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# Needfulness and challenges of internationalisation and involvement of international environmental NGOs in University research and education: The lessons learned from nuclear waste management sector research projects

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Society's perceptions of desired democratic standards in radioactive waste management sector have changed significantly in the recent two decades. The change, known also as 'participatory turn', can be well illustrated on the example of site selection process for a geological repository of spent nuclear fuel in the Czech Republic. Empiric evidence from this process outlines links between the roles of Governmental bodies, NGOs, research institutions and businesses in dealing with the new challenges in decision-making procedures concerning spent nuclear fuel. Selected examples from the EURATOM financed research projects ARGONA, COWAM and IPPA illustrate a growing need for internationalisation and involvement of environmental NGOs in related research and education processes in a near future.

**Keywords:** Internationalisation, research, education, nongovernmental organisations, nuclear waste management

## Introduction

Dealing with spent nuclear fuel (SNF) is the most crucial challenge of commercial use of nuclear energy for the purpose of electricity production. Visions of reprocessing SNF into a new fuel suitable for repeated use in nuclear power plants have not been carried out as planned, mainly due to financial and commercial reasons, but not leaving environmental and health concerns aside. As a consequence to such unplanned development, countries with commercial nuclear programs now face a need to safely dispose SNF which has accumulated heavily after decades of operation of circa 500 commercial nuclear reactors. But the efforts to develop geological disposal facilities for SNF and other very dangerous high-level radioactive waste (HLW) have repeatedly failed. The reasons behind these failures are often related to intensive public opposition, typically manifested in the so called 'Not in my back yard syndrome' (Richardson and Galson, 2009, p.1). Renowned experts of the U.S. Nuclear Waste Technical Review board Metlay, Garrick and Mote (2012, p.5) have recently stressed that "few public policy issues rival the management of HLW and SNF in terms of the controversy it engenders and the demands it places on scientific research and engineering practice".

The aim of this paper is to illustrate recent trends in internationalisation and involvement of NGOs in research and education processes concerning management of radioactive waste. The paper focuses on the empiric evidence

from the Czech Republic which was reported within the results of the EURATOM funded research projects 'Arenas for Risk Governance' (ARGONA) and 'Implementing Public Participation Approaches in Radioactive Waste Disposal' (IPPA). Referring to 'the Czech case', the benefits of both internalisation and involvement of environmental NGOs in decision-making procedures can be regarded as a fulfilment of society's desire for more democracy in radioactive waste management sector. Referring to the result of EURATOM funded research project COWAM in Romania, a need for new ways of education in a field of democratisation of decision-making procedures in the nuclear sector is briefly outlined. The paper concludes with the observations regarding challenges and opportunities for internationalisation and involvement of international environmental NGOs in University research and education in a field of nuclear waste management.

## The 'participatory turn' as a result of desires for democracy and control of nuclear risks

One of the crucial reasons behind the so called 'Not in my back yard syndrome' and other factors of public concerns regarding processes of siting of SNF and HLW disposal facilities lies in the fact that policy makers, together with the representatives of the nuclear industry, have repeatedly exercised long time traditional ways of decision making labelled as 'DAD' (from 'decide - announce - defend'), where decisions were made centrally by politicians who consulted only selected scientists, with none or very little public involvement.

The so called 'participatory turn', characterised by abandoning from 'DAD' principle and replacing it with much more democratic decision-making processes based on transparency and public participation, can in the nuclear sector be related to the consequences of the fatal accident at the nuclear power plant in Chernobyl in 1986. Not only the severe health and environmental damages, but also psychological factors related to improper knowledge and information management have profoundly increased public interest in nuclear issues, and more importantly society's desire for much wider public control of decisions in the nuclear sector than before this most catastrophic nuclear accident of our era.

In the efforts to illustrate the 'participatory turn', Kojo and Richardson (2011, p.144) refer to a work published in the UK in 2009 by MacKerron and Berghout who stated that "where once emphasis was placed on the generation of factual validity in close decision-making procedures supported by scientific research and assessment, today emphasis is placed on facilitating open procedures in which justificatory discourses involving a broad range of stakeholders can take place". In the words of MacKerron and Berkhout, the 'participatory turn' can be outlined as a reflection of a "deeper shift in societal attitudes to expertise and a demand for greater inclusivity and deliberation in policy processes" (Ibid.).

The 'participatory turn' in the nuclear waste sector happened in the context of preparation and ratification of the two important pieces of international legislation which are generally applicable in procedural aspects of environmental protection: 'The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters' (the Aarhus Convention) and 'The Convention on Environmental Impact Assessment in a Transboundary Context' (the Espoo Convention).

**New challenges: Trust and authenticity (theory)**

Jenkins-Smith et al. (2011, p.166) state that "public attitudes concerning the management of SNF and HLW are coupled with attitudes about nuclear energy more generally. Understanding how perceptions and preferences concerning nuclear energy have evolved in recent years provides necessary context for making sense of the beliefs, concerns and preferences for managing SNF". The researches concerning failures to start construction of SNF and HLW repositories have identified the lack of trust as one of the key issues underlying public opposition and risk perceptions regarding siting of the SNF and HLW repositories (Kojo and Richardson, 2011, p.144). Metlay, Garrick and Mote (2012, p.11) assume that risk perceptions are linked to trust in the institutions charged with managing them. When there is no trust to a safety of nuclear installations, which often corresponds to a lack of trust in state nuclear regulatory authorities, the literature suggests that the 'participatory turn' is the answer to rebuilding trust (Kojo and Richardson, 2011, p.144).

The need for more transparency, stakeholder participation and community involvement in decision-making processes related to siting of SNF and HLW repositories have gradually been acknowledged by nuclear waste management organizations. Knowledge has increased dramatically with respect to risk communication, various models of citizen participation, conditions for community involvement and transparency. New approaches to participation and transparency have emerged in this sector (Jonsson and Andersson, 2010, p.5). One of the new approaches to public participation, which puts significant amount of importance on both trust and authenticity related to nuclear sector institutions and their representatives who deal with informing and consulting the public (i.e. rather than putting emphasis on scientific and technical aspects of risk analyses), is the so called RISCOM model. It was developed and successfully implemented in Sweden in the early 2000s, and also tested in the Czech Republic recently (as will be presented further in this paper). "A central concept of the RISCOM model is the so called 'stretching', which refers to a practice where central actors in a decision making process are gathered in front of a wide audience that challenges their claims to truth, validity and authenticity by posing questions from different perspectives" (Ibid., p.19).

A different example of putting emphasis on authenticity, which has no relation to application of the RISCOM model, is known from Finland. In the decision making procedures, authenticity of stakeholders is being safeguarded by recording the oral statements given in the public hearings. The general philosophy would seem to be that nobody should interpret the feedback [that the presentations by the nuclear safety authorities and other official bodies had towards answering concerns of citizens], but that the decision-makers should receive authentic messages from the citizens [regarding how the citizens were impacted by presentation of the results of risk analyses and safety studies] (Ibid., p.14).

Putting emphasis on trust and authenticity has a strong impact also on the perception of transparency. In the traditional ways, transparency is perceived as a practice of disclosure of such documents to citizens and NGOs that have been previously classified as secret or confidential. The developers and practitioners of the RISCOM model, however, perceive transparency as much more complex issue. In their view, "transparency is the outcome of ongoing learning processes that increase all stakeholders' appreciation of related issues, and provide them with channels to stretch their operators, implementers and representatives to meet their requirements for technical explanations, proof of authenticity, and legitimacy of

actions. Transparency requires a regulator to act as guardian of process integrity" (Andersson, K., Westerlind, M., et al., 2003; Jonsson and Andersson, 2010, p.36).

**The recent empiric evidence from the Czech Republic**

In the Czech Republic, six potential localities for SNF and HLW geological repositories were officially assigned in 2002 (see: Concept of Radioactive Waste and SNF Management in the Czech Republic, approved by the Czech Government in the Decree No.487 from 15 May 2002). The citizens of these localities were subsequently approached by the official authorities via information campaign and establishment of local information centres. This way of informing the affected local citizens has to a significant extent applied the 'decide - announce - defend' method. The approach chosen and implemented by the Czech authorities in the 2002 - 2007 period lacked modern perception of transparency and approaches to public participation as they were outlined in the previous section of this paper. In a consequence to such approach of consulting the local citizens, the lack of trust from citizens to authorities and the 'Not in my back yard syndrome' have soon been manifested in the citizens' initiatives for local referenda against plans for SNF and HLW repository. The local referenda were held in the 2004 - 2007 period in a majority of potentially affected municipalities, and with one exception (where the participation has not reached the necessary quorum of 50% by missing cca. 2.8%) these referenda were legally valid. In all cases, more than 90% of voters requested local political actors to use all of their legal power to dismiss plans for siting of SNF and HLW repository in these localities. In consequence to such strong opposition by the local citizens, the national authorities decided to put five years moratorium on any further attempt to continue site selection process.

The moratorium afforded time for the Czech authorities to establish relations with both local Czech and foreign stakeholders (see e.g.: Ustohalova, Minhans and Kallenbach-Herbert, 2012, p.13). The Czech authorities have benefited from increased internationalisation by networking with the implementers of the above mentioned RISCOM model from Sweden and other foreign institutions through the ARGONA project, which was funded under the Sixth Framework research program of the EURATOM and implemented in the 2007 - 2009 period. "In the Czech Republic, the RISCOM approach was based on three basic elements or prerequisites:

1. Technical/scientific issues can be clarified with scientific methods. They relate to questions like "Is this true?" or "Are we doing things right?
2. Normative issues reflect what is considered fair and acceptable in society, what is legitimate ("Are we doing the right things?")
3. Authenticity builds trust: it has to do with consistency between the actions of a person (or an organization) and who the person (or organization) is, or the role in the decision-making context." (Vojtechová, 2009, p.5).

Even though certain features of the RISCOM model have in the Czech Republic been used only to a limited extent (Ibid., p.44), there was significant progress achieved with regards to successful re-launch of discussing the very sensitive and controversial issues of SNF and HLW repository siting process with the affected local citizens and their representatives (see e.g.: Ibid., p.22; Ustohalova et al., 2012, p.4 and other parts of these reports and other relevant reports of the ARGONA

and IPPA projects). This was possible largely due to benefits of internationalisation via the ARGONA project which enabled authentic knowledge of the RISCOM model directly from its Swedish authors. According to Mr. Dalibor Stráský, who represented the Czech Ministry of Environment in 2009 (note: he currently works as Plenipotentiary of Upper Austria for Nuclear Energy), "the application of the RISCOM Model in the Czech Republic was a suitable tool to be used in attempts to find solution to problems faced at that time with regards to blocked positions between national level and local level stakeholders involved in the SNF and HLW repository siting process, but it came with the delay of about 7-8 years" (In: Vojtechová, 2009, Annex No.4, p.42).

The application of the RISCOM model presupposes full respect and significant involvement of NGOs. The implementers form the Czech Republic faced challenges with regards to involvement of national level environmental NGOs at the beginning of the process, which is called a 'pre-understanding phase of the RISCOM process'. This was caused by their lack of knowledge of the structure of national level environmental NGOs in the Czech Republic (i.e. about the existence of the platform 'Green circle' which served as an umbrella organisation for national level environmental NGOs and therefore had to be used in a process of electing NGO representative to the RISCOM structures). Even though the Czech implementers contacted all the relevant national level environmental NGOs by letters and often also by telephone, in the end they were still criticised for an improper approach to NGOs (See: Ibid., p.12-13 and Annex No.3, p.38). It is worthwhile to mention that the trust and authenticity, whose roles were outlined in the previous subchapter of this paper, had to be in this particular process secured via involvement of the 'Green circle platform', which was not the case in the end.

**Roles of Governmental bodies, NGOs, research institutions and businesses in research and implementation**

Due to reasons outlined at the beginning of this paper, involvement of a wide spectrum of stakeholders is desirable in both research projects and decision-making procedures in nuclear waste management (NWM) sector. Environmental and antinuclear NGOs can play important roles in deliberation processes as, from their nature, these types of NGOs are typically one of the most motivated subjects to thoroughly process publicly available risk-related documentation and provide inputs that can be helpful in order to evaluate understandability of publicly available nuclear risks related information and to identify or potentially incorrect information in publicly disclosed documentation (Mihók, 2011, p.233). In the IPPA project, which can be considered a follow up to the ARGONA project, the challenges related to a need to involve environmental and antinuclear NGOs were treated in several different ways. First of all, the international organisation which is specialising in 'environmental NGOs - Governmental organisations relationships', Regional Environmental Center for Central and Eastern Europe (REC), was included amongst the invited partners for the 'post-ARGONA project' that was later acronymed as IPPA. Secondly, amongst the research institutions, two Universities were replaced by the two specific research institutes that are significantly focused on environmental issues (Öko-Institut, Germany) and democracy issues (Center for the Study of Democracy, Bulgaria). Last but not least, the request of the European Commission for inclusion of the NGO representative in the Advisory board of the project was fulfilled by successful nomination of the representative of one of the most authentic international environmental NGOs - 'Friends of the Earth Europe'.

The EURATOM funded projects ARGONA, IPPA and several others in a field of NWM reflect a need to 'uniquely combine' research activities with an immediate implementation in real life context. From this reason, several private companies which are eligible for research activities are always involved in these projects as partners. Interaction of these private business with Governmental bodies concerns not only research activities, but also political decision-making - this can be, again, well illustrated on a cooperation of the Czech partners within both the ARGONA and IPPA projects with regards to the 'Working group for a dialogue concerning deep repository' (the Statute of this official advisory body and reports of its activities are available at the webpage of the Czech Radioactive Waste Repository Authority www.rawra.cz).

While the key role of the business research institutions is to develop an environmentally safe and financially feasible way of nuclear waste storage, the roles of the Governmental bodies in the NWM field are twofold: ensuring that the highest safety standards are observed throughout all the phases by the implementers, and achieving public acceptance. "The degree of public acceptance for nuclear facilities is linked to individuals' intuitive balancing of the perceived risks and benefits associated with those facilities" (Jenkins-Smith et al., 2011, p.166). With the internet and other new communication instruments being easily available to individuals, public opinion can be influenced easily by the foreign and international actors. Especially the antinuclear NGOs can have significant impact on trust amongst the citizens that are potentially affected and/or interested in influencing decision-making procedures concerning designing and siting of nuclear waste repositories, as these type of NGOs often manage to benefit significantly from highly developed schemes of international networking. Strong bonds of social trust between stakeholders provided with a challenge to deal with nuclear waste disposal and potential host communities can be created only throughout years of interaction (Metlay, Garrick and Mote, 2012, p.12).

## Role of Education establishments in securing trust in nuclear waste management sector

The methods needed to prepare young generation for a future participation in the decision making procedures concerning the most dangerous nuclear wastes must be inevitably based on education at all levels of school establishments. Moreover, as was outlined at the beginning of this paper, rather than focusing on technical aspects of nuclear safety, the education of 'masses' in this field must concern transparency, public participation and democracy issues applied in the context of nuclear safety. From amongst the research carried out in this field, the results of the EURATOM financed projects 'COWAM-2' and 'COWAM in practice' in Romania serve best to fulfil the aim of this paper. With regards to the context of the research whose selected results were already presented in this paper, it has to be noted that the 'COWAM-2' and 'COWAM in practice' (CIP) projects were realised in the 2004-2006, respectively 2007-2009 period (i.e. in parallel to the experience in the Czech republic mentioned above in this paper), and more importantly their follow up activities were merged together with the above mentioned ARGONA project (2007-2009) into the abovementioned project IPPA (2011-2013). The acronym COWAM stands for 'Community Waste Management' and outlines that this project in particular was more focused on education of 'lay citizens' than the two other projects mentioned in this paper. Within the main recommendation in a field of education, the COWAM 2 project concluded that the education about decision-making procedures (DMP) should be compulsory, and start already within the 5th - 8th grade of elementary schools. In parallel to education about DMP, "interdisciplinary courses should be introduced ... in order

to discuss energy alternatives, pollution, safety aspects, security of energy supply, radiations and radioactivity including nuclear power plants and radioactive waste repository aspects" (Constantin and Diaconu, 2006, p.58).

The issues concerning DMP in the nuclear sector are one of the most difficult challenges of the present society, and thus there is no doubt that they could be gradually introduced throughout all the levels of education from the second half of elementary schools (as suggested by the COWAM 2 project) until the PhD studies. These issues can be easily tailored into several different fields: Energy policy, Nuclear safety, Economics (i.e. internalisation of externalities), Law (right of veto of local communities and legal ways for national level governments to overcome it, etc.), Public administration, Sociology, Psychology etc. The new project proposal entitled 'Building a platform for enhanced societal research related to nuclear energy in Central and Eastern Europe', as of middle April 2013 in a negotiation phase, may bring progress with regards to approaching Universities nation-wide in the relevant 'new EU member states' with impetuses for incorporation of the 'current challenges in nuclear energy' into high school education Curricula.

Apart from enhanced societal research and education, practical skills of students also need to be built. With regards to DMP, although "an 'a-priori' pessimism was present" for the most experimental method of education tested within the COWAM 2 project, "the enthusiastic participation and the results proved that the method of simulating work of a local committee is a very powerful method to learn technical, scientific, social and organizational aspects" of nuclear waste issues (Ibid., see p. 4-5, 40-41, 43, 56-59). This result of research from the COWAM 2 may be related to a paradigm of its parallel research project ARGONA which (after a series of successful application of the RISCOM model in Sweden) puts emphasis on factors such as authenticity, trust etc. rather than on traditional means of communication of risk related issues.

In the USA, academicians have recently responded to challenges in a nuclear disposal with a suggestion that a "creation of an ecosystem for innovation and entrepreneurship that culminates in commercialization" should be introduced in the University environment (the Bridge, 2012, p.73). In order to ensure society's success in disposing radioactive wastes, "educational models for innovation and entrepreneurship must embrace not just business students but students in all areas of study", and "the best way to reach students is to embed the teaching of entrepreneurship into existing curricula" (Ibid.). In this context, the academic experts concluded that "Success should be celebrated and publicized enthusiastically" (Ibid.), which without doubts can be done successfully only by authentic stakeholders which have their own recent success stories to share.

The present and future generations of citizens must be prepared for important decisions concerning siting of SNF repositories and several other crucial 'decisions in principle' that will sooner or later have to be made in all the countries with commercial use of nuclear power. In order to ensure preparation in the field, an authentic education based on 'success stories' seems to be inevitable. The recent changes towards more transparency, public participation and 'more democracy' in political decision making in the nuclear sector, which were outlined in the first part of this paper, can be considered important 'success stories' worth of inclusion into curricula of general education as well as University education in many different fields. Representatives of the NGOs, which were amongst the key actors behind the so called 'participatory turn', have a potential to be the most authentic presenters of these issues for a wide spectrum of students. Apart from 'pro-transparency and pro-democracy NGOs', the 'participatory turn' was to a significant extent supported by activities of environmental NGOs, especially those that contributed directly or 'behind the scene' to social movements which resulted in preparations and ratifications of important international legislation such as the

above mentioned Aarhus and Espoo Conventions. The authenticity of these NGOs in the current decade is underlined by the fact that they recently initiated several procedures concerning compliance of recent political decisions made at a national level with one of the above mentioned international conventions.

## Concluding remarks

Even though the society's desire for democratic decisions concerning safe nuclear waste disposal were clearly visible in the EU (and USA) in the recent decade, the ways for achieving 'safety, security, transparency and democracy standards' were not always straightforward. The selected results of recent EURATOM financed research projects, briefly presented in this paper, outline the near future challenges in this field. In the process of siting of deep geological repository for SNF and HLW in the Czech Republic, which was briefly introduced in this paper, new challenges were observed in late 2012 and early 2013 - they were not reported in this paper, but they will be presented at the IPPA project End user conference in Prague in the autumn 2013, and subsequently in the project's final deliverables.

Despite years of significant efforts, management of SNF and other radioactive wastes still remains one of the most difficult current challenges in several fields including nuclear safety, technical development and democratic decision making. Apart from 'creation of an ecosystem for innovation and entrepreneurship' in order to help overcome the present obstacles in engineering practice, more capacities in scientific research will have to be dedicated to social research in the fields of transparency, public participation, consideration of environmental and social aspects together with technical and safety aspects (i.e. so called 'sustainable development'), public administration, etc.

Roles played by environmental NGOs in the decision-making procedures and knowledge management of radioactive waste issues have changed rapidly in the recent decades. NGOs become partners to research institutions, Governmental bodies and in some cases also to private sector entities in the international research projects. The needfulness of involvement of environmental NGOs in University education can also be related to a growing trend in requests for more authenticity in both decision-making procedures (i.e. an application of the RISCOM model in the Czech Republic as outlined in this paper) and in education of 'democracy issues' (as outlined in the results of the COWAM 2 project). The core challenges in attempts to involve international and environmental NGOs in University education may be related to the fact that these NGOs still need to dedicate significant amount of their capacities into procedures concerning compliance of national level decisions with international legislation.

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