PREDIS

Panel discussion

THEMATIC AFTERNOON ON BELGIUM PROGRAMME

This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945098.

Setting the scene

Moderator Christophe Bruggeman, SCK CEN

- European Commission update, Seif Ben Hadj Hassine, Euratom, EC
- Status on European Strategic Research Agendas (EURAD and PREDIS), Christophe Bruggeman, SCK CEN
- Status on HARPERS project activities related to predisposal regulatory harmonization, Elke Jacops, SCK CEN & Réka Szőke, IFE
- Status on preparations for future European Joint Partnership (EURAD-2), Erika Holt, VTT
- Views from IAEA on the impact of Euratom collaboration projects, Rebecca Robbins (by video)

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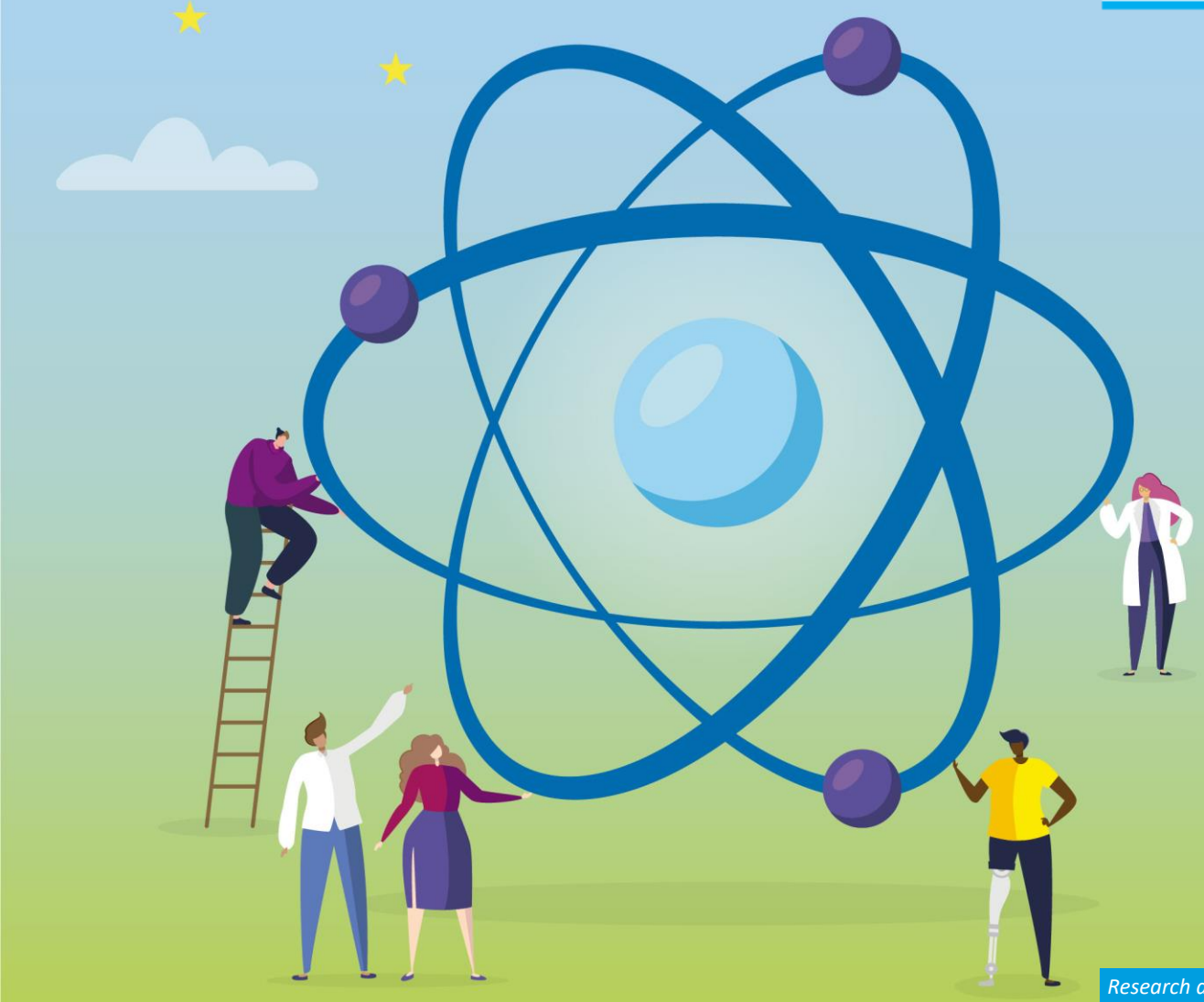


#Euratom

PREDIS 3rd Annual Whole Consortium Workshop

22-26 May 2023

Seif BEN HADJ HASSINE
Unit C4, Euratom Research
DG RTD

Research and Innovation

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

EURATOM

- Fusion
- Fission
- Joint Research Center

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

The Euratom Research and Training programme

What is it?

- Research and Training (R&T) programmes implemented by the European Commission (EC), under the provisions of the European Atomic Energy Community (Euratom) Treaty, in which all European Union (EU) Members States participate.

What is its role?

- To supplement and coordinate MS' programmes to perform joint and/or coordinated cutting-edge research, to support knowledge creation and knowledge preservation. To avoid duplication and achieve critical mass if needed.

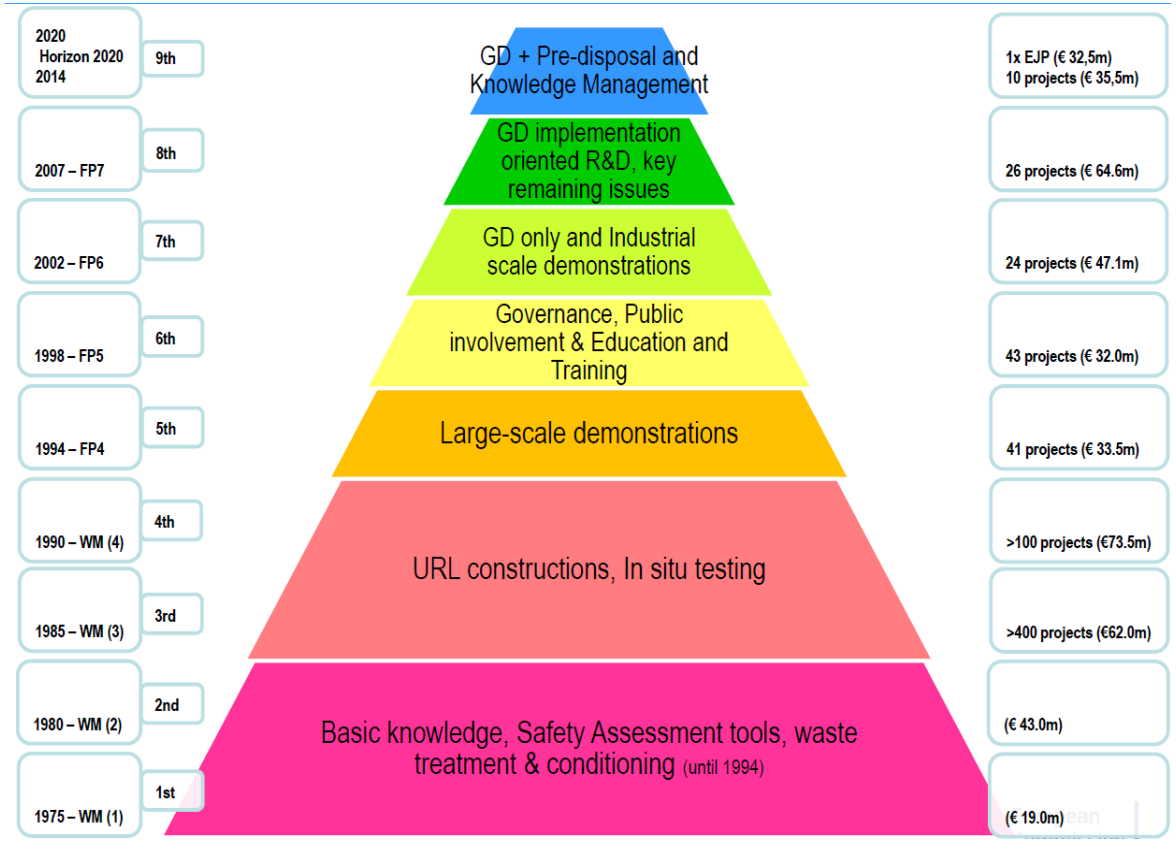
How is it implemented?

- By Multi annual Framework Programmes (FP), 5 years +2 since FP7 and annual / biannual Work Programmes;
- Projects of up to five year duration are funded after calls for proposals evaluated by independent experts.

Waste Management and Geological Disposal

Strong effort of EC to support R&D on radwaste since more than 40 years and an evolution to federate all the actors, in an holistic view and including all types of radwaste

Financial orientation



Evolution of the R&D process

→ Joint programming **EURAD**

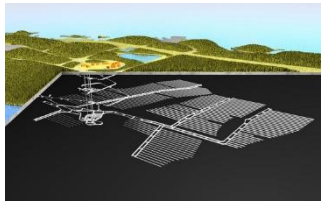
eurad
European Joint Programme on Radioactive Waste Management

→ IGD-TP 2009 ; SITEX 2012
EURADWASTE 2013, 2019

→ Large integrated projects

igd·tp
safe solutions for radioactive waste

Start multi partner
& multi discipline projects
and coordination actions



A group of front runners FI, SE, FR

Single partner or
single discipline
contracts

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- At least 200 nuclear reactors are to be decommissioned in the next 30 years
- Lifetime extension of reactors is considered and investigated in many EU countries
- A *renaissance* in the nuclear sector is foreseen with the emergence of the SMRs and advanced technology reactors
- Implementation of the 2011 Waste Directive and inclusion of nuclear energy in the EC Taxonomy

➢ **Securing the safe management of the back-end is a prerequisite to the durable development of the nuclear sector**

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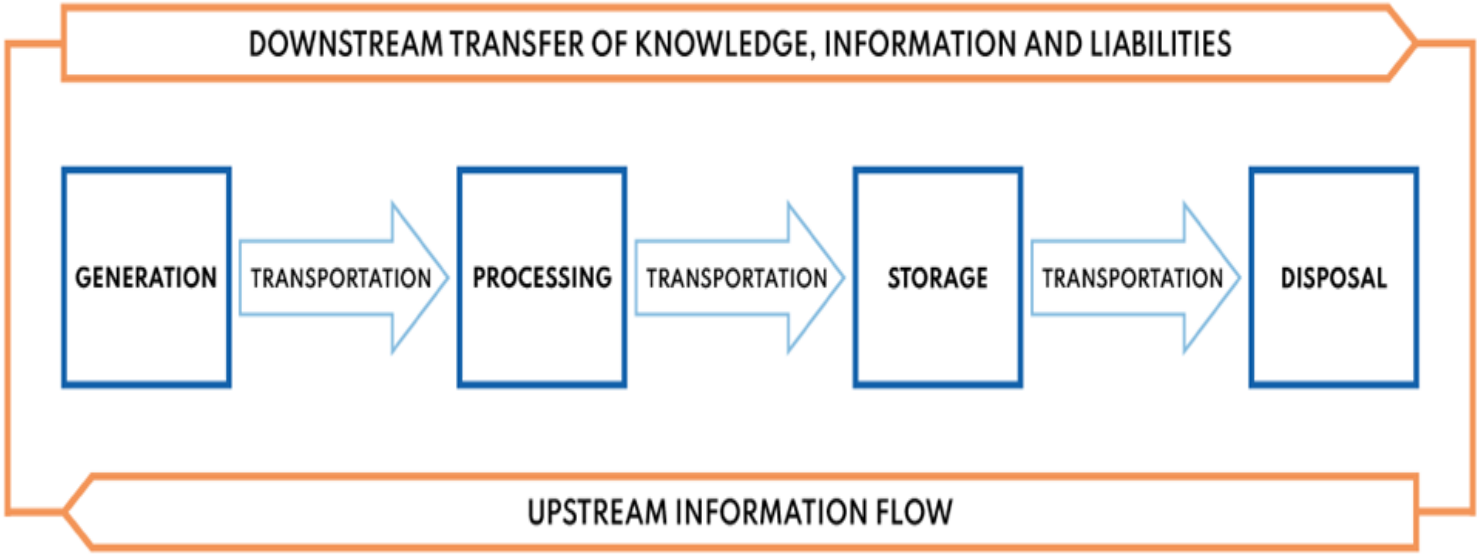
- *What is the PREDIS project about?*

➢ All **predisposal activities** from the waste generation and prior to its disposal

➢ A **gap analysis** identified the main research topics to be investigated

➢ The work packages address specific waste streams: **organics, metallic waste and cemented packages**



European Commission

PREDIS

PRE-DISPOSAL MANAGEMENT OF RADIOACTIVE WASTE

47 partners
17 countries
25 End User Group members

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

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

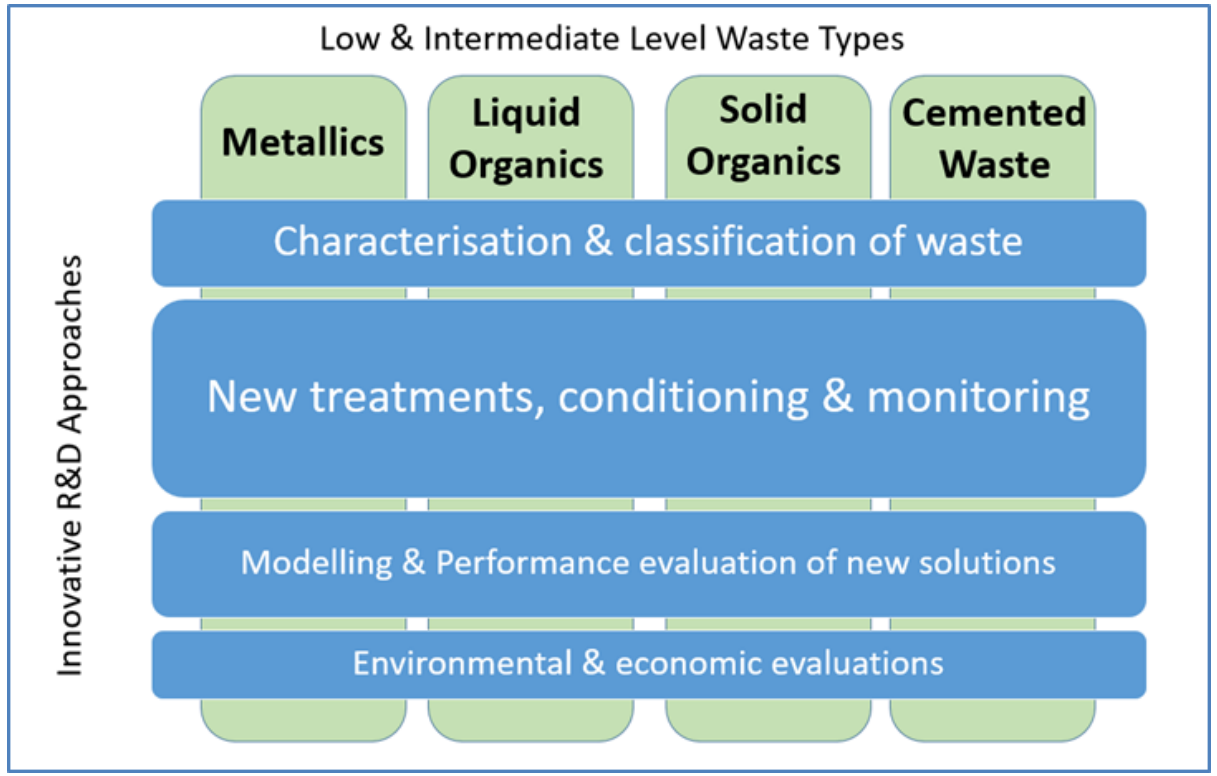
Total budget 23.7 M€
EC contribution of 14 M€

4 years
Started Sept 2020

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

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

PROJECT OBJECTIVES



- Develop solutions (methods, processes, technologies and demonstrators) for future treatment and conditioning of waste across a number of Member States, for which no industrially mature or inadequate solutions are currently available, improving safety during next waste management steps
- Improve existing solutions with safer, cheaper or more effective alternative processes where they bring measurable benefits to several 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

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

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- All milestones and deliverables have been achieved. **No major deviations**
- The project is **on track** and ressources and budget are being used **as expected**
- The progress of an EC project is hardly linear!
- Some of the achievements of PREDIS:
    - **Breakthrough scientific and technic results**
    - **Collaborations** between labs and countries
    - Opportunities for **young scientists and researchers**
- The **role of the End-Users and the stakeholders** in making use of the results of the research community

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

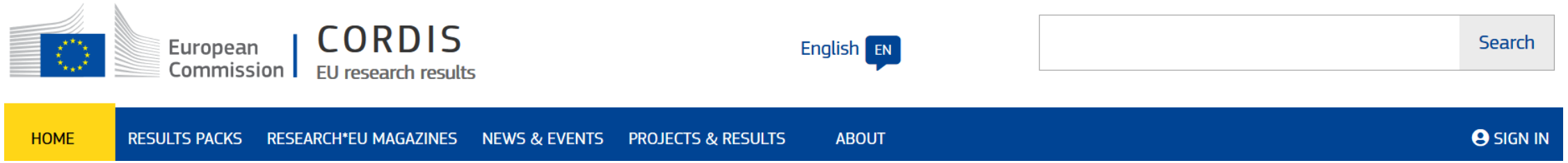
€532 million for direct actions undertaken by the Joint Research Centre

- A first 2-year Work Programme for 2021-2022
- A second 3-year Work Programme for 2023-2025
- An extension is required/foreseen for the last two years 2026-2027

Euratom 1-12 (Fission) and Other Actions (including Fusion) **DRAFT**	EUR million EC contr./prop	Total Budget (indicative)	Proposals (indicative)
1 RIA - Safety of operating nuclear power plants and research reactors	**5**	**20**	**4**
2 IA - Safety of Light Water Small Modular Reactors (LW-SMRs)	**15**	**15**	**1**
3 RIA - Safety of advanced and innovative nuclear designs …….....	**4**	**12**	**3**
4 COFUND - Co-funded European Partnership for research in nuclear materials	**20**	**20**	**1**
5 RIA - Partitioning and Transmutation of minor actinides towards industrial applications……	**5**	**5**	**1**
6 RIA - Improved nuclear data for energy and non-energy applications of ionising radiation	**4**	**4**	**1**
7 COFUND - Co-funded European Partnership on Radioactive Waste Management	**20**	**20**	**1**
8 IA - Innovative technologies for safety and excellence in decommissioning ……..	**2**	**4**	**2**
9 IA - Safety of LEU fuel for research reactors – securing the supply of medical radioisotopes	**7**	**7**	**1**
10 IA - Nuclear and radiation techniques for EU strategic autonomy, circular economy and climate change policies	**2.3**	**7**	**3**
11 IA - Harnessing innovation in nuclear science, technology and radiation protection ……..	**3.5**	**7**	**2**
12 CSA - Preparatory phase for a EU production capability to secure a supply of HALEU.....	**1**	**1**	**1**
<u>Other Actions:</u> FISA2025-EURADWASTE'25, early June 2025, under Polish Presidency of EU Nuclear Innovation Prizes 2025 (RS, RWM, RADIOPRO), SOFT Prizes 2024 & 2026 Contribution to the GIF Secretariat for the Generation-IV International Forum E&T and networking actions to strengthen Ukrainian and EU nuclear research MSCA in nuclear research and training Fusion IFMIF-DONES and industrial expertise for DEMO External Experts and communication		**0.3** **0.3, 0.1 x2** **0.15 x3 0.75** **2** **1.25, 3** **0.75, 0.3**	
Overall Euratom Fission 2023-25 Call indicative budget, 152 EUR million, (includes budget return back to fusion budget line after call 2021-22 amendment on VVER Fuel supplyEUR 10 million and EUR 20 million to Partnership PIANOFORTE)		**132 (fission)**	**21**

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

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

… Latest relevant projects summaries !

European Commission

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Director-General **Marc Lemaitre:** @Lemaitre_eu

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https://www.facebook.com/EUScienceInnov/

Horizon Magazine: @HorizonMagEU

Horizon Europe website: http://ec.europa.eu/horizon-europe

European Innovation Council: http://ec.europa.eu/research/eic

European Research Council: https://erc.europa.eu/

European Commission

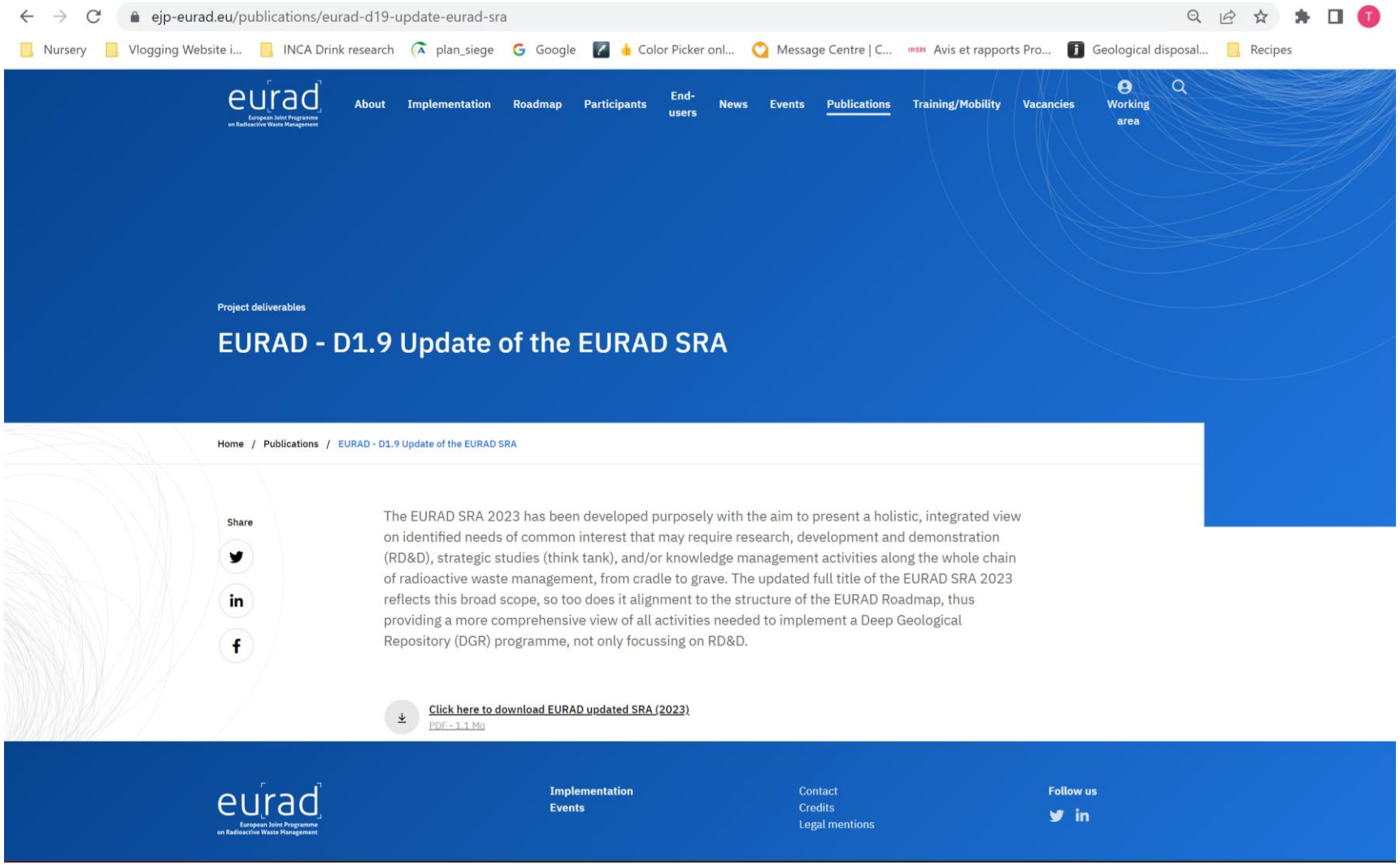
Thank you!

HorizonEU
Euratom

http://ec.europa.eu/horizon-europe

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/euratom

EURAD SRA 2023 – NOW AVAILABLE ON THE EURAD WEBSITE



WHAT IS THE EURAD SRA ?

- **SRA = Strategic Research & Knowledge Management Agenda**
- **What are the objectives?**
  - Document domains of common interest for further EURAD joint activities
  - Shared by the different types of actors involved in EURAD
  - Considering the EURAD objectives and “boundary conditions”
  - Considering what is done outside of EURAD
  - With the objective to provide added value to MS for the implementation of their national programmes
- **For what is it used?**
  - To disseminate current EURAD domains of interest for the next ≈10 years
  - It provides a common basis to identify, discuss, propose and develop new joint EURAD activities
  - Promote interactions between colleges and thus benefit from the EURAD multi-actors dimension

SCOPE OF THE SRA UPDATE

- **Activities of common interest for next 10 years**
- **Scientific and technical activities on radioactive waste management from cradle to grave (excluding dismantling and decommissioning of nuclear facilities):**
  - Radioactive waste characterisation and processing (including treatment, conditioning and packaging);
  - Interim storage and transport of radioactive waste; and
  - Disposal solutions – mainly geological disposal of spent fuel, high-level waste (HLW) and long-lived intermediate level waste (ILW).
- **The scope of the update will consider the following main inputs:**
  - The EC PREDIS project (aligns mainly with SRA Theme 2), bringing in views from waste generators
  - Updated SRA / Position papers from EURAD Colleges
  - Views from Civil Society will be brought in by TSO Updated SRA / Position papers.
  - KM priorities from EURAD (+PREDIS) KM Work Packages
  - Input from EURAD Strategic Studies

FROM JOPRAD TO EURAD SRA 2023

2017 2019 2021 2023 2024

eurad 2

JOPRAD

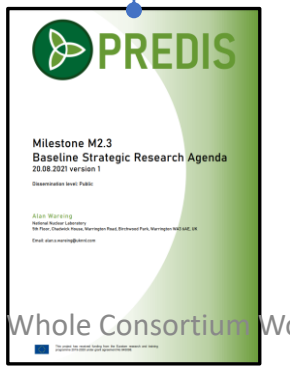
TOWARDS A JOINT PROGRAMMING ON RADIOACTIVE WASTE DISPOSAL

eurad

EUROPEAN JOINT PROGRAMME ON RADIOACTIVE WASTE MANAGEMENT

PREDIS

PRE-DISPOSAL MANAGEMENT OF RADIOACTIVE WASTE



eurad

EURAD SRA UPDATE PROCESS: STATUS

October 22

Colleges Position Papers
PREDIS Position Paper

Goals of Update → 2019 SRA → SRA new classification → 2023 SRA

Step 1: Agree Goals + Process (GA5, Sept 2021) — January 22

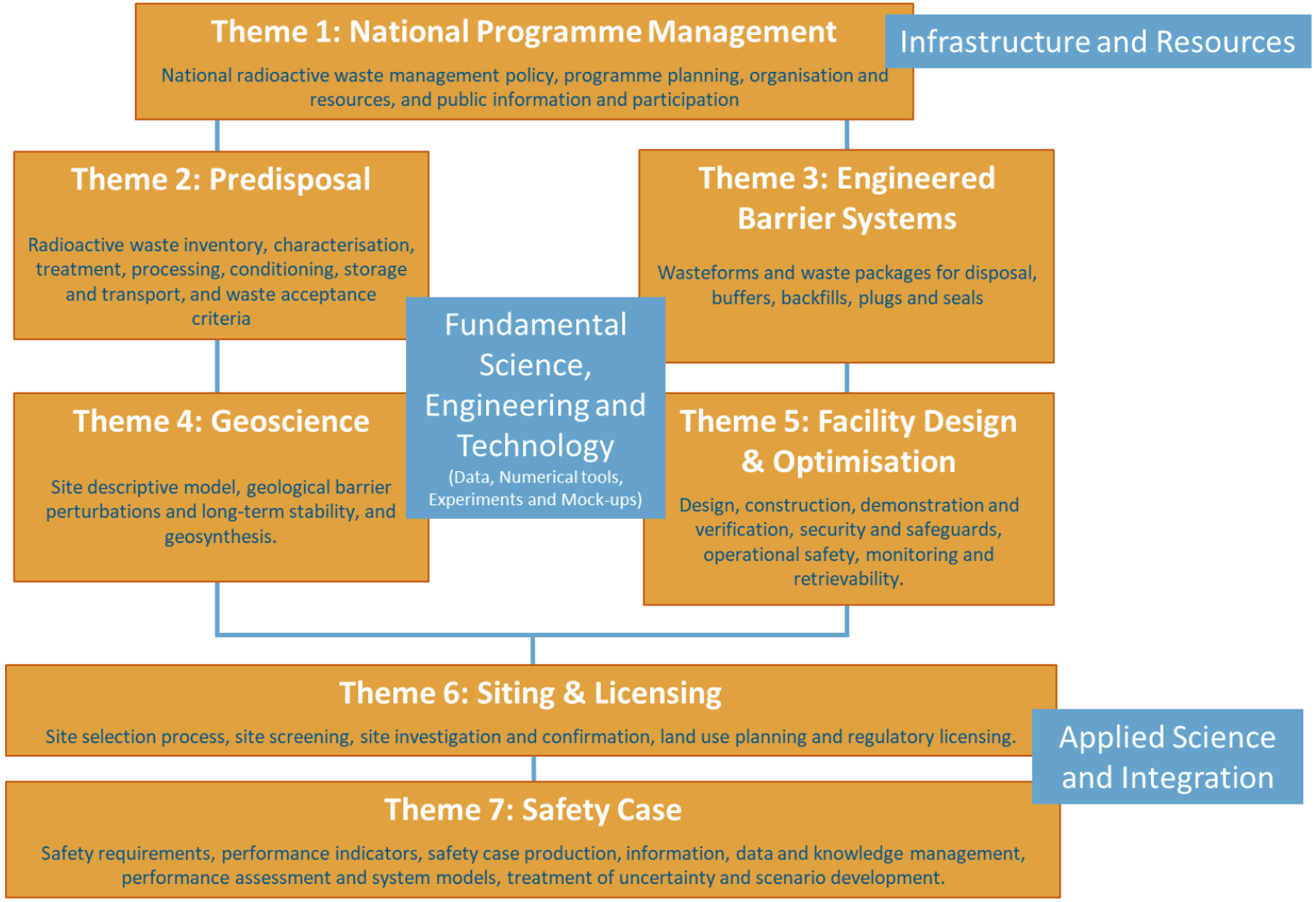
Step 2: Improved classification / drivers — May 22

Step 3: Revise existing SRA content – to make it more focused — July 22

Step 4: Screen additions from College SRA's + KM WPs. — January 23

THEMES OF THE SRA

- EURAD Roadmap provides a framework for EURAD activities.
- Goals Breakdown Structure of the Roadmap:
  - Level 1 = 7 Themes
  - Level 2 = Domains
  - Level 3 = Subdomains
- Each SRA topics is related to 1 (or several) SRA domain(s).



IMPROVED CHARACTERISATION: DRIVERS

EXAMPLE OF HOW DRIVERS ARE USED IN THE EURAD SRA 2023

Corresponding Roadmap Domains	Description of RD&D, Strategic Studies or KM Needs of Common Interest	Drivers
Planning 2.1 - Planning predisposal management of materials and radioactive waste in close cooperation with waste generators		
2.1.1 Inventory	**NEW Knowledge management regarding existing studies on legacy and problematic waste inventories and capturing good practice in the management of inventory data, uncertainty treatment** Expected outcomes and impact: Understanding wastes that are not currently well characterised and are without identified waste routes. Improved knowledge of waste inventory helps improve methodologies to define radionuclide inventories, including DTM nuclides and activation assessments, use of radionuclide vectors and handling uncertainties, and thus further understanding evolution of the radionuclide inventory after disposal for impacts to the repository's safety case. Sharing of good practice in the management of inventory data can lead to cost effective data quality improvements. Cooperation and relevant past projects: EC PREDIS project, EURAD, ERDO (Legacy Waste Characterisation project), CHANCE.	**KM, Tailored Solutions** There is a need to understand the form of legacy wastes and associated radioactivity (e.g., whether liquids are present, any materials that may promote corrosion, gas generation etc.,) in order to better develop and validate processes for treatment, conditioning, packaging and disposal of such wastes. **Innovation for Optimisation, Scientific Insight** There is a need to gain a better understanding of certain waste inventories (e.g., legacy waste), which are currently either not well characterised or have not been well managed (treated and conditioned) and are known to pose safety issues for current treatment and conditioning technologies and disposal routes.

CONCLUSIONS

- **The agreed process was followed.**
- **Good PMO / Bureau collaboration.**
- **Strong commitment from the Colleges (Position Papers, Workshops…).**
- **Strong efforts needed to reach:**
  - a consensus about joint SRA drivers
  - a "Strategic" SRA (<> "shopping list")
- **This is finally not surprising as we touched the Heart of Joint Programming:**
  - SRA Drivers: why programming activities? Each college has individual interests !
  - Strategy: find a joint direction, bringing added value for all stakeholders !
- **We will identify the lessons learned to improve future SRA update processes.**
- **Good news: we did it ! This is a nice demonstration of joint programming and promising for the future of EURAD.**

HARMONISED BEST PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

HARPERS project overview, activities and stakeholder engagement

PREDIS Whole consortium workshop

May 2023

Technical coordinator: reka.szoke@ife.no
Coordinator: elke.jacops@sckcen.be

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Presentation outline

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

- Short overview
- Overall goals, objectives
- Project structure
- Work plan / Cooperation
- Stakeholder engagement
- Next steps

European Commission

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HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

HARmonised PracticEs, Regulations and Standards in waste management and decommissioning

2022-2025

2,4M€ EC
0,9M€ NO/UK/JRC

26 partners, 13 countries

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Overall goals & objectives

Establish & clarify the benefits & added value of potentially aligned practices, standards and regulations in decommissioning and RWM.

Identify the obstacles & issues preventing implementation of a more common regulatory approach, covering e.g. nuclear, industrial safety, occupational health, environmental, … aspects.

Realisation of the aims of the project will contribute to enhance the overall safety & economics of the nuclear sector.

This project has received funding from the Euratom research and training programme 2021-27 under GA No 101060028

Project structure

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

WP1 - Project Management

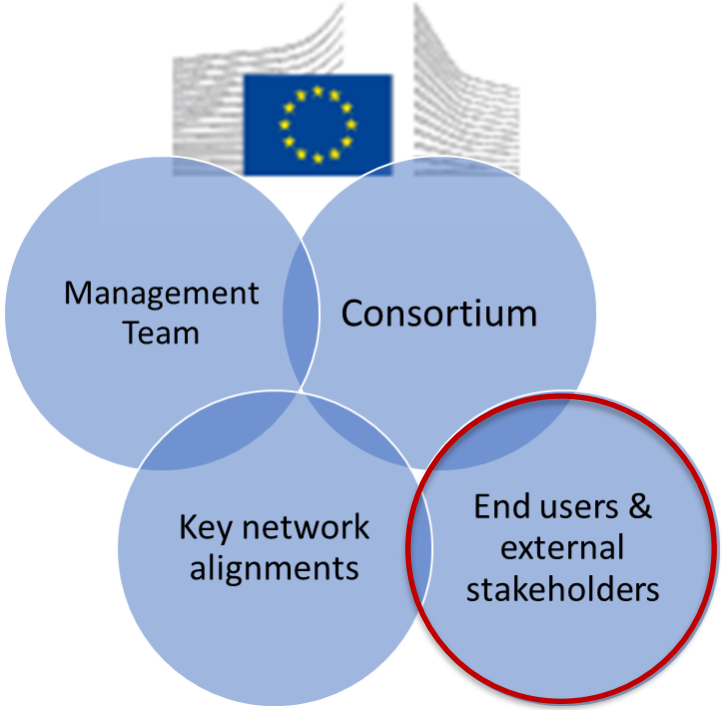
WP2 - Strategic tasks
stakeholder mapping engagement, survey development and analyses, manage open calls, consolidate business case outcomes

WP3 - Cross Border Services/Facilities	WP4 - Circular Economy	WP5 - Advanced Technologies

- prioritize needs and opportunities
- refine and elaborate subthemes
- assess regulatory impact
- produce business case

WP6 - Regulatory Framework
establish regulatory working group, identify relevant regulatory differences, evaluate potential for harmonisation, evaluate strengths, weaknesses, opportunities and threats toward harmonisation

WP7 - Engagement and Dissemination



European Commission

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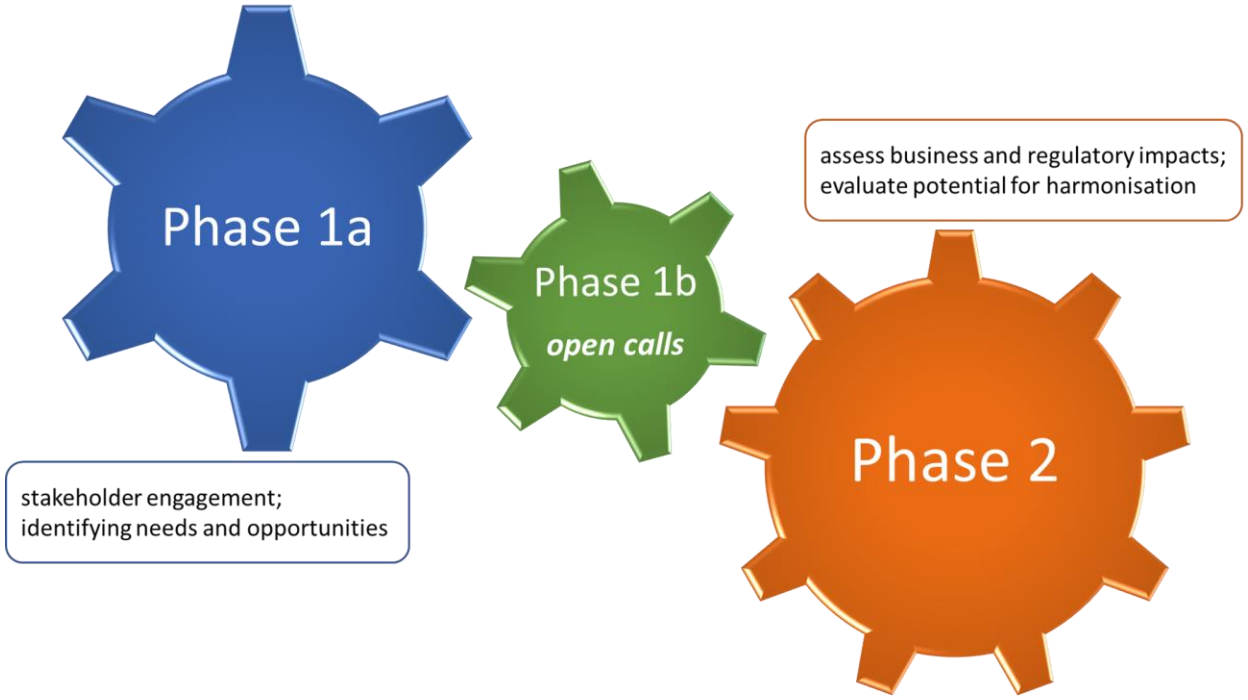
Work plan

HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

The project aims to reinforce the activities of the European Joint Programme EURAD, PREDIS and SHARE projects; international cooperation is encouraged.



Phase 1a: establishing a wide MS stakeholder community + associated engagement → define priority areas for Phase 2.

Phase 1b: open calls for expert contributions on defined priority areas, includes possibility for 3rd parties to contribute.

Phase 2: further development of priority topics including deeper engagement with the stakeholder community; assessing business and regulatory impacts.

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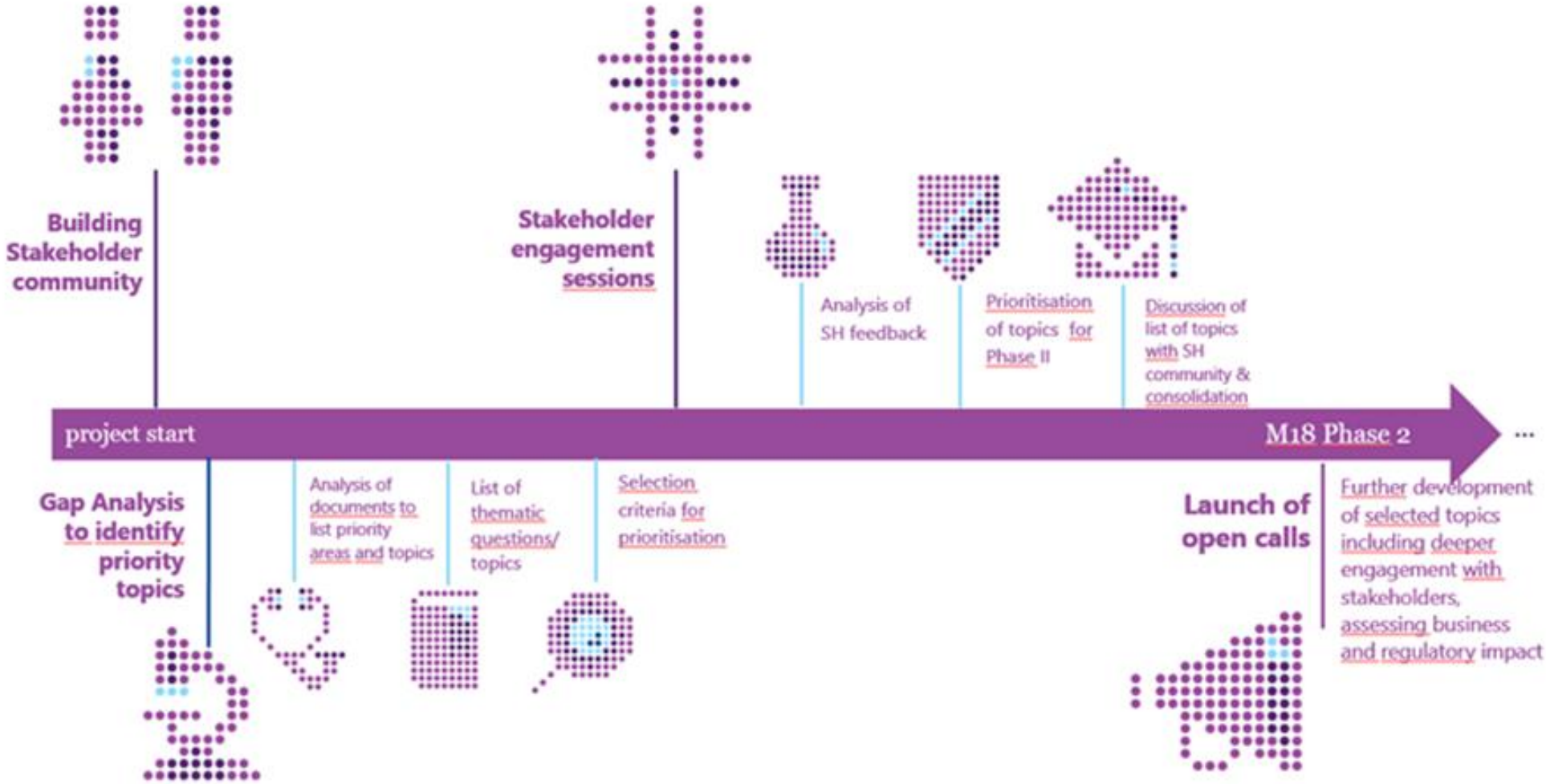

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Stakeholder engagement
WP3-5

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Overall OBJECTIVE in WP3-5

Conditions & Opportunities for implementing

- **Cross border services/facilities,**
- **Circular Economy**
- **Advanced Technologies** in RADWASTE in Europe

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

Prioritisation of needs and opportunities (Phase 1a)

Define **Topics**

Develop **Selection Criteria**

Identification **Priority Areas**

Jul 22 …..…….. Stakeholder webinars to consolidate……..…….. Jun 23

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Understand stakeholder views on Priority Areas

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

- **Cross border services/facilities** — **WP3**
- **Circular Economy** — **WP4**
- **Advanced Technologies** — **WP5**

slido

To understand stakeholder views on the **topics/benefits …**

- ranking poll on predefined topics: **IMPORTANCY/URGENCY**, with option to say not of interest
- ranking poll: **challenges / barriers**

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

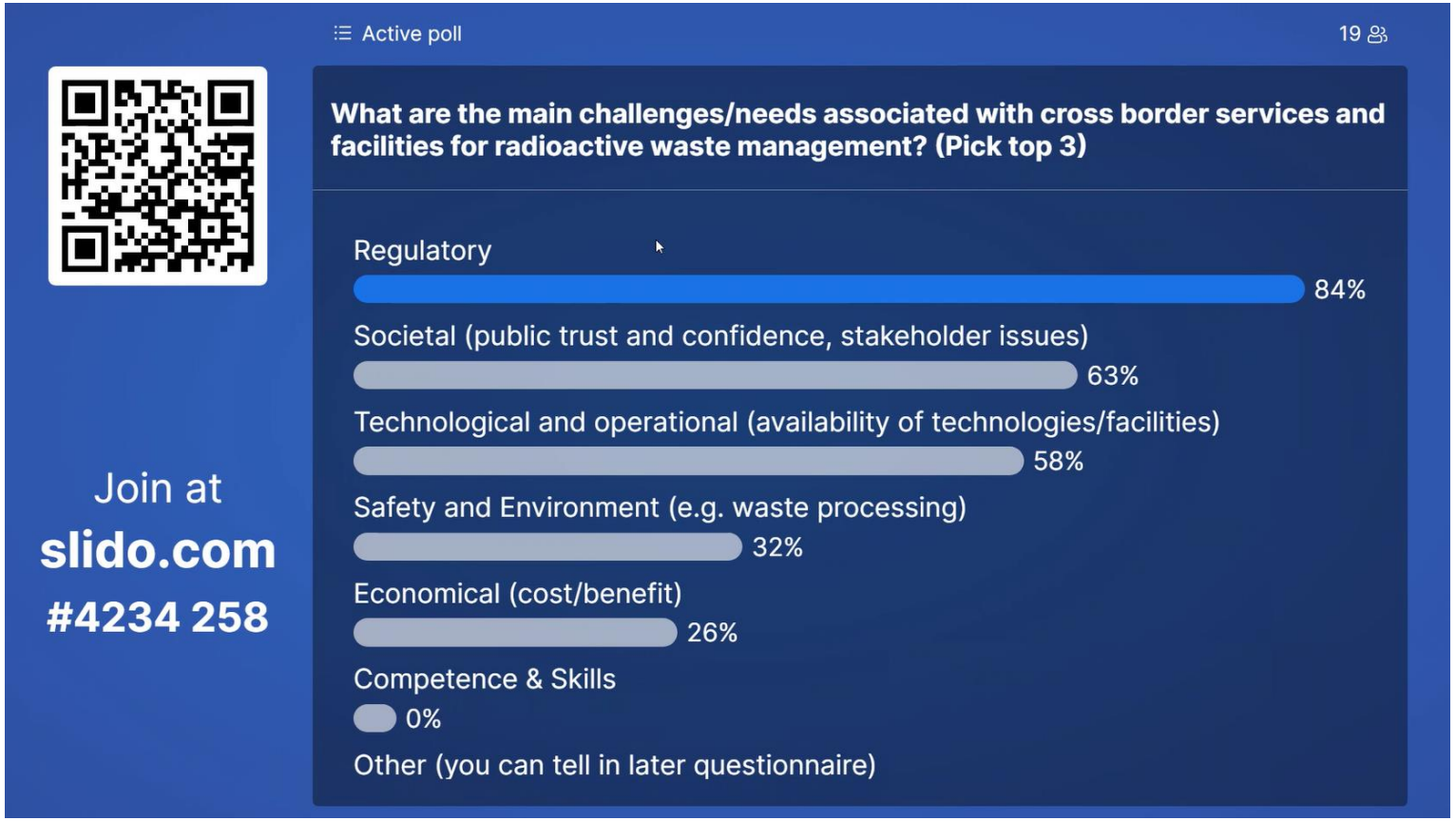
WP3

Cross Border Services and Facilities

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Main Categories – 18 topics

- Harmonisation
- Best Practice
- Technical Challenges
- Geological Disposal Facility (GDF) and Waste Storage Facilities



This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

WP4 Circular Economy

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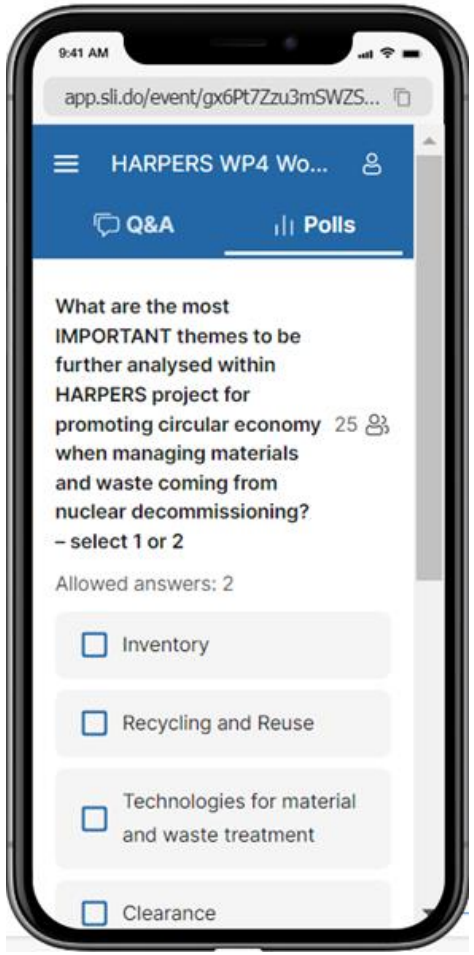
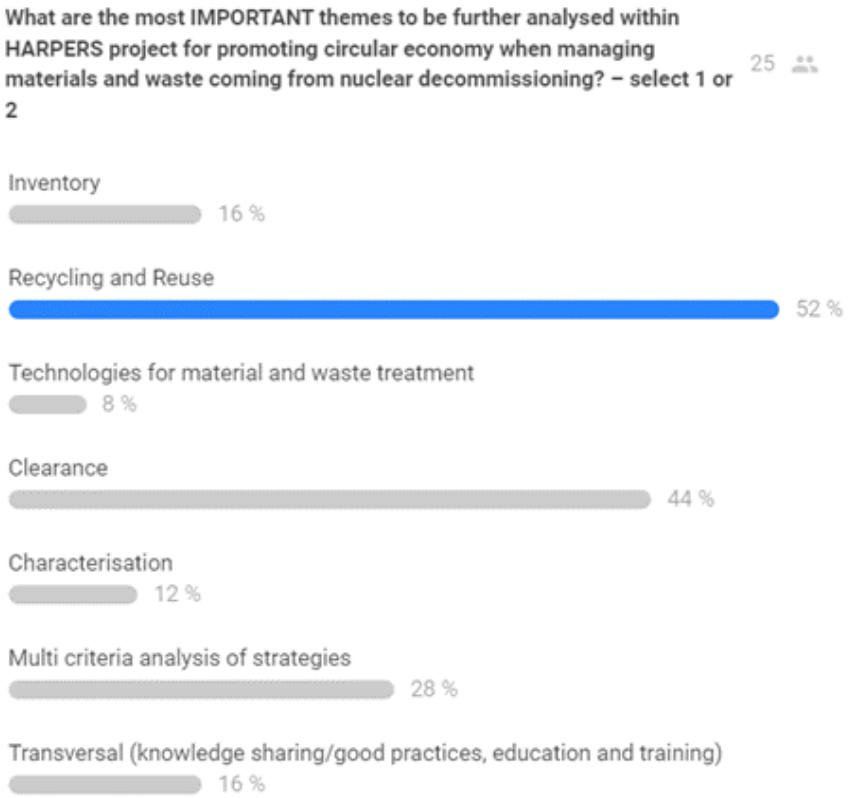
Stakeholder engagement - webinars

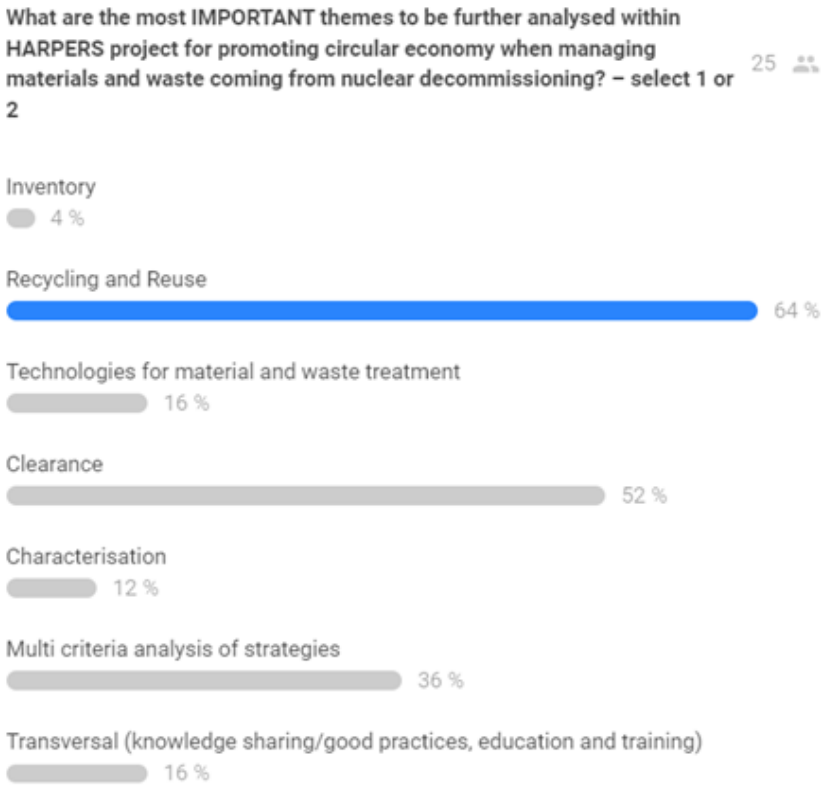
slido polls to understand stakeholder views on the topics and the main challenges



1st Session



2nd Session



This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

WP5
Advanced Technologies

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Main Categories - Topic List (example)

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

Waste treatment

Advanced technologies for decontamination, waste treatment and characterisation

Automation and Robotics

Automation and robotics in decommissioning, decontamination, waste management

Digitalisation

Standardisation, protocols, digital twins, building information management systems, digital architecture, 3D modelling

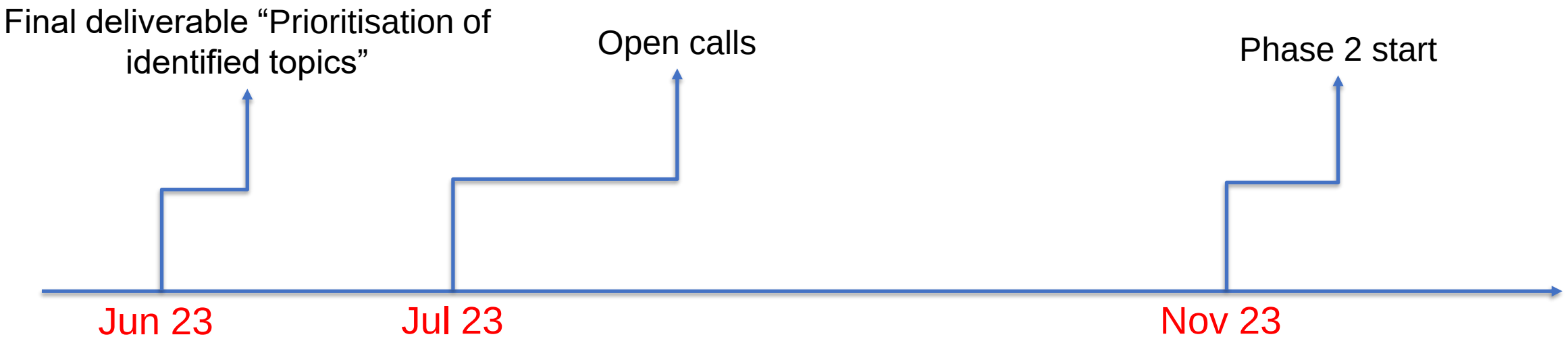
European Commission

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

Next steps

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028

- The results and topic prioritisation will be presented in a 2nd round of stakeholder interaction together with the outputs of the other WPs 3/4/5 (May 30, 2023 10-12 CET)



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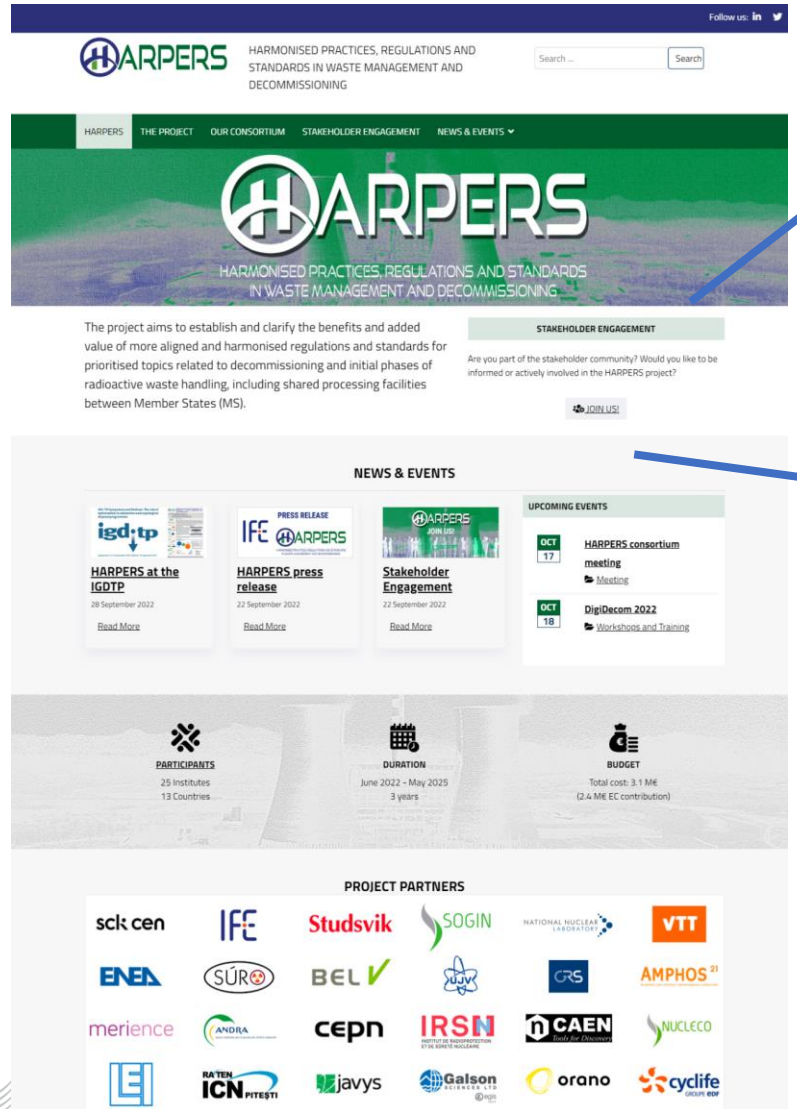
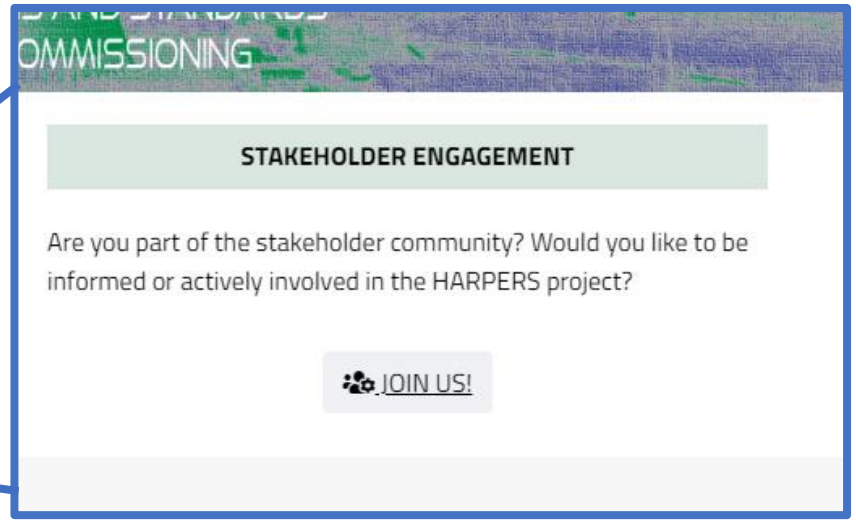
Stakeholder Engagement - Harpers-h2020

HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING





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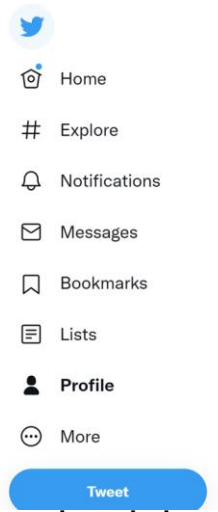

ng from the Euratom research and training programme 2021-27
060028

This project has received funding from the Euratom research and training programme 2021-27 under grant agreement No 101060028.

Acknowledgement

HARPERS
HARMONISED PRACTICES, REGULATIONS AND STANDARDS IN WASTE MANAGEMENT AND DECOMMISSIONING

Status on EURAD-2 Preparations

EURATOM call opened recently, deadline 8.11.2023 including EURAD-2 “joint partnership” with named Beneficiaries

EURAD-2 preparations underway, as merge of EURAD-1 (2019-24) and PREDIS (2020-24). Preparations guided by Core Group persons, nominated by 3 Colleges (WMOs, REs, TSOs). Target ~ 100 M€ total budget (EC + co-financing)

19 Work packages in preparation (Wave 1 target ~ 60 M€ total budget allocated). R&D WPs target 5 M€ budget (includes +50 % co-funding) for 5 year durations, Strategic Studies shorter/smaller to assess current SOTA challenges/need. Final decision if these WPs “pass” in June 2023

- Predisposal issues fall within Theme 2 of EURAD SRA and Roadmap:
  - WP5 Characterization
  - WP6 Treatment/Immobilisation
  - WP7 Long term performance of waste matrices
  - WP8 Graphite handling & treatment
- Other topics are also within Theme 1 about holistic Programme Management (e.g. sustainability, handling small inventories, SMR waste management)
- Register for EURAD-2 public webinar 11 July for info on the status of work packages (- Register -)
- See many public communications on PREDIS web page “Towards EURAD-2”, including info from January 2023 webinar and FAQ

This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945098.

PREDIS

Panel discussion of Belgium stakeholders

- Erik Coppens, ONDRAF-NIRAS (WMO)
- Kevin Govers, Federal Agency for Nuclear Control (FANC, regulator)
- Peter Berben, ENGIE (industry)
- Thomas Huys, Belgoprocess (industry)
- Jens Verbeeck, Magics Technologies (industry)
- Alberto Fernandez Fernandez (FOD Economie, government)

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2 sites in Belgium with 7 PWR reactors

Doel

- In service: 1929 MW
  - Doel 1 15/02/1975
  - Doel 2 1/12/1975
  - Doel 4 1/07/1985*
- In decommissioning:
  - Doel 3 23/09/2022

Accounting for ~35 % of Belgium's electricity needs

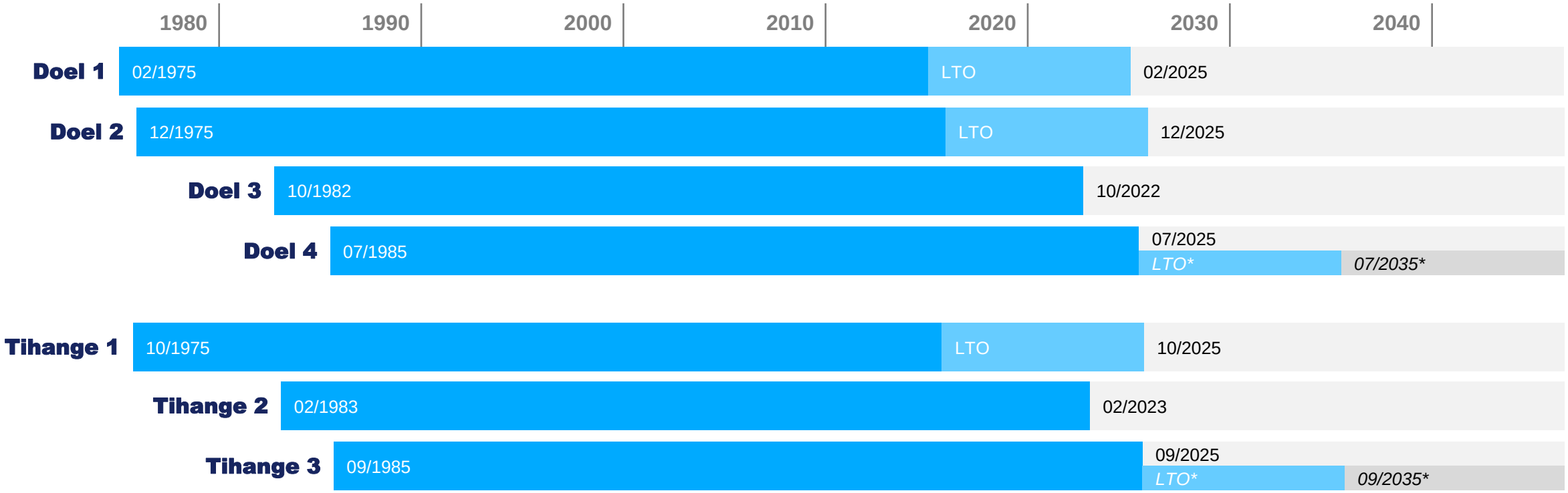
3929 MW

Tihange

- In service: 2000 MW
  - Tihange 1 1/10/1975
  - Tihange 3 1/09/1985*
- In decommissioning
  - Tihange 2 31/01/2023

* Non-binding letter of intent signed with government on possible 10-year exploitation extension

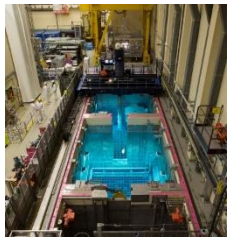
Timeline Doel and Tihange NPP production



* Agreement in principle signed between ENGIE and the Belgian federal government for the extension of Doel 4 and Tihange 3 for 10 years

From producer to exit

Radioactive Waste		Radioactivity		
		Low	Medium	High
Half-Life	Short	Cat A		Cat C
	Long	Cat B		



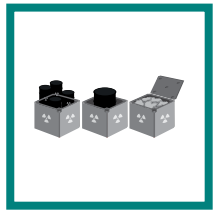
NPP Operations

Post Operational Phase

Dismantling

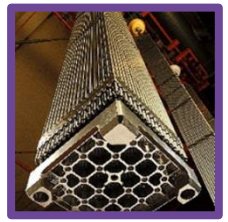
Spent Fuel

Conventional waste



Cat A

Cat B



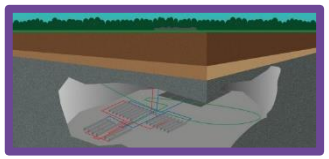
Cat C

Near-Surface Disposal

(not available yet > 2027 tbc)

Temporary storage Belgoprocess

Temporary storage on site (SF^2)



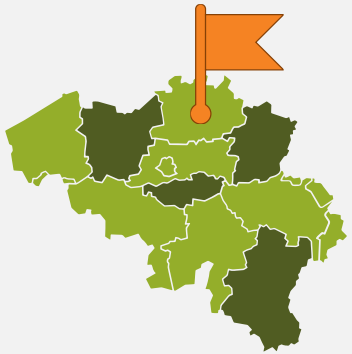
Deep Disposal

(not available yet > ~2055 tbc)

BELGOPROCESS

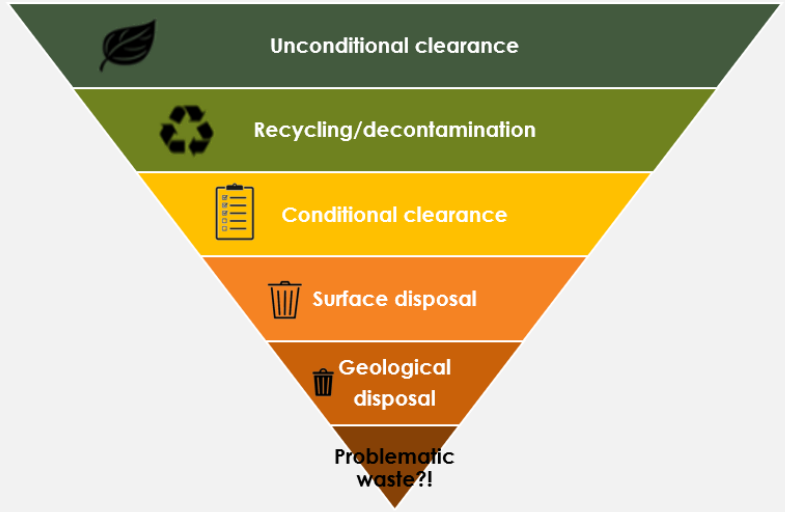
Introduction

- EUROCHEMIC Reprocessing Plant [1957]
  - Demonstration on industrial scale – recycling SNF
  - European collaboration
    - 13 OECD countries
    - 1966 – 1974
    - Wide range of SNF (200 ton / 36 reactors)
- Belgoprocess [1984]
  - Dessel and Mol (Belgium)
  - Industrial daughter of ONDRAF/NIRAS
  - Decommissioning of Eurochemic infrastructure (> 1000 man.year)
  - Centralized waste treatment and conditioning in Belgium
    - LLW, MLW, HLW, TRU,…
    - NPP, research, isotope production



Belgoprocess – predisposal activities

- Processing techniques
  - Incineration, pyrolysis, plasma melting
  - Supercompation, cutting, dry blasting, sorting,…
  - Cementation, *bituminisation, vitrification*
- Characterization capabilities
  - Lab:1500 samples/yr, 7000 measurements/yr
  - NDA: 3000 measurements/yr
- Focus on Waste Hierarchy
- Interim storage → > 70.000 waste packages



BELGOPROCESS

INTRODUCING MAGICS TECHNOLOGIES

Intro Predis

Jens Verbeeck – CEO
jens.Verbeeck@magics.tech

24/02/2023

MAGICS

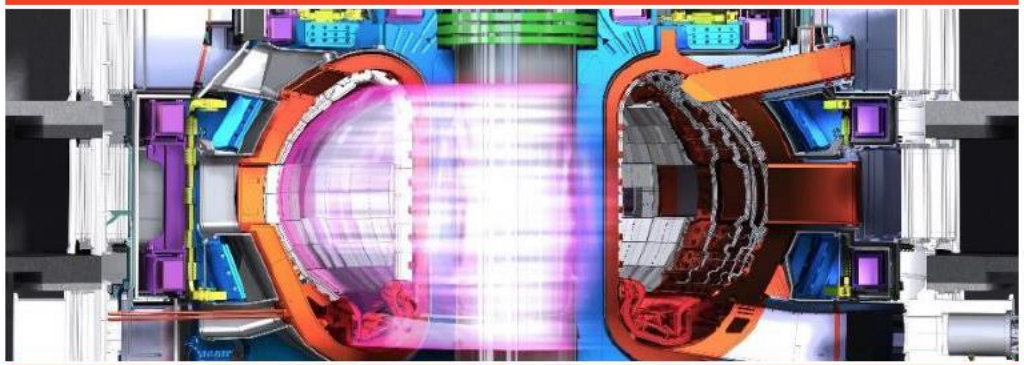
About
MAGICS Technologies NV

Located in Geel, Belgium, Magics Technologies is a fabless semiconductor supplier focused on creating innovative solutions for the space and nuclear industry.

With the aspiration to become the leading supplier of rad-hard semiconductors and custom sollutions for the Energy and Space markets, Magics has doubled its staff and revenue almost annually.

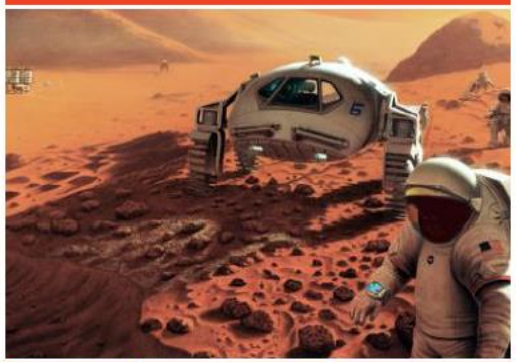
From NUCLEAR to other high-demanding industries

NUCLEAR FUSION AND FISSION



Nuclearization of I&C systems	Automatization
Engineering services to nuclearize components and current systems	Improved fault-tolerant of automated GRASPING of objects
Digital readout systems for sensory information	**Digital twins in waste management facilities**
Actuation systems to enable precision remote handling operations	

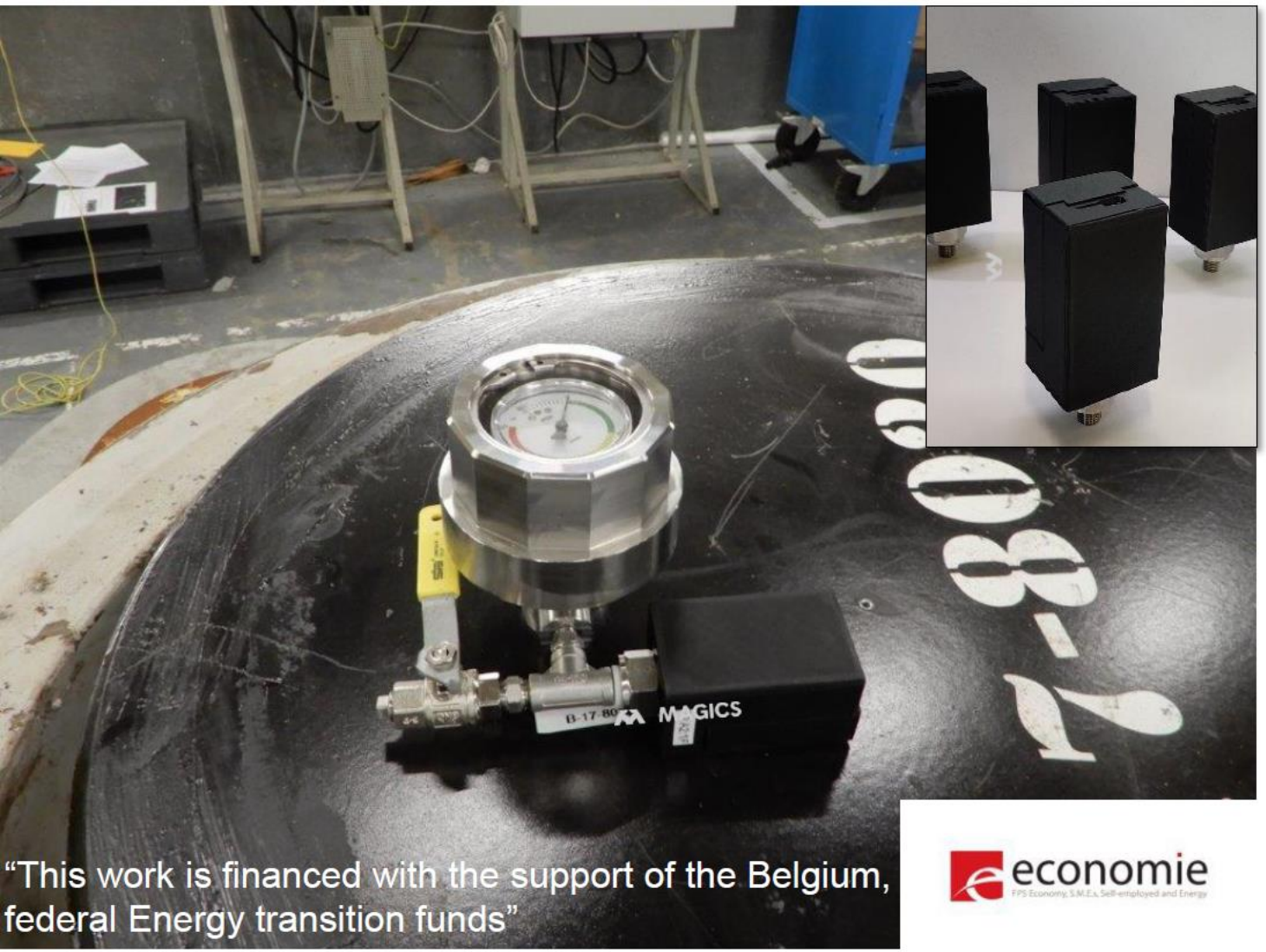
SPACE SUBSYSTEMS



Sats	Landers	Rovers

- Motion control of space-subsystems
- Measurements ranging via ToF for object detection
- Clocking, time-tagging and RF communications
- AI for On-board processing of images

SMART SENSOR NETWORK FOR RADIOACTIVE WASTE

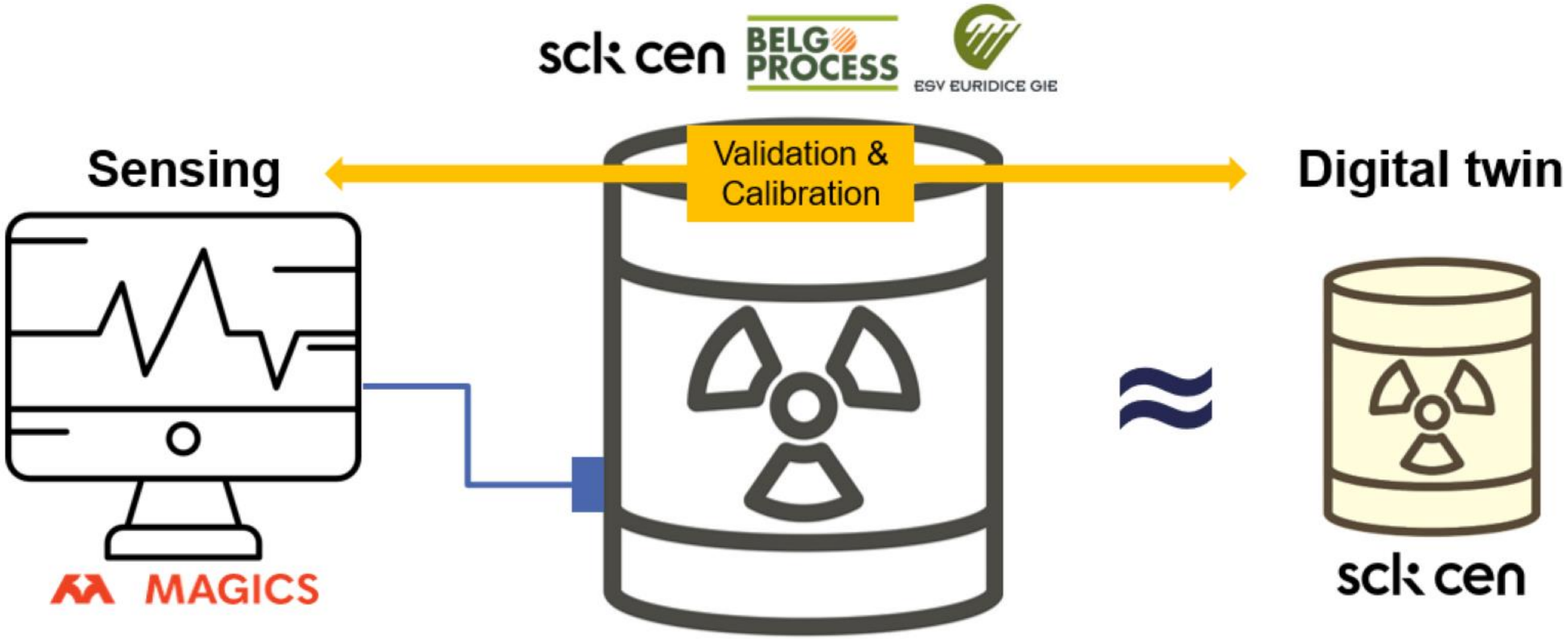


- End to end integration of high reliable IoT solutions in Nuclear waste management facilities with easy integration on existing fittings of traditional manometers.
- Reliable data transmission: 99,99%.
- Size: 114x54x59 mm with pressure sensor.
- Designed to monitor nuclear waste on a battery for more than 10 years.
- The module can be used as a hub for other sensors (i.e., strain gauges, silicon-based radiation sensors).

"This work is financed with the support of the Belgium, federal Energy transition funds"

economie

PREDIS: NON-DESTRUCTIVE BATTERY-OPERATED SENSOR TECHNOLOGY FOR DIGITAL TWINS



PREDIS

Concluding remarks

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Course announcement – WAC school confirmed

Summer School, Waste Acceptance Criteria

September 4-8, 2023

CV REZ, Prague, Czech Republic

40-50 participants

Registration will open in next 1-2 weeks!

Follow the PREDIS website

Overview on Waste Acceptance System, a Tool to Facilitate the Safe Storage, Transport, Packaging and Disposal of Radioactive Waste

Joint organisation by **EURAD and PREDIS**

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

Mark you calendars!

PREDIS Final Conference in France 2024

- 3.-7.6.2024 Novotel Avignon Centre, Avignon, France
- Open to End User Group members and all stakeholders

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If you didn't yet respond – only for EUG and stakeholders!

- Question 1 - In what format would you like to see the final results of the PREDIS project? https://www.menti.com/al9j932rr5mv

- Question 2 - If you selected other, what additional format(s) did you have in mind? https://www.menti.com/alxkxxwfk5f7

This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945098.

Thank you for attending the PREDIS May Workshop!

Please provide feedback https://www.lyyti.fi/questions/f4fc2ffce9

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