

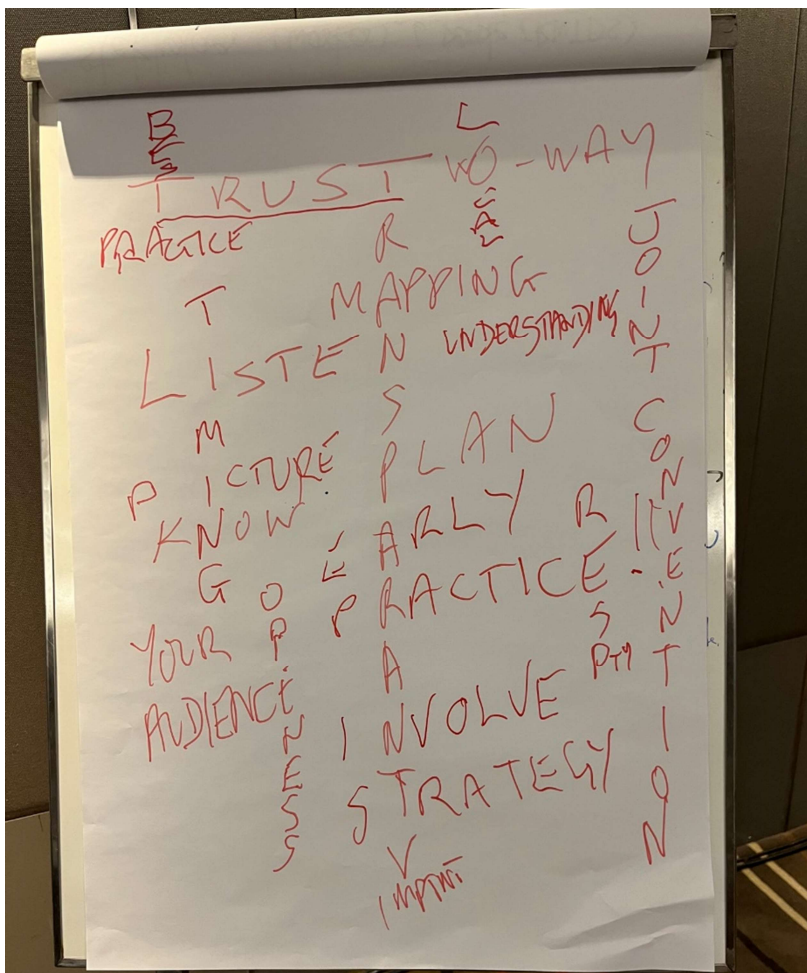
KEY PRINCIPLES OF COMMUNICATION AND CONSULTATION IN RWM

French Strategy and Examples of Experience

Delphine PELLEGRINI

Regional Workshop on Communication and Consultation Regarding Issues Related to Radioactive
Waste Management

Bangkok, Thailand, 25-28 October 2022



Like Safety,

**Trust, Audience, Openness,
Involvement**

CANNOT BE DECREED

this will not happen one day to the next

start early as possible !

FRENCH STRATEGY AND EXAMPLE OF EXPERIENCE

CONTENTS 1/2

1. Overview of the French RWM Programme Framework
2. IRSN : “Enhancing nuclear safety”
3. Evolution of governance of nuclear risk in France
4. Perception of risks and safety in France, IRSN barometer
5. IRSN approach for public information and participation

FRENCH STRATEGY AND EXAMPLE OF EXPERIENCE

CONTENTS 2/2

6. Transparency & Communication actions towards the public around RWM
7. Initiatives involving exchanges and joint work with the French Civil Society
8. Participation to international level initiatives involving Civil Society



1 - Overview of the French RWM Programme Framework



Management of Radioactive Waste and Spent Fuel in France

WASTE GENERATION

56 power reactors in operation,
1 in construction

900 MWe (🔵)

1300 MWe (🟡)

1450 MWe (🟢)

1650 MWe EPR in construction (🔴)

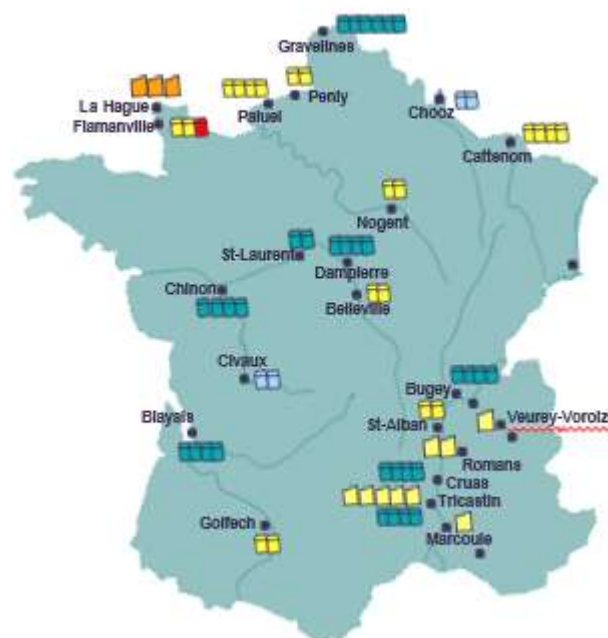
12 Fuel cycle facilities

🟡 Enrichment and manufacturing

🟠 Spent fuel processing and storage

Unsealed and sealed
sources users

- ~ 48,000 sealed sources 80% of which in industry
- 750 nonmedical users of unsealed sources
- 230 Nuclear medicine units

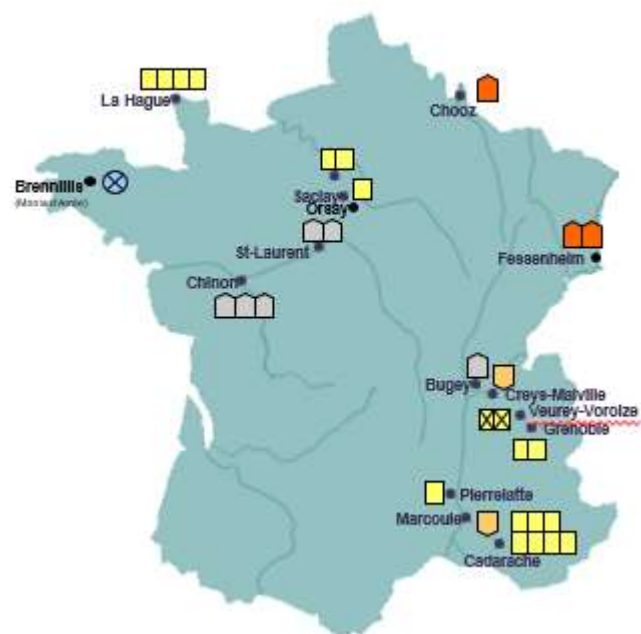


Management of Radioactive Waste and Spent Fuel in France

WASTE GENERATION

Facilities being dismantled or shut-down

- 12 power reactors:
 - 6 GCRs 
 - 1 HWR 
 - 3 PWR 
 - 2 FNRs 
- Other facilities 
- Facilities delicensed since the 6th RM 



Management of Radioactive Waste and Spent Fuel in France

WASTE REPOSITORIES

Repositories

- Centre de stockage de la Manche (CSM), *undergoing closure*
LIL-SL: 527000 m³ *
- Centre de stockage de l'Aube (CSA)
LIL-SL: 363000 m³ *
- Centre industriel de regroupement, d'entreposage et de stockage (CIRES)
VLL: 430000 m³ *

Underground research laboratory







Bure laboratory

* Values as of end of 2021



Management of Radioactive Waste and Spent Fuel in France

TYPES OF WASTE AND MANAGEMENT ROUTES

	Short lived (half-life \leq 31 years)	Long lived (half-life $>$ 31 years)
Very low level (VLL)	Surface Disposal (CIRES) <i>in operation since 2003</i> 	
Low level (LL)	Surface Disposal CSM <i>undergoing closure</i> 	Low depth disposal <i>Under study</i> 
Intermediate level (IL)	CSA <i>in op. since 1991</i> 	
High level (HL)	Deep geological repository <i>Cigéo under study</i> 	



Management of Radioactive Waste and Spent Fuel in France

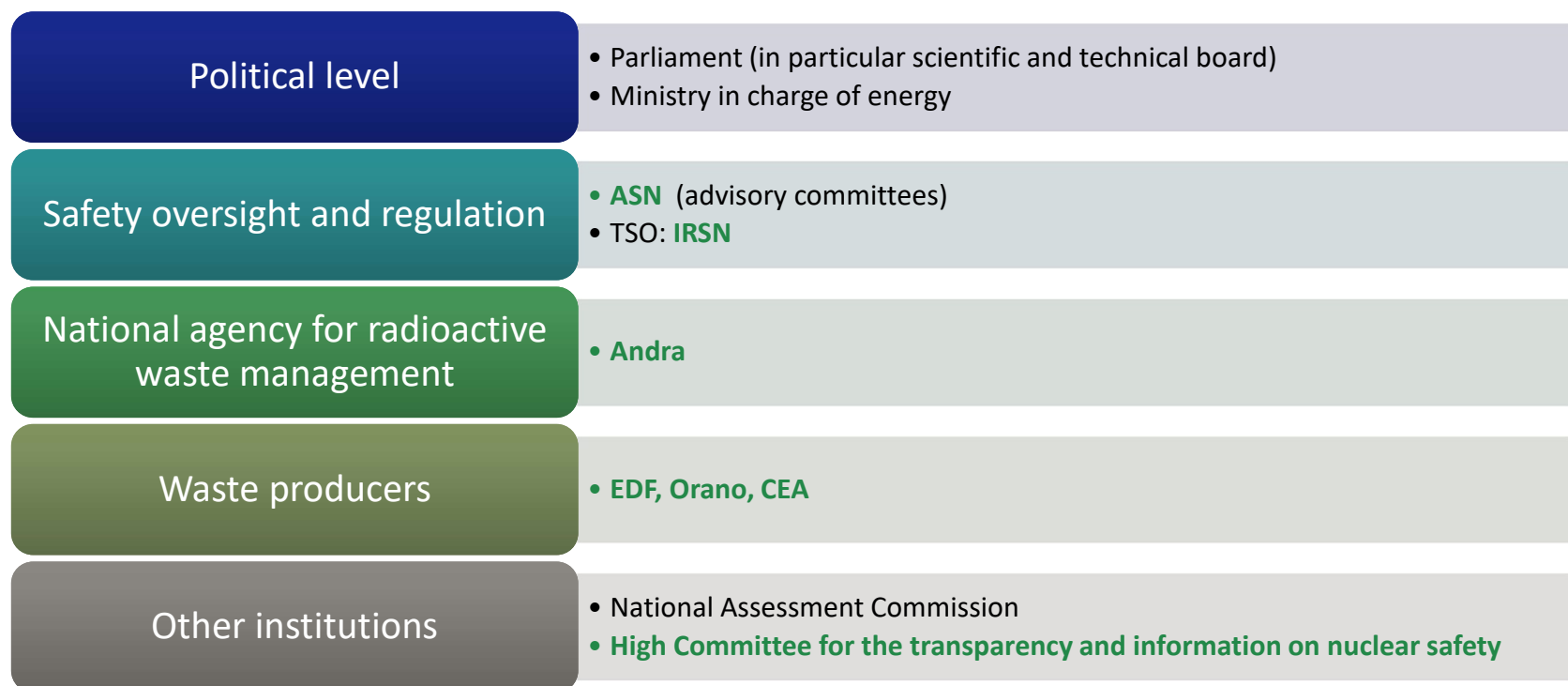
STORED WASTE AND SPENT FUEL INVENTORIES

Type of waste	Volume as of end 2016 (m ³)	Volume as of end 2020 (m ³)
HL waste	3650	4190
IL-LL waste	45000	42900
LL-LL waste	90500	93800

Location	Mass of French spent fuel in storage (tonnes) as of end 2016	Mass of French spent fuel in storage (tonnes) as of end 2020
La Hague (Orano)	9739	10494
EDF NPP sites	4150	4148
CEA centres	88	55



Management of Radioactive Waste and Spent Fuel in France The main players



Management of Radioactive Waste and Spent Fuel in France

4 Main Principles:

- Responsibility of the waste producers until waste elimination
- The amount of waste and its harmfulness must be minimised
- No foreign waste can be disposed of in France
- **Stakeholders engagement and participation**

A Management Framework resting on 3 pillars:

- A clear legislative and regulatory framework
- **A periodic national plan on waste management (PNGMDR)**
- A public Agency dedicated to waste management (Andra)

Management of Radioactive Waste and Spent Fuel in France

1ST PILLAR: THE LEGISLATIVE AND REGULATORY FRAMEWORK



- Major acts:
 - Act of 30 December 1991 relative to research in the management of high-level long-lived radioactive waste
 - Planning Act of 28 June 2006 on the Sustainable Management of Radioactive Materials and Waste (Waste Act)
 - Act of 25 July 2016 relative to the creation of a deep geological repository (reversibility, next steps for involvement of Government and Parliament)
- Compliant with the European directives including the « waste » directive (Council Directive 2011/70/Euratom of 19 July 2011)

Key factor: the early and longstanding commitment of the parliament and the governments led to a clear legislative and regulatory framework

Management of Radioactive Waste and Spent Fuel in France

1ST PILLAR: THE LEGISLATIVE AND REGULATORY FRAMEWORK

The legislative corpus is supplemented by:

- A set of Decrees and ministerial Orders (see report)
- General scope Resolutions issued by the nuclear safety authority ASN
- ASN guides

e.g.: ASN Guide No 6: Shutdown, decommissioning and delicensing
ASN Guide no 14: Structures' remediation in nuclear installations
ASN Guide no 24: Management of polluted/contaminated soils



Management of Radioactive Waste and Spent Fuel in France

2ND PILLAR: THE NATIONAL WASTE MANAGEMENT PLAN



- National inventory (since 2004, updated yearly by Andra)
- National Plan for management of radioactive materials and waste (PNGMDR)
 - 1st issue in 2007
 - Prepared by an open working group including all the stakeholders
 - Concerns all radioactive waste and materials
 - Produces an inventory of management routes
 - Identifies the foreseeable needs for disposal and storage capacities
 - Determines the targets to be achieved for waste for which no definitive management solution exists
 - Its recommendations become binding through regulatory texts



Management of Radioactive Waste and Spent Fuel in France

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Key factor: comprehensive, step by step planning, prepared with all the stakeholders

5th Plan for RWM:

- Significantly **enhanced engagement of the public and stakeholders** in the decision making process:
 - Public debate in 2019
 - National scale public consultation process on first draft (Sept 2020-April 2021)
 - Public consultation on final draft
 - Review of the plan by members of Parliament

Management of Radioactive Waste and Spent Fuel in France

3RD PILLAR: A PUBLIC AGENCY FOR WASTE MANAGEMENT

Andra: public agency in charge of radioactive waste management

- Created in 1991 (1991 Act)
- Notably in charge of:
 - Managing the existing disposal facilities
 - Research
 - Design and construction of disposal facilities
 - The national inventory of radioactive material and waste on the French territory
 - Management of orphan polluted sites and soils
 - Last resort management of orphan sources



2 - IRSN “Enhancing Nuclear Safety”



Areas of intervention



IRSN IS THE NATIONAL PUBLIC EXPERT ON NUCLEAR AND RADIOLOGICAL RISKS



NUCLEAR SAFETY AND SECURITY

Reactors, fuel cycle, waste management, transport of radioactive materials, radioactive sources.

PROTECTION OF THE POPULATION AND THE ENVIRONMENT

Against the risks associated with ionizing radiation.

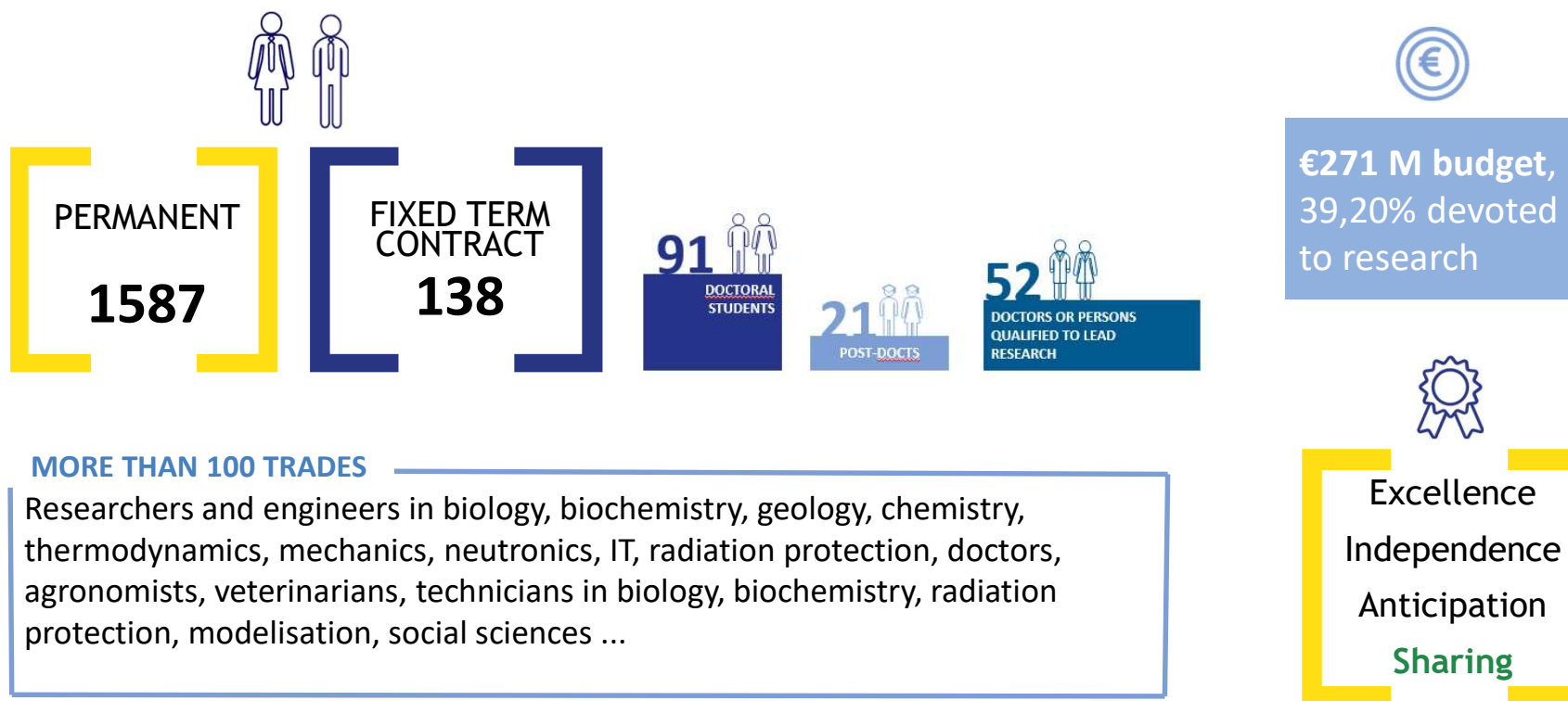
NUCLEAR AND RADIOLOGICAL EMERGENCY RESPONSE

Operational support capacity.



Public industrial and commercial establishment supervised jointly by the French Minister of the Ecological transition, the French Minister of Defense, and the French Ministers of Energy transition, Research and Health,

IRSN key figures 2021



Our DNA

A SEPARATE ASSESSMENT OF THE DECISION

- The expert is distinct from the decision-maker (Authorities, Ministries)
- An independent and impartial expertise

EXPERTISE-RESEARCH SYNERGIES

- An expertise enriched by research &
- A research essential to expertise

To sustainably have the knowledge necessary in the evaluation of radiological and nuclear risks

A STRONG CULTURE OF OPENNESS TO CIVIL SOCIETY

- Publication of technical notices to authorities
- Interactions with civil society actors: collaborative citizen science (Open Radiation app, etc.)
- Involvement in public debates
- Development of new modes of interaction and dialogue

IRSN « Enhancing Nuclear Safety »

■ As a Technical Safety Organization (TSO), in the French context and with regard to accidents/incidents, faces the challenges :

- **of meeting the rising demand from the Public**
 - for information, and for more transparency
 - for involvement in the decision making processes

- **and makes it part of “enhancing nuclear safety”**

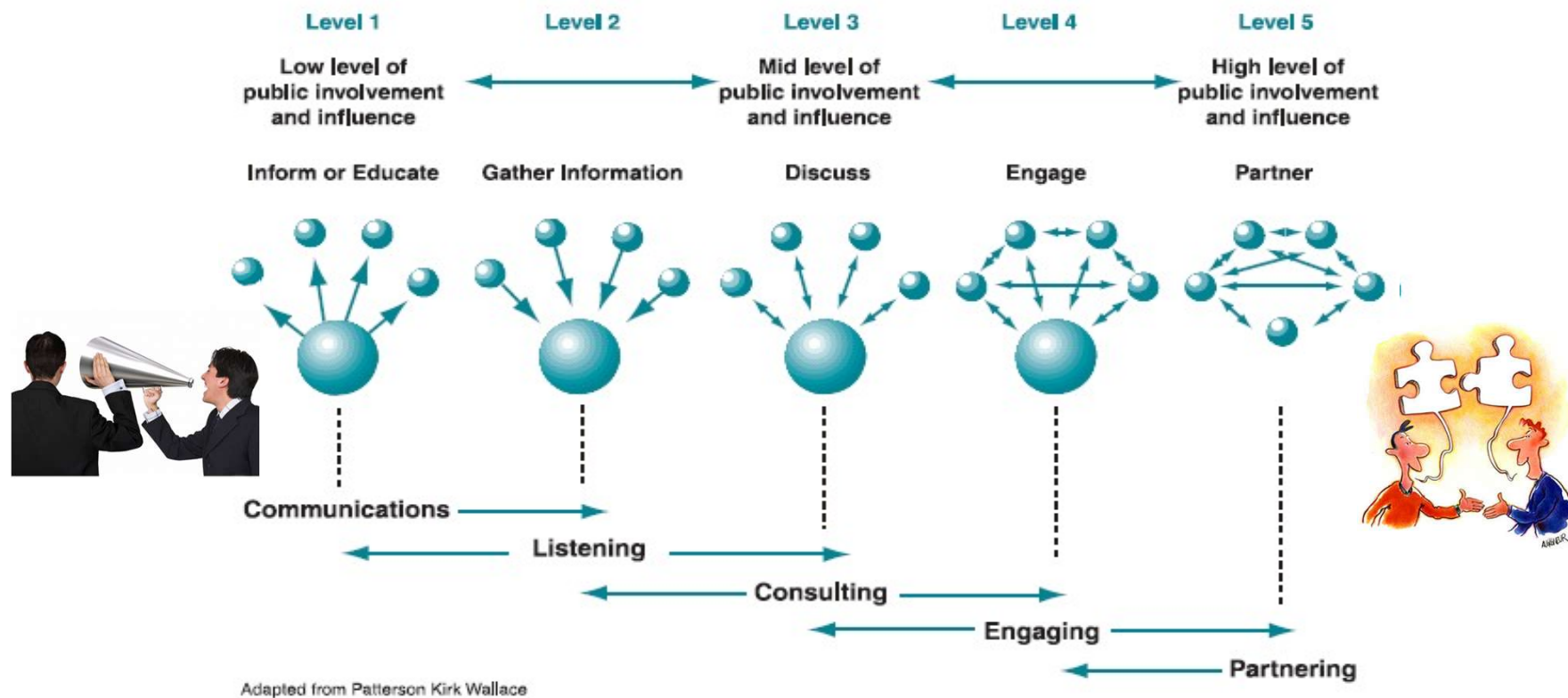


4 - Evolution of the governance of nuclear risks in France



From communication to interactions with interested parties

[Stakeholder
Engagement
Escalator]



European and French legal framework

■ **Increasing expectations** from citizens on risks (IRSN's barometer) and **changes in the legal framework** in the past 2 decades :

- **Aarhus convention** (1998) -> Rights to know, to participate, to justice in the environmental field
- **Transparency and security Act** (2006), **Energy transition for green growth Act** (2015) add legal requirements for transparency in the nuclear field in France
 - » Access to information on nuclear safety
 - » Publication of IRSN opinion (assessment notices, in // to the regulator's decision)
 - » Local information commission (CLI) and their national federation (ANCCLI)
 - » HCTISN at the national level



■ ... **but transparency**
is not enough

European and French legal framework

■ Aarhus Convention & Nuclear (ACN) process initiated in 2008

Practical implementation of Aarhus Convention with the objective of enhancing public participation in decision-making in the nuclear field, implemented by ANCCLI with European Commission, with support of IRSN, ASN...

- **Lessons learned** to enhance public involvement in decision-making :
 - Give the public access to operator documentation and existing expert assessments as early as possible
 - Develop participation in decision-making when all options are still open
 - “Giving more time” is a key prerequisite → Civil Society competence building

Local information commission (CLI)

It's a long way to promote and enhance the role of civil society

- 1977: Creation of first CLI in Fessenheim (East of France)
- 1981: “Circulaire Mauroy” (Prime minister’s act) officialize the status of CLIs as official information way
- 2000: Creation of ANCCLI, national Council of CLIs
- 2006: Transparency and Security (TSN) Act gives legal status to CLIs and their Council: ANCCLI
- 2015: TECV Law (Moving toward renewable energy) includes new missions in CLI's scope of work (public meetings, consultation on emergency plan updates...)
- 2018: 35 CLIs exist in France – All are members of ANCCLI
- CLIs are an essential link between consultation, information and transparency at local level

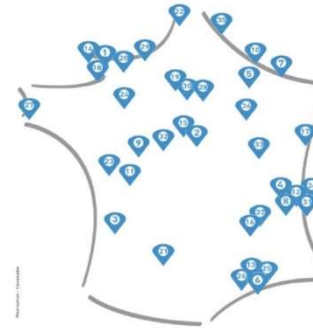
Work of CLIs, is not only about providing information. It also means to:

- **Exchange**
- **Discuss**
- **Share several opinions**
- **Develop one own understanding**
- **Develop knowledges**
- ...

CLIs want to develop their own expertise, play a part as advisor in decision making-processes and raise public awareness on emergency procedures

ANCCLI : Council of CLIs

- ANCCLI develops close working relationships with CLIs, implements training actions and gives information in order to raise population's awareness.
- **Objectives: to share technical feedbacks collected from CLIs, to support CLIs administration processes and to develop citizen expertise**
- Scientific committee,
- Working groups
 - **waste management**
 - **safety of NPPs**
 - **crisis situations**
 - **dismantling process**
 - **health**
- ANCCLI is working in close cooperation with national institutions and other partners (ASN, HCTISN, IRSN, operators ...).



CLIs and ANCCLI are neutral stakeholders

They respect pluralist opinions of their members

High-Level Committee for Transparency and Information on Nuclear Safety



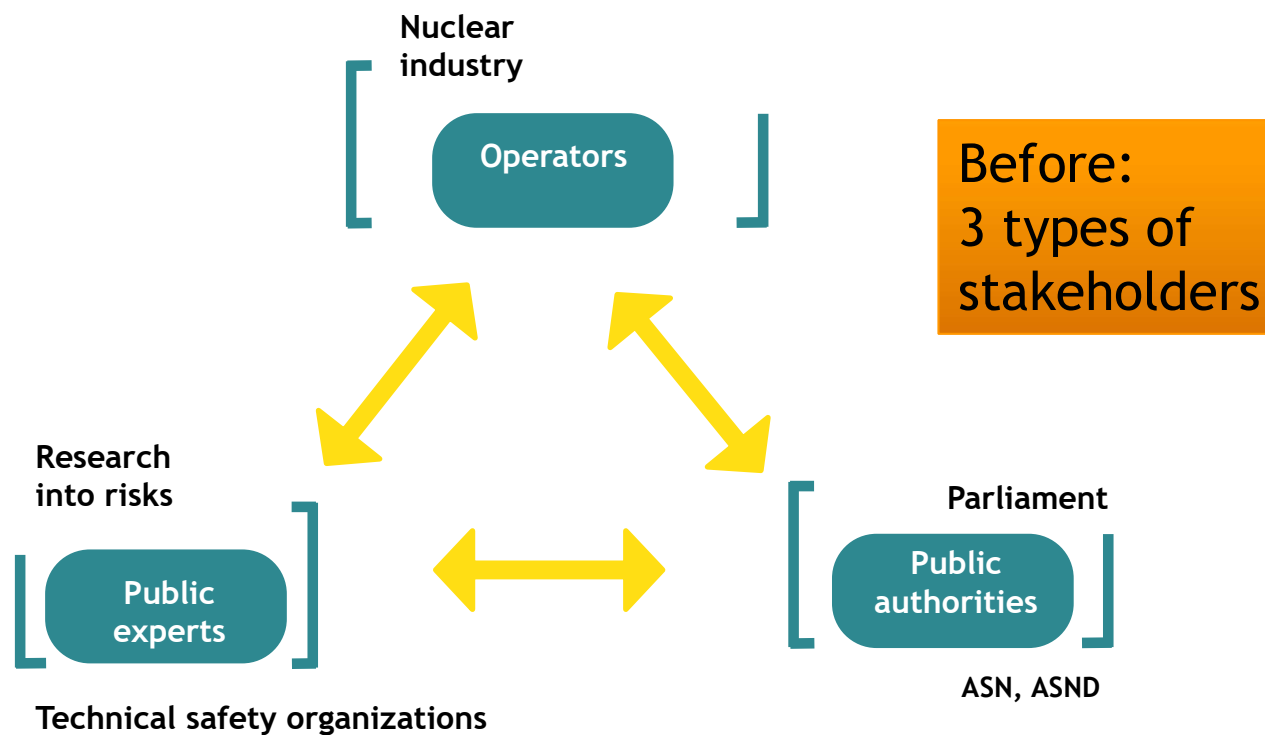
■ **An independent and pluralist body made up of all the players in the nuclear world (2006 Act)**

■ **Mission** of guaranteeing and promoting transparency and information on nuclear safety

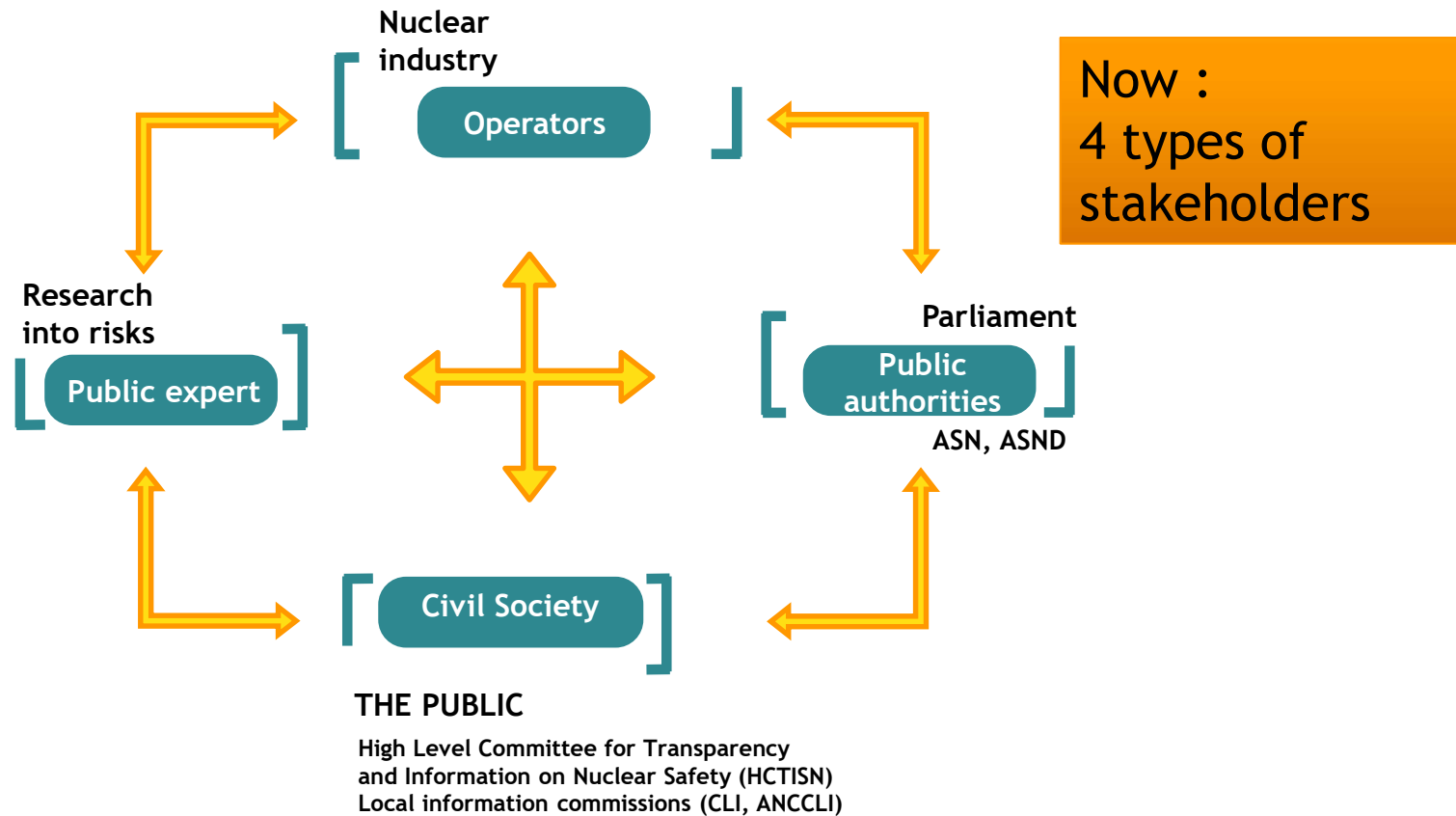
- Make information on nuclear safety available to the public
- Propose measures to guarantee or improve transparency
- Issuing opinions and recommendations to public authorities and operators
- Designing consultations and debates with the public to ensure that nuclear safety issues are discussed beyond expert circles.
- To commission expert reports necessary for the accomplishment of its missions and to organise contradictory debates

➤ **The operators of nuclear activities, the Nuclear Safety Authority and the other institutional organisations concerned shall provide the HCTISN with all documents and information relevant to the performance of its tasks**

French nuclear risk governance evolution

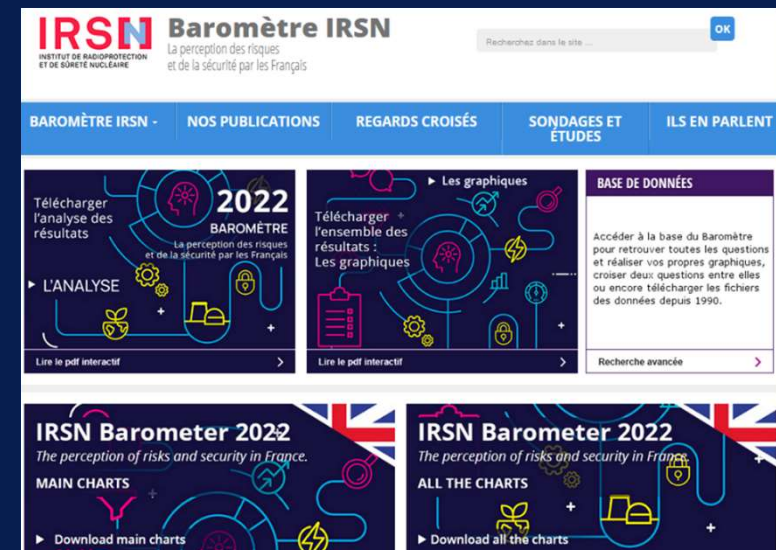


French nuclear risk governance evolution



3 - Perception of risks and safety in France, IRSN barometer

Hugo LUTUN (hugo.lutun@irsn.fr)



<https://barometre.irsn.fr>

Perception of risks and safety : IRSN French Barometer, a useful tool

- For more than 30 years, IRSN has been carrying out an annual survey on the public opinion towards risks and safety - Open access, broadly disseminated
- A tool for everyone to better understand the opinion of the general public and where one stands
 - to follow developments in public opinion towards risks and safety, most notably in areas of health, industry, food and the environment
 - an objective tool to ease communication towards lay-people



The Barometer focuses on 4 major topics:

- the current concerns of the French,
- their views on science and expertise,
- their opinions of various risk situations,
- their opinions on nuclear matters and safety

➤ **Contributes to orientate IRSN Strategy in communication and openness to Civil Society**

Perception of risks and safety : IRSN French Barometer, a useful tool

Methodology

- A compromise between continuity and evolution (questions, implementation)
- Questionnaire remained with marginal add-ons and removals to guarantee stability among the data
- **Face-to-face** survey of 1003 people representative of the French population (gender, age, socio-professional category..)
- 2020: **online survey**, 2003 people (*quota and strata method*), – 24 minutes



about
60
questions

more than
30y of
survey

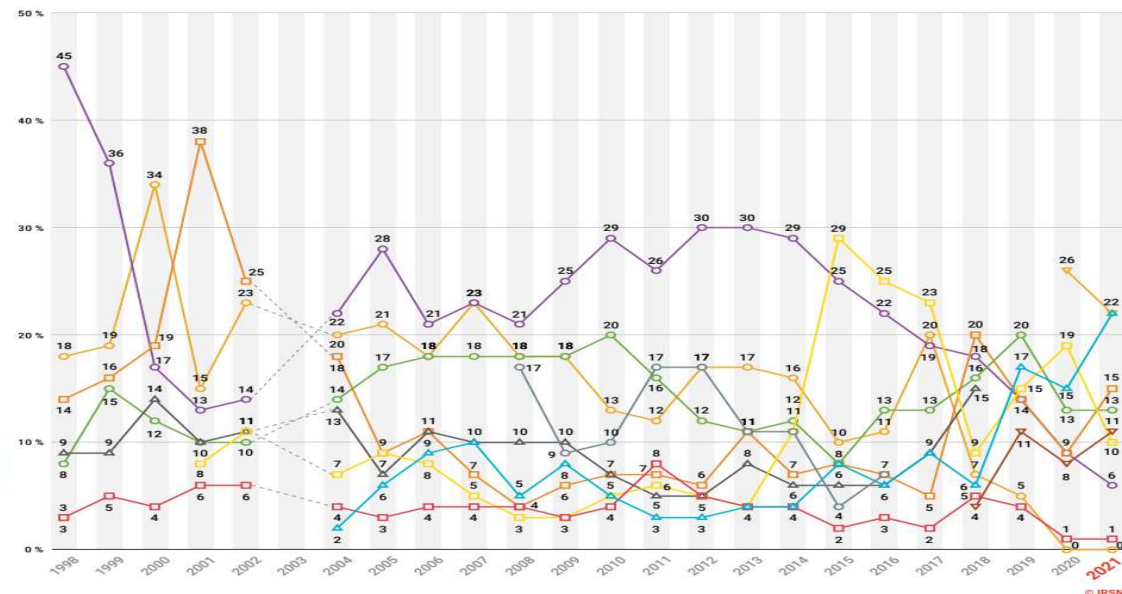
Barometer Part 1 – Main concerns

QUESTION N°1



In France, which of the following current issues do you find most concerning? First?

ÉVOLUTION OF THE RESULTS
1998 - 2021



- ❑ Health at 1st position, as well as climate change (22%)
- ❑ 2nd position, crime- unsecurity (15%) replaces terrorism
- ❑ Nuclear risks at 1% (8% in 2011, 5% in 2018)

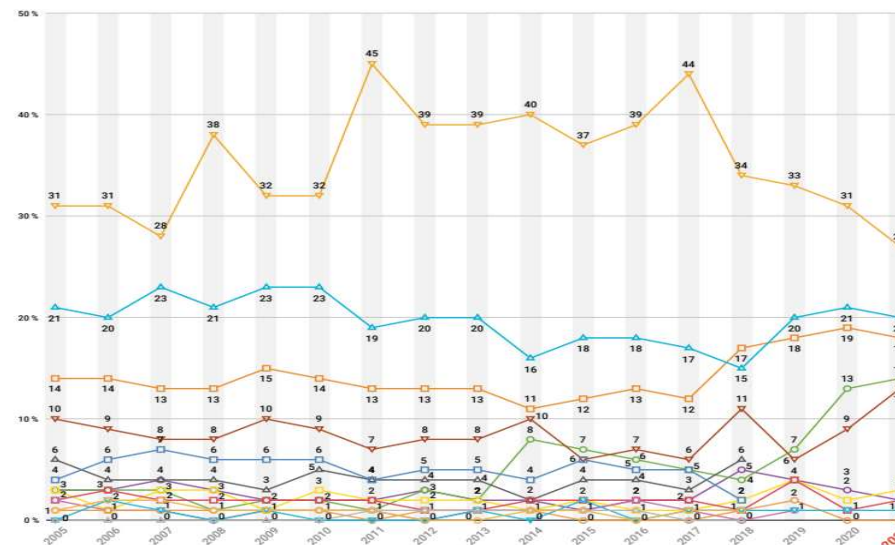
Barometer Part 1 – Facilities as potentials for disasters

QUESTION N°8



Which of the following industrial or technological activities do you think is most likely to cause a severe accident or a disaster in France?

ÉVOLUTION OF THE RESULTS
2005 - 2021



Concerns about accidents are overwhelming, « Nuclear » advantages are essentially seen in terms of economics, and safety is an important topic (incl. pros. and cons.)

Nuclear Power Plants still in 1st position with 27% but at a historically low level (44% in 2017), then radioactive waste disposal facilities (20%) and chemical facilities (18%)

Barometer Part 2 – The outlook of the French on Science and Expertise

QUESTION N°4



In general, do you have a good or a bad opinion of scientific experts?

NOVEMBER
2021

Good opinion

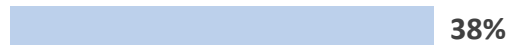


54%



+ 10 points than in May 2020 with Covid-19 first wave

Neither good nor bad



38%

Bad



8%

QUESTION N°1



Here are a number of propositions related to science. For each one, please indicate on the following scale whether you....

I trust scientific institutions



64%



+ 3 / 2020

The development of science and technology generates more benefits than negative effects



55%



+ 15 / 2017

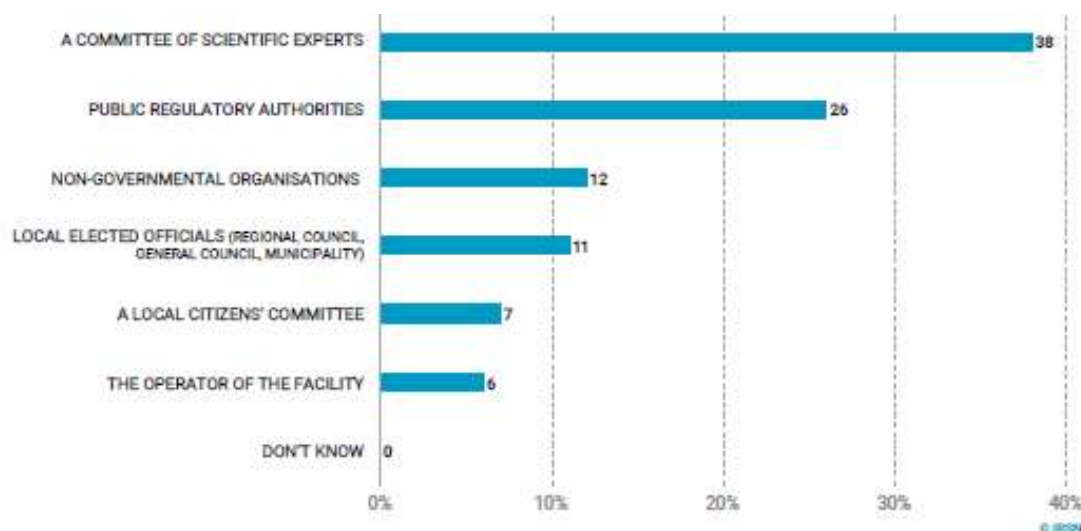
Barometer Part 2 – The management of high-risk facilities

QUESTION N°10



Regarding the oversight of the impact of a facility that poses risks to the environment and neighboring populations, who do you think should control the environmental and health impact outside the facility?

NOVEMBER
2021



- ☐ Scientific experts and Regulatory Authorities far ahead (/elected officials, operators)
- ☐ The increased use of scientific experts during the Covid-19 pandemic could have a long-term influence on the opinion that the French have of experts

Barometer Part 2 – Citizen participation

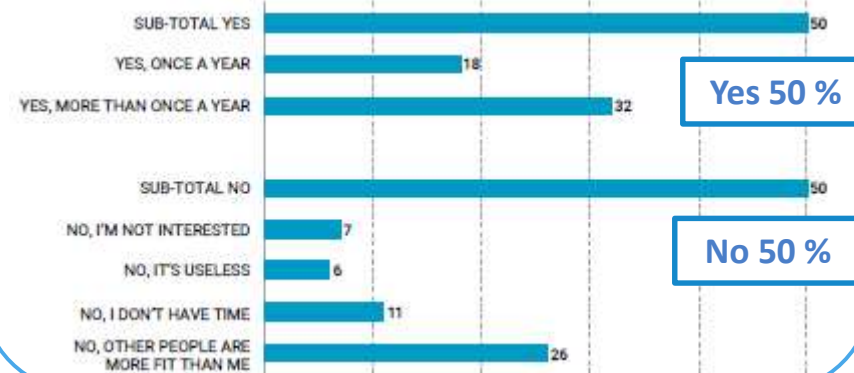
QUESTION N°11

A commission bringing together scientific experts, elected representatives, operators, NGOs, citizens and whose aim would be to deal with at-risk situations would be ...



QUESTION N°12

Would you be willing to spend time participating to information and consultation meetings on the management of a high-risk installation near your home? *



- ☐ Strong support for pluralism in risk assessment and interaction with experts
- ☐ 1 out of 2 French people is willing to participate , most of them more than once a year
- ☐ The main obstacle to French participation is a feeling of illegitimacy

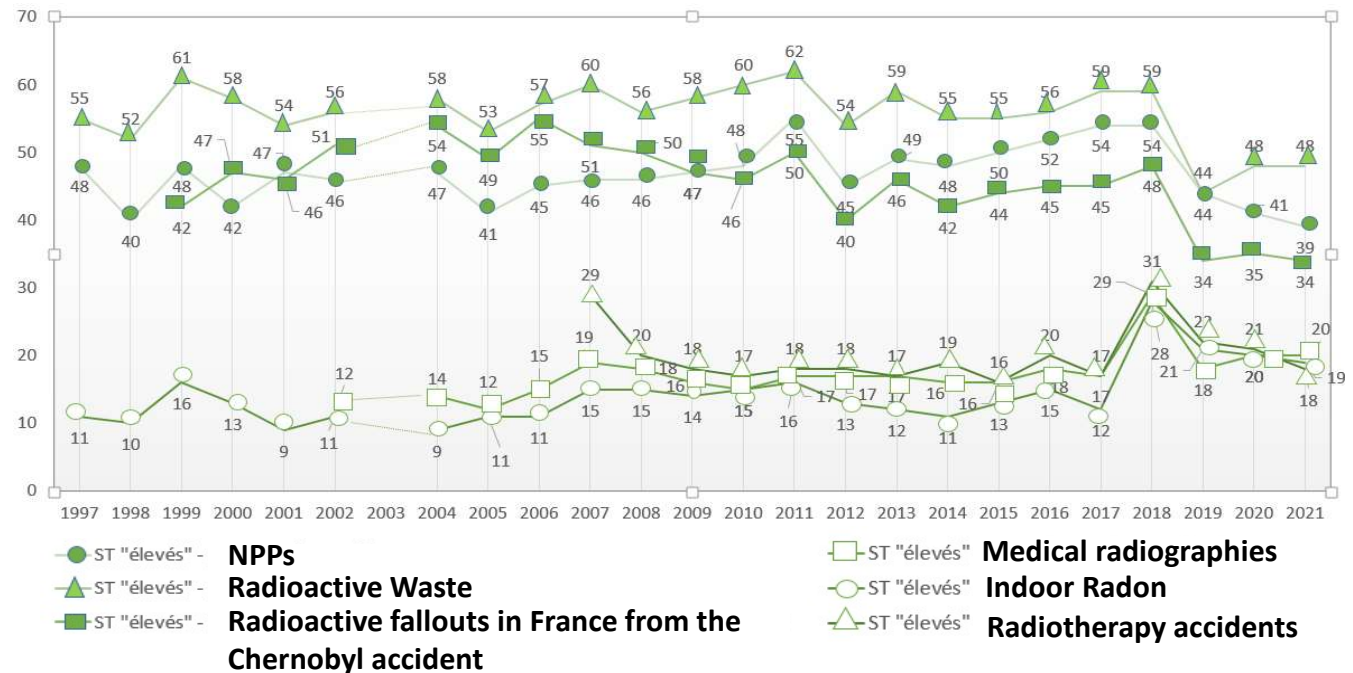
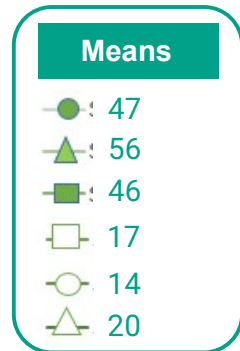
Barometer Part 3 – Perception of risks related to ionizing radiations

Question n°1



«In each of the following areas, do you consider that the risks for the French population in general are...(high, medium, low, don't know)»

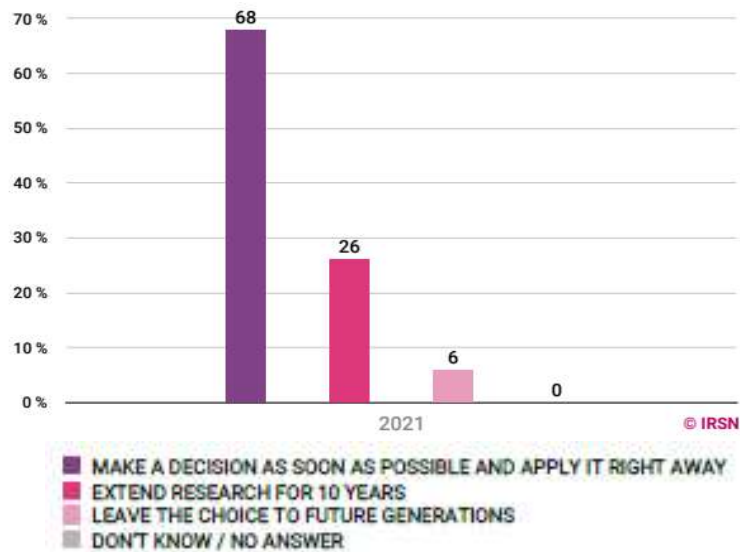
EVOLUTION OF THE RESULTS
1997-2021



- ❑ Radioactive waste at the top
- ❑ « High level » risks historically low since 2019

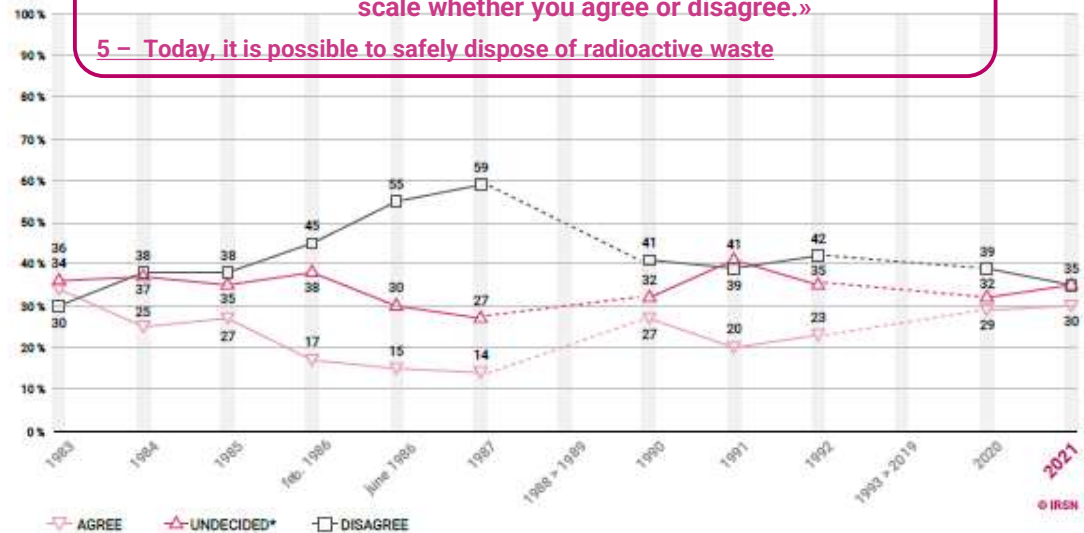
Barometer Part 4 – Radioactive Waste Management

QUESTION N°9 « To solve the radioactive waste problem, which solution sounds the most reasonable to you?»
 NOVEMBER 2021



QUESTION N°1 « Here are a number of proposals relating to nuclear facilities. Please indicate on the following scale whether you agree or disagree.»

5 – Today, it is possible to safely dispose of radioactive waste



- ❑ Nearly 7 out of 10 French people think that radioactive waste is a problem that call for a rapid decision and solution implementation
- ❑ But only 3 French people over 10 think that waste disposal is a safe solution

5 - IRSN approach for public information and participation



IRSN's Charter on openness to society (2009)



A policy of openness to society for a citizen vigilance to the risks, aiming at a shared understanding of complex issues regarding risk situations

- **3 commitments to improve risk assessment through a better interaction with society**
 - Enhance transparency
 - Share knowledge
 - Help stakeholders to acquire skills
- **3 commitments to implement openness to society**
 - Enhance ability to interact with stakeholders
 - Mobilize resources for stakeholders' involvement
 - Carry out an internal policy on openness to society



Charter shared with other French expertise and research institutes (health, food, environment, industrial and natural risks)

... and implementation (non exhaustive)

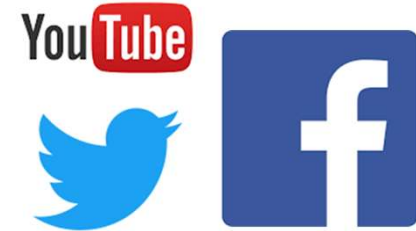
- In addition to the communication unit, **a dedicated “CS” (Civil Society) unit follows and coordinates actions, assists the technical units**
- **Internal organization : “CS” committee** (directors), a **network** of contact scientists for the CLIS (technical units managers)
- Enhancement of this **“culture”** through IRSN seminars (involving CS representatives), → motivated (thus better) implication of the experts
- **Extend appropriate parties to interact with** : Human Sciences, non-institutional experts, civil society constituted groups (pro's and con's), territorial bodies, local representative, youngsters and students
- **Build partnership with relevant parties :**
cooperation agreement between IRSN and ANCCLI (2003) : implementation (training, expertise on precise topics, implementation of coordinated actions) followed by a steering committee
- **Participate to HCTISN WGs, to the consultations held by the National Public Hearing Commission, to ACN...** : sharing IRSN / CS opinion and positions



Implementation means towards general public (Communication Unit)

➤ Public Information Network:

- Websites ([actualities](#), [assessments](#), [Knowledge base](#), [focus](#)),
- Annual reports,
- Magazines, Newsletters, Information Updates, YouTube, Twitter
- Press : Data Center, Releases, Conferences and travel, Trips for National and International Journalists



➤ Public Outreach Network

- Open Doors for Public and Media
- Congresses and public exhibitions
- Public Surveys
- Education & Information Programs for Primary School , High School & University, Education & Information Films
- Public Debates



(Openness to Society Unit)



Implementation : interactions with involved public (examples)

- Partnership between IRSN and CLI's in the Valley of the River Loire to improve the Communication on **Environment Monitoring Data** (2006-2008). It inspired IRSN to set-up the National Network of Radioactivity Measures in the Environment (2010), and allowed inter-CLI cooperation in the Loire Valley and consolidation of IRSN/CLI/ANCCLI relationship



- Since 2015 establishment of a continuous technical **dialogue on manufacturing anomalies during forging** operations of main coolant system equipment (co-organised by ANCCLI, CLI Flamanville, IRSN and ASN)

- A step further to the **“High Level Wastes” dialogue** (initiated in 2012), of a pluralistic exchange group related to the technical assessment of the safety option file of the CIGEO waste disposal facility is set up by IRSN in 2016



Technical dialogue on manufacturing anomalies during forging operations

- *Objectives:* help civil society to obtain accessible information on safety related issues with highly technical aspects

How?

- ❖ Several meetings with stakeholders: CLI, NGOs, non-institutional experts, authority, experts, operators
- ❖ Presentations of institutional expertise methodology and results at each assessment step
- ❖ Discussions about civil society concerns: how representative the tests are, defence-in-depth issues, margins, manufacturing inspections...



Lessons drawn:

- ❖ For civil society: better understanding and participation of decisions taken by the authority
- ❖ For experts: offer an overview of all the components that contribute to the safety margins

Continuous technical dialogue concerning the 4th periodic safety review of reactors

2014-2016: several meetings during the orientation of this safety review

- Development of ANCCLI's own view on important issues



2016: dissemination seminar to involve more CLI members

- An opportunity for the CLI and ANCCLI to expose their view and the way they could be involved in the process

2017-2018: three meetings during the expertise process

- Objective: gather questions on these subjects from civil-society
- 3 specific issues: conformity and ageing, protection against internal and external hazards, the prevention and mitigation of core meltdown accidents



Stakeholders involvement in post-Fukushima stress tests



3 seminars between civil society and experts to exchange about:

- ❑ Stress tests methodology
- ❑ Risks (sismic, flood, human factors...)
- ❑ IRSNs and other stakeholders analysis



- Early access to reports: key factor in the public involvement process
- CLI, ANCCLI and association analysis: also benefited to IRSN's expertise on the way

IRSN takes of 10 years of openness to society commitments

- Year after year, IRSN has responded to requests from CLI (Local Information Committees around each French nuclear facility) and their national federation (ANCCLI) to **share its knowledge** on nuclear safety, environmental monitoring and health of public and worker.
- Establishment of **continuous technical dialogues** conducted in partnership with ANCCLI on sensitive nuclear safety issues, particularly in the context of the 4th periodic review of 900 MWe reactors and in the context the radioactive waste storage project and the public debate on the 5th PNGMDR (National plan for the management of materials and radioactive waste).
- As **for participatory science projects**, initiatives such as OpenRadiation have enabled a wide sharing of citizen measurement of radioactivity in the environment, while pluralistic territorial initiatives were developed, particularly in relation to domestic radon risk management.



General feedback on benefits of Civil Society involvement

➤ Benefits for IRSN

- Improve the **credibility** of IRSN actions
- **Enhance the quality of our expertise** through the social stakeholders complementary point of view
 - **it is not a new way to communicate,
it is a new way to perform our expertise**

➤ Benefits for Civil Society

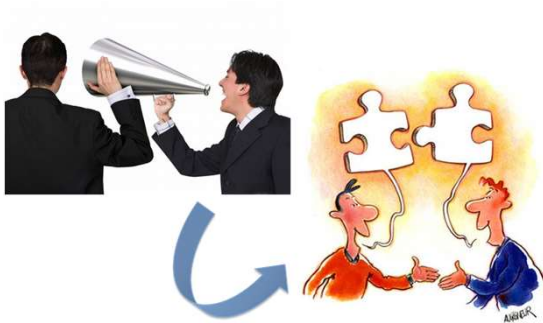
- **Build their own technical skills**
- « Gradually build a reciprocal understanding of expectations and constraints »
- « Facilitate the emergence of news ideas or hypotheses »
 - **it is a way to enhance safety through citizen vigilance**

More in-depth feedback on practical cases coming

FRENCH STRATEGY AND EXAMPLE OF EXPERIENCE

CONTENTS 2/2

6. Transparency & Communication actions towards the public around RWM
7. Initiatives involving exchanges and joint work with the French Civil Society
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**Transparency and Openness to Civil Society :
as a culture inherent to the way of working
and
implicating IRSN collaborators in
communication actions**

6 - Transparency & Communication actions towards the public on RWM

- Publication of expertise (reviews)
- RWM website
- Open Days

RECHERCHE ET EXPERTISE DE L'IRSN
Connaître et prévenir les risques liés à la gestion des déchets radioactifs

Accueil | Actualités | **Déchets radioactifs** | Recherche | Expertise | Dialogue avec la société | Médiathèque

Accueil > Les déchets radioactifs

La gestion et le stockage des déchets radioactifs

La production d'électricité, mais aussi les hôpitaux, les universités et certaines industries non nucléaires génèrent des déchets radioactifs.

Les déchets radioactifs

- La gestion et le stockage des déchets radioactifs
- Définitions, classement
- Mode de gestion des déchets radioactifs

Les mystères de l'eau dans l'argile
L'IRSN vous ouvre sa station expérimentale à Tournemire

Dimanche 17 juin 2018

Connaître et prévenir les risques liés au stockage géologique des déchets nucléaires

3:57

Transparency & Communication - EXPERTISE



Publication of review notices and reports : a change of culture over the past 15 years



- Formerly "hermetic" writing: just needed to be understood by the authority, no explanation of the experts findings, and centered on “recommendations”
- For RWM, publication felt needed by IRSN with the 1st public debate in 2005 on the feasibility of geological disposal as Andra (WMO) produced a public safety case
 - need to make known the detailed technical assessments by the TSO
 - this detailed review report was the first by IRSN to be made public, although it was not written for this purpose -- **acknowledgement from civil society representatives**
- From then on, it evolved:
 - IRSN guidelines were edicted for drafting notices and reports
 - IRSN proposed a list of notices/reports he wanted to publish to ASN, who gave the go to IRSN, once its decision was made public too.
- From 2015, all assessments are public** (by law), without waiting for ASN decision

Transparency & Communication - EXPERTISE



**Publication of review notices and reports :
a change of culture over the past 15 years**



Reports and notice are made for the Authority to have the technical inputs to elaborate its decision and must also allow interested CS parties to access to due information

Internal guidelines:

- self-supporting text with contextualization
- explanations, arguments, calculations..., to support the assessment
- search for concision
- make recommendations but also recognize what is relevant, high quality
- (if necessary, an unpublished document, for ASN with additional technical elements, e.g. confidential matters for industry or security)

Still evolving: **commented reviews**, didactic, written or video format



Transparency & Communication – RWM WEBSITE



A IRSN website devoted to RWM

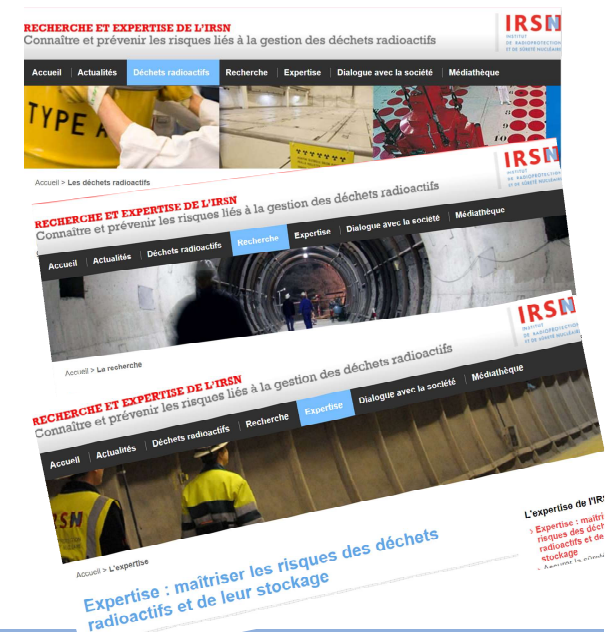
IRSN assessments, the research and other activities conducted are made public through a main website and diverse specific ones

For RWM

- deemed as necessary in the context of the public debates about deep underground repository (conceived and driven by the “Waste” department)

➤ **challenge** : which public(s) to aim at and how?

- focused on key issues and civil society concerns / questions
- contents was thought by the safety experts and researchers



Transparency & Communication – RWM WEBSITE

The image shows a screenshot of the IRSN website with several annotations in blue callouts and boxes:

- Radioactive wastes**: A blue box at the top left of the page content.
- News**: A blue box pointing to the 'Actualités' (News) section on the left sidebar.
- Menu : generalities about wastes and RWM**: A blue oval pointing to a central menu with the following items:
 - La gestion et le stockage des déchets radioactifs
 - Définitions, classement et modes de gestion des déchets
 - La gestion pour les déchets à vie longue
 - Le stockage en couche géologique profonde à l'international
 - Le stockage en couche géologique profonde en France
 - Vidéo: ce qu'il faut savoir sur le stockage des déchets radioactifs
- « Waste » News page**: A blue oval pointing to the 'Nos dernières actualités' (Our latest news) section on the left sidebar.
- Link to « IRSN » news page**: A blue oval pointing to the 'A voir également : Les dernières actualités de l'IRSN' (Also see: The latest news from IRSN) link on the right.
- One of most difficult tasks is to keep the site « on the move »**: A brown box pointing to the 'Nouvelles publications scientifiques dans le domaine de la recherche sur le stockage géologique des déchets radioactifs' (New scientific publications in the field of research on the geological storage of radioactive waste) article.

Transparency & Communication – RWM WEBSITE

Research

Accueil | Actualités | Déchets radioactifs | Recherche | Dialogue avec la société | Médiathèque

Accueil > La recherche > Une variété d'outils > Une station expérimentale

Une station expérimentale à Tournemire

Un laboratoire grandeur nature

En 1992, l'IRSN (alors Institut de protection et de sûreté nucléaire – IPSN – rattaché au CEA) a acquis la station expérimentale de Tournemire, dans laquelle il mène des expérimentations depuis 1993. L'objectif était d'acquies des connaissances méthodologiques et phénoménologiques sur ce type de roche, potentiellement intéressant pour un futur stockage de déchets radioactifs, mais jusqu'à lors peu étudié en France.

La sélection par la suite par l'Andra d'un site en Meuse/Haute-Marne pour y installer un éventuel stockage dans une formation argileuse de même type, a renforcé l'intérêt de ce laboratoire souterrain. C'est un outil fondamental pour l'IRSN, permettant d'étudier les propriétés de confinement de la roche argileuse et les performances de certains composants d'un stockage dans le but d'assurer une expertise indépendante de l'Andra.

Situé dans un ancien tunnel ferroviaire de près de 2 km de long creusé entre 1882 et 1888, ce laboratoire grandeur nature est utilisé à des seules fins de recherche scientifique et technique. Il n'est en aucun cas destiné à accueillir un jour des déchets radioactifs. De plus, aucun composant radioactif n'y est introduit au fil des recherches.

General approach

Au service de l'expertise

La station expérimentale est située dans le bassin des Grands Causses, en bordure sud du Massif Central (au sud de l'Aveyron). Le tunnel centenaire traverse la formation argileuse jurassique [1] du Tournemire [2]. La couche argileuse, composée d'argilles et de marnes, s'est déposée en domaine marin il y a environ 180 millions d'années. Située entre 200 et 250 mètres de profondeur, elle mesure 250 mètres d'épaisseur et est encadrée par des formations calcaires dans lesquelles circulent des aquifères. De par sa configuration géologique et la nature des roches, ce site expérimental présente de larges similitudes avec celui étudié par l'Andra en Meuse/Haute-Marne, mais la présence d'une faille régionale hydrauliquement active et de failles plus locales, constituent des conditions extrêmes (par comparaison avec le site de l'Andra où de telles discontinuités n'ont pas été identifiées) pour l'évaluation des propriétés de confinement d'un milieu argileux à l'échelle de millions d'années.

Les études géologiques sont abordées dans le cadre de plusieurs programmes de recherche menés depuis 1990 au moyen de différentes techniques d'observations et d'analyse : à partir de la surface, du tunnel, des six galeries excavées depuis 1996 et des nombreux forages (plus de 250) réalisés dans le tunnel et les galeries, selon différentes directions. La connaissance géologique du secteur constitue la base nécessaire pour le développement des différents programmes de recherche et pour le choix des zones d'expérimentation. Celle-ci apporte des informations nécessaires pour le test de méthodes

La recherche de l'IRSN

- Des recherches à finalité d'expertise
- Une variété d'outils
- Une station expérimentale à Tournemire
- Un laboratoire grandeur nature
- Contenu géologique
- Failles et fractures
- Un tunnel centenaire
- 1000 : Permettre les premières études géométriques
- 2003 : Instrumenter le tunnel
- 2005 : Étudier la zone d'implantation
- Adopter les techniques de forage
- Un laboratoire en la-de-France
- Des modèles numériques
- Des programmes de recherche solide
- Des simulations à différentes échelles
- Les projets de recherche européens

En images

Médiathèque

- > Documentation
- > Vidéos et Animations
- > Publications scientifiques
- > Des modèles numériques
- > Connaître la géologie de la roche-hôte
- > Prévoir le comportement mécanique de la roche
- > Évaluer les transferts de radionucléides dans la roche
- > Assurer le scellement final d'un stockage
- > Évaluer les perturbations dues aux infrastructures
- > Des simulations à différentes échelles

list of scientific publication

Focuses through university links and IRSN leaflets

Transparency & Communication – RWM WEBSITE

The screenshot shows the IRSN website's 'Expertise' section. The main heading is 'L'expertise La sûreté d'un stockage géologique : l'expertise du dossier Cigéo'. Below this, a box labeled 'IRSN General approach' points to the text describing the IRSN's mission and its role in ensuring the safety of geological storage. Another box labeled 'list of related assessments' points to the 'Avis de l'IRSN' section, which lists various assessments and reports. A third box labeled 'IRSN Assessment presentation' points to the 'Avis de l'IRSN sur le choix par l'Andra de la zone d'intérêt pour la reconnaissance approfondie (ZIRA) dans le secteur de Meuse/Haute-Marne'. A fourth box labeled 'IRSN notice' points to the 'Rapports de l'IRSN présentés aux Groupes permanents d'experts'. A fifth box labeled 'Link to IRSN main site' points to the 'Avis de l'IRSN' section. A sixth box labeled 'ASN notice' points to the 'Rapports de l'IRSN' section.

Expertise

L'expertise
La sûreté d'un stockage géologique : l'expertise du dossier Cigéo

Dans le cadre de sa mission générale, l'IRSN mène des expertises sur la sûreté de l'ensemble des opérations associées à la gestion des déchets issus des installations nucléaires de base, et en particulier le stockage en couche géologique profonde des déchets radioactifs à moyenne ou haute activité et à vie longue [1]. Ces expertises mobilisent les ingénieurs et chercheurs de l'institut, qui contribuent au développement des connaissances sur les risques et des méthodes d'évaluation.

En France, la responsabilité de concevoir et de réaliser un éventuel stockage en couche géologique profonde a été confiée à l'Andra, l'Agence nationale pour la gestion des déchets radioactifs. La loi de programme du 28 juin 2006 relative à la gestion durable des matières et déchets radioactifs définit le cadre pour la réalisation d'un tel stockage et en précise le calendrier. En application de cette loi, l'Andra conduit des études et recherches en vue de choisir un site et de concevoir un centre de stockage avec pour objectif d'aboutir en 2015 à une demande d'autorisation de création et, sous réserve de cette autorisation, à une mise en exploitation en 2025. Dans ce but, l'Andra a installé un laboratoire souterrain en Meuse/Haute-Marne afin d'évaluer la possibilité de créer un tel stockage de déchets (projet Cigéo) dans la formation argileuse profonde.

Une expertise fondée

Pour sa part, l'IRSN a la charge d'appliquer la loi du 28 juin 2006. L'IRSN assure les étapes du processus et aide les parties prenantes à la mise en œuvre d'un tel stockage en matière de sûreté et de protection de l'environnement. Cette expertise est restituée sous forme d'avis, comme ce fut le cas en 2006 sur le dossier de faisabilité d'un stockage en formation argileuse préparé par l'Andra, en application de la loi du 30 décembre 1991 [2].

Il est impératif qu'un stockage géologique de déchets radioactifs soit conçu dans des conditions garantissant, dans le temps, la protection de l'homme et de l'environnement. La sûreté du stockage est fondée sur le principe d'interposition de barrières multiples entre le déchet et la biosphère : les colis de déchets, les ouvrages du stockage et le milieu géologique. L'évaluation de sûreté consiste notamment à apprécier la capacité de ces barrières à maintenir un haut niveau d'efficacité sur le long terme et à vérifier que d'éventuelles défaillances de certains composants du stockage ne conduisent pas à des conséquences inacceptables pour l'homme et l'environnement.

L'expertise de l'IRSN

- Expertise : maîtriser les risques des déchets radioactifs et de leur stockage.
- Assurer la sûreté de la gestion de tous les déchets radioactifs.
- La sûreté d'un stockage géologique : l'expertise du dossier Cigéo.
- Etablir des guides de sûreté à très longue échéance.

Avis de l'IRSN

Avis de l'IRSN sur le choix par l'Andra de la zone d'intérêt pour la reconnaissance approfondie (ZIRA) dans le secteur de Meuse/Haute-Marne

Avis de l'IRSN sur les commentaires de l'Andra relatifs au rapport de l'ITER concernant les recherches effectuées par l'Andra pour définir une Zone d'Intérêt pour la Reconnaissance Approfondie (ZIRA)

Avis de l'IRSN sur les évolutions du projet Cigéo depuis le Dossier 2006, au stade du jalon "Jesse01"

Rapports de l'IRSN présentés aux Groupes permanents d'experts

- Rapport de l'IRSN sur la sûreté relative à la maîtrise des risques en exploitation du projet Cigéo.

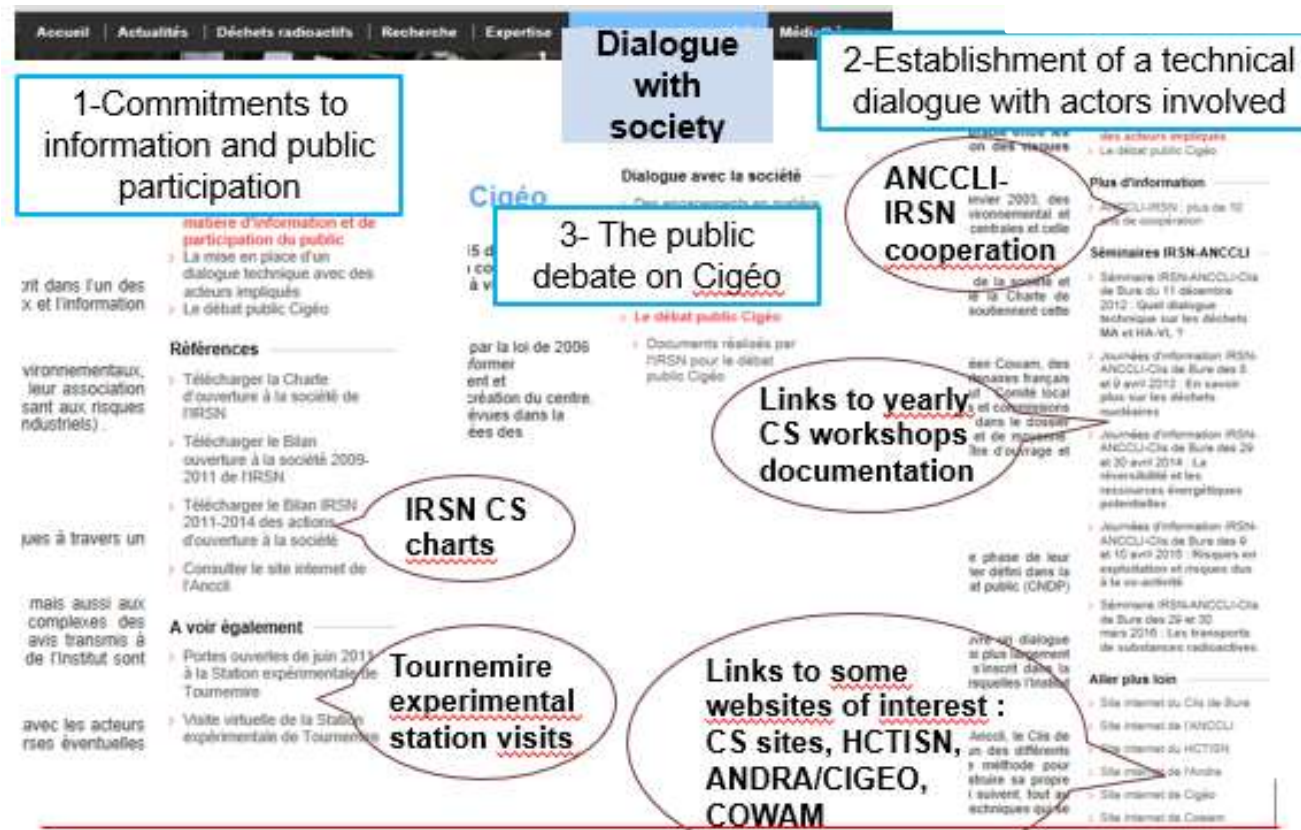
IRSN Assessment presentation

IRSN notice

Link to IRSN main site

ASN notice

Transparency & Communication – RWM WEBSITE



Transparency & Communication – RWM WEBSITE

The screenshot shows the IRSN website with a navigation bar at the top: Accueil | Actualités | Déchets radioactifs | Recherche | Expertise | Médiathèque. A blue box labeled "Dialogue with society" points to the "Médiathèque" link. A light blue box on the left contains the following text:

3- Documents produced by IRSN for the Cigéo public debate :

- share the knowledge and experience acquired over more than 20 years
- allow everyone to position themselves on the basis of the widest possible information

Below this, a white box with a blue border contains the text: "N pour le débat public". To the right, a section titled "Dialogue avec la société" lists: "Des engagements en matière d'information et de participation du public", "La mise en place d'un dialogue technique avec des acteurs impliqués", and "Le débat public Cigéo". Below this, a section "A lire aussi" features a booklet titled "RWM Thematic booklet" and a magazine cover titled "Repères" labeled "Special issue of IRSN magazine".

Annotations on the screenshot include:

- A white box pointing to a document titled "En particulier, vous trouverez le cahier d'acteurs de l'IRSN qui décrit, de manière synthétique, le rôle de l'Institut sur le site de stockage" with the text: "booklet summarizing the **Institute's position**".
- A white box pointing to a document titled "Fiches thématiques sur les risques" with the text: "2 set of thematic sheets concerning the key safety issues associated with the storage project to shed light and clarify IRSN positions on various technical and scientific aspects associated with these issues, based on all the expert work and research conducted (9 on risks, 12 on IRSN research)".

Transparency & Communication – RWM WEBSITE



Medias

Médiathèque
Vidéos et animations

importance of
short videos



Le dialogue autour du projet Cigéo



Visite virtuelle de la Station expérimentale de recherche de l'IRSN à Tournemire



Qu'est ce qu'un déchet radioactif ?



Quelle quantité et quelles sortes de déchets radioactifs y-a-t-il en France ?

Médiathèque

- > Documentation
- > Vidéos et Animations
- > Publications scientifiques
- > Photos

14 videos
for FAQ



Transparency & Communication – OPEN DAYS at the Labs, including URL

■ When the teams meet the local public (~ every 3 years, during a week-end, for the URL)



Transparency & Communication – OPEN DAYS at the Labs, including URL



Enabling the public to approach RWM disposal topics often wrongly perceived, and presenting IRSN research

- A **challenge** for the teams
- 40 staffs involved, 900 visitors
- **Visits of the URL** are conducted by the researchers accompanied by safety experts, focused on research programs issues:
 - Answering any question,
 - Stimulating awareness of the public
 - explaining the role of IRSN
- Besides: general presentations, experiments for kids, posters & **discussion area...**
- **Always motivating, exciting, inspiring...**
...gives meaning to what each of us do!



7 - Initiatives involving exchanges and joint work with the French Civil Society

- HLW ILLW technical dialogue
- Review of DGR Safety Options
- Feedback from the WIPP Accident
- Public Debate on national RWM Plan



Exchanges and joint works - The “HLW-ILLW TECHNICAL DIALOGUE” initiative



Technical seminars as a start

- Difficulties for CS to apprehend such a complex project (even though ANDRA, IRSN and ASN documentation have been published since 2005)
- Evolution of the ANDRA's project since the first debate



Launched in 2012 by
ANCCLI
Clis de Bure
IRSN

Not to be a “one shot”,
but to create regular
meetings along the
project development
process → dedicated
steering committee

Exchanges and joint works - The “HLW-ILLW TECHNICAL DIALOGUE” initiative



Technical seminars as a start

How ?

- **Annual WORKSHOPS** on topics identified by the stakeholders (inventory and RWM routes, reversibility, natural resources, fire hazards, radiological protection, transport...), accounting for participants feedback from one to the other workshop
 - participation of **different kinds of stakeholders**: CLIS de Bure, ANCCLI, non-institutional experts, citizens involved in former public debate, authorities, TSO, WMO, producers, experts from public or private entities ... (~ 100 attendees)
 - 2 days with overviews (institutional expertise methodology and results) and topical **talks**, associated to large timeslots for **discussions**
 - Added value for communication on the SC review and thus on SC but **additional tools needed to deepen interactions**
- ❖ Set up in 2016 of an **EXPERIMENTAL APPROACH** related to the technical assessment of the safety option file of the Cigéo deep disposal facility

Exchanges and joint works - The REVIEW of DGR Safety Options



Involving civil society in a key-step of the DGR Cigéo project

Objectives:

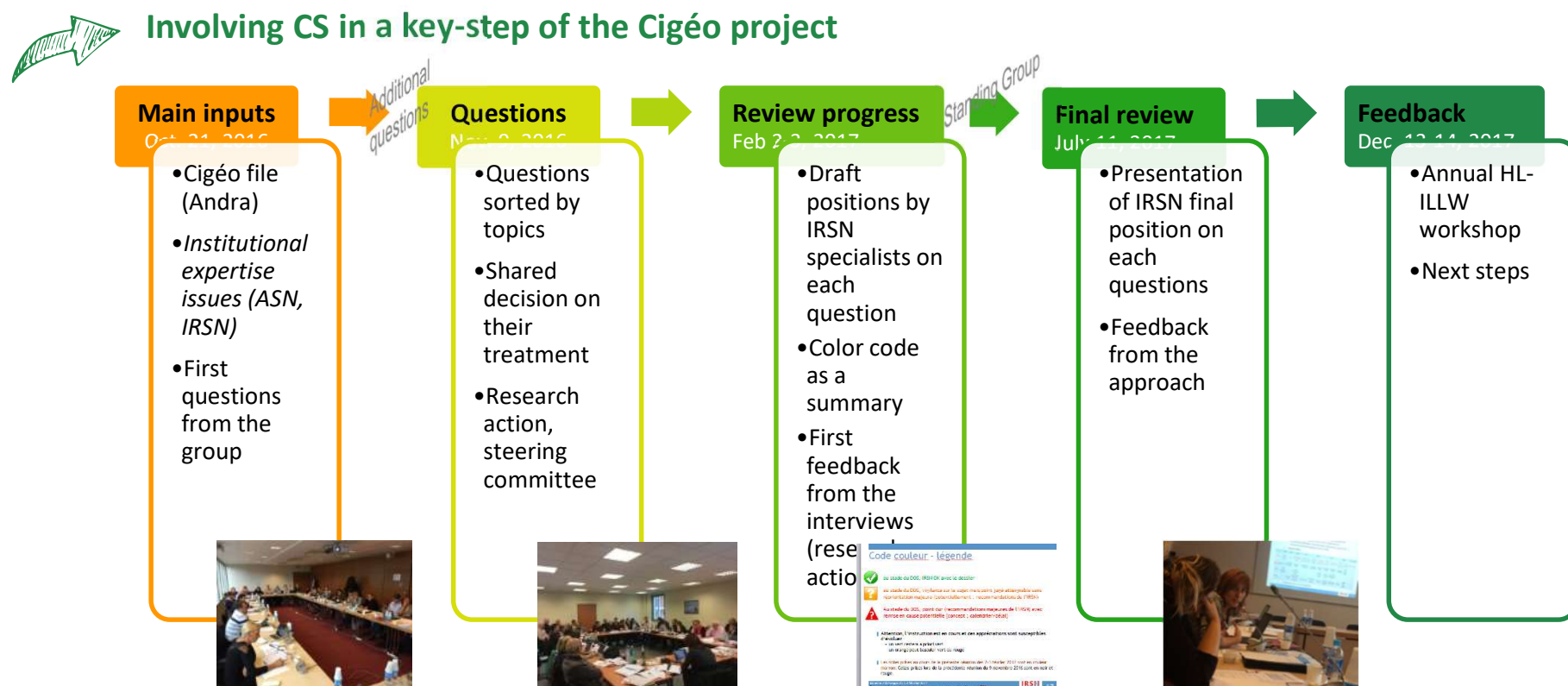
- take into account the civil society (CS) expectations during the assessment process itself
- define new ways of interaction between CS and the IRSN on questions with a high society challenge

How ?

- Set up of a **pluralistic exchange group** (~20) of CS along the review process
- Involve IRSN researchers, safety reviewers, experts in social sciences, concertation engineerin

Exchanges and joint works - The REVIEW of DGR Safety Options

Involving CS in a key-step of the Cigéo project



Exchanges and joint works - The REVIEW of DGR Safety Options



Involving CS in a key-step of the Cigéo project

47 questions from the group → 6 topics

Code couleur - légende

- au stade du DOS, IRSN OK avec le dossier
- au stade du DOS, vigilance sur le sujet mais point jugé atteignable sans réorientation majeure (potentiellement : recommandations de l'IRSN)
- Au stade du DOS, point dur (recommandations majeures de l'IRSN) avec remise en cause potentielle (concept ; calendrier/déla)

Attention, l'instruction est en cours et ces appréciations sont susceptibles d'évoluer

Sûreté en exploitation - Incendie

L'analyse par l'Andra du risque "incendie" est-elle correcte ? (2/2)

2017 sont en couleur
2016 sont en noir et

Les déchets - Modèles de relâchement des RN

Caractérisation de l'état de la matrice des déchets vérifiés (hypothèses prises notamment sur la fracturation - confinement)

Contamination - Contamination

Contamination dans l'installation souterraine, contamination en surface ?

IRSN

Waste

- Inventory
- Characteristics
- Undetected nonconformity

Retrievability, Closure

- Reversibility/retrievability objectives
- Assets & drawbacks / safety

Transversal issues

- Modelling, scenarios
- Costs

Operational safety

- Geotechnics
- Fire hazard, explosion hazard...
- Releases, radiological impact

Pilot phase

- Process
- Timing

Post-closure Safety

- Sealing
- Natural Ressources
- Impact

Exchanges and joint works - The REVIEW of DGR Safety Options



Involving CS in a key-step of the Cigéo project

Experimental approach :

- Main outlines/constraints shared at its start and then **co-building of the format**
- Participants from the pre-existing network of contacts (among which opponents)
- Strong expectations and lots of unknown on the results
- Research action to improve this initiative

Some lessons learnt

For the CS

- *enhanced understanding of technical issues, various level of concern / safety*
- *clarification of IRSN's role and working methods*
- *participation in the process rather than presentation of conclusions one's done, multi-step close exchanges over several months highly appreciated*

For IRSN

- *technical issues more developed in the review report than would have been without this initiative (eg. bacterial activity, reversibility/retrievability..)*
- *Topics need further preparation/exchanges (radiation protection and interpretation of low doses, inventory, impact other than radiological, costs...)*

Shared willingness to go on with such type of approach

Interactions ahead of the licence application eg through the PEP (see SITEX presentation)

Exchanges and joint works - The REVIEW of DGR Safety Options



Involving CS in a key-step of the Cigéo project

- Gradually build a reciprocal understanding of expectations and constraints, including on the Safety Case
- Facilitate the emergence of new ideas or hypotheses
- Enhance the quality of the technical expertise through the social stakeholders complementary point of views

- ❑ an efficient way to share the safety case issues – SC as an interaction tool
- ❑ allows us enhancing safety through citizen vigilance
- ❑ a new way to carry out our expertise

- ❑ Plans for the licence application review:
 - 3 years technical review
 - extended group(s)



Exchanges and joint works – JOINT STUDY OF Feb. 2014 WIPP ACCIDENT

WIPP, a **deep geological repository** for radioactive waste located in New Mexico (USA), has been designed to accommodate, within cavities dug in the salt at a depth of about 660 meters, 176,000 m³ of **transuranic waste** (including Americium and Plutonium), from American defense-related nuclear activities (military research and the production of nuclear weapons). After 15 years of operation, the repository experienced, **in February 2014, two significant events: a fire in the northern part of the underground facility and then, 9 days later, a release of radioactive material in the southern part of the facility.**

■ IRSN published an information note based on the public data; a **CS member of the ASN's Advisory Committee** assisted by a Franco-American scientist began to collect information → joint work

- Context, history, stakeholder mapping, characteristics of the facility,
- Factual description of the accidents, factual analysis of the causes (from the Accident Investigation Boards), whether material, human or organisational - Remediation phase of the facility
- Role and relationships between institutional and non-institutional regarding the communication modes and topics addressed (information, questions and answers)



But...disagreements on what conclusions can be drawn



Exchanges and joint works – JOINT STUDY OF Feb. 2014 WIPP ACCIDENT

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- Context, history, stakeholder mapping, characteristics of the facility,
- Factual description of the accidents, factual analysis of the causes (from the Accident Investigation Boards), whether material, human or organisational - Remediation phase of the facility
- Role and relationships between institutional and non-institutional regarding the communication modes and topics addressed (information, questions and answers)
- **Set of conclusions that can be shared by the authors** on the feedback that can be drawn from accidents, 5 major areas: compliance with requirements and the role of institutions, politico-economical aspects, technical concepts and choices, organisational and human factors, communication in and out of the crisis period.

However, each of them may be led to present their own visions, based on the same material. In the end, this is what constitutes the richness of the pluralist work that has been carried out

Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



An integrated vision of the radioactive materials and waste management at the national level



- Since, 2007, updated every 3 years (→ 5 years)
- A management tool used to be elaborated jointly by the Ministry of Environment (MTES) and the nuclear regulatory body (ASN) (→ MTES, implementation supervised by the ASN)
- For the first time : a public debate on the 5th edition of the plan, with focus given by the « client » (MTES, ASN) to:
 - Reclassification of materials as waste
 - New capacities of SF storage
 - Management of VLLW
 - Optimisation of LL-LLW routes
 - Cigéo: pilot phase, reversibility

Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



Debate implemented by the National Commission for Public Debates



- An administrative Authority dedicated to the fulfilment of participative democracy, the sharing of decisions and their legitimacy on major infrastructure projects
- Informs French citizens and ensures the recording and accountability of their diverse points of view
 - organizes the debate
 - provides information sharing platforms
 - provides minutes and conclusions
 - ensures the follow-up of answers
- ❖ **Neutral** (boycott of public hearings organized by the operator)



Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



Diverse stakeholders and interests, 10 months process



- *Responsible for the elaboration of the Plan*
- *Public expert on radiological risks*
- *producers of radioactive materials & waste*
- *WMO in charge of RW inventory and disposal*
- *Civil society representatives & NGOs*
- *Unions and mediatory bodies*
- *Research entities*
- *Individuals*

MTES, ASN

IRSN

EDF, Orano, CEA, hospitals, Institutes...

Andra

Global Chance, WWF, Greenpeace, FNE...

MEDEF, CGT, CFTD...

CNRS, Universities, CEA...

April-
September
19

• Pubic Debate



February 20

• Answer from
MTES and ASN

November 19

• Commission report

Consultations
Process

Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)

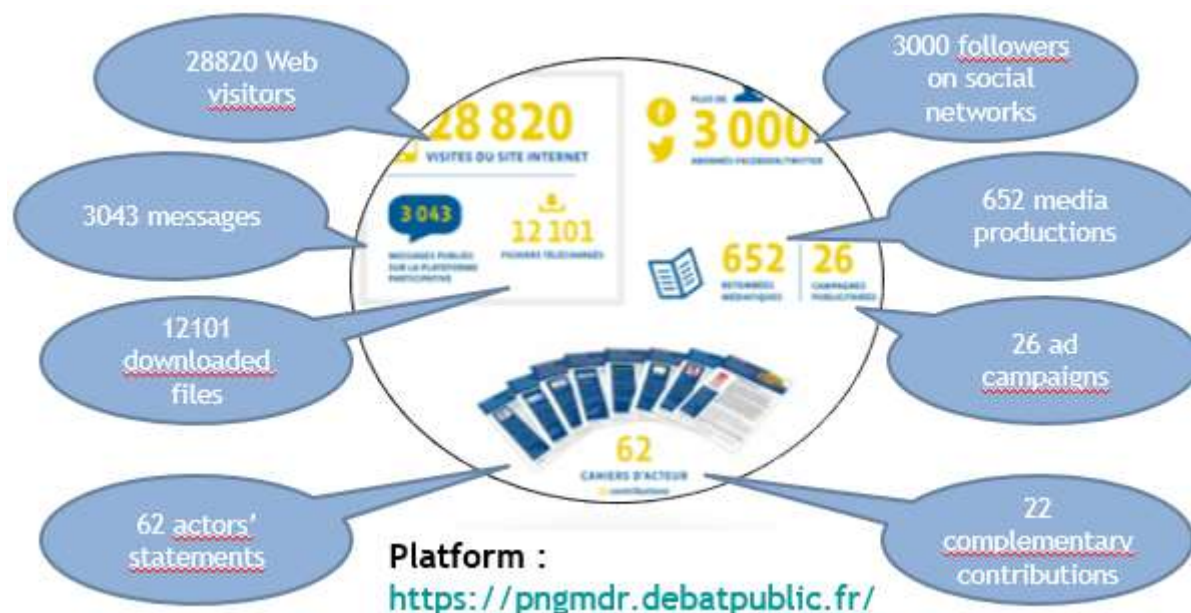


A combination of tools along the 6 months formal debate : classical and more innovative

- 23 meetings + 5 « mobile » debates in 24 cities
- 3400 participants in persons



- Web tools with written contributions



Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



A combination of tools along the 6 months formal debate: classical and more innovative

❖ Preparatory phase

Interviews of actors by the 8 CPDP members → identification of 16 other topics (environmental impact, U mining sites, transport, governance, costs...)

■ ‘controversies’ clarification

→ allow the public to appropriate the differences in argumentations



IRSN requested for additional documents on dry storage and on alternatives to DGR



❖ Debate implementation

■ **Mirror Group:** 14 non-knowing persons, 3 week-ends → citizen notice



■ **Workshop of Young Generation:** 40 students, 1 week-end, serious game PEP developed and implemented by SITEX.Network



Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



IRSN contributions

❖ Personal involvement

- Researchers, safety reviewers, not only managers
- Fears but usefulness, acknowledgement, gratification



Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



2 key lessons learned by the Public Debate Commission



Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



2 key lessons learned by the Public Debate Commission



❖ Ethics and governance

- The arguments developed by the public since the first nuclear debates in 2005 have little evolved in their content but strongly in their hierarchy
- Arguments regarding ethics and governance now have a prominent place
- The public is waiting for its participation to be extended to strategic choices, not just operational management choices

❖ Warnings about the influence on the decisions

- The "ordinary" public deserted the institutional arena of public debate considering that it has no impact on the decision makers, a consideration argued by past decisions of the government
- The participants in this public debate, in particular the opponents, demonstrated their confidence in existing institutional procedures to arrive at reasoned and transparent decisions. Betraying this trust would lead to discredit institutions, participation, and therefore to fuel the discourse of mistrust and violence

Exchanges and joint works – 1st PUBLIC DEBATE ON RWM PLAN (PNGMDR)



As a synthesis by the Public Debate Commission

❖ On the topics submitted by the Authorities (MTES, ASN)

Materials vs Waste

- Reprocessing of SF
- Waste classification when utilisation is not guaranteed
- Adaptation in time, depending on technological evolutions

New capacities of SF storage

- Needed by 2030
- Impact of recycling policy
- Modalities (dry or water pool)

Management of VLLW

- Clearance level or ad hoc derogation from the zoning principle
- Sensitivity to traceability, control (efficiency and independancy)
- civil society association to potential evolution

Optimisation of LL-LLW routes

- No unique solution due to the heterogeneity of this category
- Additional technical expertise needed to feed public participation to decisions, including territorial impacts

Cigéo: pilot phase, reversibility

- No real debate on the pilot phase but on retrievability
- Subsurface storage and research on transmutation as an alternative to DGR
- Effective public participation to the decision making process on the long time frames

“it was not intended to decide between the options, but to enlighten by its contributions the decisions which the public power will have to take”

8 - Participation to international level initiatives involving Civil Society



European level initiatives



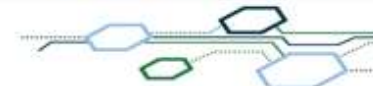
The **SITEX**.Network

A plurality of views for a strengthened RWM safety

Sustainable network for Independent Technical Expertise on radioactive waste management



<http://sitex.network>



European level initiatives – SITEX.Network



« Enhance and foster cooperation at international level in order to achieve a **high quality expertise function, independent** from organizations responsible for the implementation of waste management programmes, aiming at **supporting the Nuclear Regulatory Authorities**, as well as the **Civil Society**, in the field of safety of radioactive waste management »



European level initiatives – SITEX.Network



R&D related activities

- **Expertise Function Strategic Research Agenda (SRA)** in the field of RWM
 - Initial version used develop the EURAD European Joint Program (EJP)
 - Workshops for developing the Social and Citizen Sciences Topic in the SRA
- **Coordination of the Expertise Function interest within EURAD EJP**
 - TSOs representatives in EURAD PMO and Bureau
 - Gather the EURAD TSOs and **SITEX.Network** members views as inputs to the EJP, including CS groups
- **Topical Days**
 - Recent PhDs in social sciences on RWM governance (Slovenia, 2019)
 - Deep Borehole Repository of HLW and SF - State of knowledge by SITEX.Network



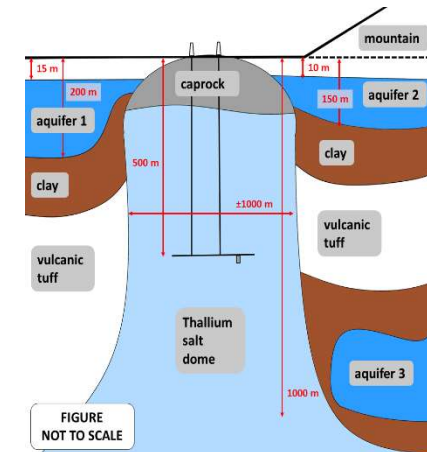
European level initiatives – SITEX.Network



Safety review related activities



- A **Guidance** for the technical review of Safety Cases for geological disposal facilities
- **Position papers** on interpretation and proper implementation of safety requirements for geological disposal (WAC, site characterisation, optimisation of protection, operational issues / post-closure safety)
- **Benchmark on Safety Case reviewing approaches**
 - fictive safety case developed in the context of the site selection of a geological disposal facility (safety strategy, design, assessment basis...), with a focus on a human intrusion scenario caused by deep geothermal energy activities
 - Different roles played: WMO, NRA, TSO, CS groups
 - Workshops to present the fictive SC, gather the feedbacks in view of an update, then share the assessment by the actors
 - **Lesson learnt in terms of interactions and review approaches**
- **Review on Deep Borehole Disposal**



European level initiatives – SITEX.Network



REVIEW ON DEEP BOREHOLE REPOSITORY

R&D
related
activities

Safety
Review
related
activities

Training &
Tutoring

Interaction
with civil
society
groups

Approach

- Investigate the main outcomes from previous borehole disposal concepts

- Provide an overview of the new DBR concepts to

- help each of us identifying the **pros & cons of DGR and DBR options** regarding the following topics...

- Debate in a “Topical Day” workshop



Safety of DBR



Answers to social concerns



R&D needs



Regulatory needs

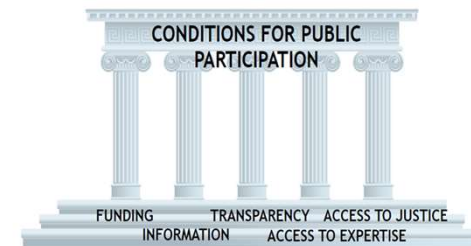
[Deep Bore Hole Repository for High Level Waste Report | SITEX_Network](#)

European level initiatives – SITEX.Network



Interaction between Expertise and Civil Society functions

- **Conditions and means** for developing interactions with CS
 - How could CSOs concerns be integrated in R&D activities of the Expertise Function?
 - How safety culture for RWM can be shared through different stakeholders, including CS?
 - Intergenerational governance
- The **Serious Game PEP** as a tool for dialogue
 - A large number of NGOs were reluctant to discuss about DGR issues because seemed imposed to them in SITEX as THE common goal subject.
 - **How to unlock the situation and go forward ?**



European level initiatives – SITEX.Network



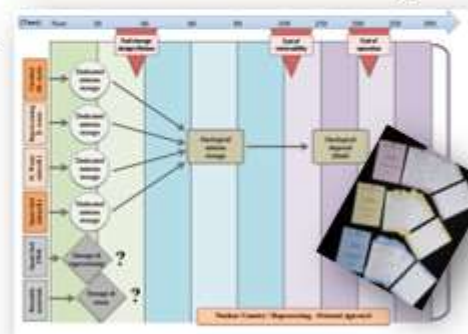
THE PEP TOOL...

... a **SERIOUS GAME** created by SITEX: **Pathway Evaluation Process (PEP)** to stimulate dialogue on routes for the safe long term management of HLW & SF

- Identify issues all along the pathways to a safe terminus that would really matter for different categories of actors
- Put into discussion different strategies allowing to reach a safe situation for the long term

Game mechanism: scenarios with various perturbations and criteria

- a board with a pathway → 3 types of boards exist (with safe terminus chosen in advance or not)
- each participant elaborate a scenario to test the robustness of a pathway by choosing a “testing condition” card (=event) + “Evaluation Criteria” cards



- Discussion on each scenario between the participants (go round the table)



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THE PEP TOOL...

Tested in several context :

- With SITEX-II partners and CS groups in Budapest, June 2016
- With students in cooperation with 3 NGOs in Prague, May 2017
- In the French Public Debate on RWM, with 40 students
- As part of SITEX/ENSTTI course, Fontenay-aux-Roses, France, March 2020
- With > 80 students in political sciences and engineering at the University of Liège, Belgium, April 2021
- Autumn 2021: **new sessions** by SITEX (including variants)
- HL-ILLW Technical Dialogue, October 2022



⇒ A discussion tool **to make explicit the implicit** (not a tool to select the “best” option)

⇒ PEP helps the players **to grasp the complexity** of RWM that is considered here as a socio-technical issue, not only a technical one

⇒ PEP allows a **pluralistic discussion** on the way to secure safety of humans and the natural environment through different options

⇒ Discussions emphasize the importance of transversal elements such as institutional structure & background, meaningful public participation, availability of financial resources, monitoring & memory in the long-term...

SITEX.Network Topical Day – 12 December 2022

Sep 12, 2022 | Uncategorized

Feedback on PEP serious game experiences and future development The SITEX.Network Topical Day this year will be on the Pathway Evaluation Process (PEP) taking place in December. If you are willing to participate, please register at the following address:...

[Read More](#) →

European level initiatives – SITEX.Network



Training activities

- **SotA** on practices, experiences and prospective views on training and tutoring
- A **training module** for generalist experts in DGR, with the **safety review perspectives**
 - 1-week pilot training session implemented in Lithuania in 2017
 - 1-week SITEX/ENSTTI training module implemented in France in 2020



- Being redesigned to be adapted to hybrid sessions (e-learning, further modules on specific topics...)
- Open to all stakeholders
- **Next module in within EURAD EJP in 2023**



European level initiatives – SITEX.Network



SITEX key points and challenges

- **SITEX.Network, a sustainable technical expertise network**
 - **structured** community, producing outputs and able to coordinate actions when required
 - **plurality** of actors (TSO, NRA, CSO) and views : a **strengthened** safety expertise
 - exchange of experience and methodologies
 - joint work on strategies
 - competence building
 - **sometime easier to start with at the international level than at the national one 😊!**
 - **successful interactions within the EURAD EJP**
 - **inclusiveness** with a well-balanced participation of the different communities (WMOs – TSOs – RE – Civil Society) is a key aspect
 - gathering all parties **as early as possible** whatever the project is an advantage !
 - the complexity of RWM issues entails involving both “**Social science**” and “**Citizen science**” in future research projects

<https://www.sitex.network/>



Combination of tools

The earlier,
the better

Long way

Co-construction of processes

SINCERITY

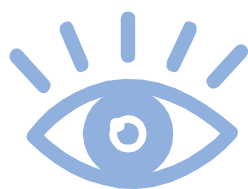
Accountability

SC as a basis for exchanges

Human relationships

Soft skills

Enhancing safety through citizen vigilance



Thank you for your attention !

