



*Euratom Treaty,
signature 1957*



Joint Programming of EU Member States and Euratom Research Programmes on Radioactive Waste Management

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European Commission expectations

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- The Euratom programme
- Rationale for Joint Programming in RWM
- Joint Programming
(policy, instruments and principles)
- Joint Programme on RWM
(expected activities, deployment strategy & schedule, budget & activity funding and implementation mechanisms)
- Summary and conclusions

The Euratom Programme on radioactive waste management



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) Member 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;

The aim is to help MS's implement safe, sustainable and publicly acceptable solutions in the processing and disposal of radioactive waste.

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.

What are the results and achievements

9 continuous R&T programmes in RWM incl. Disposal, since 1975;

700-800 contracts/projects, >1000 S/T reports, Total cumulative EC funding Euro 410 million;

Regular practice of integration of the actors around common and shared research issues : Large Integrated projects in FP6, and on research agendas of EU-added value : Implementers in IGD-TP since 2009 and Technical Support Organisations via SITEX since 2012;

Contribution to development of knowledge, competence and scientific and technical results for solutions in the MS;

Intense networking, sharing and development of views and results on key issues in RWM;

Expected enhanced credibility of safety cases and RWM solutions at national level when results issued from collaborative work at European Union level.

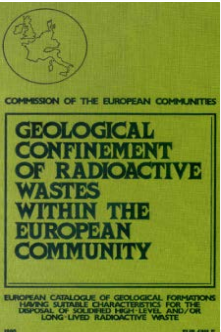
The Euratom Programme on radioactive waste management Overview



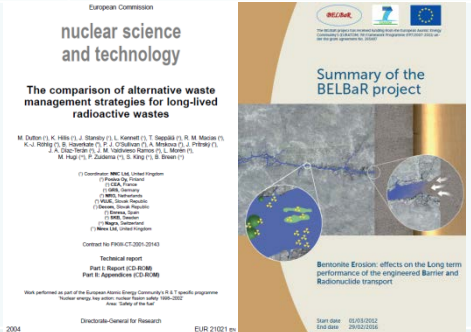
1975 WM1 1 st prog.	1980 WM2 2 nd prog.	1985 WM3 3 rd prog.	1990/94 WM4 4 th prog.	1994/98 FP4 5 th prog.	1998/2002 FP5 6 th prog.	2002 FP6 7 th prog.	2007 FP7 8 th prog.	2014 Horizon 2020 9 th prog.	Total €m
€ 19m EC funding	€ 43m	€62m	€ 73.5m	€ 33.5m	€ 32m	€ 47.1m	€ 64.6m	2014/17 = €35.2m	€409.8
contracts / projects & avg./ct		>400 180k€/ct	>100 430k€/ct	41 820k€/ct	43 745k€/ct	24 €1,96m	26 €2,48m	5 (2014-15)	

Waste management strategies & system studies
 Waste Characterisation, QA/QC, Treatment & Conditioning
 Disposal (basic phenomena, Natural Analogues, Modelling & Safety Ass.t)
 Repository design, URL construction, EBS, Backfilling/sealing, THMC,
 Geochemistry, in situ exp.ts & demonstrations)

reports > 1000
http://cordis.europa.eu/fp7/euratom-fission/funded-reports_en.html
<http://cordis.europa.eu/fp6-euratom/lib-projects.htm>
http://cordis.europa.eu/fp5-euratom/src/lib_finalreports.htm
 Lists of publications 1975-2000 http://cordis.europa.eu/fp5-euratom/src/lib_docs.htm



MIRAGE, CoCo, PAGIS, PACOMA, EVEREST, SPA, SFS, BENIPA, CHEMVAL, Interclay, PEGASUS, MEGAS, HADES, ASSE salt mine, KONRAD, AMELIE, TOURNEMIRE, GRIMSEL, Mont Terry, AESPOE, ONKALO, Bure, Josef URC NAWG (OKLO, Palmottu, El Berocal, Dunaroba...) Governance (RISCOM, COWAM,...) COMPAS, SAPIERR, CATT Education & Training (CETRAD, PETRUS, ...)



Euratom conferences / Euradwaste

1980	1985	1990	1996	1999	2004	2008	2013	4
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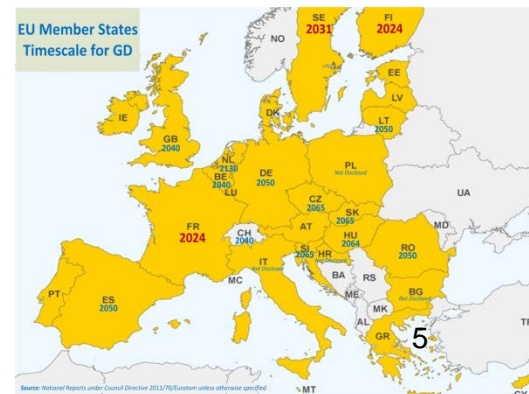
Rationale for Joint Programming



Geological Disposal

- FP6 & FP7 largely oriented towards integration of WMOs, implementation & remaining aspects of GD
- Knowledge is now considered globally sufficient for IGD-TP 2025 vision in advanced programmes (license FI,SE, 2015/16)

- This calls for a review of the Euratom programme to ensure its raison d'être in future i.e. strategic content, partnership method and management
- Support of Euratom to individual projects only may not be adapted anymore





Geological Disposal

- R&D now focussed on societal demands, regulatory concerns, maintain SoA science, improve & optimise repository solutions, address legacy & new wastes, etc...
- Need to manage and disseminate knowledge in preparing state-of-the-art and document knowledge on S/T, methods, programme organisation, strategies etc...
 - To avoid duplication
 - For use in existing and future programmes
 - To train new staff and transfer to new generations,
 - To guide R&D planning and implementation including knowledge transfer between programmes in particular smaller/less-advanced programmes

Rationale for Joint Programming



Other waste categories & waste management methods & solutions largely untouched since FP5 (1998-2002)

- Time to reconsider R&T on radioactive waste management in a comprehensive way from generation to disposal as also indicated in the Waste Directive 2011/70/Euratom

Activities may include improvement, optimisation and innovation on predisposal steps including waste from decommissioning i.e.:

- Pre-treatment (segregation, chemical treatment, decontamination)
- Waste characterisation
- Treatment (volume reduction, radionuclide removal, change of physical & chemical composition)
- Conditioning (Waste immobilization, containers & overpacks)
- Storage (methods, conditions, decay & safety issues)



Commission's continuous aim & support to coordination and integration of national programmes

Explained in the EC Communication, COM(2011) 572 on partnering in research & Innovation

in order to:

- Build critical mass to ensure the scale and scope required;
- Facilitate joint vision development and strategic agenda setting;
- Facilitate programming approach in European R&I for broad-based focus including all potential partners;
- Enable flexible structures to facilitate the size and scope of a partnership, depending on its nature and goals.



Forms of partnering :

European and national level players in :

- Public-Public Partnerships (P2Ps)
- Public-Private Partnerships (PPPs), see annex
- Programme co-fund also, in Euratom (EJP, ERA-NET & Marie Curie)
for details see separate ppt "*European Joint Programme and ERA-NET Co-fund Actions under Horizon 2020 – a primer*" presented by A. Iatrou, EC legal officer, at the JOPRAD regional meeting, Bucharest, 04 Feb.2016



	Objective	Implementation
ERA-NET 160 projects since 2002	Coordinate national research programmes in a selected area	MS launch and implement joint actions/calls and EU funds for coordination part – 100%
ERA-NET Plus & ERA-Net cofund : 23 & 63 projects since 2007/2014	Enhance joint funding by MS and EU in a selected area	MS launch and implement a joint call with a top-up of EU funding (33%) + only coordination costs for other calls
Article 169/185 Initiatives 9 since 2003	Integrate national and European research programmes in a selected area	MS implement multiannual programmes and EU contributes with matching funds
JPIs 10 since 2008	Coordinate / integrate national research programmes to address a societal challenge	MS develop and implement <u>common Strategic Research Agenda</u> EU supports MS networking
SET (Strategic Energy Technology) Plan since 2007	Accelerate development of low carbon energy technologies and streamline national research programmes in strategic technology areas at EU level	Implementation via European Energy Research Alliance (EERA), now via own resources of the partnering institutes
Europe INNOVA/PRO, INNO Europe since 2008	Joint policy learning and development of better innovation support	25 pilot projects targeted at Eco-innovation /innovation in services and clusters



DEFINITION

'programme co-fund action' means an action funded through a grant the main purpose of which is supplementing individual calls or programmes funded by entities, other than Union bodies, managing research and innovation programmes. A programme co-fund action may also include complementary activities of networking and coordination between programmes in different countries'

“Programmes” means entire or parts of research programmes having the following characteristics:

- be strategically planned
- be financed or managed (and possibly partly implemented) directly by national or regional public bodies, or by structures closely related (e.g. agencies)

Five participants minimum (Programme owners and managers) are those able to direct national funding and/or manage a national research programme – mandated by the government. If justified private programmes may participate - in addition to the minimum conditions

Instruments	Objective	Implementation
EJP (European Joint Programme)	implementation of a joint programme of activities ranging from research & innovation to coordination & networking activities, including training activities, demonstration and dissemination activities, support to third parties etc.	Direct consortium activities and/or (single or multiple) calls for proposals for financial support to third parties with EU funding up to 70% EURO Fusion EJP (€ 857 million budget & 55% EU funding) CONCERT radiation protection (EUR 28.5 million budget & 70% EU funding)



A Joint Programme should not be considered as an ad-hoc, one off contract. It should be the first of a series over time.

Therefore, the JP needs to result from the **wish of MSs** to develop & implement joint activities beyond standard projects and with **long-term vision**

This means commitments on:

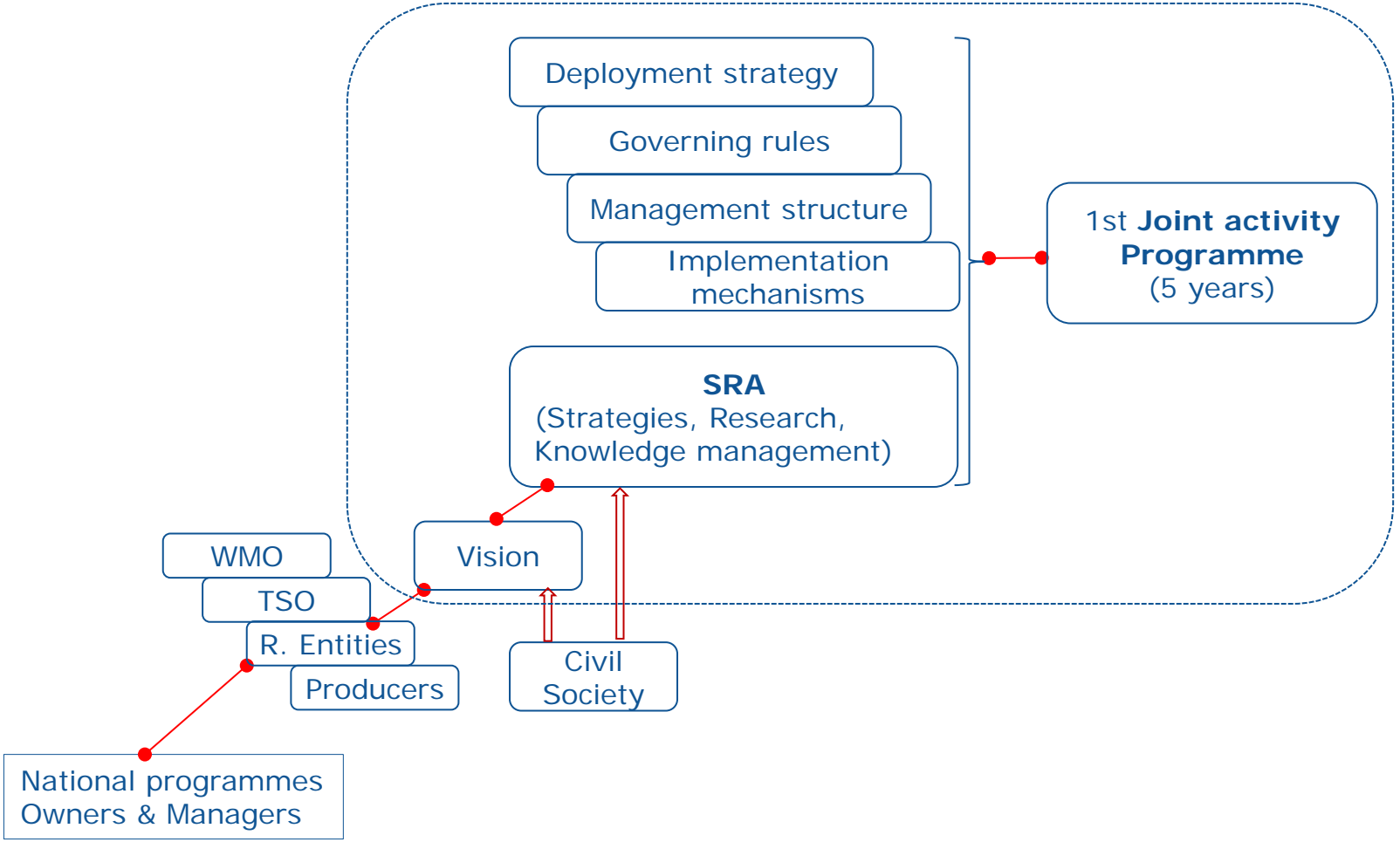
- A **common research agenda** and management of the results and knowledge
- A **deployment strategy** for its long-term implementation
- Ambitious overall budget (e.g. minimum EUR20-50 million, EU contribution leveraged at 50% funding)
- **Inclusiveness** of MS programmes and needs
via flexibility during implementation of the programme: on R&D priorities, on topics & openness to new/additional actors



- **Governing and management structures**
with transparent decision-making rules between programme owners & managers
- **Various implementation mechanisms**
Common/own activities of the beneficiaries may be implemented without competition between projects but need inclusiveness of actors,
Activities outsources need to follow transparent procedures allowing contribution of new/additional actors



European Joint Programme on Radioactive Waste Management



Vision

Establish and implement a strategic Programme of research and knowledge management activities at European level between and supplementing EU Member State programmes in order to ensure cutting-edge knowledge creation and preservation in view of delivering safe, sustainable and publicly acceptable solutions in the processing and disposal of radioactive waste across Europe now and in the future

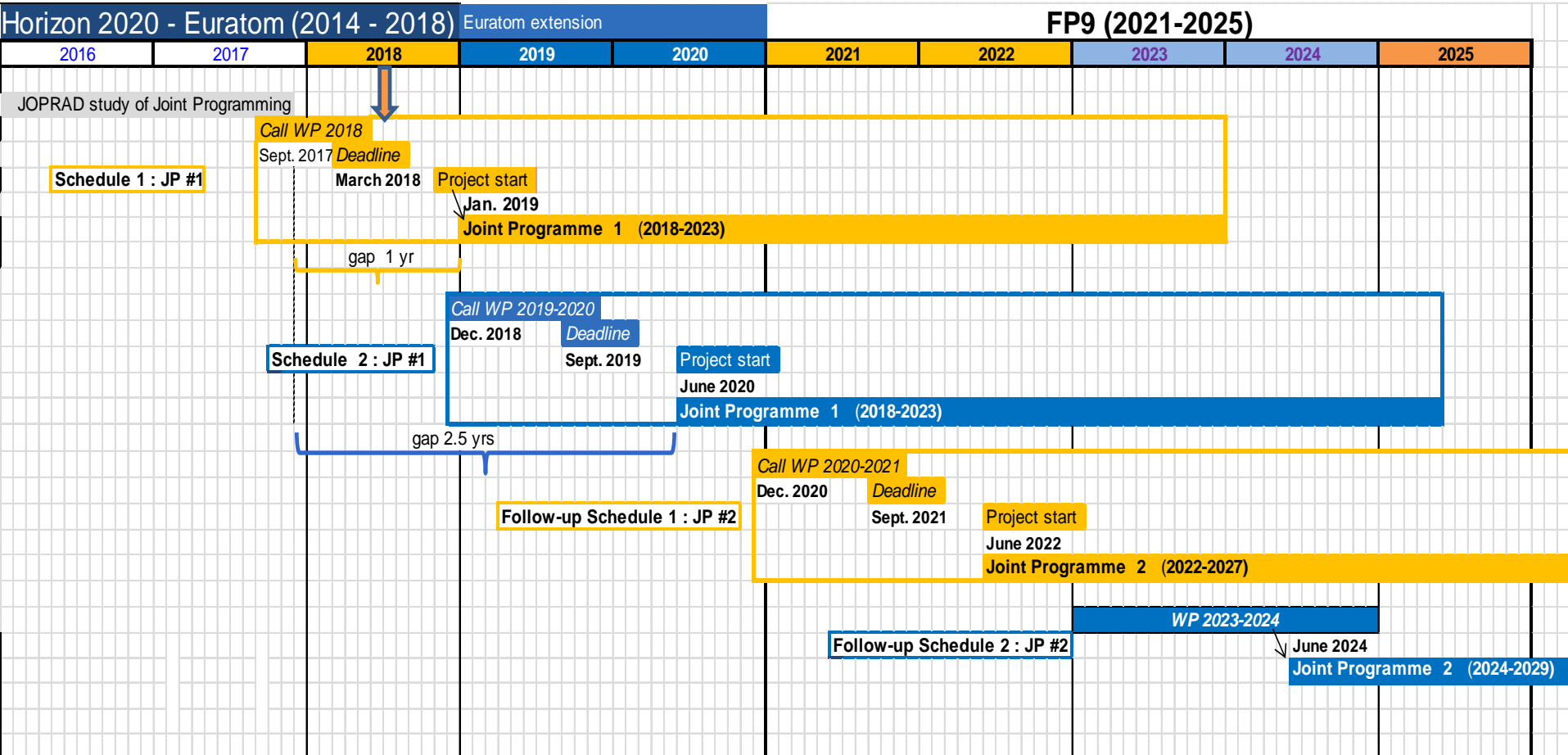
Field of activities for the strategic research agenda

Research on all radioactive waste categories and their management from collection, pre & treatment, characterisation, conditioning, storage to disposal

Knowledge Management activities

- to produce handbooks on the state of science and technologies,
- to prepare guidance documents for less-advanced programmes,
- to carry-out strategic and coordination studies in support of national programmes,
- to train on the results of the JP research, and the KM activities,
- to disseminate the results of the JP activities

Deployment strategy and schedule



JP budget

Horizon 2020 - Euratom (2014 - 2018)

Euratom extension

WP 2014 / 2015		WP 2016 / 2017		2018	2019	2020
Actual R&I spending ~ €105.5 million		Planned R&I spending ~ €125.34 million		ca. €65 million	Hypothetical R&I budget ~ €118 million	
		Cumulative ~ €230.84 million		Cumul. ~ €295 million	Cumulative ~ €414 million	
Reactor systems	€ 38,3 M	Reactor systems	€ 63,15 M	101,45		
Radiation Prot.	€ 26,2 M	Radiation Prot.	€ 9,0 M	35,20		
Radioactive WM	€ 16,3 M	Radioactive WM	€ 18,89 M	35,19		
E&T + Socio-eco.	€ 9,4 M	E&T + Socio-eco.	€ 6,0 M	15,40		
Other (JHR + GIF)	€ 15,3 M	InnovFin + GIF	€ 20,3 M	35,60		
		Fission / Fusion	€ 8,0 M	8,00		

Budget % in RWM (15.2%) ~ €8,80 / year

15,2% for last 3 years ~ €27.80 million

At 20% for last 3 years ~ €36.60 million

At 20% over H2020 (7 yrs) ~ €47.60 million for last 3 years

Funding rate and activity funding

Example of CONCERT EJP in radiation protection for consideration :

EU funding is EUR 20 million at 70% = EUR 28.5 total budget,
At 50 % the total budget would be doubled (€40million), so for a fixed EU grant a lower rate increases the total budget
In EURO Fusion the rate is 55% of EUR 857 million budget

How can we increase the number of research activities of most EU-added value
1. e.g. by limiting the experiments at high Technology readiness levels (TRL) (large-scale demo tests)

- TRL 1 – basic principles observed
 - TRL 2 – technology concept formulated
 - TRL 3 – experimental proof of concept
 - TRL 4 – technology validated in lab
 - TRL 5 – technology validated in relevant environment*
 - TRL 6 – technology demonstrated in relevant environment*
 - TRL 7 – system prototype demonstration in operational environment
 - TRL 8 – system complete and qualified
 - TRL 9 – actual system proven in operational environment**
- * Industrial environment in the case of key enabling technologies
** Competitive manufacturing in the case of key enabling technologies;

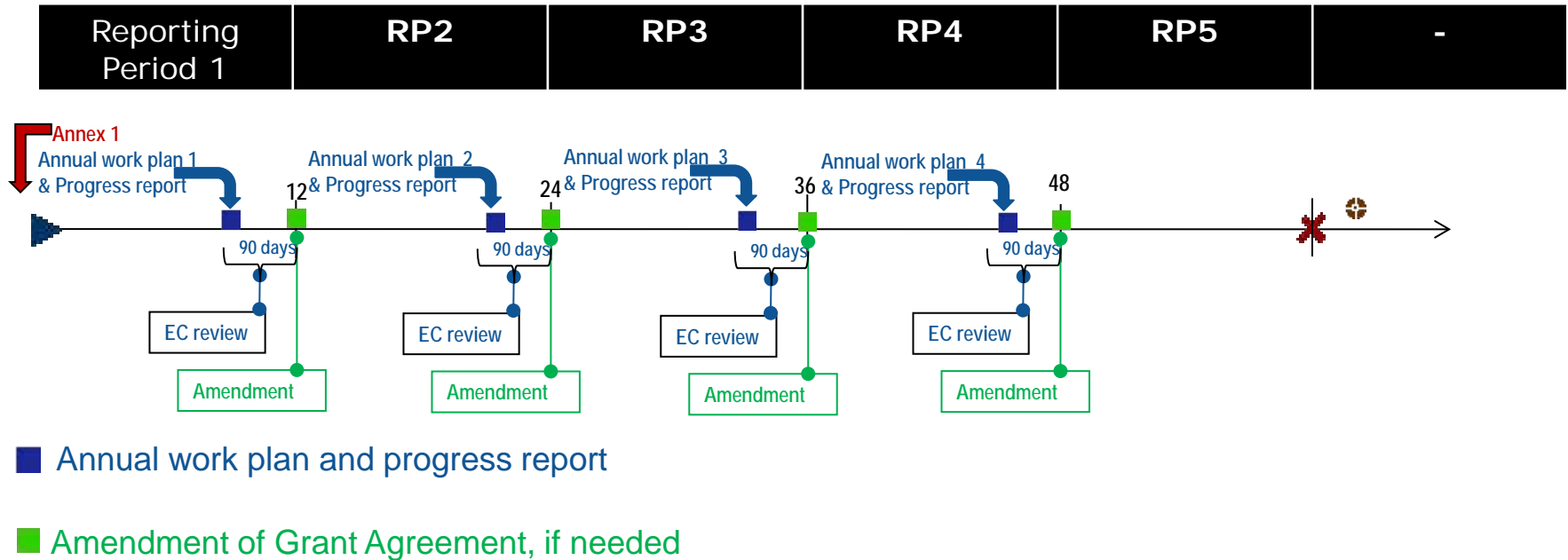
Out of 25 projects, the 2 Concept & technology demo projects LUCOEX & DOPAS costed 20% of FP7 budget.
Consider keeping the generic part of such projects and also avoid duplications & demo projects which are not shared in several programmes

Funding rate and activity funding

How can we increase the number of research activities of most EU-added value

2. Coordination and committee meetings should be considered as activity of the JP and their associated costs, organisation and effort shared in the JP budget. If coordination is of interest and demanded for the execution of activities then it should be of cost shared
3. The relevance of including tasks consisting of meetings with only minutes as deliverables should be considered
4. Involvement of actors in any task should be linked to a clear contribution and deliverable
5. Delivery of training bespoke courses could be organised making use of university human resources and facilities. These are less costly, (reference to the PETRUS project)
6. For the implementation of the JP the administrative and management expenditures should aim at no more than 6 % in line with requirement on the EC Euratom indirect actions of H2020

Deployment and Implementation mechanisms of the JP



Deployment and Implementation mechanisms of the JP

Avoid frozen joint activity programme for 5 years:

- Recommendation: propose a flexible work plan allowing new activities (within the scope initial scope) and possibly new actors (either new beneficiaries, third parties or via subcontracts) each year, following proposals by the Programme owners and managers via scientific, technical bodies. This means reserve a substantial budget not pre-allocated to defined beneficiaries.

In the same way, EU Members States would not understand if the Euratom work programme made only one call at the beginning of its 5 year Framework Programme

Who should do the work and with what legal link with the JP

Beneficiary

+ Affiliated entities

&

Third parties
with a legal link

Contributions in kind

Subcontracts

Other third parties

Specific conditions



- Must be set identified in the Grant Agreement, but do not sign the GA
 - Must be set out in Annex 1
 - Free of charge or against payment are eligible costs under eligibility conditions
- For works (research activities) normally limited part, and goods, services
 - Estimated costs and tasks of works must be identified in the budget and Annex 1 and deliverables pre-identified
 - Best value for money (best price-quality ratio) and no conflict of interests
 - Awarding following transparent and non-discriminatory procedure
 - Beneficiaries governed by public law apply national law on public procurement, generally request for tenders from at least three providers
 - Private beneficiaries not requesting several offers must demonstrate how best value-for-money was ensured
 - Cascade funding via call for proposals

Summary and conclusions



- ✓ Recent Euratom R&T programmes have concentrated on implementation-oriented RD&D & remaining aspects for GD
- ✓ Knowledge is now considered globally sufficient to achieve IGD-TP's vision of the 1st geological repositories by 2025 and licenses have been granted in two EU MSs (FI,SE, 2015/16)
- ✓ This calls for a review of the Euratom programme to ensure its *raison d'être* in future i.e. strategic content, partnership method and management
- ✓ The EC advocates inclusion of research activities on the whole RWM domain, from collection to disposal of waste
- ✓ Partnering of national research programmes is now widespread in many research fields of Horizon 2020 (246 ERA-NETs since 2002)
- ✓ The widespread needs in MSs calls for regrouping of EC support in an integrated programme with a long-term implementation vision₂₄

Summary and conclusions



- ✓ RWM community is lagging behind other research domains in uptaking the new instruments possibilities
- ✓ Now is time to change
- ✓ If not we may have missed the train and the MS may not see justification to maintain the Euratom programme at its current level in future
- ✓ The decisions is in the hands of decion-makers in national programmes



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since 1957*



European
Commission

SK  **EU2016**

Slovak Presidency of the Council
of the European Union

***THANK YOU
FOR YOUR ATTENTION***





Member States shall implement national programmes including:

- Technical solutions for **spent fuel & radioactive waste management** from generation to disposal, Article 12.1(d)
- RD&D needed to implement solutions for the management of SF & RW, Article 12.1(f)
- E&T and R&D needed to obtain, maintain and further develop expertise and skills..., Article 8
in recitals, IGD-TP mentioned as key source of expertise



Public-Private Partnerships (PPPs)

	Objective	Implementation
JTIs 11 Joint Undertakings under Article 187 TFEU since 2007	Strengthen European industrial leadership in well defined areas	Build on Strategic Research Agendas of European Technology Platforms (ETPs) EU matching funds for research, from industry mostly in-kind)
SESAR Joint Undertaking under Article 187 TFEU	Modernise European Air Traffic Management (ATM)	Co-funded by EU (€350 million from FP7 + €350 million from TEN-T), Eurocontrol (€700 million) and 15 industry members (€700 m)
Recovery Plan PPPs since 2008	Maintain and strengthen industry sectors hit by economic crisis	Project-based FP7 funding with industry contributing to developing a multiannual Roadmap to define research priorities
Future Internet since 2011	FI-PPP: Ensure future Internet development for society	Recovery Plan PPPs: €3.2 billion (2010-2013)
COLIPA since 2009	COLIPA: Help industry comply with EU legislation	FI-PPP: €300 million up to 2013 COLIPA: €25 million
European Industrial Initiatives (EIs) under the SET Plan 13 EIs since 2010	Address the demonstration/ market rollout bottleneck in the innovation chain of low carbon energy technologies	Technology roadmaps with specific R&D actions and 10 year perspective Calls under FPs for joint actions among MS

Objectives for Knowledge Management in Joint Programming



To produce handbooks on science supporting the Safety Case

To prepare guidance documents for research programmes

To carry-out strategic studies in support of programme implementation

To prepare a portfolio and deliver training courses based on the products of the JP research, the KM activities and complementary needs

To coordinate and implement the dissemination activities of the JP, its technical projects and KM actions

An implementing committee is probably needed to establish list of domains, topics and prioritise activities for short and long-term use, for less- and advanced- programmes and along the JP timeframe and beyond