



#Euratom

Radioactive Waste Management in Small Inventory Member States

Overview of the Euratom R&T Programme

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EC DG RTD

Outline

- The Euratom Research and Training Programme
- Past actions on RWM: EURAD & PREDIS
- The way forward: EURAD-2
- Upcoming events

The Euratom Research and Training Programme



HORIZON EUROPE

EURATOM


SPECIFIC PROGRAMME: EUROPEAN DEFENCE FUND
Exclusive focus on defence research & development

Research actions

Development actions

SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT*
Exclusive focus on civil applications

**Pillar I
EXCELLENT SCIENCE**




European Research Council

Marie Skłodowska-Curie

Research Infrastructures

**Pillar II
GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS**




Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Mobility
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre

**Pillar III
INNOVATIVE EUROPE**



European Innovation Council

European Innovation Ecosystems

European Institute of Innovation & Technology*

WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA

Widening participation & spreading excellence

Reforming & Enhancing the European R&I system

Fusion

Fission

Joint Research Center

* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

Euratom Programme 2021-2025



The financial envelope for the implementation of the new Euratom Programme 2021-2025 shall be **€1.382 billion in current prices.**

€583 million for indirect actions in fusion research and development

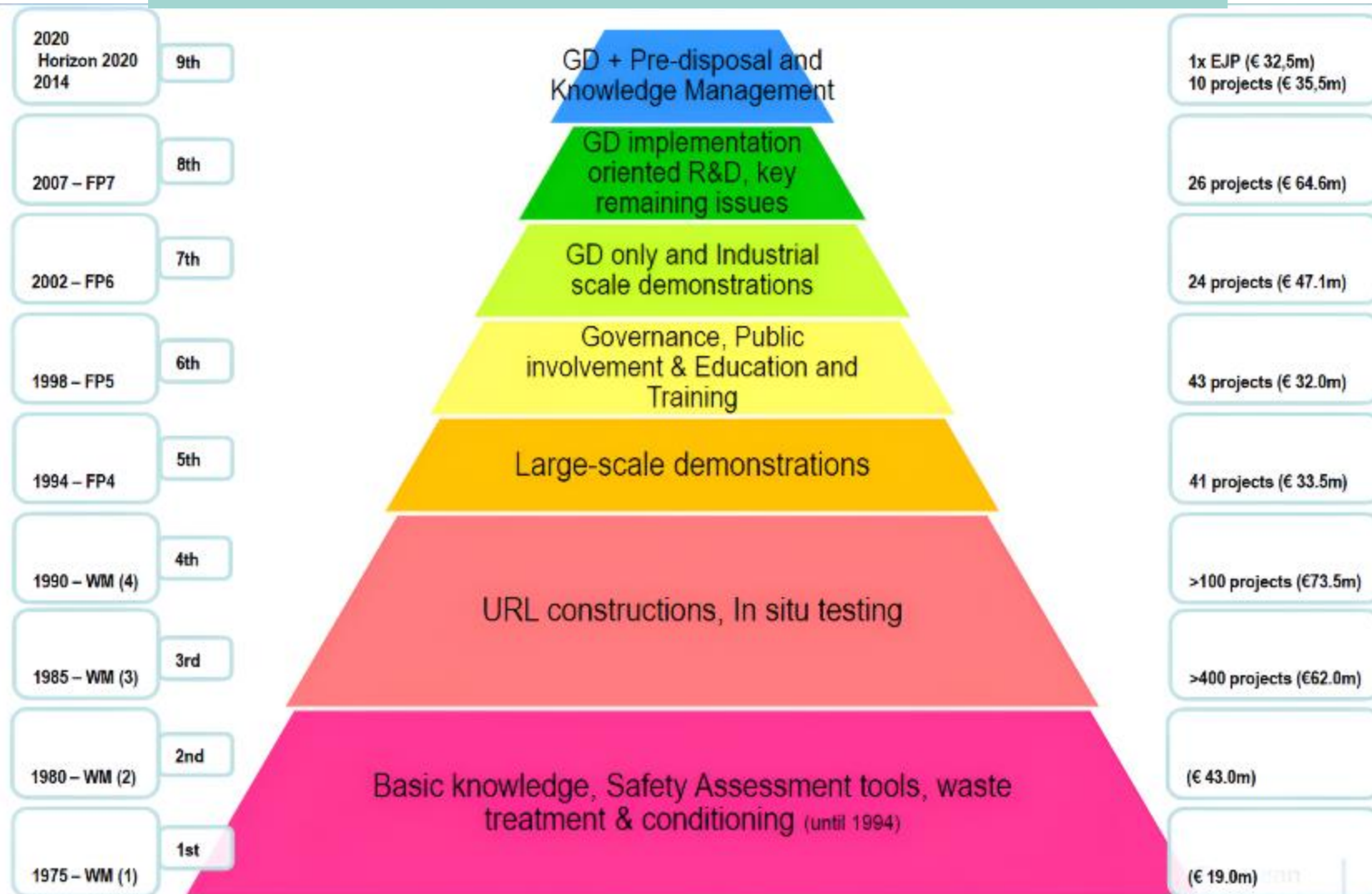
€266 million for indirect actions in nuclear fission, safety and radiation protection

€532 million for direct actions undertaken by the Joint Research Centre

⇒ *A 2-year extension of the Euratom programme will be requested in 2025 with an additional top-up budget to be defined*

Waste Management and Geological Disposal

FINANCIAL ORIENTATION



EVOLUTION OF THE R&D PROCESS



Overtime, there has been a move towards a holistic approach involving all stakeholders & waste types

Radioactive Waste Management



Programme/projects on RWM

European Joint Programme



- Establishment of the IGD-TP in 2009
- Creation of the SITEX Network in 2012
- The 3-year JOPRAD project launched the preparatory phase for a first European Joint Programme in 2015
- A governance system of the future EJP built around the 3 colleges (REs, TSOs, WMOs)
- **EURAD (June 2019 - May 2024)**

8

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

PREDIS project



- Developing pre-disposal activities identified in the scope of EURAD
- Focus on conditioning processes for metallic and organic waste streams and monitoring of waste packages
- Signed MoU to foster cooperation & communication EURAD/PREDIS
- Joint dissemination, joint stakeholder engagement
- **PREDIS (Sep. 2020 - August 2024)**

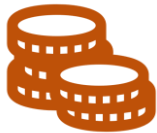
<https://predis-h2020.eu/>



Overview and objective



5 years
2019-2024



59,9 M€
55 %EC
contribution



17
work packages

In accordance with the Waste Directive, support Member States in developing and **implementing their national RD&D programmes** for the safe long-term management of their **full range of radioactive waste** taking into account the **various stages of advancement of national programmes**



Small inventories : no
nuclear power programme
but medical/research
reactor-derived wastes

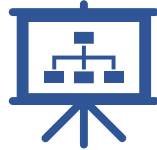


Large, complex inventories:
large nuclear power and
defence programmes

EURAD participants



3 Colleges



115 organisations



~ 900 individuals



110+ PhD/post-doc/master students

Ministries from 23 European countries recognising their role of directing RD&D at the national level, provided mandates to **51 organisations** acting as Beneficiary within EURAD:

- Waste Management Organisations (WMO)
- Technical Support Organisations (TSO)
- Research Entities (RE)
- ... with **61 linked third parties** & **3 international partners (Canada, Australia, Japan)** also participating
- 100+ end-users registered representing 21 countries (incl. USA, South Korea and Japan)



PRE-DISPOSAL MANAGEMENT OF RADIOACTIVE WASTE



47 partners
17 countries
25 End User Group members



Total budget 23.7 M€
EC contribution of 14 M€



Aim: Identify, develop and improve innovative technologies in pre-disposal radioactive waste management



4 years
Started Sept 2020



Endorsement and close interaction with SNETP-Nugenia, IGD-TP, IAEA, NEA, EURAD



Detailed info:
<https://predis-h2020.eu/>

PREDIS 2019-2024

- ~24 M€ budget
- 47 partners
- 17 countries
- 25 End Users
- <https://predis-h2020.eu/>


Project outcomes


Better solutions for treatment and conditioning of low and intermediate level radioactive waste (LILW) streams


- SAFE, but cheaper, more sustainable or effective alternative processes
- assess that solutions meet the waste acceptance criteria (WAC) and can be disposed of eventually

Highlights:

- Update predisposal focused **Strategic Research Agenda** (SRA)
- Value assessment and sustainability indicators with **life cycle assessment** and life cycle costing
- Successful mobility and training programme, 12 **Domain Insights** to EURAD Roadmap ([link](#) to PREDIS publications), free online [training videos](#)
- Making problematic metallic waste management routes (from storage to disposal) **safer** and more **economically efficient**
- Availability of a **treatment and conditioning process for radioactive organic wastes up to TRL 6** including validation tests (real waste) and feasibility scale-up tests.
- Demonstration of the **thermal treatment benefit** and characterisation of the treated materials
- **Versatile and reliable condition monitoring technologies**, demonstrated on operating radioactive facilities and made available to end users; Digital twins, evaluating artificial intelligence for data handling

 55 milestones
61 deliverables
Over 100 publications

 19 webinars
> 450 individual participants
41 countries
4 open workshops

 51 students in total
60+ mobilities

 8 Courses
1 theme overview
12 domain insights
4 case studies

How does EURAD help the Member States?

Overall added value

- **Direct relevance** of the WPs (ex. MODATS, GAS)
- Importance to have results **broadly discussed**
- Interaction with and hearing from others gives **confidence** to be on 'right track'
- Role of **training courses & networking** to hear and learn support for students by having contacts
- EURAD also supports interaction at national level
- Documentation available / accessible (value of **SotAs**: complex knowledge is up-to-date)
- EURAD **important for regulator** to get information and skills
- Coverage for **DGR** is good, transfer of knowledge through involvement in WPs
- Being part of such a **big network** gives confidence at the political level

How does EURAD help the Member States?

What added value for the SIMS?

- Solid solutions to be managed by small organisations
- Decommissioning → legacy waste → disposal solution: **skills and competences** are a challenge
- Importance of having **WMOs** involved
- Importance to learn about and have access to **competence clusters** (having the 3 colleges)
- **Role of DGR less relevant** – SF/HLW (... and 'special waste'): **shared solution**
- Importance of **shared solutions for pre-disposal**
- How to find the relevant information?
- **Continuation of EURAD** important – continuity provides stability for planning, continuity supports confidence by public
- EURAD: **platform for exchange of information & sharing of information**

In numbers, EURAD has been

- 📖 10 State-of-the-Arts published
- 📅 14 Civil society events organised
- 📰 16 newsletters published
- 💻 17 work packages
- 👩🎓 24 trainings provided
- 🔍 25 Domain Insights published
- 📢 25 conferences / workshops organised
- 💡 31 Lunch-and-learn organised
- 🌐 98 mobility actions granted
- 👤👤 106 registered end-users
- 🏢 115 organisations involved
- 🎓🎓 132 PhD/post-doc/master students funded in EURAD
- 📖 191 deliverables published
- 📄 326 milestones achieved
- 📚 353 publications produced

👩👤 965 individuals involved in the programme who contributed to this large success !

The way ahead: EURAD-2



Towards a new Partnership on RWM



The 2023-2025 Work Programme included a *name-to-beneficiary* topic for a new Partnership on Radioactive Waste Management.

Ensuring a smooth transition from the Joint Programme EURAD to the Partnership EURAD-2 in 2024

Similar 3-college governance system as in EURAD. A first list of Work Packages is public. A second wave will follow.

A more pronounced role for the regulators and the waste generators /industrial stakeholders in a structured End User Group

Kick-off meeting

23-24 October 2024

We are delighted to invite you to the Kick-off meeting of EURAD-2, which will be held in Ghent, Belgium, from 23 (afternoon) to 24 October 2024 (full day), at the Marriott Hotel of Ghent!

The draft agenda of the event will be communicated soon.



Location:
Ghent / Gand (Belgium)
Hotel Marriott
Korenlei 10
9000 Gent

⇒ Registration to the Kick-off is mandatory if you would like to attend.



OVERVIEW



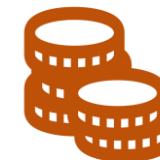
**5 years
2024-2029**



21 European MS + 6 Associated countries

143 organisations

Continuous cooperation with IAEA & NEA/OECD



20 M€ (2024-2025)

60% EC



**Interactions with
civil society**

- WP5 – ICARUS
- WP6 – STREAM
- WP7 – L'OPERA
- WP8 - SAREC
- WP9 – InCoManD
- WP10 – ANCHORS
- WP12 – RAMPEC
- WP14 – SUDOKU
- WP16 – HERMES
- WP17 - CSFD



10 R&D WPs



**6 Strategic
Studies**

- WP3 - ASTRA
- WP4 – FORSAFF
- WP13 – OPTI
- WP11 – CLIMATE
- WP15 – DITOCO2030
- WP18 - DITUSC



1 KM WP

Upcoming events and useful links

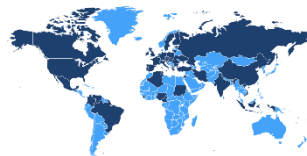


FISA - EURADWASTE - SNETP Forum - ENEN PhD 2025, in Warsaw (PL), 12-16 May 2025

Under the Polish Presidency of the Council of the EU



One Plenary room up to 500 persons, three parallel rooms 120-150 persons



ENS-YGN **High-Level Opening**

+150 participants

1 day Young Generation Network, Awards and Atomic Careers' Day

3 full days FISA-EURADWASTE 2025 and SNETP Forum 2025

- High-level Opening / Closing plenary sessions
- **5** Plenaries (I to V)
- **12** Parallel sessions
- **100** students invited (Posters), 100 Euratom projects up to 200 Posters in total

1 day Technical tours

Open Call MSc/PhD/R&D Awards Competition,
Nuclear Innovation Prize, Poster Exhibition,
SNETP Forum and **ENEN PhD Event & Prize**

Meet & Match, +500 Attendees

Several Prizes Nuclear Innovation Prize, R&D Awards, ENEN PhD Event & Prize

Exhibition Stands and Posters

EPJ-N special editions and Proceedings of the conferences in 2025



Euratom4U iOS Android App. & desktop version



Take-aways and conclusions



Common issues and challenges

1. Meet
2. Listen & Share
3. Make a plan!
4. Implement

Common issues and challenges

- Political commitment
- Institutional gaps
- Challenging waste streams
 - NORM, Research reactors, Disused sources (sealed, orphan, non-sealed)
- Specifically tailored disposal solutions (ex. Borehole)
- Predisposal operations (e.g. characterisation, conditioning, transport)
- Skills, training and competences
- Limited resources, small teams

How can we help?

- Integrated waste management approach
 - SMR, decommissioning, medical isotopes, legacy waste
- EURAD-2
 - Strategic Studies and KM, End-Users, 2nd wave of WPs
- Structured groups of SIMS stakeholders
 - Targeting the needs and the challenges of the SIMS
- What knowledge can be transferred from front runners and LIMS to the SIMS? → Harmonising the way we report on the Waste Directive impl.?
- EC initiatives
 - Shared solutions for predisposal and disposal

An action plan?

- Tomorrow: EURAD-2 kick-off
 - There will be annual events, opportunities for the SIMS to take the stage
- The on-going joint solution study/project
 - How to make progress on a potential mutualisation of the resources?
- Establishing a SIMS group
 - What level? Implementers? Regulators? Decision-makers?
- Synergies with the other IO (IAEA, NEA/OECD)
- Skills, training and competences: EURAD-2 can be part of the solution

Publications – CORDIS (EC R&D Information Service)



View all H2020 Euratom projects summaries
and public deliverables on CORDIS <https://cordis.europa.eu/>

H2020 Euratom projects (All)

[https://cordis.europa.eu/search?q=contenttype=%27project%27%20AND%20\(programme/code=%27H2020%27%20OR%20programme/code=%27H2020-Euratom%27\)%20AND%20\(%27euratom%27\)&p=1&num=100&srt=Relevance:decreasing](https://cordis.europa.eu/search?q=contenttype=%27project%27%20AND%20(programme/code=%27H2020%27%20OR%20programme/code=%27H2020-Euratom%27)%20AND%20(%27euratom%27)&p=1&num=100&srt=Relevance:decreasing)

... Latest relevant projects summaries

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Thank you!

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