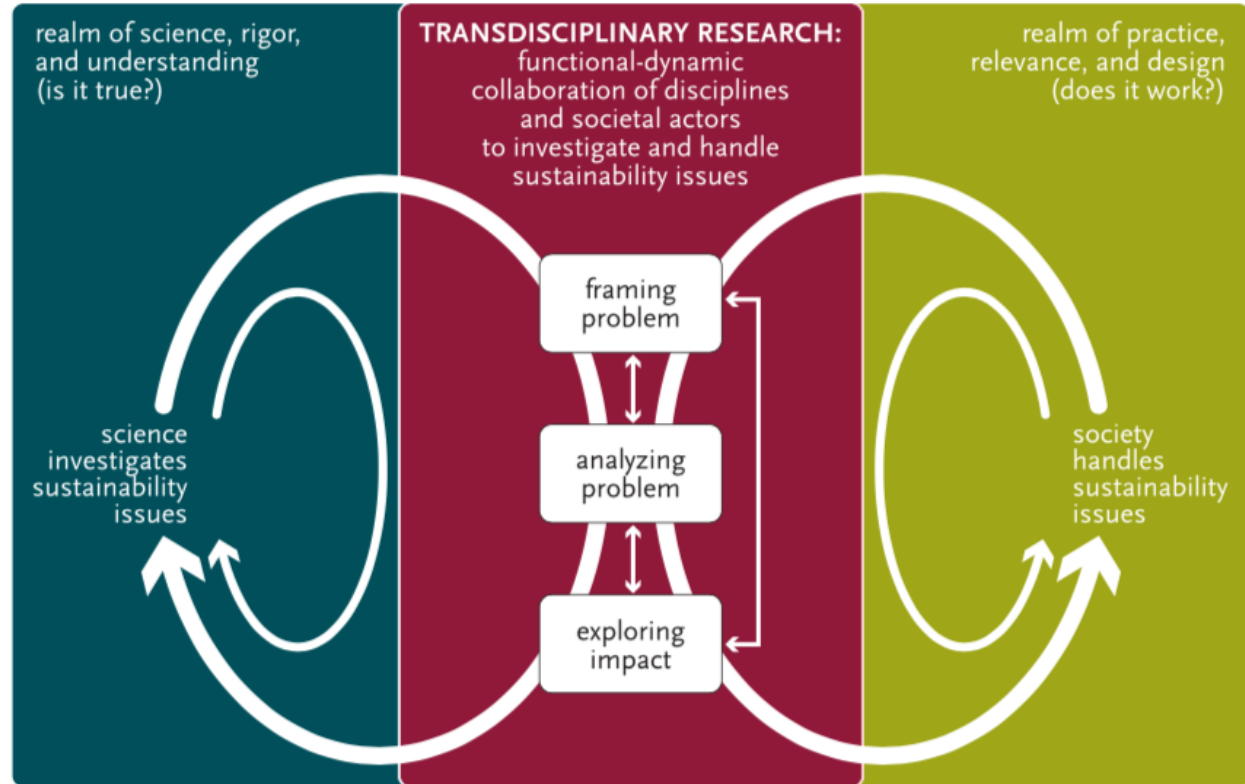
- Discourse about, and evaluation principles for, RWM options: “meta-categories” safety / security, fairness
- 2017 Act amendment: final disposal in a repository mine with reversibility”: embracing elements of all three “ENTRIA options”
 - ENTRIA contributed substantially to discourse
 - Results on governance and participation and on technical issues can be of use in further process
- Book projects, disciplinary & interdisciplinary papers
- ENTRIA academic interdisciplinary education → staff for RWM





Why now transdisciplinary research?

- New site selection procedure requires novel scientific approaches
 - Bridge the gap between science and civil society!
 - Traditional (one-way) science communication no longer sufficient
- **TRANSENS: Principles of transdisciplinary research**
- Reflexive, integrative, methodology-driven scientific principle
 - Scientific contribution to solving a societal problem
 - Inclusion of non-specialists and actors from practise in problem-orientated research processes with societal relevance

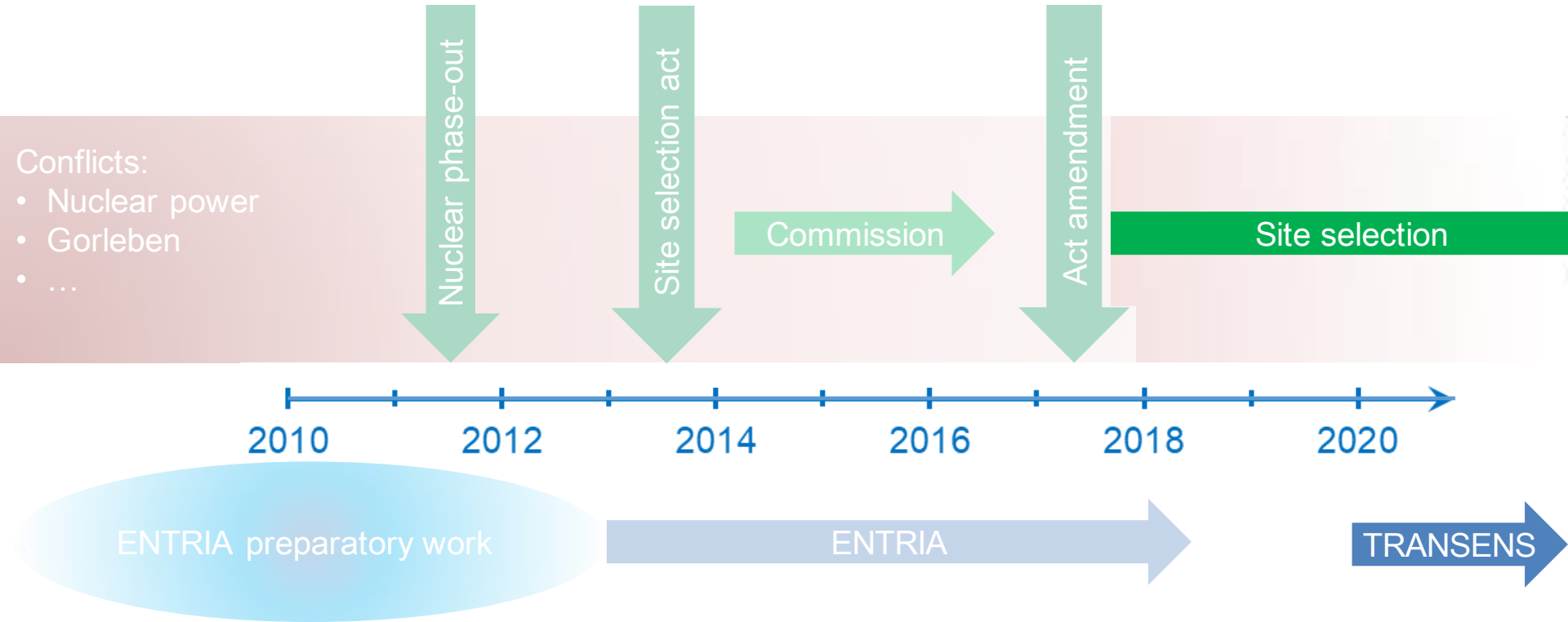


(Pohl et al. 2017)



TRANSENS (2019-2024)

- Four „theme corridors“
 - HAFF: Ability to act and flexibility in a reversible process
 - SAFE: Safety Case: Stakeholder perspectives and transdisziplinarität
 - TRUST: Technology, uncertainty, complexity and trust
 - DIPRO: Dialogue und process design – law, fairness, governance
- Education
- Accompanying formative research





TRANSENS and society

- Application-orientated basic research
- Transdisciplinarity, but no transformative research
- Formats with, inter alia, „standing groups“ recruited from interested public for addressing issues such as monitoring, safety case, tradeoffs ...
 - No stakeholders, no specialists
 - Multi-step recruitment, parity w.r.t. gender, age, education, ...
 - First experiences: Enthusiasm, commitment, self-organisation, ...
- COVID-19 ...



Thank you für your attention!

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www.entria.de

www.transens.de



13 ENTRIA Partners: an interdisciplinary consortium

- Disposal Research
- Geomechanics
- Risk research
- Law
- Building Materials / Concrete Construction
- Materials Science
- Radioecology / Radiation Protection
- Technology Assessment and Systems Analysis
- Policy Research
- Environmental Philosophy / Ethics





TRANSENS: 17 partners from Germany and Switzerland

- Disposal Research
- Geomechanics
- Risk research
- Law
- Building Materials / Construction
- Materials Science
- Transdisciplinary research
- Psychology
- Radioecology / Radiation Protection
- Technology Assessment and Systems Analysis
- Policy Research
- Environmental Philosophy / Ethics
- Informatics / Web Science
- Economics

