

Socio-Political Processes and Plan Management in Controversial Settings Applied to the Plan for Long-Term Management of Type B & C Waste: Summary Report

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Since its creation in 1995 at the University of Liège, SPIRAL (*Scientific and Public Involvement in Risk Allocations Laboratory*) developed a unique expertise in many fields: risk policies, public policies analysis and evaluation as well as participatory democracy. The ongoing research is underlined with a global thinking about the new modes of governance, especially within the framework of deep uncertainties linked with the scientific and technological developments. SPIRAL does handle a broad array of qualitative as well as participatory methodologies that help to evaluate and shape the decision-making processes. It is composed with an interdisciplinary team of about twenty collaborators. Its overall integrated approach relies on many disciplines and competences, ranging from political science to social sciences and political philosophy, as well as more public policies-oriented sciences – administrative science and law.

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- Social construction of contemporary risks: risk perception, risk governance, risk communication
- The changing role of experts and expertise given scientific uncertainty and/or in light of public controversies; emergence of new concepts and theories, and assessment of new modes of public interaction
- Stakeholder and citizen participation in knowledge generation and decision making, with a focus on public controversies, dealing with scientific uncertainty (and social mapping, social impact assessment to identify relevant actors and frames)
- Identifying factors that sustain or build societal support for environmental policies; social transition towards more sustainable societies
- Social inequality and environmental concerns
- Renewal of environmental policy and strategic policy planning; institutional stability and dynamics
- Methods of environmental policy evaluation

The research is informed by theory and empirical work in the fields of sociology of the environment and environmental sociology, sociology of science and policy analysis. It is primarily qualitative and action oriented, as well as interdisciplinary; e.g. through the pooling of environmental economics, environmental law, environmental chemistry and toxicology. This interdisciplinary research is conducted with other universities and research institutions as well as in the context of the UA Institute for Environment and Sustainable Development.

Special attention is given to analytical aspects of policy renewal, policy organization and evaluation, public support and stakeholder participation (multi-actor policy), inter- and

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transdisciplinarity (science-policy-society relations), the social construction of risk and social impact assessment.

Applications are to be found in the following subfields: environmental nuisance, environment & health, risk assessment, risk management and risk communication, brownfield rehabilitation, integrated water management, disposal of nuclear waste, transitions & sustainable materials, nature conservation and town and country planning.

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Introduction

The solution for managing “type A” radioactive waste, characterized by low to intermediate activity and a half-life of less than 30 years, as defined by the federal authority¹ based on the work of NIRAS/ONDRAF², was developed through participatory dialogue with representatives from society.

NIRAS/ONDRAF would like to follow this same philosophy for type B and type C waste, i.e. high-level and/or long-lived waste. Any solution for managing such waste has to be technically feasible and safe, without placing too heavy a burden on future generations. Therefore, anchoring the dialogue with society in the decision-making process is something that needs to be done both to justify and to optimize the solution. It cannot merely be a solution that is acceptable in the eyes of civil society at a given time; it needs to be the most suitable solution for the entire lifespan of the waste and spent fuel.

Any action having to do with managing very long-lived radioactive waste (tens or hundreds of thousands of years, an eternity from a human perspective) entails finding a balance between optimum safety and radiation protection of humans and the environment on the one hand, and societal acceptance of the chosen solution, taking into account the implications for future generations³, on the other.

Public participation in the process of defining a waste management solution remains a challenge. The precedent set by the management of type A waste helped highlight certain aspects, such as the concept of adaptability⁴ and the role of partnerships. The first led to

¹ Decision of the Council of Ministers, 23rd June 2006.

² See: ONDRAF, “*La mise en dépôt final, sur le territoire belge, des déchets radioactifs de faible et moyenne activité et de courte vie – Rapport de clôture de l’ONDRAF relatif à la période 1985-2006 invitant le Gouvernement fédéral à décider de la suite à donner au programme de dépôt*”, document NIROND-2006-02 F, May 2006.

³ Note that NIRAS/ONDRAF identifies two other dimensions of a sustainable waste management solution: the “science & technology” dimension and the “economics & finance” dimension. We believe that the first is directly associated with the safety dimension, while the second is part of the social acceptability dimension.

⁴ *Ibid.*, p. 163.

the idea of “tailor-made storage”, on the premise that the most acceptable solution is not predefined, but rather integrated in and adapted to the local socio-environmental context. Partnerships between NIRAS/ONDRAF and municipalities⁵ helped “crystallize” and structure the discussion to create a so-called “integrated” project, i.e. a project that is appropriate and contributes to the dynamics of the region to which it is attached. Since the broadest possible consensus on a waste management solution is sought, these precedents could be transposed and developed according to the contingencies of type B and type C waste.

The final version of the B&C Waste Plan, adopted by the NIRAS/ONDRAF Board of Directors in September 2011, is the first strategic document in the process of defining the search for a management solution: it incorporates the findings of consultative processes in 2009 and 2010 (eight participatory dialogues and one interdisciplinary conference organized by NIRAS/ONDRAF with the Belgian population, representatives of civil society and stakeholders, as well as a citizens’ conference organized by a third-party institution, the King Baudouin Foundation⁶).

The NIRAS/ONDRAF now seeks to extend this exercise by planning the terms of a societal dialogue within the decision-making process, which will have to be “adaptable, participatory and transparent”⁷ in order to effectively and efficiently combine technical feasibility and societal acceptability. In other words, it must be progressive, participatory, adaptable, transparent and credible, and it must ensure continuity in the very long term⁸.

This report is the result of research conducted by the universities of Liège and Antwerp over the course of a year. This research project, subdivided into five axes, aims to identify the conditions conducive to a realistic, effective and socially acceptable process to translate an action plan (the Waste Plan) into a specific implementation project that would

⁵ The association is not, however, the decision centre. The partners go back to their respective municipal councils and federal supervisory authority for the formal adoption of the conclusions.

⁶ See “*Plan Déchets pour la gestion à long terme des déchets radioactifs conditionnés de haute activité et/ou de longue durée de vie et aperçu de questions connexes*”, NIRAS/ONDRAF, September 2011, document NIROND-2011-02 F, p.11. This document will hereinafter be referred to as the “Waste Plan”.

⁷ Ibid.

⁸ See Waste Plan, p. 159 and following.

likely still be subject to arbitration and negotiation. Moreover, each axis of research aims to answer a particular question in order to address the issue from five different perspectives — theoretical, legal, media, societal and international:

- Axis 1, “The decision-making process: from plan to project”, provides a theoretical discussion of the legitimacy of the decision-making process for B&C nuclear waste management.
- Axis 2, “Evaluation of the Process of Societal Consultation about the Waste Plan”, sheds light on the expectations expressed in public consultation and on the successive stages of consultation that have already been implemented.
- Axis 3, “Analysis of the Media Coverage of the 2010-2011 Waste Plan”, examines the visibility of the Waste Plan and the way it is treated in the media, as well as the actors and rhetoric occupying centre stage on the media scene.
- Axis 4, “International Decision-Making Comparison”, explores decision trajectories developed in other countries (France, the United Kingdom, Sweden and Switzerland) in order to identify which lessons learned there can be transposed to the Belgian setting.
- Axis 5, “Societal Support for the Solution for B&C Radioactive Waste and Spent Fuel Management in Law”, focuses on the legal and institutional framework of the decision-making process.

This report is a synthesis of all the reports listed above. In this context, a dual perspective is adopted: prospective and retrospective. The first part of the document is prospective and consists of two chapters. The first chapter — based on the report of S. Paile (Axis 5) — analyzes the degrees of legal freedom when it comes to defining the various stages of the decision-making process. These stages must be defined by the authorities in order to organize the management of B&C radioactive waste in the very long term. Chapter 2 — based on the report of C. Zwetkoff (Axis 1) — leaves the legal realm to analyze what determines the legitimacy of public decisions in a climate of uncertainty, and subsequently proposes an initial set of criteria for establishing a decision-making process that is both effective and legitimate.

The second part of the report presents a retrospective look at the experiences of the past two years. Chapter 3 — based on the report of K. Van Berendoncks (Axis 2) — presents a critical analysis of participatory steps already implemented by NIRAS/ONDRAF in preparation for the 2011 Waste Plan: how have these experiences helped to reinforce societal support for the decision-making process? Chapter 4 — based on the report of C. Parotte (Axis 3) — gives an overview of the debates found in the print media in the country's two major Communities.

Concluding the report is an international comparative analysis — based on the report of K. Van Berendoncks and A. Bergmans (Axis 4) — of decision-making processes, involving the reference framework developed for studying NIRAS/ONDRAF's participatory processes in Belgium. This work is based on the assumption that it is possible to benefit from experiences in other countries, analyzing participatory decision-making in France, Switzerland, Sweden and Great Britain.

Finally, the conclusions of the report will come back to the general and prospective guidelines for the process of implementing the Waste Plan, the precautionary principle and lessons learned from the retrospective analysis, while some research priorities will be proposed for B&C waste management.

Part I: A prospective view on the construction of the precautionary approach in managing the Waste Plan

1. Legal and societal support⁹

Type B&C waste management will take decades or even centuries: having to take into account the very long term brings up a great many questions, both in terms of technical management (How do we incorporate technological advances over the decades? Should we factor them in from the start?) and in terms of organizing socio-political support for the process. The purpose of this chapter is to examine the conditions of realistically implementing participatory dialogue between society and authorities, and the need to support this dialogue with a stable legal framework.

The report concerning Axis 5 details the provisions of the law applicable to the issue, either in the international, European or Belgian legal rules regarding nuclear material, or in environmental law — with particular attention to the latter, which has historically been a vector for greater consideration for the societal legitimacy of risk activities, thereby strengthening and consolidating established worker safety measures.

International nuclear law has gradually grown into a veritable legal set of rules pertaining to nuclear activities, often with precedence over national rules to protect populations and workers against the effects of ionizing radiation. Since the Joint Convention of 1997, this set of rules also includes specific provisions regulating the definition of solutions for managing radioactive waste and spent fuel. Given the risk of nuclear activity to populations and the environment, these provisions particularly describe the obligation to submit such activity to an authorization scheme (Stoiber et al, 2003). Environmental law is directly applicable to nuclear activities because of the risk they pose to people and the

⁹ Paile S., Processus socio-politiques et Gestion de plan en univers controversé. Axe 5 : l'assise sociétale de la solution de gestion des déchets radioactifs B et C et du combustible usé en droit, 2012

environment. It also applies indirectly to the extent that nuclear law itself has gradually incorporated the “acquis” of environmental law, such as the precautionary principle, the “polluter pays” principle and the prevention principle (Nuclear Energy Agency, 2010). These two branches of law must be mobilized by using the complexity of a multi-level analysis.

This synthesis begins with the main contributions of international, European and Belgian positive rights and then puts them into perspective with the different stages of the decision-making process proposed by NIRAS/ONDRAF so as to draw specific lessons from them to strengthen societal anchoring.

1.1. Legal framework

1.1.1. An indeterminate decision-making framework

When analyzing the rules at Belgian level, one must take into account the division of powers between the federal level and the federated and/or decentralized entities. The regulation of nuclear activities comes under the jurisdiction of the federal institutions, while responsibility for the environment is spread out over all levels of government, and land use planning comes under the exclusive jurisdiction of the federated entities.

However, these laws barely regulate the decision-making process aimed at developing a type B&C radioactive waste management solution. Upon analysis of the draft of the decision-making process outlined in the Waste Plan, it appears that the phases and steps are only residually planned or regulated. The law generally provides technical requirements and mechanisms to garner societal support, which are often contained in instruments to ensure the compliance of actions for environmental purposes, such as SEA and EIA, but does not link them to any established or suggested timeline. This formal vacuum is insufficiently compensated by the provision of these instruments and their related obligations. However, this absence of a legal framework can also be seen as an asset, making the decision-making process so flexible that it allows for more adjustments to maximize societal support.

As it stands, decision-making process characterized by the active pursuit of societal support is not a fixed part of the law. Should it be established by law? The issue is worth debating. Indeed, should the important steps in the process be regulated? Or, rather than hoping to project a reassuring legal “certainty” into the future, would it be better to offer a more pragmatic approach, where “day-to-day” decisions are not entrusted to the law, but to one or more bodies that would check whether the public's rights are respected and, taking into account the criteria of legitimacy and efficiency, would propose measures or adjustments to optimize societal support? More than the translation of the law, this pragmatic approach would favour the idea of governance that allows the process to effectively and efficiently achieve the objectives of stepwise progression, societal participation, transparency, flexibility and adaptability, while ensuring the necessary continuity of these processes in the very long term that sets them apart.

1.1.2. A flexible governance system

Spearheading the governance of radioactive waste and spent fuel management are NIRAS/ONDRAF, the authority responsible for the process of defining the management solution, and the Federal Agency for Nuclear Control (FANC), responsible for the safety of nuclear activities. As a technical authority, the FANC possesses information and key expertise enabling it to assess the safety of potential solutions. Its expertise, already subject to transparency requirements, is therefore invaluable. The interaction between FANC and NIRAS/ONDRAF, structured in the decision-making process while respecting a certain distance necessary for the missions of both organizations, would enable them to anticipate the “transition” between the laws applicable to the search for solutions and the laws applicable to the solution itself. This transition would take place when the solution reaches the planning stage and is submitted to the nuclear facility licensing scheme. In this way, the public would have a long-term view of the regulation of waste management activities instead of just a view of the activities themselves, for maximum involvement in the decision-making process.

There is no legal regulation that refers to the creation, jurisdiction, organization or operation of any authority supervising compliance with the principles of pursuing broad societal support in the decision-making process. In terms of institutional and documentary

support of this endeavour, the law does not prohibit anything. As for the Waste Plan, it states that NIRAS/ONDRAF is not “in the best position to organize or support participatory processes” and would therefore like organization and support to be entrusted to “experts”¹⁰ by organizing “follow-up by an independent, institutionally guaranteed body”. Given the division of powers in Belgium, this follow-up should be organized at the federal level and a flexible “normative system”¹¹ should offer the “institutional guarantee” specified in the Waste Plan¹², giving the body its rightful place, to be created in the federal legal system. This body should also be provided with guarantees of independence and allowed to take on the responsibility of organizing said follow-up with sufficient leeway to react and to meet society’s expectations in a flexible and pragmatic way.

The plans are not irreversible, as they will need to be amended and modified in light of changing strategic considerations. The Waste Directive¹³ requires that the national programme be “maintained and improved, if necessary, taking into account (...) lessons learned from the decision-making process”, or in light of technical or scientific developments as well as “lessons learned and good practices derived from peer review”, while the Commission is to be kept informed of such changes. However, it is necessary to provide some certainty for participants in the process. In order to avoid jeopardizing all the accomplished work, and at the same time allow the Waste Plan to be adaptable to trends and lessons learned during the process, an option would be to issue a reminder of the strategic considerations that governed the plan’s creation in all subsequent actions. This reminder could possibly take the form of a “Waste Plan clause” in the green lights or authorizations, intended to place the document within a strategic vision for long-term planning of the management solution, while ensuring continuity between the various stages of the process (and even in the longer term, after the site is closed down).

¹⁰ Waste Plan (2011), p. 163.

¹¹ Ibid., p. 173.

¹² Ibid., p. 163.

¹³ Council Directive 2011/70/EURATOM of 19 July 2011 *establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste*. Hereinafter referred to as the “Waste Directive”.

1.2. Draft of a decision-making process in 6 steps

This section presents an analysis of the room for manoeuvre authorities have for each step in the decision-making process as proposed in the current Waste Plan. Will it be possible to define for each step specific measures ensuring the appropriate level of societal participation, transparency, flexibility and adaptability, and while maintaining the necessary continuity of the process? Analysis of the decision-making process reveals that the room for manoeuvre is quite large, but differs per stage.

1.2.1. Defining a national programming framework

The Belgian Waste Plan is now fully developed and legally valid since NIRAS/ONDRAF's Board of Directors has adopted it¹⁴. For the national authorities, the development phase of the Belgian national programme will probably be a priority immediately after the ratification of the Waste Plan policy. Indeed, the Waste Directive requires Belgium to develop a national framework, namely the "legislative, regulatory and organizational framework (...) that assigns responsibilities and provides coordination between the competent bodies"¹⁵ and defines provisions on information and public participation, before 23rd August 2015. Formally, this endeavour to arrive at a definition is a step in the decision-making process, beginning in a way by establishing the rules, without making any assumptions about which site is eventually selected for actual implementation. The Waste Plan can be seen as a preparatory act that will serve as a basis for drafting this programme: it will have to be completed with "important deadlines and clear timetables in order to meet these deadlines" or "transparency policy or procedure", as well as with cost estimates.

All states adhering to the Kiev Protocol¹⁶ are formally required to carry out a Strategic Environmental Assessment (SEA) before finalizing any plan or programme with a potential impact on the environment. As it is a "programme" as defined by European law,

¹⁴ Royal Decree "NIRAS/ONDRAF" Article 9, paragraph 1 and Article 2 paragraph 3.1 c).

¹⁵ Waste Directive, Article 5.1.

¹⁶ Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, Kiev, 2003, implemented by Directive 2003/35/EC and the Law of 13 February 2006.

the Belgian national programme will be subject to the provisions relating to environmental¹⁷ "plans and programmes"¹⁸. We think that in the course of its development and in the sense of the SEA Directive, it might have to carry out a Strategic Environmental Impact Assessment (SEA) on both the Directive on public participation in the development of plans and programmes¹⁹ and Belgian law²⁰, even though the B&C Waste Plan has already been the subject of such an assessment.²¹ Public participation itself in the development process is mandatory under the provisions pertaining to SEA procedures "during their development and before (the plans and programmes) are adopted".²² The SEA should be subject to public consultation as early as possible in the course of its development. Specifically, the public to be consulted, which also includes legal persons, must be identified and must be informed of both the draft plan and a specifically drawn up "environmental report".

The national programme should contain a proposal outlining the terms of the search for broad societal support: this particular point implies that the public should be informed and consulted on the terms of its own information and consultation, put in place to support the programme's implementation. Belgian law implementing the Aarhus Convention²³, and in particular Article 5, guarantees public access to all legal acts and to the policy notes that

¹⁷ It should be noted here that the Directive does not stipulate anything of the sort. This obligation, also anticipated by NIRAS/ONDRAF and bodies in other Member States, is characterized only by an overall reading of EU law, including environmental law.

¹⁸ It should be noted that neither international law (Kiev Protocol, Article 2), nor EU law (Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, OJ L 197, 21 July 2001, known as the "SEA Directive", Article 2), nor federal law (Law of 13 February 2006 on the assessment of the effects of certain plans and programmes on the environment and public participation in the development of plans and programmes relating to the environment, Belgian Official Gazette, 10 March 2006, known as the "SEA Law", Article 3), nor regional regulations in Wallonia (Walloon Environmental Code, Article 6) provides a distinct definition of each of these actions. "Plans and programmes" are always paired up in the definitions and legal provisions.

¹⁹ Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in the preparation of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice, Council Directives 85/337/EEC and 96/61/EC, OJ L 156, 25 June 2003.

²⁰ SEA Law.

²¹ Note that although NIRAS/ONDRAF considers this interpretation to be coherent, the body does state that not all Member States share this view. Furthermore, the European Commission has no unambiguous interpretation of how to apply the SEA legislation to the national programme.

²² Law of 13 February 2006, Article 4.

²³ Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Aarhus, 1998, Article 8.

constitute environmental information²⁴. The public must be involved from the "beginning of the procedure, that is to say, when all options and solutions are still possible and (it) can have a real influence" (Article 6.4). It "effectively participates in the work throughout the decision-making process regarding the environment" (Article 6.3). Its opinion must be taken into account. The decision must be communicated to the public, along with the reasons that have led to this decision. This means that the public not only has the right to challenge the decision in court, but also has a means of pressure in the longer term on decision-makers who do not take into account its views on the details of the decision and its implementation.

Both the Belgian safety authority and NIRAS/ONDRAF have a general obligation of transparency "in the areas falling within (their) competence".^{25,26} The safety standards of the IAEA, which are not binding acts, but whose content is of expert level, require ongoing communication on the part of the authorities about regulations and criteria in terms of radiation protection in the vicinity of a proposed installation. This requirement is followed in the timeline by requirements for establishing communication channels between these authorities and the general public on the one hand, and between these authorities and workers on the other hand, as soon as the nuclear facility enters the active phase. This obligation to structure the information should be taken into account in the pursuit of societal support for the waste management solution as a building block that will increase public trust in this management.

1.2.2. Green light for the siting draft phase

The step that would allow the authority to prepare the *siting* draft is not prescribed by law, but would allow NIRAS/ONDRAF to ensure political support prior to the identification of a series of sites in order to investigate the technical feasibility of an installation there.

²⁴ Law of 5 August 2006 on the access of the public to information about the environment (Belgian Official Gazette, 28 August 2006), Article 14, paragraph 1.

²⁵ This obligation can be found for both bodies respectively in Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, OJ L 172, 2 July 2009, Article 8, and in the Waste Directive, Article 10.

²⁶ Law of 11 April 1994 on the public nature of government (Belgian Official Gazette, 30 June 1994), Article 2.

The law distinguishes only "plans and programmes" on one side and "projects" on the other. Neither is there anything in between the SEA, which is an impact study for a strategic act, and the EIA, its counterpart for a project. As the step studied in this case is no longer in the strategic domain, but is actually an early realization in the work towards a final decision on a management solution, it can legitimately be argued that the process is in the planning stage and that it should therefore be subject to the obligation to carry out an EIA²⁷. This phase would not be the last one to be subject to an EIA, thereby deliberately creating the opportunity for more public consultation and transparency in the process. The texts do not mention the possibility of multiple EIAs for what is ultimately a single project, but neither do they prohibit carrying out more than one. Along with their appended risk assessments and safety reports, EIAs must be the subject of active and electronic communication by the authorities²⁸, federal and/or regional in this case, in addition to transparency requirements in administrative matters.

1.2.3. Green light for the draft phase for an integrated disposal project

In the analyzed body of law, there is no provision aimed at regulating how to carry out this phase proposed by the Waste Plan, which aims to obtain a mandate to proceed to the next phase in the development of the integrated disposal project. This step is only intended to prepare the negotiations, especially economic and social in nature, regardless of environmental aspects. Although this step is not, by nature, subject to the obligation to carry out an EIA, there is no avoiding the issue of garnering societal support at this stage. Indeed, while the process is still only in a political and administrative draft stage, a broad societal basis would lay the groundwork for negotiations to discuss the terms of society's acceptance of the management solution that has yet to be defined. This stage should allow for a first identification of stakeholders directly and concretely affected by the proposed

²⁷ See for example Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, OJ L 26, 28 January 2012, Article 6, and the Decree of 6 February 1991 of the Flemish Executive establishing Flemish regulations concerning ecological authorization (Belgian Official Gazette, 26 June 1991), Article 2, paragraph 5.

²⁸ Law of 5 August 2006 on the access of the public to information about the environment (Belgian Official Gazette, 28 August 2006), Article 14, and the Walloon Environmental Code, Article D20-16.

implementation of the draft, including foreign stakeholders²⁹. This is also the time to draw up an inventory of practical means to be developed in order to organize and sustain a societal dialogue with relevant entities, taking into account the provisions pertaining to NIRAS/ONDRAF³⁰. The latter devotes its competence to creating or maintaining societal support for a management solution to be established in a local community, allowing it to establish or participate in associations, interest groups and consultative bodies.

1.2.4. Green light for preparing the project file

The green light for preparing the project file marks the transition from the draft stage to the project stage. There is no specific legal requirement for this stage in the analyzed body of law. NIRAS/ONDRAF's request to be given the green light will have to take into consideration not only the federal objectives, since authorization must come from the federal level, but also the views expressed directly throughout the draft stage or anticipated views, which means taking into account the fact that the federated entities will express their opinions during the project phase, within the limits of their jurisdictions. Similarly, this must be anticipated in the many documents that will be required for subsequent phases, especially in compiling the authorization file, since several regional, provincial or municipal jurisdictions in Belgium will then be involved.

It is also possible and desirable, with a view to ensuring optimal societal anchoring of the decision-making process and in view of possible delays between each stage, to carry out an EIA, possibly with consultation of foreign parties. This is indeed justified insofar as the decision endorsing this phase relates to a project³¹ that has a potential impact on the environment. It can even be added, since an EIA includes the obligation to consult the

²⁹ Only if the two steps to obtain the green lights for the *siting* draft and for the integrated repository draft are taken simultaneously. If an EIA was already conducted in the first stage of the phase, and if it preceded the integrated repository project draft phase, this would imply that these partners were already identified and consulted during the first phase.

³⁰ NIRAS/ONDRAF Law, Article 179, paragraph 2. For instance, it can create a medium-term fund ("MTF"), intended to "cover the costs of the conditions (associated with the implementation of the management solution) that have been approved by the municipal councils (involved) and (through NIRAS/ONDRAF) the Federal Government", part of which can be earmarked as a "local fund" focusing more specifically on the creation of a "sustainable added value for a local community."

³¹ By accepting the previously proposed extensive interpretation of what constitutes a "project", i.e. including the draft level, and possibly even the pre-draft.

public when "all options are open"³², that this phase is the one that best matches this requirement.

1.2.5. Obtaining authorization

The phase to obtain the necessary authorizations can be approached from four angles, which, although they are not formally steps, help us to understand the complexity of the analyzed body of law. Approval of the site is a first key element, because it is the site itself that, once it is defined, determines the public whose support is sought and the local entities concerned. Approval of the *design* is a second element, the identified provisions of which relate more specifically to the safety that this *design* must ensure. From a technical point of view, indeed, the Joint Convention requires an assessment of the facility's safety and an environmental assessment to be carried out prior to construction, anticipating its entire useful life. The importance of cooperation and collaboration of various public authorities is therefore particularly important here. The approval of the operator is a third element of understanding. At this stage it is already incumbent on those who operate this facility, in this case NIRAS/ONDRAF, to respect the obligations associated with the act of authorizing the activity in general. Operators must act as channels of communication on nuclear safety and they must anticipate this reality from the development of the authorization file onwards. Finally, the planning permission is a special part of the process, because it cannot be defined or organized by international law or European law: it comes under land use planning, which is the jurisdiction of regional authorities.

1.2.6. The operational phase

After the authorization phase comes the operational phase with its practical steps for construction, operation and closure. The first step involves no specific decision, since it was taken in the context of the building permit. The operational step, meant in the strict sense, as it consists of actually storing the waste and spent fuel, begins with the decision to stockpile type B and then type C waste, according to a first draft timetable laid down in the Waste Plan³³ and the technical requirements of each type of waste. The last step is the

³² EIA Directive, Article 6.4.

³³ Although the Waste Plan does not provide a specific date in this regard, NIRAS/ONDRAF does offer a draft decision-making process that, as the body specifies, needs to be enhanced, refined or even modified

practical realization of the selected solution, i.e. most likely the closure of the geological repository for an indefinite period of time on a human scale. This key moment ushers in a whole period, rather than a mere step, of monitoring the effects of the now concrete solution on the environment.

The actual closure of the facility also imparts a certain finality to the waste management solution: after the decision to close, the solution will be final. Even so, the question remains whether the materials could be reused, because one day they could be considered a resource and entered into a new cycle of use.

The last step is monitoring the installation. The Joint Convention stipulates that, in the period following closure, all states are to check the results of the safety analyses *ex post facto*³⁴. By spreading the results of these checks as safety information, actual public confidence in the long term can be verified. This way, two states can decide to sustain their dialogue on the environmental effects of a facility, as well as the way each of them consults the public, as a part of an EIA's long-term follow-up.

This last phase, however, is formally no longer part of the decision-making process and, since radioactive substances are now involved, the decisions no longer result from the same competences. Nuclear safety and security are at the centre of decisions that must be made to regulate the activity. The FANC therefore becomes the primary decision-maker and NIRAS/ONDRAF acts as an operator of a nuclear installation if it is actually approved as such. At this stage, the applicable law is expanding into new branches concerning safety, security, but also radiation protection and transfers of materials. This means that the pursuit of societal support for the management of type B&C waste and spent fuel no longer falls within the remit of NIRAS/ONDRAF. Nevertheless, in a logic of anticipating discussions that may arise in the future, even with regard to safety, NIRAS/ONDRAF should prepare society for these realities from the decision-making process onwards.

through consultation with all stakeholders, by gradually integrating the social and ethical dimension. See Waste Plan, p. 167.

³⁴ Joint Convention, Article 16.

2. Legitimation of the decision-making process³⁵

Once the decision in principle is made, the Waste Plan needs to be translated into a construction project to ultimately support the selection of the installation site, the implementation of the chosen option (tangible and intangible site) and its routine operation. As mentioned previously, this operation involves a decision-making process spanning several decades. Such a process involves many steps, during which judgment calls will be made between uncertainty and the gradually narrowing range of possibilities as to the location of the site and the manner of disposal.

The proposals presented in this chapter are based on the prior assumption that the decision-making process raises different problems that share a common denominator: they are all directly or indirectly related to the distributive nature of the final decision. Indeed, any decision regarding the establishment of a potentially undesirable activity organizes some distribution, an allocation of positive and negative resources. This distribution is subject to a judgment of justice on the part of the stakeholders. This judgment is accompanied by a more or less strong sense of justice or injustice. In order to feel it, the stakeholders call upon criteria and values of justice. These are pivotal to both the individual and the group. In a pluralistic modern society, these representations of what is just are far from unambiguous. The criteria raised by the judgment of what is right or wrong may have different meanings or weights. Some definitions of what is right are mutually exclusive, thus constituting the drive of distributive conflicts, such as territorial conflicts.

We will discuss four of these problems. Considered separately, they are sources of conflict, but — with the exception of the duration of the decision-making process — they are not specific to the Waste Plan. Together, they create a unique challenge for social acceptability.

³⁵ Zwetkoff C., *Processus socio-politiques et Gestion de plan en univers controversé. Axe 1 : le processus décisionnel : du plan au projet*, 2012

1. The room for manoeuvre as to the location of the project is limited by the strategic scenario that structures the plan. Will the inhabitants concerned take ownership of the plan? Specifically, how can we prevent and manage the risk of territorial conflicts, i.e. NIMBY (Not In My Back Yard) — a risk potentially compounded by the distance between the decision-makers and the people concerned? What is the nature of this distance? How can we reduce it?
2. The duration of the decision-making process, from the time of the decision in principle until the end of the *siting* process, is unique. How do we get local stakeholders to keep on agreeing with the decision in principle and then with the key decisions made by their "predecessors"? This duration, combined with a changing institutional and political context, entails ongoing work to transmit the memory of the reasons why, the arguments underlying the decisions already made and the identification of what becomes intangible or, on the contrary, remains reversible. But until which stage of the process is a decision reversible and at what "cost"?
3. There are conflicting views on the definition of the problem at hand. Is it legitimate to deal with waste management without regard for policy concerning the source of that waste? The answer depends on the costs and benefits taken into account in formulating a judgment of justice. A classic territorial conflict of the NIMBY sort (Not In My Back Yard) is explained by an imbalance between the distribution of costs, mainly borne by the local "host" community, and the distribution of diffuse or indirect benefits to a population much broader than the inhabitants of the area surrounding the proposed site. Implicitly, opponents are accused (rightly or wrongly, but that is not the issue here) of selfishness. As a rule, such conflicts are usually resolved by a readjustment, minimizing the costs and increasing direct benefits (compensation). But there are obviously other variants of conflict settlement, better conveyed by the acronym BANANA (Build Absolutely Nothing Anywhere Near Anything), which describes the position of some opponents of the decision in principle about the Waste Plan. In this view, the very existence of the benefits of waste management sites is challenged. Correspondingly, these opponents highlight the potentially huge costs in a context of great uncertainty, even ignorance, to subordinate waste management to phasing out nuclear power altogether. In this context, the very principle of offering compensation becomes a sensitive issue.

4. Socially valued distributional criteria vary according to the resources that are distributed. We can therefore predict that it is difficult to agree on distributional criteria when it is unknown, in part at least, what the nature of the direct and indirect effects of the selected option is.

The combination of these difficulties makes the decision-making process a complex and unique issue with high risk of destructive conflict(s).

The theme of this research is based on an assumption: studying the legitimacy of the decision-making process is inevitable in order to analyze the emergence of support for, or opposition to, the Waste Plan. This chapter seeks to clarify the conditions of the process of legitimation in this context, as well as the opportunities to maximize the social legitimacy of the output at each stage in the decision process.

The second assumption places waste management and the accompanying decision-making process in a precautionary framework. Making extensive use of the precautionary principle leads to deadlock, given the physical impossibility of making a decision without making it; of creating irreversible results while leaving the future open³⁶. Then again, by using the precautionary principle in a procedural way it is possible to recognize the asymptotic character it imposes on the decision and to enhance the potential of legitimizing the collective decision-making process. Following an initial analysis of the processes governing the legitimation of public decisions, this chapter proposes a set of quality criteria for a decision-making process using the concept of procedural justice in the domain of uncertainty³⁷. Furthermore, the full report on Axis 1 outlines a scenario of participatory dialogue.

³⁶ Although the precautionary principle is generally mobilized quite substantially, we believe that this use in the context of nuclear waste management would lead to deadlock as soon as inconsistencies are revealed.

³⁷ Based on experience gained in the field of type A waste management, secondary empirical data (other relevant projects – Depred, Suit, Appeal, Scope, Alpe), and scientific literature on decision-making theory (Keren et al., 2003, Simon, 1982, 1997, Chen et al., 1972), but also on the sociology of justice (how the justice of a distributive decision is judged: Kellerhals et al., 1988, Thibault et al., 1978, Tornblom et al., 1983, Tyler and Lind, 1990), we have chosen to address the issue of decision quality by focusing primarily on the process and the procedural approach, rather than on its outcomes (Keren et al., 2003).

What are the conditions of the legitimation process in this context? How are they evolving? How can we maximize the social legitimacy of the output of each stage in the decision process?

2.1. Why the choice to deal with the legitimacy of public decision-making in general and nuclear waste management policy in particular?

A public policy is legitimate if it is in accordance with the norms, values, beliefs, practices and procedures accepted in a group. The legitimacy of a decision therefore constitutes a reservoir of goodwill that allows authorities and institutions to go against the will of the public without too many consequences. The observation is not new, but its vague wording suggests that the extent of the powers of legitimation in the case of unpopular decisions remains an open question, largely dependent on the context and especially on the distribution of values and beliefs in a pluralistic society.

2.1.1. Still a relevant and open question

The identification of contextual variables influencing the relationship between legitimacy and support remains a subject of current research. The process of legitimation, its factors, conditions and/or its effects have inspired different models, in line with the dominant ideological framework of the time (Tyler, 2006).

Among the newer models, the quality of the decision-making process would at least partially explain its legitimacy or would influence, together with the legitimacy of the decision-maker, the interpretation and acceptability of the effects of the distributive process. The quality of the process would be dictated by compliance with criteria of procedural justice. One of these criteria today is the quality of taking into account the expectations of different categories of stakeholders about the substance of decisions and the manner of deciding, in line with the model of deliberative governance (Bacqué, Rey and Sintomer (ed.), 2005).

The manner of deciding would have an even greater impact on the legitimacy of the decision if said decision were made in a context of great uncertainty, or even complete

ignorance of its technical and social effects³⁸. This type of interaction is particularly relevant in the case of the Waste Plan.

The recent emphasis on process quality also addresses a double challenge: the fragility of public legitimacy resulting from the pluralism of values among the social actors, and the role of moral and normative aspects in the birth and management of socio-technical conflicts. After all, if there is no consensus on the fundamentals of a decision, then said decision would at least be more acceptable to the parties concerned if it met their expectations of procedural justice. In addition, a "good" decision-making process increases the chances of a "good" decision, or at the very least a decision meeting the objectives of as many parties as possible — at least if "good" means that it is based on the model of deliberative governance or dialogic democracy.

2.1.2. Relevance of the theoretical framework applied to nuclear waste management

The context of this management is uncertain in three ways. On top of technical uncertainties, there are social uncertainties. Moreover, the conditions and factors of legitimacy are themselves changing or variable because they are marked by a certain degree of historicism and cultural relativism. They are to be evaluated especially when a decision-making process takes decades, and in addition assumes a transition from the theoretical (federal) realm to a specific project that will materialize locally in a region of the country.

The potential historicity and cultural relativism of legitimacy criteria also impose an obligation to memorize the different legitimation arguments advanced in previous stages of the decision-making process, not only to advance from one stage to another, but also to allow the following generations to understand the choices made in the past, and possibly to agree with them. The memory obligation implies identifying and following legitimacy criteria through time and space.

³⁸ In practice, we see that the construction of the precautionary model is added to, or even mixed with, the prevention model in the sense that the precautionary principle is also mobilized with regard to "traditional" risks. Ewald F. (1996) Philosophie de la précaution, L'année sociologique, vol. 46(2) : 382-412.

2.2. Legitimation factors

Traditional drivers for individuals' acceptance of a decision made by an authority about the distribution of goods that are rare but necessary for the operation of society include:

- A good understanding of the decision by those accepting it, both in terms of the decision's substantive content and the complexity of the way it has been developed;
- The belief that the decision made is in line with public interest;
- The belief that the decision is in line with one's particular interest as well.

These three factors (intelligibility, being in line with the common interest and compatibility between public interest and individual interest) are required for the individual accepting the decision to feel mentally and physically able to carry out the decision and accept its distributional effects.

The conditions of agreement are being renewed in this society that is both pluralistic and "participatory", in a climate of technical and social uncertainty (in terms of values) and mistrust for the prevention model that favours experts, while the consequences of scientific progress are challenged. These are the beginnings of a mixed and inflexible conflict (Deutsch, 1994). In such conflicts, opposing parties systematically employ legal discourse when it comes to making the trade-off between public interest and individual interest.

The principles of procedural and distributive justice underpin both the legal order and sense of justice. The value of justice is crucial, because it is both universal and important for the individual as well as for the group (Kellerhales, Coenen-Luther and Modak, 1988). It helps to perpetuate a social order, while recognizing individuals' rights. This dual sensitivity explains why the argument of justice is at the epicentre of the belief in the social legitimacy of a political decision that has to reconcile the individual interest with the common interest. H. Lasswell's famous phrase "*Who distributes what to whom, in virtue of what criterial characteristics, by what procedures, with what distributive outcomes?*" (Lane, 1986) summarizes the dimensions of a court's judgment in respect of a

distributive (political) decision. Each party attaches different meaning and importance to the different elements of that phrase, which can exacerbate the conflict.

In the context of radioactive waste, the different elements of the question can be rephrased:

- Who is the source of the waste problem?
- Which dimensions of the risk are taken into account? How are they assessed?
- Who are the stakeholders?
- On which criteria was this distribution based? Equality or equity? Macro- or micro-justice?
- How is the distribution carried out? On the basis of which distributive criteria does one agree on how to proceed?

2.3. The criteria of procedural fairness

Does compliance of the decision-making process with criteria of procedural fairness have a positive influence on the degree of social acceptance of the decision ultimately made? And on the basis of which criteria does one agree on how to decide?

For a long time, theoretical perspectives (implicitly) posited that the procedures and the subjective evaluation of the results (perceived satisfaction) were independent. Distributions were assumed to have an intrinsic value, regardless of the path followed to obtain them. In recent years, this particular dimension of justice has shown to be important for individuals' acceptance of a decision made by an authority. One explanation is put forward: taking into account expectations in terms of procedural justice is no longer merely an attempt at balancing contributions and rewards; it is (also) a way of giving recognition to people.

Interest in the procedural approach has also been boosted by the fact that public participation in the decision-making process (dialogic democracy) has been put on the agenda.

The criteria of procedural fairness include (but are not limited to):

- Citizens' control over the decision-making process. Can citizens present their point of view in the more or less advanced stages of the decision-making process?
- Citizens' control over the final decision. Can citizens change it?
- The ability of the procedure to produce a solution that is "objectively" of high quality. The solution makes use of contextualized scientific knowledge; it adapts to new knowledge; it takes into account all points of view; it is based on the available information; it enlists the help of technically competent experts or citizens assumed to have lots of common sense; and so on.
- The neutrality of the procedure. Does it remove or correct bias, and does it guarantee the impartiality of the decision?
- The ethical nature of the procedure. Does it respect general criteria of morality and justice?
- Consistency. Are similar problems handled and solved in the same way?
- The reversibility of the decision. Is it possible to correct an unfair or inadequate decision?

The relative importance of each and every criterion, and the optimal combination of criteria, must be determined case by case. Indeed, the difficulty is that all these procedural criteria are perceived as legitimate, yet cannot be met simultaneously in one and the same decision-making process. Some are contradictory in actual practice (consistency versus citizens' control over the final decision, for example) or are inspired by different intellectual approaches (quality through contextualization of the decision versus consistency in decisions belonging to the same category). It is necessary at each step to try out new institutional decision-making mechanisms built around a compromise between the different procedural fairness criteria.

2.4. Building a dialogue programme

A procedural approach rather than a substantive one allows us to centre the decision-making process on a key question: can consensus on distributional criteria be reached when it is unknown, in part at least, what their direct and indirect effects are? The precautionary principle is understood as a constraint to be applied in a context of great

scientific and social uncertainty: it comes down to coordinating the various actors in terms of how to do things, ways to act, rather than in terms of positions of principle, which are not easily negotiable. The actors' creativity, called upon to create a scenario for a precautionary approach together, is itself an essential ingredient of a good cooperation dynamic.

In a climate of uncertainty, the decision-makers' inability to use scientific or economic knowledge to help them make a decision that influences the future, and subsequently to justify it to the public, places an unprecedented emphasis on rationalities other than technical reasons in choosing a line of action. Political intervention remains crucial, but it must be preceded by a public debate of a particular project, thus garnering social acceptance of the recognized benefits and costs, their distributions and the manner in which to decide. The public might very well still choose the option of zero risk, but it will then know that this option would create or exacerbate other present or future risks, or that it would transfer the risk to other populations (Keeney, 1995), because the public will have participated with experts and policy-makers in an analysis of the risks and their direct and indirect effects to be taken into account (Long and Fischhoff, 2000). Such a debate will prove enlightening for politicians and will also help to clarify their role: since they have access to a shared and informed reference framework, their final decision will be the result of a process that is already mapped out of precaution, indicating in particular the type of error (overreacting or underreacting) to be minimized as a matter of priority.

Why talk of uncertainty when the risks associated with radioactive waste are well-known? The sources of uncertainty are related to the long-term evolution of the site itself, exposed to the waste. For instance, socio-political developments in the very long term (hundreds of years) cannot be predicted, and therefore represent a major lack of knowledge about the social environment of nuclear waste.

The sense of justice is ideally linked to the conviction of being a respected partner and to the balance of contributions and rewards. Interest in the procedural approach has also been boosted by the fact that public participation in the decision-making process has been put on the agenda. Faced with an increasing demand for participation, the decision-making process must be rethought and redesigned to incorporate it, without blocking or

excessively slowing down the process (stalling tactics or destructive conflicts) (Bacqué, Rey and Sintomer, (ed.), 2005). Therefore, constructing the legitimacy of technological choices, and especially those making use of the precautionary principle, is now done by organizing a "dialogue" between politicians, scientists, the various stakeholders and the general public. This dialogue is subject to a sequential programme of participatory processes regarding the dialogue method (interactive communication), following one another throughout the multiple stages of the decision-making process.

2.4.1. Challenges of a strategic dialogue programme

When it comes to radioactive waste management, the difficulty is developing a dialogue programme that maximizes the chances of being understood and accepted at each step, and by every successive generation, until the end of the process. What's at stake is maintaining trust between the actors, keeping in mind that trust and distrust are not symmetrical. The success of such a programme depends on a two-pronged approach. A prospective *backsight* approach, in order to give the programme a minimum of coherence in the long term, and a *contextualization* approach.

This means that the (extralegal) participatory methods to be employed are developed step by step, with particular attention to consistency over time; to adaptation to the specific object of the current dialogue; to the actors involved; and to the relevant geographic area. Without the prerequisite of contextualization, the dialogue is very likely to be useless at best, or even counterproductive (causing distrust). This process is to be repeated at each step, and always opened up to the public. Although expensive, this approach is part of the responsible organization's learning process, allowing it to draw lessons from the successes and failures of past moments of opening up to the public, and from what is happening in other countries.

2.4.2. Dealing with uncertainty through a shared precautionary approach

The decision-making process for the implementation of the Waste Plan is flexible. We must therefore examine the social and scientific changes that justify an adaptation of it. Once again, this raises the question of which authority is responsible for the decision and

which body would be in charge of (possibly) organizing a participatory dialogue to define its scope and/or content. Who will assess these changes? According to which criteria? Does this assessment significantly reduce a given uncertainty, such as a scientific uncertainty? These issues come down to ways of dealing with uncertainty, ways that will be easier for the public to understand and support if they avoid overuse of the precautionary principle, leading to overreactions in the context of the crisis.

Organizing a debate on a set of specifications for a precautionary approach would have two advantages: it would increase understanding of the complexity of uncertainty management, and it would make the results of such an approach, still confined to the realm of experts, more readily adoptable. It is possible to initiate such an approach by following different paths:

- In a *top-down* approach, the participatory programme is defined at the political-administrative level, which proposes a dialogue scenario that the authorities deem best suited to meet the stakeholders' expectations.
- It is possible to give participants a transformative say in the matter: they can suggest changes to the scenario proposed by the authorities.
- It is possible to give participants a deliberative say in the matter, to choose a scenario from several proposals by political authorities: this approach is often proposed during public consultations.
- In a *bottom-up* approach, actors in civil society (whether organized groups or individual stakeholders) are directly involved in the development of scenarios.

At which point(s) of entry into the process of defining the dialogue programme do the different categories of actors want to intervene? What degree of control (a transformative say and/or a deliberative say) do they wish to exercise? What is the extent of the importance (distinctiveness) attributed to these expectations? These two dimensions of the stakeholders' procedural expectations are combined to determine four approaches (ideal types) for the construction of the dialogue programme. Rather than homogenous and distinct categories, they represent points on a continuum, between the *top-down* and the *bottom-up* approach. As to the prominence of procedural expectations, all things being

equal it modulates the dialogue organizer's room for manoeuvre, in particular its available resources.

If the choice is open between these different approaches (as was also demonstrated by NIRAS/ONDRAF's creativity during preliminary consultations about the Waste Plan), the selection process is not without constraints. Below, we will point out at least three that are likely to alter the effectiveness of a dialogue programme accompanying the decision-making process.

1. *The political culture* — The first element is the historical and social dimension of the political culture. It sets the tone in terms of the social acceptability and social legitimacy of theoretically applicable opening methods. However, cultural elements can vary over time (dialogic democracy and representative democracy, for example) and by place (regional, local subcultures). The legitimacy of a decision at a certain stage is contingent upon the identification (pursuit) of the procedural fairness criteria raised by stakeholders in the temporal and spatial context of that stage, and of the relative weight attributed to them. In case of incompatibility between several criteria identified as important, this weighting becomes a sensitive issue.

One of the challenges relating to the political culture is the public's preference for ineffective or even counterproductive methods of participation (such as referendums), while there are other methods better suited to the context, but less known to the public.

2. *The need for flexibility* — As the Waste Plan is strategic in nature, it must be adaptable to scientific or social changes that are deemed inevitable. How can we ensure that change management remains intelligible and that consensus is reached on how to arrive at a decision to apply changes, and on their content?

3. *Representativeness of the participants* — Past experience with participatory dialogues, led by NIRAS/ONDRAF in 2009, has shown that it is difficult to get individuals involved who are not directly and immediately affected. Consequently, this observation has cast doubt upon the results, considered by some to be biased. However, the level of activity will vary over the course of the dialogue programme, ranging from high activity to being put on the back burner in some stages, during which the mobilization of the public is

likely to be low. One of the challenges will be mobilizing the appropriate groups at different stages, leaving the process open to *bottom-up* participation, and organizing a system of active monitoring so that interventions — possibly at unscheduled moments in the decision-making process — can be taken into account.

“Which specific injustices will the group members tolerate for the sake of greater overall justice?” This question is central in the process of legitimation. Empirical research has shown that, when faced with a distributive decision, the sense of justice depends on the intrinsic value of the decision’s effects and on the way to achieve it (the procedure). The sense of justice is linked both to the conviction of being a respected partner and to the balance of contributions and rewards. This observation makes sense, all the more because the effects are uncertain or even entirely unknown.

Research has also shown that the followed procedure is often the cause of conflicts about the applied rules, due to the complexity of the judgment of procedural justice. This judgment is in fact based on criteria that are diverse and sometimes even mutually exclusive, yet coexist in the same society at a given time. In conclusion, expectations about the procedure are a sensitive issue and are to be monitored throughout the decision-making process by means of iterative research on the territorial level, relevant to each of the stages where the means of decision-making are opened to the public. This means that, when making the trade-off between persistent uncertainty and the gradually narrowing range of possibilities as to the location and management of the site, the legitimacy of each step is at stake.

Part II: Retrospective analysis of recent participatory processes in managing the Waste Plan

3. Evaluation of the consultation process that preceded the Waste Plan³⁹

In addition to the legally required consultation, NIRAS/ONDRAF set up an advisory process in preparation for the Waste Plan, consisting of several instruments: eight NIRAS dialogues, an Interdisciplinary Conference and a Public Forum, run by the King Baudouin Foundation. By launching a societal consultation process at a stage prior to the legally required public consultation procedure, NIRAS/ONDRAF aimed to integrate various concerns going beyond technical aspects. Despite these efforts, several actors voiced criticism, saying that they were not sufficiently heard or that their participation was not sufficiently reflected in the final Waste Plan for B&C waste.⁴⁰ This chapter aims to assess the level of success or failure of the various instruments used in the societal consultation procedure. The starting point of this analysis is that the choice and interpretation of specific forms of consultation is never neutral and always contains a bias for the types of actors that will manifest themselves, for the kinds of questions that can be discussed and for the output that can be generated by this participation. This is a general fact, which is independent of these specific problems. In addition, the evaluation criteria employed cannot be dissociated from the stage of the decision-making process and the uniqueness of the problem. For that very reason, a theoretical framework was first developed, making it clear that there can be different functions of consultation processes, and therefore also very different evaluation criteria. The comments expressed in the aftermath of the process should therefore be understood from this perspective.

³⁹ Van Berendoncks K., *Processus socio-politiques et Gestion de plan en univers controversé. As 2 : Evaluatie van het maatschappelijk consultatieproces rond het NIRAS Afvalplan*, 2012

⁴⁰ For a systematic overview of the concerns and criticisms expressed by the actors concerned, we refer to the appendix to the sub-report on Axis 2.

The criteria generally to be met by consultation and participation processes concerning socio-technical issues are quite different from classic decision-making. In order to have realistic expectations in terms of final outcome, efficiency and turnout, we will start by outlining the characteristic traits of participation in socio-technical issues and the different theoretical functions in consultation. Subsequently, we will use these insights as a basis to assess the instruments used in the consultation period. Lastly, combining those theoretical and empirical elements, we will review the entire procedure.

3.1. Theoretical framework

Socio-technical issues raise a number of specific challenges for participatory processes: the technical and scientific grounds for decisions are debatable and variable, the stakeholders are often difficult to identify, and clearly defined schedules are often disrupted by unanticipated interconnections between social and technical aspects (Callon et al 2009). In addition, consultation on these issues does not necessarily increase the level of consensus. However, we argue that reaching consensus should not be the standard by which to measure the success of a given consultation process. Controversy contributes to the identification of the different dimensions linked to the problem, and makes solutions more robust in an evolving societal context.

While the need for participation is widely recognized nowadays, translation into operational terms is often lagging behind, even in academic literature. Specific regulations as to who should be involved, when, and regarding which aspects remain abstract, especially in the earlier stages of the decision-making process (*pre-siting*). We argue that roughly three different functions of consultation can be distinguished: normative, instrumental and substantive (Lehtonen 2010). These functions can overlap, but they can also contain mutual inconsistencies.

Consequently, the intended function of a consultation should be taken into account in its evaluation: some instruments can be used strategically to increase societal support, others to maximize all parties' chances of participating in the process, and others still to bring out a maximum of different perspectives and alternatives.

<i>Normative</i>	<i>Instrumental</i>	<i>Substantive</i>
<ul style="list-style-type: none"> • Transparency • Accountability • Neutral organization • Access and openness • Sufficient means • Inclusion in policy 	<ul style="list-style-type: none"> • Increase acceptance of policies already decided on • Give institutions legitimacy 	<ul style="list-style-type: none"> • Integrate a diverse array of views, knowledge and values • Broaden perspectives

Table 1: The three main functions of consultation

The considerations taken into account in the design of a consultation tool can be grouped into four clusters: finality, target audience, problem definition and output. In what follows, we will examine how each of the three different possible functions of consultation can be dealt with, starting from the basic assumption that there is no clear and simple answer to these considerations and that evaluation criteria therefore cannot and must not be absolute, but indicative instead.

3.1.1. Finality

A common pitfall is considering participation procedures to be an end in itself, without contextualizing the finality of this effort any further. Clarifying the objective, and in particular the relation to the decision-making process, can avoid many problems and misunderstandings, both during the recruitment of participants, in the process itself, and when it comes to feedback. One of the choices to be distinguished here is the preference either to receive information *bottom-up* primarily, or rather to focus on informing others. The role fulfilled by the organizer can vary greatly with the anticipated function, ranging from mere facilitating work to being a stakeholder actively defending a particular policy choice. Finally, the intended function also determines when the consultation process is mobilized within the logic of the decision-making process — either during policy preparation or during implementation preparation.

FINALITY	<i>Normative</i>	<i>Instrumental</i>	<i>Substantive</i>
<i>Role of the organizer</i>	Informs	Convinces	Facilitates
<i>Direction of information</i>	Bidirectional	Top-down	Bottom-up

Stage	During decision preparation	During implementation preparation	During policy preparation
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Table 2: Elaboration of the three main functions of consultation for the ‘finality’ domain

3.1.2. Target audience

Stakeholder analysis is an exercise that consists of determining which aspects of a problem are related and which individuals and groups are affected by the issue, as well as prioritizing those individuals and groups in the decision-making process (Reed 2008). Depending on the stage in the decision-making process, priority will be given to directly vs. indirectly involved parties, local vs. national level, experts vs. laymen, stakeholders vs. representatives, traditional civil society vs. ad-hoc representation, and so on. In addition, the degree of inclusiveness to be achieved varies with the function. For instance, the trade-off to be made between completeness and workability will have a different final form. The weight given to representativeness also varies according to the function. While this is not a prerequisite to a substantive objective, it is a formal guarantee within the normative function of consultation.

TARGET AUDIENCE	<i>Normative</i>	<i>Instrumental</i>	<i>Substantive</i>
<i>Representativeness</i>	Maximum	High	Of lesser importance
<i>Inclusion</i>	Limited	Maximum	Limited
<i>Stakeholder identification</i>	According to the formal role	As broad as possible	As diverse as possible
<i>Inclusion of institutional stakeholders</i>	Maximum	Less	Maximum
<i>Mobilization and communication</i>	Passive	Active	Active

Table 3: Elaboration of the three main functions of consultation for the ‘target audience’ domain

It is therefore important to make these choices explicit because, in the event that the organizer is also responsible for policy, there is often the natural tendency to contact actors and networks the organizer is already familiar with.

3.1.3. Problem definition and agenda setting

A specific aspect of socio-technical policy issues is that the definition of the problem is contested. This problem definition, i.e. “what is part of the problem”, is itself at the centre of the debate. Openness in the problem definition during participation processes presupposes that the manner in which the problem is discussed is not predetermined. Defining the problem and determining the criteria for decision-making are part of the process and are opened up to the stakeholders to a certain degree. The trade-off here is that any form of participation requires some provision of information. However, this information has to be presented in a way that avoids jeopardizing the openness of the problem definition. Moreover, this problem definition is often limited in practice by the steps that have already been taken in preparing the decision-making process.

First of all it is necessary to decide whether to predetermine the range of policy options to be submitted, and to what extent. The trade-off that should be made is that an overly broad definition can jeopardize the output of the process, while an overly narrow definition can be seen as a bias on the part of the organizer. The extent to which the stepwise progression of the process itself is put up for public participation, too, can vary according to the objectives in view. A final consideration is whether the organizer wishes to actively inform the target audience, and by means of which didactic instruments.

PROBLEM DEFINITION	<i>Normative</i>	<i>Instrumental</i>	<i>Substantive</i>
<i>Problem presentation</i>	Closed	Closed	Open
<i>Agenda setting</i>	Rather top-down	Completely top-down	In cooperation
<i>Number of policy options</i>	Limited	One	Unlimited
<i>Information provision</i>	Lies with the institutional actors themselves	Coming from the organizer	Identified by participants

Table 4: Elaboration of the three main functions of consultation for the ‘problem definition and agenda setting’ domain

3.1.4. Output

Given that the decision-making process concerning socio-technical issues often runs for a long period of time and does not always lead to decisions in a linear way, reporting on the consultation process is important. Particularly when it comes to consultations at plan level, participants often remain in the dark as to how their input was incorporated into the decision-making process.

A first consideration that arises is whether to strive for completeness or rather to present a summary of the views in the reporting. Moreover, the reporting can focus either on elements about which there is consensus, or on the different views and disagreements. It is also important to include information on procedural aspects in the reporting, such as the selection of participants, and any meeting minutes. As the biggest frustration in participatory processes is often the lack of efficacy in relation to decision-making, it also seems crucial to come to an agreement in advance, clearly stipulating how the input of the process is used and how it can influence policy.

OUTPUT	<i>Normative</i>	<i>Instrumental</i>	<i>Substantive</i>
<i>Reporting</i>	Formal presentation of reactions	Summary made by organizer	Part of process
<i>Feedback</i>	Passive	Passive	Active
<i>Policy reformulation</i>	Limited	Weak	Strong

Table 5: Elaboration of the three main functions of consultation for the ‘output’ domain

3.2. Analysis of the consultation process leading up to the Waste Plan

3.2.1. Evaluation of the various instruments

In this section, we will assess the three consultation instruments voluntarily used by NIRAS/ONDRAF during development of the Waste Plan, based on the four dimensions discussed above. In our analysis, we will examine the use of consultative instruments in the context of the entire history of B&C radioactive waste management policy, so not only within the legal planning cycle governing the Waste Plan. For a detailed overview of this

evaluation, please refer to the sub-report. Listed below are the main findings summarized per consultation instrument.

Dialogues: from 18 th April to 16 th May 2009 – 4 sessions in Dutch (40 participants) and 4 sessions in French (20 participants)	
Finality	<ul style="list-style-type: none"> • Dual objective: on the one hand, identify the citizens' principles and concerns from a <i>substantive</i> perspective; on the other hand, from an <i>instrumental</i> point of view, strengthen confidence in NIRAS/ONDRAF as the responsible institution, and provide NIRAS/ONDRAF with information on where the draft Waste Plan needed to be revised. • Preparation of the stepwise progression of the process, as well as its objectives, by a diverse advisory group. • Confusion among participants regarding the parity of waste management options and the scope of the decision in principle.
Target audience	<ul style="list-style-type: none"> • Not predetermined: yet one of the objectives was precisely to identify the stakeholders. • Mobilization problem: despite several communications efforts, NIRAS/ONDRAF's low visibility proved to be problematic. Further exacerbated by concurrent campaign of the Nuclear Forum, which aroused suspicion among some actors. • Significant geographical (Province of Antwerp) and demographic bias in the turnout. • No institutional actors or manufacturers involved, leading to confusion about the role of NIRAS/ONDRAF.
Problem definition	<ul style="list-style-type: none"> • Introduction and explanation by NIRAS/ONDRAF of different waste management options and the different dimensions related to the problem. • Information provision received positive evaluation by the participants; only some ambiguity perceived about the financial implications. • In practice, the discussions focused mostly on geological disposal and little on other alternatives.
Output	<ul style="list-style-type: none"> • Extensive reporting by supporting experts and an independent audit committee. • Comments are not linked to the different waste management options or translated into recommendations. • Too few participants to bring into view the entire spectrum of actors, let alone possible public support. • Increased focus on retrievability/reversibility.

Interdisciplinary conference: 30 th April 2009 – 84 experts (38 French-speaking, 46 Dutch-speaking)	
Finality	<ul style="list-style-type: none"> • Unambiguous: compile evaluation criteria for the decision-making process from an interdisciplinary perspective. • Just like in the Dialogues, the timing in relation to the decision-making process and the long history of research had a limiting impact on the equivalence of the presented waste management options.
Target	<ul style="list-style-type: none"> • Participants with a background in the exact sciences are more strongly represented than social scientists, economists, etc. This is partly attributed to a stronger

audience	<p>awareness of the existence of NIRAS/ONDRAF in this target group.</p> <ul style="list-style-type: none"> • Low representation of institutional actors or nuclear industry representatives, and major player Greenpeace refused to participate.
Problem definition	<ul style="list-style-type: none"> • Outlined by NIRAS/ONDRAF, including its express preference for geological disposal. Consequently, the technical-scientific discussions focused mainly on this waste management option. • Process support externalized to journalists and academics. • Input defined in advance, in predetermined dimensions.
Output	<ul style="list-style-type: none"> • Stepwise progression of the process extensively documented. • No substance or priority given to the identified criteria, which weakens the impact on policy. The report strived to be exhaustive rather than to summarize. • This exercise resulted in attracting a third party as the organizer for the next consultation instrument, the Publieksforum.

Publieksforum: organized by the King Baudouin Foundation (KBF) – three weekends (14–15 November 2009, 12–13 December 2009 and 30–31 January 2010) with 32 participants (16 French-speaking and 16 Dutch-speaking)	
Finality	<ul style="list-style-type: none"> • Unambiguous, exclusively from a substantive function: identifying values, considerations and arguments that citizens find important in making the decision in principle. • Clearer explanation of the status in relation to the decision-making process.
Target audience	<ul style="list-style-type: none"> • Quite representative, thanks to active selection based on geographic and demographic criteria. • Multiple meetings promoted equal access of participants within the group.
Problem definition	<ul style="list-style-type: none"> • Presentation by the KBF, more neutral with respect to the different waste management options than was the case with previous instruments. • Availability of independent experts and representatives of key stakeholders, such as manufacturers, although they only became available at a late stage. <ul style="list-style-type: none"> • Given the long history of research into the domain, geological disposal is the dominant option here as well.
Output	<ul style="list-style-type: none"> • Summary report written by the participants themselves, which definitely strengthens the supporting power of the document: <ul style="list-style-type: none"> • requirement for a permanent supervisory committee that guides decision-making and monitors the latest developments; • requirement of reversibility was defined more clearly and explicitly made a precondition for geological disposal. • Not much information available on the internal stepwise progression of the process. Unlike in the Dialogues and the Interdisciplinary Conference, no extensive overview of the content of discussions or the way they progressed was made public by the KBF, other than the summary report.

3.2.2. Reactions in the public consultation process (legal consultation)

In addition to the voluntary initiatives taken by NIRAS/ONDRAF evaluated above, there was of course also a legally required consultation procedure. The criticism expressed in various consultative bodies, the formal responses and public comments are systematically identified in the research report and linked to the relevant actors. Criticism voiced by municipalities and various social actors was mainly directed at the timing of the consultation period and the failure to understand the urgency to make a decision then and there. In addition, the current knowledge base was also called into question. Another issue causing displeasure was the implicit link between the decision in principle and the location, and the associated communication to (Dutch-speaking) municipalities involved. Finally, uncertainty about funding turned out to be a recurring point of criticism.

3.2.3. General review of the entire consultation process

The report lists the main challenges and problems that were identified throughout the evaluation of the various consultation instruments. We will discuss the main points here.

Finality

- The participants in the consultation process were faced with a policy problem, since one of the solutions, geological disposal, already had a long research history and the responsible institution, NIRAS/ONDRAF, already had an express preference for that waste management option.⁴¹ Attempts to disregard this and to focus the input mainly on the principles proved rather counterproductive. The status and the ambition level of the public participation instruments in the decision-making process therefore often created confusion among participants. Within this context, the participants saw the relatively short time that remained to make a decision in principle as a fundamental problem undermining their ability to influence the choice of the recommended waste management option. To some

⁴¹ In our analysis, we will examine the use of consultative instruments in the context of the entire history of B&C radioactive waste management policy, so not only within the legal planning cycle governing the Waste Plan.

extent, this lowered the potential to achieve a substantive consultation exercise, irrespective of the decision-making logic.

- Any gauging of public support for the various waste management options remained largely outside the societal consultation process. The choice was made not to link the input to the various waste management options and to list the remarks as general principles and preconditions for geological disposal.
- The view on integrating public participation instruments into the decision-making process was too short-sighted — especially at first. The policy process followed a logic that was largely disconnected from the consultation process.

Target audience

- The public debate about the Waste Plan was influenced by the simultaneously occurring debate about an extension of the nuclear phase-out and the uncertainty surrounding it, which was beyond NIRAS/ONDRAF's control. In this climate, it was much more difficult to include opponents of nuclear power, since one of the solutions to the waste problem was seen as a justification for postponing the nuclear phase-out. Only when the nuclear phase-out is guaranteed to happen in the short term, making nuclear waste a 'finite' problem, can a stronger commitment of green movements be expected in the search for solution paths.
- Open participation is undesirable in substantive public participation exercises, and this was confirmed by the experience with the Dialogues. A diversified stakeholder strategy based on quotas for certain predetermined relevant characteristics would have been a better approach in this case. For certain objectives (such as mutual learning) it can be interesting to involve a mix of citizens, organization representatives and institutional actors (such as FANC, manufacturers). However, other parallel instruments (to increase public support, for instance) might benefit more from participation being limited to one or several groups.
- NIRAS/ONDRAF's low visibility with the general public was a disadvantage during recruitment. This can be overcome by bringing in a well-known external

partner for recruitment⁴². When the goal is to attain a specific representation of stakeholders (civil society, local actors ...) it may be advisable to delegate recruitment to the organizations themselves and to involve these organizations when determining the stepwise progression of the process and its objectives, as was the case with the organization of the Publieksforum.

Problem definition

- In order to keep both debates separate in terms of content and chronology, NIRAS/ONDRAF deliberately sought to disconnect the decision in principle as much as possible from the discussion about the choice of a suitable location. This prompted their decision not to communicate about the specific consequences that a recommendation in favour of geological disposal would have on the selected location. However, in doing so, they left an information gap that was filled by Greenpeace.
- The problem definition remained very closed in terms of waste management options. Long-term surface storage, in particular, was not presented to the participants as a serious alternative, with much more emphasis on geological disposal. As the rejection of this option in the Waste Plan was not based on the responses within the social consultation procedure, chances are that a more thorough assessment of this option will be demanded at a later stage.
- For the public, it is very difficult to grasp what exactly is the role that NIRAS/ONDRAF plays in the complex web of relationships with manufacturers and other parties involved. From this perspective it is desirable to involve manufacturer representatives, so that they can answer the participants' questions themselves, as was the case at the end of the Publieksforum. Then again, it also seems important to have an external party introduce and explain the problem. The social consultation process also revealed that NIRAS/ONDRAF, in instances where it was not the organizer, was seen as more neutral.

⁴² Although NIRAS/ONDRAF did call upon external parties for the organization of the dialogues, it clearly took the position of initiator and driving force.

- Analysis of the responses to the Waste Plan indicates that funding was a bigger societal issue than expected. Prior to the public participation processes, NIRAS assumed that this was a purely internal management matter, but it appears to be a predominant concern among citizens, requiring its principles to be made explicit.
- There is a strong demand for clear positioning on how other countries deal with the same problem.

Output

- The social actors' responses indicated that significant uncertainty remained about the impact of the public participation process on the Waste Plan. Actively communicating with participants and explaining why certain elements were integrated, or were not, is therefore advisable.
- Although the social consultation process only had a limited impact on NIRAS/ONDRAF's recommendation to opt for geological disposal in clay as the waste management option, the process has brought up a number of conditions (such as reversibility/retrievability) that will help to shape the future implementation agenda. Another element brought to the table was the need for an external regulator overseeing the rest of the process.
- Comprehensive reporting on the stepwise progression of the participation instrument is crucial. Both the steps in the process (recruitment, background of experts, etc.) and the content of the debates ought to be made available afterwards. Given the long-term nature of the decision-making and implementation processes, it must be possible to reconstruct the logic behind certain decisions.

4. Media coverage of the Waste Plan (2010-2011)⁴³

This section presents a summary of the events covered by the Belgian press concerning B&C radioactive waste management, in order to examine the way the media present the issue and to identify the spokespersons called upon to inform the public.

4.1. Methodology

The corpus was established by Auxipress at the request of NIRAS/ONDRAF and by the researcher based on the keywords “NIRAS/ONDRAF” and “Waste Plan”, and covers the years 2010 and 2011, and to a lesser extent the year 2009. The list of articles is by no means exhaustive, but large enough in number to be representative. The French-language and Dutch-language corpora are both treated separately, with the former serving as a comparative base for the latter. The French-language corpus consists of 154 texts from 26 different sources, one of which is the Belga news agency. The Dutch-language corpus consists of 251 texts from 34 different media and news agency Belga.

Some semantic clarification is in order here. Certain terms used by journalists to describe the waste management option advocated by NIRAS/ONDRAF differ from those commonly used by experts in the field. French-speaking journalists and stakeholders use the terms “enfouissement géologique”, “stockage définitif”, “solution d’enfouissement” and “stockage en formation géologique profonde” as opposed to “stockage en surface”, “stockage réversible”, “stockage provisoire en surface”, “stockage prolongé en surface” and “entreposage perpétuel en surface”. Dutch-speaking journalists and stakeholders use “opslag van kernafval in klei”, “ondergrondse opslagplaats”, “kernopslag”, “permanente opberging” and “definitieve bergingsplaatsen” as opposed to “bovengrondse opslag”, “langdurige opslag in een opslaggebouw” and “tijdelijke opslagplaatsen”. In other words, the stakeholders give the impression that they are talking about three different options: (1)

⁴³ Parotte C, Processus socio-politiques et Gestion de plan en univers controversé. Axe 3 : Analyse de la couverture médiatique du Plan Déchets de 2010-2011, 2012

geological disposal / “dépot géologique en profondeur” / “geologische berging”⁴⁴, (2) eternal storage / “entreposage perpétuel en surface” / “eeuwigdurende opslag”⁴⁵ and (3) “temporary” surface storage, called extended interim storage / “entreposage de longue durée” / “langdurige opslag” by NIRAS/ONDRAF. In fact, reading the corpus reveals that this distinction is not clear for the actors. The option of burying waste does not raise any confusion, whatever it is called, but the actors contrast it to storage in a general sense, not distinguishing between the two practical variants as defined by the Waste Plan: “interim” versus “eternal” storage. Virtually none of them uses the term eternal storage / “entreposage perpétuel” / “eeuwigdurende opslag” to render the actors’ statements⁴⁶.

Opmerking [PC1]: It’s geological disposal.

Therefore, in order to ensure consistency in the analysis, we shall use “**geological disposal**” to describe the burying solution (as this term is in line with the experts’ vernacular and corresponds to terms found in French and Dutch versions of the Waste Plan) and “**storage**”, as used in the media to refer to both eternal storage (as defined by the Waste Plan) and interim storage.

4.2. Results of the semantic analysis

The semantic analysis aimed to identify the key moments and players taking part in the debate on the media scene, in order to examine their stance on the issue of B&C nuclear waste management.

⁴⁴ This term, with synonyms used in the press including “enfouissement géologique”, “stockage définitif”, “solution d’enfouissement” and “stockage en formation géologique profonde”, is often associated with the verb “enfouir” (to bury).

⁴⁵ This term is rarely used in the press in the sense used in the Waste Plan.

⁴⁶ The term “entreposage perpétuel” (eternal storage) is used twice by La Libre Belgique and l’Echo when referring to the options ruled out by NIRAS/ONDRAF in the Waste Plan. So the wording is taken directly from the Waste Plan. The Dutch equivalent of this term, “eeuwigdurende opslag”, is not used by any of the actors.

4.2.1. Events included

Analyzing the headlines allows us to identify what captures the media's attention as regards nuclear waste⁴⁷.

Chronologically, following the publicity surrounding social consultations, French-language newspapers first raise the question of waste disposal (“What to do with nuclear waste?”), and then mention waste storage in geological repositories, in the context of the Citizens' Conference. After the legal public consultation (June 2010) mention is made of waste management funding (July 2010), the location of the waste burial site (“22 towns are likely candidates to store Belgium's nuclear waste”, August 2010), concerns voiced by the Netherlands (September 2010) regarding the option of nuclear waste burial, and protest rallies in front of the European Parliament, led by Greenpeace (October 2011). The decision of the European Commission in favour of waste burial (November 2011) is also an important news item, followed by a few headlines about the safety of nuclear waste (La Libre Belgique), waste transports from France to Belgium, and reactions of stakeholders to the Waste Plan (February 2011). Coinciding with the announcement of the approval of the Waste Plan by NIRAS/ONDRAF's Board of Directors in September 2011, headlines mention clear location information (“Nuclear waste: two locations in Flanders considered”). The year 2011 concludes with the question of how the management option will be funded, and 2012 begins with the issue of dismantling plants.

As in the French-language corpus, the headlines in the Dutch-language press, too, are partly in tune with the legal procedure surrounding the Waste Plan, but here it is the question of the location that receives the most media attention. Indeed, chronologically, newspapers highlight the participatory dialogues in January 2009, while the launch of the legal public consultation in June 2010 provides the first opportunity to look into the location and to focus on the press release issued by Greenpeace in August 2010. Whereas the French-language media, mostly through dispatches, simply pass along Greenpeace's

⁴⁷ Although it is not included in the analysis of media coverage of the Waste Plan, it is important to note that the participatory dialogues launched by NIRAS/ONDRAF were held at the same time as an action initiated by the Nuclear Forum. Though the events were not connected, NIRAS/ONDRAF did notice that there was some confusion between the two events.

press release regarding locations likely to store nuclear waste, the Flemish press addresses the issue in greater detail. The issue is taken up again whenever a new stage in the legal process is presented, or when an event is likely to fuel controversy. Finally, besides events directly linked to the Waste Plan, mention was made of a number of other events more generally connected to waste management: a survey into the health of people living near Mol (September 2010), protest rallies in front of the European Parliament led by Greenpeace (October 2010), the river Nete depositing mud in Mol (October 2010), the financial management of nuclear liabilities (September 2011), and the issue of waste transport (October 2011).

4.2.2. Actors

In the entire French-language corpus 58 actors were identified, each of whom was linked to an entity. In the entire Dutch-language corpus 132 actors were identified and 102 people invariably spoke on behalf of an institution or a partnership grouping. Some similarities between the two corpora soon emerge: the representatives of the various national institutions weigh in extensively in both the French-language and the Flemish press. An actor is present on the Dutch-speaking side, the GECORO (Gemeentelijke Commissie Ruimtelijke Ordening). These local experts (the equivalent of an advisory committee for land use planning and mobility) also take a stance against the Waste Plan. This presence in the Dutch-language corpus is mainly due to the focus of the debate on the location.

4.2.3. Arguments put forward in the French-language media

Drawing up an inventory of all of the arguments raised by the previously identified actors allows us to identify several themes that are clustered into four points: defining the object, selecting a waste management option (raising once again the question of geological disposal versus surface storage), the issue of consultation, and funding.

Some actors base their definition of waste on where it comes from, whereas others refuse to make that connection. The first group, which includes representatives of Greenpeace and ecologist parties (Ecolo Europe, Ecolo), such as minister Henry, links the issue of nuclear waste management to the closure of nuclear power plants. And since this group of

actors treats these two issues as being inextricably linked, we see that the focus of the nuclear waste debate shifts to the decommissioning of plants. By contrast, a second group of actors refuses to make this connection — starting with journalists who treat the two issues separately, although they are aware of the link between them. NIRAS/ONDRAF, the Nuclear Energy Centre (SCK/CEN), nuclear engineers (included in the “scientific” category) and the European Commission are also of the opinion that “the waste is there, and we have to manage it” (NIRAS/ONDRAF). This group deals with nuclear waste from a technical-scientific perspective, while Greenpeace and Ecolo link the waste to the risks it represents.

In the French-language corpus, the French-speaking actors distinguish two choices: geological disposal versus interim storage. First, some minor differences aside (the citizens’ stance at the Citizens’ Conference, for example), the actors see geological disposal as an irreversible solution and interim storage as a reversible solution. Stakeholder groups will usually employ the same type of arguments to justify their preference for one waste management option or the other. For instance, the actors in favour of storage and those against it use the very same safety argument to justify their opposing views. Finally, the lack of consensus about which option to select means there is also disagreement about the political decision to be made on the one hand, and about the timing of the political decision-making process on the other. In other words: *when* and *what* needs to be decided?

As regards the political decision vis-à-vis the plan, three positions have emerged: wait, decide or refuse. Actors supporting geological disposal would be in favour of a decision, whereas actors opposed to this option would rather wait than choose a particular waste management option. There are actors who believe that “it is too early to decide” and that it is necessary to continue studying alternatives, in light of scientific uncertainties. Greenpeace is the only actor whose formal stance is to refuse.

All actors (citizens, the European Commission, Greenpeace, the Nuclear Forum, NIRAS/ONDRAF, local politicians) are unanimous when it comes to the interest of consulting the population: it is essential. It is therefore necessary to “(...) make public consultation more systematic through greater transparency, an ongoing societal debate and

an ethical dimension” (citizen). Two actors (journalists and local politicians) question the application of the principle by pointing out the gap that can exist between the principle and actual practice: both in general, by highlighting the “false transparency” that the nuclear industry can sometimes demonstrate, and in a more practical sense, by a lack of administrative transparency.

With regard to funding, too, requests for transparency were made by several actors (journalists, citizens and NIRAS/ONDRAF).

4.2.4. Arguments put forward in the Dutch-language media

When making an inventory of the arguments raised by the actors in the Dutch-language corpus, we find many of the same themes — yet with some differences, such as the dominance of the issue of geological disposal, approached from different angles.

In the Dutch-language corpus, two debates are conducted simultaneously. The first debate, about the principles, involves virtually the same actors as those identified in the French-language corpus. The second debate focuses mainly on the possible location. We see that it is mostly local actors who take a stance on this subject, as they are the people contacted by journalists.

Unlike in the French-language corpus, storage is not contrasted directly with geological disposal, but it is part of a wider debate on the issue of alternatives. Also, several points take centre stage on the media scene: rejected alternatives, the existence of alternatives to geological disposal, and storage.

The issue of political decision-making as regards B&C nuclear waste management is discussed in the press in a very pragmatic way. First, the actors seem well aware of the division of powers between the influential actors. Also, the press, local actors and NIRAS/ONDRAF regularly point out that NIRAS/ONDRAF has no jurisdiction to make this decision in principle and that it is to be made by “the people and the government”. Next, the press and the actors turn their attention to the European calendar, which requires a decision to be made fairly soon (2015). Indeed, the European Directive and the definition of the national programme it imposes could steer the debate in the direction of

the issue of timing: “*When do we make a decision in principle?*” As for whether to decide now or to wait, the reasons for either deciding or waiting are identical to those identified in the French-language corpus.

The funding issue is hardly addressed by the actors, with the exception of NIRAS/ONDRAF and the European Greens.

As on the French-speaking side, there is the desire and demand to include citizens in the decision-making process, with criticism directed at the participatory phases already completed.

While the debate on the French-speaking side is centred on which waste management option to choose, the Flemish press systematically links B&C waste to the Waste Plan, shifting the focus of the debate to the criteria of its implementation. There are two main causes for this debate shift. One is Greenpeace’s press release stating that 22 municipalities are likely candidates to store nuclear waste (including a map of the locations drawn up by Greenpeace, reproduced by a large number of newspapers)⁴⁸. The other is a reinterpreted passage from the Waste Plan, cited by publications including *Gazet van Antwerpen* (25th August 2010):

“Once the decision in principle is made, discussion about the location can begin. NIRAS/ONDRAF will be launching a call for input from interested municipalities. [...] yet a clear added value for both society and economy is being touted.”⁴⁹

These two events are considered “critical discourse moments” (Chilton 1987 in Gamson and Modigliani, 1989), capable of engaging journalists and actors over a relatively long period of time (Gamson, Modigliani, 1989):

With continuing issues such as nuclear power, journalists look for “pegs” — that is, topical events that provide an opportunity for broader, more long-term coverage and commentary.

⁴⁸ Belga, « Greenpeace identifie 22 communes susceptibles d’accueillir les déchets nucléaires belges. », in *Belga*, 25 août 2010.

⁴⁹ Denissen, A., (2010). « 22 gemeenten kunnen kandideren voor opslag nucleair afval », in *Gazet van Antwerpen*, 25 août 2010, <http://gva.be>. Rousseuw, B., (2010). « Regio wil geen radioactief afval », in *Gazet van Antwerpen*, 26 août 2010.

This leads the press to ask the following question: what are the key criteria in determining a suitable location? Two main (controversial) criteria identified by scientists and the press are the depth of storage and the choice of clay (Boom clay or Ypresian clay?). Based on these technical criteria, journalists start interviewing local actors about the corresponding sites. The choice of alternatives, as discussed earlier, is now no longer a matter of geological disposal versus surface storage. Now, the choice of an alternative comes down to either geological disposal in Boom clay or geological disposal in Ypresian clay. Indeed, while in the French-language corpus the option of Ypresian clay is hardly mentioned, it is an integral part of the discussion in Flanders, on equal footing with Boom clay and the issue of finding the optimal depth.

Furthermore, compared to the French-language corpus the matter of reversibility is shifted, as it is included in the debate on whether or not to opt for geologic disposal. There are two opposing stances: on one side are those who equate geological disposal with irreversibility⁵⁰ (Groen!, Greenpeace, Hooyberghs H.) and on the other are the proponents of the possibly reversible nature of the solution⁵¹ (NIRAS/ONDRAF, Gazet van Antwerpen journalist).

As is highlighted by the identification of the arguments for geological disposal, the debate focuses mainly on the location issue. The question where to build the waste management sites is often discussed in a straightforward manner, based on the journalist's question: do local actors wish to host a geological repository on their territory? The actors' reactions are usually negative, neutral or positive without further justification.

4.3. Two concurrent debates

The French-language and Dutch-language press each follow a different dynamic when it comes to this issue. While in the French-language corpus, the issue of nuclear waste is still

⁵⁰ “The proposed underground storage option is also irreversible, making a solution in the future impossible” (Groen!). “If you bury nuclear waste in the ground, you cannot get it out again. Which means you cannot do anything about it when something goes wrong.” (Greenpeace)

⁵¹ “Within a certain period, this waste can most definitely be controlled and can also be dug up again.” (NIRAS/ONDRAF). “If humankind does invent a processing method decades or centuries from now, the waste can be dug up from below the ground.” (Gazet van Antwerpen)

being discussed at the level of principles (*Is geological disposal the most preferable option?*), the Dutch-language press seems to take for granted the choice of geological disposal, advocated in the Waste Plan, and instead turns to the question: *Which criteria in the choice of geological disposal should be given priority?* Here too, we see that the issue of reversibility is not treated in the same way in both language communities: one links it to the storage solution, the other links it —or doesn't— to geological disposal. Is this the first sign of irreversibility in the decision-making process on the Dutch-speaking side?

While both language communities share the desire to include the citizens more in the debate, many actors criticize how this is put into practice. Indeed, despite NIRAS/ONDRAF's efforts (emphasized by journalists in our qualitative interviews) for increased transparency and information transmission, local political actors, Ecolo and Greenpeace have pointed out shortcomings in the public consultation process. The citizens' demands in this regard are twofold: procedural (*How and when should citizens be included in the legal decision-making process?*) and substantial (*What is the aim of this inclusion? To what end? To have what kind of impact?*). Although the principle is established, few people emphasize innovative implementation, as most are content to hide behind the few legal mechanisms of the proceedings. Only Jean-Paul Poncelet (Foratom), in an opinion piece in 2010, made an appeal to sociologists, anthropologists and psychologists to think about “deliberation and decision mechanisms allowing (them) to be discussed.”

This analysis of the media coverage of the Waste Plan debate echoes the conclusions proposed in the first part of the report: cross-fertilization between the procedural dimension (How to decide?) and the substantive dimension (What to decide?) is essential in order to bring citizens together in a problem-solving logic.

PART III: Prospective and retrospective elements of foreign experiences

5. Comparative analysis of some foreign decision-making processes regarding the long-term management of high-level waste and/or spent fuel⁵²

Since many European countries are struggling with the same challenges in finding a long-term solution for managing their high-level radioactive waste⁵³, it is worthwhile to look beyond our borders. We have selected four countries where the policy choice was made to opt for geological disposal and where consultation processes were conducted to varying degrees: France, the United Kingdom, Sweden and Switzerland. First we will outline the policy context, showing that in the past, purely technically motivated implementation efforts in each of these countries were met with local resistance, having since led to a new approach with express involvement of the actors concerned. In the second, retrospective part, we examine how consultation processes were organized in the past in light of this new approach, in order to make a decision in principle at the planning level or at the operational level. Finally, in the third part we investigate how the different challenges identified within the Belgian context for the remainder of the process are being developed in other countries. In doing this, we will focus on three elements: the structures that are established to convert the process into a local dialogue, the translation of socio-technical concepts such as reversibility/retrievability into operational terms, and dealing with the demand for independent process monitoring.

⁵² Van Berendoncks, K. and Bergmans, A., *Processus socio-politiques et Gestion de plan en univers controversé. As 4: Internationale vergelijking van de besluitvormingsprocessen*, 2012

⁵³ Here we make no analytical distinction between high-level waste and spent fissile fuel.

5.1. Context of the cases

A unifying theme throughout the cases is that, in the 70s and 80s, purely technical and centrally organized projects were set up, usually resulting in the issue being politicized and ultimately failing due to public protest. Increased public sensitivity in these countries, along with the political culture shifting towards greater participation, has since led to the creation of new structures of responsibility and more transparent and participation-oriented process management.

Crucial to understanding the **Swiss** case is the deadlock in the plans for an underground repository for type A waste in Wellenberg, in the canton of Nidwalden. Despite local support in Wellenberg and the government of the canton of Nidwalden approving the application, the project was vetoed by cantonal referendum. After a second failed siting attempt in Wellenberg, the Nuclear Energy Law was amended. In 2004, the concept of geological disposal with the potential for retrievability was established. The legal procedure and the responsible parties were also specified in this law and, most importantly, the cantonal veto power was replaced with an optional referendum at the federal level. Moreover, the siting process was henceforth to take place through the Sector Plan, a common spatial planning instrument for projects of national relevance.

Traditionally, **France** has a highly centralized and private energy policy. As of the mid 70s, the demand for more transparency about radioactive waste increased. There was much dissatisfaction with the purely technical principles used by waste manager ANDRA in selecting four potential storage sites in the 80s. A tipping point in the way the radioactive waste policy was handled was the 1991 Bataille Law, in which a reversal of logic took place: social acceptability was given precedence and a subsequent phase would indicate what was geologically feasible. From then on, voluntary and stronger participation was the norm. In 2006, a national debate was organized in partnership with the CNDP, the French committee for national debate, in order to prepare the parliamentary debate that would lead to the law of 2006 establishing geological disposal as the preferred option.

In the 1970s, plans were made in the **United Kingdom** to build a radioactive waste storage site in the Scottish Highlands, but the project was dropped due to local opposition. In the 80s and 90s, Nirex focused on finding suitable geological locations to be used as repositories for high-level and intermediary-level waste. After renewed efforts, a permit for geological storage was refused by Cumbria County. The Sellafield project was permanently dropped in 1997. 2001 saw the transition towards the process of developing a waste management process that the public would accept. This process was named Managing Radioactive Waste Safely (MRWS). In the context of this process, an expert committee (CoRWM) was established to advise government on the long-term management option and the process for further decision-making and implementation. As part of that mission, CoRWM conducted a broad public consultation process. Our analysis focuses mainly on this phase (and how the CoRWM's role changed afterwards), and less on the subsequent siting phase, which recently came to a standstill after another refusal by Cumbria County, due to insufficient guarantees about the county's role in the process of voluntary application by potential host municipalities.⁵⁴

In **Sweden**, the 1977 Law on Nuclear Energy was pivotal: it linked the commissioning of new reactors to a demonstrable solution for the waste problem. SKB, an institution uniting waste producers, was given the responsibility of handling the waste problem. After a failed top-down approach in the 1980s, all Swedish municipalities were invited by SKB in 1992 to volunteer to have a feasibility study carried out, mapping technical aspects as well as the social impact. Due to the limited success of this invitation, the focus shifted back to municipalities that already had a history of nuclear activity. Eventually, the municipalities of Oskarshamn and Östhammar signed a contract with SKB for further research. SKB ultimately selected Östhammar in 2009.

5.2. Evaluation of the consultation processes followed

These contextual descriptions show that the cases discussed above have all been riddled with various obstacles and have generally seen a tipping point towards a more

⁵⁴ <http://www.bbc.co.uk/news/uk-england-cumbria-21253673>

participatory decision-making process. Meanwhile, all these countries have reached a stage where geological disposal is the formal policy option, sometimes linked to the choice of a suitable site. In three out of four cases, with the exception of Sweden, there was a consultation process prior to either the decision in principle (France and UK) or the further development of the implementation process (Switzerland). In this retrospective section, we will analyze how the consultation process was set up in this period and compare it to the Belgian process that preceded the Waste Plan.

In France, we have analyzed the public debates organized by the French **Committee for National Debate** in 2005-2006. The debate led to the adoption of the 2006 Radioactive Waste Management Law, which included the continued study of the various options and the reversibility of the storage option⁵⁵. For the UK, we have gone over the process since the **CoRWM**'s creation in 2003. This independent advisory body was responsible for evaluating the possible storage options and for setting up a consultation process to this end. The CoRWM report in 2006 led to a government decision for geological disposal. In Switzerland, we have analyzed the participatory processes during the development of the concept of the **Sector Plan**, which set out the objectives, procedures and selection criteria for the siting process. This conceptual part was characterized by the development of the three subsequent phases in the site selection process.

For this retrospective analysis, we will once more make use of the structure mentioned in Axis 2 of this report (see Chapter 3): finality, target audience, problem definition and output. *Finality* refers to the timing and status of the consultation in the decision-making process. *Problem definition* discusses the extent to which there was openness in determining the agenda by the participants and the neutrality in the process organization. In terms of *target audience*, we will analyze the stakeholders that were identified and the extent to which they were involved. And finally, *output* refers to the manner of reporting and the translation of the consultation process into policy documents.

⁵⁵ Programme Law No. 2006-739 of 28 June 2006 concerning the sustainable management of radioactive materials and waste.

In the **United Kingdom**, the CoRWM expert committee was entrusted with the organization of the consultation process. It started from scratch and tried to narrow down the number of storage options in a process consisting of several phases. Despite this relatively open approach, CoRWM was accused of being biased in the evaluation of disposal options, and of favouring geological disposal from the start. CoRWM deployed a range of instruments, from private stakeholder forums to public information sessions, and managed to reach a large audience. For instance, it also managed to involve opponents such as Greenpeace, despite a parallel debate about nuclear energy policy (Simons, Bickerstaff & Walls 2006). The final CoRWM report (CoRWM 2006) concludes that geological disposal is the best option at that time, but also stipulates a number of preconditions, such as the need for continued research and voluntary candidacy. However, the translation of these recommendations by the government was selective, disappointing many participants.

In **France**, the process organization was also externalized to some extent, albeit to an existing government agency, the *Commission nationale du débat public* (CNDP). Unlike CoRWM, however, the CNDP's primary task was not to formulate recommendations, but rather to inform parliament prior to its debate on the adoption of a law on radioactive waste management (CNDP 2006). Consequently, the debates followed a Habermasian deliberative logic, in which identifying the various arguments was given precedence over making the different views converge. The actual organization was in the hands of a committee of experts with diverse technical and social backgrounds. The problem definition was quite open, and the participants had the opportunity to express their views on different waste management options. For each session, however, the agenda was restricted to a sub-theme, so as to work in an accumulative manner. Rather than involving a representative participant field, the French efforts were focused on providing equal access to participants (Lhomme 2006). We therefore see a distortion similar to the one observed in Belgium, towards a higher turnout of those directly involved. In addition to the consultation sessions held in several French cities, extra focus was given to regions with a specific connection to the theme. Rather problematic for the involvement of environmental organizations was the fact that a parallel CNDP debate was held regarding

the construction of a European Pressurised Reactor (EPR).⁵⁶ This had a negative impact on their participation in the debate on radioactive waste. The reporting of such public debates does not usually consist of a summary of recommendations, but rather of an exhaustive presentation of the various positions. At any rate, reversibility was laid down as an explicit precondition for the future repository in the 2006 law.

In **Switzerland**, the finality of the consultation process was not merely making a decision in principle, but outlining the siting and implementation process. The choice of geological disposal was in fact already determined, prompted by an expert committee and limited stakeholder consultation. BFE, the Swiss Department of Energy, was responsible for organizing the process. In testing the design of the conceptual part of the Sector Plan, it especially focused on the representatives of the cantons (BFE 2008a). They were the first and last party involved. The emphasis here was on the complementarity with the cantonal policy and the representation structures during the siting process. Public consultation was more limited and involved a few focus groups. Characteristic of the Swiss case is also that special consideration was given to the Austrian and German stakeholders, for whom special information sessions were held (Minhans & Kallenbach-Herbert 2012). However, the choice not to disclose the stakeholders' formal responses does make it difficult to assess to what extent the expressed concerns have been included in the Sector Plan.

5.3.Challenges from a comparative perspective

The discussed consultation processes have led to decisions in principle, retaining one or more waste management solutions. In order to make the transition from a conceptual to an operational interpretation of this decision in principle, the options in terms of location, technical conditions, timing, etc. need to be narrowed down. In our overview of the

⁵⁶ In parallel with the waste debate, two other energy debates were held: one on the EPR and a second on a power line to connect this EPR to the national grid. With regard to these two debates, the French government objected to making confidential information public. This turned free access to information into a very sensitive issue in the French waste debate. Moreover, the parliamentary decision on the EPR reactor before the end of the debates gave a biased impression, also with regard to the waste debate, increasing scepticism about the sincerity of the consultation exercise.

structures set up for this purpose, we are inspired by the challenges that also present themselves in the current stage of the Belgian process. Key questions are therefore:

- How is local support garnered for a disposal site?
- How are the conditions distilled from the consultation process further developed?
- Which actor manages the process and ensures compliance with the process conditions?

5.3.1. Local dialogue & siting

First of all, we will look at the structures that were set up in the four countries to evolve towards a **siting process**. The approaches used in the search for a host city for the disposal project are very diverse. They vary in the extent to which they prioritize technical versus social conditions, phasing, voluntariness, actors involved, presented topics, and local structures.

The **United Kingdom** opts for the partnership approach, which is heavily inspired by the Belgian way of dealing with type A waste. At the time of our study, one partnership was established: the West Cumbria MRWS Partnership. This united three local authorities (at county level), and any organized stakeholders in these counties were also able to participate. The process of applying as a candidate consists of six stages, and after each stage the candidate may withdraw. The mission of the Partnership is to consult the local actors, to translate the technical documents and to inform the population (Landström 2012). Meanwhile, the Partnership has published a report on the first phase. The decision to move to the second research phase lies with the local authorities. In the meantime, however, the possibility remains for other municipalities to apply as candidates. After our research report was finalized, Cumbria County Council withdrew from the process (on 30th January 2013), making the candidacy of this location void for the time being. Although it is still too early for an in-depth analysis, press reports⁵⁷ and stakeholders'

⁵⁷ See for example <http://www.bbc.co.uk/news/uk-england-cumbria-21253673>

reactions⁵⁸ seem to indicate that the main reason for the withdrawal is a lack of guarantees regarding the next steps and opportunities to lay down local conditions.

In **France**, the CLIS (Comité local d'information et de suivi) was set up in Bure when the underground laboratory was established there. This is a specific form of the more frequently used CLI consultation structures in projects with an impact on the environment. It is composed of a mix of politicians from various levels of governance, socio-economic actors and experts. The CLIS was entrusted with two main tasks: informing the widest possible audience and monitoring the results of the research carried out. Therefore, the emphasis in the operation lies primarily on technical monitoring and the involvement of institutional actors. In order to prepare for the final decision, however, France has chosen to organize another national debate in 2013, led by the CNDP.

The **Swedish** approach is quite different and consists of a kind of contract approach between SKB and the candidate siting municipality, where the aim is to implement the KBS-3 concept developed by SKB. The major efforts in terms of consultation with the two applying municipalities resulted from the EIA obligations (Elam & Sundqvist 2006, 2009). Despite the funding of NGOs for their involvement, SKB's interpretation of this remained minimal. In order to bring the debate back to the national level, a transparency programme was set up in 2007, with information sessions organized by the National Nuclear Waste Council.

In the **Swiss** Sector Plan, the actors to be involved in each of the three phases are clearly identified in advance. Over the course of the three phases, the aim is to narrow down the geologically suitable candidate sites to two candidate siting municipalities. In a first phase, the emphasis lies on consultation with the cantons. For instance, the Cantonal Commission enters into dialogue with the process leader, BFE. In a second phase, the role of the siting regions increases (more limited in terms of territorial scope) by means of the Regional Conferences. The subject of consultations is mainly focused on complementarity with cantonal spatial planning and regional socio-economic development. About the storage

⁵⁸ Recorded during personal communications.

concept itself, which is fleshed out during the process, very little consultation is provided (Kuppler 2012; Minhans & Kallenbach-Herbert 2012). Citizens and other stakeholders can make their concerns regarding technical security known through the Technical Forum for Security. The former cantonal referendum has since been replaced by an optional national referendum at the end of the process.

5.3.2. Integration of socio-technical conditions

In the Waste Plan, NIRAS/ONDRAF undertakes to take into account three requirements resulting from the consultation in the development and implementation of geological disposal: reversibility & retrievability, control, and transfer of knowledge (2011 Waste Plan: p 207). Looking into the consultation processes in other countries has taught us that these conditions also arose in other countries. We will discuss reversibility & retrievability and monitoring & control here, because those are the conditions for which the most concrete developments can be identified thus far.

5.3.2.1. Retrievability and reversibility

In **France**, reversibility (*réversibilité*) was included in 2006 as an explicit condition in the aforementioned legislation. It states that prior to final closure, any underground repository must be reversible for a period of at least 100 years. However, the law remains vague on the start of this period (Does it start when the first waste container is placed there, or the last one?), nor does it precisely define the concept of 'reversibility' (Does this signify a technical or a political concept, or a combination of both?). Then again, it was postulated that this definition was to be determined in a subsequent law (planned for 2015). For more detailed specifications regarding what, how, and for how long, reference is made to conditions that will be need to be met when the permit is granted. Since 2006, French waste manager ANDRA has been working on a more concrete definition of the concept of reversibility, based on the approach of reversibility as a management concept, linked to the notion of a modular repository. Through periodic reviews of the disposal concept, of technological and scientific developments, and of the evolution of the national energy policy with possible effects on trends in radioactive waste management, the applicable schedule can be reviewed and adjusted if necessary. Just how this is to be made concrete is food for thought and subject to further discussion, but the general idea would be to move

towards closure using a phased approach, and to meet with the actors involved whenever a specific decision needs to be made, in order to ensure participation in these decisions. In any case, it is certain that permanent closure of a geological disposal facility in France is only possible through a political decision, laid down in a law (Law No. 2006-739: Art. 12).

In **Switzerland**, on the other hand, it is retrievability that is included as an obligation in the law of 2004⁵⁹. This stems from the choice of a concept of monitored geological disposal. Here, retrievability is a technical condition for being able to support this storage concept, and it is to be guaranteed for as long as the repository is not finally closed down (KEV: Art. 67 § 2).

At present, neither reversibility nor retrievability is explicitly provided for in the **United Kingdom**'s geological disposal concept, but it is not ruled out either. The West Cumbria MRWS Partnership stated in its report that it prefers reversibility to be explicitly included in the generic storage concept in this phase. According to the Partnership, the final decision on reversibility and retrievability should be made with respect to a specific design for a specific location, and based on input from a wide range of stakeholders (West Cumbria: MRWS 2012).

In **Sweden**, both reversibility and retrievability are absent in the storage concept. The issue has never been deemed terribly important there. Both SKB and the security authorities hold the view that, in principle, retrievability always remains possible, albeit at a certain cost (SOU 2010). In 2010, the Nuclear Waste Council put the issue back on the agenda, but this does not seem to have led to a drastic course change.

5.3.2.2. Monitoring and control

Especially in **France** and **Switzerland**, verifiability and monitoring are clearly on the agenda, because they are an essential part of the official storage concept. Because of the requirement of reversibility and retrievability, a lot of research is done into opportunities

⁵⁹ Kernenergieverordnung vom 10. Dezember 2004 (KEV)

for *in-situ* monitoring, with a view to ensuring both operational and long-term safety. This is mainly a matter for technical experts: what is technically feasible?

In **France**, monitoring is also an explicit local requirement, stemming mostly from environmental and health concerns. Partly for this reason, an '*Observatoire Pérenne de l'Environnement (OPE)*' was set up in the context of the future storage project in the region of Meuse/Haute-Marne, in order to provide information about the state of affairs, today and in the future, of the environment around the (future) disposal site. As for environmental monitoring, the general assumption seems to be that efforts will be continued after the installation is closed down. This is (so far) not the case for *in-situ* monitoring (MoDeRn 2010).

In **Switzerland**, monitoring is required by law and a crucial part of the disposal concept, in which an extended monitoring period is provided after the end of the operational phase and before final closure (KEV: Art. 68). To this end, a pilot section or pilot plant will be built (KEV: Art. 66). It is currently in a research phase. The government will decide whether and when monitoring has gone on long enough and final closure can be initiated, and whether additional monitoring is to be provided after closure (KEG: Art. 39 §2)⁶⁰.

In **Sweden**, monitoring is mainly related to supervision and surveillance, and not so much to active checks of the repository. The permit file does emphasize the importance of monitoring during the preparatory phase (site characterization and description of the safety case), during the construction and operational phase and during the closure of the plant (SKB 2011). There is deliberately no monitoring of technical barriers, so as not to jeopardize the safety functions. After closure, no more monitoring activity is planned. So far, the monitoring aspect has not been discussed explicitly with the local actors. However, recently the local follow-up structure in Östhammar has shown increased interest in this topic.

At present, the storage concept in the **United Kingdom** is still very generic. Various aspects of monitoring, including *in-situ* monitoring, are currently being investigated. The

⁶⁰ Kernergesetz, vom 21. März 2003 (KEG).

West Cumbria Partnership considers monitoring an important issue, but so far it has not formulated any concrete expectations in this regard.

5.3.3. Process monitoring

The bias that almost inevitably occurs when the guidance of siting and consultation processes is left to the initiator is an internationally recurring problem. In concrete terms, the requirement for objective process management translates into three questions: (1) Who will follow the progress in the development of technical knowledge and alternatives? (2) Who will supervise compliance with the conditions that are to be fulfilled by the decision? (3) Who will guide these consultation processes?

Despite the CoRWM's demand for a body independent from the Nuclear Decommissioning Authority (NDA) to supervise the process, no such body was established in the **United Kingdom**. However, the operation of the CoRWM expert committee was extended, albeit with a more limited mission and without its own research initiative, for example (Lehtonen 2010). In addition, government agencies, CoRWM and local actors are united in the Geological Disposal Implementation Board (GDIB). Rather than as a consultative body or a knowledge institution, however, it acts as a monitoring body for the UK Department of Energy.

In **France**, the HCTISN and the CNE are the two main process monitors. The *Haut Comité pour la Transparence et l'Information sur la Sécurité Nucléaire* (HCTISN) is composed of representatives of government agencies, socio-economic organizations and experts. Its operation, which is not limited to the issue of waste, is set up through working groups that deal with specific issues, such as reversibility. An actual review of the activities of ANDRA, EDF, ASN and others is in turn conducted by voluntary experts in the *Commission Nationale d'Evaluation* (CNE). This committee drafts annual reports for parliament, assessing developments in various research domains.

In **Sweden**, all technical knowledge has been monopolized by SKB since the 1970s, stemming from the obligation to develop a demonstrable solution to the waste problem as a precondition for the construction of new reactors (Hanberger 2010). Nevertheless, the government can rely on the experts of the Nuclear Waste Council. Their job is to deliver

founded opinions to the government, but other parties such as government agencies, local authorities and stakeholder groups can request their services.

In **Switzerland**, there is a strict separation between the responsibility for the technical aspects (Nagra) and the responsibility for societal aspects (BFE). In this constellation, an independent body is missing and the technical and scientific knowledge and the search for a geologically suitable location remains largely in the hands of Nagra, whose autonomy is reinforced by the fact that the technical concept is further developed during the siting process (Minhans & Kallenbach-Herbert 2012). BFE is responsible for the stepwise progression of the process and reports to the Federal Council, which decides when it is time to move to the next project phase.

Based on these examples of process monitoring in other countries, we conclude research axis 4 with a number of recommendations. Despite our very specific national context, we believe that a set of *best & worst practices* can be derived and used as guidelines for Belgian process monitoring. The main elements are listed below in the general conclusion of this summary report.

6. Conclusions

Several key elements seem to emerge from this study, which over the course of one year sought to integrate the expertise of two university teams into an interdisciplinary resolution approach (involving political scientists, sociologists, jurists and philosophers).

6.1. General process framework: a precautionary approach

This analysis is based on the premise that by applying the precautionary framework to any given risk, the lay public doubly displaces its original (expert) meaning by applying it to known risks and by equating precaution with a search for zero risk. This displacement is the source of many misunderstandings and uncertainties, hence the absolute need to organize a public debate designed as a platform for interactive communication between different kinds of actors about the precautionary principle, its objectives, its resources and its sequences, as well as about its themes. The radioactive waste debate is no exception.

The proposed scenario favours a procedural approach of the precautionary principle (although it cannot quite hide its substantive dimensions, especially in the context of a very specific local implementation project). The usefulness of the procedural precautionary approach, as it has been advocated in this project, is contingent upon two empirical findings. It is particularly hazardous to organize the convergence of actors in a pluralistic society about a desirable end state when faced with complex risks, weighed down by uncertainty in the very long term. In each and every case, procedural fairness is a critical condition for the individual and societal acceptance of the end result reached when resolving such conflicts. But this is not enough. Citizens do not want to have their own political jurisdiction confiscated, i.e. their capacity to formulate fundamental projects, especially about the collective heritage of security they want for themselves and for future generations. Substantive questions will therefore probably not be abandoned, but they would benefit from being put into perspective by procedural questions.

Shifting the debate to the procedural precautionary approach without emptying it of its substantive dimension allows the fundamental questioning of “How to decide?” to shape the dialogue on “What to decide?”. Dialogue becomes possible when parties are engaged in a problem-solving logic: mobilizing the actors’ creativity in such a way in order to construct a scenario is an essential ingredient of a cooperative dynamic, as is demonstrated by local partnerships for the cAt project (ex. Bergmans 2008; Van Steenberge & Bergmans 2007).

Debating the precautionary principle will require significant resources in terms of organization, time, skills, etc. Therefore, it invites the researcher to examine the conditions governing the efficiency of a public debate on the precautionary approach. Specifically, “ordinary” citizens are mobilized when they become aware of the social, political and ethical significance of a technological choice. This choice should be viewed as “critical” or important enough for them to engage in a debate that requires them to incur significant costs. This leads us to question the legitimacy of a debate limited to strictly procedural issues, which would not be appealing regardless of the context ... as is confirmed by the findings in Chapter 3, regarding the participatory experiments carried out by NIRAS/ONDRAF in the context of the Waste Plan.

If we want to achieve a maximum of mobilization possibilities, we should take advantage of the coming waste management debate and ensure that it has some generalization potential in terms of precaution and a shared security reference framework. Can we benefit from other public debates on topics mobilizing the same precautionary framework? The efficiency of a debate on precaution, organized to help the decision-maker come to an informed choice and ultimately, with full knowledge of the facts, select an option in a very specific case (GMOs or nuclear waste management, for instance), is also assessed in terms of the generalizability of the substantive and procedural reference framework it generates in different contexts. This empirical question needs to be explored, because without a certain degree of generalizability, the construction of a common reference framework around the interpretation of the precautionary principle loses much of its usefulness. It is hard to imagine that such an inevitably long debate would recommence every time a new choice to be made mobilized the precautionary principle. Which lessons can be learned from innovative processes that will be put in place to deal with the issue of long-lived

radioactive waste? Will these lessons be brought into widespread use during the translation into policy (“la mise en politique”, in the words of Barthe (2006)) of other technological choices?

What are the lessons learned from analyzing the legitimacy and effectiveness criteria of the precautionary approach that we should use to guide the management process? It is important to ask the citizens to participate in the decision-making process, but the conditions of mobilization have yet to be defined, and not every approach is equally practical: in fact, some of these conditions are counterproductive in the long term and others are not compatible with the political conditions in the country or region concerned. A pragmatic approach must be proposed in order to ensure sufficient proximity, to mobilize the stakeholders and also to ensure the quality of the debate. In fact, avoiding crisis management is only possible if the conditions of public debate are of such quality that political overreactions are unlikely, while maintaining a collective mobilization dynamic in order to avoid another risk, which is the risk of collective indifference, the long-term consequences of which would also be unpredictable.

The legal framework for the decision-making process has yet to be constructed. The legal analysis has highlighted the indeterminate nature of the decision-making process when it comes to supporting B&C waste management. Everything has been set in motion and today it is possible —necessary, even— to create an innovative process so as to ensure the implementation of a precautionary approach. Recent experiments conducted by NIRAS/ONDRAF in recent years are a unique source of inspiration, as well as ongoing experiences in Belgium’s neighbouring countries.

6.2. Experiences to be remembered from the retrospective analysis

The analysis and evaluation of the consultation process established by NIRAS/ONDRAF in preparation for the Waste Plan has shed light on a series of problems that have also revealed challenges in other countries. Counting on spontaneous participation seems to cause a serious and noticeable bias: there is a large overrepresentation of highly trained people, senior citizens with technical training or people who have a local connection with the issue. If the objective is to identify the potential societal support for a series of

alternatives, it is preferable to select participants actively, based on specific criteria of representation, as was done for the Citizens' Conference. We have also seen the added value of using an external organizer for the consultation process. On the one hand, this kind of support ensures a certain neutrality in the process. On the other hand, it avoids NIRAS/ONDRAF being seen as part of the “nuclear power generation” sector in the absence of specific representatives of that sector, particularly waste-producing companies or the ministries involved. This risk of being pigeon-holed in the nuclear sector should not be overlooked. It is demonstrated by the fact that the possibility of delaying the nuclear power phase-out has led to the withdrawal of NGOs such as Greenpeace. The latter refuses to participate in the debates so as not to help legitimize this kind of decision. This experience has emphasized the importance of considering and clarifying as much as possible the link between the waste issue and other related policy issues, rather than trying to purify the debates and having them focus solely on nuclear waste. For example, problems may arise if the strategic choice is made to separate the communication process as much as possible from the debate process, concerning both the decision in principle and the practical consequences such a decision may have on localization. Greenpeace was able to develop a very effective form of communication, filling a gap in the media by presenting very clearly on a map the practical consequences of the preference for Boom clay expressed by NIRAS/ONDRAF: where is this kind of clay typically found? During the consultation process, it was not possible to assess the level of societal support for the various options. It is advisable to organize the terms in the broadest possible perspective, thus avoiding that issues having been set aside carefully during the consultation process are put back on the agenda later on, thereby undoing all progress made. The Swedish case provides an interesting example here, as the parties involved at the local level call into consideration the possibility of organizing some form of monitoring, based on experiences in other countries that have resorted to (or are considering) this mechanism.

Opening up the process and making it transparent is also of great importance: by setting up a reporting system that is as broad and detailed as possible, and by keeping access to documents and information open for the sake of transparency, the decision-making process can be reconstructed at any time, which helps to legitimize the decisions made in the long term. The organization of this procedural memory and access to information will

also make it possible (if necessary) to consult the contents of debates that shaped previous decisions at any time: such “historical” clarification might turn out to be important in order to give meaning to subsequent course changes in the decision-making process in a logic of flexibility, which is required when the precautionary principle is called upon.

Although today the door still seems open, as the precautionary approach has yet to be translated into concrete processes, we already see several players trying to close it again. On the one hand, European authorities have requested clarification of the arrangements for consultation and information that the authorities intend to organize in the national programme by August 2015. The public will have to be informed and consulted about the terms of its own information and its own consultation, but the very conditions of the debate that will be initiated at this particular stage could have a very long-term impact on the waste management process. Indeed, this obligation to predefine the terms of consultation could limit the possibilities to adapt to developments in the project and during its contextualization. On the other hand, at the national level, NIRAS/ONDRAF chooses to restrict creative spaces by already bestowing the status of final option on geological disposal in unhardened clay: if the national programme increases pressure on authorities, the choice not to open up discussions on the substance of the decision will limit the opportunities for creative problem solving in conjunction with the partners.

This is one of the lessons learned from our analyses of the approach in terms of societal consultation by NIRAS/ONDRAF in the past three years. To be effective, the moments of participation punctuating the precautionary approach should be organized strategically to enable stakeholders to fully exercise the function that has been entrusted to them. Recent experiments by NIRAS/ONDRAF have shown that it is difficult to mobilize civil society if the consultation process is either focused on marginal issues, or organized in a sequential order that is perceived as inappropriate (e.g. too late). Questions regarding the finality of the consultation, but also those related to the surrounding framework (which question is legitimately asked?), are determinants of the quality of participatory processes to be organized.

The questions asked during moments of consultation ought never to stem from a purely top-down approach. This has been tested several times during participatory exercises.

Some debates are beyond the control of managing authorities and are *de facto* contributions to the decision-making context: the significance of the debate on the phase-out of nuclear energy and on extending the lifespan of power plants has kept a number of stakeholders from getting involved in the nuclear waste discussions, as they refused to take the risk of scattering limited resources on issues they felt were less strategic in the short term. But we have also seen authorities themselves refuse to debate certain elements, for example by avoiding issues related to potential landfill sites. Given the freedom of information in our societies, this kind of action is rendered counterproductive. Any communication flaws are picked up by the media and pressure groups, and soon become crisis episodes, testing the very precautionary approach that is sought to be implemented. At the same time, avoiding all discussion of controversial waste management issues weakens the debate and increases the risk of a subsequent resurgence of questions that will not have been answered with sufficient legitimacy.

6.3. Research priorities for B&C waste management

This research has highlighted the need to establish a quality communication and information structure at the level of the precautionary approach, and evaluated according to the same criteria as the precautionary approach. One of the first challenges is to think about the qualities to confer upon such a structure, so that it can ensure communication that is strategically integrated into the management process, while ensuring the “memory” of the various stages.

We must also stress once more that the case we are focusing on in this research has the distinction of being part of a very long-term approach. Indeed, the uncertainty that public management must deal with is both technical and temporal, because it applies to hazardous waste in the very long term. This means that the consistency and relevance of the precautionary approach must be taken into account, not only bearing in mind the current stakeholders, but also strategically considering future socio-political developments. Keeping track of the “memory” of the process is probably characteristic of an approach in terms of responsibility, but this only becomes meaningful when it is integrated in an open learning dynamic: after all, the criteria determining the legitimacy of

public management are to evolve throughout the many decades this particular project will be active. The validity of the answers given is largely contingent upon the quality of the questions asked, yet these elements could be subject to differentiated approaches over time.

The success of this kind of programme depends on a two-pronged approach: a prospective *backsight* approach, in order to give the programme a minimum of coherence in the long term, and a contextualization approach to adapt to the specific object of the dialogue of the moment, to the actors considering themselves involved here and now, and to the geographical territory relevant to that step. The analysis of experiences in other countries in this domain allows us to conclude the following about the importance of voluntary acceptance: finding a suitable location comes down to a zoning process that is to be organized level by level, before discussing any specific and precise locations. Going for the voluntary approach seems particularly relevant as a starting point, both in terms of democratic principles and in light of safety criteria. Recent developments in Great Britain illustrate the importance for stakeholders at the local level to be given enough guarantees regarding their possibilities to intervene at later stages of the process: they must be able to retain some power, to intervene and state their demands regarding the safety of the chosen option, while considering its sustainability vis-à-vis the local environment. A pragmatic approach based on a bottom-up logic can ensure these contextualization criteria, allowing for the process to be left open to participations *whose legitimacy is not defined beforehand*, by organizing a system of active monitoring so that interventions — possibly at unscheduled moments in the decision-making process — can be taken into account. The strategic approach can establish an information and memory system that ensures the continuity of the process despite its sequential discontinuity, by preserving traces of the determinants of decisions made. This approach would be paramount to ensure the Plan's necessary flexibility, so that it can adapt to the societal and scientific changes that will inevitably occur during the long lifespan of the disposal site.

But who will assess these changes? According to which criteria? There is no legal regulation that refers to the creation, jurisdiction, organization or operation of any authority supervising compliance with the principles of pursuing broad societal support in the decision-making process. In terms of institutional and documentary support of this

endeavour, the law does not prohibit anything. As for the Waste Plan, it states that NIRAS/ONDRAF is not “in the best position to organize or support participatory processes” and would therefore like organization and support to be entrusted to “experts”⁶¹ by organizing “follow-up by an independent, institutionally guaranteed body”⁶² at the federal level. This body should also be provided with guarantees of independence and allowed to take on the responsibility of organizing said follow-up with sufficient leeway to react and to meet society’s expectations in a flexible and pragmatic way. Establishing such a body might be a key step in the precautionary approach, but it would prove to be counterproductive, or even illegitimate, if it failed to integrate both social plurality and the complexity of the subject. With this in mind, we performed a comparative analysis of examples of structures established abroad, and we also conducted a study of how to manage this problem in different political environments.

In putting forward the concept of “process monitoring”, we must keep in mind two distinct objectives. On the one hand, we must ensure that the organization of the consultation process is neutral enough to involve the various stakeholders in a satisfactory manner; on the other hand, we must avoid monopolization of technical and scientific knowledge available at a given time. These two functions (organizing open consultation procedures and organizing technical second opinions) may be provided by one and the same organization, as is the case with the British Committee on Radioactive Waste Management (CoRWM) or *Kärnavfallsrådet* (the National Council on Nuclear Waste) in Sweden. In other countries, these two functions are split between at least two different bodies: France, for example, has established the High Committee for Transparency and Information on Nuclear Safety (HCTISN) and a National Evaluation Committee (CNE) (a type of body that is widespread in other sectors as well), which publishes an annual report for the Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPECST), detailing the progress made in nuclear waste management research.

The evaluation of the Waste Plan’s consultation process has highlighted the importance of having an external body as an organizer. Since the decision-making process and the site

⁶¹ Waste Plan, p.163.

⁶² Waste Plan, p.163.

implementation process will take a very long time, it is best to set up a permanent body to avoid that, over time, discussions are limited to the local level. We need to ensure continuity in public management, and we need to keep it in line with the changing social context and developments in technical knowledge. In light of the Belgian context, it seems problematic to limit the jurisdiction of such an institution to the sole issue of waste, thereby subjecting it to the control of NIRAS/ONDRAF. After all, such a constellation would be the basis of a recurring conflict between two poles: the body to be created on the one hand and NIRAS/ONDRAF on the other. It is by opposing the latter that the new body could strengthen its own legitimacy. In this sense, it seems imperative to create the monitoring body at the national level to organize structured follow-up in a more reliable manner, involving all stakeholders, whether the aim is to ensure the implementation of a precautionary approach or to implement a *siting* strategy by taking advantage of targeting political options.

In addition, there will be many debates about socio-technical choices during all stages of the site selection and the implementation of the disposal solution. These debates should be organized at the national level (as is the case in Sweden with *Kärnavfallsrådet*). Combining these two functions (organizing open consultation procedures and organizing technical second opinions) within the same body seems undesirable in view of the current political context. This does not mean we needn't analyze the other experiences in different environments. The importance of organizations capable of fulfilling these two functions is that they can regularly inform the competent authorities on the procedural aspects and societal developments, as well as on developments in terms of scientific and technological competence. What we take away from the Swiss experience is that the responsibility for the organization of the decision-making process is split between stakeholders (despite a slew of criticism, for instance about the refusal to open up debates on matters considered to be purely technical choices). A shared monitoring structure uniting other stakeholders would also empower other actors besides NIRAS/ONDRAF, such as the FANC, the FPS Economy, the Belgian Federal Council for Sustainable Development, local authorities, an expert body to be created, ... in the spirit of what was achieved in Sweden with *Kärnavfallsrådet*.

In order to stimulate reflection, it is interesting to revisit the lessons we can take away from some of the examples from other countries (which does not mean we suggest simply copying them). As regards truly independent process monitoring, it seems to us that none of the countries concerned can claim to have a set of mechanisms that allows for such a mission. We have previously described the bodies with a mandate fairly close to this (see the special report on Axis 4): the Swedish *Kärnavfallsrådet* and the British CoRWM work as think tanks for specific questions regarding waste management. In their capacity of advisory bodies, they have the advantage of being able to make creative proposals more readily, they develop approaches for thinking outside the box and they take into account the issues that the institutional actors in charge of operational management, on their end, consider as already processed and no longer subject to debate. The existence of such a body can be a source of inspiration and can support a broader and more open decision-making process, which it would help legitimize. Nevertheless, caution is advised because using such a body as a catalyst or to arrange false debates would have a negative effect on the legitimacy of the whole process.

The role played by the HCTISN in France is interesting to us, because it goes beyond the issue of waste. The committee was not established with the mission merely to support a specific procedure: it also looks into issues of transparency with regard to nuclear safety in general. It can formulate opinions at its own discretion, or upon the request of other authorities. Such a committee shares many similarities with the parliamentary inquiry committee, while presenting a broader and more diverse panel of participants. It can strengthen its legitimacy by taking institutions, actors or diversified processes under scrutiny. Unfortunately, such a body is mostly reactive and therefore highly dependent on how its opinions are solicited. Moreover, the HCTISN works mainly in connection with other institutions and not with the public, which can be a disadvantage, whereas the British and Swedish national councils on nuclear waste (CoRWM and *Kärnavfallsrådet*) can feed off public discussions.

We have proposed to develop a procedural approach to the precautionary principle, without losing sight of the substantive dimension. It is important to reflect further before the actual and progressive implementation of such an approach takes place. We need to

examine to what extent the current plan has any recognition or even any real legitimacy. Under which conditions are the different actors willing to deepen the dialogue about the next steps in the decision-making process? Which technical issues do these actors still consider unresolved when it comes to the choice of the proposed solution (geological disposal), and which options are still being debated?

These are the issues about which positions of principle will need to be defined in the national programme in 2015. In order to answer these questions, both government and experts will need to make responsible innovation efforts to define deliberation or consultation mechanisms that are in line with Belgium's political culture.

7. GLOSSARY

BANANA: This acronym (Build Absolutely Nothing Anywhere Near Anything) is used to describe the stance of individuals who believe that the project should be implemented neither here nor there, in other words nowhere near anyone. It refers to territorial conflicts where the second part of the equation, the benefits, is considered absent by opponents. This type of conflict can arise when the project's usefulness is challenged. It could be a conflict stemming from local objections to a national project (Wester, Herber, 2004). The BANANA conflict can also reflect the increasingly general nature of the arguments used by those opposed to a local project. For instance, they rely on the model of sustainable development or environmental justice. In doing so, they employ a strategy to broaden the discourse, allowing them to sidestep accusations of selfishness and to identify themselves with a wider audience, by extending the boundaries of the moral community they claim to speak for. By defining themselves as the spokespersons for a wider community, these opponents try to undermine previous or possible future alliances, as well as the social order legitimizing the project they are opposed to. This phenomenon can describe the position of some opponents of the decision in principle about the Waste Plan. In this view, the very existence of the benefits of waste management sites is challenged. Correspondingly, these opponents highlight the potentially huge costs in a context of great uncertainty, even ignorance, to subordinate nuclear waste management to phasing out nuclear power altogether (Zwetkoff, 2012). In this context, the very idea of offering compensation becomes a sensitive issue.

More generally, they also refer to the issue of the perception of risk for each of the stakeholders (Wester, Herber, 2004).

Decision-making process: The decision-making process underpinning a public action programme is designed in a comprehensive manner from a double perspective. On the diachronic level, it is a succession of more or less incremental decisions involving, to varying degrees, more or fewer categories of actors, starting from the moment that the idea of a public intervention takes shape, up until the routine operation of the programme. On the transverse level, this process raises the question of the limits of its scope. Is this scope limited to nuclear waste management only, or does it include the source of this waste too? The question is open to debate. Different process families are involved in the decision-making process: (1) management processes, concerning the development of the project, (2) implementation processes, concerning the creation and operation of the organization, (3) support processes, managing human resources and infrastructures and thereby contributing to the proper operation of the other processes. The legitimization process is part of these.

Ignorance (in the decision-making context): The decision-maker does not know whether the consequences of an option have a probability of zero or more (context of ignorance). In a context of great uncertainty, the decision-maker does not know the probabilities of these consequences, yet knows that they are greater than zero (Hansson S.O., 1996). Great scientific uncertainty or ignorance about the effects of an option can result from a scientific or regulatory approach where the scientific quality of the answers is not questioned, but rather the quality of the questions asked by the scientist or regulator (type III error, Sanderson H. & Solomon K, 2003, Precautionary Limits to Environmental Science and Risk Management, The Journal of Transdisciplinary Environmental Studies, vol. 2).

Intergenerational equity: refers to the concept of justice by incorporating a temporal dimension. The use of collective resources, primarily non-reproducible resources, by present generations must not affect the ability of future generations to benefit from them in a fair manner (Ferrari, Mery, 2008).

Monitoring: is directed towards predefined objects and concerns “any gathering of data relating to behaviour of a repository and its natural and social environment” (Bergmans, 2013).

Moral community: This is the community of members considered to be entitled to fair treatment (Susan Opatow, Animals and the Scope of Justice, Journal of Social issues, 1993, vol. 1, pp. 71-85).

NIMBY: Territorial conflicts are often given the label NIMBY (Not In My Back Yard), suggesting somewhat pejoratively (Nadaï & Labussière, 2010) that people are supportive of measures in the general interest as long as those do not entail direct consequences for them personally. Such individuals are described as selfish, primarily concerned with the decline in quality of their own living environment, their own well-being and the economic value of their property (Pol et al., 2006). When we mention NIMBY, it is the selfish character of a certain behaviour that is pointed out rather than the reasons justifying it. The essence of NIMBY conflicts lies in the imbalance, as pointed out by opponents of the site implementation project, between the costs incurred by the local "host" community and the expected benefits of the project.

Precautionary approach: This (historically recent) precautionary model (Ewald F. (1996) *Philosophie de la précaution, L'année sociologique*, vol. 46(2): 382-412) is not so much connected to actual practices (most of which have yet to be developed), but rather to a new hypothetical problematization of so-called "modern" technological risk management. The expert reference to the precautionary principle is made in a context where scientific and technical knowledge do not allow us to identify, prevent or control risks and uncertainties when technological choices have to be made. The precautionary model or approach includes guidelines governing the use and implementation of the precautionary principle (Commission of the European Communities, COM (2000) 1 Communication from the Commission on the precautionary principle).

Prevention approach: not to be confused with the precautionary approach, the prevention approach seeks to reduce the residual risk, i.e. the probability of known risks occurring and/or the severity of the effects (Bouzon, 2005).

Procedural fairness: highlights the importance of rules and procedures mobilized in a decision-making process. It is a question of "how" to decide, rather than merely of what to decide, so it is about means as well as ends. Any given decision's procedural justice is judged on the basis of the criteria for a fair procedure. These criteria are socially constructed. (Tyler T., The Role of Perceived Injustice in Defendants' Evaluations of Their Courtroom Experience, Law and Society Review, 1984, 18(1): 51-74; and Keren G. & Bruine de Bruin W, On the

Assessment of Decision Quality : Considerations Regarding Utility, Conflict and Accountability in D. Hardman & L. March, (2003), Psychological Perspectives on Reasoning, Judgment and Decision-making, John Wiley & Sons, Ltd)

Prospective approach: Approach consisting of taking into consideration the future, or rather the possible futures. A tool that helps build the future (De Jouvenel, 2002), considering its increasing unpredictability and the speed of relevant changes. Therefore, the definition of the possible futures is ever-changing. This approach applies both to changing phenomena and to those believed to be immutable (De Jouvenel, 2002). It is based on three main principles (anticipation, action and ownership) and is opposed to predictions through its multidisciplinary and systematic approach, including the long term and the possibility of disruptions (De Jouvenel, 2002; Godet, 1991).

Prospective backsight approach: Approach consisting of taking into consideration the future, or rather the possible futures, defining a desirable future so as to build a scenario “going backwards”. This notion also introduces the issue of memory management, as one of the challenges is also to understand how today's information was treated yesterday (Zwetkoff, Fallon, 2012).

Recoverability: Technical possibility to recover the waste safely after partial or complete closure of the repository, using means other than those provided for initial placement of the waste (Waste Plan, 2011, p.135). The NEA defines this concept more broadly as the technical possibility to recover the waste (NEA 2011: 4).

Reversibility: An option (whether technical or political) is irreversible when the actors cannot go back to the point where this option was just one of several options, and when this option determines subsequent options (see Callon M. (1991) Techno-economic networks and irreversibility, in John Law (ed.), A Sociology of Monsters: Essays on Power, Technology and Domination, Routledge, London and New York, 132-161). The NEA defines this term as the possibility to reconsider a decision (A. Bergmans, 2012, p. 33 of the Axis 4 report).

Risk: The expert definition of risk is based on the product of two dimensions: the probability of an undesirable event (danger) occurring, and the severity of its effects. Besides this expert definition there is also a layman's definition (called perceived risk), which is more complex because it involves more dimensions (Slovic P, Fischhoff B, Lichtenstein S, Why Study Risk Perception, Risk Analysis, 2 (2), 1982).

Uncertainty in the decision-making process, in the context of a precautionary logic:

Uncertainty is a multidimensional concept. It can be observed in different registers of knowledge (scientific vs. layman's knowledge). The different dimensions of uncertainty are rooted in a lack of knowledge, a lack of information and/or the variable nature of phenomena that are subject to uncertainty (events, the operation of various relevant systems – physical, biological, social, procedural and managerial, etc.) (Dowe, 1994). The nature of uncertainty can be temporal (uncertainty about the past or future state), metric (measurement inaccuracy), structural (lack of an empirically validated model describing the causal links in an activity), procedural, etc. There can also be translation uncertainties, arising during the communication process (information and explanation), which can be explained by differences in perspective, for example between experts and laymen (Dowe W. (1994) Understanding Uncertainty, Risk Analysis, vol. 14 (5): 743-50).

8. BIBLIOGRAPHY⁶³

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PART I: A PROSPECTIVE VIEW ON THE CONSTRUCTION OF THE PRECAUTIONARY APPROACH IN MANAGING THE WASTE PLAN

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