

Genesis of an Approach

WP1

From public non-participation to participation in a LILW site selection process in Slovenia

CHK-4

Antwerpen
2006

Berlin
2004

Ljubljana
2005





CHK – 4

**GENESIS OF AN APPROACH:
FROM PUBLIC NON- PARTICIPATION
TO ITS PARTICIPATION IN LILW SITE
SELECTION PROCESS IN SLOVENIA**

Marko Polic

*Department of Psychology, Faculty of Arts, University of Ljubljana, Ljubljana, Slovenia,
marko.polic@guest.arnes.si*

Drago Kos

Faculty of Social Sciences, University of Ljubljana, Ljubljana, Slovenia, drago.kos@fdv.uni-lj.si

Nadja Zeleznik

ARAO, Ljubljana, Slovenia nadja.zeleznik@gov.si

Ljubljana 2006

TABLE OF CONTENT

Proposal	3
Abstract	3
Introduction	4
Elements of the context	5
Narrative: Short history of the use of nuclear energy in Slovenia	6
Decision making procedure.....	10
From technocratic to socio-technical approach.....	11
The new LILW repository site selection procedure	13
Reflections of the siting process in public opinion polls and other survey studies.....	17
Radioactivity, Society and Trust	17
Public opinion polls about RWM.....	19
Contrasting previous and current siting procedure: Participation	25
Local partnership.....	30
Different approaches in 3 local communities.....	31
Participation as a part of the search process.....	31
Findings and proposals.....	32
Conclusions	33
Lessons Of The First »Technocratic« Approach.....	33
New combined procedure.....	34
Basic principles of the new sitting procedure were as follows	34
The evaluation of the present state of the affair	35
References	36

Proposal

Theme

Genesis of public involvement in search for LILW repository location in Slovenia

Focus

During the eighties and nineties Slovenia was a typical case of an unsuccessful search for a LILW repository site, mainly because the public, especially locally, was ignored and could not participate in the process. An entirely technological approach proved itself unsuccessful due to public opposition and consequently public involvement appeared as a necessity. The lesson was learned and the Slovenian siting process is nowadays widely based on a consideration of social acceptability. The genesis of the participatory approach in Slovenia will be analyzed and learned lessons will be presented with generalized findings and practical recommendations.

Objectives

- A. Reconstruction of events leading to unsuccessful site selection process and transition to participatory technology.
- B. Dissection of the case into a series of crucial decision occasions and recognition of critical actors/stakeholders at different levels as well as contextual factors influencing the event development.
- C. Analysis of the reflections of the siting process in public opinion polls and other survey studies running parallel to the siting process.
- D. Contrasting previous and current siting procedure.
- E. Installation of the findings into the frame of general knowledge regarding public acceptance of dangerous technologies and preparation of practical recommendations aiming at avoidance of causing public reaction.

Approach

Evaluative desk research on the basis of pertinent literature, available documents and reports, mass media sources and interviews with involved decision-makers, stakeholders and citizens as well as the use of all available results of the public opinion polls and other survey studies.

Research Steps

1. Collection of relevant materials and data
2. Analysis and integration of findings
3. Preparation of generalized findings and recommendations that may be used within WP1

Abstract

Searching for the location of risky or unpleasant objects is becoming increasingly difficult task. Slovenia is for the number of years now in the process of search for the location of the low and intermediate waste (LILW) repository. Social acceptability of this facility is currently the main problem in this search. Efforts in this direction are presented in all its diversity, with weaknesses and successes, addressing also the context of the whole process, but especially considering different aspects of public participation. The most important step in the whole procedure was the transition from purely technical approach to the approach that involves people in the decision processes. Development of search process is presented and critical changes explained in the frame of their own dynamics as well as changes in the country. Public opinion was closely reflecting these changes, sometimes also generating them. Formerly highly negative attitudes are slowly substituted with the less negative ones, while the participation of local people – though still underdeveloped – is increasing.

Keywords: LILW repository, NIMBY, participation, radioactivity, risk perception

Introduction

The siting of the radioactive waste repository, even for the low and intermediate level radioactivity waste (LILW), presents a great problem in almost every country that produces these materials. Acronyms like NIMBY, LULU, and NIMTOF are widely known, and phenomena they represent are common nowadays. The questions of risk perception and safety as well as what is '*acceptable*' or '*tolerable*' has different answers depending on who, what, where, etc. is posing the question. Beliefs of experts differ from that of laypersons what makes the matter even more difficult. Ethical and value questions are often in the forefront of discussion. Nowadays *stakeholder involvement* had replaced *risk communication* as the required ingredient of any risk management effort (Kasperson, 2005). Attempts to locate a disposal facility in Slovenia during the eighties and nineties was a typical case of an unsuccessful search for LILW repository site, mainly because of ignoring public (especially the local one), not to mention its participation. After the failure of the first "technocratic" approach it became evident that the main problem was not a technical one, but socio-psychological, namely the public acceptability of any radioactive waste disposal facility (RWD). In general people strongly oppose to any kind of such a facility in their vicinity and exhibit a 'Not In My Backyard' (NIMBY) attitude even if there are strong arguments for object necessity. Entirely technological approach proved itself unsuccessful due to public opposition and public involvement appeared as necessity. Nowadays there are slight signs of changes especially in argumentation supporting the public denial of LIL RWD.

The main LILW producer in Slovenia is nuclear power plant in Krško (NEK). The project for the construction of this plant did not include concrete consideration of the LIL RWD. Therefore the search for possible locations of LILW repository started only after the beginning of its commercial operation in 1983, especially after the plant's LILW storage was filled almost to its limits. The search process for LILW repository in Slovenia will be presented in all its forms, from public campaigns to different participatory efforts, as well as its reflection in different survey studies, conducted either in the whole country or in involved communities mainly in the time span of the last five years. The lesson was learned and Slovenian siting process is nowadays widely based on the consideration of the social acceptability based on public participation. The genesis of this *participatory approach* in Slovenia will be analyzed and experiences presented with generalized findings and practical recommendations.

Relevant information and data are available in different official, media and expert reports that serve as the material basis for our report. Public opinion polls done during that time reflect the background in which the RWM process was going on, especially those attitudes that influence its changes to participative technology.

The general development of radioactive waste management (RWM) problem in Slovenia was similar to the development in other developed countries, while its details and context differ in smaller or greater degree due to different cultural, political, social and economic backgrounds. Characteristics of the RWM process and factors that influence it will be presented, with the special emphasizes on the stakeholders involvement, development of their roles and reasons for this.

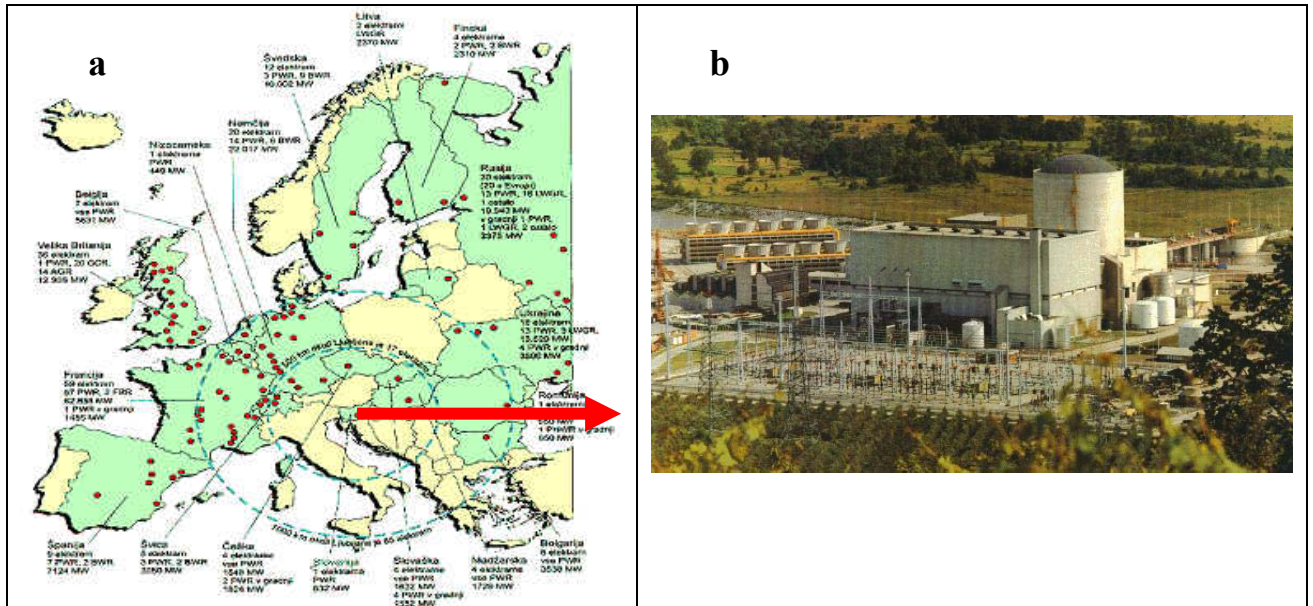


Figure 1. Nuclear Power Plants in Europe (a) and Nuclear Power Plant Krško (b)

The procedure to find a LIL RWD is proposed and established, but the processes leading to final solution are going on without being completely foreseen yet. There are a number of specificities mainly in the context of RWM processes that distinguish the Slovenian situation from that of other countries, but the general underlying view is connected with the *fear of radioactivity* and general *negative attitudes toward nuclear technology* and LILW repository. As such it is also a useful tool for political manipulation.

Elements of the context

Some elements of the development of the search process were connected to the *changes in political system*; others were the links in the causal chain of causes and effects going on mainly as the necessary part of the NPP Krško operation. Interestingly enough, despite the previously different political system in Slovenia the processes of RWM had the similar course as in other developed countries: *technological approach neglecting public issues* → *public reactance* → *move toward public involvement*. All this was accompanied by the relevant public attitudes: *neutrality* → *rejection* → *eventual conditional public acceptance (or less strong rejection)*.

Slovenia is strongly *dependent* on nuclear energy. The NPP Krško is supplying about one third of its energy needs. This played important role in the first independent election, when the Green party, though an important part of the ruling coalition did not succeed with their proposal to close the NPP although this promise was the most important part of its election program.

Relevant for RWM debates are Austrian attitudes toward the Slovenian NPP Krško and the fact of common ownership over this NPP with Croatia. Croatia is at the moment not willing to accept it's half of the waste, which adds another difficulty in finding a radioactive waste management solution. Interestingly enough, negative Austrian attitudes toward the NPP Krško had occasionally the contrary effects than the initiators may have wished (e.g. the case

of protests by the Austrian Green movement against a steam generator's replacement in the NEK – typical case of psychological reactance).

Narrative: Short history of the use of nuclear energy in Slovenia

Decision making in RWM is not going on independently but in its historical, social, political and economic context. The use of nuclear energy has a strong tradition in Slovenia. In 1949 the Institute Josef Stefan was founded, devoted to research in physics, with great emphasis on nuclear physics. A few years later (1966) the research nuclear reactor TRIGA started to work in the vicinity of Ljubljana, to support its research. Use of nuclear energy (NE) in Slovenia and previously in Yugoslavia was of non-military nature, though at the very beginning of its use in Yugoslavia there were also some ideas (fortunately not realized) about its military use.

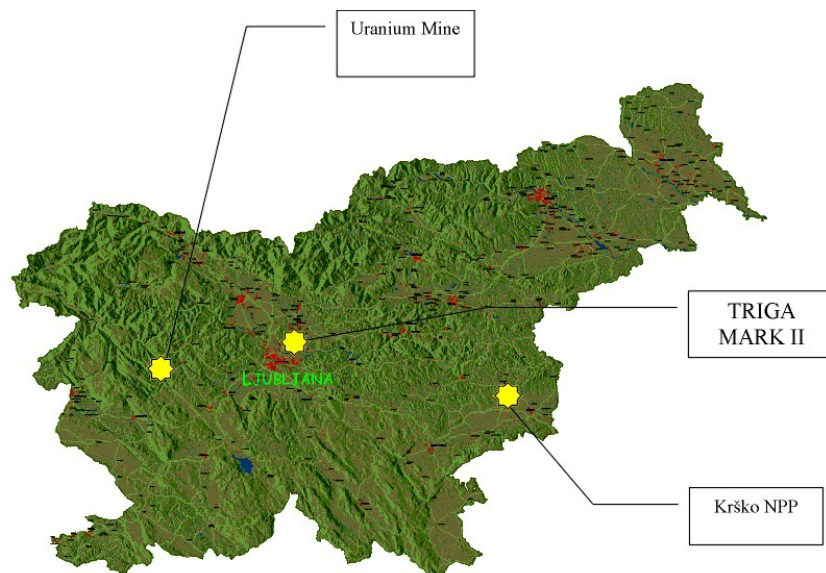


Figure 2. Nuclear facilities in Slovenia

The first attempts to site a LILW repository in Slovenia were linked to the construction of the NPP Krško in the 70's. Only a technical (“technocratic”) approach was used, as was the case of many other countries at that time. When constructing the first NPP in Krško there was still a view that several NPP's would be built in Yugoslavia and that one centralized disposal facility for radioactive waste from all the NPP's would be prepared in the 80's. However, later on the idea of construction of several additional NPP was abolished due to serious political problems as well as economical crisis that arise.

The events were then going on as described in the following paragraphs.

In **1970**: Executive councils (governments) of Slovenia and of Croatia signed agreement on NPP Krško construction in 50:50 shares. Repository would be connected to another NPP in Prevlaka, Croatia.

In **1974**: State president J. B. Tito set a foundation stone for NPP Krško. Siting license required that the investor should find the final solution for all radioactive waste until the end of the construction period.

In **1981**: Start of the NPP Krško commissioning operation. Still no final disposal solution accepted.

In **1983**: Members of municipalities chamber of Slovenian Parliament raised the question of radioactive waste management. Executive council of SRS believed that the storage at NPP Krško has sufficient capacity for the next five years and that it is reasonable from economic and safety reasons to find common solution together with Croatia i.e. at the location Prevlaka in Croatia.

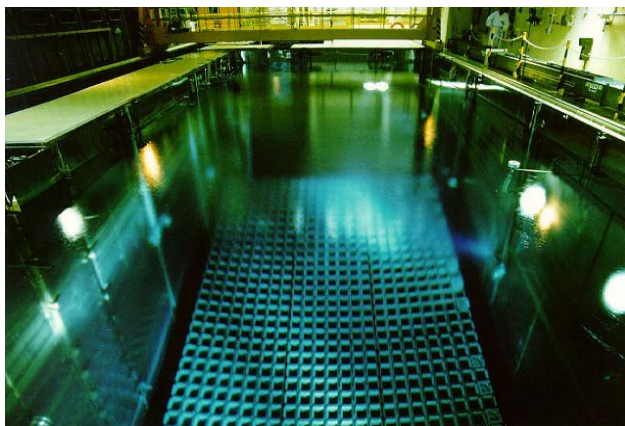


Figure 3. Spent fuel pool and operational LILW storage in NPP Krško

In **1984**: Start of the construction of Central interim storage for small producers in Brinje near Ljubljana (at the place where experimental nuclear reactor is also located). Only after the opposition to construction of the facility, the local inhabitants were informed about it.

In **1985**: The agreement between Elekrogospodarstvo Slovenije (Electricity management of Slovenia), Združenje elektrogospodarskih organizacij Hrvatske (Association of electricity managing organizations of Croatia) and NPP Krško on start of siting of LILW repository. First study entitled “Disposing of radioactive waste and spent nuclear fuel for Yugoslavian NPP construction program until 2000” based on technical approach to the site selection was prepared by Elektroprojekt Zagreb. In the study three possible locations in Slovenia were also mentioned.

In **1987**: Institute Josef Stefan (SEPO department) and Bio-technical faculty (Department of Landscape Architecture) prepared on the base of the contract with NEK study on LILW repository and siting possibilities in Slovenia. Result was broader overview of 39 possible areas for siting of the disposal. The areas were chosen on the base of geological, demographic and spatial developmental criteria.

In **1990** started the site selection procedure for a LILW repository in Slovenia only using exclusion and comparative criteria, but not taking into account social acceptability. The result of siting procedure was that five micro locations were defined in **1993**, which provoked

strong opposition between neighbouring inhabitants. The presentation of the results to the public was unsuccessful and has provoked strong disapproval within the local communities where the locations were identified. Because of the extremely negative reactions from local municipalities, the public acceptance criterion at these locations was not met; therefore in 1993 the siting process was suspended. All activities connected to this siting were stopped.



Figure 4. Central interim storage facility for radioactive waste from small producers

In **1991** the national Agency for radwaste management (ARAO) was founded with the assignment to provide conditions for final disposal of all radioactive waste. ARAO was established in time when all activities for LILW repository site selection were already under way and no bigger change of the approach was feasible.

In **1993-1994** ARAO was challenged with organizational replacement after the unsuccessful site selection.

In **1995-1996** ARAO made thorough analyses of this siting process which showed that the main reason for the failure of the siting project was insufficient and inadequate communication to the public. Information on the project was poor, public participation in the site selection process was not established and the representatives of local communities were not involved in the process. The analyses also agree that the site selection process did not have sufficient political support. A waste management policy that could have provided the needed link between the politicians and the investor did not exist. In fact, the period of the site selection process coincided with the time of tremendous changes that occurred in our country in the late eighties and early nineties. The changes in the political, social and economic system, in combination with the growing opposition to the peaceful use of nuclear energy, would require a different approach to the problem. The siting project, based on the technical screening method should have adapted to all changes and new circumstances, but due to its long-term nature it was practically impossible.

In **1997-1999** ARAO proposed a new mixed mode approach to the site selection in 1997 and made a wider discussion between experts from different fields of work (technical, natural and human sciences). The majority of the participants supported the combined approach to the site selection for LILW repository. In their opinion, the advantage of the combined approach is flexibility, transparency and public involvement from the early stage. Until 1999 the whole

siting procedure was defined including a program of co-operation with the public. Special attention was devoted to the involvement of the local communities in the site selection process, which was recognized as essential to the process. It was decided that the best way to communicate with the local communities was through an independent mediator, who would conduct the negotiations between the community and the investor, and thus represent the link between the two parties.

In **2002** with the amendment to the Nuclear act accepted in 2002, Slovenia made a clear decision on the disposal of LILW. The amendment requires that the site for a LILW repository be approved by 2008 and the repository in operation by 2013. The site selection and the repository construction are therefore the first priority of ARAO. In order to achieve this goal, the suitable site(s) should be identified in 2004-2005 and the site characterization completed in 2007.

In **2003** the *Program of NPP Krško Decommissioning and Spent Fuel (SF) and Low and Intermediate Level Waste (LILW) Disposal* was prepared in accordance with the Agreement between the governments of Slovenia and Croatia on the status and other legal issues related to investment, exploitation, and decommissioning of Nuclear power plant Krško from 2003. By this bilateral agreement the ownership of the NPP Krško is divided in equal shares between Republic of Slovenia and Croatia as well as the responsibilities for its decommissioning and SF and LILW disposal for radioactive waste and spent fuel from NPP Krško operation and decommissioning.

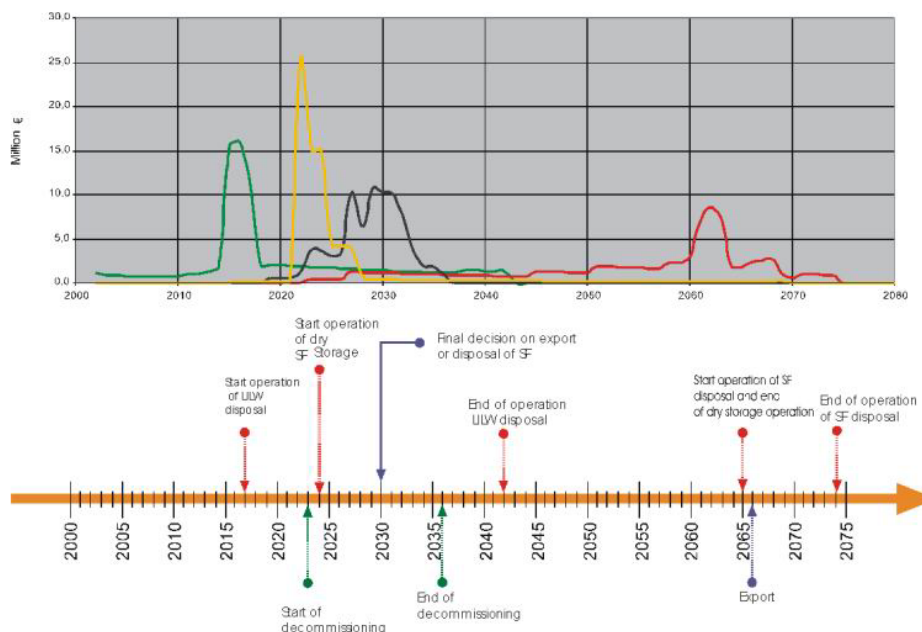


Figure 5. Time schedule of the RWM

In **2005** according to the *Act on Ionising Radiation Protection and Nuclear Safety* (Off. Gaz., RS, No. 67/2002) the *National program for radioactive waste and spent fuel management* was accepted in October 2005 by Slovenian Government and was adopted by the Slovene Parliament in February 2006 as a part of the national program for the protection of the environment pursuant to the regulations on environmental protection. The technical ground for the National Programme for Radioactive Waste and Spent Fuel Management (2004), together with a detailed description of the measures relating to the reduction of the occurrence

of radioactive waste, to the treatment thereof prior to disposal and to its disposal, and the measures relating to the treatment and disposal of spent fuel, was carried out and communicated by the ARAO to the ministry of the environment. The operative programmes within the national programme of the radioactive waste and spent fuel management shall be drawn up by the ARAO and adopted by the Slovene Government. The operative programmes shall be adopted for a maximum of four years.

The Slovenian nuclear programme consists of only three operating facilities (Figure 2): the small, 250 kW TRIGA research reactor, which has been in operation since the mid sixties, the nuclear power plant – 676 MWe PWR Westinghouse type – which is in commercial operation since 1983 and Central Interim Storage Facility for LILW from small producers. The NPP was jointly constructed by Slovenia and Croatia and is owned in equal shares by Slovenian and Croatian utilities. The fourth nuclear facility, the uranium mine Žirovski vrh, was in operation in the eighties. It was closed in 1990. The mine is now being decommissioned.

We must also consider the fact that Slovenia is strongly dependent on nuclear energy. NPP Krško is covering about one third of its energetic needs. This question played important role during the first independent election, when Green party, though important part of the ruling coalition did not succeed with their proposal to close the NPP although this promise was the most important part of its election program.

In 2002 relevant legislation regarding the process of site selection for LILW repository was accepted and in 2004 invitation issued to local communities to join the process of LILW repository site selection. Eight local communities offer their participation.

Decision making procedure

During the Yugoslavian times, though formally *self-management* (a kind of public political participation) was the proposed way of the governing the state, it was not always efficient. Often the decisive power was only in the hands of federal or republic state's governments. Especially the issue of nuclear energy was treated in this way.

Currently in Slovenia responsibilities regarding decision making in RWM are divided between a number of actors on different levels, from government, across several ministries, their agencies and boards, to local communities, waste producers, etc. Slovenia is a rather *centralized* state divided into more than 200 local communities of very different sizes and from few hundreds to a few hundred thousand inhabitants. Therefore the decision making process is running on *two* levels only – a strong central level and a formally rather weak local level. This holds also for RWM. On the operative level responsibility for RWM is with the Agency for Radwaste Management (ARAO). Its task is to assure efficient, safe and responsible management of all kinds of radioactive waste in Slovenia, from producers to the final deposition.

Decisions about RWM are therefore in the hand of the state, but regarding the location of the site of the LILW facility, the relevant local communities have in fact quite strong decision-making power.

The first searching process from 1990 to 1993 was non-transparent and did not involve people from targeted communities. This was also the main reason for its failure. As procedure is established now, local community (municipality) should have the final word in the approval

of the location, but veto option has no legal ground, while acceptance should be approved also by the state. Offers from the local land owners should be approved by the local community. Players differ depending on the level of observation: general and local. Undoubtedly the state (through its different bodies) is involved, as well as local communities and NGOs.

As it follows from the previous information, first decision (in eighties and nineties) about the location of LILW repository were accepted mainly on the state level in an interplay between state bodies and nuclear community (e.g. technical experts, management). We must not forget that enormous amounts of money are in play in connection with nuclear facilities, what established a playground for a number of local and other interests.

From technocratic to socio-technical approach

The most important aspect of the whole search process was the *transition* from purely technical approach to the approach that involves people from the local community in the decision process. Development of this process is presented and critical changes explained in the frame of its own dynamics as well as changes in the country. Public opinion was closely reflecting these changes, sometimes also generating them. Formerly highly negative attitudes were slowly substituted with the less negative ones.

The first searching process from 1990 to 1993 was *not transparent* and *did not involve people* from targeted communities. This was also the main reason for its failure¹. It seems as if administration and authorities as well as scientific-technical community believed that adequate solution of the problem is only their responsibility because the public had not the adequate knowledge. Also the general tendency of administration to skip public in important decisions is evident. Nevertheless, at the moment the search process is publicly presented, local communities are free to join it, to reject or to withdraw their participation. Also rather high *compensation* is offered to local communities as a partial reimbursement for the loss connected to hosting a waste facility (e.g. lowering of land value, limitation in land use, etc.).

Who are the stakeholders depend on the level of observation: general and basic (local) as well as narrow and wider circle of stakeholders. Undoubtedly the state (through its different bodies) is involved, as well as local communities and NGOs. More concretely, on some basic level we have the following actors or groups of them:

- Radwaste Management Agency (ARAO) and other official bodies of Ministry for planning and environment, including technical experts;
- Nuclear sector, mainly the NPP Krško
- Local communities, involved in the siting procedures;
- NGO on local or state level; expert communities, political parties.
- Media.

Different stakeholder groups have different role in the repository site selection procedure. On one hand there is an interest of the government to safely solve the problem of radioactive waste management and to construct the proper facility for its long-term management. The governmental interest is realized through the implementers' activities to locate and build the repository by complying with legal and legislative norms and standards inspected by regulatory bodies and competent authorities. The involvement of regulatory bodies and the

¹ See more in Kos and Polic (1999).

competent authorities depends on the development of the siting/safety case, but at all times it has to be assured that the discussions are fair and respectful. The implementer needs a rightful, independent and competent regulator in the decision-making process in order to build trust in the other stakeholders about the management of the safety case process. One very important special target group that could significantly support the site selection and decision-making process is the national and international scientific community. Their views should be carefully and appropriately inputted in the process.

On the other hand there is the local community who will host the repository site. The community is the key stakeholder in the process and more or less in all countries it has to provide social acceptability to the planned radioactive waste repository. The local community is represented by many actors, formal actors like the mayor and municipality council representatives, and informal like the local public opinion makers, local NGOs, associations or other individuals. Their role in the safety case could be very different, contradictory and variable. Different factors that could influence the acceptability of repository in the local community, such as lack of trust in the governmental institutions, fear and also the local community interests, should be considered.

A special role in the safety case and in the process also goes to the media, reporters, journalists working for magazines, newspapers, TV and radio stations, and public opinion makers who represent a very strong information source for general public opinion and consequently influence all other stakeholders. Since nowadays the media are commercially oriented, frequently “the only news is the bad news”. Although the contents of a report or contribution might be fair and well-intentioned the title itself often reflects suspicious meanings. In parallel, different special target groups of stakeholders, such as NGOs, political parties in opposition, etc., have a special role in the site selection process have to be properly addressed. In general, media and other public opinion maker are working as social amplifiers of the risk (e.g. Kasperson, Jhaveri and Kasperson, 2004), having *'a potential for generating stigma-related effects for places, technologies, or products'*. This stigmatization is evident in attitudes toward nuclear energy, and manifest itself also in such trivial cases as is the rejection of strawberries from community Krško (because of NPP) by consumers on Ljubljana market.

ARAO is formally responsible for the radioactive waste management in Slovenia but it executes the policy of the Ministry for the Environment. Governmental policy on RWM was inconsistent from the very beginning but now it has firm bases due to the National program on radwaste and spent fuel management (adopted in 2005).

The nuclear sector is economically strong and state owned. The open question is joint ownership between Croatia and Slovenia of NPP and unsolved issue of decommissioning fund in Croatia. It is influencing the siting process through interaction with the state and local politics.

The role of local communities involved in the siting process is often diverse and ambivalent due to the public opposition to the facility being sited in their community, but wishing to receive relatively high compensation offered by the state to community willing to accept the facility. Presently local partnership is to be founded in 3 local communities (Krško, Sevnica, Brežice), which already host NPP or are bordering to the NPP location.

In Slovenia there is a number of NGO's focusing on environmental problems. Their activity is not coordinated and their power depends mainly on the level of harmonization of their attitudes with that of the concerned public. The government and/or local communities financially support most of them. With regard to nuclear energy they are mainly opposed to it. During the siting process new groups are constantly emerging, mainly as the opposition to the involvement of the community in the search process, and less frequent as the counter opposition to the previous. The later groups are weaker, though they could have official support. The problem is, that some of the groups, wishing to get political recognition through defending NIMBY attitudes in the local population, stimulate the opposition to the siting of the repository by using rather controversial views and manipulating people.

Regarding attitudes toward RWM process, different media play different roles, depending on the occasion and nature of the event. They are not leading consistent policy with regard to RWM, but mainly emphasize the problems (what is in principle not bad), while not supporting search into the solution to the problem. Some of the reasons for this lie in inconsistent governmental policy toward the issue of RWM.

The role of political parties is not transparent enough, but often at the local level most parties are following the predominant public opinion on the siting of RWD although at the national level their position is different.

The new LILW repository site selection procedure

LILW repository siting is the key governance issue in Slovenia and is taking place according to the mixed mode procedure which follows the IAEA recommendations. It combines the expert assessments and local initiatives and proposals. The mixed mode procedure is divided into four stages:

1. *Conceptual and planning stage*: this was concluded in 1999; the siting procedure incorporating the public participation was defined;
2. *Area survey stage*: identification of potentially suitable areas was concluded in 2001 and a map was presented to the public; identification of potentially suitable sites was concluded in 2005, and the sites were agreed upon with the local communities after their volunteering to the site selection process;
3. *Site characterization stage*: this will be concluded in 2007; maximum three potential locations will be studied, additional cabinet and field research will provide the necessary data for the site confirmation, the research will be carried out with the local community consensus;
4. *Site confirmation stage*: this will run in parallel with the previous stage; the suitability of the potential locations will be evaluated and additional data for safety analysis and environmental impact assessment will be provided by further research with consensus of the local community.

In 2001, the area survey stage was performed by cabinet investigations using the multi-criteria decision-making evaluation program within a Geographic Information System. The most important were related to the integrity and safety of the repository, which were then evaluated through study of the geological properties of an area. The results showed that about 15 % of Slovenian territory is potentially suitable for underground disposal and almost 45 % for surface disposal.

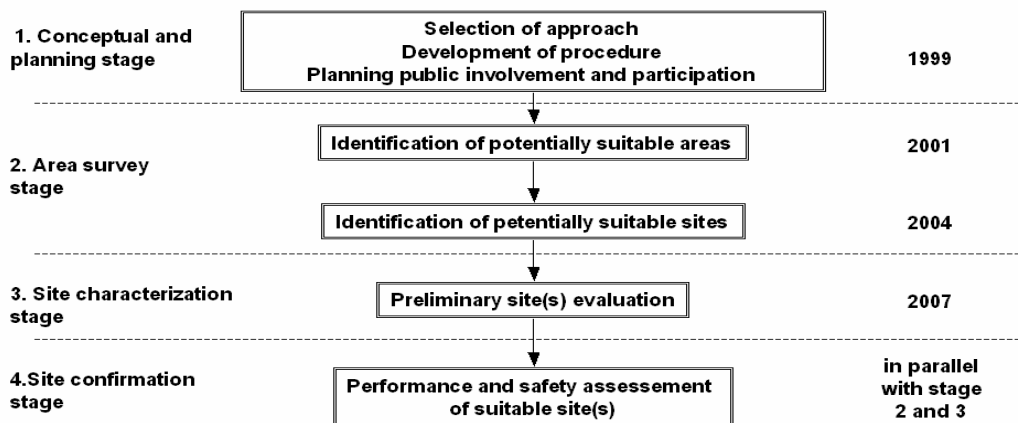


FIGURE 6. Stages of the site selection procedures.

The most difficult step is the identification of potentially suitable sites, which requires extensive communication and negotiations with the local communities at the area of interest. In February 2002, ARAO has presented approach to the local representatives and invited the local communities to participate through an independent mediator, representing a link between the two parties and thus facilitating the communication and negotiations between the investor and the local community. The mediator represents the connection between public interests in local environmental protection and the governmental interests to safely dispose of the radioactive waste.

The real negotiations with the local communities have started with the legal basis for financial compensations to the hosting community, which were accepted through the Decree on criteria for the determination of the compensation level due to the limited land-use on the site of a nuclear facility in December 2003 (Off.Gaz. RS 134/2003). The decree defines the fixed compensation of 2.3 mio EUR due to the limited land-use to the local community who would host the LILW repository during its operation, and 1/10 of that amount for field investigations and the repository construction.

In November 2004, the official administrative procedure for the siting of the repository was set. The Ministry of Environment and Spatial Planning together with ARAO carried out the First Spatial Planning conference. The Program for the preparation of the national location plan for the LILW repository was accepted, and ARAO invited all local communities in Slovenia to volunteer a site or area for further investigation. Applications had to be signed by mayors only.

By the beginning of April 2005, ARAO finished the bidding process with eight applications from local communities. Within the next two months three local communities had decided to withdraw their applications. Only one of the remaining five local communities proposed an appointed potential site for further investigation. In the others, the potential sites were defined by cabinet studies and presented to local communities for confirmation. Only the potentially suitable sites confirmed by local communities were further assessed in the pre-feasibility

study. This provided the assessment of all sites based on public acceptability, passive safety, technical functionality, economic, environmental and spatial aspects.

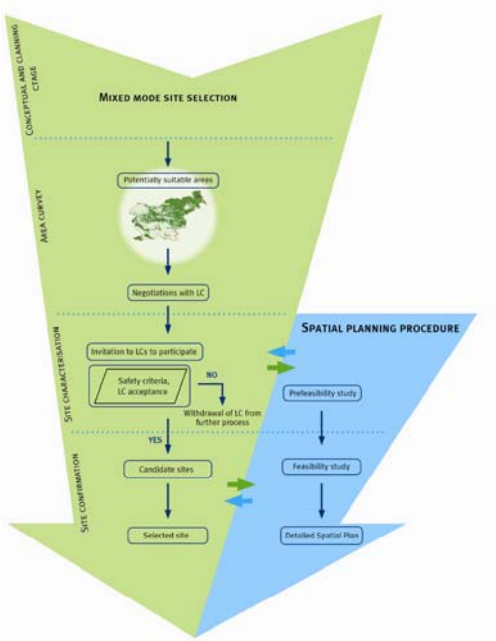


Figure 7. Cross-linking scheme of the mixed-mode site selection process and spatial planning procedure.

The methodology of the assessment of public acceptability included factors that could influence social aspects of the life of individuals (subjective parameters) and the people’s attitudes in the whole local community (objective parameters). The only exclusion parameter in public acceptability was the eventual rejection of participation in the siting procedure by a local referendum.

The assessment of technical aspects followed the selection of potentially suitable sites approved by local communities. The areas in communities, which had not proposed the site by themselves, were analyzed by using environmental, spatial and safety arguments. Water protection areas, catastrophic flooding regions, areas inside Natura 2000, areas inside 500 meters from continuously populated areas, community or national borders, were excluded from further assessment. ARAO defined 11 potentially suitable sites in 4 local communities, and the fifth local community proposed one.

The proposed 12 sites were assessed from the point of view of passive safety, technical functionality, and economic, environmental and spatial aspects. The methodology criteria and evaluation approach were prepared for each of these aspects, and assessment parameters were defined. The results of the expert assessments based on cabinet data and field visits were used for the comparison and evaluation of proposed potentially suitable sites. The sites were classified first by ranking local communities by the public acceptability criterion. In the second step, all other aspects were considered equally and the sites were ranked again. If the potential site was excluded only because of one aspect it was excluded from further evaluation. In this way selection of the three most promising ones for further field investigations was performed. The pre-feasibility study was finished in October 2005 and 3

local municipalities were proposed for further field investigations by the Government of Slovenia.

The next step in repository siting will be through the establishment of local partnership. Together with the help of the mediator it will serve as an umbrella for all activities during site characterization and confirmation and will also be the platform for cooperation and for decision making of local stakeholders. Local partnership will consider the characteristics and expectations of individual local community but will have to include form and mode of work, decision making contents, mode of independent studies, consultations and verification, time dependence and results of cooperation on individual steps. This will enable the process to continue with public consensus and without interruptions.

The future key milestones are presented and accepted in the National program for radioactive waste and spent fuel management (2005, adopted by Slovenian Government) which is developed by the 2015 with more detailed plan for the period 2005-2009 and more general for 2010-2015. It provides information on needed measures, financial estimations and time dependence. It takes into account current and future RAW streams in Slovenia, present and planned waste management practices, planned lifetime of NPP Krško (2023) and valid legislation, strategic documents and policy on radioactive waste management. The main activities in this period are site selection and construction of LILW repository, assurance of stable functioning of public service of RAW management for small producers together with the operation of Central interim storage facility, safe on site radioactive management of all waste from NPP Krško, decommissioning of uranium mine which is now under closure and revision of decommissioning programs for nuclear facilities. Spent fuel disposal is not a priority while it is planned to be developed only in 2065.

Table 1. The key milestones in the near future.

Area	Activity	When
Public service of RAW management from small producers	Operational licence for CISF	2007
	RAW characterisation	2006
	T&C possibilities	2008
	Transportation	2006
Site selection and construction of LILW repository	Site characterisation	2006
	Site selection	2007
	Project documentation	2009
	Construction	2013
RŽV decommissioning	Decommissioning and remediation	2009
	Permanent supervision	2010
	Maintenance	2010
Decommissioning	Revision of the documents	2009

Reflections of the siting process in public opinion polls and other survey studies

The story of the development of the use of nuclear energy in Slovenia and relevant public attitudes will be analysed. We shall face the problem of risk and social trust connected to resolution of certain environmental problem - location of the radioactive waste repository. Even repository for the waste of low and intermediate level (LILW) radioactivity, presents a great problem in almost every country that produce such a waste. In this part we try to analyse public surveys and other research on this problem, done in Slovenia during the last twenty years. This is also the problem of misunderstanding between general public, experts and state administration, caused not only by differences in perception of risk² between involved parties, but also by distrust on the side of general public. Both issues are strongly connected as trust, values, equity and notion of social justice interact with risk perception (Kasperson and Dow, 1993). Also awareness of the potentials of public contribution toward risk management is increasing.

Radioactivity, Society and Trust

In a number of domains, mainly those connected to any kind of possible – real or imaginary – risk, distrust to official actors is increasing as is evident either through public opinion polls or concrete political people's behaviours. Reactions to risk communication are more and more influenced by the trust in those responsible for providing the information. Cvetkovich and Löfstedt (1999) even edited a book entitled »*Social Trust and the Management of Risk*«, while numerous papers and book chapters cover the same topic. Really, the solutions of many urgent problems that are perceived as risky or annoying are nowadays – at least in democratic societies - more dependent on public acceptance than on technical possibilities. Necessity to work with the public and not simply »to educate« her is increasingly evident. Apparent superiority of only technical approaches is withdrawing before the socially based ones. Radioactive waste management is a typical case of such a problem, but there are also many others, subsumed under new, dread, involuntary or uncontrolled risks (Slovic, 1993; Morgan et al., 2002).

Public and scientific knowledge and consequently their attitudes changed through the time. Before the hazards of for instance high-energy radiation were fully recognized, radioactive substances were advertised and X-ray pictures were freely taken (see Fig. 8). What was earlier perceived, as nice prospect and advancement of technology, later become a dread threat. While up to seventies nuclear energy presented a sign of prosperity and development, during the later years its popularity decreased. Threats of earlier times were replaced by the new ones, especially after a number of disasters e.g. Chernobyl. Atomic bomb becomes the prototype mental model of nuclear energy. Problems that were earlier perceived only or mainly as technological, e.g. energy problems, waste management, or genetic manipulation become increasingly social due to the increase in public concern. The route of evolution was similar for many of them: enthusiasm, scepticism and rejection. This stance revealed itself also in the prevailing type of sociopsychological research in certain domain.

² Lay public use more complex »multiattribute« definitions of risk, including additional considerations beyond the expected numbers of deaths (Morgan et al., 2002).

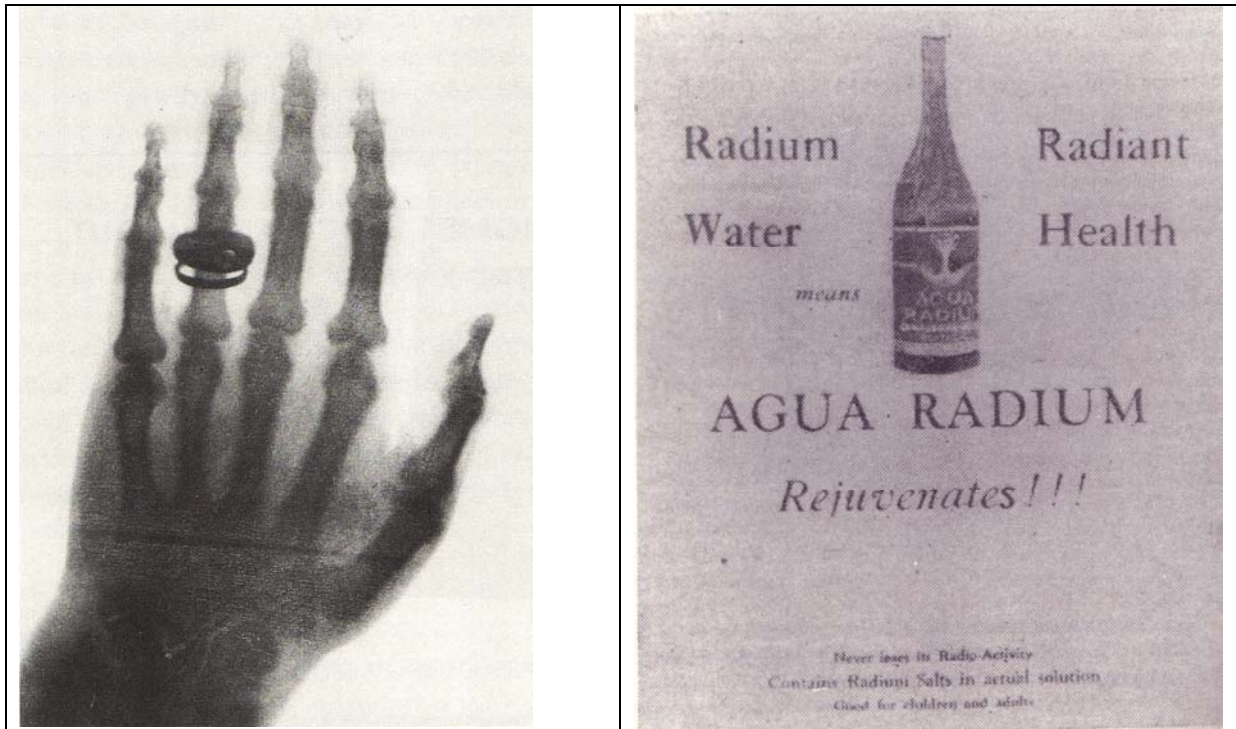


FIGURE 8. Hand with ring - one of the first X-ray pictures made by Roentgen in 1898, and advertisement for “Aqua Radium” sold to public during the 1920s and 1930s (after Goldstein and Goldstein, 2002).

Following Cvetkovich and Löfstedt (1999, p. 3) and reflecting changes in public attitude we could trace the characteristic evolution in the research related to risk assessment and management from: (1) initial issue of determination of the levels of acceptable risk; (2) risk perception with concern about differences between lay people and experts; (3) resolution of existing conflicts and application of concepts about risk perception to risk communication; and (4) current stage of focusing on trust which broadened the concern from assessment of only physical processes to understanding of social systems and their actors. Social trust defined in essence as ‘assured reliance on the character, ability, strength, or truth of someone or something’ (Merriam-Webster Dictionary) has also some additional characteristics (after Cvetkovich and Löfstedt, 1999; similar attitude could be find also in Kasperson and Dow, 1993):

- Implication of a difference in power and control; trade of behavioural and decision control for cognitive and secondary control;
- Involving of risk; trade of a primary physical risk for a social risk followed by a physical risk;
- Expectation about a relationship, namely attribution of the characteristic of trustworthiness is based on an expectation of how somebody will conduct him/herself relative to me and my interests;
- Choice when to trust and who to trust;
- Aspects of impersonality; social trust relates to individuals who have responsibilities imposed by formal organizational roles and who may be personally unknown to the trusting person.

The basic function of the social trust is the reduction of cognitive complexity, but because it is empirically based, its traditional account increases complexity. In their studies Earle and

Cvetkovich (1999) found the support for the cultural-values hypothesis, namely social trust is based on value similarity. While distinguishing between *pluralistic* social trust, rooted in the pasts of existing groups, and *cosmopolitan* one, that is multiple and based on a new sets of values, and as such more suitable for successful risk management.

Public opinion polls about RWM

Beliefs and values concerning RWM in Slovenia are similar to those in other EU countries. This is evident also in public opinion polls. In Slovenia the introduction of nuclear energy (NE) was accepted rather enthusiastically. It was considered as a big technological achievement but later on with the political and social changes the attitudes drastically changed. Decisions about NPP were accepted in one political system, while later management of the NPP and connected decisions were made after radical political changes.

The main LILW producer in Slovenia is nuclear power plant in Krško. Therefore rather early after the beginning of its commercial operations in 1983 search for possible locations of LILW repository started. As a part of these activities also opinion surveys were conducted, regarding public perception and acceptability of the LILW repository. The first one was carried out already in 1986, a month after Chernobyl disaster, while others follow more or less regularly each year. Some of them were conducted as a special surveys for the needs of agency ARAO (2000), responsible for the radioactive waste management, while also questions about nuclear energy, waste, etc. were sporadically included into regular every year public opinion poll in Slovenia³ (Toš, 1999) with broader range of questions (politics, economy, environment, etc.). The main tendency was increasing awareness of the threat because of the radioactive waste and decreasing credibility of state administration responsible for the waste. NIMBY phenomenon was strongly present. In depth interviews (Kos, Polič, 1999) showed that one of the important factors influencing rejection of LILW repository in the vicinity of one's place was lack of relevant communication with those people.

In Table 2 a chronology of different events connected to the use of nuclear energy in Slovenia and relevant social surveys studies are presented. While public opinion polls ordered by ARAO (since 1995) were strictly measuring attitudes toward LILW repository, Slovenian public opinion poll was from the very beginning in 1968 oriented mainly toward the measurement of political attitudes while other domains entered a study more or less occasionally, if they were politically relevant (e.g. green movement and its political proposals regarding NEK). All Slovene Public opinion Poll studies were conducted on random representative samples of adult inhabitants of Slovenia with the smallest numerous (N) greater than 1000, while polls conducted by different agencies for ARAO were smaller. All these surveys enable us to follow changes in attitudes toward different issues from 1968 on and attitudes toward nuclear energy and associated topics from 1980 on. Only recently a few small-scale studies were conducted, trying to establish relationships between different variables, mainly to discover those that influence attitudes toward LILW repository and consequent behaviour of people.

Negative attitudes towards nuclear energy quickly substituted enthusiastic interpretations of nuclear energy as a symbol of technological progress. Development of ecological consciousness abroad and in Slovenia put other aspects of nuclear energy into the forefront.

³ These polls were conducted by the Centre for public opinion research at the Faculty of Social Sciences.

From the end of seventies onwards it seemed that antinuclear attitudes in public become very strong and prevailing.

TABLE 2. Chronological summary of different events and surveys of public opinion on nuclear issues in Slovenia

Year	Event	Survey and Its Main 'Nuclear' Themes
1949	Establishment of Jozef Stefan Institute in Ljubljana, from the very beginning devoted also to the research in the field of nuclear energy and radioactivity.	No surveys or opinion polls as they started only in 1968.
1961	An incident at the Oncological institute in Ljubljana with dispersion of a radium applicator, the wastes were transported to a provisional storage facility. Not publicized until waste was found in former military building in village Zavratac in nineties.	/
1964	Decision to construct NPP Krško (NEK)	/
1965	Agreement on NEK construction between Slovenia and Croatia	/
1966	Construction of the experimental reactor TRIGA in Podgorica by Ljubljana	/
1968		Starting of public opinion polls in Slovenia
1971	International invitation for tenders for NEK technology	/
1974	Foundation stone for NEK laid by then President of Yugoslavia Tito	/
1979	Three – Mile Island Accident	
1980	Conclusion of NEK construction	Slovenian Public Opinion Poll (attitudes toward NPPK, reasons pro/contra NPPK)
1981	Start of the commission of NEK	Slovenian Public Opinion Poll (support for NPPK)
1982	Agreement on conditions and ways of solution of the problem of radioactive waste management in Yugoslav federation	Slovenian Public Opinion Poll (support for NPPK)
1983	Start of normal operation of NEK	/
1984	Start of the Central interim storage construction in Brinje	Slovenian Public Opinion Poll (NPPK in comparison with other power sources)
1985	First studies on disposal of radioactive waste from NEK with technical site selection approach, 3 macro locations identified in Slovenia	/
1986	Chernobyl accident	
1986	Establishment of special service for radwaste management at NEK, who was the implementer for the LILW repository construction. At the beginning socio-psychological aspects were accepted as a part of the procedure.	Mail survey study (N=515) about LILW Repository (questions concerning responsibility, decision making, place characteristics, repository influences, possible threats).
1987	New study on Repository for LILW – study of location possibilities in Slovenia; the result is 39 possible regions in Slovenia.	Slovenian Public Opinion Poll (referendum about NPPK, fear of Chernobyl, Waste Repository)
1990	Start of the first phase of the site selection process with continuation of the next phases up to 1993. Emphasize was on technical aspects while social were abandoned.	Slovenian Public Opinion Poll (LILW Repository, fear of Chernobyl, characteristics of NPPK, support for closing NPPK, Nuclear Energy, Credibility of different actors, possibility of accident, acceptance of decision about repository location, etc.)

1991	Establishment of national Agency for radwaste management (ARAO)	Slovenian Public Opinion Poll (Nuclear Energy)
1993	Conclusion of the site selection process with identification of 5 suitable locations, the results were presented to the public unsuccessfully, public acceptance criterion was not met, and the siting process was suspended.	Slovenian Public Opinion Poll (LILW Repository, fear of Chernobyl, characteristics of NPPK, support for closing NPPK, Nuclear Energy, Credibility of different actors, possibility of accident, acceptance of decision about repository location, Knowledge about Radioactivity, etc.)
1995		Started Public Opinion Poll ARAO (acceptability of different energy sources, site selection procedures for LILW repository, ecological problems of different waste, dissemination of information on radioactive waste and geographical dependency of (dis)approval of the use of radioactive materials, social trust in institutions and organizations responsible for decision making about radioactive repository).
1996	Start of a new site selection for LILW repository by combining technical approach with public participation.	Public Opinion Poll ARAO
1997		Slovenian Public Opinion Poll (NPP, responsibility for waste, handling of waste, conditions of acceptability, sources of waste, etc.; Public Opinion Poll ARAO
1998		Public Opinion Poll ARAO
1999	Conclusion of the conceptual and planning stage	Public Opinion Poll ARAO; In depth interviews with members of local communities exposed in previous search for location
2000	Conclusion of the remediation of the provisional storage facility	Public Opinion Poll ARAO
2001	Conclusion of the first part of area survey stage with identification of potentially suitable areas from geological point of view	Public Opinion Poll ARAO
2002	Continuation of ARAO activities; Function of a mediator is established	Public Opinion Poll ARAO
2003	Continuation of ARAO activities; Engagement of NGO	Public Opinion Poll ARAO
2004	Site selection procedure	Public Opinion Poll ARAO
2005	Site selection procedure	Public opinion polls as a part of selection activities

This is evident also in different public opinion polls concerning nuclear energy and starting even before the beginning of NPP Krško commercial operations in 1983. As a part of activities connected with the search of possible locations for the LILW repository opinion surveys were also conducted, regarding public perception and acceptability of the LILW repository. The first one was carried out in 1986, a month after the Chernobyl disaster, while others have been undertaken more or less regularly each year. Some of them were conducted as a special survey for the needs of agency ARAO, responsible for the radioactive waste management, while questions about nuclear energy, waste, etc. were sporadically included in yearly public opinion polls in Slovenia (Toš et al.1999) with a broader range of questions (politics, economy, environment, etc.). The main tendency was increasing awareness of the threat because of the radioactive waste and decreasing credibility of the state administration responsible for the waste. The NIMBY phenomenon was strongly present. In depth interviews (Kos, Polič, 1999) showed that one of the important factors influencing rejection of the LILW repository in the vicinity of a community was lack of relevant communication with people living in the community.

All survey studies were descriptive in nature and the only hypothesis they tried to check was the intensity of attitudes toward the issues in question. The main weakness of the majority of them is a lack of theory behind the study and reduction to description. In that sense they stated mainly the obvious conclusions. Comparison of the attitudes of Slovenian respondents revealed great similarity with the respondents from other countries in increasing opposition to issues connected with the use of nuclear energy in the frame of other environmental problems.

Slovenian public opinion polls (Toš et al., 1999) tackled nuclear energy issues when they become popular for different reasons (e.g. conclusion of NEK construction in 1980, beginning of its work in 1981, idea about construction of a new nuclear power plant in Croatia, Chernobyl a year later) or they became politically relevant, e.g. when Green party and environmental movements or some neighbouring countries came with suggestion to close the NEK (in 1987 and in nineties), or when environmental issues become increasingly popular (the whole poll devoted to them in 1990). Attitudes toward nuclear power plant appeared in these polls rather ambivalent. People were aware of the energy needs, but also afraid because of radiation danger, waste deposition etc. Regarding LILW repository in 1990 poll respondents did not know a lot about it.

Attitudes towards the nuclear power plant appeared in these polls rather ambivalent. People were aware of the energy needs, but also afraid because of radiation danger, waste deposition etc. More than 88 % in 1987 felt afraid after the Chernobyl accident, especially about the possibility that a similar disaster could repeat. Both in 1987 and 1990 polls more than half of the respondents believed that safe repository was not possible. Almost 80 % would not like to live in the vicinity of NPP, while almost 87 % would not like to live in the vicinity of LILW repository. In 1990 for 89 % respondents Chernobyl presented the worst accident during the last few years. The support for closing the NEK decreased from 55, 8 % in 1990, to 34, 2 % in 1991, and to 29,5 % in 1998. The political importance of the issue decreased with the downfall of the green party on one side and awareness of energy needs on the other. Almost 71 % of respondents in 1990 believed that a bigger accident in NEK is possible, either because of technical error (31, 8 %), earthquake (25 %) or for other reasons. Regarding information about nuclear energy in 1990 there appeared a lack trust in any institution or group. To a greater degree people trusted physicians (59, 5 %), the Green Party of Slovenia (55, 3 %), experts for energy (45, 3 %), government (35 %), journalists (34, 5 %), the electric company (23, 1 %) and local politicians (9, 8 %). Only 31, 3 % believed that those responsible would inform them about an accident in NEK (43 % felt that they would not and 25, 7 % answered 'did not know').

Regarding the LILW repository in 1990 poll respondents did not know a lot about it, e.g. 52, 3 % believed that used fuel would be deposited there and 48, 4 % believed that such a facility was really dangerous. Some 61, 4 % believed that a repository is not acceptable anywhere in Slovenia, and 76, 1 % that it is right to resist its construction. Some 43, 5 % would resist it even by physical force. More than 76 % of respondents would not accept repository under any condition. Three and seven years later opinions were more or less similar, because 62, 4 % and 72 % of respondents respectively would not accept repository in the vicinity of their community. But 40, 2 % and 43, 7 % respectively believed that the best solution for radioactive waste was a central repository for Slovenia. Still 35, 9 and 38, 2 % believed that waste should be exported. People are therefore aware of the problem, but are not willing to accept the solution if it would in any way about their community.

What is evident from these polls is a lack of information in general public, relatively great fear and resistance to nuclear energy and connected issues. Although partially this could depend on the specific naive models of radioactivity, a great deal of it is a matter of distrust because people were not informed and involved in decision making about relevant issues during previous times.

The beginning of ARAO's surveys coincides with the start of the new siting process for LILW repository and was part of the wider strategy towards communication activities in support to the site selection process. Every year public opinion poll is conducted on a representative sample of approximately 700 participants from general public. In addition, groups of special public are questioned, e.g. public who live nearby nuclear locations, politicians, journalists and NGOs. Although the number of interviewees are sometimes small and don't have statistical reliability, attitudes of different publics toward the radioactive management can be observed. The surveys served also as a tool for the evaluation of the general communication campaign efficiency. Although radioactive waste is still perceived as the greatest ecological problem the percentage of rejection of LILW repository in ones vicinity is decreasing. People are more and more polarized on the nuclear issue and less of them are undecided. A lack of trust in institutions such as government and parliament regarding environmental issues is evident.

Although radioactive waste is still perceived as the greatest ecological problem (app. 42 % in 2001) the percentage from 1995 is decreasing (52 % in 1995). Respondents support the use of radioactive material in medicine (82 %) and research (71 %). On the other hand, the interviewees do not support the use of radioactive or nuclear material in defence (only 7 %) and in energy production (only 40 %), the percentages from 1995 to 2001 are decreasing. It seems that for the future general public believed the solution of the problem of energy would be in fossil resources (57 %) and sun (96.4 %).

The percentage of people who in 2001 support (app. 40 %) or oppose (app. 37 %) the usefulness of the nuclear technologies is increasing. This means that more and more people are clearly polarized on the issue of nuclear and there is less undecided. More and more people are aware that radioactive waste management presents a real problem in Slovenia (from 36 % in 1995 to 68 % in 2001); therefore safe disposal of radioactive waste (from 40 % in 1995 to app. 69 % in 2001) is needed and a repository should be constructed (from 48 % in 1995 to 81 % in 2001). The increased recognition of the problem of radioactive waste management is evident. It is a consequence of more active public awareness of ecological problems as well as open public discourse. The interest of public for information on radioactive waste is rising from 55 % in 1995 to 71 % in 2001, what can be shown also by demand of public for more information (app. 64 % of public think that they don't have sufficient information on radioactive waste in 2001). Siting of the repository under transparent and democratic process is acceptable for approximately 25 % of respondents. Still 71 % of them would not under any circumstances accept the repository construction in their local community (NIMBY effect).

A lack of trust in institutions such as government (only 1 %) and parliament (0, 4 %) regarding environmental issues is evident. Trust is low even for other sources of information on suitable radioactive waste storing as are ecologists (app.26 %), experts (19 %), scientists (app.12 %), and ARAO (7 %). Simultaneously people believe that the final decision on repository construction should be taken by the experts (app. 30 %) together with the local

residents (app.18 %) and ecologists (app.8 %). All the percentages concerning trust are low, showing great distrust to responsible parties and wish to gain control over the issue.

Interestingly enough, attitudes toward nuclear issues did not differ a lot between different parties (general public N= 700, politicians N=61, environmental organizations N=17 and journalists N=48).

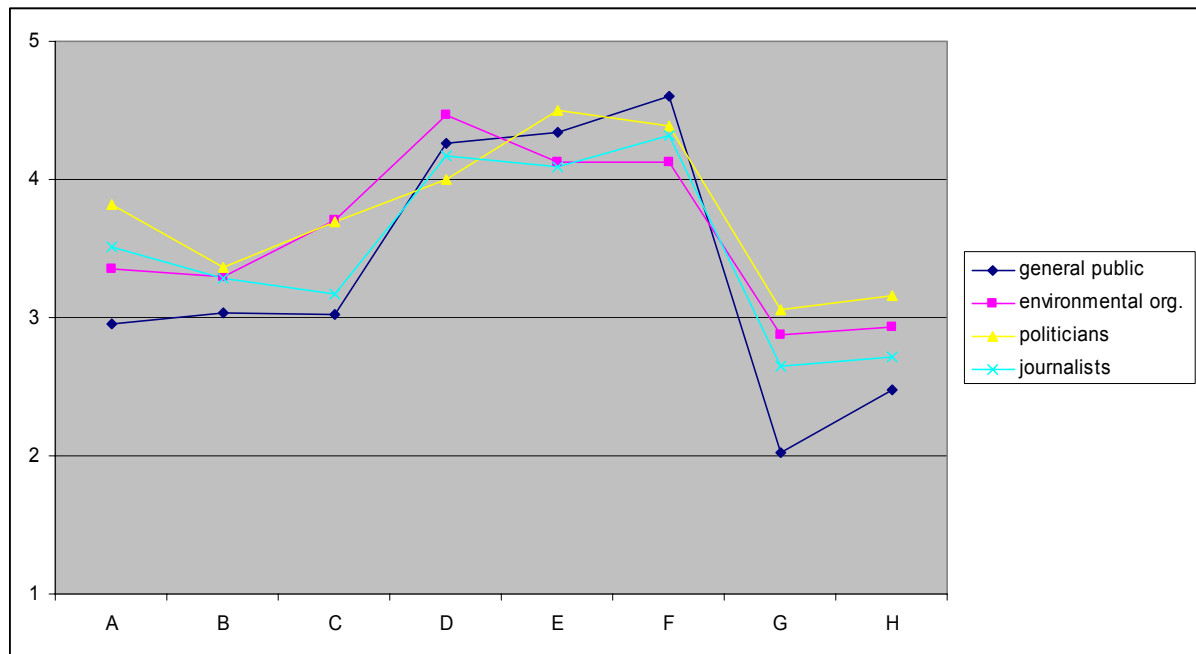


FIGURE 9. Comparison of attitudes to different issues of nuclear energy use on 5-point scale “strongly disagree (1) – strongly agree (5)” (A. Use of nuclear is good for people; B. We need NPP for undisturbed supply with energy, C. Energy from NPP is friendlier to the environment than thermo PP, D. Radioactive waste management is very serious problem in Slovenia, E. We need to take care for safe disposal of RAW, F. While we produce RAW we need repository, G. Repository does not present danger to the human and environment, H. ARAO is successfully with solving the RAW problem of different publics (ARAO reports, 2001).

It can be seen from the Figure 9 that there are no major differences in direction of different public’s attitudes, but only in intensity. Due to the small number of participants from special publics (61 politicians, 48 journalists and 17 members of environmental organizations) and different characteristics of the groups (e.g. age, employment, knowledge) the results don’t have statistical reliability. Answers of politicians differ the most from the answers of general public.

While opinion polls were measuring opinion without being based on any model, Železnik and Polič (2000, 2001) also conducted two studies in which they try to establish factors and conditions that influence people's behaviour regarding construction of a radioactive waste repository in someone’s local community. In the first they applied Ajzen’s model of planned behaviour. Two different scenarios about the construction of a radioactive waste repository in one's community, together with a set of questions were presented to different groups of participants. From the results it can be seen that in general the participants opposed the construction of radioactive waste repository, while significant differences in answers mainly

regarding evaluation of repository consequences were found. Answers were also dependent on participants' knowledge. In the second study (Železnik, Polič, 2001) they tried to find out how people perceive the mediating process and conditions under which the LILW repository would be accepted in the local community. Results of the survey study showed some of the conditions under which participants would possibly accept the LILW repository. Differences in the perception, especially in the assessment of the consequences of LILW repository construction on the environment between non-expert and expert groups were demonstrated and analyzed. Also the socio-psychological influences of the LILW repository were noted and examined. Consequences and recommendations for the future work on site selection procedure were prepared on the basis of the research results.

Establishment of radioactive waste repository is necessity in Slovenia because it is producer of such a waste. The problem of repository location is by now of psychological and sociological nature and not a technical problem. To solve it people's attitudes must be understood, but above all people must be involved into decision making, they must gain a control over the procedures of location search and repository construction and maintenance. Lost trust must be re-established.

What is evident from all these polls is the lack of information, relatively great fear and resistance to nuclear energy and connected issues. Although partially this could be connected with the lack of knowledge a great deal of it is a matter of distrust because people were previously not informed and involved into decision making about the relevant issues.

Contrasting previous and current siting procedure: Participation

The first preliminary technical study concerning the LILW repository started before the nuclear power plant went into operation but the siting process actually started in 1990. The technical part of the project, based on systematic technical screening of the territory to identify the most suitable areas/locations, was concluded in 1993. As a result five most suitable locations were identified. The presentation of the results to the public was unsuccessful and has provoked strong disapproval within the local communities where the locations were identified. Because of the extremely negative reactions from local municipalities the siting process was suspended in 1993. All activities connected to this siting were stopped.

The later analyses of this siting process were more or less unique in judgment that the main reason for the failure of the siting project was insufficient and inadequate provision of information to the public. Information on the project was poor, public participation in the site selection process was not established and the representatives of local communities were not involved in the process.

The analyses also agreed that the site selection process did not have sufficient political support. A waste management policy that could have provided the necessary link between the politicians and the investor did not exist. In fact, the period of the site selection process coincided with the time of tremendous changes that occurred in Slovenia in the late eighties and early nineties. The changes in the political, social and economic system, in combination with the growing opposition also to the peaceful use of nuclear energy, would require a different approach to the problem.

Technical screening represents a directed siting methodology also known as Decide-Announce-Defend approach. In the past it has been applied in different countries. In Slovenia volunteer siting became more feasible when the Environmental Protection Act was issued in 1993. By this act financial stimulations and other compensations to the local community, which would host the project of general importance, are foreseen. This possibility could be applied in the case of volunteer siting of a radioactive waste repository. Another approach to site selection is the combined approach, sometimes also called mixed mode siting. It is practically a mixture of the first two approaches. Besides rough technical screening the combined approach incorporates negotiations with the host area/community and some other elements characteristic of volunteer siting, which guarantee high public involvement.

ARAO has been working on the disposal project for LILW already for several years. The siting of a repository, as a most sensitive and delicate phase of the whole disposal project, has been thoroughly prepared over the past few years. The site selection procedure was established already in 1996. It is based on a mixed mode site selection approach, which is a combination of technical screening and volunteer siting. An essential component of this procedure is full recognition of public participation and local communities' involvement in the decision-making process. The participation of local communities in the process is based on their free decision. The decision for participation can be stimulated but not forced, and the volunteer approach should be respected throughout the whole procedure.

During the conceptual and planning stage that was finished in 1999, the entire process considering technical as well as social aspects of the site selection was prepared and defined. Recommendations and methodology for ranking the areas, according to their suitability for LILW disposal, were developed and basic design requirements for the planned repository were also prepared.

A program of co-operation with the public was also established. Special attention was devoted to the involvement of the local communities in the site selection process, which was recognized as essential to the process. It was decided that the best way to communicate with the local communities was through an independent mediator, who would conduct the negotiations between the community and the investor, and thus represent the link between the two parties.

In spite of the carefully developed site selection process the implementation of different steps of this process is difficult. The main problems in implementation of the procedure originate from an incomplete or not fully sensible legal basis for siting such facilities, and a need for clear strategic decisions on the national level. Lately, several important acts and documents have been adopted which helped to clarify some aspects of the siting procedure and contributed to the progress of site selection process.

The situation drastically changed with the proposed mixed approach, which involve local participation as its integral part. During the conceptual and planning stage that was finished in 1999, the entire process considering technical as well as social aspects of the site selection was prepared and defined. Recommendations and a methodology for ranking the areas, according to their suitability for LILW disposal, were developed and the basic design requirements for the planned repository were also prepared. The independent mediator who facilitated the communication and negotiations between the implementer and the local community in the site selection process was introduced in February 2002. Interest for participation in the site selection process increased with the possibility that the hosting local

community would receive financial compensation due to the limited use of the environment as defined by the decree (2003). In some cases the financial compensation was interpreted as bribery, but mostly it was perceived as being fair and helped to continue the process.

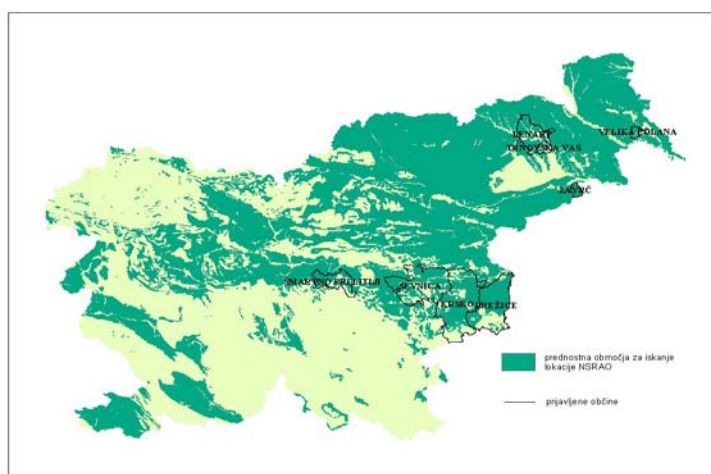


Figure 10. Local communities, which volunteer in the site selection process

Participation of local communities in the site selection process for LILW repository is established according to the requirements of the Aarhus Convention about access to information, public participation in decision-making and access to legal protection.

Nov.2004	Apr.2005	May 2005	Jul.2005	Nov.2005	Jan.2006	Feb.2006
Invitation to LC to participate	End of bidding process	Theses for local partnership	Pre-feasibility study	Govern. decision on 3 LP	Com. activities	Signing of LP
Phase 1		Phase 2			Phase 3	

Figure 11. Local communities involvement in the LILW repository site selection

The participation of local communities followed the next three steps:

1. Phase: ARAO invited local communities to participate
2. Phase: pre-feasibility assessment of the public acceptability in local communities
3. Phase: establishment and implementation of local partnership

At the end of 2004 ARAO invited all local communities in Slovenia with the exception of three, which in advance rejected participation (altogether 190 communities) to volunteer a site or area for further investigation. Applications had to be signed by mayors only (what could cause a problem in the case of rejecting attitudes of community council) and could include whole territory of municipality or some special selected areas in the community. Beside the form for application the leaflet also included the general information on LILW repository, the radioactive waste, minimal necessary surface for the facility, the conditions for financial compensations provided in the decree, further process on the pre-feasibility study and on local partnership establishment and timeframes for activities.

By the beginning of April 2005, ARAO finished the bidding process with eight applications from eight local communities (Figure 10). Within the next two months three local communities withdraw their applications. Only the potentially suitable sites confirmed by local communities were further assessed in the pre-feasibility study. ARAO prepared a methodology on how to define potentially suitable sites in local communities and how to evaluate and compare the sites from different aspects to propose three sites for further field investigation. Only one of the remaining five local communities proposed an appointed potential site for further investigation. In the others, the potential sites were defined by cabinet studies and presented to local communities for confirmation. Only the potentially suitable sites confirmed by local communities were further assessed in the pre-feasibility study.

The methodology for the assessment of public acceptability included factors that could influence social aspects of the life of individuals (subjective parameters) and the people's attitudes in the whole local community (objective parameters). The only exclusion parameter in public acceptability was the eventual rejection of participation in the siting procedure by a local referendum.

The assessment of technical aspects followed the selection of potentially suitable sites approved by local communities. The areas in communities, which had not proposed the site by themselves, were analyzed by using environmental, spatial and safety arguments. Water protection areas, catastrophic flooding regions, areas inside Natura 2000, areas inside 500 meters from continuously populated areas, community or national borders, were excluded from further assessment. ARAO defined 11 potentially suitable sites in 4 local communities, and the fifth local community proposed one.

The sites (12 potentially suitable) were classified first by ranking local communities by the public acceptability criterion. In the second step, all other aspects were considered equally and the sites were ranked again. If the potential site was excluded only because of one aspect it was excluded from further evaluation. The results of the assessment of potentially suitable sites are summarized in the pre-feasibility study for all volunteer local communities and sites.

The final three local communities, which were selected for the further field investigations were obtained by taking into account also technical assessment in addition to the public acceptability criterion. After the decision of Slovenian Government in November 2005 local partnerships were formed with local communities in Posavje (municipalities of Sevnica, Krško and Brežice).

Organization of stakeholders' involvement was partly defined in the methodology of public acceptability assessment, which was prepared as a part of pre-feasibility study. Namely, involvement of the local community and NGO members/representatives was an integral part of the search process. The methodology ensures that those factors that could influence social aspects of the life in the local community will be assessed. There is a need to assess the size of the possible influences on the social life of the inhabitants (assessment on the base of *objective* data, e.g. prevailing activity, demography, employment rate, education) as well as on the base of *subjective* ones, like attitudes toward a LILW repository as revealed in public opinion polls, decisions of political bodies, reactions in radio talks, etc.

Data from desk and field studies jointly gave the base for a public acceptability assessment. The following criteria were taken into account in this process: (a) repository should not have negative impact on the quality of life of inhabitants (no interaction with current or proposed

activities, land use, etc.); (b) inhabitants agreed with participation in site selection procedures or did not oppose it and (c) local community council formally approved collaboration in site selection procedure. All criteria (a-c) were assessed with regard to the strength of the impact, and the type of influence. The more the assessed parameters were positive and strong, the more the respective community was assessed as showing greater social acceptability towards the siting of the repository. In the final assessment, all the data were taken into account with equal weight. Excluding factors were a negative decision by the local community council or a negative referendum decision, but no such case was present during the assessment.

With regard to these criteria ARAO compared the local communities involved and suggested that three, for which the assessment of social acceptability gave the highest rate be included into the further procedure. From the research it was evident that at the time of application by the local community the prevailing public attitude was negative in general in all volunteering communities, although the applications indicated the political will of the local decision makers. Nevertheless considerable differences could be recognized in the intensity of opposition in each local community, ranging from a slight dissatisfaction of individuals to the formation of civil initiative groups that showed up in the media and demanded a referendum.

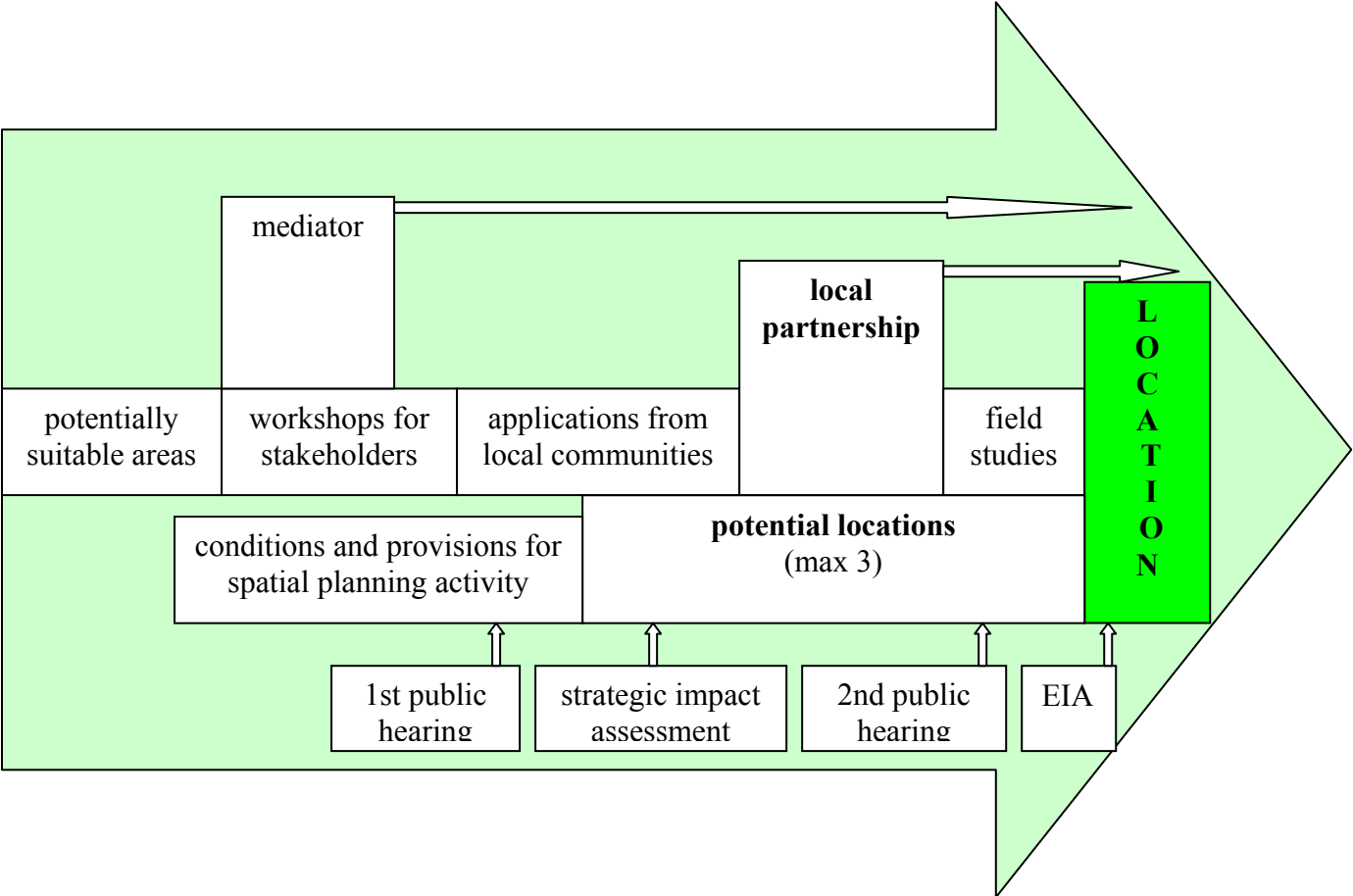


Figure 12. The site selection process for LILW repository

The general level of public acceptability was evaluated comparatively and no local community was excluded on the basis of the results of the public acceptability assessment. It was proven that open discussions from the very beginning stimulate public acceptability but also that such projects enable different political oppositions to take advantage and promote themselves by opposing the mayor’s or local council’s initiative.

The next step in the repository siting process was the *establishment* of the *local partnership* as an organizing frame for search activities and decision-making. The local partnership will consider the characteristics and expectations of the individual local community, the form and mode of work, decision-making contents, mode of independent studies, results of cooperation, etc.

Local partnership

Local partnerships, which were established in three⁴ local communities in Posavje serve as an umbrella for all activities during site characterization and confirmation of potential sites and give also the platform for cooperation and for decision making of local stakeholders. The local partnerships consider the characteristics and expectations of the individual local community but for each of them the form and mode of work, decision making contents, mode of independent studies, consultations and verification, time dependence and results of cooperation on individual steps are defined.

Although local partnerships are formally working according to agreements between ARAO and each of the communities they provide framework for participation and cooperation of people - citizens in the site selection process. The general scheme, given in the figure 12, foreseen the establishment of local partnership through the steering committee, which has the role to coordinate and to facilitate the participation and involvement of citizens. To involve as many people as possible different tools can be chosen such as organizing different committees, working groups, presentations, round tables, workshops or any other appropriate way to involve locals. During the establishment of the local partnership clear program, which define the purpose of local partnership, principles, goals, participants, functioning, information accessibility, decision making, funding and time frames, has to be prepared and accepted by all partners.

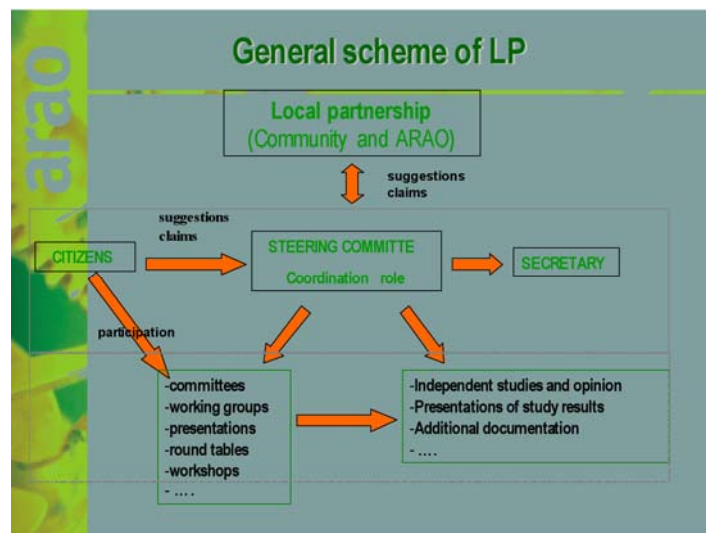


Figure 13. General scheme of local partnership

Functioning of local partnership is formal in the administrative procedures like preparation of National location plan for LILW repository, EIA process, etc., and informal with discussions on field investigations, design solutions for LILW repository, safety aspects of nuclear

⁴ Later one withdraw completely and the other decided on the modification of potential location.

facility, environmental impacts, development possibilities due to compensation for the limited land use, societal and health issues and all other aspects which are relevant or interested for individual local community. The work of local partnership is public therefore the minutes, invitations and documents are published in the web page or on the locally usual way. Local partnership has funds for its functioning, informing of public, expenses for work of reporters and reviewers and for independent expert opinions and studies. The funds are limited for individual year and defined by ARAO, but decision on the use of the funds is taken by the local partnership. The decision-making process stays with local council and other bodies of local autonomy. Local partnership has advisory role.

Different approaches in 3 local communities

LP in Sevnica: In February 2006 steering committee with 9 members on mayor proposal and council approval formed. In the beginning of March strong civil initiative movement started to oppose the decision on local community participation in site selection process. In March 2006 local council decided to withdraw from the site selection process on the mayor proposal and ARAO stopped all activities.

LP in Brežice: Several presentations for citizens, different groups of public and decision makers started just after the decision of Government. Formation of steering committee with 8 members nominated by council, mayor, locals and ARAO in the March 2006. The local partnership accepted program with activities and started with work (information activities, visits, presentations, independent studies, organization of working groups,). In May 2006 strong civil initiative movement against application of local community formed. Due to pre-election time (summer 2006) the community council decided to withdraw the potential location, but adopted also to stay in local partnership and to identify new potential location.

LP in Krško: Several presentations for citizens, decision makers and local politicians early in spring. Very strong and clear involvement of mayor to participate in the site selection process as the community where all the radioactive waste is already located. Preparation and adoption of the program and formation of working groups/committees for sustainable development, technical issues, for environment and health, limited land use and for consideration of Aarhus convention. Latent civil initiative became partner in the partnership.

Participation as a part of the search process

The process of stakeholder involvement is still in its beginning and it is not easy to evaluate its nature and contribution. Nevertheless, it is evident that without involvement of different stakeholders, the whole search process will be unsuccessful and would eventually end with a governmental/parliament decree.

Generally speaking, the fact that stakeholders had at least partial control over the procedure, that they have the possibility to get relevant information, and possibilities of contact with responsible people, mitigates their previously more or less completely negative attitudes and enables wider discussion of the relevant issues. Different interests of different stakeholder groups are still evident, though due to the process of their involvement are slowly converging. Local stakeholders are not so much interested in broader issues. Their problem is the location

of a facility in ‘their’ community, while they may have much less interest for the issues that do not directly involve their immediate environment.

Certain groups of stakeholders were officially defined (e.g. by law: ARAO, local community council), while some were self-organized (e.g. local NGOs). There are also transitions between those groups, e.g. a self-organized group can become formally recognized, mainly because it expresses a prevailing interest of the particular community. Of particular interest are groups that use the nuclear issue as a tool for achieving their recognition and political goals other than ecological ones.

The stakeholders are changing during these processes. Different survey data showed that they acquire greater knowledge and understanding of nuclear issues. While this knowledge could support quite the opposite attitudes, contacts between different stakeholder groups are easier and have less tension. In principle especially members of the local communities were satisfied with the process of their involvement and contacts with ARAO representatives.

Due to the fact that LILW repository should be located in the territory of one local community, and that it is the right of that local community to decide about the issue, SI could not work without the territorial notion. Also interests of the neighbouring communities should be considered.

National identifications regarding the nuclear issues are not as strong as local ones. Nevertheless it has certain influences connected to the reactions to the attitudes and behaviour of some neighbouring states (e.g. Austria, Croatia). The siting process in Slovenia is going on more or less successfully, learning from its successes and pitfalls and is addressing these requirements.

Findings and proposals

Although the fear of the general public towards nuclear energy has perhaps no rational background from the (technical) expert’s point of view, it has to be taken into account. Moreover it must be accepted that even relatively “non-dangerous nuclear activities” like the siting and construction of low and intermediate level radioactive waste repositories will be met with strong opposition. Even more important is the fact that people want to have *control* over their environment, especially over risk technologies in it. *Participation* in the siting process as well as in other activities connected to the RWM gave to people a sense of control and is immanent to democratic societies. All these processes are framed within current political situation and other circumstances. Confidence in responsible actors strongly depends on their *credibility*, which must be established and maintained. Skipping the responsibility for RWM process on the side of government and parliament and delegating it only to ARAO is not fruitful, as the Agency has not enough power for crucial decisions, while the field of opposition to procedure remain open for political manipulations. Evidently the search process had to become a national consensual project, of course transparent and open to verification. It must not proceed without local community and its inhabitants or even against them. The actors must be aware that critical events (e.g. accidents, lack of energy, political events, etc.) in the field of nuclear energy will influence the attitudes and behaviour of people toward the nuclear issue in one or the other direction.

The nuclear issue should be a matter of wide discussions and not confined only to the frames of technical community and some governmental bodies. It must become a normal matter of

discussion, with the awareness of its seriousness. And even than quite often the final result is not possible to predict. Due to many communicative obstacles it is difficult to establish effective participative framework even. The first steps therefore should be building context specific communicative practice.

Basic condition to confidence building is consistent, long term, cross sectorial and cross level endeavour. It means that highly specialised institutions and different political and social actors with different interests and knowledge base should act together.

Conclusions

The search process in Slovenia is not yet finished. Some lessons were learned, but not completely, and tendencies toward narrowing the stakeholder basis are reappearing. Possible consequences and nature of this process are discussed. Unfortunately some mistakes (e.g. not taking public into account), known from earlier attempts to solve the RWM problems in other countries were repeated, as if the learning on own mistakes is necessary. International exchange of experiences in the field may help countries and communities to skip the mistakes already known and to communicate their own successful experiences to other participants enabling them vicarious learning. In this way problems could be solved faster and greater safety achieved. Not solving a problem of safe disposal of RW is in itself a danger, because the control over RW is weaker and their safe manipulation truncated.

Plus ca change, plus c'est la meme chose!

Lessons Of The First »Technocratic« Approach

1. Lessons learned from »technocratic« approach of RW sitting from 1990 to 1993 were clear and apparently accepted as the fundamental input to new »combined« socio-technical approach. It was obvious that low trust in safety performance of nuclear technology contaminate all connected systems and institutions including expert assessments procedures.
2. There were evident disproportions between technical dimensions of the RW sitting process and legitimization of these procedures in public. Hypothetical believe in expert discourse was misleading and contributed to the failure of the »technocratic« sitting procedures.
3. The cumulative of the negative experiences i.e. the motivation to learning from past experiences and experiences o others was low. In the period of the »transition« (from so called state or real socialism) the believe that »most social and technical questions regarding nuclear safety are already solved« prevented the search of the solution which would correspond to local specific political culture.
4. Traditionally the central – local relations produces tensions. In this case the “automatism” of local disagreement that prevents even basic exchange of information was not surprising.
5. Public opinion surveys confirmed that nuclear technology was regarded as the most risky technology, even more, the nuclear waste become a symbol of most dangerous (industrial) activity.
6. The political institutions in the filed were not willing to devote necessary time and energy to the RW sitting problems, mostly because of the well known »NIMET« (not in my election time) syndrome. Frequent institutional changes did not contribute to the smoothing of the muddling through procedures.

7. Because of that the sitting process was not well coordinated, especially it suffered because it was not long term oriented in other words discontinuity was one of the most transparent problems. Quite often the idea that the best solution would be the export of the RW emerged.
8. There were some hints but evidently compensations of the risks and damages were not clear at all. Of course this didn't support the legitimization process.
9. The general dissatisfaction with nuclear energy production and also other sources of social and economic problems were focused on RW sitting process.
10. All the information and all the procedures were not open to the public, moreover some events proved the experts arrogance towards the local population who were not treated as competent stakeholder.
11. The general evaluation of the proceedings was that the inappropriate information process, i.e. the communication with local and general public was the most important reason of the sitting legitimization failure.

New combined procedure

These experiences were used in preparation of the new sitting procedures, which was designed and managed by new established Radwaste Management Agency (RMA). Its main objective was to overcome the existing cul-de-sack in the sitting procedures. In fact trust building was the most important task. New approach included extensive use of communicative tools and open design of the decision making processes: demonopolization of the expertise, openness of the decision making institutions and procedures, openness of the dialog between all stakeholders:

In advance offer of relatively high (financial) compensations for limited land use could in itself attract local community applications, because it enable local administration to solve a number of local problems and in this way influences its popularity between voters. Citizens' opposition, appearing later in the form of civil initiative or otherwise, causes withdraw of community from this option. Oppositions to LILW facility location is sometimes *pretext* of real political opposition and its interests (they do not really consider nuclear as threat, but use fears connected to it as a means in political battle), while sometimes it seems that *nuclear stigma* is still strongly present, preventing rational solution of LILW facility location. In advance offer of compensation is somehow misleading and *negotiation* process regarding this and other issues could be more favourable, because of greater involvement of local participants. The role of policy (either of parties or government) is not always consistent, mainly because of the sensitivity of the issue, but also because of great financial resources connected to nuclear sector.

Basic principles of the new sitting procedure were as follows

1. Social acceptability and technical feasibility are two most important and equal sine qua non criteria,
2. Therefore only technically feasible localities could be invited to participate in sitting procedures,
3. Local community has the right to exit from the sitting procedure in any phase,

4. The public should have access all information about safety and to all technical data, all important data about investor, and should be informed about supposed role of the involved institutions,
5. Second (even third) opinion is self evident right of any stakeholder,
6. Local community should get help in negotiation process,
7. The democratic standard of sitting procedures should not suffered because of the time constraints,
8. The chosen local community should get fair compensation for loss of real estate value and other disadvantages,
9. Credibility, stability and continuous coordination of communication activity are condition sine qua non for legitimization of the sitting procedure,
10. The RMA as the main coordinator of sitting activity should be recognized as reliable and expert institution.

The evaluation of the present state of the affair

1. Public opinion surveys prove that extremely negative attitudes and evaluations of the RW are still present and harm the normal communications with local communities.
2. The relations between all protagonists are still not transparent and consolidated. The RMA did not succeed to occupy the leading position in RW management. Because the sitting processes is going on for almost two decades the common sense interpretation that there is no real need to hurry is accepted in public.
3. The change of the technocratic approach and adopting democratic and more communicative one did not considerably change general negative public attitudes towards nuclear lobby and its connected partners and activities.
4. Because global problems in energy supply are rising also the aspirations of »nuclear lobby« are rising. At the same time the will to communicate with all concerned parties is getting weaker again.
5. The promised compensations have ambiguous effect. On one side it motivate local communities to participate in the sitting process on the other side it stimulate different speculations and even new threats: the RW should be very dangerous if there such generous compensations are offered.
6. Well-coordinated, consistent, flexible and differentiated communication on long term on all levels is obviously too high standard and is beyond the capacities of the involved institutions. Communication with general and local public is interrupted with often political changes and institutional reorganizations.
7. The new sitting process was formally confirmed but real support of the competent political bodies is missing. To understand the development the formal informal divide has to be considered, any communicative activity is divided to formal and informal one.
8. The personal connections of local stakeholders with political institutions on the national level are important, sometimes decisive factor in understanding the development.

9. The credibility of expert argumentation is still getting lower, although in some cases even basic understanding of the technical characteristic of the siting process and repository facility is still missing.
10. Stakeholders participating in the siting procedures are very different. Some are informed and has even their communication activities, the others are missing basic information.
11. The stakeholders could be differentiated according following dimensions:
 - Well informed – low informed about the technical characteristic of RW and siting procedures,
 - High or low communicative competences,
 - Highly or low motivated to participate in siting procedures,
 - Using formal or/and informal channels to influence siting procedures,
 - Well-organized or improvised organization of stakeholders.

Although the international cooperation is necessary, one sided initiatives and influences would not be accepted well, especially if they are against the country very interests (at least as perceived).

Though public participation and transparency of search process could not guarantee its success, they are the only way that enables it at least in democratic society.

References

1. Ajzen I. (1988). *Attitudes, Personality and Behavior*, Buckingham: Open University Press.
2. Becker B.J. (2000). Multivariate Meta-Analysis, In: Tinsley H.E.A., Brown S.D. (Eds.). *Handbook of Multivariate Statistics and Mathematical Modelling*, San Diego: Academic Press, 499-525.
3. Cvetkovich G., Löfstedt R.E. (Eds) (1999). *Social Trust and the Management of Risk*, London: Earthscan.
4. Earle T.C., Cvetkovich G. (1999). *Social Trust and Culture in Risk Management*, In: Cvetkovich G., Löfstedt R.E. (Eds). *Social Trust and the Management of Risk*, London: Earthscan, 9-21.
5. Eiser J.R., van der Pligt J. (1988). *Attitudes and Decisions*, London: Routledge.
6. Gamson, W.A., and Modigliani, A. (1989), 'Media Discourse and Public Opinion on Nuclear Power: A Constructionist Approach', in: *American Journal of Sociology*, 95(1): 1-37.
7. Gamson, W.A. (1992) *Talking Politics*. Cambridge: Cambridge University Press.
8. Goldstein I.F., Goldstein M. (2002). *How Much Risk?* Oxford: Oxford University Press.
9. Kasperson R.E., Dow K. (1993). Hazard Perception in Geography, In: Gärling T., Golledge R.G. (Eds.). *Behavior and Environment*. Amsterdam: North-Holland, 193-222.
10. Kasperson R.E., Stallen P.J.M. (1991) (Eds.). *Communicating Risks to the Public*, Dordrecht: Kluwer.
11. Kasperson R., Jhaveri N., Kasperson J.X. (2004), Stigma and the social amplification of risk: Toward a framework of analysis, In: J. Flynn, P. Slovic, H. Kunreuther (Eds.), *Risk, Media and Stigma*, London: EARTHSCAN, 9 – 27.
12. Kasperson J.X., Kasperson R.E. (2005). *The Social Contours of Risk. Vol I: Publics, Risk Communication & the Social Amplification of Risk*. London: EARTHSCAN.
13. Kos D., Polič M. (1999). *Analiza izkušenj v predhodnem postopku izbora lokacije odlagališča NSRAO* (Analysis of experiences in Preliminary Procedure of LILW repository Site Selection), ARAO–T1238/99, Agencija RAO, Ljubljana.

14. *Metodologija ocene družbenih vidikov uresničljivosti prijave za sodelovanje v postopku umeščanja odlagališča NSRAO* (Methodology for assessment of social aspects of feasibility of application for participation in procedure of LILW facility installation), ARAO-PR-2114-4/1, Marth 2005.
15. Morgan M.G., Fischhoff B., Bostrom A., Atman C.J. (2002). *Risk Communication: A Mental Models Approach*, Cambridge: Cambridge University Press.
16. Slovic P., Fischhoff B., Lichtenstein S. (1981). Perception and Acceptability of Risk from Energy Systems, In: Baum A., Singer J. E. (Eds.) *Advances in Environmental Psychology*, Vol 3., Energy: Psychological Perspectives, Hillsdale: LEA, 155-169.
17. Slovic P. (1993). Perceptions of Environmental Hazards: Psychological Perspective. In: Gärling T., Golledge R.G. (Eds.). *Behavior and Environment*. Amsterdam: North-Holland, 223-248.
18. Research project ARAO 2000, Ljubljana: ARAO
19. Toš N. (1999). *Vrednote na prehodu* (Values in Transition). Ljubljana: Center for public opinion studies.
20. Toš N. et al. SJM data 80, 82, 84, 87, 90, 90/3, 91/2, 93/2, 97/3, and 98/1.
21. Železnik N., Polič M. (2000). Acceptability of low and intermediate level radioactive waste repository, *Proceedings of Nuclear Energy in Central Europe 2000*, Ljubljana: Nuclear Society of Slovenia.
22. Železnik N., Polič M. (2001). Expert and non-expert groups perception of LILW repository site selection procedure, *Proceedings of Nuclear Energy in Central Europe 2001*, Ljubljana: Nuclear Society of Slovenia.
23. Železnik N., Kralj M., Mele I., Veselič M., (2005). *Development of Site Selection Process for an LILW Repository in Slovenia*, paper at the International Conference: Nuclear Energy for the New Europe 2005, Bled.