



# EU-PREDIS PROJECT OVERVIEW

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 945098.

## PROJECT SHORT OVERVIEW

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- Title: “PREDIS: Pre-disposal Management of Radioactive Waste”
- Participants: Consortium of 47 partners from 17 countries
- Duration: 4 years, started September 2020 through August 2024.
- Budget: 23.7 M€ total, of which EC contribution of 14 M€
- Reply to: Euratom call NFRP-10, Research and Innovation Action (RI). Key planned during March 2019 Nugenia Forum, TA5 session.
- Support/endorsement from Nugenia, IGD-TP, IAEA, NEA, EURAD project – all are listed for cooperation during the project duration (establishing i.e. MoU for information sharing)
- Project web page: <https://predis-h2020.eu/>



# **PREDIS CONSORTIUM MEMBERS**

*Bold indicated WP leaders, = Project Management team*

- **VTT Technical Research Centre of Finland, Finland**
- **National Nuclear Laboratory (NNL), UK**
- **Joint Research Centre (JRC), Belgium**
- **Institut Mines Télécom Nantes Atlantique (IMTA), France**
- **Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France**
- **Studiecentrum voor Kernenergie / Centre d'Etude de l'Energie Nucléaire (SCK•CEN), Belgium**
- **Bundesanstalt fuer Materialforschung und Pruefung (BAM) Germany**
- Magics Instruments, Belgium
- Technical University Sofia, Bulgaria
- Ceske Vysoke Uceni Technicke V Praze (CTU), Czech Republic
- Centrum Vizkumu Rez (CVRez), Czech Republic
- Statni Ustav Radiacni Ochrany (SÚRO), Czech Republic
- ÚJV Rez, Czech Republic
- University of Helsinki, Finland
- Centre National de la Recherche Scientifique, France
- Ecole Centrale de Lille, France
- Institut de radioprotection et de Sûreté Nucléaire (IRSN), France
- ORANO CYCLE, France
- DMT GmbH & Co., Germany
- Forshungszentrum Julich GMBH, Germany
- Karlsruher Institut fuer Technologie (KIT) Germany
- National Center for Scientific Research "Demokritos" (NCSR), Greece
- Isotoptech Nuklearis Technoloiai Esszolgaltato Reszvenytarsasag, Hungary
- Radiookologiai Tisztasagert Tarsadalmi Szervezet (SORC), Hungary
- TS Enercon Mernokiroda KFT, Hungary
- Ansaldo Nucleare SPA, Italy
- Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA), Italy
- Istituto Nazionale di Fisica Nucleare (INFN), Italy
- Nucleco Societa Per L'Ecoingegneria, Italy
- Politecnico di Milano, Italy
- Societa Gestione Impianti Nucleari (SOGIN), Italy
- University of Pisa, Italy
- Valstybinis Moksliniu Tyrimu Institutas (FTMC), Lithuania
- Nuclear Research and Consultancy Group, Netherlands
- Institutt for Energiteknikk (IFE), Norway
- Regiei Autonome Tehnologii pentru Energia Nucleara - Institutul de Cercetari Nucleare Pitesti (RATEN), Romania
- Amphos 21 Consulting SL, Spain
- Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Spain
- Agencia Estatal Consejo Superior Deinvestigaciones Cientificas (CSIC), Spain
- Empresa Nacional de Residuos Radioactivos SA (ENRESA), Spain
- Universidad Autónoma de Madrid, Spain
- Paul Scherrer Institut, Switzerland
- Galson Sciences Limited, United Kingdom
- University of Manchester, United Kingdom
- University of Sheffield, United Kingdom
- National Science Centre Kharkov Institute of Physics and Technology (KIPT), Ukraine
- Institute of Environmental Geochemistry, National Academy of Science, Ukraine



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# **PREDIS TECHNICAL SCOPES** (WPs in green, Tasks in blue)

Low & Intermediate Level Waste Types

**Metallics**

**Liquid  
Organics**

**Solid  
Organics**

**Cemented  
Waste**

Characterisation & classification of waste

New treatments, conditioning & monitoring

Modelling & Performance evaluation of new solutions

Environmental & economic evaluations

Innovative R&D Approaches

Scope was developed in spring 2019 based on iterative feedback from end user community, regarding priorities on R&D topics.

Selection of topics and tasks based on areas having highest potential for technical and innovation impact.

Description of Action (Project Plan) gives exact techniques and their current, project and future technology readiness level (TRL) targets

# **PREDIS OBJECTIVES & CHALLENGES TO ADDRESS**

PREDIS high-level, overall objectives are to:

- **Develop solutions (*methods, processes, technologies and demonstrators*) for future treatment and conditioning of waste across a number of MSs for which no industrially mature or inadequate solutions are currently available, improving safety during next waste management steps;**
- **or improve existing solutions with safer, cheaper or more effective alternative processes where they bring measurable benefits to several MSs (Member States).**
- **Analyse criteria, parameters and specifications for materials and packages with associated Waste Acceptance Criteria (WAC) for pre-disposal and disposal activities, supporting homogenisation of waste management processes across Europe.**

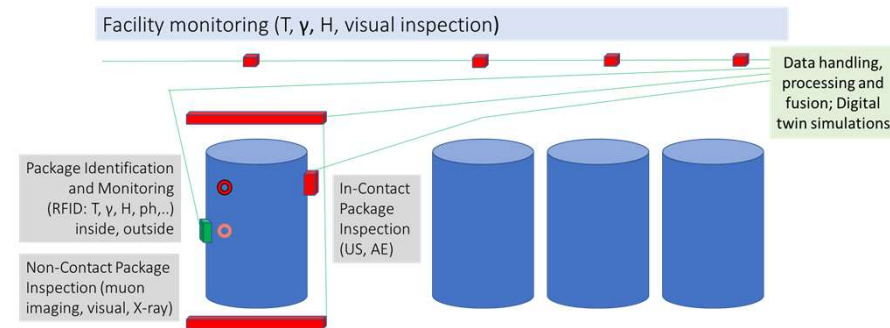
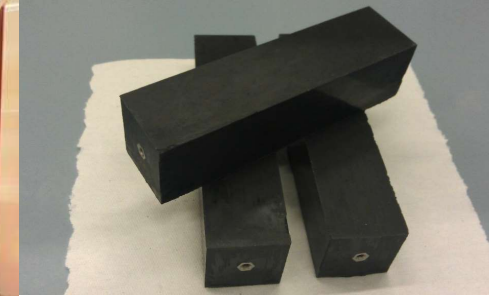
These high-level objectives will be met by PREDIS having specific objectives:

- 1) Applying multi-disciplinary and multi-scale scientific approaches to demonstrate technical, economic and environmental feasibility of the new solutions;
- 2) Addressing project drivers from the end users' points-of-view;
- 3) Fostering deeper cooperation between experts from many EU Member-states and across generations;
- 4) Training new experts in the field of pre-disposal waste management technologies;
- 5) Updating and revising pre-disposal guiding documents (vision, SRA, roadmap, governance and deployment mechanisms), together with the EURAD EJP executive bodies.



# PREDIS PROCESSING TECHNICAL EXAMPLES

- WP4 : Demonstrate innovative techniques for METALLIC WASTE decontamination, quantifying the efficiency of decontamination processes and allow more effective application of the waste hierarchy. Treatment of secondary waste stream.
- WP5: Develop direct conditioning solutions of LIQUID ORGANICS using geopolymer, including validation tests with real waste and feasibility scale-up tests
- WP6 : Develop and performance verification of conditioning of SOLID ORGANIC residues and secondary wastes stemming from (thermal) treatment
- WP7: Develop innovative sensors, non-destructive evaluation methods, digital twins and decision making tools for evaluation of CONCRETE WASTE package integrity
- ALL:
  - Evaluate impacts with respect to waste acceptance criteria
  - Apply life cycle environmental assessment and life cycle cost assessment to new techniques, for decision making by industry implementation



Figures: Top left - encapsulated metallic waste (Orano), Top right – 20% oil immobilized with geopolymer, Bottom – holistic monitoring



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# PREDIS Achievements in first 6-12 months

- Project web page established: <https://predis-h2020.eu/>
- 1<sup>st</sup> [newsletter](#) was published December 2020, including overview of 1<sup>st</sup> workshop held in October.
- 1<sup>st</sup> project workshop 20-22 October 2020, included public stakeholder session and panel discussion (industry, IAEA, EURAD). All material available online.
- Established End User Group - currently 23 End User Group Members from 14 countries. More EUG members are welcome – register via Project webpage (registration [link](#))
- Cooperation with participation to EURAD project training, dissemination, roadmap (WP1)
- Mapping stakeholders. Conducting gap analysis of industry needs and priorities (also with input from i.e. IAEA, SHARE project, EURAD project SRA, etc) (WP2)
- Establishing training and mobility protocols for partners (WP3) + externals. EURAD links.
- Drafting State-of-Art technical baseline reports (WP4-7), ready by summer 2021. Setting boundary conditions (materials, test parameters, etc) for technical innovation tasks (experimental, modelling). Surveying needs.



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# PREDIS Ways to Get Involved

- Apply for End User Group (waste owners, waste producers) or Stakeholder group – [here](#)
- Participate to any of our upcoming public (free) webinars with discussion groups, registration link [here](#). Dates & topics:
  - January 19, 13-16 CET: Innovations in cemented waste package monitoring and storage (WP7)
  - February 16, 13-16 CET: Innovations in metallic material treatment and conditioning (WP4)
  - March 9, 13-16 CET: Innovations in solid organic waste treatment and conditioning (WP6)
  - March 30, 13-16 CET: Innovations in liquid organic waste treatment and conditioning (WP5)
  - TBC – Waste Acceptance Criteria issues (WP3, Task 2.3 – together with EURAD-ROUTES)
- 2 online surveys ongoing about EUG waste inventories, management practices, needs. Deadline was January 2021, but OK to submit if haven't done so already. Results directly feed into SOTA reports and Gap Analysis (due spring 2021).
  - Waste inventories & treatment (WP4-6) [survey](#)
  - Concrete packages & monitoring (WP7) [survey](#)
- 2<sup>nd</sup> project workshop planned May 4-7, 2021 (at VTT/Finland and/or online), including EUG and stakeholder session. Welcome to join! Further update will be in the April newsletter and web page.

What is your opinion on the greatest challenge in waste pre-treatment?

a. <a href="#">Waste segregation and sorting</a>	(15%)
b. <a href="#">Waste classification and characterization</a>	(22%)
c. <a href="#">Waste processing</a>	(21%)
d. <a href="#">Waste transport</a>	(5%)
e. <a href="#">Waste interim storage</a>	(11%)
f. <a href="#">Financing</a>	(13%)
g. <a href="#">Governmental policy</a>	(13%)

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What type of waste should we focus on for near-term R&D on treatment technologies (for highest impact/achievement potential)?

a. <a href="#">Metallic waste (steel, aluminum)</a>	(18%)
b. <a href="#">Graphite waste</a>	(16%)
c. <a href="#">Concrete waste</a>	(16%)
d. <a href="#">Solid organic wastes (fabric, paper, wood, ...)</a>	(13%)
e. <a href="#">Liquid organic wastes (oil, sludge, chemical effluent, ...)</a>	(29%)
f. <a href="#">Other</a>	(8%)

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# Thanks!

Questions/Comments – please send to [erika.holt@vtt.fi](mailto:erika.holt@vtt.fi)

WE ARE LOOKING FORWARD TO THIS  
INNOVATION-DRIVEN PROJECT AND  
COOPERATING WITH MANY INTERESTED  
PARTIES OVER THE NEXT 4 YEARS



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