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The Future for Long-term Management of High-Level Radioactive Waste and Spent fuel in Belgium

Synthesis of the Delphi enquiry

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Executive summary

From April to November 2019, a team of political science scholars from Liege University (Spiral Research Centre), in collaboration with the University of Antwerp (*Milieu en Samenleving* Research Centre), invited 580 people to take part in the bilingual online survey on 'the future of the long-term management of high-level radioactive waste and spent fuel in Belgium'.

The main objective of the enquiry was to identify the needs and expectations of various stakeholders regarding the long-term management of high-level radioactive waste and the type of decision-making process they wish to see implemented.

242 people participated; 109 questions were asked; 11,695 responses were proposed by the participants. These constitute a very pluralistic panel of actors involved on nuclear issues for more than 10 years, and composed of committed citizens, scientists but also members of NGOs in favour or against nuclear power, municipal/regional/federal officials active or not in the nuclear and health fields.

The main messages in terms of governance that emerge from the analysis relate to the framing of the debates, the type of participation to organize, the missions and the types of control and monitoring bodies to be envisaged.

How to frame the debates in the future?

- Combine the debate on the future of high-level radioactive waste with the debate on the future of nuclear energy. To a lesser extent, it could be part of a wider debate on the energy mix and climate change.
- Despite recognition and support for research already carried out on the geological disposal option, consider studying other management options in a complementary manner, including in financial terms.
- Integrate the status of the spent fuel (resource or waste?) in the discussions.
- Debate collectively on the definitions of reversibility and retrievability.

Participation, yes but how?

- Take support as the willingness of stakeholders to engage in the future: they desire to participate outside and/or in consultative exercises organized by the institutions.
- Ensure a real connection of the participation processes with the decision-making process.
- Ensure that these participation processes support institutions competent in these matters but not 'instead of': consider decision-making as negotiation between stakeholders and public authorities.
- Consider participation on a continuous basis, flexible and adaptable according to the stages of the process and progressive. It is not fixed once and for all.
- Put in place laws that specify the minimum consultation for the future and that defines the main key stages of the consultation process.

- Regularly reassess how to organize participation with the target audiences.
- Set up a quality, varied information system (from multiple sources, including contradictory expertise): being consulted is the minimum.
- Organize the traceability of decisions made (Pluralist Documentation Centre).
- Organize these consultations as a shared responsibility between ONDRAF/NIRAS, AFCN/FANC (for matters that concern it) and an independent pluralist body whose composition remains to be defined but cannot be limited to only those involved in the nuclear sector.

Control, evaluate and monitor the societal and technical aspects of the programme

- Control societal and technical aspects jointly.
- Ensure the principles of reliable financial management: organize the ultimate responsibility of the State, consider the evolving nature of the cost, suggest a risk analysis about the bankruptcy scenario and ensure strict control of funds at European and national level.
- Organize financial control independent of the executive and attached to Parliament (like the Court of Auditors). An opening of the composition of the Nuclear Provisions Commission to other audiences not directly associated with the nuclear world should be possible.
- Make the role of the AFCN/FANC more active: in terms of information, adoption of regulations and the organization of debates on safety aspects. This work must be carried out with an independent mixed pluralist body.
- Establish a pluralist mixed body at federal level. It would work closely with the other authorities to assess the management process at the strategic level. To a lesser extent, it could also be responsible for evaluating the operational process and public consultations.
- Offer the possibility of a counter-expertise at the local level.

When is it the time to debate and to be consulted?

- Now, without waiting for the effective application of the 2003 law concerning the exit from nuclear power and without waiting for a decision in principle concerning the long-term management of highly radioactive waste.

Introduction

This report presents the synthesis of the online enquiry concerning the future for long-term management of high-level radioactive wastes ('HLRW') and spent fuel in Belgium, conducted in April and November 2019 by political scientists from the Liege University (Spiral Research Centre, RU Cite, ULiege) with the support of the University of Antwerp (*Milieu en Samenleving*, UAntwerpen).

The general objective of the online enquiry was to **identify the needs and expectations of various actors concerning long-term management of HLRW and the type of decision-making process they would like to have set up.**

There were four specific objectives:

1. Reach out to and invite participants identified as potential stakeholders in the nuclear waste management programme, beyond the 'usual suspects', those who are always involved.
2. Identify and understand past events and occurrences that were significant and influencing the future of the Belgian management programme for radioactive wastes.
3. Identify and understand various futures the participants deem (un)desirable concerning the principles to be considered when designing the management options, the LT options for organizing the controllability and follow-up of the HLRW programme and its the financing governance;
4. Ask respondents to react on first round respondents' suggestions concerning:
    - Framing of nuclear waste management debates in the future, giving due attention to the future of the nuclear programme itself;
    - Kind of progressive participation they desire
    - Management of financial perspective
    - Independence and missions of the control and monitoring bodies

This report is divided into two parts. The first, entitled 'methodological choices' lays out the methodological options chosen by the researchers, presenting the interest and characteristics of the Delphi method for this type of online enquiry, describing how the first enquiry round was set up and explaining how the participants were selected for the online enquiry and discuss the profile of the respondents (who are they? How long have they been interested in the subject?) The second part presents the results of the qualitative enquiry. The chapters address how these participants envisage future management solutions, the nuclear energy future, the financing, follow-up and monitoring of the nuclear waste management programme, as well as the way to organize participation on these matters. Before each presentation of results, the introduction associated with each topic will be present in a box.

This one-year research project was conducted in full autonomy by the Liege University with the support of the University of Antwerp. It received funding from the Belgian National Agency for Radioactive Waste and Enriched Fissile Material (ONDRAF/NIRAS). The results from this enquiry will be published in the scientific media and will also be presented to ONDRAF/NIRAS. *The analysis provided in this report is the full responsibility of the authors.*

2. Methodological Choices

In this project, we organized a two-round Delphi enquiry of a 'backcasting' type. The first two sections present the interest in using a Delphi enquiry and the characteristics of the method, explain what the backcasting type of Delphi method is exactly.

2.1. The added value of the Delphi method

The Delphi method is the best known and oldest of the so-called expert qualitative methods. It is also a tool in the range of 'weighty tendencies' that comprise the full set of qualitative methods, but it has also become a preferred tool for experimental research in social sciences. First used as a tool solely for studies on futures, the 'Delphi' (or 'Delphi Group') method is a technique that is both sophisticated (capable of rendering the complexity of an issue and organizing the passage from thinking to coordinated action) and modulable (it is highly adaptable depending on the issues to be studied). One major evolution in the method, which justifies the interest we saw in the context of our research, is the method's gradual shift from scientific and technical expertise to a more public, 'profane' expertise. Indeed, the panel of participants is no longer composed exclusively of experts in their specialty, but can be formed of normal people, with no particular competence in the topic covered other than their involvement and concrete experience of a situation related to the issue (Turoff and Linstone, 1975). The method's objective is henceforth directed towards a more inclusive use where perceptions and the representations of a situation become the focal point of the method.

From this point of view, the Delphi method presents a number of characteristics and advantages:

- It enables a large collection of opinions, favouring the emergence of a broad diversity of alternative stances and views, making it possible to highlight the multiple facets of a problem and reveal its full complexity;
- It provides a quite complete source of information capable of launching the debate on sound and reliable bases, then to dynamize and enrich this base, especially when it touches on technology and science;
- It helps initiate a collective awareness among the public concerned as well as academic and industrial experts or even public agencies;
- It offers the advantage of a highly appreciative learning effect – the participants learn not only about the method but also about the problem at hand; they also receive a first approach to adversarial debate among panel members, the springboard for disseminating information towards the public at large;
- It is a decision-making tool, leading implicitly or explicitly to forming a consensus on the results of the approach (choice, recommendations, opinion or action modes);
- It can serve to mobilize the panel actors around future scenarios that are both possible and desirable, a mobilization that generally takes shape in a high level of involvement and increased sense of responsibility; the participates reappropriate the debates and their conclusions, becoming spokespersons towards the outside world;

- It thus authorizes and fosters a shift of the debate towards the public sphere, making it possible to organize the move from collective reflection to common action, through the definition and coordination of the concerted action;
- The options and decisions taken also generally hold the advantage a high level of social acceptability.

The characteristics of this method are manifold. It is first an **iterative method, based on a written mode.** Depending on the needs of the enquiry, the number of participants can range from 10 to 100 people. The responses obtained are **rendered anonymous and analysed by the research team** who, on the basis of these analyses, propose a new series of open, semi-open or closed questions depending on the responses from other participants (see below).

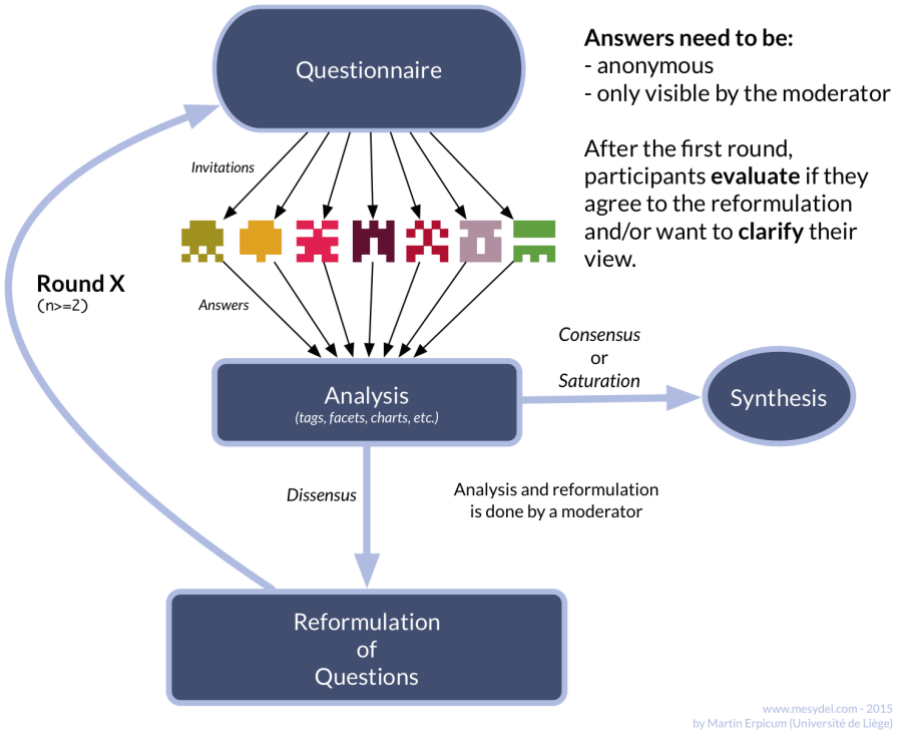

Figure I – Erpicum (2015) The Mesydel IT tool implementing the Delphi method.

In the context of this project financed by ONDRAF/NIRAS, a Delphi enquiry (using the Mesydel[1] tool) in two rounds. The Delphi envisaged in the project is oriented towards the future. It is not a question of evaluating a past action, programme or policy, but rather to look ahead towards the future.

In the context of this project, the selection of (un)desirable futures resulted from an internal reflection with the research team (ULiege and UAntwerpen) and statements issued by Belgian stakeholders over the past years. This is because, on the one hand, the first

1 In order to efficiently organize a two-round Delphi survey, we used an online tool called Mesydel. This tool enables an easy and manageable input of the survey questions, contact with the respondents and analysis of the obtained data and answers.

questionnaire round is built on the basis of analysis elements that emerged during earlier research conducted by ULiege and UAntwerpen human and social science researchers (Fallon et al., 2012; Parotte, 2018). On the other hand, these analyses were coupled with various stakeholder positions, whether or not they were for or against nuclear energy over the years. These latter stances were formulated as statements to which the participants were invited to respond. The following section details how the first enquiry round was organized. These proposals were rendered anonymous as also explained to the participants (extract from page 2/7):

> The proposals given below were formulated over recent years by scientific experts, the regulatory body, non-governmental organizations or citizens who participated in the Consensus Conference. These statements will be shown in quotes and presented without mentioning the author(s) in order to guarantee a form of anonymity.

During the **first round (April-June 2019)**, **54 questions were asked** and gathered in 7 topics:

1. The past events of nuclear programmes that matter for the future
2. The desirable(s) future(s) for the waste including the management options to envisage and principles of reversibility and retrievability for high-level radioactive wastes.
3. The future of nuclear production chain including the future of spent fuel
4. The future of financial management and control
5. The participation of stakeholders in the decision-making process
6. The controllability and follow-up of the HLRW programme
7. Profile questions

Based on the analysis of the first round, **55 new questions** were asked during the **second round (October-November 2019)**, gathered in **4 main topics**:

1. Framing of nuclear waste management debates in the future
2. Kind of progressive participation they desire
3. Management of financial perspective
4. Independence and missions of the control and monitoring bodies

2.2. Invited Participants and the Respondents

A. Targeting Belgian stakeholders beyond the group of 'usual suspects'

We chose to **exclusively focus and to invite Belgian stakeholders** to participate in the enquiry. One objective of this project was precisely to gather the opinion of people or associations concerned or liable to be concerned by the nuclear waste program.

We combined two techniques in order to select participants for the enquiry: the research team first identified the people/associations/institutions deemed to be relevant for participation. The main selection criteria were **the people/associations/institutions had to have an interest**

or involvement in the topic. Given the lack of a predefined list of potential Belgian participants,[2] **we initially selected the following people or associations** (see appendix 1)**:** Belgian stakeholders that have been involved in extra public consultations organized by ONDRAF/NIRAS in 2009–2010, Belgian stakeholders who have participated in legal public consultation in 2010, Belgian stakeholders that have publicly made a statement in the media on nuclear waste plan from 2009 to 2011, experts interested in high-level radioactive waste issues and stakeholders we identified as future or present stakeholders during the WP1. A list of **580 participants has been created.** The list of invited persons is presented in appendix 1

B. Response Rate.

- 580 participants invited to respond to the enquiry.
- 3850 invitations were sent and to increase the response rate, each invited participant received up to 6 mails (invitation, reminders, extended deadline).
- 327 of them effectively connected to the platform and 242 invited participants were active, answering at least at one question.
- It also 5918 answers to the first round and 5777 for the second one.

The participants replied to this questionnaire primarily by presenting themselves as **'citizens' and 'scientific experts'** but some of them were also **members of environmental associations, healthcare professionals, involved in emergency planning, trade unions and federal/regional/local civil servants….**

For the first round, 33.28% participation! There were **193 respondents** and a large majority of them **have been interested in these questions for over a decade.** Three fourths of the respondents wish to be further involved in these topics in the future because of their job ('Consultant', 'NGO', 'Trade Union', 'Academia') or for activities and interests directly or indirectly associated with nuclear energy.

For the 2d round, there was a 27,93% participation! There were **162 respondents**. The respondents took the time to answer most of the chapter: 80% participation for the 10 chapters (out of 11). We had 49 new participants for the second round (they did not participate in the first round).

We receive some feedback from participants *via* email about the quality of the online enquiry. Four categories of remarks have been identified. Some have expressed satisfaction. Indeed, most of the comments remain positive. They are glad some consultations have been organized, satisfied about the bilingual suggestion. Some others have asked for clarification about the universities' independency, the enquiry's anonymity and the promotion of the collected results. Others have mentioned the length of it (especially for the round 1) and sometimes the complexities of some questions (for round 1 as well). Regarding to those two arguments, we decided to extend round 1 and round 2 to give enough time to respondents. Lastly, other potential participants have expressed their refusal to participate (see next section).

2 The final listing of invited participants is the result of the merging of existing lists. Some have been provided by ONDRAF/NIRAF (extra and legal public consultations). The others are a compilation of social researchers' lists (WP1 results and previous University research experiences at nuclear events).

C. Refusal to participate? Convincing the people invited to participate.

Several invited participants explicitly refuse to participate in the enquiry. It is a result in itself! Among those who explicitly refused to answer the enquiry, **we identified two types of position: on the one hand, those who refused to participate in virtue of the conviction or position they held, and on the other hand, those who felt they were not competent or sufficiently concerned by the topic to participate.**

Often, the groups which had been identified by the social scientists as 'future' stakeholders in long-term management of high-level radioactive waste did not identify themselves as such and therefore they did not see an interest in taking part in the study.

Other persons invited automatically refused the researcher's official invitation. This is especially the case of environmental associations that are openly opposed to nuclear energy. For instance, there were people who considered the consultation tool inadequate or else they explicitly supported one specific future for the nuclear programme over another. The refusal to participate, furthermore, is a form of participation that is as legitimate as any other and may also represent the will to oppose the form of institutionalization proposed for the consultation (Parotte, 2018). In the context of this project, these refusals were often followed by an exchange of arguments (by mail or by phone, outside the online enquiry) where the researcher clarified and re-clarified the way the questionnaire was drawn up, its objective as well as the way the results would be promoted.

The social scientist thus accomplished a task of 'onboarding' (Callon, 1986) for the persons invited to participate in the enquiry; the researchers themselves assumed their status as committed researchers and attempted to convince people to participate. In the same vein, those persons were also invited to participate in the second round of the enquiry to see the results of the first round and to take a position.

D. Who should be targeted as an actively involved stakeholder in the future?

What is a stakeholder and who should be part of such process is another common question for such a long-term programme. The answer can evolve over time (Parotte, 2018) and constantly be debated with potentially affected stakeholders (Meyermans et al., 2018). When respondents were asked to select and identify the relevant stakeholders to take into account in the future steps of the decision-making process on nuclear programs, several of the suggested groups were selected. Over three quarters of the respondents agree that 'control organizations' are one of the most important ones. Beyond the control organizations, over half of the respondents also mention that the nuclear industry, the concerned administrations at the federal, regional and local levels, the stakeholders directly concerned with nuclear sites matter. But some also selected 'all affected Belgian publics'.

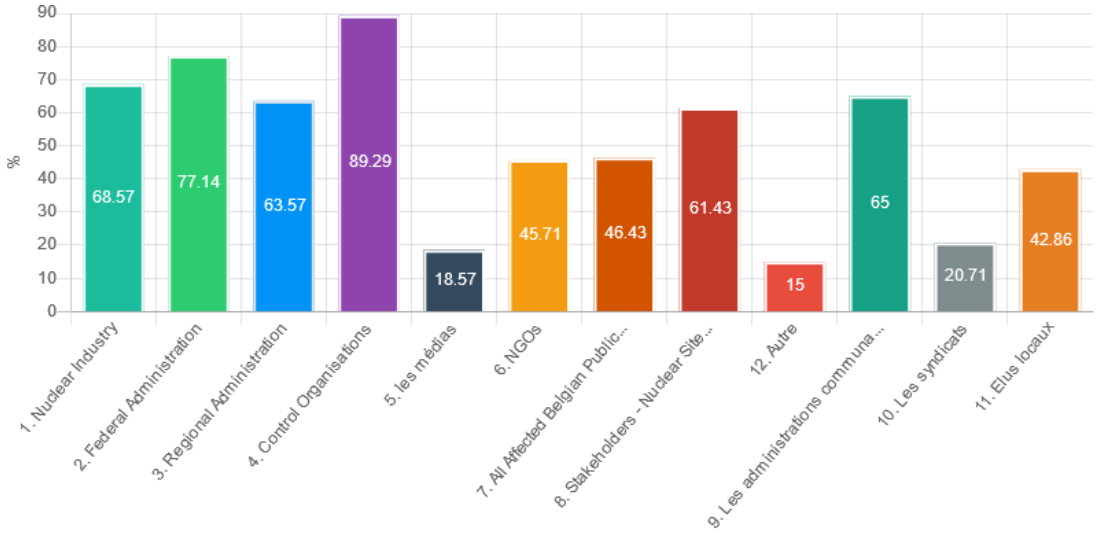

Figure II – Responses related to the question: 'How to select and define a stakeholder? Select the relevant ones' (Delphi enquiry 2019, Round 2, question 2.4.1, 140/162 respondents).

Who is the relevant stakeholder is a notion that can potentially change during the phasing and the siting of the program but **three types of publics can be underlined here: those who produce wastes, those who are officially in charge of dealing with the public issue and those who are already/could be affected at the local level.**

2.3. Qualitative thematic analysis of the responses of a heterogeneous panel

The method **proposed, of a qualitative nature**, aims to collect **a wide range of opinions and positions from a heterogeneous set of actors** who made up the target public: the (future) Belgian stakeholders in the nuclear wastes programme. It is important to point out that the aim of this qualitative approach was to identify the main tendencies and the plurality of positions. Furthermore, **there was no question of having a statistically representative snapshot** in favour of one or another option for management, financing or participation (Petit Jean 2019). The closed questions thus were almost systematically associated with an open 'comments' question where the participants could justify their replies if they so wished.

The data collected were subject to a **thematic analysis** (Braun and Clarke, 2006). **In the context of a thematic analysis, the aim was to identify the topics and subtopics and to highlight the plurality of positions.** As a result, the analysis of this first questionnaire round linked the closed questions (results presented systematically specifying the number of replies to the question) with the 'comments' section associated with each closed question.

Lastly, the set of responses were processed and analysed without distinguishing the respondent categories. The analysis thus does not group the positions by categories of actors.

It is thus essential to bear these aspects in mind when reading the analysis presented here: the data compiled through the Delphi method are **perceptions of reality as seen by the participants.**

3. Debating the nuclear question in the future

A. How can we frame the debate on high-level radioactive wastes with a long-term perspective?

Over half of the respondents consider that the debate on HLRW is intrinsically linked with, and cannot be divorced from, a debate on the production of these wastes: '*Of course, halting nuclear production will not make wastes already produced disappear, but you can't [address one issue] without the other now.'*

Some even propose to extend the debate to discussing a mix of energy or a debate on climate change: '*The scope [of the debate] should be expanded: what is the role of nuclear energy in a low-carbon future (starting from now!)', 'the question to raise in the future is perhaps the hardest one to manage: energy, wastes, climate..?', 'the emergence of alternative energy sources (wind and solar power, hydrogen) and not wanting to invest in their future development'.*

Nonetheless, many of the participants also consider that the wastes already exist and a programme to manage them needs to be proposed, completely independent of whether or not the abandon of nuclear energy, foreseen for 2025, will effectively come about or not.

Over three quarters of the respondents agree with the statement: '*We can not organize a public debate on the future of high-level radioactive waste without discussing the entire nuclear production chain.'*

The debate on HLRW is intrinsically linked with, and cannot be divorced from, a debate on the production of these wastes. **More than half the respondents consider that the HLRW debate should also be considered in a broader context (climate change or future energy mix)**.

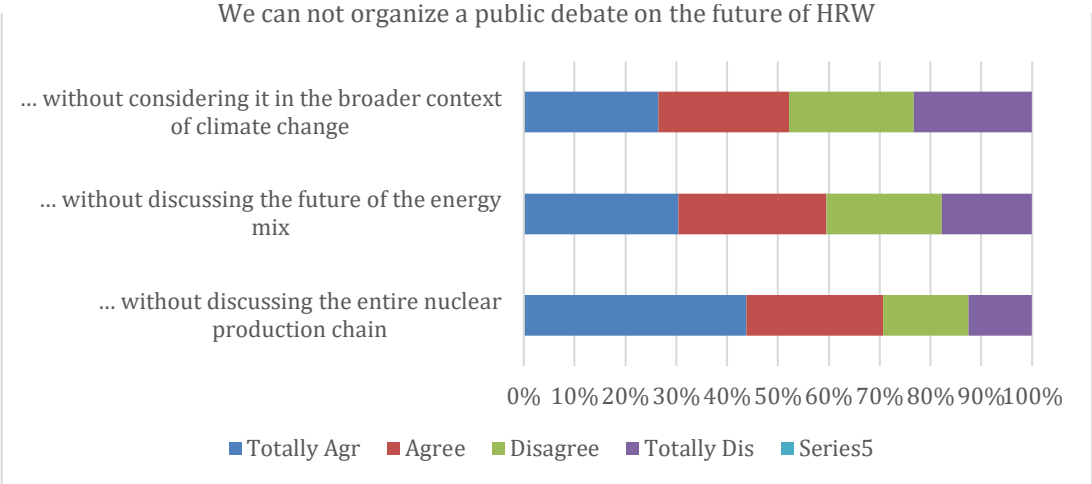

Figure III – Responses related to the three questions on 'How to debate about radioactive material in the future' (Delphi enquiry 2019, Round 2, question 2.1.1 "production chain" 162/162 respondents; question 2.1.2 "energy mix" 159/162 respondents; question 2.1.3 "climate change" 160/162respondents).

Lastly, **many participants ask about the status of spent fuel or high-level radioactive waste in the future:** will they be a resource, a material to be put to use in the future? Or, on the contrary, are they to be considered as wastes? There are diverging opinions. Several participants ask for clarification on this point.

A very large majority consider that in this step the delicate question of **the status of spent**

fuel should be discussed publicly.

B. What management options are interesting to explore for the future? Must there be a waiting period before taking a decision? And what are the conditions?

Over half of the respondents see the geological repository as the '*most realistic*', '*the only long-term solution*' and consider that advanced nuclear technologies such as transmutation are mainly the options to explore in the future.

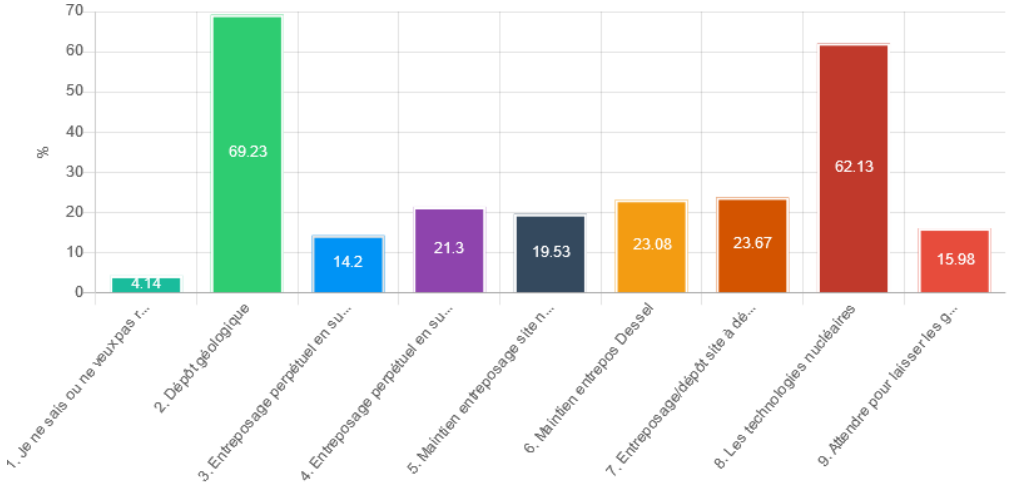

Figure IV – Responses related to the question: 'Among the management solutions suggested managing high-level radioactive waste, select the one(s) that you consider interesting to explore' (Delphi enquiry 2019, Round 1, question 1.2.1, 170/193respondents).

1. I cannot or I will not answer this question
2. Geological Disposal
3. Eternal Surface Storage
4. Eternal subsurface Storage
5. Storage on the site where the waste is produced (Doel and Tihange)
6. Storage on the site where some wastes are already temporally stored (Belgoprocess in Dessel)
7. Storage on a site to be determined
8. Advanced nuclear technologies such as transmutation
9. Waiting so that the future generations can come up with a better solution.

Those in favour of 'advanced nuclear technologies such as transmutation' are also in favour of 'retreating wastes'.

Often, **they consider that management options should be combined in function of a determined period of time.** The idea of storing them on the sites where they are produced or on a centralized 'controlled' site should not be excluded: '*In any case, you need a storage site, even if it is "temporary", it will likely take a certain time.*'

A very large majority of respondents agreed with the statement that **'waiting' is not a solution.** And then that public action about HLRW should go stepwise.

They also consider that '***a regular inventory of existing waste*** *on site should be considered*'. All respondents agree with this statement and consider that the first step is the full inventory of waste on existing sites. In the same vein, '***It is necessary to first agree on a strategy for all waste*** *(and their management) and then on its implementation in successive stages*'.

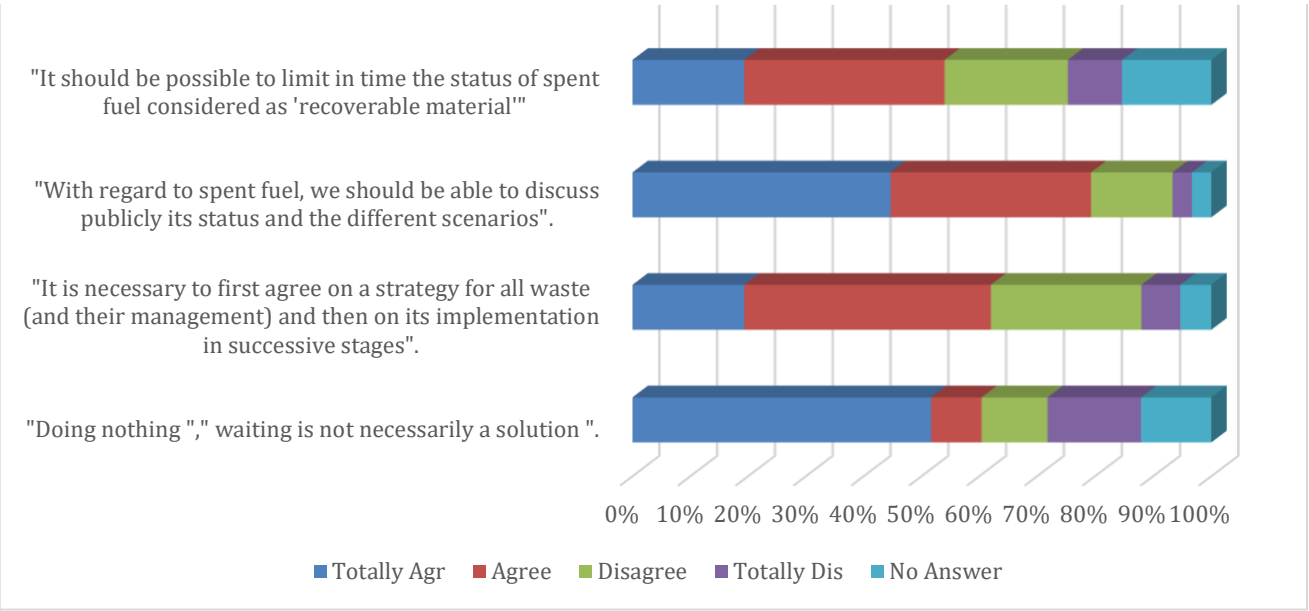

Figure V – Responses related to the three questions on 'How to debate about radioactive material in the future' (Delphi enquiry 2019, Round 2, questions 2.2.4 and 2.2.3 on "spent fuel", 150/162 respondents; question 2.2.2 "strategy for all waste", 150/162 respondents; 2.2.1 "waiting, doing nothing" 149/162 respondents).

C. Reversibility and Retrievability in time

Lastly, a large majority of the respondents consider that the **definitions suggested for reversibility and retrievability are adequate:** '*the possibility of monitoring the integrity of the waste packaging, so that any deterioration can be quickly detected. The retrievability of waste, so that it is always possible to intervene if failures are to be observed or so that future generations can apply better treatment techniques if necessary'*. Their main advantages, in their views, are prevention and controlling risks, respecting the precaution principle and the possibility to leave options open for future generations. The main drawbacks are the cost, management maintenance, feasibility and security problems that these concepts may incur. Some participants ask when they must be applied, other proposed to limit the application of these concepts in time.

Should reversibility and retrievability be limited in time? Opinion is divided. **Less than half the respondents agree** with the statement that '*particularly with respect to the geological repository option, …* ***reversibility and retrievability should be limited in time*****'.** When asked for the time of use of RR, few people responded to it. They considered that the three periods (during exploitation – after exploitation – also after final closure) seem to be important to be taken into consideration.

Three quarters of the respondents agree with the idea for a participative approach in the development of RR criteria. The construction of reversibility and retrievability should be built with stakeholders in the process if they so wish. '*It can not therefore come only from the regulator and / or the waste manager'*.

4. Maintaining expertise and knowledge in the nuclear field

What type of knowledge is needed for the future? **How can knowledge be maintained?**

Over 75% of the respondents are in favour of creating an independent documentation centre. On this subject, four major concerns are regularly raised:

- Who should be in charge of managing, coordinating or controlling this documentation centre?
- Shouldn't databases already in existence be used?
- What type of information should be circulated? What would the target public be?
- Which principles should be applied systematically in the realm of information?
- How to maintain the necessary knowledge for the future?

More than three-quarters of the first-round respondents favoured the creation of an independent documentation centre. But in what form? How to maintain the expertise in case of nuclear exit? How to ensure the '*traceability of the decisions taken and their motivations*'? Respondents point out that this kind of problem remains under the responsibility of the authorities.

This 'Documentation Centre' should be pluralist and rely on existing data bases. Such a Documentation Centre (as it is now active for CatA) should be organized first **with the support of experts from SCK and from the universities**: these two groups are unanimously called for. **The participation of environmental groups** is also proposed by a large majority of respondents.

Other mentions the following groups:

- NIRAS; FANC[3]; BEL-V
- Foreign experts
- Engineering offices that carry out research assignments for stakeholders
- Federal and local archives, …
- People who live near power plants
- Emergency services
- Citizens who participate in the participation process can possibly do this.
- Members of an environmental organization.

A documentation centre is just one component of a broad collective memory that needs to be maintained around this matter. As many parties as possible must play a role in this. Not only technical information about the waste and the disposal facility must be passed on, but also where that waste came from, why it ended up here and why it was recovered in this way. One of the answer recalls that it would be '*very difficult to maintain such a centre for a very long time. That is why this should be supported as broadly as possible*'.

3 The FANC is in charge of setting up scientific and technical documentation in the field of nuclear safety / security (law of 15 April 1994 on the protection of the population and the environment against the dangers arising from ionizing radiation and relating to the Federal Agency for Nuclear Control, Article 23)

5. Progressive participation in the future

A. What kind of participation?

In their view, **being informed, receiving quality information and being consulted is a strict minimum.** Over half of respondents consider that an **organization in the form of a partnership**, where decisions are taken through a negotiation among public authorities and the stakeholders, **is pertinent.** Some of them cite the experience with the CatA partnerships (the Belgian low-level radioactive project) as a source of inspiration, whilst being aware of the additional challenges associated with the HLRW category.

When asked to position themselves on 'what should be the objectives for integrating stakeholders into the decision-making process?', they tend to climb the Arnstein's ladder of participation (1969) up to partnership (between stakeholders and public authorities), which is quite high. But decision is left to the authorities.

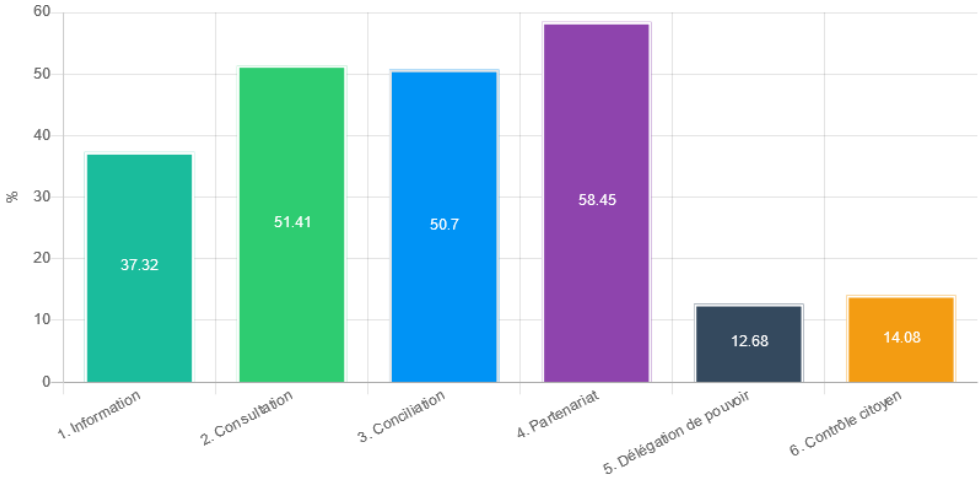

Figure VI – Responses related to the question, 'According to you, what should be the objectives for integrating stakeholders into the decision-making process?' (Delphi enquiry 2019 Round 1, question 1.5.1, 143/192 respondents).

Several participants point out that, in their view '**participating is not the same as deciding' and stress the role of public authorities in decision-making.**

A majority of the respondents wish to be consulted about **the decision of principle on the management modes**. A majority also wish to be **associated with the step of 'defining monitoring and control agencies'.**

Nearly three quarters of the respondents consider that **ONDRAF/NIRAF should organize public enquiries in the future.** Some qualify this view, mentioning that ONDRAF/NIRAF **is not sufficiently independent or too focused on its preferred scenario.**

Nearly three quarters of the respondents are also in favour of having an independent, institutionally guaranteed, body monitor the organization and follow-up of the participative processes.

The fundamental questions are '*(…) How will a decision be taken? What will be decided on? Who actually are these stakeholders?'*

B. Key phases of a decision-making

In their point of view, the **key phases of a decision-making** process for long-term management of HLRW **are both numerous and closely interdependent.** In addition to the steps concerning the decision of principle on the management modes, budget estimates and financing means, definition of waste categories or defining bodies responsible for monitoring and control, the respondents deem that attention should be paid to steps associated with:

1. **Territorialisation of the options** (choice of the site, choice of the host rocks in case of a decision favouring the geological repository).
2. **Modes of monitoring, evaluation or control, which can be split into several types:** follow-up of the decision, follow-up and evaluation of security, environmental monitoring or even financial monitoring of the programme.
3. **Modes of communication, consultation and decision**, whether they involve consultation, information to the publics regarding the evolution of the implementation or the Parliament's involvement in the decision-making.

A large number of respondents consider that **legislation has a double role to play.** The law should specify the minimum level of consultation for the future, but the initiative should be largely left to the body responsible for consultations (reflecting what is done in Canada). The law can define some of the key steps of the consultation process within the overall process (reflecting what is done in France).

Almost all the respondents state they are in favour of regular re-evaluations of the way the stakeholders are consulted.

On this subject, several of the participants stressed that the **decision-making process should not be 'frozen': '***The decision-making process must be accepted by all parties. It is an aspect of the consultation and must not be completely frozen from the very beginning.'*

C. What to start tomorrow?

During the 2d round, the question of 'participation' was also asked for the very short term for the ongoing management issue: '*In the much shorter term, do you think that the decision in principle on the preferred management option should be preceded by a new round of consultations*'.

Two third of the respondents asked to such consultations to be organized. And several comments pointed to the quality of the consultation (and of the information to be discussed there) with requests for innovation: '*Can we imagine an assembly of technicians, elected officials and citizens selected from a panel of prequalified volunteers'.*

A minority opposed the consultation and one of them stated that: '*These consultations are useless because the decision is political'…*

6. Managing financial perspectives for the future

A. Cost Management Practices for the future

How can financing be ensured whether or not nuclear energy is discontinued? '*If we stop producing wastes (in other terms if we abandon nuclear energy), we need to make sure that all activities to manage the existing wastes are financed, even if the producers declare bankruptcy and the federal authorities distance themselves from the matter.'*

A large number of the respondents consider that we need to cope with **risks of the waste producers' insolvency.** How to ensure the solvency of producers of waste? If it is an '*absolute necessity*' for most of the respondents, some wonder: *'what guarantees can be really provided by Synatom with a French waste producer, with the possibility of lending 75% of its provisions or in the case of bankruptcy of producers"*?

Three quarters of respondents consider that binding European legislation should regulate the financing of waste.

At the national level, nearly **three fourths of the participants favour a transfer of the reserve funds to a public body, independent** from the nuclear energy industry. **A 'non-producer body', 'outside government control', 'totally independent' or a state structure 'with strict conditions'** must be envisaged in this area.

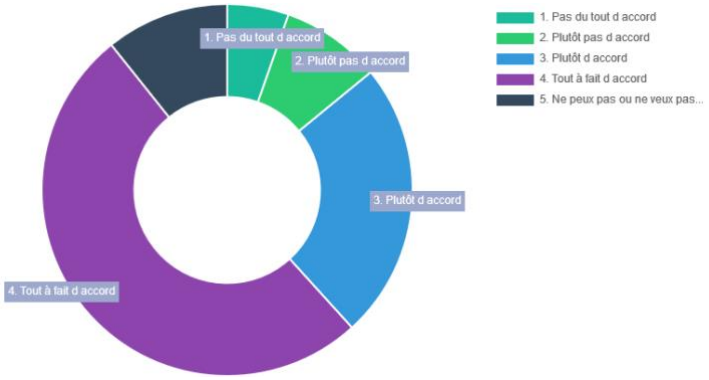

Figure VII – Responses to the closed question: 'These funds, currently managed by a subsidiary of Electrabel, must be transferred to a public body, independent of the nuclear energy sector', (Delphi enquiry, 2019, Round 1, question 1.4.3, 151/193 respondents).

In the same vein, more than a half of respondents agree that all the provisions could be managed in a public structure according to strict conditions: dedicated funds, specific financial tools reporting more than the state tools.

They also agree with the proposition that **ultimate state responsibility should be planned.** As a respondent stresses: *'given the time space involved, it is more than likely impossible to apply the polluter pays principle in full. What is important is to guarantee, in the very long term, the safety of man and the environment. In the long run, only states can provide this*

guarantee. Therefore, a transparent and manageable load transfer mechanism needs to be developed.'

The respondents **all agree** on several **good management principles** suggested by other respondents:

- In terms of **cost assessment, all the management options that must be evaluated, compared and reported publicly.**
- The **changing nature of the costs over the long time periods** should be taken into account.
- **The cost of waste treatment and dismantling** should be collected **every year.**
- Nuclear provisions could be invested in order to be valued, but to be **available when requested**.
- **An risk analysis** is required to know precisely what are the consequences of the cessation of funds to properly manage waste according **to management stages**.

B. A new vision on the Commission for Financial control?

Some respondents consider that independent financial control can be guaranteed according to certain conditions. Among the proposed control mechanisms, one mentions a multiple and direct 'Citizen Control', and another a new composition of the Commission, with representatives of civil society.

When considering the actual composition of this Commission for financial control, there is an almost unanimous support on the proposition that '*financial control should be independent of the executive*' and **three out of four agreed with the proposition to attach the financial control to the Parliament as is currently the case for the Court of Auditors**. The composition of the Commission should also be open to other stakeholders and not only to actors directly involved in waste production and management.

The respondents consider that the current composition of the actual commission remains limited to the 'business-as-usual actors' including those directly in charge of managing waste. For them, there are '*too many current personalities involved in waste management'*. Some suggest opening up the commission to other several groups such as:

- *Representatives of environmental associations and civil society;*
- *Representative of Consumer Associations,*
- *Trade Union Representatives*
- *Non-related personalities for example from the academic world and industry*
- *Representative of the Federal Council for Sustainable Development.*
- *The federal Parliament could appoint experts to serve for a specified period of time and report on an annual basis.*
- *… and why not Representatives of the Regions.*

7. Independence and missions of the control and monitoring bodies

A. A state of affairs

What must be controlled and monitored? Who must be in charge of controlling and monitoring, and of what? What must be the role of the Belgian regulator, the federal nuclear control agency (FANC/AFCN) in this process?

A large majority of the respondents favour monitoring and control of the programme's social and technical aspects, which are to be considered jointly.

While ensuring the FANC/AFCN's independence, many respondents concur that **this agency should play a more active role** in the decision-making process vis-à-vis the stakeholders. The French and Canadian examples are seen as '*interesting', 'to be followed*' and as something that '*can serve as a reference*' for a larger reflection on the agency's future role. *On the other hand,* the Belgian regulator's current position seems '*opaque', 'too much in the background'.*

The participative and programme financing processes must also be monitored and controlled. Indeed, **three fourths of the respondents also agree that the organization and management of the participative processes should be monitored by an independent, institutionally guaranteed body.**

Who should be part of this or these control and monitoring body/ies? Many of them highlight the interest in **combining different categories of actors** within **a single 'joint commission'.** It must have a **mixed composition.** Furthermore, a **preponderant role for experts** must be conserved whilst underlining the importance of integrating different points of view. Lastly, a number of them **excludes the idea of a 'political representative'** often perceived as inadequate in this type of commission.

At what level of power, should the monitoring and control bodies be established? **A majority consider the federal level to be the most appropriate but not exclusively.** In their view, managing radioactive wastes, nuclear safety or control of nuclear energy are part of the 'federal realm' and a topic that concerns 'the whole country'. The participants do not exclude the involvement of other levels of Belgian power, but they present it more for example as a 'strong involvement of local communities'.

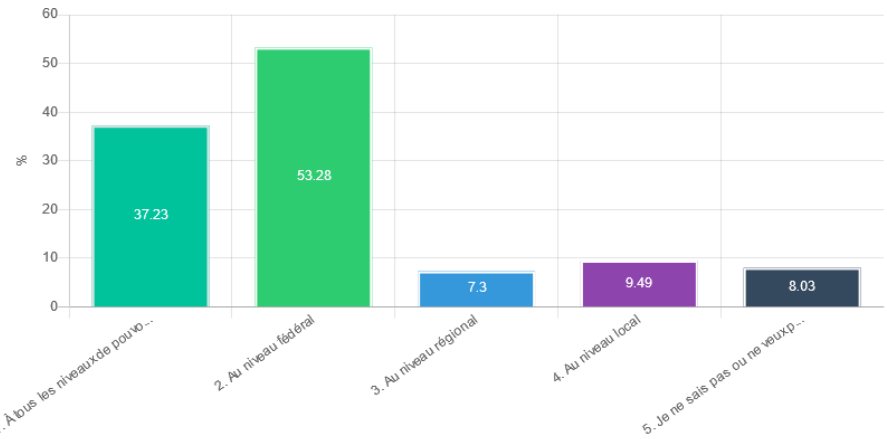

Figure VIII – Responses to the closed question: 'At what level of power should this control and monitoring body (ies) be established?', (Delphi enquiry, 2019, Round 1, question 1.6.4, 137/193respondents).

Almost 75% of the respondents also favour the possibility of a second assessment for local communities involved, which would be financed by the public authority or the wastes management entity.

Yet, several respondants point out that controls already exist, such as those of the FANC/AFCN or ONDRAF/NIRAF. These participants suggest that it is perhaps a better idea to reinforce the competence and responsibilities of 'existing bodies'.

Lastly, several of them ask: *'exactly what does being independent mean?'*

B. A Joint Commission associated to the process

Many of the respondents in the first round supported the idea of combining different categories of actors within a same commission. This 'joint commission' must associate a mix of stakeholders, because it is important to integrate a plurality of views, while maintaining a prominent place for the experts.

All respondents agree that such a commission should have **the right to ask questions to all the institutions in charge of the radioactive waste program.**

What should be the evaluation missions of this joint commission? The respondents were asked to consider that the commission could address issues related to the long-term management process either on a strategic level, or also on a more operational level; it could also be in charge of evaluating public consultations. The first option was approved by all respondents while the other two were also taken by a large majority. This means that **the work** of such **a joint commission must the strategic choices but also the operationalization of the latter, both socially and technically**.

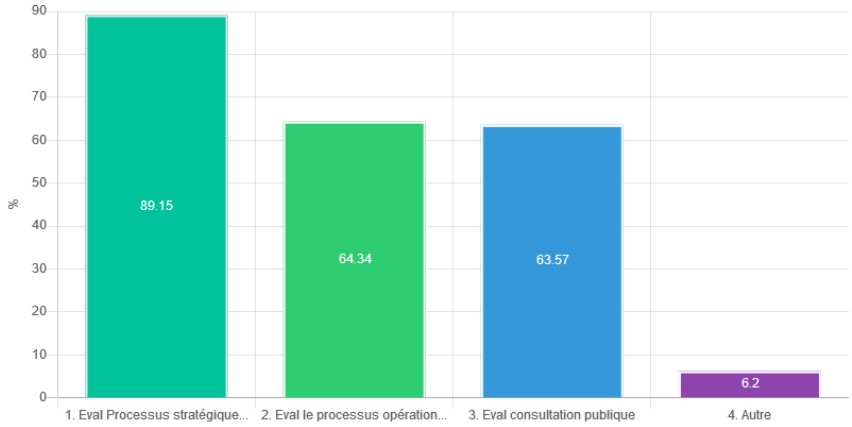

Figure IX – Responses related to the question: 'What should be the missions of this joint commission?' (Delphi enquiry, 2019, Round 2, question 2.7.6, 129/162 respondents).

Maintaining independence?

Many respondents addressed the dimension of 'independence' of such a body: it should not be directly financed by the industry but by Belgian authorities, with the indirect contribution from the producers.

At the same time, while considering the question of 'independence' the respondents did not so clearly reject the presence of political / industry representatives in the Commission: the position is much more balanced on this issue of profiling the members of the Commission.

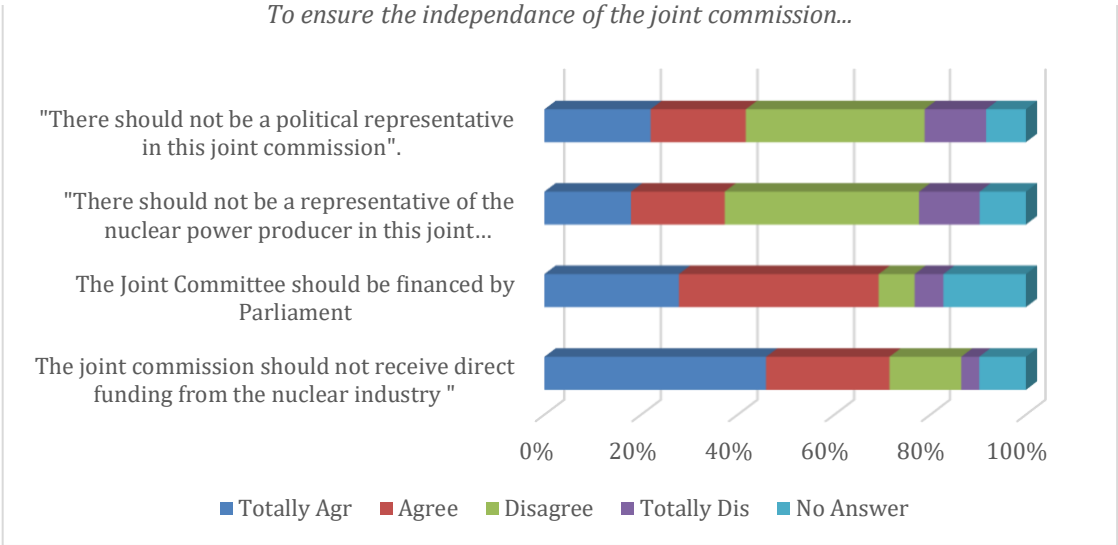

Figure X – Responses related to the questions how to organize the Joint Commission (Delphi enquiry, 2019, Round 2, question 2.7.4 "political repres." 132/162respondents; question 2.7.3 "nuclear power repres." 134/162respondents; question 2.7.2 "Parliament funding support" 133/162; question 2.7.1 "nuclear industry funding support 133/162).

In the first round, several participants also pointed out that it is important that these stakeholders be 'educated', able to 'grasp the problem that remains highly technical', 'competent', include 'the basics of nuclear energy'. **Only a small minority (one in five respondents) disagreed with the statement that 'stakeholders should be competent'** but many commented on this issue about what it means exactly for them *'being competent meaning*

being able to develop a rational discourse…'. Other participants mention that this criterion shouldn't be an excuse to exclude people from discussion: *'the criterion of competence should not be used to exclude those who are aware of the problems but without mastering all the technical aspects. Nevertheless, objective and contradictory information must be put in place.'*

C. What should be the role of the regulator – FANC?

Several questions were asked about the role of FANC, the regulator in Belgium. The questions addressed the issue of the production of regulation (FANC alone or with other partners?) and the question of information.

A very large majority supported the statement that *'the FANC should be required to actively inform about the regulations adopted'* and the other propositions received a large support of two third of the respondents (see figure below). **These answers can be translated as a large support for a more active and socially participative role of the regulator**.

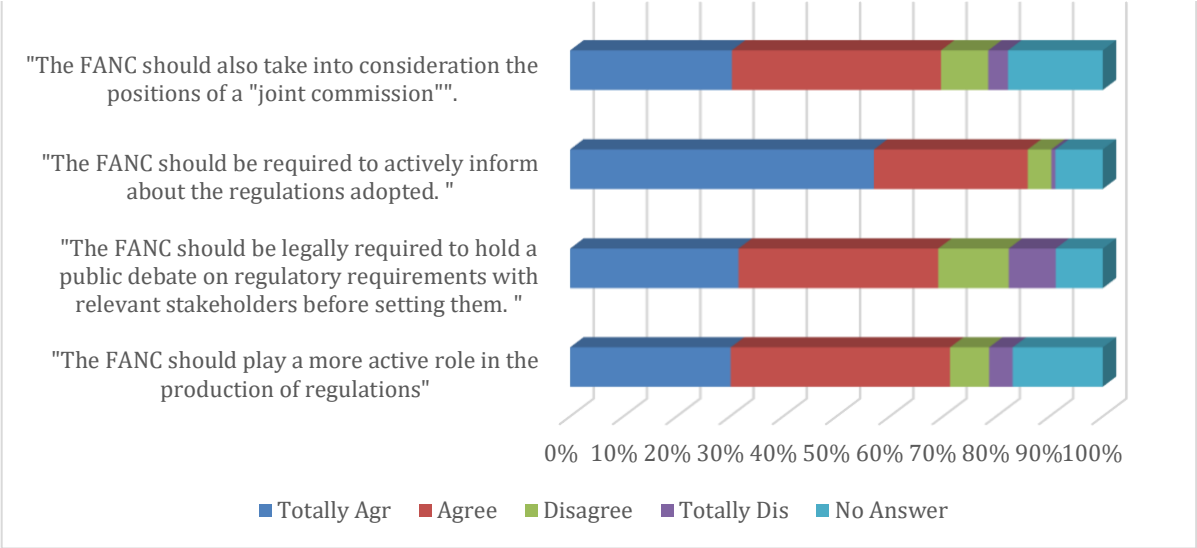

Figure XI – Responses related to the questions: 'what should be the active role of FANC/AFCN' (Delphi enquiry 2019, Round 2, question 2.6.4 "FANC and joint commission", 135/162 respondents; question 2.6.3 "inform about the regulation" 135/162; question 2.6.2 "FANC and public debate" 136/162; question 2.6.1 "production of regulations" 136/162).

8. International and European dimension

Can a shared multinational solution be envisaged? What is the role of the European Union? Must it also intervene in questions of financing?

More than three fourths of the participants are in favour of European legislation to regulate the financing of wastes. As the same time, three fourth **of participants favour a common management by several countries** at the European or international level. Among the management solutions envisaged in the future, the possibility of **exploring multi-state joint management solutions at international level** is considered by a very large majority as a possible endpoint.

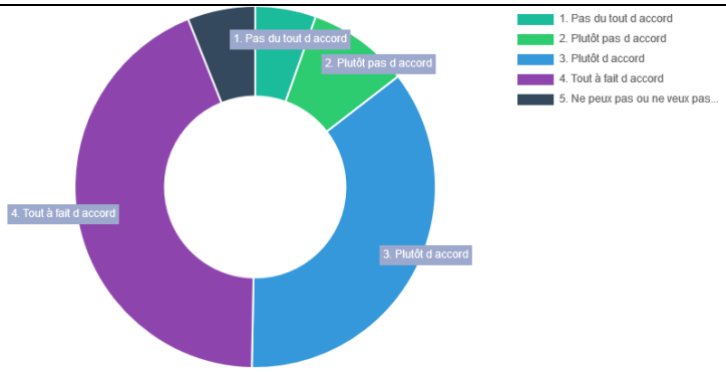

Figure XII – Responses related to the closed question: 'what do you think of the "shared multi-state solution", that is to say the possibility of exploring management solutions common to several states at the international or European level?', (Delphi enquiry, 2019, Round 1, question 1.2.4, 166/193 respondents).

The advantages of a multi-state shared solution are: the ability to share costs and the ability to select the most suitable site 'technically' speaking.

> *'The possibility for mutual management at the long-term, along with other European countries, must be envisaged (ex: shared storage); this is for both financial reasons and also in view of limits in potential storage sites.'*

At the same time, many of them also **consider this idea 'utopic'** and point out the challenges entailed. The danger is the risk of a 'low cost' solution focused exclusively on the financial dimensions; the problems about sharing of responsibilities, … and the unreliable nature of some management programs. One participant favouring this solution explains as follows:

> '*Nonetheless, this solution raises problems that would be really interesting to look into: – diversity of wastes to accept and agreement* a priori *on a single concept of storage; – financing (cost distribution criteria?); –responsibilities (operator, regulators); –social acceptance in the host country.'*

9. From past events and occurrences to the future

A large number of the respondents consider that **all the events occurring in the past are important to take into account** when envisaging the future of HLRW. In particular, over half of them agree that introducing institutions for management (like ONDRAF/NIRAF), control

(FANC/AFCN) or research (SCK/CEN), publishing reports evaluating the costs of managing HLRW are past events that are still important for the future of the management programme.

The respondents were asked to select in a list of events which seemed most relevant to them when thinking about the future of HLRW management. Highest ranked are the **institutions** in charge of managing or finding management solutions, the **definition of the plan** for managing highly radioactive waste and the evaluation of **the cost** of the chosen option that seems to matter most to all respondents. There are very few mentions of the LLRW decisions and processes.

Respondents also identified a large number of other events to consider in the future. We have identified six categories that each ask different questions (Parotte, 2019).

1. **events playing a role in mapping and defining a radioactive waste** and its evolution over time, including occurrences concerning the overall nuclear production chain;
2. Occurrences **linked to programmes for research and development** in the area of nuclear wastes at the international or national level;
3. **national, European or international regulations,** which oversaw and continue to oversee the waste management programme;
4. **nuclear incidents or accidents** such as 'Three Mile Island', 'Chernobyl', 'Fukushima' or even '*(...) the number of accidents and incidents that, year after year, affected nuclear reactors and which, with less luck, could have degenerated into a major accident (...)'*
5. **Events that concern the integration of different audiences in the nuclear programs. significant** such as '*citizen demonstrations'*, '*the position adopted by anti-nuclear groups'*, resistance to the CatA project '*in the 1990s ONDRAF/NIRAF, in the process to manage category A wastes, failed a to find an "optimal" place somewhere in Belgium, which indicates that the same problem for HLRW will play an even greater role.'*
6. Some participants mentioned, to a lesser extent, the importance of taking into account events indirectly linked, according to them, to the nuclear waste management program such as climate change or the choice of energy mix.

Why are they important?

Many of them consider that nuclear waste program and nuclear program are indivisible. They state that **the source of the waste production is the starting point** of the whole issue and one that also defines its future (especially on the volume of wastes produced): *'(...) if there are no power stations, there are no wastes', 'They exploit [this energy] without worrying about the wastes produced (...)'*.

Some events also clearly illustrate **the narrowing of possibilities** in the future of HLRW and spent fuel. Several respondents, both in favour and opposed to the narrowing, indicate that these events *'mark the further steps that are necessary for a solution',* they are '*turning points'*, '*lock in'* and some events represent '*an implicit choice for the scenario in favour of a geological repository in poorly indurated clay.* Then, they reinforce over time the choice in favour of a particular option for managing highly radioactive waste.

There are also events and occurrences that **highlight** the issue of HLRW management, they generate an awareness that the wastes '*are here and must be managed'* such as the nuclear

accidents, the cost assessment or the R&D program.

Lastly, some events underline the democratic nature of such decision-making process: '*some milestones lay the first bases that recognize that it is not only a political question but also a civic one*.'

Conclusions: what are the inevitable milestones for the future?

From April to November 2019, a team of political science scholars from Liege University (Spiral Research Centre), in collaboration with the University of Antwerp (*Milieu en Samenleving* Research Centre), invited 580 people to take part in a bilingual online survey entitled, 'the future of the long-term management of high-level radioactive waste and spent fuel in Belgium'. What were the lessons of this Delphi survey that mobilized a heterogeneous panel of stakeholders engaged on nuclear issues for more than ten years?

The respondents identified several important milestones. In this conclusion, we have chosen to focus on crucial points of attention **in order to consider the future of a management program for high-level radioactive waste and spent fuel in Belgium**. This category includes the positions or suggestions that are widely shared by the respondents, regardless of their opinion on the direction to give to nuclear programs: these positions seem like an invitation to reorganize and reconsider the future of the management of high-level radioactive waste: what questions, according to the respondents, should be given priority? Which principles should be defended, submitted to a wider debate or put on the political agenda?

Opening Up the Debate on High-level Radioactive Waste

Our analysis highlights that the respondents call for a **triple opening process.** First, an opening regarding the framing of the debate. According to the respondents, **the debate on nuclear energy is indivisible from the debate on high-level radioactive waste.** One cannot go without the other. This suggestion clearly goes against the framing of the debates organized by the Belgian institutions so far for high-level radioactive waste (Parotte and Delvenne 2015).

Second, an opening concerning what the debates should precisely focus on. According to the stakeholders, it is necessary to continue to **discuss and consider other long-term management options, sometimes in a complementary manner, even if they recognize and support the research already carried out on the geological disposal option**. All types of radioactive waste should be strategically considered as a whole and a complete inventory drawn up on a regular basis. In particular, the concepts of **reversibility and retrievability,** far from being imposed by the competent administrations, should be defined and debated publicly. Finally, an opening regarding the debate on what the radioactive material should manage in the long term. According to the participants, **the status of spent fuel also deserves to be discussed**: should it be considered as a time-limited resource or as waste?

These debates on the future of nuclear power and its waste should be organized now, without waiting for the effective application of the 2003 phase out law concerning the nuclear power and without waiting for a decision of principle concerning the long-term management of high-level radioactive waste.

Organize progressive participation

Respondents, regardless of their position on the future management options, want to participate in various ways in the decision-making process (including those who refused to participate in this survey!). This participation, far from being fixed once and for all, should on the opposite be regularly assessed, 'accepted by all stakeholders'. This participation could be regulated by the law. The minimum level of consultation for the future should be specified and some key consultation steps in the decision-making process should be defined.

How to participate? Being informed, receiving quality information and being consulted on a regular basis is often considered as the *minimum*! Many also point out the value of considering a process where 'decision-making takes place in negotiations between public authorities and stakeholders'. Here, we can speak of 'continuous, progressive and adaptive' participation capable of adapting according to the stages of the process and the needs of the stakeholders.

Respondents wish to be able to give their opinion on the decision-in-principle on the long-term management options and want to be involved in strategic choices, particularly in the 'definition of monitoring and control bodies'.

However, they do not seem in favour of a total delegation of power to the citizens. The institutions responsible for these matters must remain central to the process of managing and controlling nuclear programs.

Control and Monitor the Socio-technical Aspects of the Programs

Who should be in charge of organizing these public consultations? Our analysis highlights that this responsibility should be shared, and not be the prerogative of a single institution. In the short term, ONDRAF/NIRAS should first be responsible. While they widely recognize the expertise of this organization, they consider that the FANC can also play a more active role in terms of consultation on safety aspects. They are also in favour of monitoring the organization of participatory processes by an independent pluralist body, guaranteed institutionally.

The management program will be subject to evaluation, control and regular monitoring in the future. But who should be in charge of assessing what? What level of power is the most appropriate? For the respondents, the social and technical aspects of the programs should be assessed jointly. They regularly stress the importance of ensuring the independence of the institutions responsible for monitoring these matters.

They concretely suggest reviewing the functioning or the missions of existing control bodies such as the FANC or the Nuclear Provisions Commission whose composition could be more open. In particular, the FANC could be more proactive in the production and dissemination of regulations or in organizing public debate on regulatory requirements on safety aspects. On the financial aspect, they unanimously fear the (organized or not) bankruptcy of the waste producers. According to them, it is necessary to adopt or recall several key principles of good financial management practices (for example planning the ultimate responsibility of the State). The comparison and financial evaluation of all the long-term management options as well as an analysis of the risks linked to a lack of funds should be realized. According to them, financial management should be detached from the nuclear industry and the financial control should be

independent of the executive and closely associated with Parliament (like the Court of Auditors).

Finally, they also offer to establish a **joint body at the federal level** able to work in close collaboration with the various levels of power. Composed mainly of experts but also of representatives of different concerned parties, it would be able to integrate a plurality of points of view. Its missions, according to the respondents, would mainly be to assess the management process at the strategic level. But it could, to a lesser extent, be responsible for evaluating the operational process as well as public consultations.

Finally, at a local level, the **possibility of a second opinion** should be possible, in particular to leave the possibility to local communities of integration integrated into the decision-making process, to fuel the debate and render transparency and control. It aims at envisaging several control bodies capable of proposing integrated assessments.

Maintain Expertise and Organize the Institutional Memory regardless of the Outcome of Nuclear Programs.

The participants regularly insisted on the importance of maintaining knowledge and expertise in the nuclear field. The experts must be able to feed the debates, and to confront their positions publicly. Respondents also tend to place the experts at the heart of the management program, the control or the monitoring bodies.

At the same time, the creation of a **pluralistic documentation Center** is to be considered for the future. It would in particular be supplied by the administrations in charge of controlling and managing high-level radioactive waste, but also by NGOs and university research centers or not, specialists in these matters. The Center would also take care of combining all existing data and archives. One of its missions would be to ensure the traceability of technical, political and societal decisions taken at each stage of the process. This center should therefore, in a way, ensure the institutional memory of management programs.

What if in 2050 …?

And then finally, there are also suggestions sometimes widely supported by the participants but almost systematically considered as utopian or unrealistic. The one that obtains the broadest consensus is undoubtedly the possibility of developing an international multi-shared solution: a single site, which could accommodate waste from several waste producer countries. This suggestion also questions, in the long term, the adequate level of power, in the future, to manage high-level radioactive waste: should it be national, European or international? There are also 'techno-optimistic' positions that consider solutions such as reprocessing and transmutation/partitioning, carrying technological promise to reduce the toxicity of waste where others see it as a chimera closely associated with the pursuit of nuclear energy by other means. Finally, there are also those who envision the future of these programs in particularly unstable environmental and political contexts. These various events could also influence the scenarios to be considered for the future of nuclear programs. But waiting to talk about those nuclear waste programs is not an option…

Epilogue – Delphi enquiry in 2019 and then what?

This report, and the 2019 stakeholder survey that preceded it, is not intended to close the debate between Belgian stakeholders on the definition of one or more future(s) of the high-level radioactive waste management program. On the opposite, **it should be considered as a starting point, a call to complement the debates** already launched during the extralegal public consultations organized by ONDRAF/NIRAS and the King Baudouin Foundation in 2009–2010 and the legal public consultation of the Waste Plan of 2010. Likewise, it must also be considered in conjunction with a series of critical positions that refuse to express themselves through institutionalized channels and regularly favour other means of expression (demonstrations and symbolic actions).

Among the past events that matter for the future, respondents recalled that **civic engagement** in various forms was **often considered 'essential', 'central' and 'essential' to be considered in the future of the program for respondents**. Many have insisted on the democratic nature of political decision-making. The participation of different audiences must also be, to quote some respondents, 'connected' with the decision-making process, to allow political choices 'made by the greatest number of citizens and not only by experts or politicians'.

Questions, principles or suggestions from participants presented in this report are also an opportunity to interpellate different audiences. The results of this research should interpellate the policy-makers and the administrations in charge of managing or controlling these matters, challenge the representatives of the nuclear industries as much as the NGOs in favour or against nuclear energy, and finally more broadly challenge any citizen or group of citizens, associations who (do not) wish to take up this theme. This report sounds like a double reminder. As we have already mentioned, in many of our previous research, the future of high-level radioactive waste and spent fuel is not only technical but it is and will also be socio-political. Then and finally, the suggestions made in this report are not decided, organized and checked once and for all by the experts, but they call for wider participation by citizens and clear responsibility for policy-makers. On the opposite, those previous works and this enquiry recognize that these atypical and sensitive programs impose another way of governing. This new form of governing means a collective decision-making built with the public willing to engage on the subject. Imposing a *'fait accompli'* policy, as scientifically sound as it is for such a sensitive project from a very long-term perspective; not taking seriously the repeated calls to change the framing, the opening up, the setting up of wider public consultations or accountable control bodies, … This is to risk missing the call for democracy launched in 2009–2010 with legal and extralegal public consultations on the Waste Plan. Indeed, our investigation confirms the legitimacy of such a call for openness, debates and the regular association of stakeholders in the decision-making and follow-up process.

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Appendix

Appendix 1 – List of invited participants

- All Belgian stakeholders that have been involved in extra public consultations organized by ONDRAF/NIRAS in 2009–2010. More specifically, it includes:
    - Invited Expert at Consensus Conference (2010–2011)
    - Keynote Speaker at the Interdisciplinary Conference (2009).
    - Observants at the Interdisciplinary Conference (2009)
    - Participants at the Interdisciplinary Conference that included NGOs, public and private organizations, university experts (2009).
    - Citizens selected to participate at the Consensus Conference (2010–2011)
- All Belgian stakeholders who have participated in legal public consultation in 2010. More specifically, it includes:
    - Citizens who reacted to Waste Plan Proposal during the legal public consultations in 2010.
    - Municipalities and public and private organizations (including environmental ones) that reacted to Waste Plan Proposal during the legal public consultations in 2010.
    - Governmental institutions such as federal/regional agencies or commissions that reacted to the Waste Plan
- All Belgian stakeholders that have publicly made a statement in the media on nuclear waste plan from 2009 to 2011 (including chain players such as waste producers, environmental NGOs, journalists who developed a nuclear expertise).
- Experts interested in high-level radioactive waste issues. More specifically, it includes:
    - Experts who participated to CSS workshop in 2017 entitled 'Nuclear accidents, environment and health in the post-Fukushima era: Emergency response.'
    - Experts who participated to SBGIMR workshop in 2019 entitled 'Geological Disposal of Nuclear Waste' in February 2019.
- All stakeholders identified as future or present stakeholders during the WP1. It includes among others:
    - Trade Unions
    - Local stakeholders who have expertise on nuclear emergency planning.
    - Water companies, provincial organizations and other private companies or associations;
    - Local stakeholders who are directly concerned by nuclear power plant installations (Doel and Tihange) and their neighbourhood municipalities (a.o. Municipalities that have been formally invited to participate in the Preliminary Information Meeting at Tihange (2019).