



# Sogin decommissioning program: achievements, challenges, perspectives

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# Italian nuclear activity has a long history



*Enrico Fermi in his physics lab, Rome 1935*

The nuclear option was initiated prior to World War II, starting from the studies of **Enrico Fermi** and his team on nuclear physics, irradiating several elements with neutrons and discovering nuclear transformation.

Applied nuclear research was marked by the foundation of the Research and Experimentation Information Centre (Milan 1946), that just a few months ago SOGIN led to the **green field**.

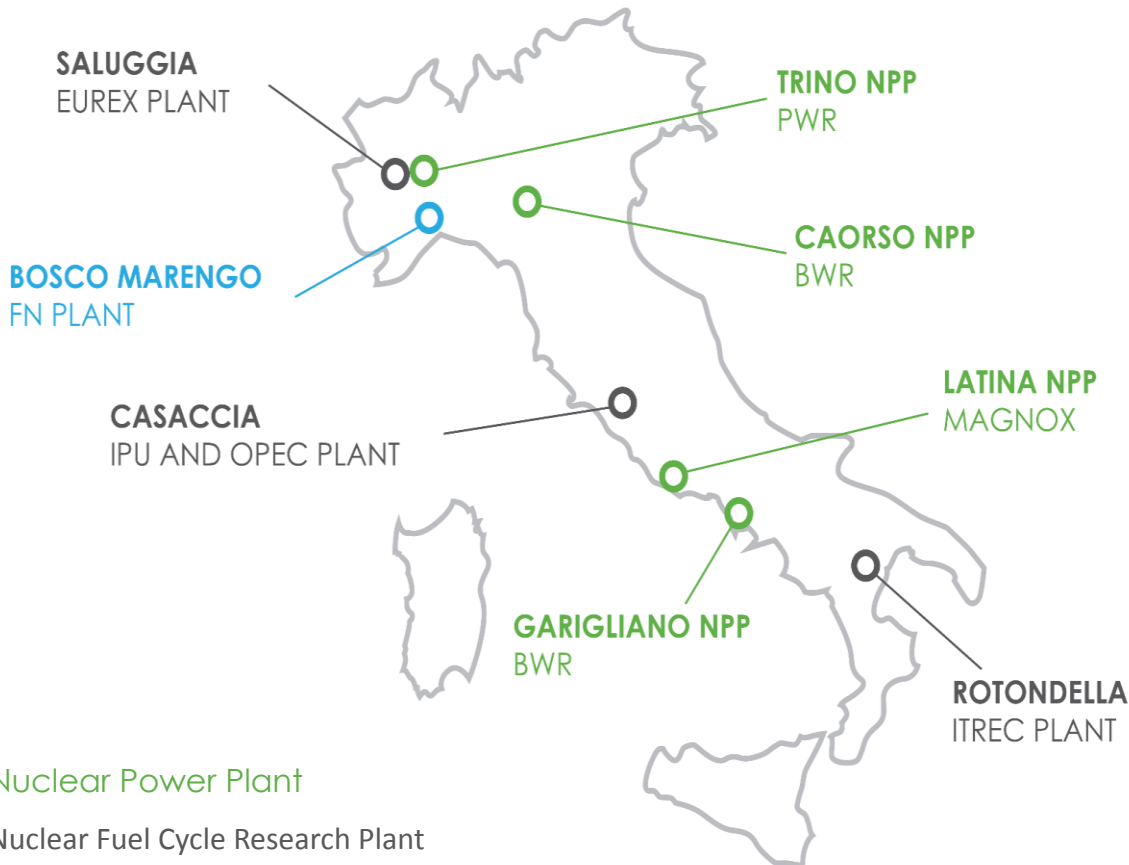
The first reactor CP-5 for the research nuclear center of Ispra (today JRC) was commissioned in 1955.

The commercial use of nuclear energy began in the early 1960s.



*CP-5 construction, ISPra 1956*

# Industrial use of nuclear energy



Four NPPs were connected to the grid:

- 210 MWe GGR (5/63) – **Latina**,
- 160 MWe BWR (4/64) – **Garigliano**
- 270 MWe PWR (10/64) – **Trino**
- 870 MWe BWR (12/81) – **Caorso**

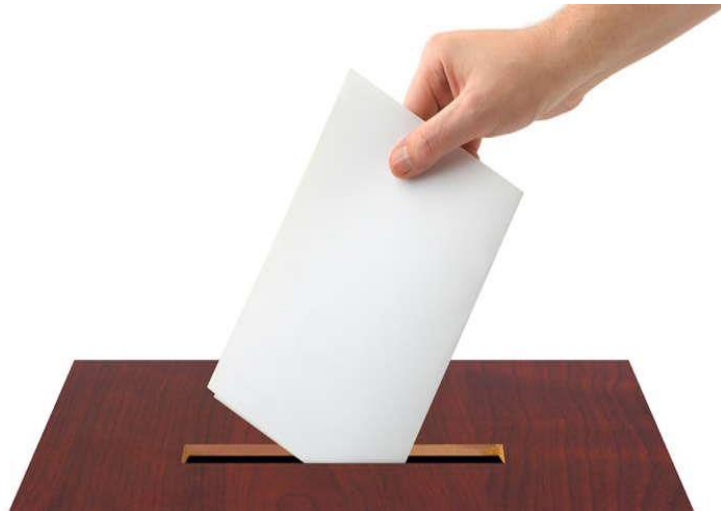
An extensive R&D program was developed:

- several Research Reactors were tested;
- **Plutonium** and **OPEC** plants – Casaccia,
- **EUREX** repr. and **IFEC** fabr. plants – Saluggia,
- **ITREC** repr. plant at Trisaia.

A private LEU fuel fabrication plant was commissioned at Bosco Marengo.

# Post-Chernobyl accident

On 1987, a national referendum on nuclear activities was called after the Chernobyl accident



Following the results of the referendum, the same year by political decision the NPPs of Latina, Trino and Caorso were definitively shut down.

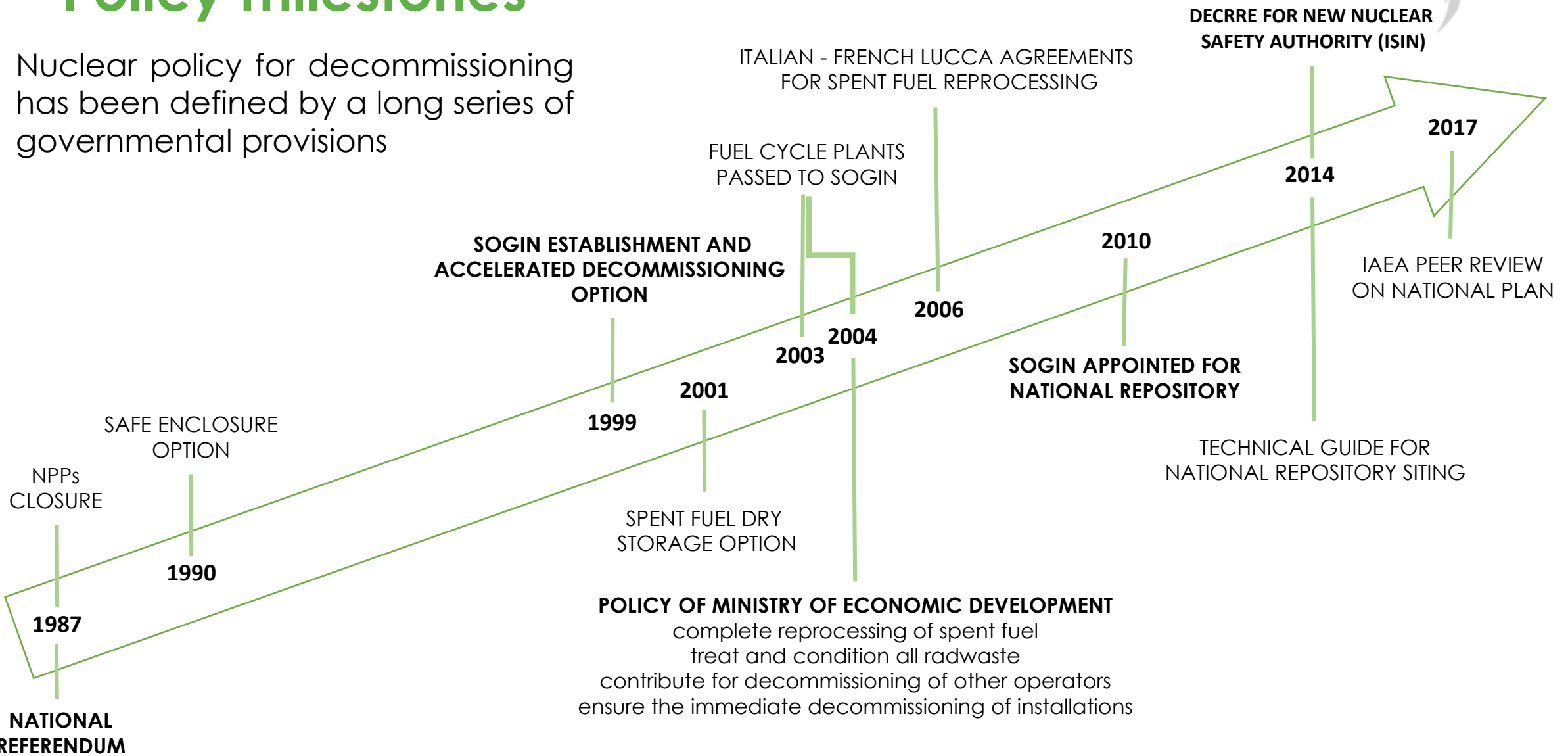
The same for the fuel fabrication plants and other nuclear laboratories

Garigliano NPP was already in shutdown and placed in "safe enclosure" from 1978 for technical reasons.

The Italian nuclear community unexpectedly faced decommissioning !

# Policy milestones

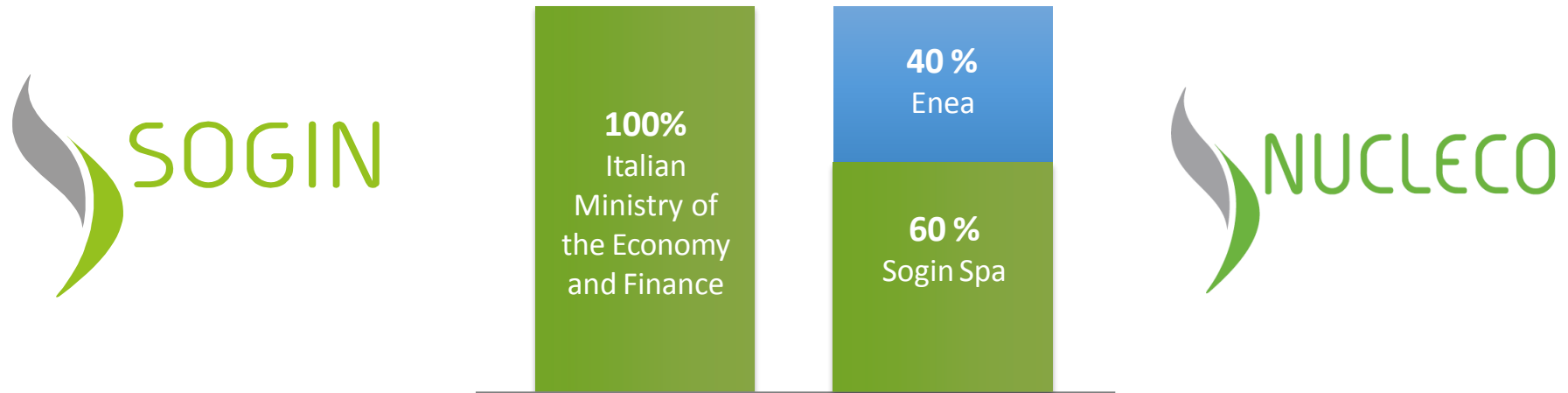
Nuclear policy for decommissioning has been defined by a long series of governmental provisions



# Assets

Sogin, established in 1999, is the Italian public company responsible for the decommissioning. It is fully operating since 2001.

It became a Group in 2004 through the acquisition of the majority stake (60%) of Nucleco SpA, the national operator responsible for collecting, treating, conditioning, temporary storage of radioactive waste and nuclear sources from medicine and scientific and technological research activities.



The over 1,000 employees of the Group are selected and trained according to levels of excellence. They include nuclear, civil, mechanical, chemical and environmental engineers, physicists, geologists, radiation protection and materials science experts, biologists.

# Decommissioning Plan

Since its creation, Sogin has taken into account the real situation, as described before, primarily conducting within the current licenses the most possible decommissioning activities and preparing the global decommissioning project.

Over the years it developed a comprehensive program with the main aim to up-to-grade the safety systems and tools, adapting them to decommissioning.

Today, we can assert that:

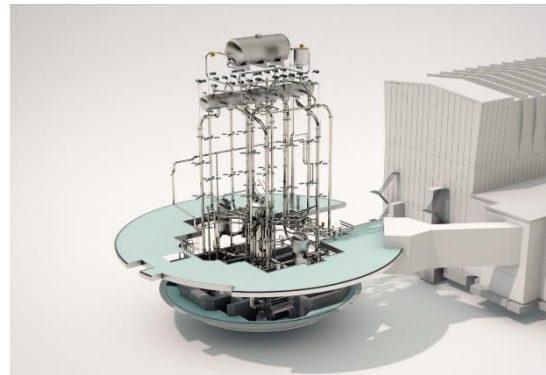
- Almost all of the fuel has been removed and waste treatment is at a well-advanced level of progress.
- For all sites detailed global dismantling plans have been developed and submitted for authorization to nuclear and environmental authorities.



# Main achievements

For 4 plants, authorizations are already in place and for the others they are expected in short term. For Bosco Marengo fuel fabrication plant, the completion of dismantling is expected within this year.

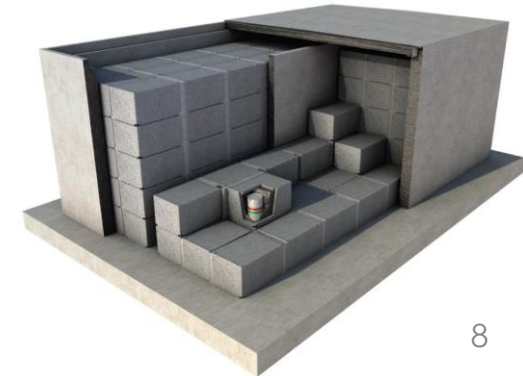
Dismantling of auxiliary and conventional buildings has been completed and they are reused as waste treatment stations or for temporary waste storages.



The dismantling of the nuclear islands, the primary circuits and the vessels have been started with the designing phase.

A complete revision of the general plan has been carried out with a better definition of duration, cost, uncertainties and contingencies. The end of dismantlings ranges in the period 2025-2035, a century later of Enrico Fermi first studies.

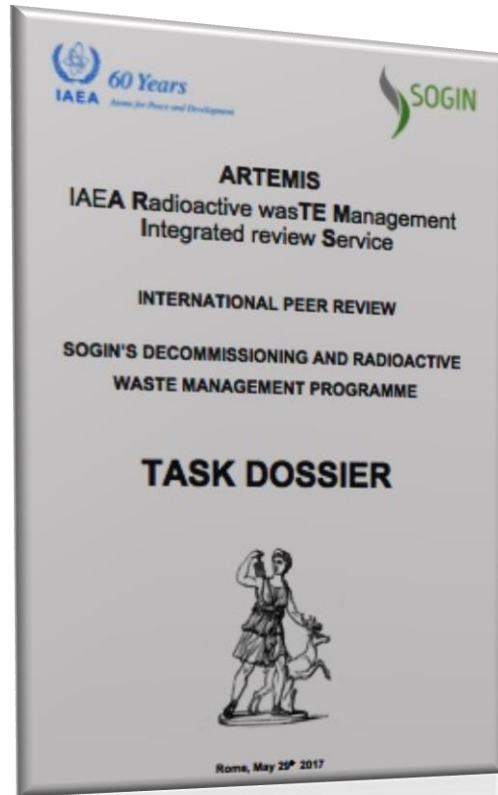
The conceptual design and the map of the areas suitable for the national repository have been drawn up and delivered to the competent authorities. The national repository is planned to be in operation by 2025.





# Peer Review process

The Temporary General Plan (PTG), technical and other relevant documents were translated into English with the involvement of "Young Talents", collected in a Task Dossier, which was delivered to the IAEA International Expert Group.



February 2017

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Expert mission site by site  
July 2017



September 2017

# Findings

The IAEA team acknowledge SOGIN staff's openness and readiness to respond to requests for information throughout the review whole process, identifying several good practices, as:

*“At the time of the review, SOGIN has demonstrated, with its present organisational structure and skills, their **knowledge and capability** to deliver the Italian decommissioning and radioactive waste management programme;*

*To prepare for nuclear decommissioning in years to come, SOGIN has launched its ‘**Young talents initiative**’ to secure specific skills for the future;*

*SOGIN has recognised the need to have **a strong safety culture**, which should be fostered going forward, particularly to deal with the increasing number of subcontractors;*

*The team acknowledged that the **care and maintenance of the facilities** and sites were of a high standard;*

*SOGIN applies **a robust and thorough cost estimating process** in accordance with the recognized international practices. In addition they have also demonstrated their **continuous improvement in project controls and financial reporting**;*

*SOGIN is using proven and **well tested technologies** and approaches for decommissioning.”*

# Recommendations to Italian System

The Government of Italy give high priority to establishing a **National Repository** for disposal of radioactive waste;

The Government of Italy implement efforts to **strengthen the capacity of the regulatory body** for safety, consistent with Decree 45/2014;

Strengthen strategic governance at SOGIN to **minimise the effect of the frequent changes** at the Board level;

The Government of Italy adopt the **clearance levels consistent with EU Directives**;

# Recommendations specific to SOGIN

A **more proactive stance be taken by SOGIN with the safety regulator** and other relevant bodies to ensure that prompt and high quality information is provided to support decommissioning licenses and other authorizations;

Increase **confidence in the total cost and completion dates**, by the use of strategic risk modelling at SOGIN;

Waste package inventories in storage facilities be screened to **identify material eligible for clearance**;

Criteria for **authorised discharges be harmonised** with Requirement 31 of the **IAEA General Safety Requirements Part 3**;

Opportunities be **pursued to release parts of sites for reuse** once their decommissioning has been completed;

SOGIN adopt the **terminology of interim and end states** in their strategies and plans instead of ambiguous usage of the term brown field.

# Sogin People

Work force 2016			Sogin	Nucleco	GROUP
< 30	years	n.	92	48	140
30-40	years	n.	327	100	427
41-50	years	n.	243	30	273
> 50	years	n.	291	40	331
<b>Total</b>		<b>n.</b>	<b>953</b>	<b>218</b>	<b>1.171</b>
< 30	years	%	9,6	22,02	11,96
30-40	years	%	34,31	45,87	36,46
41-50	years	%	25,50	13,76	23,3
> 50	years	%	30,54	18,35	28,3



About half of our employees will not see the **green field** status and nearly one-third that of **brown field** (for technical directors and managers the value grow up to two-third !)

# Make room for new generations

Knowledge transfer to young generation is the key objective to ensuring continuity in decommissioning activities to be carried out according to the highest level of safety standards ....



... in order to



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**We protect the present  
We guarantee the future**