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Department FSN

JOPRAD Regional Meeting



3rd – 4th February, 2016
Marshal Garden Hotel, Bucharest, Romania

Italian participation in JOPRAD



- ❑ Program Owner: Ministry of Economic Development (MiSE)
- ❑ *Potential mandated* Program Manager: Italian Agency for Energy, New Technologies and Economic Development (ENEA) - RE
- ❑ Company for Management of Nuclear Plants (SOGIN) – WMO
- ❑ National Institute for Nuclear Physics (INFN) – RE
- ❑ Italian National Institute of Health (ISS) – RE
- ❑ National Institute for Geophysics and Volcanology (INGV) - RE



Ministero dello Sviluppo Economico



People involved



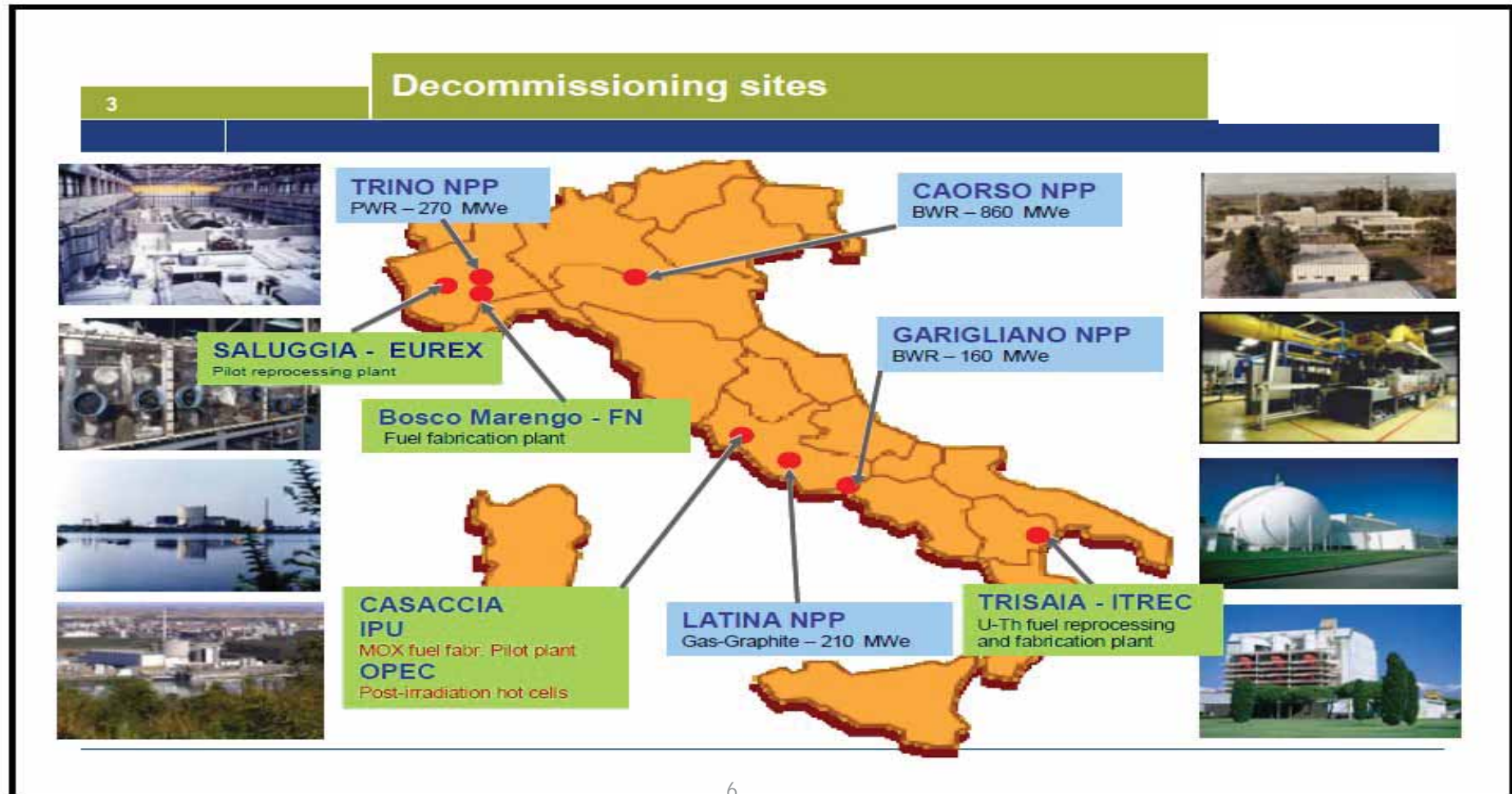
- Programme Owner: MiSE (Sara Romano – Director General)
- Programme Manager: ENEA (Research Entity) – Aldo Pizzuto - Massimo Sepielli
- Sogin (WMO) – Angelo Paratore
- INFN (R.E.) – Giacomo Cuttone - Marco Ripani – Paolo Finocchiaro
- ISS (R.E.) – Francesco Bochicchio
- INGV (R.E.) – Rocco Favara



Ministero dello Sviluppo Economico



Decommissioning process in Italy



Waste Amount Projection (m³)



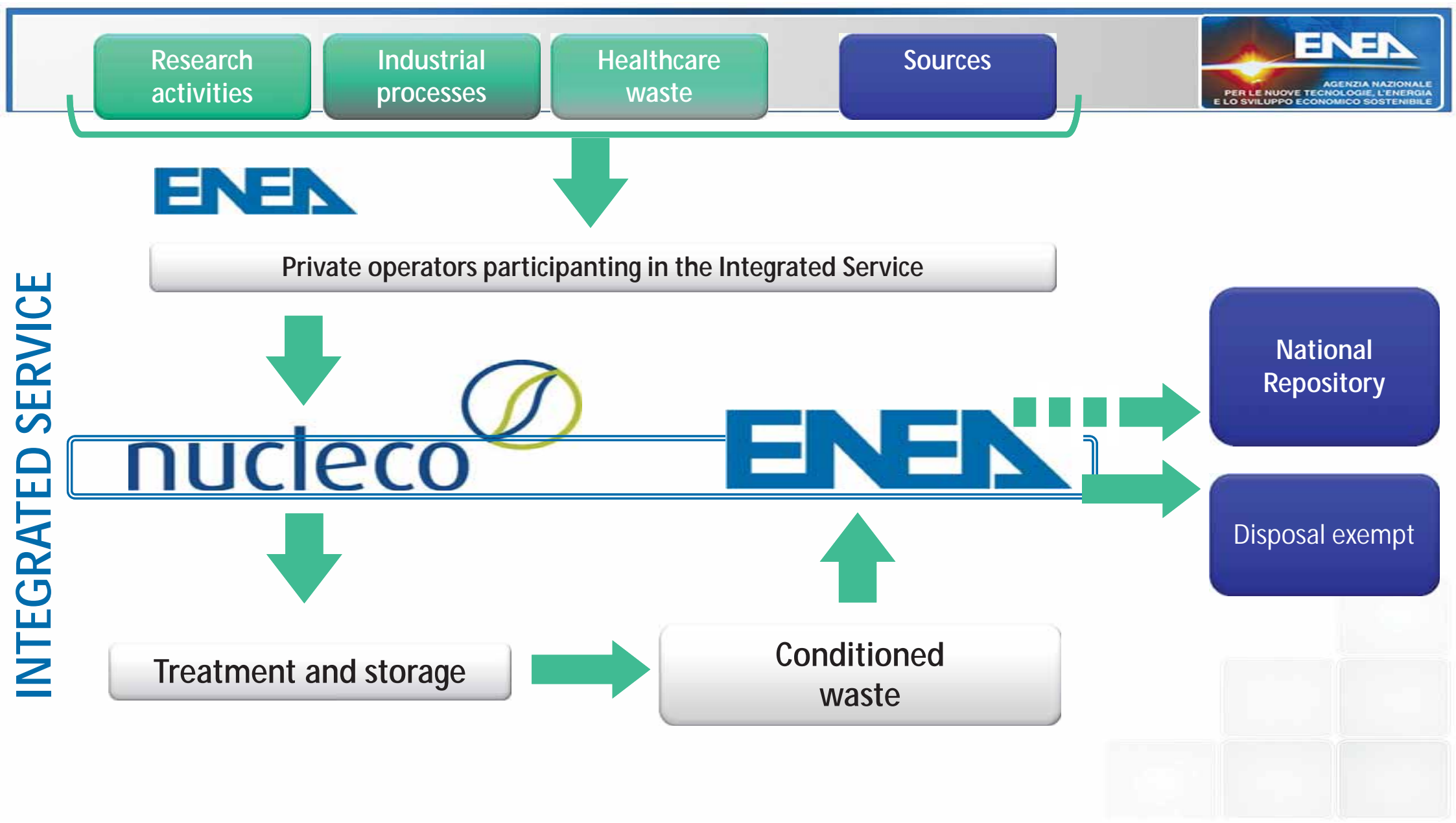
STIMA DEL VOLUME DI RIFIUTI RADIOATTIVI CONDIZIONATI DA CONFERIRE AL DNPT

(Proiezione su un arco temporale di circa 40 anni)

BASSA E MEDIA ATTIVITA' (smaltimento a titolo definitivo)						ALTA ATTIVITA' (immagazzinamento a titolo provvisorio di lunga durata)							
	ENERGETICI		NON ENERGETICI			TOTALI		ENERGETICI		NON ENERGETICI			TOTALI
	SOGIN	Ricerca	Servizio Integrato**	Altri***	SOGIN*			Ricerca	Servizio Integrato**	Altri***			
PREGRESSI (al 31.12.2012)						PREGRESSI (al 31.12.2012)							
Vol Manufatti (mc)	13.400	3.600	7.800	400	25.200	Vol Manufatti (mc)	4.000	2.500	600	100	7.200		
FUTURI						FUTURI							
Vol Manufatti (mc)	31.000	6.000	11.000	1.800	49.800	Vol Manufatti (mc)	6.400	700	900		8.000		
TOTALI						TOTALI							
Vol Manufatti (mc)	44.400	9.600	18.800	2.200	75.000	Vol Manufatti (mc)	10.400	3.200	1.500	100	15.200		
	44.400	30.600					10.400	4.800					

	mc	%
TOTALE RIFIUTI ENERGETICI	54.800	60%
TOTALE RIFIUTI NON ENERGETICI	35.400	40%
TOTALE COMPLESSIVO	90.200	

NOTE:
 (*) A questi rifiuti vanno aggiunti circa 1000 mc di residui da riprocessamento e combustibile non riprocessabile in cask (nell'ipotesi di implementare lo 'swap' dei residui a bassa/media attività con un equivalente quantitativo di residui ad alta attività)
 (**) La produzione futura di rifiuti da Servizio Integrato è assunta pari a 4 volte quella attuale (500 mc/anno) e quindi circa 2000 mc/anno che condizionati diventano circa 200 mc/anno
 (***) Include i rifiuti di origine Ministero della Difesa



Research activities

Industrial processes

Healthcare waste

Sources



Private operators participating in the Integrated Service

INTEGRATED SERVICE

nucleco



ENEA

National Repository

Disposal exempt

Treatment and storage

Conditioned waste



Radioactive Waste Management (Casaccia)

Completion of the Integrated Service Activities, i.e. conclusion of the cycle.



Compaction,
drumming,
cementation and
temporary storage
of low-activity non
energy wastes

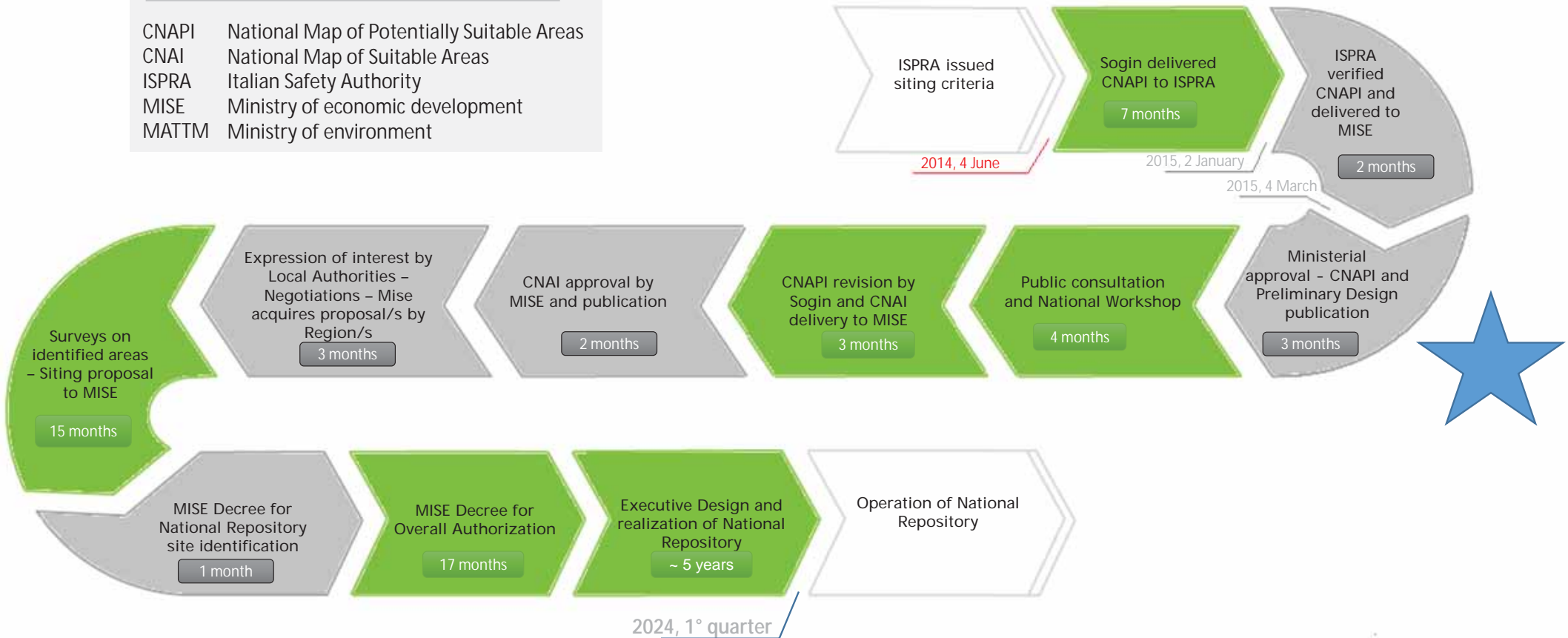
National Repository – Technology Park



SITING AND CONSTRUCTION PROCESS*

LEGEND

CNAPI	National Map of Potentially Suitable Areas
CNAI	National Map of Suitable Areas
ISPRA	Italian Safety Authority
MISE	Ministry of economic development
MATTM	Ministry of environment



Letter to Ministry of Economic Development

ENEA-INFN-ISS-INGV-SOGIN

NOTA CONGIUNTA per Dott.ssa Sara Romano (MSE)

Oggetto: Partecipazione al Progetto JOPRAD
(A step towards a Joint Programming on Radioactive Waste Disposal RD&D)
(Finanziato da EURATOM FP7 SecIGD2 2013-2015)

- European Directive n.70
- Transposition in Decree n.45
- National programme (Aug 2015)
- National Repository
- Geological Repository
- JOPRAD and dual track
- Program owner and manager
- EJP on Radwaste disposal R&D
- Endorsement and mandate

Cara Sara,

con la presente lettera le scriventi Istituzioni intendono riportare all'attenzione di Codesto Spettabile Ministero l'opportunità di riavviare in Italia le attività di ricerca sul deposito geologico per rifiuti di alta attività a vita lunga.

Con il Decreto Legislativo n. 31 del 2010 sono state ampliate le competenze della Sogin anche alla localizzazione, realizzazione e gestione del Deposito Nazionale dei rifiuti radioattivi e del Parco Tecnologico (DNPT), e segnate le tappe temporali dell'iter autorizzativo del Deposito Nazionale le cui prossime scadenze prevedono la pubblicazione della Carta Nazionale delle Aree Potenzialmente Idonee e del Progetto Preliminare del DNPT una volta ricevuto il N.O. dai Ministeri competenti e la promozione di un Seminario Nazionale entro i successivi quattro mesi..

Contemporaneamente, con il recepimento della Direttiva europea 2011/70 sui rifiuti radioattivi (in Italia avvenuto con il D. Lgs. n. 45 del 4 marzo 2014), gli Stati Membri dell'UE sono tenuti a documentare entro agosto del 2015 un credibile programma tecnico/economico di gestione dei rifiuti radioattivi. Pertanto anche l'Italia dovrà inviare alla Commissione Europea un Programma Nazionale sulla gestione di tutte le tipologie di rifiuti radioattivi e del combustibile irraggiato che tracci il percorso, ivi incluse risorse finanziarie e fabbisogno di ricerca, fino allo smaltimento.

Il Deposito Nazionale ospiterà una struttura per la sistemazione definitiva in superficie dei rifiuti di media e bassa attività nonché un deposito temporaneo per lo *'stoccaggio provvisorio di lungo termine'* di circa 16.000 m3 di rifiuti di alta attività e combustibile irraggiato derivanti dalle attività nucleari pregresse in attesa dello smaltimento definitivo. Lo smaltimento dei rifiuti di alta attività a vita lunga in opportune formazioni geologiche profonde è la soluzione riconosciuta a livello internazionale come la più sicura e sostenibile. Questa soluzione, come evidenziato dall'esperienza internazionale, richiede una prima lunga fase di ricerca e sviluppo finalizzata a studiare il comportamento delle formazioni geologiche su lunghissime scale temporali. Risulta pertanto evidente quanto sia indispensabile ed opportuno riavviare in Italia la ricerca sul deposito geologico.

L'attuale supporto e consulenza tecnico/politica della Comunità Europea nei confronti degli Stati Membri si sta esplicitando attraverso la "vision" ed il Report "RD&D Planning Guide for Geological Disposal" della Piattaforma europea IGD-TP (Implementing Geological Disposal of Radioactive Waste Technology Platform), la guida NAPRO (Guidelines for the establishment and notification of National Programmes), il Progetto Newlancer per la creazione di una rete multi-livello a servizio di una più ampia partecipazione dei nuovi Stati Membri nella ricerca EURATOM ed infine il Progetto JOPRAD che mira a definire un quadro Europeo della ricerca sui depositi geologici nazionali e valutare la fattibilità di avviare, in un secondo momento, un programma congiunto di ricerca europea sui depositi geologici da realizzare nei singoli Paesi ("Joint Programme" - JP).

JOPRAD Proposal - Cross cutting activities in Radioactive Waste Management R&D - Input needed to JOPRAD Regional Meeting – Bucharest – 3-4 February 2016

- *Contribution provided by Italian organizations in JOPRAD: ENEA, INFN, ISS, INGV (RE) and SOGIN (WMO)*

in accordance with RE-SRA (Strategic research agenda of European Research entities) working document draft - version 0.3 of 5th December 2015 (topics 2.1.5, 2.1.7, 2.3.8, 3.4, 3.6, 4.1)

Topic 1: Handbook documenting and updating the Knowledge concerning the different aspects of establishing and implementing disposal Programmes

- A common and shared *Data Base Management System* including national and international Laws, regulations, procedures, financial and legal aspects, could be created and updated at different levels of detail by the participating Countries and by the EU Commission and governmental bodies. This active archive should contain a data pool with real time networking access, and be accessible by different user categories with appropriate authorization and open with free access to the general public for non-confidential information.

Topic 2:

Education and Training for generating and developing competence

- We believe that one of the fundamental technical and scientific aspects of the repositories is the **radiological safety assessment through innovative tools** that could determine the radiological conditions within different environments in real-time and guarantee the sound implementation of radioprotection measures. This means 1) **to study and implement a suite of flexible tools for monitoring radiological conditions in all phases, from siting to characterization of the packages, to construction and operation** of the repository, and for detection and management of anomalies 2) to use the data to formulate the requirements and the implementation aspects of the radioprotection program. Therefore, this topic must be included in all programs for **Education and Training**. From a practical point of view, our group of RE is interested in the **organization of PhD schools and workshops to ensure education and training of younger generations on specific matters** ranging from repository geological and engineering aspects, to radiological monitoring and radioprotection aspects as a part of the radiological safety assessment approach. Schools and workshop themselves may be organized such as to cover different horizontal, cross-cutting topics.

CROSS CUTTING ACTIVITIES PROPOSAL

Topic 3: Guidance on selected topics making the Knowledge accessible for specific purposes and applications, and supporting transfer of Knowledge between different Programmes

- Our interest here is in the development of resilient communication platforms, the definition of 'common languages', the enhancement of the comprehensibility of information (reduction of complexity without losing substance). In practice we should define the specific purposes of knowledge bases (i.e. what kind of information they must contain, for whom and in what form) and applications (e.g. what functionalities should a certain implementation in a database offer) such as to define what knowledge base to implement in which type of database, in what hardware platforms, with what intercommunication/exchange capabilities between different databases, what kind of accessibility (public, restricted, etc.), etc.

Topic 4: Strategic Studies developing specific topics

- Here we are interested to participate in safety case communication, development of databases for real-time radiological monitoring and assessment as tool for communication of safety, environmental and health aspects to the public.. We believe that proper communication of the safety case, starting from long-term management of repositories, to radiological assessment, health impact assessment (HIA) and all the relevant radiation protection aspects, is key to public acceptance.
- Also important is the aspect of the long term memory preservation.

CROSS CUTTING ACTIVITIES PROPOSAL

Topic 5: Dissemination and exchange of the Knowledge to the expert community and other interested parties

- Part of this task may be the development of a generic open source performance assessment computer program/code which can grow over time, accompanying disposal concepts allowing also non-experts to get a quantitative insight into the key elements of the safety case.
- Another item would be the creation of an EU accident waste disposal event information system, using a methodology similar to the one for reactor accidents.
- It is essential to develop a fundamental **peer reviewed knowledge base for key processes** governing nuclear waste disposal safety and environmental/health protection (based on WIKI – like or similar tools), addressing a broader interested community as well as for intergenerational knowledge transfer and knowledge transfer between advanced and less advanced programmes, with particular attention to having an independent implementation body, transparency and building on recognized, trustworthy unbiased expertise.. The peer-review process helps in gaining trust especially during the siting process.
- In all the above topics, dissemination and exchange of different types of information at different levels can be studied and the most appropriate ways for implementation can be established (which type of information, time frame for dissemination, platform resilience, dissemination and exchange paths, etc.)
- A key part of this topic is the organization of workshops, seminars and other events to communicate with the general public, in order to ensure the transparency and strengthen the public confidence.

PANEL DISCUSSION PROPOSAL

Which R&D areas do you see as common to WMO, TSO and RE?

- Fundamentals and retention of radionuclide migration in different formations
- Siting and site characterization technologies
- Monitoring (strategies and programmes for performance confirmation, technologies and techniques, engineered barrier system, etc.)
- Waste forms and their behaviour
- Safety Case
- Cross cutting activities (communication, education and training, knowledge management, memory preservation, etc.)

What are the main challenges in your national disposal programme?

- Italy is facing the risk of being considered a 'MLAP', Member with a Less Advanced Program, not having yet a repository for LILW disposal, nor a clear strategy for a GDF.
- The main challenge is to define a flexible strategy for ILW/HLW, including disposal inside or outside Italy ('dual track'), without jeopardizing the siting of the centralised National Repository that should include, accordingly to Decree 31/2010, the long-term interim storage for ILW/HLW.
- Such an approach, together with clear responsibilities and roles in RWM, should be included in the National Programme that has not been presented yet to EC.

How to formulate JP for different concepts (different host rock, design/EBS, inventory)?

- In this stage, different countries and different organisations involved should focus on general topics, primarily safety, aiming to understand which features are common among different projects. Host rock is the most relevant topic, because it's directly connected to exclusion criteria that can, or cannot, enable many countries to implement a GDF inside its borders. In dealing with this task, a suitable balance should be kept between technical and political assessments, guaranteeing at the same time viable solutions in terms of safety and a sufficient availability in terms of geological formations.

Shall we deal with topics not directly linked to scientific research (social, cross-cutting activities)? How to include social science R&D programmes?

- Yes. Cross-cutting activities are essential for the success of the initiative. The realisation of a GDF project, including the siting procedure, is directly related to many social aspects. A Joint Programme should research, develop and demonstrate how best international experiences were able to improve communication and stakeholder engagement activities, through these fostering confidence and quality of decision-making processes. Many countries have already developed common platforms (COWAM, ARGONA, RISCOM) in this direction, examining many topics in a scientific perspective, adopting theoretical models and adapting them to different situations all over Europe.

How to set up a robust and reasonable repository development project?

- Our judgement, derived from latest national experiences, is that in order to create a project perceived as reasonable, it's mandatory to set up, from the beginning of the process, a clear framework for decision-making. This should include the siting process, with an early involvement of national and local stakeholders, and the safety approach, showing to a vast majority of public opinion that solutions are available, enabling to solve problems while not imposing undue burdens to future generations.

How to ensure WMO vs. TSO independency of a joint R&D project?

- As mentioned above, a clear framework of decision-making process is crucial, and it should include clear responsibilities from the beginning, describing what WMO's are going to do in each phase of the project, and providing a stepwise green light from TSO's. A joint R&D project should be developed starting from this assumption, enabling each actor to investigate deeply several topics, being aware immediately of its own duties. At the same time, sharing knowledge and values would be helpful to design more accurately the decision-making process, reducing the risk of future misunderstandings.

How to implement JP for national programmes in different development stages (planning x siting in progress x development of documentation for the construction permit)? Are there different Strategic Research Agendas?

- Implementing a GDF requires quite often a stepwise approach, that should grant to many countries to review, and sometimes adapt, previous decisions. This is an important heritage, in terms of success stories, of CIGÉO's *Debat Public*: even countries "advanced" beyond localisation stage can be called to a more flexible approach, debating issues that could be misjudged as frozen. Countries with LAP should be at the same time interested in understanding successes and failures of the most advanced ones, and actively involved in showing how more recent approaches, from a stakeholder engagement perspective and more generally with an adaptative problem solving strategy, can be useful in such stepwise approach.

Additional topics and recommendation

- ✓ Start asap to structure and assemble a proposal with specific activities (projects), according to the SRAs and the RWM cycle as described in the IAEA guide
- ✓ Give importance to pre-disposal activities (RW characterization, treatment, conditioning) and take into account the interim storage condition in view of the final disposal
- ✓ Consider also security aspects during loading phase and design
- ✓ Italian group has already started to elaborate some potential activities in the RE Working group

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