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Identifying remaining socio-technical challenges at the national level: Spain

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1 INTRODUCTION

On 29 December 2009, the Spanish government launched a site selection process to host a centralised interim storage facility for spent fuel and high-level radioactive waste. It was an unprecedented call for voluntarism among Spanish municipalities to site a controversial facility. Two nuclear municipalities, amongst a total of thirteen municipalities from five different regions, presented their candidatures to host the facility in their territories. For two years the government did not make a decision. All regional governments with candidate municipalities willing to host the centralised interim storage facility publicly opposed to the siting of the facility. Only in November 30, 2011, the new government elected on 20 November 2011, officially selected a non-nuclear municipality, Villar de Cañas, for hosting this facility. This paper focuses on describing and analysing the process of siting the centralised interim storage facility in Spain. This process, as it will be shown, has been one of the most important challenges in the radioactive waste management strategy in Spain over the last years. Research on and strategies for the disposal of high level waste and spent fuel seems to have been hindered by the urgent priority to site the storage facility first. As a result, planning radioactive waste disposal seems to be currently lacking.

2 CURRENT STATES OF AFFAIRS

Spain has six nuclear power plants in operation (eight power reactors in six sites) and an installed capacity of approximately 7700 MW, providing around 18% of the country's electricity generation. Spent fuel is currently stored at the nuclear power plants where it is generated. Two nuclear power plants are closed down, one of them, José Cabrera in Zorita, is being decommissioned whilst the other one, Vandellós I, was shut down in 1990. License renewal for the nuclear power plant of Santa María de Garoña came up for review in 2009 and the CSN recommended a 10-year life extension. The Socialist government, with a policy of closing down nuclear power plants as early as possible, granted only a 4-year licence extension, to 2013. In January, the new conservative government referred this matter back to CSN with a view to revoking the 2009 decision and allow operation to 2019, which was approved by CSN (World Nuclear, 2012).

The only spent fuel reprocessed to date has been that generated in Vandellós I nuclear power plant, sent to France, and certain amounts sent to Great Britain by José Cabrera and Santa María de Garoña nuclear power plants, prior to 1983 (OECD/NEA, 2005). Low and intermediate level waste is managed at an above ground storage facility in the Southern part of Spain called El Cabril (Córdoba) since 1992.

According to the 6th General Radioactive Waste Plan (Ministerio de Industria, Turismo y Comercio, 2006) the total amount of radioactive waste to be managed during the lifetime of the present NPPs will be:

- Conditioned low, very low and intermediate level waste, including very low level waste: 176,346 m³

- High level waste (including spent nuclear fuel and high level waste and intermediate long-lived level waste which cannot be managed at El Cabril): 12,816 m³ of which 10,000 m³ are spent fuel and 81 m³ is vitrified waste from Vandellós.

2.1 Main actors

The most important organisations involved in nuclear activities in Spain are the following (OECD, 2010):

- The Ministry of Industry, Tourism and Trade responsible for issuing authorisations and permits for nuclear facilities, certain radioactive facilities and associated activities, subject to a mandatory and binding report from the Nuclear Safety Council;
- Autonomous Communities have functions and services committed to the Ministry of Industry and related to radioactive facilities;
- The Nuclear Safety Council (Consejo de Seguridad Nuclear, hereinafter CSN) is the only competent body on nuclear safety and radiological protection. It is responsible for the regulation and supervision of nuclear facilities. CSN is governed by public law and is independent of the state administration and reports directly to Parliament;
- The Ministry of Agriculture, Food and the Environment participates in the licensing process, in collaboration with the CSN, by providing an environmental impact statement (EIS), as do regional and local governments in the areas under their competence. The Ministry of the Environment issues the EIS before any permit or authorisation is granted by the Ministry of Industry, Tourism and Trade;
- UNESA is the Spanish Electricity Industry Association which is formed by the five main players of the energy sector that provide for the vast majority of electricity production in Spain. UNESA, through its Nuclear Energy Committee, coordinates aspects related to nuclear safety and radiological protection, regulation, nuclear power plant operation and R&D (OECD/NEA, 2007);
- The Nuclear Industry Forum (*Foro Nuclear*) brings together all Spanish companies involved with the peaceful use of nuclear energy and has the objective to raise public awareness of nuclear energy;
- The Empresa Nacional de Residuos Radiactivos SA (hereinafter ENRESA) as the mercantile public capital company that carries out activities related to the back end of the nuclear cycle, authorised to undertake the disposal, transport and handling of radioactive waste and activities related to both the dismantling and decommissioning of nuclear facilities. ENRESA, the state-owned company responsible for managing radioactive waste and decommissioning nuclear plants, was created in 1984 through the Royal Decree 1522, of July 1984. As soon as spent fuel is discharged from the reactor, it is considered as waste. ENRESA prepares and submits the General Radioactive Waste Plan to the Ministry of Industry every four years (or when

required by the Ministry), who forwards it to Parliament for its approval. The first General Radioactive Waste Plan was approved in 1987 whilst the latest in 2006, is still in force. ENRESA establishes R&D plans every four years, taking into account the activities of the International Atomic Energy Agency (IAEA), Nuclear Energy Agency (NEA) and European Euratom Framework Programmes. The current R&D Plan in force goes from 2009 to 2013.

- The Spanish Association of Municipalities in Nuclear Areas (AMAC)¹ bring together municipalities that host or whose boundaries lie within a distance of ten kilometres from a nuclear facility. AMAC was constituted in February 1990 and has currently 72 members. The main aim of the association was to be a representative voice of the local level in nuclear activities in Spain, focusing on safety, information and local development. One of its main goals has been to improve the safety in nuclear areas and promote emergency plans. AMAC has agreements with different institutions like Enresa and CSN to improve safety aspects, information and communication in nuclear areas, develop training programmes and raise public awareness on nuclear issues. AMAC is also one of the representative organisations in the Advisory Committee for Information and Public Participation of the CSN².

Apart from the institutional actors, there are also environmental NGOs at national level, like Greenpeace, Amigos de la Tierra and Ecologistas en Acción, who represent the anti-nuclear movement. In fact, the origin of the traditional ecological movement in Spain is the anti-nuclear movement (Costa & Baños, 2010). Their discourse is based on the need to phase out nuclear power before finding a solution for radioactive waste. According to these groups, “there is no safe solution to manage radioactive waste produced by nuclear energy, despite the millions of dollars and decades of research invested” (Greenpeace, 2008). According to these environmental groups, there is no need nor urgency to build a storage facility for radioactive waste and it is better to keep the waste in the pool of nuclear power plant or in a storage facility nearby.

2.2 Legal aspects

There is no specific legislation in Spain concerning radioactive waste management, but four major sets of regulations are applicable: 1. Regulations concerning radioactive waste management included in the legislation that rules nuclear safety as well as the process of authorisation of nuclear and radioactive installations; 2. Regulations concerning Environmental Impact Assessment; 3. Regulations concerning Land Uses and Municipal Functions and 4. Regulations concerning the activities of Enresa and financing of radioactive waste management (Lidskog & Andersson, 2002).

¹ Another association is the Coordinator of Nuclear Municipalities in Spain (COMUN) representing only the municipalities hosting nuclear facilities.

² This Advisory Committee is an instrument to provide recommendations on information and participation of the regulatory body as well as to improve transparency.

The main legislation that regulates the development and control of nuclear energy in Spain is listed below (OECD, 2010):

- Nuclear Energy Act 25/1964, which defines basic concepts, such as the allocation of responsibilities to authorities and organisations. Article 28 sets out that nuclear and radioactive facilities shall be subject to a systems of authorisations issued by the Ministry of Industry, following a mandatory report by the CSN, after having heard the Autonomous Communities with competences in relation to land planning and the environment.
- Electricity Industry Act 54/1997, modified by Act 17/2007, regulates the electricity sector. The sixth additional provision of the Act, modified by Act 11/2009, sets up a fund for the financing of the activities considered in the general radioactive waste plan.
- Royal Decree Law 5/2005 on urgent reforms to promote productivity and improve public contracting modified the additional provision of Act 54/1997 in order to partially revise the procedure for management and maintenance of the fund regulated therein, fundamentally with a view to apply the “polluter pays” principle. It also establishes that the state shall assume the ownership of radioactive waste, along with the required surveillance activities following the decommissioning of a nuclear or radioactive facility.
- Royal Decree 1836/1999 regulates the system of administrative authorisations for both radioactive and nuclear facilities and defines the types and categories of facilities.
- Act 11/2009 regulates limited investment companies quoted on the real estate market. According to these modifications, the management of radioactive waste, including spent fuel and the dismantling and decommissioning of nuclear facilities, constitutes an essential public service reserved solely to the state. ENRESA is assigned to undertake the management of this public service, under the auspices of the Ministry of Industry and carries out the tasks assigned to it by the Government. ENRESA reports to the Ministry of Industry via the Secretariat of State for Energy, which is responsible for strategic management and monitoring and control of its economic and technical activities.

2.3 Economical aspects

The management of radioactive waste as well as the decommissioning of nuclear power plants is financed through a fee on the electricity bills. Producers pay also tariffs for the waste to be treated and disposed of. The money collected goes into a fund, which is managed by Enresa. The total cost of the Spanish nuclear waste management programme

up to 2070 is estimated to be 9,734 million euros, according to the 6th General Waste Management Plan (2006).

2.4 Current research, development and demonstration program on radioactive waste management

Enresa carries out research and development through five-year plans, in accordance with the main activities set out in the General Radioactive Waste Plan. Four technical areas of work have been established in the current plan (2009- 2013):

- waste technology: relates to the physics and chemistry of the different components of radioactive waste, along with issues associated with the reduction of their toxicity.
- centralised temporary storage: all activities related to spent fuel technology and the technology of the centralised temporary storage facility;
- long-term safety assessment of storage facilities: associated with long-term behaviour of engineering barriers, geological barriers, radionuclides in the biosphere and safety assessment methodologies; and
- support for facilities: optimising performance, reducing costs and improving safety in El Cabril facility.

The aforementioned areas are coordinated via an additional fifth area dealing with coordination, integration and management of the products and technological assets generated.

The economic resources set aside for R&D amount to six million euros per year.

To undertake R&D projects, Enresa usually collaborates with (Enresa, 2009):

- Spanish universities (UPC, UPM; UV, UAM, UO, URV, US, etc.);
- Public organisations: the Centre for Energy- Related, Environmental and Technological Research, a public research agency of the Ministry of Science (CIEMAT) and the Spanish National Research Council belonging to the Spanish Ministry of Economy and Competitiveness (CSIC);
- Foundations (AITEMIN, INASNET, etc.);
- Companies (ENUSA INITEC; AMPHOS, INGEMISA; INYPSA, GEOCISA, etc.);
- other agencies from different countries (NAGRA; SKB; ANDRA; etc.).

Enresa also participates in European projects, where they collaborate with a wide range of national and European organisations. In the 7th Framework Programme, Enresa participates or has participated in the following European projects: MoDERN, Petrus II and Carbowaste. In addition, a research centre “Technology Centre Mestral” was created to assess the experience in decommissioning the nuclear power plants of Vandellós. Together with a close by university, this centre is undertaking R&D on decommissioning. In addition, close to the El Cabril facility, another research centre will be developed associated with R&D regarding low and intermediate level waste. The research programmes of the universities of Córdoba,

Sevilla and Extremadura will be integrated in this centre. Finally, the storage facility for spent fuel and high level waste also foresees the construction of a research centre to specifically undertake R&D on spent fuel. Finally, Enresa takes part in different technology platforms at national (CEIDEN) and European levels (SNE-TP and IGD-TP).

3 MISINFORMATION IN THE SPANISH PUBLIC OPINION ON NUCLEAR

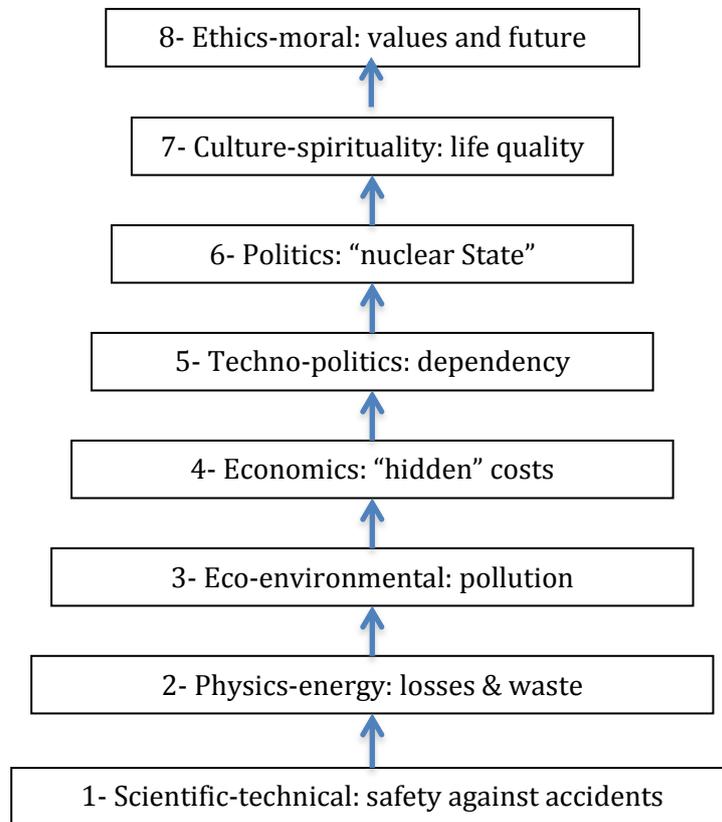
When considering public opinion on radioactive waste in Spain, it is important to take into account the economic, cultural, political, institutional and societal context. One of the striking characteristics of the Spanish society is its uninformed public opinion on nuclear matters, regardless the actual dependence on nuclear power. Spain is in fact one of the EU countries with operational nuclear power plants, where the level of support for nuclear energy is below the EU 27 average (EC, 2008). Results from the Euro barometer on nuclear safety (EC, 2010) reflect that 83% of Spanish citizens feel uninformed about nuclear safety related topics. Furthermore, Spanish respondents tend to show a different pattern from the rest of European countries with nuclear power plants. For instance, whilst the majority of citizens in Member States with nuclear power plants agree with the statement that nuclear energy helps to decrease dependence on imported fuels, Spain shows a high level of non-response rate, similar to the group of countries that do not have nuclear power plants. Similarly, the non-response rate for the statement that “nuclear energy helps to limit climate change is higher than the average in the EU and then the countries that have operating nuclear power plants. The proportion of negative opinions regarding nuclear power in Spain has risen significantly from 2006 to 2009, from 55% to 61%. Furthermore, a majority of citizens (73%) consider that nuclear power plants represent a risk and trust in the nuclear safety authorities is rather low, compared to the average in countries with operating nuclear power plants (EC, 2010).

When examining public opinion regarding radioactive waste, more than eight in ten respondents do not feel informed. Thus, the lowest (self-perceived) information levels are found in Spain, apart from Austria and the two newest member states, Bulgaria and Romania (EC, 2008). In addition, Spain appears to be one of the countries with the lowest level of knowledge regarding radioactive waste, contrary to the trend that countries with nuclear power plants in operation are generally more knowledgeable about radioactive waste management than those without nuclear power plants.

Costa and Baños (2010) argue that one could draw a pyramid with eight different rungs of arguments against nuclear energy, as shown below. The main argument used as an element for discussion and conflicts is the technical-scientific, based on the insufficient capacity and inability to ensure safety. The dread and fear associated to the likelihood of accidents or incidents is the main factor against nuclear projects or nuclear facilities. This is linked to the lack of confidence in science and technology. As one moves up the ladder, there are other arguments used against nuclear projects, such as the energy losses from fission and waste, pollution, hidden costs, the technology dependency from other countries, the limited and

privileged production system based on nuclear, the break with cultural and spiritual sphere and finally, the ethical stance.

Figure 1. Pyramid of antinuclear arguments



Source: Costa and Ba (2010)

According to Costa and Baños, the problem of radioactive waste is transversal and embraces all the eight rungs and involve safety problems in the transport, radioactive pollution, permanent control measures, decrease in life quality and the environment, and burdens for future generations. They argue that some scientists (naming two physicians) regard radioactive waste as a problem which only involves the three first levels, and do not take into account the problem as a whole, with all its dimensions.

4 INFORMATION COMMISSIONS

One of the formal mechanisms for public engagement in nuclear affairs in Spain are the so-called Information Commissions, created under Article 13 of the Royal Decree 1836/1999 of 3rd December of the Regulation on Nuclear and Radioactive Facilities. According to the Royal Decree these commissions operate during the construction, operation and decommissioning

of the nuclear power plants and their members would be nominated by the Director General of Energy and Mines. The members of the commission would be representatives of the Ministry of Industry, CSN, delegation of the Government, owner of the facility, regional government, Direction General for Civil Protection and Emergencies and the municipality hosting the facility. The president of the information Commission is a representative of the Ministry of Industry and the vice-president is the mayor of the municipality hosting the facility. Its main competences are to inform the members of the development of nuclear regulated activities and other issues which may be of interest.

AMAC considered that these information commissions were insufficient in terms of providing information to the nuclear areas. Surveys in nuclear areas showed the lack of knowledge of residents regarding the operation of the nuclear power plant in their area and its potential risks. As a result, AMAC promoted the creation of Local Information Commissions as a means to involve a wider number and range of stakeholders and improve communication between the nuclear facility and the municipalities. During the year 2005, Local Information Commissions were set up on a permanent basis in the seven nuclear areas in Spain. The participants represent all municipalities in the area around the nuclear facility and also include trade unions, businesses, direction for civil protection, environmental groups and social and cultural groups. The competences are wider, involving information on the operation of the nuclear power plant, information by means of seminars, conferences, visits, etc., and establish mechanisms for disseminating the information of the Local Information Commissions to the wider public. These commissions meet twice a year in ordinary meetings. The structure includes a permanent commission representing the mayor, as president of the commission, two mayors from the nuclear area, a representative from CSN, a representative from the nuclear facility and a social representative, that decide on calling for extra meetings if necessary.

5 DEEP GEOLOGICAL DISPOSAL: A CHALLENGE FOR SPAIN?

From 1986 to 1996, systematic geological studies were conducted all over the country in granite, salt and clays formations to assess the feasibility of deep geological disposal in Spain. It was concluded that there were a number of geological formations, which could meet the technical conditions to host a deep geological. In parallel, ENRESA developed R&D programmes to assess different aspects of deep geological disposal, together with programmes to investigate separation and transmutation. These research projects are often undertaken in collaboration with other countries and international institutions.

Some investigations starting in the second half of the 1980s had to be cancelled. In 1986 Enresa, with European funding, launched an ambitious programme to simulate the conditions of a deep geological disposal in granite via an underground research laboratory. The site chosen to undertake investigations was in Salamanca. Despite promises that no radioactive material would be disposed of in that site, there was such a level of opposition, that any research project leading to site investigations had to be cancelled. The government postponed any decision regarding underground disposal until 2010.

The General Plan on Radioactive Waste suggests that the operation of a deep repository in Spain would probably start in 2050. Therefore, the period between 2025 and 2040 would be focused on decision-making process and site characterisations, whereas from 2040 to 2050 construction would take place. A programme of activities between 2006 and 2025 to meet the objective of having a repository by 2050 is lacking (Fundación para Estudios sobre la Energía, 2007). According to an interview with a representative from Enresa: “the level of R&D and the activities on deep geological disposal was probably too advanced for the level of maturity of the society and political sphere during the 80s and 90s. On the contrary, at present, the level of activity on deep geological disposal is probably too low”. At present, there is no definite position on long-term management of radioactive waste. To date, retrievability is neither an official option nor a regulatory requirement for the final disposal of high level waste and spent fuel. However, when developing a national disposal concept, Enresa is considering options to facilitate easy retrieval of wastes for a period in order of 100 years (Haverkate, 2005).

The high level of priority given to the interim storage facility has delayed the interest and the research efforts in deep geological disposal. Furthermore, the construction of the centralised storage facility allows decisions on final management to be postponed. As raised by one of the interviewees from the Ministry of Industry: “in Spain, the approach so far has been to solve urgent problems. Firstly, it was necessary to increase the capacity of the pools of all nuclear power plants. Then, as it was not possible to increase the capacity of the pool of Trillo nuclear power plant, we built an interim storage facility at the reactor site. Now the pool of Ascó is going to be saturated in 2012-2013 and we need to build a storage facility as well. Then, the vitrified waste from Vandellós needs to return to Spain [...] In the end, we meet the needs as they come along”. As stated by Lidskog & Andersson (2002), “the main policy on high-level waste has been to work in the disposal solutions envisaged by the scientific community while providing solution to the short-term requirements”.

The main challenge in Spain over the last years has been to site a centralised interim storage facility to manage the spent fuel and high level radioactive waste for the next 60 – 100 years. This is a “strategic decision which decreases future uncertainties” (interview from ENRESA, 2011).

6 THE CENTRALISED INTERIM STORAGE FACILITY: THE POLITICAL AND INSTITUTIONAL PROCESS

The project of the centralised interim storage facility is complemented by both a research centre and an industrial park. The research centre or technology park has a main research laboratory for spent fuel and high level waste, as well as other laboratories for environmental, chemical, materials behaviour and robotics research purposes. The industrial or business park is foreseen to offer synergetic support for the facility and encourage regional development. Thus, this business park will have general offices providing services to new companies and a number of industrial buildings.

According to Enresa (2012), the advantages of having a centralised storage facility would be the unification of spent fuel management, minimising the total number of nuclear facilities, efficiency for reaching safety and security levels, cost reduction, independent between short term and long term management and flexibility in front of different development options.

In 2004, the Industry Commission of the Spanish Parliament unanimously recommended to the Government the development of a centralised storage facility for spent fuel and high level radioactive waste. This centralised interim storage facility was included as a priority in the Sixth General Radioactive Waste General Plan, drawn up by the radioactive waste management public company (ENRESA) and approved by the Cabinet on 23rd June 2006³. In fact, the Plan states that the main challenges for waste management in the years to come are the construction of a centralised interim storage facility for spent fuel (SF) and high level radioactive waste (HLW) and the decommissioning of nuclear power plants. The deadline for the storage facility to become operational was 2010. In 2006, the Parliament urged the Government to set an Inter-ministerial Commission to lead the site selection process.

In April 2006, the Ministry of Industry, through Royal Decree 775/2006, created an Inter-ministerial Commission to carry out the following functions:

- establishment of the reference framework for the technical, environmental and socio-economic conditions to be fulfilled by potential candidate sites for a centralised temporary storage facility;
- establishment and promotion of public information and participation processes;
- development of the procedures by which interested municipalities may opt to be candidates for the storage facility;
- drawing up, for submittal to the Government, of a proposal regarding candidate sites, selected from among the interested municipalities, on the basis of the technical evaluations regarding their suitability and taking into account, where appropriate, the proposals made by the affected Autonomous Communities.

The Inter-ministerial Commission carried out its functions with the support of the Technical Advisory Committee, consisting of six experts, mainly university lecturers or professors. The Commission published a number of reports related to different aspects of the interim storage facility, like risks of transport, impacts, international experiences, basic criteria for the sites (Inter-ministerial Commission, 2006a, 2006b, 2006c).

In 2006, an information campaign was carried out targeting all Spanish municipalities potentially interested in hosting the facility. This campaign, from the Ministry of Industry, included publicity in all the newspaper, publication on the specific website (www.emplazamientoatc.es), a phone line available to answer specific questions, etc..

³ The 2nd General Waste Plan already included the need to build a centralised interim storage facility in Spain.

On 29 December 2009, the Spanish government launched a public call for the site selection of candidate municipalities to host a centralised interim storage facility for SF and HLW and an associated technology centre. In accordance with this call, the interested municipalities had one month, as from the day following the publication, to submit their candidatures. Following this, the Inter-ministerial Commission studied the candidatures and passed on the selected candidatures to the Government, who is responsible for designating the final site selected.

The amount of waste that would need to be stored in a centralised storage facility is 12800m³ and the cost of the facility is estimated at 700 million euro. The centralised interim storage would accommodate returned high level waste, in the form of vitrified wastes and fissionable materials, arising from reprocessing abroad and other wastes which cannot be disposed of in El Cabril, as well as spent fuel that cannot be accommodated in the nuclear power plants for lack of capacity in reactor pools or because of their future dismantling (OECD/NEA, 2005). Waste from Vandellós I sent to France for reprocessing should have returned to Spain from 31st December 2010 on the basis of a bilateral contract. However, the penalties from this delay since 1st January 2011 Spain involves the payment of 64900 euros daily to France to keep the waste from Vandellós I in the nearby country. This bilateral agreement foresees the adjustment of the accounts with COGEMA once there is an storage facility in Spain and all the vitrified waste from Vandellós I has returned (ENRESA, 2011).

7 THE COWAM INITIATIVE: A RESEARCH PROJECT FROM THE LOCAL PERSPECTIVE

The European projects Communities Waste Management (COWAM, 2000-2003) and COWAM2 (2003 - 2006) funded by Euratom Framework Programme enabled politicians and councillors from nuclear municipalities, as well as universities and organisations involved in radioactive waste management to participate in scientific discussions regarding the governance of radioactive waste in Europe. These projects served as the basis and a framework to launch the COWAM Spain project (2004-2006). The aim of COWAM Spain was to develop a methodology for decision-making regarding conflictive infrastructures, in par. This project was an initiative from the Spanish Association of Municipalities in Nuclear Areas (AMAC) and the regulatory body in Spain CSN as well as ENRESA. Both organisations participated in defining the work programme, in the actual development of the project and co-financing it.

The School of Integral Safety and Prevention at the University Autònoma of Barcelona coordinated the project COWAM Spain. The main outcome of the project was the book *“Democratic Management of Radioactive Waste. COWAM Spain programme”* published by AMAC (2005). The main conclusions specified a roadmap for the implementation of the centralised interim storage facility in Spain based on the principles of information, participation and transparency. An extract of the main conclusions and recommendations of the COWAM Spain roadmap are summarised in Table 1 below. The book was presented in the Spanish Congress of Deputies in February 2006.

Table 1. Main conclusions and recommendations from the COWAM Spain programme

1. The State has the overall responsibility to adopt the necessary measures to solve the problem of the management and disposal of radioactive waste and to define a site for the correct storage and disposal.
2. Decision-making processes around this topic should be based on political and institutional consensus at the parliamentary and territorial levels for long-term governance.
3. Municipalities have a role in the decision-making process.
4. Regional governments should also participate in the decision-making process, particularly in the siting.
5. The legal and executive powers of the State need to clearly state their willingness to solve the problem of radioactive waste, based on the principles of political consensus, safety, public participation, information and transparency.
6. In principle all territories are potential candidate sites for storing radioactive waste.
7. It is important to communicate the ethical stance regarding radioactive waste based on two general principles: the current generation should not impose burdens on future generations and each State needs to take care of its own waste.
8. The links between policies on nuclear energy and radioactive waste management are evident and this connection needs to be considered to increase social and political credibility.
9. Local communities should participate in the process of elaboration, decision and resolution of siting a storage facility, taking into account that it is a voluntary process which does not involve accepting the facility.
10. Design of the facility and safety issues are important as well as environmental and socio-economic impacts.
11. The main vehicle to ensure transparency, democratic legitimacy and public participation in the decision-making process around siting a storage facility for radioactive waste would be the creation of a National Commission with social, political and territorial representatives.
12. The Government should designate this national Commission, based on a proposal from the Congress of Deputies.
13. The functions of this National Commission would be to define the necessary technical, environmental and socio-economic criteria for potential candidates to host the storage facility. The Commission should also develop a public procedure to invite local communities to candidate. Finally, it would suggest methodological recommendations and a list of suitable sites to the Government.
14. The Government, based on the proposals and recommendations of the National Commission and in coordination with regional governments and municipal candidates, would promote the legal and political requirements to select the final site. Local information Commissions may be useful to institutionalise and legitimise public participation.
15. The Government should select a candidate site and initiate the licensing process.
16. The National Commission should continue after the site is selected to facilitate territorial and social agreements and ensure transparency, information and participation.

On January 2007, the European COWAM2 project was followed by a three-year project named Cowam In Practice (CIP). The CIP project involved setting up National Stakeholder Groups in five European countries, being Spain one of them. The CIP project allowed stakeholders to meet again at the national level and discuss governance in radioactive waste management in their own countries (Kopetz and Martell, 2009). In Spain, different seminars

were organised in 2007 in the framework of the CIP project on issues regarding nuclear energy and climate change, radioactive waste management and radiation protection, local development associated to scientific infrastructures and governance of radioactive waste management. The participants were citizens from nuclear municipalities who were considered to have a role or an interest in the issues of radioactive waste. Each of the seminars was evaluated to assess the level of new knowledge acquired by the participants, the extent to which the information helped to solve questions, the opinion of participants regarding a centralised interim storage facility, etc.. The seminars were complemented with trips to El Cabril and the Habog facility (the centralised storage facility) in the Netherlands.

8 THE CANDIDATE MUNICIPALITIES

AMAC announced in 2006 that the members of the Association (68 municipalities located 10 km around a nuclear reactor and included in zone 1 of the nuclear emergency plans) were committed to helping the government in the siting process of the centralised interim storage facility. Thus, the association organised a number of information meetings, seminars and round tables in the seven nuclear areas in Spain to inform about the storage facility. The meetings were open to the mayors of nuclear areas, councillors, local government, associations, professionals and enterprises.

After this information campaign in all nuclear areas, AMAC developed a communication strategy with two potential candidate municipalities in nuclear areas, Ascó and Yebra. Despite not having any information on the date when the Ministry of Industry would open a public call asking for candidate municipalities, the Association organised a number of information meetings with experts, mayors from European municipalities with radioactive waste storage facilities, representatives of ENRESA, among others, to explain and discuss the facility, its impacts and its associated fears, its disadvantages and benefits compared to the current situation. All these meetings (around fifteen in total in both candidate municipalities and the surrounding municipalities) were also evaluated. As a result of the communication campaign at the local level, in one of the candidate municipalities, Ascó, nine out of ten inhabitants said they had received information about the storage facility and eight out of ten said they had knowledge of the facility. Furthermore, eight out of ten citizens of Ascó said that they would agree or would not oppose to the storage facility in their municipality (CERES, 2010). From the results above, it could be confirmed that greater amounts of information lead to greater knowledge on the specific issue and to major public acceptance. This is in accordance to the literature on these issues. In addition, acceptance is greater among those who live closest to the nuclear site. As such, the acceptance in the municipality of Ascó is far greater than that of the surrounding municipalities. In the nearby area, some municipalities were supporting the candidature whilst others were opposing to it.

The Spanish Government called for the first time ever for voluntarism among Spanish municipalities to site a controversial facility on 29 December 2009. After one month, on 29 January 2010, thirteen candidate municipalities, two of them with nuclear facilities, volunteered to host this facility in their territories. All the municipalities were small

municipalities, being Ascó one of the biggest ones with 1600 inhabitants. However, five of them were directly excluded of the process for not meeting the formal criteria from the call. The Inter-ministerial Commission said that a final decision on the site would be undertaken by June 2010, after having studied the different candidatures.

In most municipalities, citizens and platforms supporting the decision by the local council and against the centralised interim storage facility were created. However, much of the controversy appeared to be grounded on the Not In My Back Yard (NIMBY) syndrome. In some cases, even regional politicians stated that they would agree on siting the facility outside their own region. One of the main problems was political. Political parties and institutions had to provide public declarations and position themselves, as it was often required by the social movements in favour and against the facility. This led to continuous contradictions regarding the decisions adopted by different administrations from the same political parties. This was an exercise of political opportunism, rather than conviction (Costa and Baños, 2010).

Most regional governments, particularly the one in Catalonia and Castilla-La Mancha, publicly opposed to the siting of the facility despite the willingness of the municipalities in their regions to host the centralised interim storage facility. Others, like the one in Castilla León, changed their position. Whilst in the beginning they were favourable, but only if the government could reconsider extending the life span of the nuclear power plant of Garoña; later on, they decided to debate separately the two issues and declared being contrary to the storage facility. The political opposition of regional governments was presented by the previous national government as the main drawback to take a decision.

9 SOCIO-POLITICAL CONSENSUS

On 6 March 2010 the Ministry of Industry published an official announcement in the State Official Gazette notifying the possibility to send declarations or statements on the application of criteria to the candidate municipalities during a period of twenty days. In addition, 44 institutions and organisations were individually notified of the formal procedure. As a result the Ministry received a total of 14.420 declarations, some of them general and others specific to the different municipalities.

Most politicians, environmental groups and civil society organisations argued their disagreement with the siting process, stating that consensus could not be demonstrated. According to discrepant voices, consensus among political, social and economic actors could not be reached. Nevertheless, Ascó local council counted on the support from universities, trade unions, some local mayors, chambers of commerce and industry, who sent letters and made public announcements to show their level of support to the candidature. Another municipality, like Villar de Cañas, created citizens' platforms in favour of the facility.

One of the initiatives which was promoted by AMAC and Ascó local council was the creation of a consortium in the nearby area to jointly manage the industrial park which would be promoted with the storage facility. This initiative was seen as a means to engage the

different actors (political, social and economic actors) in a debate on the future of their territory. Different participatory meetings were organised with three different target groups in the nearby area - mayors and local councillors; civil society organisations; economic actors (industrial, small and medium size enterprises, commerce, etc.) - to reflect on the future of the area and potential opportunities to undertake joint projects. Whilst some groups had common goals and could foresee synergies, others, mainly agricultural groups, showed more individualistic patterns and worried about how the siting of the centralised interim storage facility could have negative effects on their products. Nevertheless, common projects in the areas of tourism, agricultural and food, and training and capacity building were identified as potential areas for local development. The working groups to discuss the consortium were a building block to assure a baseline agreed level of stakeholder involvement for socio-economic development in the area.

The nuclear municipalities of Ascó and Yebra presented a report to the Ministry developing arguments showing all the communication actions undertaken, evaluation of information meetings, the sociological studies, the different scientific studies on comparing perceived impacts of the storage facility versus real impacts, the letters of support by different stakeholders, etc.. Ascó argued that it could demonstrate a high degree of social consensus, despite the criticisms of some environmental and political voices.

10 AN URGENT DECISION TAKEN BY THE NEW GOVERNMENT

On 29 April 2010, the Inter-ministerial Commission released a report classifying the different candidate municipalities based on criteria such as: extension of the area proposed, timing for the urban licences, hydrogeology, meteorology, seismology, transport infrastructures, existence of industrial or technology infrastructures, electricity and water availability, distance to main populated areas, socioeconomic and environmental characteristics, etc.. The familiarity with the nuclear industry was not considered as a criterion. Quantitative weights were assigned to the different criteria from 2 to 10. Whilst all candidate municipalities could be potentially accepted, a non-nuclear municipality, Zarra, was in the first place with 304 points whilst Ascó was considered second with 300 and Yebra, the other nuclear municipality, was assigned 290 points. The fourth municipality was Villar de Cañas, with 272 points.

Despite the fact that the Ministry announced that a decision had to be made before summer 2010 because of the urgency to host the returned waste from Vandellós I by the end of 2010, no decision was made by the Government until 30 December 2011. The municipal and regional elections of 22 May 2011, provided support for the mayors who volunteer host the storage facility and were re-elected. Mayors from AMAC demanded for more than ten years that a centralised interim storage facility should be built and pools should be emptied as soon as possible. On the contrary, environmentalists do not want to address the issue of radioactive waste unless nuclear energy is phased out in Spain. In addition, they argue that the process is not legal because Aarhus Convention has not been applied. The process has lacked the necessary transparency and public participation mechanisms to consult and

involve the public in the decision-making regarding the storage for radioactive waste (Greenpeace, 2011; Ecologistas en Acción, 2011).

The new government in Spain elected on 20 November 2011 addressed the decision on the siting of the centralised interim storage facility in the second Council of Ministers, which took place on 30th December 2011. They decided to host the storage facility in the non-nuclear municipality of Villar de Cañas, in the province of Cuenca, 135 km from Madrid. This is a municipality with a population of 460 inhabitants (in 2008) who has a mayor from the same political party as the president of the region (Castilla-La Mancha) and the president of Spain. The unemployment rate in this municipality is very high and the socio-economic impact would be highly positive. According to declarations from the government's vicepresident "its strategic position close to other sites has been central" for deciding on this municipality (*El dia digital*, 30/12/2011).

11 POLITICAL OBSTACLES AT REGIONAL LEVEL

The siting process for the centralised interim storage facility in Spain has shown that the formal process designed by the Ministry of Industry (which started on 29 December 2009 and aimed to select a site by July 2010) was extremely short to be able to make a sound decision, based on the principles of information, participation and transparency. The government, through the Ministry of Industry, did not take a leading role in justifying from the outset the waste management plans and how they fitted into the overall energy plans. Radioactive waste issues are often used for electoral purposes in Spain and the process of siting a centralised interim storage facility was blocked for years because of the difficulty by national government to take a sound decision on the issue (Kopetz and Martell, 2009). On the other hand, the local level, represented by AMAC, launched different initiatives in Spain (such as COWAM Spain, a communication and information strategy based on the CIP project) to push the agenda of radioactive waste management at the national level. On the contrary, the Ministry did not organise any public debate nor a public information campaign on radioactive waste management. Thus, the Spanish society, which is very negative to all issues related to nuclear, did not differentiate between a debate to site a nuclear facility and a debate to site a facility to store the already existing radioactive waste. Finally, one of the premises stated in the roadmap of the book of COWAM Spain was to involve the regional authorities in the siting process from the beginning. The lack of involvement of regional authorities by central government was one of the main factors which hindered any decision on siting the storage facility in Spain for more than a year and a half. The lack of involvement of the regional governments is recognised by all the actors in the field of radioactive waste management as the main obstacle for the previous government to take a decision. As suggested by one of the interviewees from the Ministry of Industry "despite the fact that autonomous communities do not have a normative role, it is essential to keep them on board in order to reach a consensus on these matters" (2011). This statement is also reflected in the workshop held by FSC in Spain, where it was found that the regional level is extremely important since lack of support can derail agreements reached between municipalities and national governments (OECD/NEA, 2007: 21)

12 CONCLUDING REMARKS

In Spain, there has been no dialogue on nuclear energy nor on radioactive waste management, apart from the initiative promoted by AMAC, like COWAM Spain. As pointed out by Pérez-Díaz and Rodríguez (2008), the political class has in general been reticent about embarking on a wide-ranging discussion on nuclear issues, mostly due to the fact that public opinion is clearly against nuclear energy. Radioactive waste is one of the very strong arguments against nuclear energy. During the process for siting the interim storage facility, the general public has not received information on the justification of the facility and the facility itself. Instead, in Catalonia for instance, the media was mainly monopolised by the political controversy and by the social conflict between the supporters and the detractors of the facility (Camon and Martin, 2011). The media has not facilitated a debate based on scientific and technical arguments, but it has just reproduced declarations and conflicts (Camon and Martin, 2011).

At present, when the final site for the centralised interim storage facility has already been chosen, one can observe an increasing level of acceptance of the need to manage radioactive waste. For AMAC, the national government has decided only based on the positive approval of the political party in the regional government and has not considered any technical criteria. According to the mayor of Villar de Cañas, ‘we are an ideal municipality, like other candidates and [...] we will now need the technical and non-technical support to respond to the malicious misinformation from opposing organisations’ (Saiz, 2012). At present, there are still some demonstrations from anti-nuclear groups and some political parties in the chosen municipality. Those defending the project, claim that it is safe and will bring employment opportunities to the region, whilst those against it, claim that there is no social consensus and it is dangerous. Overall, one can argue that one socio-technical challenge, the decision on siting of the centralised interim storage facility, seems to have been solved for the moment but greater challenges will come ahead that are not even foreseen now.

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