Nuclear safety put to the Common test[1]

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Introduction

Civil nuclear power generation activities are associated with very significant risks[4] for humans and the biosphere. They also give rise to the production of dangerous radioactive materials, the presence of which must be envisaged for very long periods, and even infinite from the perspective of a human life itself.

From the very beginning, these activities have been the subject of strong political opposition from various groups within the populations of the producing countries and at international level. These confrontations involve pro-nuclear and anti-nuclear players, with a relatively indifferent public in the background, with the exception of periods of concern caused by the Chernobyl and Fukushima nuclear accidents. The opposition to these activities is based on the rejection of exposure to nuclear risks and their potential consequences at national and international level. The possibility of safe management of nuclear activity is a central object of controversy.

This contestation also concerns the technical, economic and social relevance of the choice of nuclear power generation, particularly in the current context of energy transition. Nuclear activities are facing a deterioration in their economic model, with a sharp rise in productivity requirements, combined with stricter European regulations restricting state aid and increased financial and economic transparency[5], which in Europe is limiting the public support from which this activity has historically benefited.

The European context today is characterised by a wide disparity in energy choices, particularly where nuclear power is concerned. Only some European countries are involved in nuclear production, often in connection with military nuclear activities. Some of these countries have decided to withdraw from nuclear power at different times. They are planning a transition to other forms of energy production. But phasing out nuclear power does not mean phasing out nuclear safety, which remains a long-term or even very long-term issue for these countries. Ultimately, nuclear safety is an issue for all European countries. Indeed, serious nuclear accidents are always of a cross-border nature and the management

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[1] For the authors, the issue of nuclear safety represents a field of research and a field of associative experience (for one of them). They have therefore benefited from privileged access to various events and projects that have taken place over several decades in this field. As such, they cannot claim to have an "outsider's" approach. This position does, however, give them the ability to analyse these elements from an insider's viewpoint, informed by a reflexive approach.

[2] The Fund for Democratic Culture (FDC) is an endowment fund set up in 2011 with the aim of supporting and developing public-interest research, scientific study and training activities designed to promote the concept of democratic culture and support its development among the general public and institutions at local, national and international level.

[3] Founded in 1990, Mutadis is an intervention and research team specialising in the governance of activities that pose a risk to people or the environment, and in the governance of the sustainable development of territories. Mutadis works on activities involving complex issues (social, human, environmental, health, economic and political) involving a wide range of public and private players at local, national and international level (http://mutadis.org).

[4] The protection of man and the living environment in the context of these activities includes nuclear safety (control of the nuclear reaction process and external factors that could disrupt it, and management of accidental and post-accident situations), the radiological protection of people and security (prevention and management of human aggression, attacks on installations, predation or dispersion of nuclear materials).

[5] It is worth highlighting here the gradual (and very marked from the mid-1990s onwards) evolution of the European Commission and the Court of Luxembourg towards a strict interpretation of the Treaty's demands concerning the exclusion of State aid to companies, as long as this field is not included in a country's administrative imperium. A number of legal challenges have been lodged by certain Member States against public aid for investment projects in the field of nuclear power generation. This situation has also led to a demand for financial and economic transparency in these projects.

of radioactive materials, although a national responsibility, remains a common safety issue for Europe's neighbours.

Nuclear safety requires a wide range of technical, scientific, economic, social and political conditions to be met. As a result, safety is highly vulnerable to changes in the economic climate affecting the industry, in an unstable international context that differs in many respects from that which prevailed in the second half of the last century. A systemic deterioration[6] in nuclear safety and security conditions could result from these profound changes in the national and international context. The ability of dyadic governance between State and Market to support nuclear safety requirements in an unfavourable economic climate is questionable. At European level, this situation is a new factor which tends to make nuclear safety a common issue for the peoples of Europe.

A study of the governance of nuclear activities since their inception reveals a profound evolution, the most recent stage of which, in Europe, is based on the societal recognition of nuclear safety as a common problem (with, in particular, an increase in the power of the European institutions on this issue), over and above the diverse positions of the Member States with regard to nuclear energy. Favoured in particular by the Aarhus Convention (1998), this development has the seeds of a gradual recomposition of nuclear safety governance, with the institutional components of safety interacting in a Common dynamic: 1) the operator (the Market), 2) the State and its institutions and 3) civil society. This move towards triadic governance could ultimately bring about a political rebalancing of the negotiation processes that govern the establishment of nuclear safety rules and standards.

Methodological approach

This article proposes a reading of various events and milestones from the theoretical point of view of this work, i.e. an identification of the clues that may reveal the emergence of dynamics of the Common in the field of nuclear safety and the occurrence of interactions between these dynamics and the functional systems constituted by the two institutional actors traditionally involved in the field of nuclear safety governance, namely the State (as regulator and as expert) and industry (public or private).

To this end, the authors propose an analysis of the complex nature of the issue and a selection of events and salient points in the history of nuclear safety governance, which does not claim to be exhaustive. The purpose of this selection is to illustrate a development based on elements that are put forward for discussion. From a theoretical point of view, the authors adopt the perspective opened up by John Dewey, both in his distinction between public and private activities and in his description of the mechanisms of public formation through social enquiry. The aim of the proposed analysis is to identify one, or rather several, dynamics of the Common and how they relate to the State and the Market. This analysis involves a set of concepts that were introduced as part of the conference 'Between the State and the Market, the Dynamics of the Commons: Towards New Equilibria' (and in particular, Ostrom, Sen, Bollier, Luhmann) as well as in previous works[7]. Drawing on the work of Anna Lowenhaupt Tsing[8], the authors set out to identify the 'frictions' between systems and actors in this process of communalisation, and the changes brought about by these interactions in different types of process.

It may come as a surprise that this article focuses on the issue of safety rather than on nuclear activity itself. This choice stems from the observation that nuclear safety is an issue that transcends the diversity of positions on nuclear activity as well as the national frameworks within which energy policies are framed. This transcendence applies not only in space but also in time, insofar as safety is deployed over a horizon that goes from the very short term to the very long term with the management of radioactive materials whose lifetimes can be in the order of several million years.

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[6] See Y. Marignac et al, "Compte-rendu des auditions parlementaires du rapport made on behalf of the Commission of Inquiry into the Safety and Security of Nuclear installations", 28 June 2018 (http://www.assemblee-nationale.fr/15/rap-enq/r1122-tII.asp).

[7] D. Bourcier, G. Hériard Dubreuil, S. Lavelle, La société en action, Paris, Hermann, 2013.

[8] A. Lowenhaupt Tsing, The Mushroom at the End of the World, On the Possibility of Life in Capitalist Ruins, Princeton, Princeton University Press, 2015; Id., Friction: An Ethnography of Global Connection, Princeton, Princeton University Press, 2005.

Some historical background to this development

In the governance of nuclear safety over the last few decades, it is possible to identify a series of events and processes that are indicative of the growing recognition of nuclear safety as a common problem within society. The facts listed here do not claim to be exhaustive. They have been selected for the purposes of the discussion in the third part.

Nuclear safety is involved in a number of issues associated with nuclear activities, such as the operation of nuclear facilities, but also in a series of questions that could be described as "collateral" to nuclear operating activities, although they are nonetheless central to those who are confronted with them. These issues arise from the consequences of these activities, some of which are unavoidable (such as the existence of radioactive effluents from nuclear facilities, the existence of hazardous radioactive waste or the need to dismantle decommissioned facilities) and some of which are potential (such as nuclear disasters and their accidental and post-accidental consequences). consequences).

Until recently, nuclear safety was essentially a bilateral relationship between nuclear electricity producers and the public authorities (at both national and international level). This dyadic governance has taken place in an extremely favourable economic and political climate for the nuclear industry. In addition, since the late 1970s there has been a gradual deployment of civil society components in the critical monitoring of nuclear safety, albeit on the fringes of the industry's institutional governance system.

A key issue in the governance of nuclear activities is the negotiation of nuclear safety criteria and standards, which are based on technical, economic, political and ethical trade-offs. How safe is safe enough? Can a downturn in the nuclear industry's economic situation justify a relaxation of safety constraints? For a long time, these negotiations were held in isolation from the public and, to a certain extent, from elected representatives. In France, for example, nuclear activity has long been regulated by regulation. It was not until the 1990s that a nuclear issue was referred to the French Parliament (see below). These legislative processes for regulating nuclear activities[9] include public participation mechanisms that first appeared in the field of radiological protection, on health and environmental issues, before gradually moving into the much more closed field of nuclear safety, where the highly technical nature and internal nature of nuclear operations long kept the issue confined to the expert circles of operators and the State.

The Groupe Radioécologique Nord Cotentin (GRNC[10]) is a prime example of this development. It was set up in 1997 at the initiative of the public authorities, following an epidemiological study by J.-F. Viel of the Besançon Faculty of Medicine, in a context of scientific controversy over the existence and origin of the risk of childhood leukaemia in the Nord Cotentin region near the La Hague nuclear site. A committee of pluralist experts was set up, chaired by Annie Sugier (a person with expertise in radiological protection who was also an activist for associations) and made up of scientists from different backgrounds and with different sensibilities (nuclear operators, institutional experts, experts from associations and foreign experts). The committee's task was to provide scientific information on the radiation-induced risks in the Nord Cotentin region, but carrying out this technical mission also required the implementation of original organisational rules to ensure the operation of such a pluralist group of experts.

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[9] With the exception of the Mauroy circular of 1981, which validates the principle of an information commission bringing together elected representatives, representatives of trade unions and the public, and representatives of professional sectors in the context of each nuclear installation, following an initiative by the population to create a local monitoring commission in the context of Fessenheim. See the Prime Minister's circular of 15 December 1981 (https://www.asn.fr/Reglementer/Cadre-legislatif/Circulaires-directives-instructions-guides/Circulaire-du-Premier-Ministre-du-15-decembre-1981).

[10] C. Mercat-Rommens, A. Sugier, Le Groupe Radioécologique Nord Cotentin, une expérience scientifique d'expertise pluraliste, November 2006 (available on the IRSN website): https://www.irsn.fr/FR/Larecherche/publications-documentation/Publications_documentation/BDD_publi/DEI/SESURE/Pages/Le-Groupe-Radioecologique-Nord-Cotentin-une-experience-scientifique-d-expertise-pluraliste-4326.aspx#.X2SFfi3pMUF).

Radioactive waste management processes also illustrate this evolution, both in France and abroad. In the early 1980s, the French public operator for radioactive waste management (Andra[11]) began studying the possibility of underground storage (storage in this case meaning geological burial of hazardous radioactive waste at great depth "without the intention of removing it"). Prospecting is being carried out without public consultation to identify a geological site for an underground laboratory. There was strong local opposition. In February 1990, the Prime Minister, Michel Rocard, decided to impose a moratorium on the four sites identified and then consulted the Parliamentary Office for Scientific and Technological Options. On 30 December 1991, a bill was passed by the French parliament defining a research programme for long-lived high-level and intermediate-level waste, focusing on three areas: 1) separation and transmutation; 2) long-term surface storage; and 3) geological disposal. The concept of the reversibility of disposal was introduced at the request of the public, to allow for the possibility of a change of strategy at a later date in the light of developments[12]. Consultation with the population and elected representatives of the sites concerned is introduced as a prerequisite for the establishment of a research laboratory.

Following this research phase, a public debate was held in 2005 as part of the preparation of a law on radioactive waste management. The conclusions of the debate emphasised the importance of "plural expertise" and recognised the need for time, "to move forward without rushing things, to evaluate, to know and to be able to stop"[13]. Despite the initial climate of conflict, the debate[14] brought together a wide range of viewpoints and proposed "long-term storage" as an alternative to the disposal option. The 2006 law retained only deep geological disposal as the reference solution, without taking this proposal into account. Stakeholder confidence in the institutional participation process was shaken, as demonstrated by the difficulties encountered a few years later in 2013 during the public debate on the project to create a geological repository at Bure (the CIGEO project[15]).
At European level, the search for practical conditions for implementing the Aarhus Convention as part of the ACN (Aarhus Convention and Nuclear) approach is also an interesting stage in this historic process. Signed in 1998 by the European countries and also by the European Community, the Aarhus Convention sets out the rights of the public: 1) access to information on decisions likely to affect the environment, 2) participation in public decision-making and 3) access to justice if these rights are denied. The competence of the Aarhus Convention in the nuclear field is implicitly recognised. In 2008, the European Commission, in partnership with the French federation of local information commissions on nuclear installations (ANCCLI[16]), began work on the practical arrangements for implementing this convention. A programme of European and national roundtables was set up between 2008 and 2013, with the aim of informing institutional players and civil society about how to implement the Convention. Five European round tables, bringing together around a hundred participants, are examining these procedures in contexts such as nuclear accident management, radioactive waste management and the safety of nuclear facilities. More specifically, a European round table is looking at how civil society can access expertise and develop its skills. The summary round table, held in March 2013, highlighted three essential aspects that are seen as practical conditions for implementing this convention:
- to unite civil society at European level so that its voice can be heard. The NTW (Nuclear Transparency Watch) association was created in 2013, bringing together civil society organisations from many European countries[17];
- developing pluralistic interactions between regulators, experts, operators and civil society at European and national level;

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[11] https://www.andra.fr

[12] This concept remained poorly defined until the law of 25 July 2016 on the conditions for creating the CIGEO repository, which set out the definition of reversibility and specified the conditions for authorising the commissioning of a deep geological repository.

[13] See G. Mercadal, Compte-rendu du débat public sur les options générales en matière de gestion des déchets radioactifs de haute activité et de moyenne activité à vie longue, January 2006, p. 35 and 106 (link on the Commission nationale du débat public website).

[14] One of the factors behind these tensions is that, although the Bataille law provided for several avenues to be explored, it was mainly geological storage that was explored and the creation of "underground laboratories", in the plural, ultimately resulted in a single site being chosen in 1998, at Bure.

[15] Given the impossibility of holding debates in public meetings, these are being replaced by "adversarial debates" broadcast over the Internet, with the option of asking questions by text message or e-mail.

[16] http://www.anccli.org

[17] http://www.nuclear-transparency-watch.eu

- encouraging civil society to develop its skills through access to expertise, so that it can make an effective contribution to the quality of safety decisions[18].

This third dimension of expertise developed very early on in a particularly interesting way in the European context. For example, from the 1970s onwards, and in the aftermath of the Chernobyl accident in 1986, centres of societal expertise[19] were set up in the field of nuclear safety. This movement to build up social expertise is accompanied by a number of initiatives by public experts to make their expertise available to society. In France, for example, the Institute for Radiological Protection and Nuclear Safety (IRSN) has included a "policy of openness and transparency in the service of a risk-aware society" in the objectives and performance contract it has signed with the government.
More recently, the development of several European research projects has made it possible for representatives of civil society to take part in research programmes dealing with nuclear safety issues. This is the case, for example, with the Sitex and Sitex II projects, which have gradually introduced civil society participation components. An original model of participation (double wing participation) has been developed to enable the equitable involvement of local, national and European representatives of society, with the support of expertise from civil society. This form of participation represents a strong form of interaction between components of society and public experts. It is being tested as part of the European BEACON research project. This project studies the very long-term behaviour of geological components (clay) in the context of radioactive waste disposal projects. It includes interaction with experts from civil society throughout the research process.

A number of clues point to the dynamics of the community around the issue of nuclear safety. This movement can be seen in the formation of different groups, of different origins, within civil society, which will gradually identify in this issue the elements of a complex problem and lead them to engage in forms of joint action involving different types of interaction with the functional systems of nuclear operators and regulatory bodies within the State.

Discussion

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This dimension of complexity makes nuclear safety a "public" matter in the sense introduced by John Dewey[20], who defines a public activity as one that is the cause of actions that will affect a group of players beyond the circle of those who carry out the activity, as opposed to a private activity that has no consequences beyond the circle of those who carry out the activity. Indeed, nuclear safety issues extend beyond the time and space of nuclear facility operations. The devil of radioactivity comes out of the woodwork in the short, long or very long term, because this activity is bound to give rise to more or

[18] In the French context, for example, the French public radiation protection and nuclear safety institute (IRSN) has been open to society since it was set up in 2002. The aim of this approach is to build a shared understanding of complex issues, risk situations and the alternatives available to deal with them. For example, IRSN has set up a pluralist process of technical dialogue concerning the safety review of the disposal project (https://www.irsn.fr/FR/connaissances/Nucleaire_et_societe/ouverture-transparence).
[19] For example, the Groupe des scientifiques pour la sûreté et l'information sur le nucléaire (Group of scientists for nuclear safety and information), created in 1975, which helped inform the public at the time of the Three Mile Island nuclear accident in the United States, and subsequently, at the time of the Chernobyl accident, the creation of the Commission de recherche et d'information indépendantes sur la radioactivité (CRIIRAD) and the Association pour le contrôle de la radioactivité dans l'Ouest (ACRO). Similarly, Law no. 95-101 of 2 February 1995 on strengthening environmental protection, known as the Barnier Law, institutionalised public participation and created the National Commission for Public Debate (CNDP), which was set up in the context of the nuclear laws from 1991 onwards.
[20] J. Dewey, Le public et ses problèmes, trans. by J. Zask, Paris, Leo Scherrer, 2003, p. 63:
"the line which separates the public from the private must be drawn on the basis of the extent and scope of the consequences of acts which are so important that they require control, either by prohibition or by promotion".

less significant forms of radioactive contamination, even if everything possible is done to prevent them. This makes nuclear safety a complex issue in the sense that it cannot be reduced to a technical problem internal to nuclear activity but, because of its interactions with the human world, includes health, environmental, economic, political, human and ethical dimensions. It also has implications for a wider circle of players in space and time (its consequences are intergenerational).
This situation is at the root of the growing difficulties encountered by dyadic decision-making processes (State/operators) in the context of these complex and multidimensional issues, which involve a wide range of stakeholders within society. For example, the Rocard government referred the issue of radioactive waste management to Parliament (1990, see above), paving the way for the creation of a legislative apparatus to regulate nuclear activities, which until then had been essentially regulated by administrative means. Similarly, public participation mechanisms were gradually introduced in an attempt to overcome these difficulties by including society in the decision-making process. In John Dewey's view, the public affair gives rise to the formation of a "public" and the conduct of a "social enquiry", i.e. the process by which these public players together identify their interests and become involved in representing them. Thus, on the social side, the clarification of nuclear safety issues is at the origin of a form of 'communality' which is associated with modes of joint action to access information and to exert a joint influence on decision-making processes through requests for access to information and expertise, participation in safety monitoring and participation in decision-making.
These joint actions will, to varying degrees, require forms of interaction between these common actors in society and the two functional systems that originally interacted in this field, namely the public regulatory and safety control components and the nuclear operators (public or private). The tensions generated by the development of these interactions between institutional and community players can be seen, as they are put to the test by the systems with which they tend to form a triadic system. Some groups find themselves exposed to the accusation of being 'recuperated' for having accepted forms of compromise with regard to their externality in relation to these functional systems.

Depending on the gradient and nature of these interactions (one-off, ongoing, cooperative, integrative), we can observe an adjustment of the commons to the logic of the State. The notion of participation, when introduced by public institutions, is part of a logic of *"étatisatisation"* to which the actors of the commons must adjust, and which is not without risk for the integrity of their identity and their own functional missions.
When the participation of community players is assimilated to the regulatory process, when it has to adopt the frameworks for reading the issues (im)posed by the institutions, when it sees its own problematisations rejected (because they are irrelevant in the context of regulatory referrals), it is exposed to the risks of *"vassalisation"* which can threaten its autonomy, its capacity for self-organisation (for example when its agenda becomes identical to that of the regulatory process) and, in turn, threaten its own dynamism and cohesion. This tendency can be observed in particular when the State comes to saturate the commitment capacities of the players in society by multiplying public consultations and participatory processes whose legal deadlines for responses and appropriation of the issues are too short to allow these players to mobilise the necessary means (human, organisational and financial resources) to become involved and give their opinion while preserving their autonomy and integrity.
It should be noted that the Aarhus Convention represents here a form of "politics of the Commons" in that it will encourage not only the formalisation of rights of access to information, participation and justice, but also the formation of wider and more diversified constituencies of actors in society around the development of interactions with decision-making processes. By stating in its preamble that:
The Aarhus Convention states that "improved access to information and increased public participation in the decision-making process lead to better decisions and more effective implementation of those decisions" and, in Article 6(8), that the signatories must ensure : "that, when the decision is taken, due account is taken of the results of the public participation procedure"[21], that the Aarhus Convention removes a structural ambiguity in participation by providing it with a strong social justification which, in a way, neutralises suspicions of recuperation as soon as the practical conditions are met for this participation to be effective. It thus opens the way to forms of communalisation around safety issues.
The existence of policies for the Common should not, however, lend credence to the idea that the Common can be institutionalised. The Common, which stems first and foremost from people's desires

[21] "Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Aarhus, 25 June 1998, pp. 2 and 11 (https://www.unece.org/fileadmin/DAM/env/pp/documents/cep43f.pdf).

and their *affectio societatis*, cannot be prescribed. Like a rare herb, or certain mushrooms, the Common cannot be produced. At the very least, it is possible to encourage it, if not cultivate it, by means of appropriate procedures and by a process of deepening that goes well beyond the usual forms of institutional participation.
Finally, it should be noted that various factors contribute to making nuclear safety a common problem for the people of Europe, despite the heterogeneity of the European landscape of nuclear activities, such as the cross-border nature of the consequences of nuclear accidents, the interdependence of Member States with regard to the fate of radioactive waste and materials, the systemic weakening of safety associated with a decline in the European nuclear industry, and the prospect that safety problems will persist beyond the possible disappearance of this industry in Europe.
This communalisation of safety is still evident in the creation of a pan-European federation[22] of associations involved in monitoring safety (the Nuclear Transparency Watch association), set up at the call of a group of European parliamentarians[23] who, for the first time, are bringing together various components of civil society (without prejudice to their position on nuclear power) around the objective of developing transparency and nuclear safety, in the perspective opened up by the Aarhus Convention. The first few years of operation of this structure, which is intended to pave the way for triadic governance of nuclear safety, have not been without their tensions and crises, which are precisely associated with the oppositions that may arise between this structure and components of society that are more in line with a logic of externality and in opposition to the functional systems (operators and State) that structure nuclear activity.

Symmetrically, we can see forms of communalisation within the components of the State, with the emergence, for example, of policies of openness to society among public experts, but also among certain operators, particularly in the field of radioactive waste management. This adjustment of the State to the logic of the Common is not without effect on the forms of construction of the general interest by the public player and more precisely on the processes of construction of the principles and standards that govern nuclear safety. This movement is not without risk for expert institutions, whose 'loyalty' to their functional system is regularly called into question. It should also be emphasised that, in the face of the pressure that may be exerted on (and in) the State to relax safety constraints (for example, when the national industry suffers a drop in productivity in an unfavourable economic climate), these interactions with society are a means of strengthening these regulatory bodies and their experts, who may be exposed to pressure from the industry (through all the channels of influence that the latter has acquired). These forms of communalisation will lead to interaction processes along gradients of varying intensity, which may take the form of informal cooperation, or even the integration of this component of openness to society into the missions of these institutions.

Conclusion

We have presented and discussed the hypothesis of the deployment of a European dynamic of the Common around the issues of nuclear safety, which would result from the occurrence of various factors of a political, social, economic and historical nature, as well as from the global dimension of this nuclear activity. In this context, the emergence of the Aarhus Convention in 1998 constitutes a form of policy of the Commons in the sense that it will encourage, around the issue of safety, the grouping of different social components in common forms of pan-European action to promote access to information and forms of equitable and influential participation in European, national and local decision-making processes.
The common ground in question here must first be understood in terms of the problems posed at European level by the consequences of nuclear activity, both in the short term (discharges, accidents) and in the very long term (waste, decommissioning). This being the case, the formation of a pan-European common denominator stems from a sort of "objective alliance" that transcends differences, and which raises questions about the ability of these players to subsequently articulate their experiences, their visions of the world, and their values, which are often different and not necessarily compatible. The clarification of these values during events or crises can be a real test for the survival

[22] The creation of this pan-European federation is a response to one of the needs identified at the end of the long process of cooperation to identify the practical conditions for implementing the Aarhus Convention, the ACN (Aarhus Convention & Nuclear) process described earlier in the article.
[23] Call from MEPs, December 2012 (http://www.nuclear-transparency-watch.eu/fr/wp-content/uploads/sites/2/2018/11/Appel-NTW.pdf).

of this dynamic. This observation highlights the need to work with the Common in the many opportunities that can arise from joint actions and the stages that punctuate the life of the structures that bring them together.
Similarly, the testing of these commons can also be seen in their interactions with functional systems such as the State and nuclear operators. Until now, these interactions have been primarily with public players (regulators) and their experts. Following on from this first stage, more integrated processes are now being developed that involve the industry's third component, for example in the context of European research projects[24] that involve civil society in research consortia that bring together nuclear operators, public experts and academic research.
We can therefore see that the emergence of a triadic society-State-market system in the nuclear safety sector remains conditional on the ability of the stakeholders to deepen the foundations of their common life within the framework of these structures, which involve frequent, if not daily, interactions, and in which the clarification of divergent values may at any time confer on an adherence the character of a "compromise". In the same way, we can anticipate the occurrence of 'frictions' in the processes of cross-society-State-market interaction, which are necessarily associated with transfers of constraints between these different systems.

In its preamble, the Aarhus Convention states that better access to information and greater public participation in the decision-making process lead to better decisions. Is this a gratuitous assertion? In the nuclear context, this statement is ultimately based on the complexity of safety. Safety is constantly put to the test by this complexity, which can more or less brutally call the process into question at any time. Niklas Luhmann[25] points out that for all existing systems, "the world is too complex", meaning that there are always many more possibilities in the real world than can be handled by a system that has to maintain itself. This situation leads the system to construct a representation of its environment that is necessarily selective. This representation shatters when contradictions appear between it and the real world. Luhmann points out that this complexity can only be addressed through a social response based on trust. In his view, trust increases tenfold the possibilities for a system to reduce complexity and take advantage of it. The distribution of tasks (e.g. entrusting safety monitoring to experts, differentiating between the role of the operator, that of the authorities, that of public experts, etc.) is a first step in this process. But, as W. J. Kinsella[26] (2005), the differentiation of systems carries with it the risk of obsolescence, because the components of the system tend, in order to increase their efficiency, to isolate themselves and operate in silos based on partial (reduced) representations of reality. They then lose their ability to grasp complexity. This is where new risks arise, and this is why the emergence of the dynamics of the Commons, involving society in cross-disciplinary processes of decompartmentalisation, combined with a form of communalisation of safety, constitutes an effective contribution to safety. It is nothing less than contributing to the prevention of what Ulrich Beck[27] has paradoxically identified as "the emancipating catastrophe", that is to say, ultimately, the event that will radically call into question the representations on which safety is based.

[24] Like the BEACON project, a description of which is available on the European Commission (https://cordis.europa.eu/project/rcn/210819_en.html).
[25] N. Luhmann, Trust. A mechanism for reducing social complexity, trans. by S. Bouchard, Paris, Economica, 2006.
[26] W. J. Kinsella, " Being "Post-Fukushima" : Divergent Understandings of Sociotechnical Risk ", dans Fukushima Global Communication Programme Working Paper Series, décembre 2015 (http://collections.unu.edu/eserv/UNU :3360/FGC_WP_18_December_2015.pdf).
[27] U. Beck, " Emancipatory Catastrophism : What Does it Mean to Climate Change and Risk Society ? ", Current Sociology, 63/1, p. 75-88, 2015.