Report of Field Research in Finland and France

(February 15, 2018: French Nuclear Safety Authority)

March 9, 2018

Grants-in-Aid for Scientific Research (B): Research on Social Acceptance of High-level Radioactive Waste (HLW) Treatment and Disposal Facilities

Waseda Resilience Research Institute (WRRI)
Graduate School of Asia-Pacific Studies, Waseda University

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1. Introduction

1.1 Objective

The objective of this field research is to clarify the factors of social acceptance of the siting of the spent fuel repository in Finland and the way of consensus building concerning the HLW management in France. Finland has already selected the site for the spent fuel repository at Olkiluoto in the municipality of Eurajoki (Government decision was ratified by Parliament in 2001) and it has been currently under construction. France has been constructing the underground research laboratory (URL) for deep geological disposal in the municipality of Bure at the border of the departments of Meuse and Haute-Marne. However, consensus building concerning the HLW management and the Cigéo (Industrial Centre for Geological St orage) project is an ongoing matter in France. Meanwhile, the concept of reversibility has been emphasized in France than the other countries concerning deep geological disposal.

Thus, the current field research aimed at investigating the Finnish practice in which has already achieved social acceptance of the siting of the spent fuel repository while clarifying the concept of reversibility in France within the consensus building practice.

1.2 Organizations (Alphabetical order)

No	Organization	Address
Finland		
1	Eurajoki Municipal Office	Kalliotie 5, Eurajoki, Finland www.eurajoki.fi
2	Ministry of Economic Affairs & Employment of Finland (TEM)	Aleksanterinkatu 4, Helsinki, Finland www.tem.fi
3	Posiva Oy	Posiva Oy, Olkiluoto, Eurajoki, Finland www.posiva.fi
4	Radiation and Nuclear Safety Authority (STUK)	Laippatie 4, Helsinki, Finland www.stuk.fi
5	Saanio & Piekkola Oy	Laulukuja 4, Helsinki, Finland www.sroy.fi
6	VTT Technical Research Centre of Finland LTD	Kivimiehentie 3, Espoo, Finland www.vttresearch.com
France		
1	Committee of Local Information of the URL of Bure (CLIS)	Rue des Ormes – The Laundry 55290 Bure, France www.clis-bure.com
2	French national radioactive waste management agency (ANDRA)	1/7 rue Jean-Monnet 92298 Chatenay-Malabry cedex, France www.andra.fr
3	Andra's underground research laboratory (URL) and surface facilities (Center Meuse/Haute-Marne)	Andra Center of Meuse/Haute-Marne BP9 55290Bure, France www.andra.fr
4	French Nuclear Safety Authority (ASN)	15 rue Louis Lejeune 92541 Montrouge cedex, France www.asn.fr
5	School of Advanced Studies in the Social Sciences (EHESS)	54 Boulevard Raspail 75006 Paris, France
6	WISE-Paris	33-31 Rue de la Colonie F75013 Paris, France http ://www.wise-paris.org

1.3 Schedule

Finland			
February 5 (MON)	11:30-15:00	JL0413	Tokyo Narita (NRT) to Helsinki (HEL)
February 6 (TUE)	13:00-15:20	Helsinki	Radiation and Nuclear Safety Authority (STUK)
February 7 (WED)	12:30-15:10	Eurajoki	Olkiluoto Visitors Centre (PosivaOy)
	16:20-17:00		Eurajoki Municipal Office
February 8 (THU)	10:00-11:00	Helsinki	Ministry of Economic Affairs and Employment
February 9 (FRI)	09:00-13:30	Helsinki	VTT Technical Research Center of Finland
February 10 (SAT)	12 :15-14 :20	AY1575	Helsinki (HEL) to Paris-Charles de Gaulle (CDG)
France			
February 11 (SUN)	-	Paris	Internal Meeting
February 12 (MON)	14 :00-17 :30	Paris	French national radioactive waste management agency (ANDRA) Headquarters
February 13 (TUE)	15 :30-17 :00	Paris	School of Advanced Studies in the Social Sciences (EHESS)
February 14 (WED)	10 :00-17 :30	Bure	Andra's underground research laboratory (URL) and surface facilities (Center Meuse/Haute-Marne) Bure CLIS
February 15 (THU)	10 :20-11 :25	Paris	The French Nuclear Safety Authority (ASN)
February 16 (FRI)	14 :00-16 :15	Paris	Wise-Paris
February 17 (SAT)	19:00	JL0046	Paris-Charles de Gaulle (CDG) to Tokyo Haneda
February18 (SUN)	15:30 (+1 day)		Arrived at Tokyo Haneda Airport

1.4 Participants

Shunji MATSUOKA	Professor (Research Director) Graduate School of Asia-Pacific Studies, Waseda University Director Waseda Resilience Research Institute, Waseda University Director Waseda University Research Center for Future Planning in Hirono, Fukushima
KwangHo LEE	Ph.D. Candidate Graduate School of Asia-Pacific Studies, Waseda University Research Assistant Waseda Resilience Research Institute, Waseda University
Yunhee CHOI	Ph.D. Candidate Graduate School of Asia-Pacific Studies, Waseda University Research Assistant Waseda Resilience Research Institute, Waseda University

2. Summary record

2.1 Finland

2.1.1 Radiation and Nuclear Safety Authority of Finland (STUK)

Date & Time	February6, 2018 13 :00-15 :20
Place	Radiation and Nuclear Safety Authority Headquarters
Participants	Jaakko Leino, Section Head, Nuclear Waste Safety Assessment Kai Hämäläinen, Section Head, Regulation of Nuclear Waste Facilities

1) Questions

① What factors led to building public trust in STUK?

- Process to produce information for the public and its assessment: Is there any method to assess or evaluate that information provided by STUK which was accepted as credible by the local people? (e.g. survey result, etc.)

② More detailed examples how did STUK's performance meet the needs of the local people?

- Information circulated mainly through the webpage or media. Is there any method to assess the level of people's understanding and acceptance of the information provided by STUK?

③ More detailed information about the survey conducted by Helsinki University?

④ How did the STUK's role influence attitude of the local people to accept the siting of the repository?

⑤ Reversibility and Retrievability (R&R) debate in Finland

2) Discussion

Overview of STUK

- As a nuclear regulator of Finland, STUK carries out three roles: 1) regulatory body; 2) expert organization; and 3) laboratory work. This includes answering the questions raised by the public.

  : For example, STUK, as an expert organization, carried out 24 hours surveillance in Finland right after the Fukushima accident due to concerns of the public although there was no big effect in Finland.

  : The natural background dose is 3.2mSv per year in Finland (the latest calculation)

- Budget of STUK is 39.9 M Euro (as of 2016)

  : One third of budget comes from national budget; main part of budget comes from the fee of the surveillance of radiation measurement (nuclear reactors and medical industry) and providing expert services. Additionally, the budget includes research funding which comes from EU and Tekes (Finnish Funding Agency for Technology and Innovation) although these are minor parts.

- STUK is supervised by the Ministry of Social Affairs and Health and closely cooperates with Ministry of Economic Affairs and Employment. However, STUK is absolutely independent for not only budgetary issues but also for recruiting or staff coordination.

  : Although the Director General (DG) appointed by the Minister of Social Affairs & Health, STUK independently hires its own staffs (no political commitment). The Director General of STUK also has

been always an expert of the nuclear field. The directors of the departments are appointed by DG.

: The proposal about staff shifting between STUK and the Ministry was declined by STUK.

- STUK closely cooperates with the other Ministries

: Although STUK belongs to the Ministry of Social Affairs and Health, opinion of the Ministry of the Interior is necessary when STUK approves license for the nuclear reactors.

: STUK cooperates with the Ministry of Environment, Ministry of Defense, Ministry of Agriculture and Forestry, Ministry of Transportation and Communication in relation to the logical instrument on the emergency preparedness, customs, and Finnish Food Safety Authority in relation to food export.

- The number of employees: 321 (as of the end of 2016)

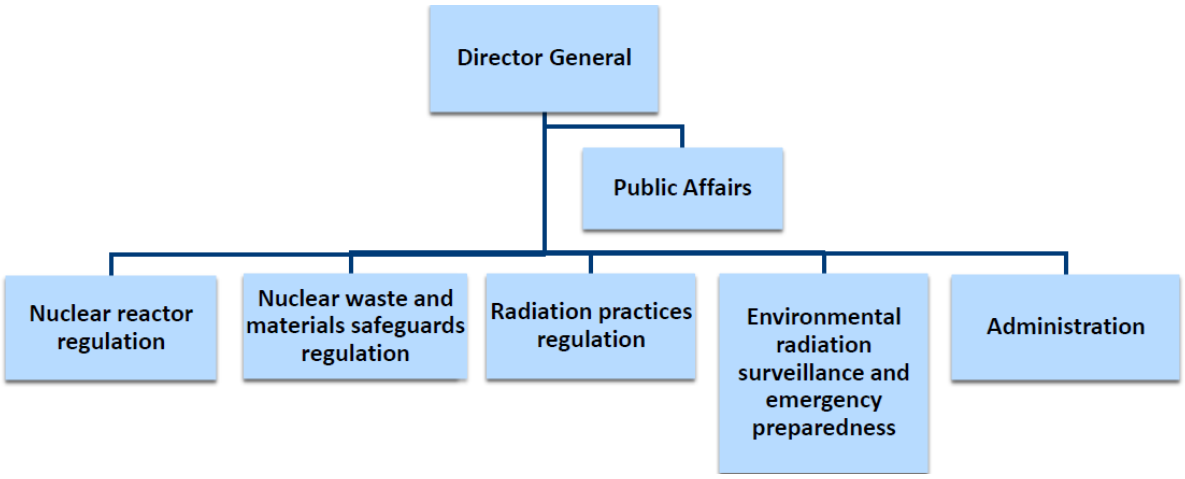

Figure 1.1 Organizational structure of STUK

Source: STUK

- STUK consists of Director General, who is appointed by the Minister of Social Affairs and Health, six Departments, and five Divisions

: Division of Nuclear reactor regulation division (120-130 employees/the biggest division)

: Division of Nuclear waste and materials safeguards regulation (around 30 employees)

: Division of Radiation practices regulation (around 40-50employees)

: Division of Environmental radiation surveillance and emergency preparedness

(around 50-60 employees/second biggest division)

: Division of Administration

- Although STUK has its own expertise, it sometimes uses expertise from VTT Technical Research Centre of Finland which STUK does not own. Since VTT also conducts researches for the power companies, STUK tries to ensure the expertise provided by VTT to STUK is not used for the nuclear companies.

: On the contract with VTT, one of the top priorities is ensuring what VTT is doing for STUK is independent from the nuclear companies

STUK's duties related to the nuclear waste management

- The Finnish nuclear waste management consists of three parts:

  1) Decision in Principle (DiP), which is political process to gain acceptance

  : Approval of the hosting municipality which possesses veto right ➔ positive DiP made by the Government ➔ ratification by the Parliament

  2) Construction license: given by the Government (It does not involve ratification by the Parliament)

  3) Operating license: given by the Government (It does not involve ratification by the Parliament)

- Throughout the whole phase, safety evaluation for the technical issues (with no relation to the political decision) is carried out by STUK. STUK can play veto right given by the Nuclear Energy Act at any phase if necessary.

  : During the licensing process, STUK shall provide the Government with a statement not to issue the license when safety problems occur. STUK also can stop the whole operation of the facilities if necessary (it has not been happened so far).

  : STUK provides a statement to the Government for the technical issues and communicates directly with the applicants (nuclear companies) to improve safety related issues instead of directly using veto right and stop the whole operation.

- Difference between veto rights given to the municipalities and STUK

  : Veto right given to the municipalities can be used only one time at the beginning of the DiP process, while the veto right given to the STUK is effective during the whole phase of the project. When Municipality accepts it, there is no option for the municipality to reject at the construction phase or operational phase unless severe safety issues are found.

- Finland is small country and the nuclear community is small as well. Thus, it is easy to change the position within the industry. Employees of STUK can move to Posiva freely; however, hiring process becomes careful when people who worked for Posiva or nuclear companies want to work for STUK. Especially, their position in STUK cannot be related to their previous position at the nuclear companies.

  : For example, someone who worked for the Loviisa power plant prior to STUK, cannot not work for the Loviisa related tasks. Instead, the person works for the Olkiluoto or Fennovoima related tasks so that the person does not work with the previous colleagues. STUK is quite careful for this.

- STUK is using international experts to review to ensure independency of STUK.

STUK's communication with the local people in 1997

- Local public and decision makers had a strong legal position based on the given veto right; however, there were lack of basic knowledge of safety issues among the local people while misbelieves on the issue were spread during the time.

  : This was based on difficulties to gain reliable information particularly for the disposal issues. Furthermore, information already provided was contradictory depending on the source of information.

- Although conducting communication with the public was not official obligation of STUK, STUK decided

to be a ‘proactive communicator’ based on its mission to inform the public on the safety related issues.

: In the 1990s, STUK was already considered as a reliable source of information in Finland.

: Finns still have very high trust in STUK when compared to citizen’s trust in the regulatory body in the other EU countries.

- Process to be involved proactively

: STUK requested Helsinki University to conduct the survey in order to clarify what the local people in the candidate municipalities expect from STUK.

: Local people expected to have more reliable information about everyday safety issues, safety and frequency of transport, evacuation, terrorism, etc.

- STUK’s goal was to increase confidence of the stakeholders-local public and decision makers-by improving their factual knowledge base while not aiming at social acceptance of the project.

: Based on the “proactive principle,” STUK aimed at providing the best information available promptly to the public while discussing only safety issues not political issues.

: Proactive principle started being emphasized when the EIA program carried out in 1997-1998. Based on the voluntary approach, STUK prepared itself to be a proactive communicator. It was driven by internal and pure motivation, not based on the external pressure by government.

: It can be considered that the beginning of such motivation of STUK to be a proactive communicator was influenced by Chernobyl accidents to some degree (Mr. Jakko).

: STUK attempted to answer to the stakeholders’ (local general public, local decision makers, local media, local NGOs) needs.

: Independence of information as a regulator (based on well-defined responsibilities and roles) allowed STUK to provide only neutral and technical information which includes benefits and cons while avoiding political aspects.

: There were no Posiva or power company staffs when STUK communicated with the local.

: In comparison with nowadays where a lot of information circulated through social media, it was easier for STUK to carry out its role as a proactive communicator for STUK.

: STUK visited all the candidate sites and held STUK events separated from the public hearings carried out during the EIA process by Posiva. STUK’s events are being carried out in the newly designated sites for the new nuclear power plants of Fennovoima.

Factors of social acceptance in Finland

- Early established national framework

: Well defined roles and responsibilities, stable funding system, and stable national policy and strategy on nuclear waste management

- Clear licensing process

: Stepwise licensing and implementation process based on Decision in Principle

: Public interest was high considering the general Finnish scale

- Active regulatory work
  : Development of regulatory approach parallel with R&D
  : STUK was involved in the project from the very early stage
  : STUK's proactive communication with the local people (STUK's own tour and STUK's participation in the formal hearings during the EIA process)
  : Increased competency over the 30 years
- Additionally, wishes of the local people to take care of the already existing waste in their communities, particularly Eurajoki and Loviisa, and their acceptance based on the veto right given to the municipalities by law.

Communication with the public

- STUK is firmly based on technical expertise on the safety issues (no political commitments) and this approach gives a clear foundation of STUK.
- Public communication department within STUK, which consists of around 10 specialists in communication and information technology, helps technicians to formulate the information for press release so that it can be more understandable by the public. If the content is too technical, it raises public mistrust and misunderstanding.
  : STUK tries to be open when it provides explanation to the media. In this case, communication specialists help for the public releases.
- Information provided by STUK is not mixed with information provided with Posiva
- Means of communication
  : Yearly report (in Finnish)
  : STUK's tour and communication with local media, civic organization, local decision makers
  : Seminars, panels, discussion, local media, newsletters
  : ALARA –journal (published by STUK), available at the official homepage of STUK
  : Conferences and meetings with journalists
  : Meetings with the Member of Parliament in the form of seminars (on request)
- Although STUK is very independent, it maintains good communication with the operators. This helps STUK to provide prompt information about the ongoing issues concerning the nuclear reactor operation to the public.
- When Posiva submitted the construction application in 2012, STUK communicated with the local public independently during the licensing process.
- Lessons learned
  : "Communicate and update it when it is needed, commit your staff to the communication principles, be open and do not hide anything, communication must be based on the needs of audience"
- STUK acknowledges that there is no feasible and perfect way to deal with geological disposal. Nevertheless, STUK emphasizes the progress is the way to learn and to address unknowns parts of the

project.

Reversibility and Retrievability

- During the DiP, retrievability was one of the requirements for Posiva.
- However, the principle in Finland is final repository which aims at passively and safely disposing spent fuel in the safe rock.
- If the future generation needs to retrieve the waste, the future generation will be responsible for funding.


<With Mr. Jaakko Leino and Mr. Kai Hämäläinen of STUK>

3) Data collection

- Presentation material entitled *STUK – Radiation and Nuclear Safety Authority*
- Presentation material entitled *STUK's communication with the general public on final disposal of spent nuclear fuel*
- Presentation material entitled *Public communication during the construction license review*

2.1.2 Posiva Solutions

Date & Time	February 7, 2018 12 :30-15 :10
Participants	Mika Pohjonen, Managing Director

(1) Questions

① Did what factors lead Posiva to gain trust from the local public?

- Strategy carried out by Posiva to build trust and to promote citizen participation among the residents in the candidate municipality (Both within and outside the EIA procedure)
- Pokka Hokkanen[1] notes that "the activities outside the EIA were important for all parties." More

[1] Hokkanen P. (2001) EIA and Decision Making in Search of Each Other: the final disposal of nuclear waste in Finland. Nordregio Report , 2001(6), 95-151

detailed information of the activities outside the EIA.

② Among the four candidate municipalities, Kuhmo and Ä änekoski remained unfavorable and Eurajoki and Loviisa became more favorable to the project. Besides the fact that Eurajoki and Loviisa were already familiar with the nuclear industry, were there any other main remarkable factors observed by Posiva among the municipalities when the EIA procedure carried out?

③ Negotiation on compensation: Was the negotiation carried out with all the candidate municipal councils or was it carried out only with the Eurajoki?

- Matti Kojo (2009)[2] emphasized the importance of community benefit to gain local acceptance. In this regard, further detailed background of the negotiation with the municipalities?

④ Why was Eurajoki chosen, not Loviisa?

- Although some explanations such as Loviisa movement were noted, it is still unclear to grasp the reason why Eurajoki, where 59% of people showed agreement to accept the repository, was chosen rather than Loviisa, where 62% of people agreed with the project?

⑤ Reversibility and Retrievability (R&R) debate in Finland

(2) Discussion

- General explanation of the Olkiluoto Island and the location of the facilities (entering gates, nuclear reactors, interim storage, and the spent nuclear fuel final disposal area, entrance of Onkalo) based on the map on the slide.
- Onkalo is a research laboratory at the moment; however, it will be a part of the repository.
- TVO and Fortum (formerly IVO), two operators of NPPs, both have interim storages and spent fuel from the both NPPs will be disposed in Olkiluoto.
- Fortum which had sent its spent fuel back to Russia joined TVO to search for the site since the amendment of Nuclear Energy Act in 1994 which banned export and import of nuclear waste.
- Three levels of permission needed in Finland for the final disposal
  1) Decision in Principle (DiP) for site selection
  2) Construction license
  3) Operation license: Operation is expected to start in mid 2020's (about 2025).

[2] Kojo, M. (2009) The strategy of site selection for the spent nuclear fuel repository in Finland. In: Kojo, M. and Litmanen, T., ed., "The Renewal of Nuclear Power in Finland", 161-191, Palgrave Macmillan, Basingstoke.

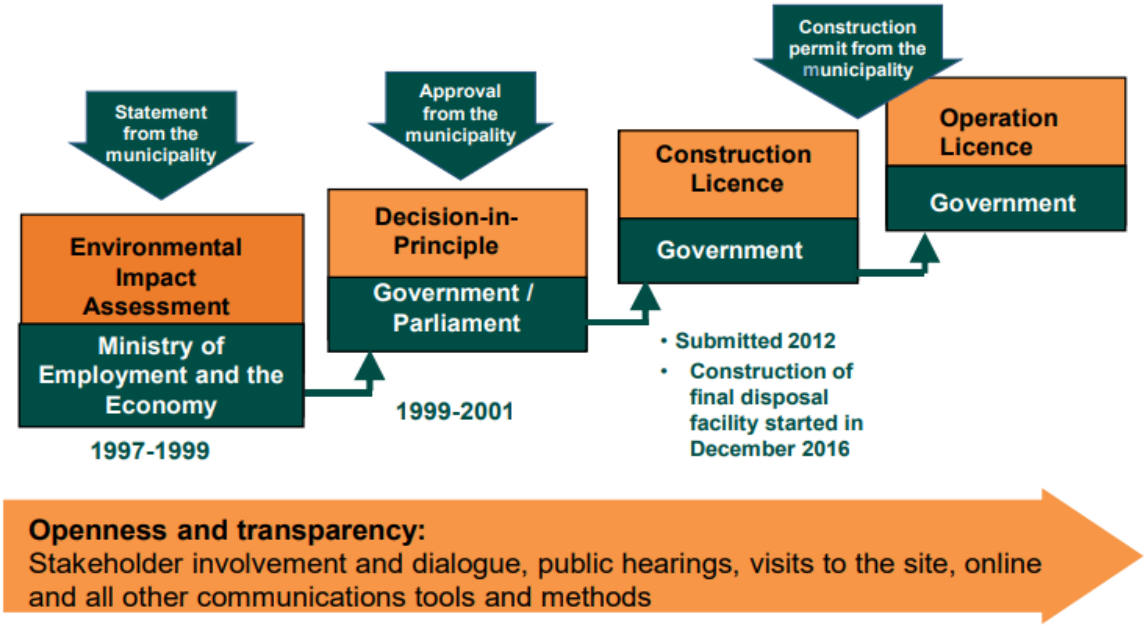

Figure 1.2 Decision making process and license requirement for the final disposal

Source: Posiva

Factors of social acceptance

- Trust and transparency

  : Posiva did not try to change attitude of people but kept telling people what they were doing.

  : Posiva aimed at maintaining local tolerance rather than achieving full acceptance at the time of site selection 1987 – 1999.

  : Majority of people in Eurajoki trust in Posiva as well as TVO.

  : According to research of Tampere university, people in Eurajoki and Pyhäjoki do not trust very much to two NGO´s-Greenpeace and Pro Hanhikivi-movement (a local NGO in Pyhäjoki)-in issues related to nuclear waste management.

- Independent and reliable authorities

  : No corruption, no political influence (it can be said as a part of Scandinavian characteristics)

  : STUK does not change its role and principle on safety related issues because of influence from government (no political at all). Also, the other authorities are very trusty in Finland.

- Local people in Eurajoki and Loviisa had a good and long experience with nuclear industry

  : Over 40 years operation, top 5-6 in the world in terms of availability of nuclear reactors and no accidents

  : Nuclear industry was already deeply engaged in the life of the local.

- Promoting overall economy of the region

  : Real estate tax from nuclear installation

- There are always opponents; however acceptance can be gained as long as they trust authorities and if they feel that it is tolerable.

: Especially people in nuclear towns where already the interim storages situated expected to have solutions for the waste while the long-term interim storage was not considered as a suitable option in Finland.

- Active communication started since the mid-90s even before the EIA process

: Information provided by one-side is not communication. Interaction with the public is the way to learn for Posiva as well.

- Suitable geological factor

: There are no seismic activities in the area. Finland has one of the most stable bedrock in the world.

- Pragmatism
- Well defined role and plan

: Local people were well informed who is making decision, what is the process, etc.

- Concerns on the image of the municipality

: People in the candidate municipalities concerned the impact on the image of the municipality. However, Eurajoki did not have certain image of the municipality back in the late 1990s. For now, the slogan of the municipality is related to electricity generation.

: Olkiluoto Visitors center also became an attraction of Eurajoki (over 15,000 visitors per year)

Candidate municipalities

- Although Loviisa was added as one of the candidate municipalities during the detailed site characterization phase between 1993 and 2000, it was based on the appropriateness of the site.

: Since the detailed site characterization costs a large amount of money, there is no reason to add one more site if it is not appropriate.

: For example, there are 57 boreholes in Olkiluoto. Each borehole with all the investigations that are done for it costs 100 – 300 k€.

: It must be noted that suitable site selection was based on many other parameters as well such as infrastructure (roads, railroads, harbours, town/municipality structures etc), land use plans, etc.

- To carry out detailed characterization in the candidate municipalities, Posiva did not need to receive permission from the municipalities. It only requires the permission of the land owners (The municipality is a landowner as well).

: Veto right given to the municipality can be used, when government asks for the statement of the municipality as a part of the DiP process.

- It is hard to say if the EIA process increased acceptance even in Kuhmo and Ä änekoski where acceptance could be hardly achieved compare to Eurajoki and Loviisa. Nevertheless, the survey demonstrated in 1999 shows that still more people in those two municipalities supported the project than the national wide level.

Public communication

- Communication is very important; there are 15 experts in the communication department of TVO Group.

  : Posiva actively interacted and cooperated with the community from the very early phase of the project.

- Posiva is communicating with stakeholders-media, public, owners, politicians, cooperation partners, subcontractors, authorities and decision-makers, environmental organizations, suppliers, potential customers, personnel, educational institutes, neighbors-based on their needs. Different communication strategies were used depending on the stakeholders.

- Guideline of communication

  : "Posiva communicates quickly, openly, neutrally based on facts" in order to increase knowledge of people on final disposal

  : Posiva aims at building its own image as a reliable operator, frontrunner in industrial final disposal, good employer, and open operator willing to discuss with people.

-Posiva also pays a lot of attention on internal communication.

Reversibility and Retrievability

- Retrievability in Finland does not mean many changes in the overall glance and the nuclear waste management plan. However, retrievability should be considered when the repository is designed by law.

- Concept of reversibility is not familiar in Finland. In the Finnish context, retrievability denotes possibility to retrieve the waste if it is necessary. Current nuclear waste fund must be able to cover the whole project until the end.

  : When the nuclear reactors are decommissioned and the repository is backfilled, the power company's responsibility transfers to the government.

<With Mr. Mika Pohjonen of Posiva Solutions>

(3) Data collection

- Presentation material entitled *Constructing the world's first Deep Geological Repository for spent fuel* (6 February, 2018)

- Presentation material entitled *Stakeholder strategy*

- Presentation material entitled *Public acceptance of final disposal programme*
- Brochure entitled *TVO Power from Nature, Olkiluoto observation trail* (English)
- Brochure entitled *TVO Posiva Electricity from uranium science exhibition*
- Pocket guide to final disposal
- Brochure entitled *Eurajoki* (Finnish)
- Brochure entitled *Rauma*
- Brochure entitled *Wellbeing with nuclear electricity*
- Brochure entitled *Geological disposal of spent nuclear fuel in Olkiluoto*

2.1.3 Eurajoki Municipal Office

Date & Time	February 7, 2018 16 :20-17 :00
Participants	Johanna Huhtala, Development Director

(1) Questions

① How did decision makers in the Eurajoki municipality communicate with the local people concerning the matter?

② Reaction of the neighboring municipalities and in case of any high-level of oppositions among them, how was it solved?

③ The vision of the municipality regarding the nuclear industry and nuclear waste management.

(2) Discussion

Spent fuel repository and acceptance at the local level

- It is quite unique having NPP and the final disposal repository at the same yard in the world.
- Trust between the local people and the developer can be seen as a major reason of acceptance in Finland.

  : Based on its own experience with having nuclear power plant in Eurajoki since the end of 1970s, there is high trust in the operator, TVO, among the local.

  : Although there was active discussion if the facility must be situated in Eurajoki due to concerns on environmental issues and uncertainty, people were on the positive side when the decision made back in 1999.

  : Ms. Huhtala was born and raised in Pori, located around 40 minutes away from Olkiluoto, and has met many people while working in the region for her entire life; however, personally she has never met anyone who strongly against the project.

  : Close relationship with the nuclear industry in the people's daily life in the region might be influenced on this. Most of people work for the nuclear power plants or nuclear industry related companies in the region.

  : In the region, TVO and Posiva enjoy good reputation.

  : Local people think that the nuclear company is very loyal.

: Strong trust in TVO and Posiva can be seen as the most important factor of acceptance of the repository in the region. People thought that TVO and Posiva build whatever, it can be trusted.

: Posiva and TVO are two different companies; however, people perceive them as one company. It can be said that trust in TVO transferred to the new company, called Posiva, and vice versa.

- Prior to having the TVO's NPP back in the 1970s, the owner of the island of Olkuluoto was probably the Eurajoki municipality. For the spent fuel repository, Olkiluoto was finally chosen after TVO searched for various different areas within the territory of Eurajoki.

Communication

- Collaborative committee between the municipality and the nuclear companies

: The recent meeting was held on December 2017 (topic was ice hockey game)

: Members of the committee consist of representatives of the municipal office, head of TVO, head of Posiva, politicians (around 20-30 people)

: The meeting is held twice a year generally; however it can be three times per year depending on the cases.

: Generally the meeting is open to the public; however, it can be a closed meeting depending on the issue.

Benefit package

- Real estate tax from the nuclear facilities allows the municipality to provide the high level of welfare to the local people.

: There is normally pressure on the municipalities to establish schools in Finland. In Eurajoki, there is enough number of schools compare to the other municipality: five different schools with the number of students around 20-30 students. Since parents prefer to send their kids to the schools with the small number of students, more people wish to move to Eurajoki.

- A stadium for the ice hockey has been already established based on the Vuojoki agreement (Name of the stadium: Wresting house arena)
- Municipality borrowed money from TVO to build a senior house.
- Tax revenue of the municipality

: Approximately two third of the total tax revenue comes from the nuclear company.

: Some part of the revenue comes from the national government as well.

Industrial structure of the municipality

- There are many middle size companies, which are mainly subcontractors related to the nuclear industry

: Particularly, subcontractors in the field of metal construction have business relationship with TVO or Posiva or nuclear industry in general. For example, Esta metal makes components of the nuclear power plants and Raikka cooperates with the UK's BHR Group. Some also have direct connection with Areva.

- In the Satakunta region, there are 150 different types of companies.

  : Egg producer, called Satamuna, is another major company in the region.

Vision of the municipality

- On 1 January 2017, Eurajoki merged with Luvia. Pori and Rauma are bigger than Eurajoki, however, Luvia preferred to join Eurajoki.

  : Level of welfare in Eurajoki is higher than the other bigger cities around.

- As one of the visions of the municipality, there is no plan or pressure to enlarge the size of the municipality at the moment in order to maintain the current level of welfare.

  : After the merger, current population is 9,000 (Formerly, Eurajoki: 6,000 and Luvia: 3,000)

  : Eurajoki Municipality considers that the current size is just perfect. It would also take time to adjust the differences between Eurajoki and Luvia.

- Dealing with waste of Fennovoima (New nuclear company of Finland)

  : Firstly, Posiva and Fennovoima need to negotiate to deal with the waste.

  : Posiva is currently opposing to receive spent fuel from Fennovoima's NPP and to dispose it in its own repository with spent fuel from Olkiluoto and Loviisa NPPs. Thus, Eurajoki municipality is not necessary to discuss the issue at the moment.

  : In case that Posiva decides to accept the waste, it must be decided at the municipal level as well as the national level.

Background of interviewee

- Ms Huhtala worked closely for the Olkiluoto project when she worked for the chamber of commerce in Rauma. She is currently in charge of cooperation with TVO and Posiva.

  : She is responsible for development at the Eurajoki municipal office.

<With Ms. Johanna Huhtala of Eurajoki Municipal Office>

2.1.4 Ministry of Economic Affairs and Employment of Finland (TEM)

Date & Time	February 8, 2018 10 :00-11 :00
Participants	Anne Väätäinen, Negotiating Official, Business and Innovation Department

(1) Questions

① Did what factors lead Finland to gain trust from the general public?

- Detailed strategy or performance carried out by the Finnish government to build trust and to promote citizen participation at the both national and local level

② Reversibility and Retrievability (R&R) debate in Finland

- What is the historical background concerning this issue in Finland? And what is the ongoing debate and international cooperation in the Finnish practice?

(2) Discussion

- After the Decision in principle for final disposal in the beginning of 2000, many relevant people and groups visited Finland and the Ministry.
- Since Finland is a small country, people in the field know each other.
- Prior to the amendment of Nuclear Energy Act in 1994, one of the nuclear companies of Finland, Fortum (formerly called IVO), sent spent fuel back to Russia. After the Chernobyl accident, there was debate among the politicians about sending spent fuel back to Russia.
  : The debate was led by Green party and politicians started searching for the new alternatives.

Factors of social acceptance

- Trust in TVO
  : At the early phase, there was opposition in Finland as well. However, strong trust facilitated acceptance of the repository in Eurajoki. Safe operation of the NPPs can be seen as one of the factors of public trust in the nuclear companies.
- Mutual interests were well established between the nuclear company and the hosting municipality.
- Well-established legal framework
  : Nuclear Energy Act well-defined the role and responsibilities of the involved actors.
  : Furthermore, it ensured independency of the actors, such as regulator, government.
  : Government maintained its neutral position during the decision making process.
  : The State Nuclear Management Fund, where the nuclear companies have been obliged to store money for the future waste management, including final disposal, played (and still plays) an important role.
- Active communication
  : Although each actor was independent, good communication was carried out between the actors. It helped in sharing the information as well as with cooperation.
- It must be noted that the small country characteristic also helped in building trust in Finland.

- A Japan-Finland nuclear seminar will be held in Tokyo in April 2018. The Ministry of Economic Affairs and Employment and Posiva, as well as some other Finnish organizations will participate.


<With Ms. Anne Väätäinen of the Ministry of Economic Affairs and Employment of Finland>

2.1.5 VTT Technical Research Centre of Finland LTD/Saaanio&Riekkola Oy

Date & Time	February 9, 2018 09 :00-13 :30
Participants	**VTT Technical Research Centre of Finland** Kari Rasilainen, Principal Scientist (D.Sc.), Nuclear Waste Management Suvi Karvonen, Research Team Leader (D.Sc.), Nuclear Safety, Nuclear Waste Management Matti Paljakka, Sales Manager (M.Sc.), NuclearEnergy and radwaste
	Saaanio&Riekkola Oy Fionan O'Carroll, Director, International Operations Timo Seppälä, Senior Advisor

(1) Questions

① Did what factors lead Finland to gain trust from the general public?

- Detailed strategy carried out by VTT and other relevant research institutes to build trust and promote citizen participation at the both national and local level

② Background of initiating the JYT program as well as the background of starting the second phase of the program with a wider range of perspectives which include researches conducted by social scientists

③ Detailed information of the program: How were researchers selected? What was the qualification to apply to the program? Are the researchers independent or belonged to the national institutes?

④ Impact of the research program: Did information and knowledge created by the program have a direct effect on the public? If so, are there any results assessed the impact of the program on the public?

⑤ VTT's relationship with the key actors in the field of nuclear waste management and the scope of work carried out by VTT, particularly for STUK and Posiva? Does the VTT design the safety assessment program and provide assessment service to STUK or Posiva?

⑥ Reversibility and Retrievability (R&R) debate in Finland

- What is the historical background concerning this issue in Finland? And what is the ongoing debate and international cooperation in the Finnish practice?

(2) Discussion

Overview of VTT

- Out of a total of more than 2400 employees, about 200-300 employees are working in the field of nuclear.
- VTT has several offices in the different areas; however, nuclear research has been carried out in Helsinki area.
- VTT is owned by the Ministry of Economic Affairs and Employment. It provides comments as a think tank for the issues related to legislation and regulation.
  : VTT also makes some technical comments on the works made by STUK.
- VTT has been involved in nuclear waste management from the very early stage.

Overview of Saaanio&Riekkola Oy

- As an engineering consulting firm, it has started dealing with nuclear waste management since 1979 for the underground engineering.
- Twin silos, one for LLW and one for KIKW.
- The company carries out experiments for bentonite and hydro at Onkalo.

KYT Finnish research program on nuclear waste management

- As the program based on the Nuclear Energy Act, it aims at providing better information and research results to STUK and the Ministry of Economic Affairs and Employment.
  : The members of the planning and steering groups are coming from all current NWM actors in Finland.
- Although the fund comes from nuclear waste management fund, the program is considered as a public research program.
- Survey has been demonstrated at the national level in order to evaluate the program.
- For the research topics on nuclear waste management and social acceptability, researches are selected on the competitive bidding.
- The researches which have been conducted under the program have been reviewed by experts from Sweden, Finland, and France.
  : International review on the research program carried out in 2017 can be accessed on the webpage of the program.
- Duration of the projects varies depending on the topics

: From one to maximum four years/sometime the projects are carried out in the form of the special project.

-

- From the perspectives of social scientists, topics such as how the social science can be combined, how to communicate the technical facts with the lay people, were studied.

: Under the program, 39 peer reviewed journal papers published in 2016 and three of them have been developed from the perspective of social scientists.

Public acceptance of HLW repository in Finland

- Challenges for acceptance

: People concern about the long-term safety issues since it cannot be guaranteed empirically.

- Situation of the candidate municipalities

: Eurajoki is one of the wealthiest municipalities in Finland because of tax income from the nuclear company considering the number of inhabitants.

: Rauma, which is located near Olkiluoto NPP, is jealous of Eurajoki because of the financial condition. Rauma has a lot of residents who are working in the NPP site.

: Considering Kuhmo and Ä änekoski where acceptance was not gained, the familiarity of the nuclear industry and profit coming from the industry played a decisive role.

: Because of its own experience with the nuclear power plant, there was less safety related discussion in Eurajoki.

: Benefits were more important particularly in Eurajoki

: It was easy to communicate with people in the nuclear towns because their attitude was already positively tuned for the final disposal.

: Many residents in the hosting municipality already worked for the nuclear industry (or their friends or family).

- The reason why Olkiluoto was chosen, not Loviisa

: Spent fuel was more situated in Olkiluoto than in Loviisa (Since Fortum, the owner of Loviisa NPP, sent spent fuel back to Russia until 1996, there was less amount of spent fuel in Loviisa.

: Additionally, there was a strong movement against the repository in Loviisa while no such movement organized in Eurajoki.

: Overall climate to negotiate was smoother in Eurajoki among the candidate municipalities.

: Particularly, the attitude had started changing within the Eurajoki Municipal Council since the Nuclear Energy Act amended in 1994, which banned import and export of nuclear waste. This enabled the members of the Eurajoki Municipal Council to consider the benefit package of the project positively.

- Consensus among the local people about proceeding with the project in order to have final solution for the waste than storing spent fuel in the interim storage. During the DiP, retrievability was one of the conditions (it was written on the safety requirements, which does not exist anymore).

- Acceptance at the national level is still lower than acceptance at the local level in Eurajoki
  : Because local people are more familiar with nuclear technology as well as the benefits that they have gained from the nuclear industry.
  : Communication was more effective with smaller population at the local level while people reacted more emotionally at the national level (their understanding was based on emotions than the actual knowledge).
- Strong communication skill of Posiva was emphasized as one of the important factors of acceptance.
  : Posiva has well trained employees to communicate with all different level of audience.
  : Posiva opened up difficulties related to the repository and tried to make it more understandable.
  : Posiva maintained its close contact with politicians while reaching out to politicians through seminars and meetings.
- Trust is an important factor and legal framework played an import role for trust building
  : Trust cannot be gained only based on the communication skills.
  : In Finland, legal framework set and defined the role and responsibility of each involved actor, and this helped with building public trust as well.
  : Cooperation among the different actors helped communication without "compromising independency."
- Legal and institutional framework also ensures the funding system for stable development of the project.
  : Even if the nuclear industry disappears in Finland, Finland will be able to maintain its nuclear waste management based on the nuclear waste management fund.
- Although the survey result shows that over 30% of people at the national and the local level do not trust safety of the final disposal up until now, it cannot be interpreted as people do not accept the project. People who accepted the project are not necessarily trust the project or technology vice versa.
  : Parliament members are quite knowledgeable since they have received a lot of information.
  : If the questions changes as "do you trust in final disposal if the regulator finds out it is safe?" probably over 60% of people would answer that they trust.
- Since the Äänekoski municipality is an industrial municipality, it was difficult to understand for Posiva the reason of lower level of acceptance in Äänekoski. However, in case of Kuhmo, Posiva felt that it would be difficult to gain acceptance since Kuhmo had already have its strong environmental related image of municipality.
- In terms of communication approach, TVO and Fortum, two nuclear companies of Finland, had different communication approach. TVO was very active in communication with the public while Fortum was not.

Background of participants

- Dr. Kari Rasilainen has been working over 30 years in nuclear waste management and public research program at VTT. He was an editor of final report of the JYT 2001.
- Dr. Suvi Karvonen is working for long-term safety, bentonite concrete, canisters related issues, engineering physics.

- Mr. Matti Paljakka has been working for VTT since 1995.
- Mr. Timo Seppälä worked for Posiva for 17 years and he was responsible for communication with decision makers in the late 90s at the Olkiluoto site.
- Mr. Fionan O'Carroll has been working in civil engineering design consultation and international operation. He is dealing with export Finnish expertise and knowhow, and bentonite related issues.


<With Dr. Kari Rasilainen, Dr. Suvi Karvonen, Mr. Matti Paljakka of VTT Technical Research Centre of Finland and Mr. Timo Seppälä, Mr. Fionan O'Carroll of Saaanio & Riekkola Oy>

(3) Data collection

- Presentation material entitled *Company presentation for Waseda University by Saanio & Riekkola Oy*, (9 February 2018)
- Presentation material entitled *VTT Technical Research Centre of Finland Ltd Overview and Radwaste* (9 Feb 2018)
- Presentation material entitled *KYT 2018-Finnish Research Programme on Nuclear Waste Management Brief presentation for Waseda Unviersity visit* (9 February 2018)
- Presentation material entitled *Public acceptance of HLW repository in Finland* (9 February 2018 at VTT)

2.2 France

2.2.1 French national radioactive waste management agency (ANDRA) Headquarters

Date & Time	February 12, 2018 14 :00-17 :30
Participants	Richard Poisson, Business Manager, International Division Annabelle Quenet, Press Officer Jelena Bolia, Business Manager, International Relations Department/Division of Development, Innovation and International Affairs

(1) Questions

① Approaches taken by Andra to gain acceptance of the local residents in Bure as well as to increase public consensus for the Cigéo project at the national level.

- Detailed strategy and activities carried out by Andra to build trust among the local residents as well as the general public at the national level
- Cooperation or relation with the platforms for citizen participation such as CNDP or independent scientists groups, etc.

② Remarkable factors observed by Andra among the different candidate municipalities when the site selection process carried out.

③ Negotiation on compensation with Bure

- The detailed information concerning compensation

④ Reversibility and Retrievability (R&R) debate in France

- In comparison with the other nuclear states, France puts more emphasis on R&R debate, particularly reversibility issues. What is the historical background (starting point) to pay more attention to R&R debate and what is the current level of debate in France? What kind of approach has been taken by Andra concerning this matter at the national and international level?

(2) Discussion

Overview of the nuclear waste management policy in France

- Andra, government agency, carries out the nuclear waste management in France and deals with 99% of civil waste.
- In France, there are several different sectors where generate nuclear waste: electronuclear, defense, research, non electronuclear (long-lived, different strategy) industry, medical (diagnosis & treatment).
- Andra publishes national inventory every three years and reports the waste volume of the NPPs.
- In France, nuclear waste is classified in three ways and the category for low-level & intermediate level waste is compatible with IAEA category. Yet, it is very conservative so that the very low level of radioactive cements also must be handled as waste accordance with the law.
- Responsibility of waste

: In France, waste producer is always an owner of waste: EDF, AREVA, and CEA.

: For non electronic waste, Andra assumes that it is Andra's waste.

: This principle is very important when claim occurs during the process of treatment conditioning, packaging, and transporting).

: For the small waste, the responsibility of the waste transfers to Andra once Andra accepts the waste physically.

- In the French territory, only nuclear waste produced in France can be existed and disposed. Reprocessing waste can exist temporarily but these wastes must be sent back to the origin of the waste.
- Based on the 1991 Bataille Act, three different options have been researched: 1) deep geological disposal, 2) partitioning and transmutation, and 3) surface long-term storage.
- Based on the Act of 2006, deep geological disposal was chosen as the most suitable option for the current situation while research has been still carried out for the other two options.
- 2006 transparency Act imposed more emphasis on public communication and transparency not only for Andra but also for the other actors within the radioactive waste producing industry.

Overview of Andra

- Andra was existed as a part of Atomic Energy Commission for 20 years before 1991. Later it was established as an independent agency to manage the nuclear waste in France in 1991 based on the 1991 Bataille Act.
- Andra is a government owned public agency which is independent with its commercial objectivities (unique structure of France).

  : The board mainly consists of government officials from three Ministries.

  : Andra does not belong directly to any Ministry.
- Andra participates in the planning process for National Plan for radioactive waste and materials management (PNGMDR), which guides Andra how to manage its own radioactive waste (Update every 3 years) together with ASN and IRSN.

  : ASN is a nuclear regulatory body

  : IRSN is not a regulator since it does not have decision power; however, it provides technical support to ASN.

Brief overview of the French nuclear industry

- There are 58 pressurized water reactors (PWR).
- EDF is an operator and constructor of the nuclear power plants.
- Areva is a fuel company.
- CEA carries out research and military operation.
- Reprocessing plant is located in la Hague.
- ITER is the concept of fusion instead of fission. The facility does not exist at the moment since it is in construction phase.

Process of the public communication regarding the project

- High level & intermediate level of nuclear waste will be disposed in the Cigéo starting from the year of 2027 or 2028. The schedule is depending on public opinion and permission.
- If the nuclear waste management policy changes and reprocessing stops in France, Cigéo needs to be able to accept the spent fuel (Lately, Green party is getting stronger on the reprocessing policy).
- There are no alternatives for the deep geological disposal repository currently; however, the project could be terminated due to political or environmental opposition at a certain point. This is a part of reversibility concept in France.
- In order to promote nuclear safety, a national outreach program is carried out on the institutional base or sometimes under the request of the public

Public communication of Andra

- There is a division of communication within Andra.
  : Total of 25 experts in the field of communication (10 in Bure and 15 in HQ)
  : Four for the homepage communication (Media, territory management, local commission, they are mostly interchangeable)
- Public has been involved in geological disposal program over the past 30 years.
- Between 1996 and 1998/1999 when Andra was still waiting for the decision of government, Andra conducted outreach strategy to communicate with the local public.
- Andra also acknowledges that there is still more emphasis on the technical aspects than communication due to deeply rooted engineer's culture in France.
- Andra's communication team attempts to consider all different aspects –local, political, and societal- in order to change the engineer-oriented culture.
- With Andra's professionals in crisis communication, Andra tries to clarify the Andra's stakeholders.

CLIS

- CLIS in Bure was created in 1999 when Andra obtained license for the URL.
- CLIS is a public interest group in the form of the follow-up committee existing in the nuclear facilities.
- Technically, URL is not a nuclear facility; however, the law imposed to URL set up the CLIS in Bure.
- CLIS consists of local members of parliament, members of agricultural union, hunting groups, etc.

Siting strategy and process

- Andra was looking for the area with less population density
  : Less than 10 people in Square meter
  : Sites were identified solely based on the scientific criteria (no consideration of political and local people's opinion)
  : Bure, with less than 100 residents, was found based on purely geological factors.

- To find a site for such facility, acceptability must be gained from all 4 different level of administrative district in France.

: National, 13 regional, district (100) municipality (36,000)

Figure 2.1 Administrative divisions of France

Source: Andra

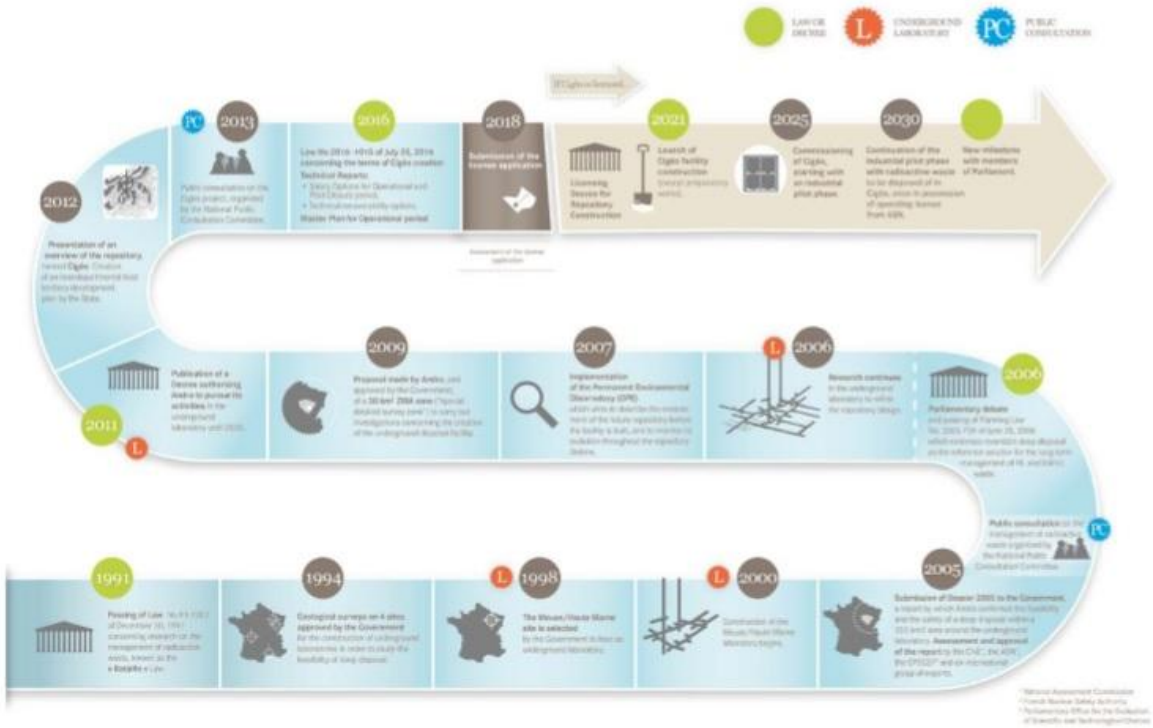

Figure 2.2 History of Cigéo project since 1991

Source: Andra

- Transposition zone

  : Within this zone, the characteristic of the rock is same. This means that URL can be located anywhere in this triangle zone.

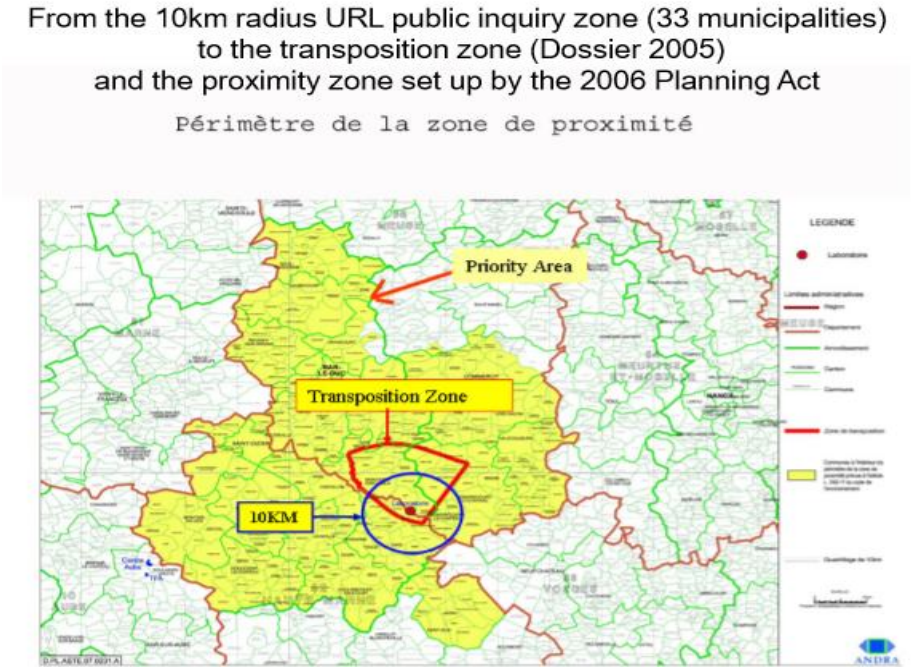

Figure 2.3 Transposition zone in Bure

Source: Andra

Legal and institutional framework

- Target of Act 1991 was only high level of radioactive waste and it did not include LLW-ILW. However, Act 2006 which replaced the Act 1991 imposed Andra to deal with all radioactive waste.
- No matter what is the political orientation of the members of the government, the process to deal with the nuclear waste management remains neutral.

  : For example, when the government changed with more rightists in 1993, the process remained neutral.
- After the 1991 Bataille Act, 35 municipalities expressed their interests.

  : Three applications were submitted.
- On the Act 2006, government defined deep geological disposal as the most feasible option.

  : From the technical point of view, deep geological disposal considered as the most suitable option for the future generation.

National Commission of Public Debate (CNDP)

- By law, public debate must be organized by CNDP for such issues.
- CNDP is independent; however, it is organized by the Ministry of Environment.
- ANDRA is not in charge of the debate; however, it provides information to the debate organized by CNDP.

- Citizen panels of the debate

: Citizen panels are selected based on the criteria; however, most of them come from the candidate district.

: It can be said that citizen panels represent the overall population.

: Committee members are appointed by the national commission.

: This is a good way to sort out the citizen panels and to debate.

: Selected panels, together with politicians and NGOs, are trained and they produce the report in the end of the debate.

: Report has been considered to be balanced. People think that there is no need to be in rush to make a decision as they prefer to see the full scale of model. As one of the options, pilot phase was requested prior to the industrial phase.

Reversibility

- The concept of reversibility was already considered in 1997.

: In the 1991 Bataille Act, reversibility was not prerequisite while the reversibility briefly mentioned.

- July 2016: the reversibility Act was adopted and the concept of reversibility is now defined by law. However, people still have tendency to understand it as a technical tool.

Background of interviewees

- Richard Poisson has been working for Andra since 1996.

-Annabelle Quenet is dealing with media, communication and dialogue with NGO. She has been working for Andra for 6 years.

- Bolia Jelena has been working in the international division and organizing various international cooperation related tasks.

<Ms. Bolia Jelena of Andra>

<Mr. Richard Poisson of Andra>

(3) Data collection

- Presentation material entitled *Waste production & waste management in France* (February 12, 2018)
- Presentation material entitled *Social acceptability and Local integration of the Cigéo Project*
- Presentation material entitled *Public involvement in geological disposal programme-The French example*
- Presentation material entitled *Siting strategy and stakeholder involvement*
- Presentation material entitled *Results of the Door-to-door campaign for the Cigéo project Andra* (September 2017)
- PPT file entitled *The 2013 Public Debate Andra* (October 2016)
- PPT file entitled *Future public involvement, What is the role of public involvement in future licensing steps and what are the public's possibilities to influence the future decision-making process?*
- Printed version of the report of PM Christian Bataille entitled *Rapport du mediateur, M. Christian Bataille, Depute du Nord, a M. Gerard Longuet, Ministre de l'Industrie, des Postes et Telecommunications et du Commerce Exterieur et M. Michel BARNIER, Ministre de l'Environnement* (20 decembre 1993) (In French)
- LAW n° 91-1381 of December 30, 1991 on Radioactive Waste Management Research (1) NOR : INDX9100071L
- Printed version of the Act of 2016 entitled *JORF n°0172 du 26 juillet 2016 Texte n°1 LOI n°2016-1015 du 25 juillet 2016 precisant les modalities de creation d'une installation de stockage reversible encouchegeologiqueprofonde des dechetsradiactifs de haute et moyenneactivite a vie longue (1) NOR: DEVX1614324L*(In French)
- Position paper on Reversibility (January 2016)
- Book entitled *Making nuclear waste governable Deep underground disposal and the challenge of reversibility*, Edited by Luis Aparcio, Springer
- Brochure entitled *Andra: Everything you ever wanted to know about radioactive waste management*
- Brochure entitled *Cigéo Project: Deep geological disposal facility for radioactive waste in Meuse/Haute-Marne departments*
- Brochure entitled *Permanent Environment Observatory*
- Brochure entitled *Andra in Meuse/Haute-Marne*
- Printed version of the plan entitled *Radioactive materials and waste: Planning Act of 28 June 2006 Consolidated version established by Andra*

2.2.2 School of Advanced Studies in the Social Sciences (EHESS)

Date & Time	February 13, 201815 :30-17 :00
Participants	Yannick Barthe (PhD), Research Director, Interdisciplinary Laboratory of Studies on Reflexivities of EHESS

(1) Questions

① The concept of reversibility and its background

② The current issues concerning HLW management in France

③ The function of OPESCT

(2) Discussion

Reversibility and Retrievability (R&R)

- At the very beginning, the concept of reversibility was not technical at all. It started from the concern of the local originated from uncertainty of the technology.
- Prior to the 1991 Bataille Act, the concept of deep geological disposal repository was a final disposal which is totally opposite from the current concept of reversibility. Even some ministers thought that irreversibility is the safe way to manage the radioactive waste.
  : The concept was difficult to be accepted by the public because of people's concern on irreversibility, which makes decision for once for all.
- In general, there are two main different concepts of reversibility, which include technical reversibility and reversibility on decision.
- Since the 1991 Bataille Act enacted, reversibility started considering as one of the safe ways to manage the nuclear waste.
  : After the 1991 Bataille Act, there was a big pressure from both local people and politicians.
  : Politicians started feeling uncomfortable with the concept of irreversible final disposal.
  : For politicians, the concept was to assure the public: 'Don't worry. We decide now but it can be changed if necessary.'
  : The word of 'reversibility' is unknown to the local people. Nevertheless, the concept was perceived as freedom of choice for the local people.
- For Andra, reversibility is the first step to move forward to final disposal which is irreversible disposal. However, the level of reversibility perceived by Andra is the way to take out waste just in case of problem occurs which means no need to reverse if there is no problem.
- For scholars, the point of debate on reversibility is being reversible as long as possible and the decision must be changeable by the future generation at any phase.
  : Flexible approach is emphasized (e.g. Adaptive planning or learning by doing)
  : There are various debates on the concept of reversibility in France. Innovative approach in process is necessary.
- There are different conceptions of safety; some feels that deep geological disposal is the safe way while some wants to keep the waste in the close place so that it can be monitored. Thus, approaching to the issues from the various perspectives is important.
- There is not specific meaning of reversibility governance in France yet.

The Parliamentary Office Scientific and Technological Assessment (OPECST)

- The function of OPECST is totally different from the one in the United States.

  : In France, there are no experts. Thus, it is not technical while being more political.

  : For certain subject, there is a small group which consists of experts. However, the main role of the experts is not conducting research for the report. The group acts as an advisor.

- The role of OPECST is paradoxical.

  : The way how OPECST reviews the subject under the political control is to bring the subject into a political space, at the same time, it tries to make the subject not to be political. It is the way to depolarization

  : The report is written by two members, one from the right wing of the party and one from the left wing of the party.

OPECST[3]

- Independent structure of assessment within the French Parliament
- OPECST acts as an intermediary between the political world and the world of research.
- Set up by Act n° 83-609 of July 8, 1983
- Objectives: to inform Parliament of scientific and technological options in order to make its decisions clear (For this, OPECST collects information, launches study programs and carries out assessments)
- Members: 18 Members of the National Assembly and 18 Senators

(Only Members of Parliament may refer matters to OPECST)

- The main subjects of topic: energy, environment, new technologies and sciences of life

Fukushima impact

- After the Fukushima accident, national center for scientific research of France (Centre National de la Recherche Scientifique, CNRS) spent more budgets on the nuclear policy and pushed researchers to conduct researches on the relevant topics in the field.

  : More than 1,000 researchers work for CNRS.

Current issues

- Terrorist attacks in recent years made nuclear issue receiving less attention than before.

  : It also makes discussions on nuclear safety with more emphasis than nuclear waste itself.

Background of Dr. Yannick Barthe

- Research director of Interdisciplinary Laboratory of Studies on Reflexivities of EHESS
- Lecturer of School of Advanced Studies in the Social Sciences (EHESS) and University Paris 1-Pantheon Sorbonne
- Chairman of the interdisciplinary commission 53(“Methods, practices and communications of science

[3] Parliamentary Office for the Evaluation of Scientific and Technological Options homepage, available at http://www.senat.fr/opecst/

and technology") of the CNRS National Committee.

- A member of the editorial board of the journal Politix
- His research interests in socio-technical controversies and public policies relating to "collective risks".
- Education background: Sociological and political science, PhD from Mines school, unit of science and technology studies
- Books

: *The fallout from the past, the paradox of the victim*, Paris, Le Seuil, 2017)

: The power of indecision. Putting nuclear waste in politics (Paris, Economica, 2006)

: *Essay on technical democracy* (Paris, Le Seuil, 2001)

: *Acting in an uncertain world* with Michel Callon and Pierre Lascoumes)

: O*n the environmental trail. Secular mobilizations* (Paris, Presses des mines, 2010with Madeleine Akrich and Catherine Rémy)

- Journal Papers on nuclear waste management

: Yannick Barthe & Claire Mays (2001) Communication and information in France's underground laboratory siting process: clarity of procedure, ambivalence of effects, Journal of Risk Research, 4:4, 411-430, DOI: 10.1080/13669870110051534

: Yannick Barthe (2009) Framing nuclear waste as a political issue in France, Journal of Risk Research, 12:7-8, 941-954, DOI: 10.1080/13669870903126119

: Yannick Barthe and Morgan Meyer (2012) Identifying remaining socio-technical challenges at the national level: France (WP 1-MS6), Working paper for European Commission

<With Dr. Yannick Barthe of EHESS>

(3) Data collection

- Link to the newsletter of the activists against Cigeo Project <http ://www.villesurterre.eu>

2.2.3 Andra's Underground Research Laboratory and Surface Facilities (Centre Meuse/Haute-Marne)

Date & Time	February 14, 2018 10 :00-17 :30
	Audrey Guillemenet, Communication Division in Bure
Participants	Dominique Mer., Communication Division in Bure
	Bolia Jelena, International Division

(1) Questions

- Same questions for Andra's headquarters

(2) Discussion (Overlapping part from the presentations at HQ is not included)

Cigéo installation

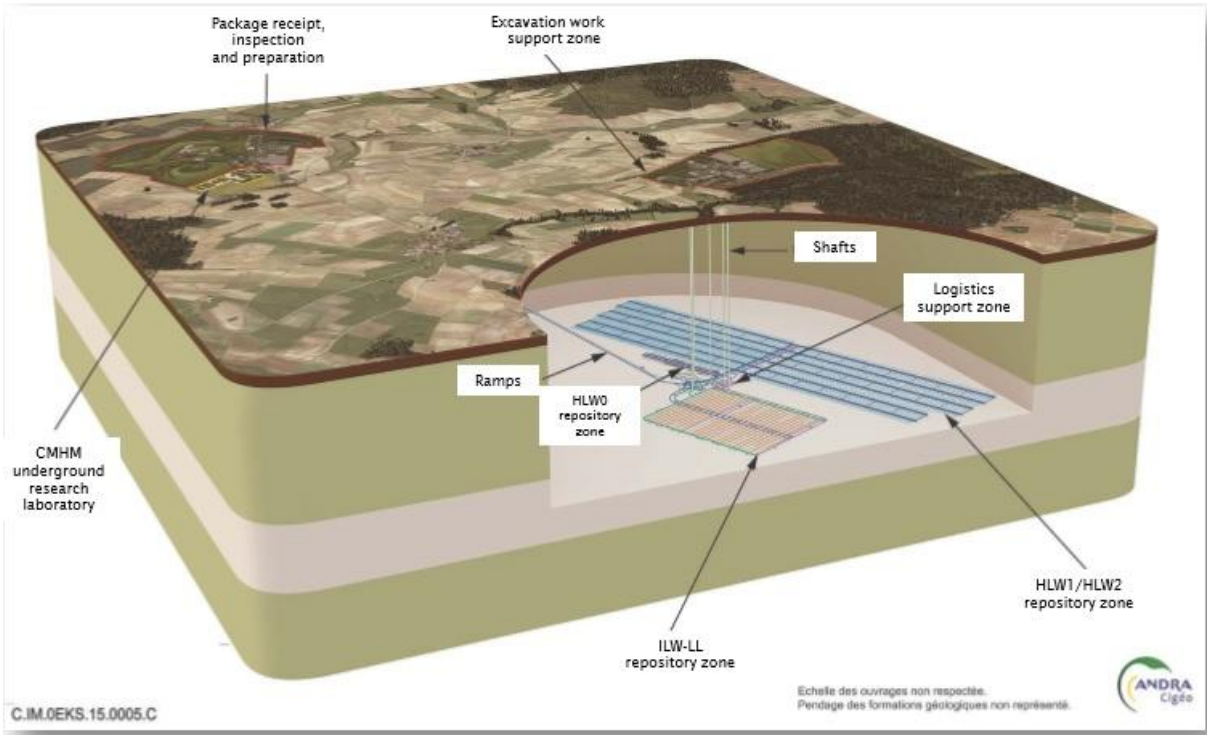

Figure 2.4 Installation of Cigéo

Source: Andra

- Final disposal facility is planned to be constructed by 2040-2050.
- The URL is a separated facility from the repository.
  : There is no connected route between the URL and the repository.
- 55,000 containers of vitrified HLW will be disposed.
- Waste will be transported by train.
- Before 2080, HLW is not planned to be disposed.
- When the repository backfilled in 2151, the waste is not reversible anymore.
- Facilities and activities of Andra in Bure
  : Laboratory and Technological showroom activities

: Cigéo project documentation preparation

: Perennial Observatory of Environment Waste

- Facilities invested by waste generators

: Areva has an archive building, waste and radioactive equipment transportation hub.

: CEA has Cicéron-hi-tech metallic parts' production unit (for aeronautics, defense and health care industries) (Bure – Saudron)

: EDF has logistics platform of nuclear park spare parts' supply, an archive building, nuclear maintenance base.

Social and Economic Benefit created by the Cigéo project

- Between 2008 and 2014, around 303 direct jobs were created in the region related to the Cigéo project.
- Indirect annual impact of local purchasing by ANDRA and associated operators equals 1,500 jobs on average between 2008 and 2014 in the Meuse and Haute-Marne districts.
- Hiring local people

: Currently, the Center Meuse/Haute-Marne (CMHM) employs: 47% ANDRA people, 53% contractors' staff

: 87% workers live less than 50 km from CMHM

: During the constructing phase, approximately 2,000 people will need to be hired (local people will be hired).

Creation of Permanent Interest Groups (GIP)

- Created in 2000 with the mission: 1) to manage the concerned equipment properly in order to facilitate installation and operation of the URL and a disposal facility; 2) to carry out territorial integration and economic development; and 3) to support training and other activities that enhance development, and scientific and technological outreach activities
- Investment funds from the tax paid by nuclear waste producers (Edf, CEA, and Areva)

: 30 M euro per year is given to each GIP

Territorial development agreement

- Launched in the end of 2016 and managed by the Meuse Prefecture on the request of the PM (submitted to PM in April 2017).

: Based on SIDT (Interdepartmental plan of territory development) created in 2013

: It aims at supporting territorial development in order to establish strategic and operational framework for proper implementation of the Cigéo Project.

- Subjects of interest

: Infrastructure of transportation, living environment and attractiveness of transportation (services, water supply, living area, access to internet and digital means, landscape and heritage), economic

development (local purchasing , jobs, skills, training , integration)

- There are 14 WGs and 14 action plans

-Director of GIP is appointed by the president of the council of district.

- The function of GIP is totally different from CLIS.

: CLIS is for organizing scientific information while GIP is working related to the economic projects.

Communication

- In the Bure office, there are 10 experts working in the communication division.

- Activities

: Publishing local newspaper (Journal ANDRA)

: Invitation of journalists (media) every month

- Interaction with the public

: In 2017, approximately 10,000 people visited the CMHM.

: Opens 09:00-17:00 for 7 days

: Around 50 villages were visited near the district through the door to door campaign for about 5-6 years ago.

- Although there is no veto right given to the municipality, Andra has a duty to listen to local the public's opinion.

<Ms. Dominique Mer. of Andra>

<Ms. Audrey Guillemenet of Andra>

(3) Data collection

- Presentation material entitled *Andra in Muese/Haute-Marne Territorial integration and regional economic development, For Waseda University Delegation* (February 2018)

- Presentation material entitled *The Meuse/Haute-Marne Centre* (13 February 2018)

2.2.4 Committee of Local Information of the URL of Bure (CLIS)

Date & Time	February 14, 2018 12 :30-14 :00
Participants	Mr. Benoit Jaquet, General Secretary of Bure CLIS Ms Conçi, Councillor of Meuse District

(1) Questions

① Role of the CLIS

② Position of the member of the council in the Meuse and Haute-Marne district

③ Opinion on reversibility

(2) Discussion

Overview of CLIS

- Established in 1999 with the mission to inform the (concerned) local public on the Cigéo related activities
  : The purpose of CLIS is not facilitating the acceptance. Main role of the CLIS is to listen to the opinion of the local people from the neutral and objective perspective
  : Information provided by CLIS is neutral and independent from Andra
- Total of 91 members from the two districts (Muese and Haute-Marne)
  : Members consist of members of parliament, local representatives, chiefs of direction of industry and of regional health agency from Grand Est, and representatives of trade unions (agriculture and industry).
- Means of communication
  : Letters of the CLIS, Newsletter, Internet site, DVD, distribution of documents, publication in newspaper, radio messages, postings, evaluation of impact of the notoriety campaign
  : Distribution reached to approximately 160,000 people for free.
- Budget of CLIS comes from state and waste producers (around 300,000 euro/year).
- Main activities
  : CLIS facilitates communication with Andra (Although some people directly contact Andra for information; however, CLIS sometimes arranges meetings or visits to Andra for the local public on request).
  : Organizes meetings and seminars for information distribution
  : Plenary sessions opened to the media and the public
  : Public meetings in the municipalities in the zone of transposition
  : Working groups on specific topics
  : Training for the members and visits of nuclear sites in France and of foreign laboratories
  : Independent expertise. CLIS requests individual experts to carry out safety assessment in order to ensure the safety. Since there are limited options to find individual experts in France, CLIS has been requested assessment and research foreign experts from Switzerland, the UK, and the US.
  : Participation to European research programs

: Interventions within ANCCLI

: Hosting delegations in Bure (French CLI, foreign visitors, students)

: Interventions for specific public such as school, people in senior house

Opinion of the council members

- Opinion of the council members in the Meuse and Haute-Marne District is divided. For example, Ms Conçi, personally, opposes the project due to safety concerns. She believes that the most important thing is security and safety although the project may bring the positive economic impact on the region. However, the other council members in the Meuse District are less interested in the safety issues than Ms Conçi. Majority of council members think that the project is acceptable as long as the project brings the financial benefit to the region.

  : There are 34 council members in the Meuse district.
- Main industry of the region is wood and agriculture. However, small and medium size companies are not very significant in the region before the Cigéo.
- Consultation is carrying out among the member of the council for the Andra's upcoming plan to apply for the construction license in 2019. Referendum would not be held, but there will be public consultation to listen to the public opinion.

Reversibility

- At the early stage of the project in the 90s, the concept of reversibility used to increase acceptability. Although the concept was important for acceptance at the beginning; however, majority of the CLIS members think that reversibility is not feasible at the moment. Due to the difficulties of the technology, it would be difficult to consider reversibility once the repository is closed.

<With Ms. Audrey Guillemenet, Ms. Bolia Jelena, Ms. Dominique Mer. of Andra and Ms. Conçi and Mr. Benoit Jaquet of Bure CLIS>

(3) Data collection

- Presentation material entitled *Comite Local d'Information et de Suivi du Laboratoire de Bure (CLIS)*
- La letter du Clis (No. 16, January 2015, No. 17, January 2016, No.18 January 2017)

2.2.5 French Nuclear Safety Authority (ASN)

Date & Time	February 15, 2018 10 :20-11 :25
Participants	Mr Christophe Kassiotis Director(PhD), Waste, Research Facilities and Fuel Cycle Facilities Department Ms Isabelle Forest, DeputyDirector, International Relations Department

(1) Questions

① Is there any specific role of ASN in consensus building on the HLW management and Cigéo project in France?
- Besides providing safety information in general, are there specific engagements or activities carried out by the ASN to the local public as well as the general public at the national level?

② Is there any method or measuring tool to assess to what extent the information circulated by ASN to the public was accepted or understood?

③ Reversibility and Retrievability (R&R) debate in France
- In comparison with the other nuclear states, France puts more emphasis on R&R debate, particularly reversibility issues.
- What is the historical background (starting point) to pay more attention to R&R debate? How should we understand the concept of reversibility adopted in France?
- What is the scope of the role of current generation as well as the rights of the future generation?
- To what extent the general public has been engaged in this debate?

(2) Discussion

Overview of ASN

- Since its creation in 2006 by the Act on transparency and security in the nuclear field (TSN act), ASN directly belongs to the Parliament and managed by the board of 5 commissioners. However, ASN works as an independent organization.
- Main responsibility is to inform the public on the safety issues; however, ASN is not in charge of security for the nuclear facilities.
- Number of employees: Total of 500 (ASN HQ: 250 /Regional offices: 250)
- Budget of ASN is 80M euro per year.
- Supported by ASN's TSO (Institute for Radiation Protection and Nuclear Safety, IRSN)
  : 400 experts in IRSN
  : Budget is 80M euro per year
- Scope of ASN's activity

: 58 pressurized water reactors, additional reactor under construction, and one fast neutron reactor (shutdown since Fall 200) are regulated by ASN.

: All the fuel cycle installations, including radioactive waste management facilities (90 facilities operated by 15 operators) are regulated by ASN.

: Research reactors

: Research, medical and industrial installations using radioactive sources

: Transport of radioactive materials

- Third party assessment of the ASN's activity

: All the documents are opened to the public on the ASN's website.

: ASN also receives an international peer review.

- Radioactive waste management in France

: Strong and efficient regulatory framework based on the "Waste act" of 28th June 2006

: A national agency, Andra, which is independent from waste producers, to manage radioactive waste

: A national plan for management of radioactive materials and waste (PNGMDR)

- The "Waste Act" of 28th June 2006

: 1) Decided deep geological disposal as an option for radioactive waste; 2) defined the timeline for the project development; 3) banned disposal of waste from foreign countries in France (except the waste received from the medical sector of Monaco); 4) defined Andra's mission; and 5) created a framework for securing financing of decommissioning and waste management costs.

- National Plan for radioactive waste and materials management (PNGMDR)

: There are two objectives of the plan, which are 1) carrying out periodic assessment of the radioactive substance management; and 2) carrying out continuous researches and studies on the options to deal with the radioactive waste

: There are three principles of the plan, which are 1) reduction of the quantity and the harmfulness of waste by spent fuel reprocessing or partitioning/transmutation; 2) long-term storage for radioactive waste waiting for treatment or disposal; and 3) deep geological disposal

: Working group for PNGMDR is consisted of the members of 1) the French Nuclear Safety Authority (ASN) and the Ministry of Energy; 2) Environmental protection associations (NGOs); 3) experts from IRSN; 4) Radioactive waste producers; and 5) the French agency for waste management (Andra).

: The working group meets every two or three months and Andra makes a presentation in front of the other members.

: PNGMDR should be open to public access. It is also assessed by the Parliament.

- Fund for nuclear waste management

: By law, the fund should be collected from the waste producers and it must be able to cover the waste

management in the current generation.

: Fund is controlled by the Ministry and should be assessed every three years.

: The triennial report published by the nuclear industry is assessed by the Ministry and the amount of fund is calculated based on the report. ASN supports the Ministry to review the technical part of the report.

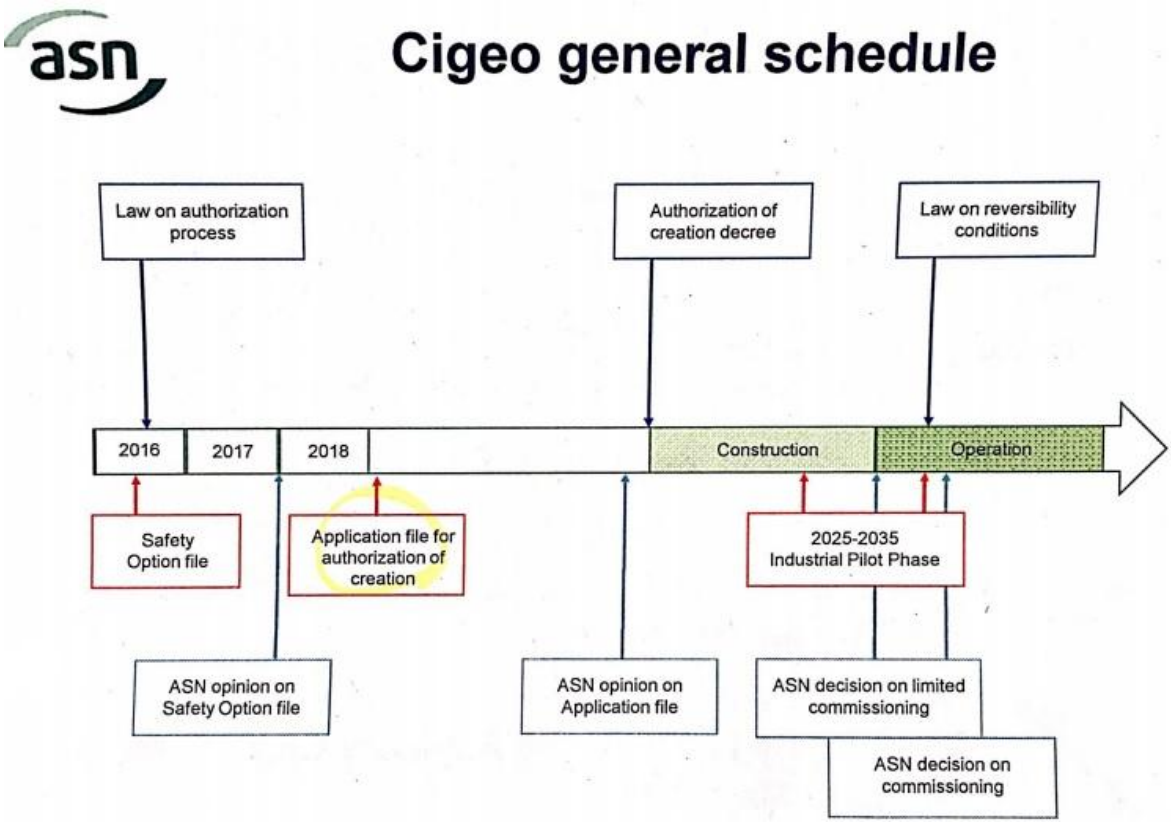

Figure 2.5 Cigéo general schedule

Source: ASN

- Three steps of decision making defined by law

  : 1) Issues, 2) public debate, and 3) authorization process (Last step made in 2016)

- Cigéo safety option file was received and assessed by ASN in April 2016. IAEA peer review of safety option file followed.

  : Based on the opinion received from ASN and IAEA, Andra must provide the modified file in order to integrate demands by 2019.

Reversibility

- Reversibility is a good way to deal with difficulties associated with DGD.
- ASN's opinion on reversibility

  : In France, specific authorization process must be set by law.

: Reversibility has to be more than 100 years; however, the exact period has not been decided yet by law. At the moment, France is expecting to have a new law, which includes precise period of reversibility. The new legislation would allow France to build the condition of reversibility as well.

: Parliament should play a central role in the authorization process. The geological disposal will be authorized by the Government, yet the Parliament will establish the conditions for reversibility and authorize the closure of the disposal.

- Reversibility implies: 1) adaptability principle, which refers to possibility to change the concept of disposal in consideration of ongoing circumstances of the society and progress in science and technologies; and "to adapt the operational scenario to industrial, political or societal decisions" which can be made by the future generation; and 2) retrievability principle, which refers to the possibility "to retrieve waste that have been already disposed during a given period fixed by law."
- At the moment, ASN considers that deep geological disposal of radioactive waste is the most feasible and safe option.
- Interviewees personally think that the current government is in favor of the current project.

<With Ms. Isabelle Forest and Dr. Christophe Kassiotis of ASN>

(3) Data collection

- Summary of French National Plan for the management of radioactive materials and waste 2016-2018
- Brochure entitled *Improving nuclear safety and radiation protection*
- Presentation material entitled *Safety oversight of high level waste management in France*
- ASN opinion 2016-AV-0267 of 31st May 2016 on the reversibility of deep geological disposal of radioactive waste
- ASN considers that the Cigéo safety options constitute a significant step forwards, published on 16 January 2018 (10:30 am)
- Abstracts ASN Report on the state of nuclear safety and radiation protection in France in 2016

2.2.6 WISE-Paris

Date & Time	February 16, 2018 14:00-16:15
Participants	Mr Yves Marignac, Director

(1) Questions

① In France, various means of communication, such as CNDP, have been carried out to promote citizen participation in the HLW management and the Cigéo project

- In this regard, detailed information about the platforms to promote citizen participation in debates on the matter
- Are there any measuring tools (such as survey) to assess to what extent the public is receiving information through these events and to what extent this means of communication effective?

② It seems that there are different viewpoints do exist among the general public on the matter at the national and the local level.

- How is this different? What is the background of these differences?

③ Regarding ongoing conflicts in Bure between local residents and environmentalists as well as between Andra and environmentalists &local opponents

④ Reversibility and Retrievability (R&R) debate in France

- In comparison with the other nuclear states, France puts more emphasis on R&R debate, particularly reversibility issues.
- What is the historical background (starting point) to pay more attention to R&R debate? - How should we understand the concept of reversibility adopted in France?
- What is the scope of the role of current generation as well as the rights of the future generation?
- To what extent the general public has been engaged in this debate?

(2) Discussion

Public debate and remained mistrust

- To discuss the current debate on this project, historical perspective must be considered.
- In terms of establishing nuclear reactors, 80% of the nuclear reactors established within 10 years. Furthermore, waste management issue was not considered when the nuclear program started in France. Accordingly, there was no debate on the nuclear waste management at the level of public as well as parliament.

  : The condition to develop debate was poor in the early phase of the nuclear program in France and the opportunities for debate were kept postponed.
- In France, 22 reactors are using MOX fuel. Thus, reprocessing option and plutonium industry became iconic for the French nuclear industry
- Industry has to continue reprocessing due to financial and industrial crisis. It is not a good time to change

the nuclear energy policy in France; however, it is likely to phase out reprocessing at a certain point in the future considering the ongoing debate on the reprocessing matter.

: Operators, ASN, IRSN, ANDRA, and government acknowledge that spent fuel might need to be disposed together with the treated and vitrified waste in France in the future.

: Although Cigéo is only for HLW for now, ASN recommends ANDRA to consider the possibility to dispose spent fuel in Cigéo as well.

- 1991 Act is the first law on nuclear waste management in France

: The law sets the three options to be researched: 1) partitioning & transmutation (CAE is in charge of this: the main purpose was to keep the fast breeding reactor); 2) deep geological disposal repository (Andra is in charge of this); and 3) subsurface long-term storage (no one was in charge of research in this option). In can be said that institutional gap did exist in France.

: The law explicitly indicates to have at least two underground research laboratories in order to compare the geological condition of two options, which are clay and granite.

: However, the French government announced that the characteristic found in clay is safe enough. Currently there is only one URL in Bure.

Public debate and remained mistrust

- National debate held by CNDP

: Public who participated in the debate strongly wanted to carry out further research on long-term interim storage.

- DGD vs. long-term storage

: People in Andra, ASN, IRSN, who work in the field of science and technology would rather trust geology while the lay people would rather not trust what the scientists say. Lay people felt uncomfortable to dispose the hazardous waste underground at the depth of 500 meters and that the society forgets about it. During the CNDP, public preferred the option that the society keeps the waste near the society and monitors.

: Nevertheless, the Act of 2006, which was followed up the 1991 Bataille Act, decided the deep geological disposal as the most suitable option at the moment.

: Debate on Sub-surface storage was more political than technical.

- Ethical debate

: In France, ethical debate on the issue never happened so far.

: Progressively the norms have been imposed on the issue. According to the technical norm, this is what France needs to do. However, it will be difficult to proceed with the project without enough debate from the ethical perspective.

: To deal with highly risky issues such as HLW, technical point of view is important. Nevertheless, consideration about the ethical issues is necessary. Point is that “is this fair or not?”

- CNDP

  : Independent from authority

  : The role of CNDP is to make sure that there is a fair and extensive discussion

  : CNDP attempts to provide the forum for argument. However, it cannot say that CNDP represents the majority of people.

  : At CNDP, public wanted that the option for the long-term storage considered as seriously as the deep geological disposal. Also, people expected to carry out further research on the long-term storage. However, government's conclusion was: 'Deep geological disposal is the safest method.' As a result, this increased mistrust in authority.

- "Long-term storage and deep geological disposal options are not equivalent and they would never be equivalent." This debate brought people the debate on reversibility.

- Rational behind deep geological disposal among scientists

  : For example, people in IRSN genuinely believe that deep geological disposal is the safest way to handle HLW. They are still cautious about how fast it must be developed, yet their point is 'why we would need long-term interim storage because we know that it would be difficult to find a better solution than deep geological disposal.'

  : However, the public considers that it is important to have long-term image about passive safety at least in the French debate.

- Reversibility debate in France is 'the way to let it go properly while making the repository stays opened as long as possible at the same time.' It is the way of thinking: "We need to remember to forget!"

- Brief introduction of PEP (Cigéo poly) game

  : The game invented by Mr. Yves and his colleague

  : The idea of the game is making the participants to discuss the strategic option about the nuclear waste management

  : During the game, civil society's concerns can be considered within the agenda as well as the concerns expressed by environmentalists

Emerging issues

- Dealing with waste package developed for ocean dumping

  : Around 40,000 tons of Bituminized radioactive waste developed for the purpose of the deep ocean dumping

  : According to IRSN, these packages cannot be disposed at Cigéo due to unexpected chemical reaction.

It is difficult to identify the chemical reaction of the waste.

: As CEA is the owner of the waste, CEA must develop the techniques for reconditioning of these waste packages.

- Dealing with the occupation and riots of the opponents in the site of Bure

: Construction project of Notre-Dame-des-Landes Airport (a.k.a Grand Ouest Airport) has been terminated as of January in 2018 due to occupation of environmentalists and opponents in the construction site (Zone to be defended). Since then, the group of opponents of the airport construction project has turned their direction to Bure.

: The role of current Minister of Environment, Mr. Nicolas Hulot, is expected to deal with this issue

: Mr. Nikolas Hulot focused on the environmental issues as a representative broadcaster of the TF1 (one of the French broadcasts) prior to join the government. He was asked to be a minister for four times from the previous presidents; however, he always declined.

: As an environmental NGO, he never dealt with the nuclear issues before. However, he will need to bring some ethical perspective into the debate.

Overview of Wise-Paris

- Established in 1983 as a part of global network <Wise-International>
- Non-profit expert organization to provide information for the debate (not NGO)
- Wise-Paris was initiated in cooperation with Wise-Amsterdam, which has strong roots in anti-nuclear group. However, the perspective of Wise-Paris is different, which is based on the professional independency to provide fact. As a result, Wise-Paris was separated from Wise-Amsterdam. Although, Wise-Paris has been remained with its original name, the perspective is absolutely independent and different from the Wise-international.

-Mycle Schneider, nuclear energy consultant, used to be a first director of Wise-Paris

- Mr. Yves Marignac

: Expert in the nuclear field over 25 years

: Academic background with scientific studies and scientific information from Paris 11

: Director of Wise-Paris since 2003


<With Mr. Yves Marignac of Wise-Paris>

(3) Data collection

- White paper IV of ANCCLI, Cigéo: The Challenges of Reversibility and Recoverability, 2017January 2017 (In French, in the form of PDF file)

Attachments

Attachment 1: Meeting agenda with VTT Technical Research Centre of Finland

Attachment 2: Meeting agenda with Andra

Attachment 3: Presentation by Professor Matsuoka Shunji

Attachment 1

Visit of Waseda University delegation to VTT

February 9.2018, 9:00 – 13:30

VTT Centre for Nuclear Safety

Kivimiehentie 3, Otaniemi Espoo

Agenda

09:00 - 09:15	Coffee/Tea, Welcome and introductions
09:15 - 09:25	VTT's role in Finnish nuclear waste management programme, MattiPaljakka
09:25 – 09:35	S&R's role in Finnish nuclear waste management programme, Fionán O'Carroll
09:35 – 10:10	Overview of Waseda University Research Activities, Shunji Matsuoka
10:10 – 10:20	Short Break
10:20 – 10:40	Finnish Research Programme on NWM (KYT), Kari Rasilainen
10:40 – 11:00	Public Acceptance of HLW Repository in Finland, TimoSeppälä
11:00 – 11:50	Discussion based on questions by Waseda University
11:50 – 12:10	Open discussion on next steps and suggestions for way forward
12:20 – 13:30	Lunch

Attachment 2

Waseda Resilience Research DELEGATION

Visit to Andra's headquarters and URL (Bure)

February 12-14, 2018

12/02/18– Andra's headquarters (Meeting room D105)

14:00 Arrival to Andra, access formalities, welcome coffee

14:15 Presentation of Andra's Activities, JelenaBolia, International Relations Dpt

14:45 History of Public involvement in French geological disposal programme, Richard Poisson, head of International Relations Dpt

15:45 Presentation of the research project and national situation by the Delegation

16:15 Discussion with Annabelle Quenet (Communications Division) on evolution of Siting Strategy since 2006, on Public debate of 2013 and on Door to Door Campaign of 2017

17:30 End of the meeting

14/02/18 Visit of Andra's Underground Research Laboratory and Surface Facilities (Centre Meuse/Haute-Marne)

10:00 Registration formalities (passport required!!)

10:15 Welcome coffee, at the Technological Exhibition Facility

10:30 Presentation of Cigéo, a deep geological disposal facility project

11:15 Presentation on communication and public dialogue

12:00 Visit of the Technological Exhibition Facility

12:30 Lunch at the Bindeuil restaurant with 2 Members of the CLIS

14:00 Safety information 14h30 Visit of the Underground Research Laboratory (Surface and Underground installations)

16:00 Environmental Data Bank

17:30 End of the visit

Access maps: http://www.andra.fr

Attachment 3

Presentation of Professor Matsuoka Shunji

Social Acceptance of High-Level Radioactive Waste (HLW) Treatment and Disposal Facilities

Shunji MATSUOKA
Professor and Ph.D
Graduate School of Asia-Pacific Studies,
Waseda University
smatsu@waseda.jp

February , 2018

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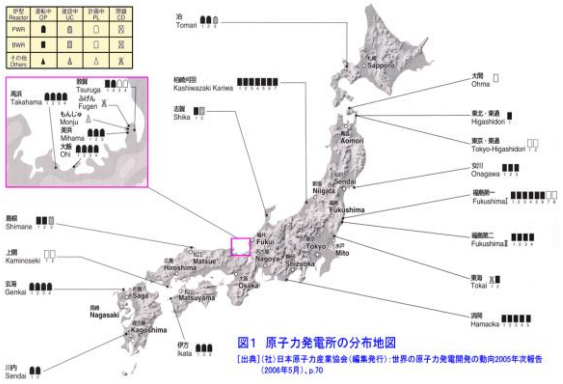

図1 原子力発電所の分布地図

[出典]（社）日本原子力産業協会（編集発行）：世界の原子力発電開発の動向2005年次報告（2006年5月）、p.70

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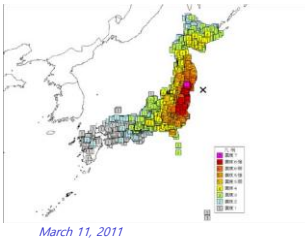

March 11, 2011
14:16 East Japan Great Earthquake M9, No.1 Reactor Scram
14:47 No.2 & 3 Reactors Scram
15:27 First Tsunami
15:37 No.1 Lost of AC Power Supply
15:38 No.3 Lost of AC Power Supply
15:41 No.2 Lost of AC Power Supply
18:50 No.1 Meltdown
March 12, 2011
15:36 No.1 Explosion of Reactor Building
March 14, 2011
11:01 No.3 Explosion of Reactor Building
March 15, 2011
6:00 No.4 Explosion of Reactor Building
6:10 No.2 Explosion of Suppression pool

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East Japan Great Earthquake 2011.3.11

(Minami-Sanriku Town, Miyagi Pref., as of 2011.11)

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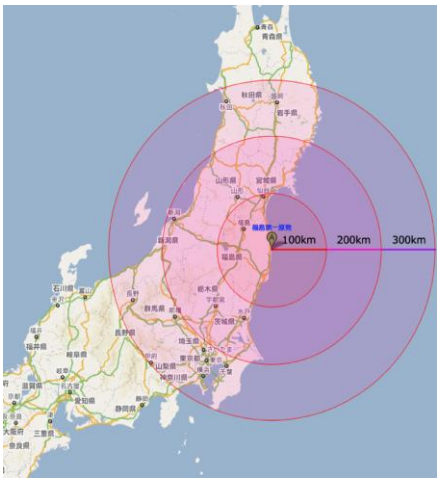

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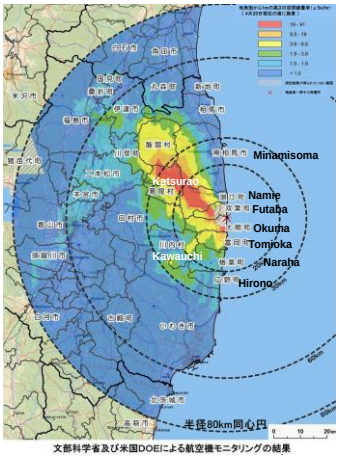

Radioactive Pollution in Fukushima, April 29th, 2011

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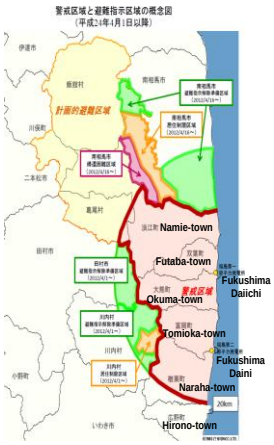

Evacuation Area in Fukushima, April 1st, 2012

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Fukushima Reconstruction Policy

Post Accident Management: Fukushima Recovery

ICRP Criteria of Risk Management

- Emergency period: 100mSv ～ 20mSv
- Recovery period: 20mSv ～ 1mSv
- Normal period: 1mSv

Fukushima Risk Management: 20mSv ← Top Down process

Difficulty: >50mSv, Restriction: 50～20, Preparation: 20>

Early Returning Home, Decontamination from radioactive contamination and Compensation: Tri-dilemma

Decontamination Budget: 2.5 trillion yen

Low Radioactive Waste 5.05 million m^3, Budget: 1.4 trillion yen

Compensation Budget: 4.7 trillion yen

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Diversified Sufferers (Victims) by Great East Japan Earthquake and Fukushima Nuclear Accident

Evacuation (evacuee, displaced people and refugee) by Fukushima Nuclear Accident

Compulsory Evacuation （90,000 → 28,000)

Voluntary Evacuation （70,000 → 25,000）

as of Dec., 2017, Fukushima Pref.: 18,000 Out of Fukushima: 34,000

Compensation by TEPCO

Compulsory Evacuee: ¥100,000/month + Property (house +land) + Wage loss

Average Family (4 persons): ¥ 90Million ++

Voluntary Evacuee: One-shot ¥120,000

Children and Pregnant Women: ¥520,000

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History of Japan's nuclear safety regulation and Institutionalism

First phase is from 1957 to 1977

Regulatory system in this period is a sort of mixed regulatory system based on Science and Technology Agency, MITI, and Atomic Energy Commission (AEC).

Second phase is from 1978 to 1999

MITI (now METI) and Nuclear Safety Committee becomes two main regulatory agencies in this period.

Third phase is from 2000 to 2011

Government took a measure of enforcement of Nuclear Safety Commission (NSC) and creation of Nuclear and Industry Safety Agency (NISA) under Ministry of Economy, Trade and Industry (METI).

Institutional Futures of Nuclear Regulation in Japan

Dependency on Nuclear Development Institutions

Principal Institution: Development Institution

Complementary Institution: Regulatory Institution

→ 2012 New Regulatory Agency launched

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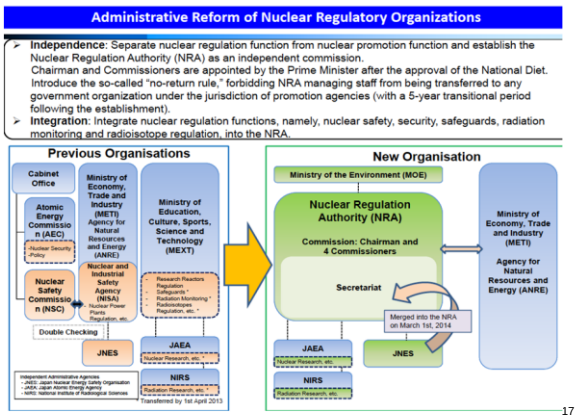

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2. Research Framework

Social Acceptance Model

18

Risk Communication: Deficit Model and Context Model

1. Main Social Characteristics of HLW
2. Social Consensus → Social Trust building
   → Risk Communication
   → Science Technology Communication
3. Deficit Model vs Context Model: Experts and People

Deficit Model: If experts can successfully input scientific information in people who don't have any accurate scientific risk knowledge, people will accept HLW facility.

Bryan Wynne (1991)," Knowledge in Context", *Science, Technology & Human Values*, 16(1), pp. 111-21.

Context Model: People have local knowledge (situation-specific and/or contextualized information). For building trust, mutual communication between local knowledge and experts knowledge.
→ Lay-Expert Model; Cancer Patients Association

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Social Characteristics of HLW Problem

1. Difficulty of adaptation of Lay-Expert model in HLW
2. Trans-Science Problem or Uncertainty of Geoscience

Alvin M. Weinberg (1972), "Science and Trans-Science", *Minerva*, 10(2), pp. 209-222

Trans-Science problem; Scientist can study the HLM problem, however scientist can not decide the solution of the problem. Society have to decide the problem.

Uncertainty of Geoscience
→ Scientific Super-long-range predict

3. Sublation Deficit Model and Context Model
   → Social Acceptance Model

Wüstenhagen, R., M. Wolsink, and M. J. Burer (2007), "Social Acceptance of renewable energy innovation: An introduction to the concept", *Energy Policy*, 35, pp. 2683-2691

4. Social Acceptance Model and Theory of Ba, Place (Framing)

National (Macro level) acceptance and Local (Micro level)

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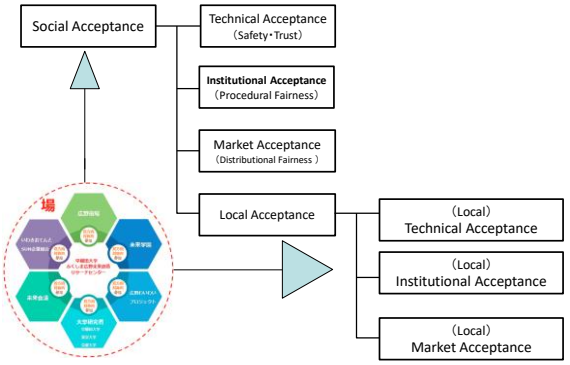
Ba, Place（Collaborative Governance）and Social Acceptance (3+3)



「Ba, Place」(Collaborative Governance)

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3. HLW Policy in Japan:

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HLW Policy in Japan

Designated Radioactive Waste Final Disposal Act in 2000

Based upon Nuclear Fuel Cycle Policy, Solidified Glass Body; high-level liquid waste that arises from spent nuclear fuel reprocessing which is mixed with molten borosilicate glass, 400,000units

Supervisor: METI (Ministry of Economy, Trade, and Industry)

Implementation Agency: NUMO (Nuclear Waste Management Organization)
→ 9 regional power companies and other gov. related institutions

Regulator: NISA (Energy Agency, METI) and NSC (Cabinet Office)
→ After Fukushima Accident, NRA (Nuclear Regulatory Agency) in 2002

Research Institute: JAEA (Japan Atomic Energy Agency, MEXT)

Site Selection Process:
3 step process, public invitation for volunteer host municipalities
(Literature Survey: 2y + Preliminary Investigation Stage: 3y + Detailed Investigation Stage: 15y)

NUMO Invitation process started in 2002. Only one town (Toyo town in Shikoku Island) officially applied to NUMO in Jan. 2007, however the

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Policy Discussion after Fukushima Accident and New Government Policy

Science Council of Japan (2012) :
Provisional Storage around 100 years
Total HLW Amount Management,
Revision of Nuclear Fuel Cycle Policy
→ Official decision of Decommission of FBR (Fast-Breeder Reactor) Monju in Dec. 2016

Government of Japan decided a new policy based upon Scientific Based Area approach in May 2015

METI analysis the reason of difficulties of existing stepwise process
1. Enough public trust is not provided for safety of HLW disposal.
2. Application process requests heavy local government accountability.

New introductory step in which a set of site screening criteria based geoscientific knowledge, Opening to the public in July 2017

"potentially more suitable areas"
"potentially suitable areas"
"potentially less suitable areas"

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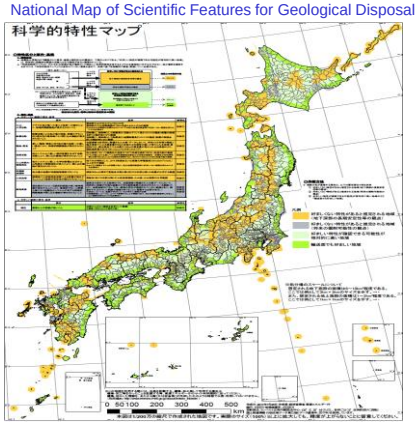
National Map of Scientific Features for Geological Disposal



Source: NUMO

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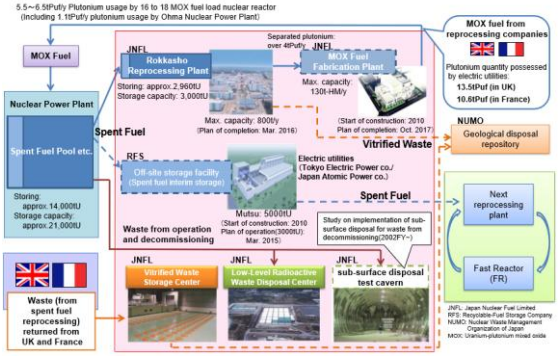
Nuclear Fuel Cycle in Japan



Source: Presentation material made by Hirobumi Kayama, Japan's current Nuclear Energy Policy, Agency for Natural Resources and Energy, METI, December 2014

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Stockpile of Spent Nuclear Fuel and Estimates

Stockpile of Spent Nuclear Fuel as of September 30, 2016						Estimates[12]		
Utility	Plant	1 core (tU)	1 refueling's worth (tU)	Control capacity (tU)[13]	Spent fuel stock (tU)	Control capacity (tU)	Spent fuel stock (tU)	Percentage of Storage Utilization (%)
Hokkaido	Tomari	170	50	1020	400	1020	600	59
Tohoku	Onagawa	260	60	790	420	790	660	84
	Higashidori	130	30	440	100	440	220	50
TEPCO	Fukushima-1	580	140	2,260	2,130	2,260	2,130	94
	Fukushima-2	520	120	1,360	1,120	1,360	1,120	82
	Kashiwazaki-Kariwa	960	230	2,910	2,370	2,920[14]	2,920	100
Chubu	Hamaoka	410	100	1,300	1,130	1,700[15]	1,530	90
Hokuriku	Shika	210	50	690	150	690	350	51
Kansai	Mihama	70	20	760	470	620[16]	550	89
	Takahama	290	100	1,730	1,220	1,730	1,620	94
	Ohi	360	110	2,020	1,420	2,020	1,860	92
Chugoku	Shimane	100	20	680	460	680	540	79
Shikoku	Ikata	120	40	1,020	640	1,020	800	78
Kyushu	Genkai	230	80	1,130	900	1,600[17]	1220	76
	Sendai	140	50	1,290	890	1,290	1090	84
JAPC	Tsuruga	90	30	920	630	920	750	82
	Tokai-2	130	30	440	370	510	490	96
Total		4,770	1,260	20,730	14,830	21,570	18,450	

Source: FEPC.
https://www.fepc.or.jp/about_us/pr/oshirase/__icsFiles/afieldfile/2016/10/20/press_20161020_1.pdf

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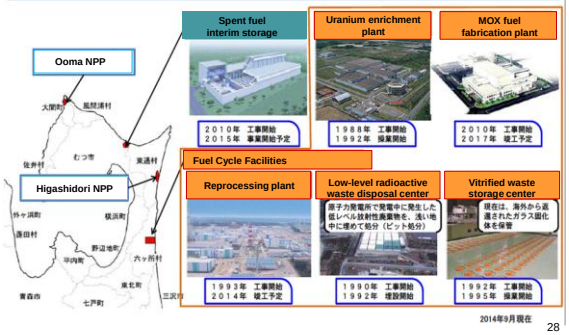
Infrastructure at the Rokkasho reprocessing plant : Nuclear fuel cycle facilities in Aomori prefecture



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