



State-of-Knowledge & Guidance in EURAD Knowledge Management

(WP11 State-of-Knowledge & WP12 Guidance)

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Introduction

In the European Joint Programme on Radioactive Waste Management (RWM) - EURAD - over 100 organisations from different countries and backgrounds work together to support member states with the implementation of their national RWM programmes. For this task, it is recognised by EURAD that Knowledge Management (KM) is of utmost importance. This can be seen in a number of dedicated activities, as shown in the Fig. 1. These activities include capturing the state of knowledge (WP11) and providing guidance (WP12).

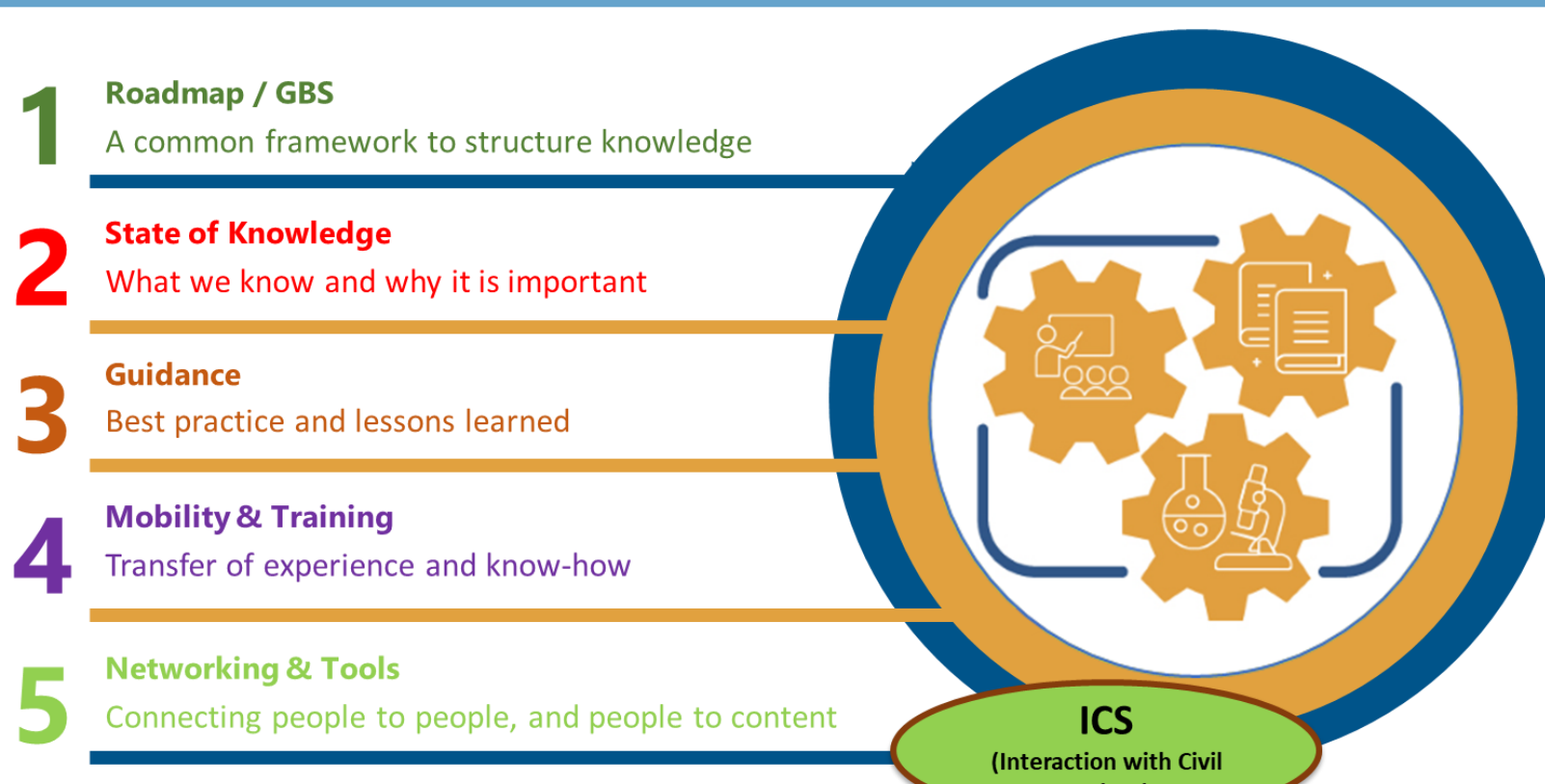


Fig. 1 EURAD Knowledge Management and Networking Programme is organized in three dedicated work packages (WP) and the project management office (PMO)

Capturing State-of-Knowledge and Guidance

One essential activity of WP11 is the capture of the current State-of-Knowledge (SoK) in the field of RWM and its transfer to end-users. This is done by different types of Knowledge Documents that are authored by recognised experts and made available through a dedicated IT-tool (e.g. a Wiki). The development of the EURAD portal-KMS (Knowledge Management System) is currently ongoing in WP11. These experts are asked to share their view on the most relevant knowledge in a specific topic, highlighting safety functions and operational aspects. Furthermore, signposting to pre-existing documents allows to identify important sources for further reading (State-of-the-Art documents, scientific papers, etc.).

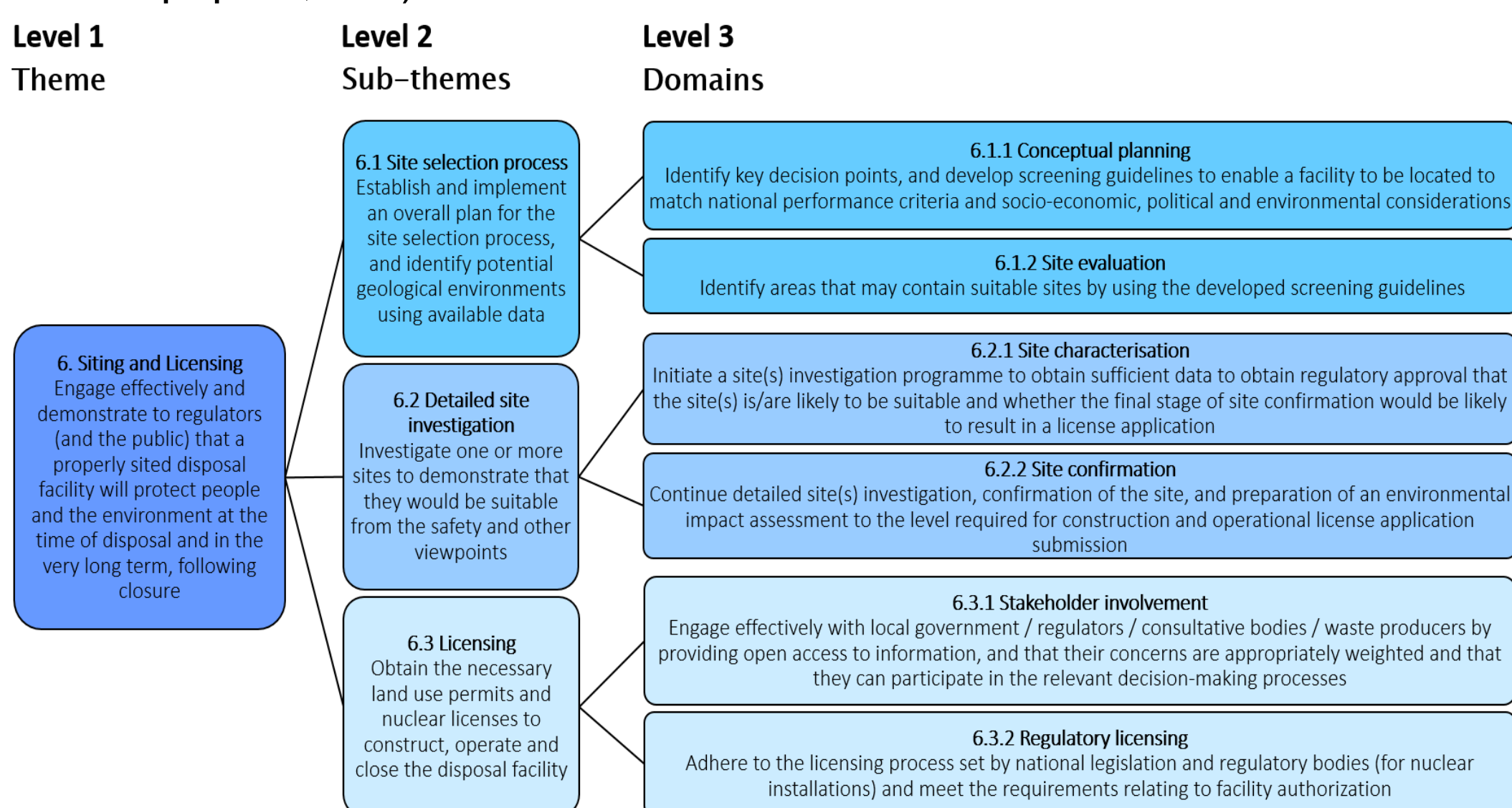


Fig. 2 Example for the breakdown of Theme 6 of the EURAD Goals Breakdown Structure (GBS) into Sub-themes and Domains

The hierarchy of the KM documents (Theme Overview, Domain Insight, State-of-Knowledge, Guidance) is closely linked to the generic EURAD Roadmap/GBS (Goals Breakdown Structure, Fig. 2) [1], which provides a hierarchical structure that facilitates definition, organisation and communication of topics. All of this allows to capture and present knowledge on the level of detail that is required by the end-user, from a broad overview down to an increasing level of detail (pyramid of knowledge, Fig. 3) [2]. To ensure the quality and consistency of the documents with the overall EURAD KM approach, quality assurance and editorial procedures are applied. Collection of end-user feedback will aid the optimisation and further development of the KM activities. All these activities will contribute to a useful and end-user friendly EURAD KM programme, that is designed to be operational well beyond the runtime of EURAD-1.

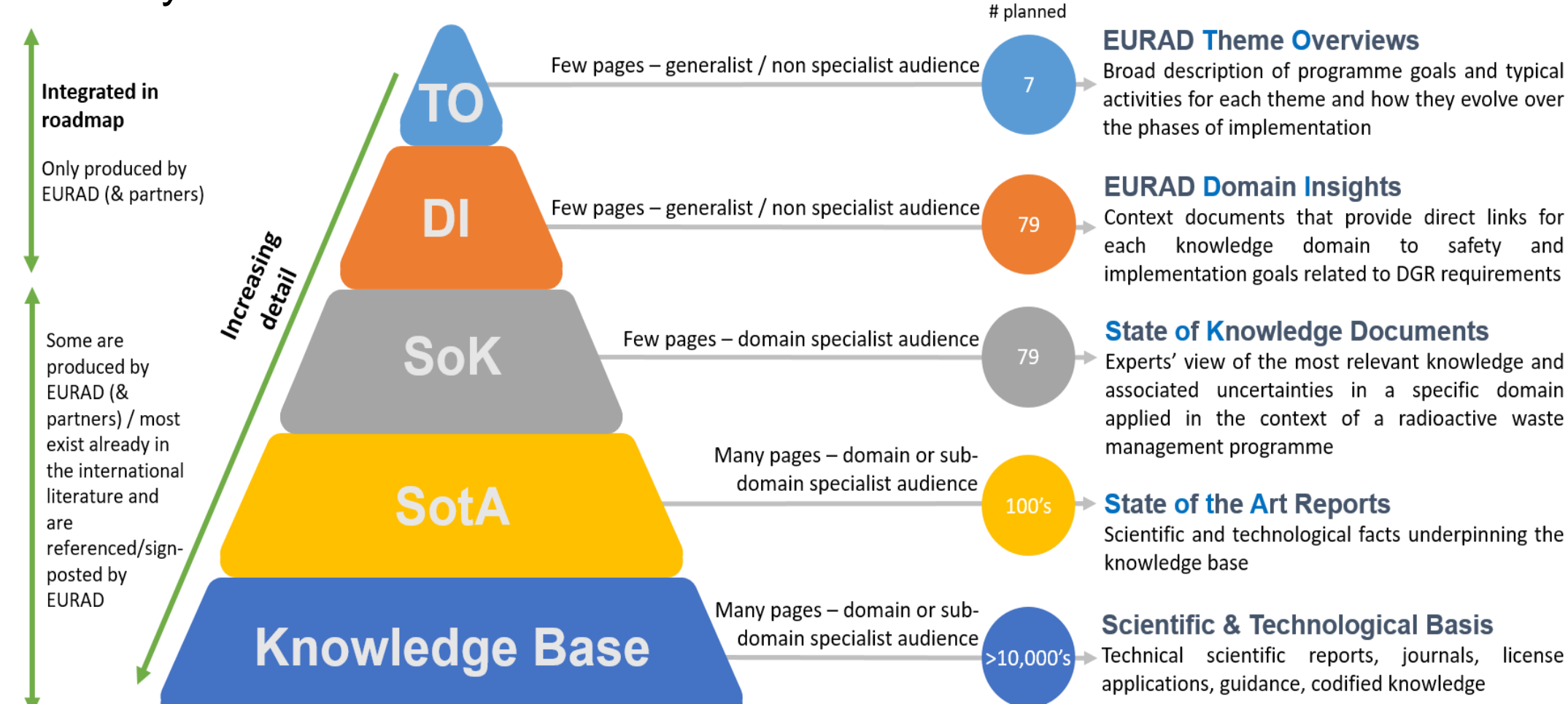


Fig. 3 Hierarchy of documents in the EURAD KM Programme (Pyramid of knowledge)

The Domain Insight documents give information about long-term safety and implementation goals (Fig. 4) of the Domain relevant to RWM and disposal with the aim to provide a general overview of the Domain.



Fig. 4 Generic feasibility and safety statements for the safe disposal of radioactive waste

The activities of the WP12-Guidance [3] are to develop a comprehensive suite of instructional guidance documents that can be used by the member states with RWM programmes.

Main objectives

The work of WP11 & WP12 will support:

- Member States (MS) planning RW disposal
- New entrants to the field (new employees at WMOs, TSOs, REs, students, civil society, etc.)
- Preserving and transferring knowledge between generations (Generational change)
- Early stage disposal programmes that plan their work
- Advanced disposal programmes that want to assess the work they have performed
- Identify knowledge gaps for RD&D, Guidance, Training & Education
- Increase understanding of KM and get people engaged in KM (regardless of EURAD)
- Creation of Community of Practice (CoP) capturing tacit knowledge
- Reviving "hidden" knowledge (e.g., old, non-digitalized reports) and make it accessible

Results and lessons learnt

Results:

- First SoK document demonstration case on Domain 3.1.1 – *Spent Nuclear Fuel* [4] was published in Nov. 2021. SoK document for Domain 3.2.1 – *HLW and SF Containers* will be finalized until end of 2022
- DI Document on Domain 2.2.5 – *Transport*, which handles the transport of radioactive wastes between facilities, was published Jun. 2022 [5]
- Authors for further 33 DI documents are confirmed
- EURAD KM Wiki is now accessible to all EURAD members
- Guidance on cost assessment and financing schemes of RWM programmes was issued [6]
- The overview of guidance and guide-like documents on geological disposal is in the process of being finalized

Lessons learnt from KM document production

- **Identification and engagement of experts** is one **central pillar** for the production of high-quality KM documents, and it is challenging
 - Requires the **timely identification and engagement of high-level experts** (involving the entire community)
- EURAD community does not cover the required expertise in all Domains, therefore it is necessary to **identify and engage external high-level experts** with a broad view
- Important to allocate enough resources for the full reimbursement of the work performed. Contractual challenges need not to be underestimated
- **Integration of critical information** from knowledge providers on key issues needs to display different views which result from the vast number of different organisations and their different backgrounds
 - Collect broad feedback (including end-users) → all voices need to be heard and a representative overview of opinions is formed when discussing specific issues and the future work
 - Moderate discussions & keeping content on a **generic level** and/or **cover all points of view**
 - The produced KM documents can be followed by lectures given by the same team of experts
- The implemented **agile learning-by-doing approach** has its own challenges

Lessons learnt from surveying KMS [7]

- KM is implemented more effectively when it is following a **top-down approach**
- **Organizational culture** is important to facilitate the knowledge exchange between people → **knowledge sharing** is essential
- Existing tools are **very diverse** and are adjusted to the respective organisational needs → no clear tendency how the KMS are set
- Portal-KMS should allow storing different types of information in various formats
- A **„forum“** – feedback and comment tools are essential for the portal-KMS
- **Statistical data** should be available to be collected and analysed
- EURAD KMS is planned to be generalized, web-based, supporting knowledge capture, storage, sharing and transferring

Conclusions and Outlook

- KM is crucial for the safe implementation of RWM. EURAD KM programme can provide a real **step change** and tangible benefit for the implementation of RWM
- WP11 SoK has taken important steps in the endeavour to capture relevant knowledge and make it accessible to end-users (e.g., SoK–SNF, DI–Transport, Wiki, KMS survey [7], development of KMS platform, ongoing KM documents production)
- **EURAD GBS** [1] is a **powerful tool** to organise and structure knowledge. The clear hierarchy and concept of the KM documents allow to fill this structure with content that enables end-users to orient themselves in the topic at hand and access the further Knowledge Base (reports, scientific paper, etc.) through signposting
- The development of a KM IT-tool based on the needs and specifications identified is planned
- Requirements management is the selected topic for the next guidance document
- We consider a **long-term vision** for the KM based on end-user feedback, acceptance, listening to the needs of the community
- A **pilot KM Community of Practice** with a significant involvement of the EURAD community will be established
- To create a **lively KM culture** we look forward to interact with you as:
 - **End-users:** take a look at the KM documents and please provide feedback
 - **Knowledge owners and providers:** support the production of the KM documents, indicate relevant sources, and participate in networking → **We are seeking experts willing to author DI documents in their area of expertise**
 - **Reviewers:** perform reviews of the KM documents in your area of expertise



For more information

References:

- [1] T. Beattie et al., EURAD Roadmap, extended with Competence Matrix, (2021), Final version as of 27.09.2021 deliverable D1.7 of the HORIZON 2020 project EURAD, EC Grant agreement no: 847593
- [2] T. Knuuti, A. Tatomir, A. Göbel, C. Franzen, D. Abbasova, T. Arnold, V. Brendler, K. Fuzik, Capturing the state-of-knowledge in EURAD knowledge management, EURADWASTE'22, 30 May-3 June 2022, Lyon, France
- [3] P. Ormai, B. Nős J. Faltejsek, J. Mikšová, N. Železnik, I. Mele, K. Fuzik, P. Carbol, A. Banford, E. Holt, Development of guidance documents in EU projects EURAD and PREDIS, EURADWASTE'22, 30 May-3 June 2022, Lyon, France
- [4] K. Spahiu, EURAD State of the Knowledge (SoK) Report Spent Nuclear Fuel (Domain 3.1.1), (2021), Available at: <https://www.ejp-eurad.eu/roadmap>
- [5] E. Holt, V. Soulanen, (2022), Domain Insight 2.2.5 - Transport. Available at: <https://www.ejp-eurad.eu/roadmap>
- [6] EURAD Deliverable 12.4 (2022) Guidance on Cost Assessment and Financing Schemes of Radioactive Waste Management Programmes.
- [7] D. Abbasova, T. Arnold, V. Brendler, C. Franzen, (2021), EURAD Deliverable 11.1: Screening and review of existing/available knowledge management approaches and/or tools Work Package 11 State-of-Knowledge