KM OVERVIEW IN EURAD AND PREDIS

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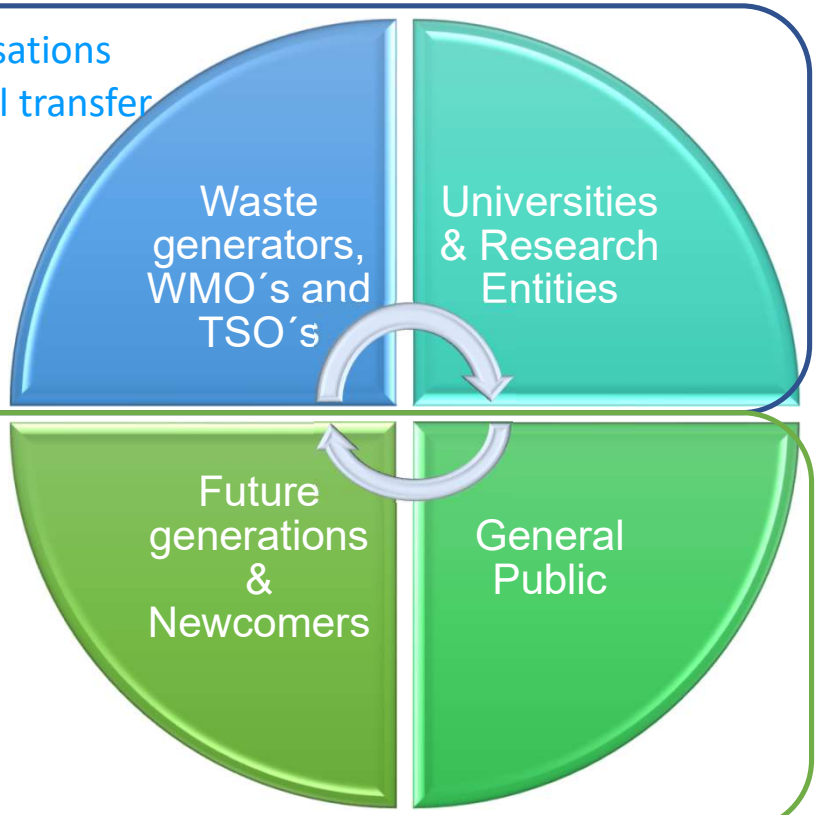
KM beyond EURAD and PREDIS

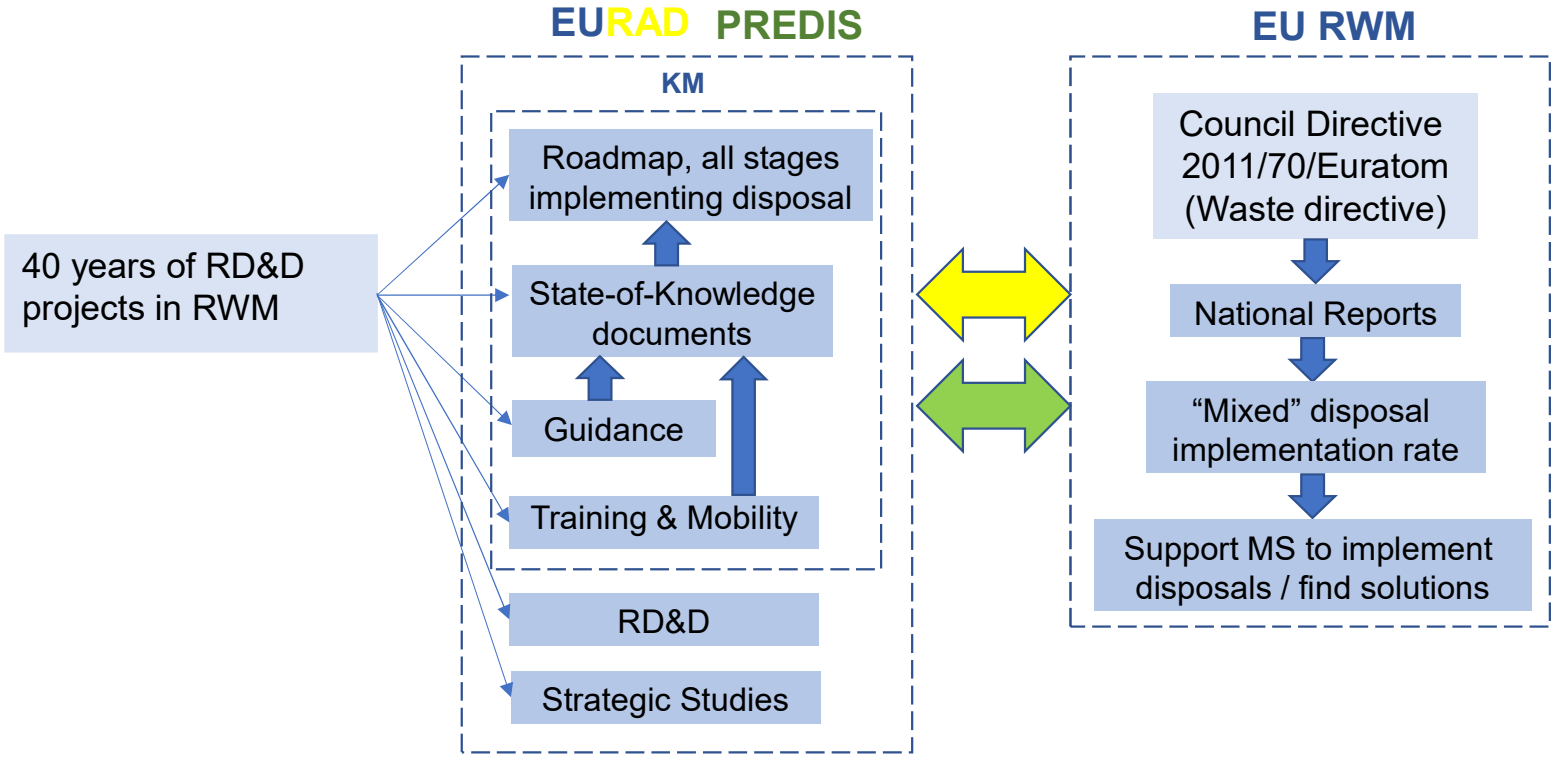
KNOWLEDGE MANAGEMENT - WHY AND FOR WHOM?

1. Preserving the knowledge within organisations
2. Replacement of people and generational transfer
3. Continuous organisational learning:
   - Internal
   - External, from other organisations
   - Identification of knowledge gaps



1. Access to knowledge
2. Development of competences
3. Generation of trust and transparency

EURAD/PREDIS and EU RWM



EJP AND KM

EURAD as Joint Programming has an outmost advantage, compared to individual projects, as it provides:

- Processes for knowledge sharing, e.g., interaction between the different radioactive waste management (RWM) actors to find out what is already known and what is most useful to investigate further.
- Resources and people to develop new knowledge and / or to support preservation of existing knowledge at risk, e.g., gap analysis, access to experts, networks and communities of practice.
- Tools and technology capable of handling the different forms of knowledge, with a focus on socialising, signposting and aggregating existing knowledge sources.

EURAD KM IN COMPARISON TO “TRADITIONAL” KM

Opportunities

- As a Joint Programme, there is opportunity to initiate change, adapt and re-shape tasks
- Maximise the KM, R&D and strategy output while profiting from access to EU´s expertise in RWM field
- Covering general broad aspects (roadmap, strategy) as well as specific (R&D, guidance)
- Very diversified and specialised work group (scientists, technologists, engineers, experimentalists, modellers, programmers, and many more), having different roles as implementer, technical support organisations (supporting regulators))
- Access to a wide pool of external experts and mechanisms for technical governance and strategic oversight (EURAD External Advisory Board and Chief Scientific Officer)
- Involving end-users, stakeholders and civil society to steer the programme and review our advancement

Challenges

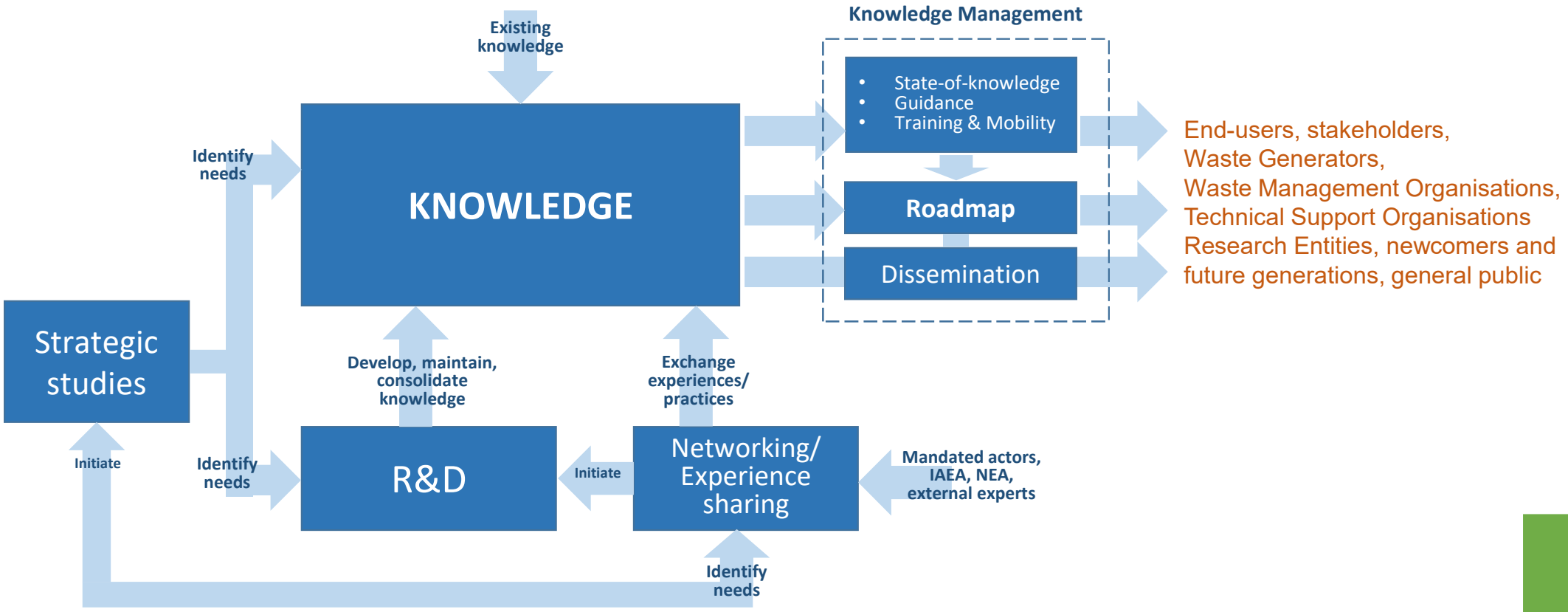
- EURAD is newly created, and continuously evolving
- How to make the long-term KM vision compatible with the 5 years funding schemes
- Requires a broad scope to support the advancement and implementation of national disposal programmes at different stages and inventories, including their KM vision
- Knowing what to achieve, but avoid competition and respect complemental to national RWM organisations and international organisations (e.g. IAEA, OECD/NEA)
- Establishment of a business case a broad commitment to a joint activity on KM (SoK, guidance and training) based on and taking into account continuous end-user needs and feedback

KM OBJECTIVES

Enhance knowledge management and transfer between organisations, Member-States and generations:

- Preservation/capitalisation of generated knowledge – Make sure that the publicly financed knowledge generated over the past, ongoing and future RD&D activities is preserved and kept accessible
- Transfer of knowledge from advanced to early-stage RWM programmes – Make sure that Member-States with National Programmes at an early-stage of implementation can take advantage of existing knowledge and know-how from the Member-States with advanced National Programmes, to access state of the art, and to ease access to knowledge developed during previous EC supported RD&D projects
- Transfer of knowledge between generations – Ensure that the necessary expertise and skills are maintained through generations of experts in view of the long lead-times and operational time-spans (several decades) for RWM, including disposal, by providing training and mobility for researchers
- Dissemination of knowledge – Disseminate and demonstrate progress, results and added-value of the European Joint Programme to a wider audience

OVERVIEW OF KM FLOW IN EURAD



KM STRUCTURES IN EURAD AND PREDIS

Knowledge management in EURAD

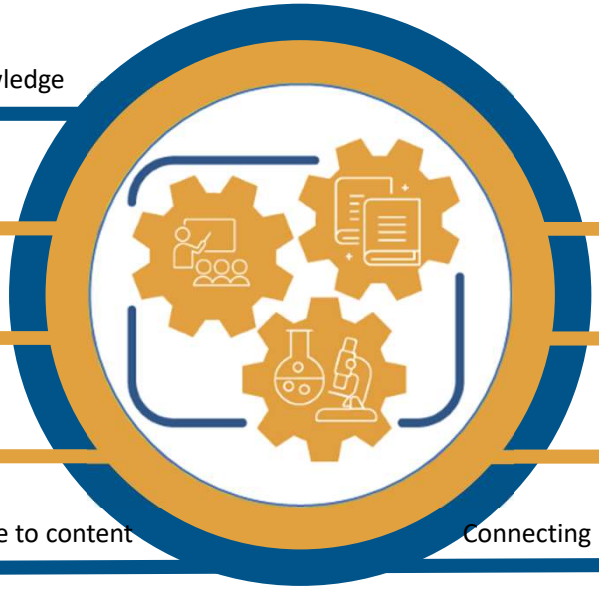
Roadmap
A common framework to structure knowledge

State of Knowledge
What we know and why its important

Guidance
Best practice and lessons learned

Training & Mobility
Nuclear experience and know-how

Networking & Tools
Connecting people to people, and people to content



Knowledge management in PREDIS

State of Knowledge
What we know and why its important

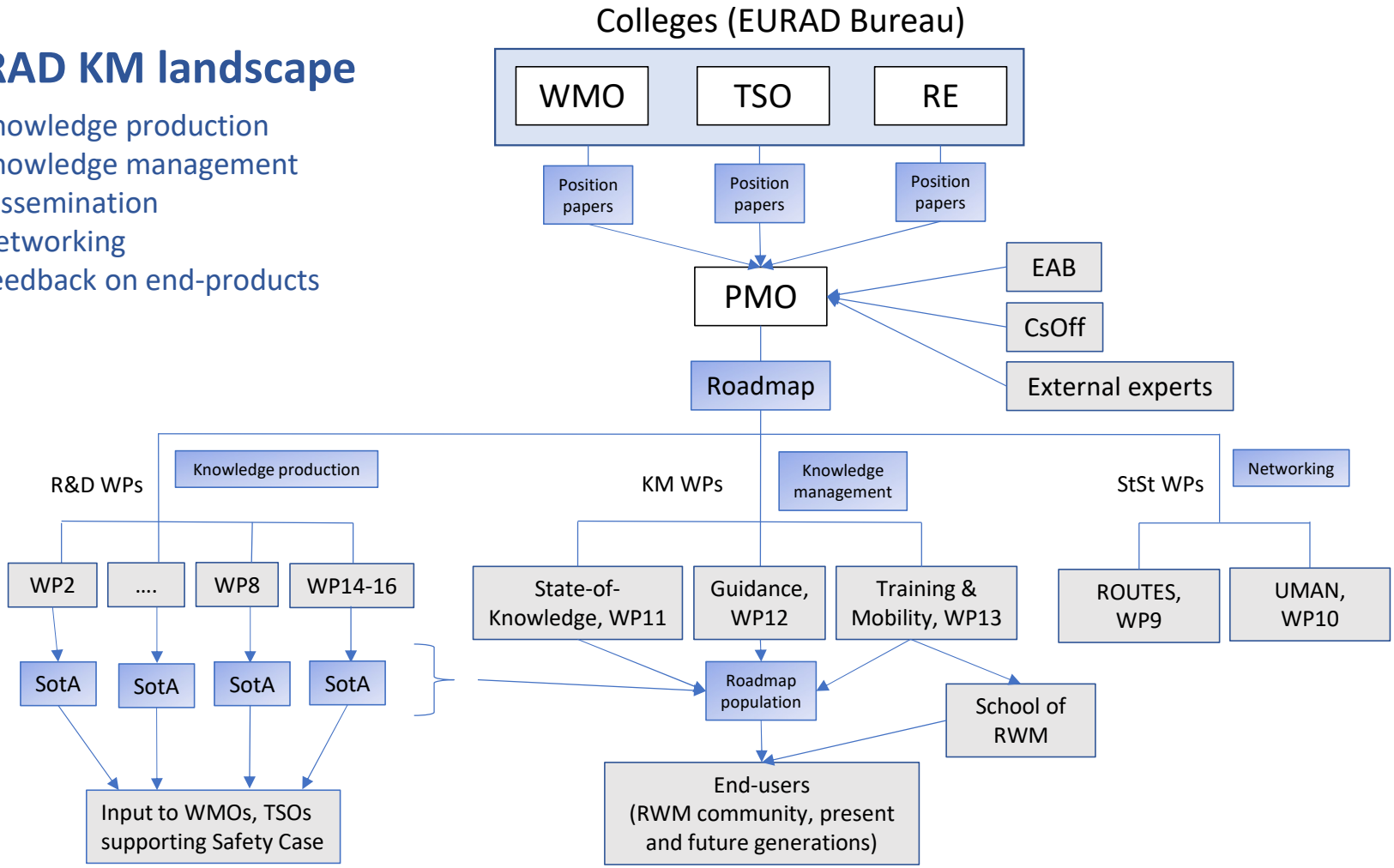
Training
Nuclear experience and know-how

Mobility
Nuclear experience and know-how

Networking & Tools
Connecting people to people, and people to content

EURAD KM landscape

- Knowledge production
- Knowledge management
- Dissemination
- Networking
- Feedback on end-products



KM “HUB” - EURAD ROADMAP

Main advantage

- Systemic view of RWM where all domains are interconnected
- All “generic” information at one place
- Entrance points independent of implementation stage
- Supports all levels of users
- Underpins development of SRA
- A “living” structure that will develop over generations

Disposal implementation phases

Activities

ROADMAP STRUCTURE

EURAD Themes

1. Programme Management
2. Pre-disposal
3. Engineered Barrier Systems
4. Geoscience
5. Design & Optimization
6. Siting & Licensing
7. Safety Case

https://www.ejp-eurad.eu/roadmap

PREDIS Theme

2. Predisposal

- Planning
  - Inventory
  - WAC
  - Technology selection
  - Waste hierarchy
- Implementation
  - Characterization
  - Treatment processing
  - Conditioning
  - Storage
  - Transport
- Operation
  - Quality Management
  - Optimization
  - Secondary Waste Management

https://predis-h2020.eu/roadmap-and-e-learning-material/

INTERACTIONS, INTEGRATION AND EXCHANGE

Interactions within EURAD

- KM WPs jointly defined and wrote the EURAD Knowledge Management and Networking programme
  - centred around the structure (Roadmap) with the individual cornerstones; contextual insight (theme descriptions, Domaine insight, SoK), competences, guidance, training and access to infrastructures (mobility) oriented to the needs of future users;
  - describes the dependence and interactions between EURAD RD&D, Strategic Studies and KM WPs;
  - foresees more intensive interactions/feedback with RWM end-users to guide the knowledge production;
  - it outlines the importance of EURADs' collaboration and networking with national RWM communities, ongoing projects as well as with international organisations, such as IAEA and OECD/NEA;
  - addresses future challenges and risks, as well as defines the success criteria's, and
  - helps to structure the future KM work of what can be realistically achieved by 2024.
- School of RWM is mainly dedicated to the student activities and forms a hub around training and mobility
- ~100 students (EURAD and PREDIS) are encouraged to form student groups through cohesive activities (common trainings, visits and workshops)

INTERACTIONS, INTEGRATION AND EXCHANGE

Integration with other EC-projects

- EJP EURAD-PREDIS
  - publishing a joint PREDIS-EURAD statement on knowledge management, defining the complementarity and interactions between the programmes;
  - common webinars (3-4 hours workshops, with a mixture of oral presentations and break-out rooms discussion with external participation to reach consensus on specific questions or topics) and Lunch&Learn sessions (1-h presentation with Q/A);
  - exchange of students participation and presentation during student sessions in the two programmes;
  - defining Theme 2 (Pre-disposal activities) in the EURAD roadmap and populating it with State-of-knowledge documents, such as the Theme Overviews and Domain Insight, which is part of PREDIS KM WP´s responsibility;
  - furthermore, a number of joint initiatives, such as common posters, scientific publications, papers and presentations
  - Initiation of Community of Practices (CoP) in RWM KM
- Others
  - presently running or just ended EC-projects such as MICADO, SHARE, CHANCE, BEACON, SEBAMA and DISCO

INTERACTIONS, INTEGRATION AND EXCHANGE

Exchange with external organisations

- interacts with international knowledge providers such as IAEA and OECD/NEA, to avoid KM overlaps and duplication, thus saving resources
- a rough differentiation of the KM activities between the three organisations is that IAEA works more on the policy level, OECD/NEA is identifying and work on different KM aspects/methodologies related to RWM, while EURAD is closer to the 'hands on' for actual work, supporting integration of KM into the R&D disposal implementation activities
- between the R&D and Strategic studies WPs with their end-users giving input to both R&D, strategy and indirectly to KM
- a number of experts from external organisations and companies, such as roadmap advisory board, guidance WP editorial board, External Advisory Board and EURADs programme end-users, are engaged to give advice on EURADs KM programme

LESSONS LEARNED (1/4)

How can KM exchange help to improve the cross-WP collaborations in EURAD to prove that EURAD is making the step-change, from a project to a programme?

- existing WPs represent only a small fraction of the skills and competence typical of a RWM programme, e.g., only a few specialist areas of RD&D are represented
- mobilisation of EURAD and PREDIS communities towards KM activities may not be sufficient, as it was not sufficiently budgeted in advance
- EURAD and PREDIS could mobilise and access other parts of RWM organisations involved in Joint Programming, e.g., to signpost to other parts of national programmes which are technical in nature, or access external experts whose technical areas are not sufficiently covered by WPs (e.g., emerging areas)
- still a too weak inter-WPs interactions

LESSONS LEARNED (2/4)

How to integrate and contextualise critical information from knowledge providers on key issues?

- 40-year long knowledge gathering, created and managed by a presently partly retiring workforce needs now to be transferred to the next generation of RW managers, encouraging focus on “integration of knowledge” with need of “technical integrators”
- important for next generation managers, not only to obtain “new” knowledge, but also to acquire the “old” knowledge, such as; why were things done as they were, what were the pitfalls that were never published, under which assumptions were decision taken and many such historical questions will turn up in the future and needs to have an answer for the upcoming regular licenses
- Continue and intensify the collaboration with IAEA and NEA with focus on complementarity

LESSONS LEARNED (3/4)

How do we improve and speed-up transfer of knowledge between advanced programmes and early-stage programmes and between generations also considering knowledge generated in previous EC programmes?

- central task within EURAD (involving KM (with inclusion of external experts), R&D and Strategic Studies) is to stimulate collaboration and networking (Community of Practices, CoP)
- there are less and less experts available with a broad overview “from cradle to grave” (so called “technical integrators”), due to a generation change and due to a RWM system with increasing complexity
- advanced programmes often have their associated business companies that are selling services related to their experience; need to develop a win-win exchange (for example a safe RWM in EU => increased national public acceptance or that an increased EU knowledge base minimizes “own” resources)
- advanced programmes are also busy with their own disposal licensing processes

LESSONS LEARNED (4/4)

On a long-term perspective, how do we keep alive EURAD building-blocks; roadmap, Strategic Research Agenda, continuation of R&D initiatives and KM structures in near-future and for future generations?

- increasing awareness to assure that the EC, REs, TSO and RWM organisations investments in EURAD, PREDIS and other projects/programmes, in form of manpower, knowledge accumulation (scientific publications), R&D output (SotA), knowledge structuring and contextualising (populated roadmap), will be used regularly, retained and conveyed into close future (15-20 years) and for future generations
- joint efforts supported by the EURAD/PREDIS organisations willingness to investing through the co-funding or more 100% funding by EC
- End-users involvement and that of a national RWM programmes is a crucial cornerstone for a future beyond EURAD and PREDIS

KM BEYOND EURAD AND PREDIS

In view of the decade-long implementation times for RW disposals and considering that MSs are at different phases of their disposal programme there has been created an increasing awareness on the need for a long-term vision for knowledge management on a European scale

- EC´s strong support of the to promote the KM in EURAD needs to be complemented by a long term vision and strong support by the national programmes and the colleges
- national KM programmes (WMO, TSO and RE) needs to be engaged in shaping and designing the future orientation of a decades lasting European KM programme driven by the largely varying national needs from programme initiation to implementation
- A future KM might become an even more than today a central part in continued European Joint Programming, providing a largely visible platform for interaction to ensure active and effective knowledge transfer, including trainings and mobility´s, including networking, and creating or participating to Communities of Practice (CoP)
- The School of RWM could function as a market place, or an active platform, where end-users (as knowledge consumers) with identified needs, using the roadmap, meets the knowledge providers/ producers (e.g. EURADSCIENCE, IGDTP or SITEX or national providers) to optimise the European R&D efforts and exchange knowledge between MSs organisations and generations

It cannot be enough stressed that a successful future programme and useful knowledge management for the coming generations depends on a strong end-user engagement and a long-term commitment.

QUESTIONS?

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MORE INFORMATION

More information will be given in the coming EURADWASTE presentations and on the posters

- EURAD Key achievements at mid-term (poster)
- The EURAD Roadmap – A roadmap for implementing radioactive waste management, leading to geological disposal (poster)
- EURAD-PREDIS projects´ synergies in knowledge management practices (poster)
- Capturing the state of knowledge in EURAD knowledge management (oral)
- Development of guidance documents in EC projects EURAD and PREDIS (oral)
- Training & Mobility in EU projects EURAD and PREDIS (oral)
- The IAEA approach to information and knowledge transfer on radioactive waste management – a brief review of synergies with the international cooperation conducted under EURAD and PREDIS projects (oral)

Other sources:

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0070&from=DA

https://www.ejp-eurad.eu/

https://predis-h2020.eu/

WPs IN EURAD

- **WP1 – Programme Management Office:** During EURAD-1, and in addition to its responsibility of administrative, legal and financial management and the /coordination of the overall scientific and technical coordination/integration
- **WP2 - Assessment of Chemical Evolution of ILW and HLW Disposal Cells (ACED):** Multiscale approach and process integration to improve long-term modelling and assessments
- **WP3 - Cement-Organic-Radionuclide interactions (CORI):** Improved understanding of the role off organics (either naturally occurring or as introduced in the wastes and their influence on radionuclide migration in cement based environments)
- **WP4 - Development and Improvement Of Numerical methods and Tools for modelling coupled processes (DONUT):** Improved understanding of the upscaling THMC modelling for coupled hydro-mechanical-chemical processes in time and space
- **WP5 - Fundamental understanding of radionuclide retention (FUTURE):** Quantification of long-term entrapment of key radionuclides in solid phases to inform reactive transport models and the influence of redox
- **WP6 - Mechanistic understanding of gas transport in clay materials (GAS)**: To increase understanding and predictability of gas migration in different host rocks
- **WP7 - Influence of temperature on clay-based material behaviour (HITEC):** Improved THM description of clay based materials at elevated temperatures
- **WP8 - Spent Fuel characterisation and evolution until disposal (SFC):** Reduce uncertainties in spent fuel properties in predisposal phase
- **WP9 - Waste Management routes in Europe from cradle to grave (ROUTES)**: Share experience and knowledge on RWM routes between WMOs, TSOs and REs from different countries, with programmes at different stages of development, with different amounts and types of radioactive waste to manage
- **WP10 - Understanding of uncertainty, risk and safety (UMAN):** Further refinement methods to make sensitivity and uncertainty analyses and the development of multi-actor network for uncertainty management
- **WP11 - State of Knowledge (SoK):** Developing a systematic approach of establishing the state-of-knowledge in the field of RWM research
- **WP12 - Methodological guidance (Guidance):** Developing a comprehensive suite of instructional guidance documents that can be used by Member-States with RWM programmes that are at an early stage of development with respect to their national RWM programme
- **WP13 - Training/mobility (Training & Mobility):** Developing a diverse portfolio of tailored basic and specialised training courses under the umbrella of the “School of Radioactive Waste Management”
- **WP15 - Container corrosion under disposal conditions (CONCORD):** Optimise and evaluate the behaviour of materials for disposal containers in view of their long-term barrier performance
- **WP16 - Chemo-Mechanical aging of cementitious materials (MAGIC):** Increase the confidence in Chemo-Mechanical simulations by reducing uncertainties in input data and understanding of key coupled
- **WP17 - Monitoring equipment and data treatment for safe repository operation and staged closure (MODATS):** Evaluate, develop and describe methods and technologies, and to provide the means to measure, treat, analyse and manage data in a consistent manner

INTERACTIONS EURAD-PREDIS

- KM & Networking Programme, developed jointly (https://www.ejp-eurad.eu/publications/eurad-knowledge-management-and-networking-programme)
- EURAD-PREDIS Joint Statement on Knowledge Management (https://www.ejp-eurad.eu/publications/joint-statement-knowledge-management-euradpredis)
- Common roadmap (https://www.ejp-eurad.eu/roadmap and https://predis-h2020.eu/roadmap-and-e-learning-material/)
- Common Webinars/presentations at workshops and annual events/EURADWASTE
- Monthly coordinators meetings
- Joint publications and meetings with international KM providers
- Initiation of Community of Practices (CoP) in RWM KM