Innovations in Managing Intractable Public Conflicts—in South Korea:
From Auctioning to Deliberative Democracy

Heungsuk Choi
Professor
College of Political Science and Economics
Korea University
The Republic of Korea

Innovations in Managing Intractable Public Conflicts — in South Korea:
From Auctioning to Deliberative Democracy

Abstract

The purpose of this study is to examine the implications of citizen engagement as innovations in dealing with public conflicts. It especially focuses on the use of auctioning and deliberative democracy to cope with conflicts involved in building nuclear power plants and their waste storage facilities. Twenty-four nuclear power reactors are in operation to comprise more than a quarter of electric power supply in South Korea. However, the endeavor of locating even a low-level radioactive nuclear waste treatment facility has been an arena of serious civil protest and conflict from the early 80s, not to mention a high-level radioactive nuclear waste storage facility. Meanwhile, the year of 2005 marked a dramatic turning point for building a low and medium level nuclear waste storage. Four cities had to compete to host the low and medium level nuclear waste disposal facility. Kyeongju succeeded in its bid to host the facility, with cheers and concurrence from its citizens. It seemed that the incentive package offered in 2005 to the host locality was not greatly different from the one in 2003, wherein the attempt of the central government was blocked by violent protests from the citizens of the Buahn county. Thus, a question should then be posed: how and why the siting of the nuclear waste disposal facilities had become more acceptable and possible? It is claimed that the answer lies in the changes made in resolving conflicts such that the central government went beyond simply negotiating the amount of compensation, but also changed the processes of legitimizing the siting decision thru an extended citizen engagement combined with the mechanism of auctioning. So to speak, the siting decision-making process became much more polycentric, so that it came to include more local actors and citizens and focus more on upward legitimation processes. Extended citizen engagement and polycentrism in the form of independent deliberative committee and deliberative citizen polling also worked in resolving the public conflict concerning the building of the Shin-Gori 5&6 nuclear reactors in 2017. South Korea is currently facing another round of very serious public conflict as it has to construct a high-level radioactive nuclear waste storage facility. Jury verdict as to whether citizen engagement and deliberative democracy would work even for such an intractable problem, and whether the lessons of deliberative approaches are imprinted in the organizational memory of the central government indeed remains to be seen.

Introduction

It was in 1978 that South Korea built its first nuclear power plant, the Gori I. As of 2019, 24 nuclear power plants are operational in South Korea. The nuclear power comprises about 26.8 percent of the electric power supply, and 19.2 percent of the electricity generation capacity in South Korea.

The nuclear power plant produces low- and medium-level nuclear wastes, as well as high-level radioactive wastes.[1] The Korean government has yet to decide the way to

deal with the high-level wastes.[2] As to the low- and medium-level nuclear wastes, the Korean government decided to store them in permanent storage facilities and had sought such location since 1986. After a decade of struggling, it finally managed to find the location to store low and medium-level wastes in 1995. Concerning the permanent storage for the high-level radioactive nuclear wastes including spent nuclear fuel, it is currently trying to come up with an agreeable alternative using deliberative democratic processes.

The process of locating nuclear waste facilities has been an arena of serious conflict from the beginning. The first significant conflict and social unrest arose in 1990 when the government tried to build the nuclear waste facilities in the An-myun island. The Ministry of Science and Technology (MOST)'s plan to locate the nuclear waste facilities in the An-myun island was leaked to the mass media to the surprise of the residents in the locality. Stunned by the governmental plan, the residents of the An-myun island mobilized themselves to oppose and stall the MOST's plan. After the incidence in the An-myun island, the MOST again tried other locations such as Chongha, Ulsan, and Jangahn from 1992 to 1994, only to meet fierce opposition from the local residents and anti-nuclear environmental NGOs.

Experiencing fierce oppositions and, subsequently, failures in locating the nuclear waste facilities, the government enacted the Law for Facilitating Nuclear Waste Management and Supporting Adjacent Areas of Facility Sites in order to enhance the legal support for the nuclear waste management and step up the financial compensation for the residents of the nuclear waste facility site. However, such efforts by the government had not been effective as evinced by the incidence in the Buan county. As the government tried to locate the nuclear waste facility in the Wido island of the Buan county in 2003, the internal conflicts among the local residents boiled up and some residents reacted with violence to the county governor who supported the location decision of the central government.

Meanwhile, the year 2005 marked a dramatic turning point in locating nuclear waste disposal facility because the Korean government adopted a new innovative strategy called auctioning of the site combined with direct citizen voting. Four cities — Gunsan, Youngduk, Pohang, and Kyeongju — had to compete to bid for the nuclear waste disposal facility. Subsequently, Kyeongju won the auction to the cheers of their citizens.

Despite its limitations as a populist and plutocratic approach, the auctioning combined with citizen vote at least enabled the government to locate the waste storage site. Turning out to be effective, the innovation plus citizen engagement began to take the main roads, pushing away the old approach of "decide-announce-defend (DAD)." The auctioning with citizen vote in 2005 was a marked change in the government strategy of locating a nuclear waste storage facility. It was a marked transition to a more effective government strategy in dealing with the issues related to nuclear power plants where decisions are anchored on the pursuit of citizen engagement.

In dealing with high-level radioactive waste storage, the former Park administration established the Deliberation Committee for Spent Nuclear Fuel in 2013. More recently, the Moon administration also set up the Deliberation Committee for Shin-Gori 5 and 6 as a temporary organization, and made use of the deliberation poll to decide whether to continue to build or not the Shin-Gori 5 and 6 nuclear power plants in 2017. The Moon administration also established the Re-assessment Committee for Spent Nuclear Fuel to deal with the issue of storing high-level radioactive nuclear wastes in 2019. It will serve as a platform for a second-round of deliberation on the storage of spent nuclear fuel.

Deliberative democracy (DM) has become a new buzz word in South Korea indeed. DM has found its utility in other intractable public conflicts. Many local and provincial governments have already set up the legal codes to establish deliberation committees to deal with various public conflicts. At the central level, DM has been adopted even in deciding college entrance policies, only to produce disappointing results. The jury is still out, however, when it comes to the effectiveness of DM in resolving public conflicts.

Auctioning with a combination of stronger citizen engagements worked like a magic solution to the decade-old and often violent problem of locating storage for low and medium level nuclear waste. Deliberative polling also worked to resolve the issue of whether to continue on building the Shin-Gori 5&6 nuclear power plants. The current Moon administration is going further with DM arrangement to deal with the issue of spent nuclear fuel. Citizen engagement and DM seem to pave a new way to resolve public conflicts. Then what is it in citizen engagement and DM to be effective in dealing with public conflict? In the case of locating a permanent low and medium radioactive material storage facility, it practically made such a dramatic reversal possible even at the time when the incidence in Buan was still vivid in peoples' memories. And what would be some conditions to constrain the effectiveness of citizen engagement and DM in dealing with public conflicts?

The purpose of this study is to analyze how citizen engagement and DM help resolve public conflicts focusing on the cases of locating nuclear waste disposal facilities in 2005 and the decision to continue on building the Shin-Gori 5&6 nuclear power plants in 2017, both of which were almost reversals of the situations until then. In analyzing the reasons for the successful, or peaceful at least, resolutions, this study especially focuses on the increase of polycentricity in the decision-making systems. More to the point, this study hypothesizes that the polycentric governance worked as a major factor in making the resolution of those public conflicts possible. In an effort to elaborate on this proposition, this study will first discuss the concept of polycentric governance and describe how a monocentric governance structure has been transformed into a polycentric governance structure. And secondly, it will explicate the mechanisms with which the polycentric governance has led to the resolution of the public conflicts.

Ⅰ. Nuclear Waste Disposal: From Scientific Problems to Political Problems

It was on April 4, 1978 when the Gori 1 nuclear power reactor first started to operate. With the ninth nuclear power reactor, the Hanul 2, becoming operational in 1989, the Ministry of Science and Technology became more serious in looking for a site for nuclear waste storage. A serious conflict involving protests and physical violence broke out between the local residents, as well as anti-nuclear NGOs, and the central government as the Ministry of Science and Technology chose the Anmyeondo Island as the nuclear waste storage in 1990. After serveral attempts by the central government, another serious and violent conflict took place in 2004. The conflict in the Buan County, however, marked a rather historical moment as it served as a leading incidence that was conducive to the adoption of the innovative approach, i.e. an auction with citizen voting, to resolve the public conflict. Table 1 summarizes the timeline of the public conflicts involved in locating low and medium radioactive nuclear waste storage.

Table1：The Process of Looking for the Site of Nuclear Waste Storage

Dates	Events
1988	Selected Uljin, Youngduk, and Youngil, but withdrawn because of the residents' resistance
1990	Selected AnmyeonDo, but withdrawn because of residents' resistance\
2003.7.24	Selected the Wido Island in Buan County, but did not make progress because of local resistance
2003.12.10	Local referendum becoming a prerequisite for siting.
2004.11.30	10 local governments from seven regions submitted the intent to host the storage, but could not proceed to submit formal applications.
2004.12.17	The committee determined to separate an intermediate-level radioactive waste site from a mediate storage facilities.
2005.3.31	A special law enacted to provide subsidy to the locality hosting the intermediate-level radioactive waste storage.
2005.11.2	In Gyeongju, Gunsan, Pohang, and Yeongdeok, the residents voted to be a nuclear waste site. Gyeongju had the highest voter turnout with 70.8% and supported with 89.5%.
2007.11.09	The construction for the nuclear waste disposal commenced in Gyeongju Yangbuk-myun.
2013.10	The Deliberation Committee for Nuclear Spent Fuel was launched.
2014.07	The 1st stage of the nuclear waste disposal construction was completed.
2015. 6.29	The recommendations were issued by the Deliberation Committee for Nuclear Spent Fuel.
2017.6.27	The government decided to stop constructing Shin-Gori 5&6 and conduct deliberative polling.
2017.7.24	The Public Deliberation Committee for Shin-Gori 5&6 officially was launched.
2017.10.20	The recommendations were issued by the Public Deliberation Committee for Shin-Gori 5&6.
2019.5	The Reassessment Committee for Nuclear Spent Fuel Committee was launched.

(Adapted from Choi, 2005, p. 294; revised and expanded)

During 1990's, the Korean central government's approach to the siting problem was monocentric and top-down. The Ministry of Science and Technology (MOST) was solely in charge of the task. The MOST in cooperation with the Korea Atomic Energy Research Institute (KAERI) and the Korea Institute of Nuclear Safety (KINS) monopolized the process of selecting the location of the nuclear waste disposal facilities.[3] The way how the MOST approached the siting decision can be characterized as sequential acts of 'decision-announcement-defense.'

Under this type of monocentic and top-down approach, the local governments and residents can hardly have any formal roles in the decision-making process. So to speak, the siting of nuclear waste disposal was regarded as a scientific and technical problem instead of a political problem. It was also considered as a problem of rather one-sided persuasion and compensation instead of a problem of collecting opinions and agreeing on an alternative. However, such a monocentric and top-down approach started to give way to more polycentric approach in 2000's.

The jurisdiction of nuclear waste management was transferred from the MOST to MOCIE in 1997 as a part of the government restructuring carried out by the Kim Young Sam Administration. There is no evidence that such a transfer of jurisdiction was done as a punishment for the consecutive failure in the nuclear facility siting. Besides, the restructuring might be a realization of the then long-standing argumentation for the separation between nuclear research and atomic energy generation and between the use of nuclear power and the nuclear safety regulation. However, it also seemed evident that there was a hope that the change of jurisdictional boundary would help relieve the stalemate in the nuclear waste facility siting.

It was in 2000 that the MOCIE changed the nuclear facility siting policy and adopted an auction strategy to select the location for nuclear waste storage. Such a change in the course of action came in existence as the government came to a conclusion that building of a permanent nuclear waste storage would not be possible without the consent of local residents (Ministry of Knowledge and Economy & Korea Hydro Nuclear Power Co., 2008).

The first auction package was implemented in the period of July 2000 to February 2001. The amount of remuneration was set as around 213 billion won with other regional development projects being extra (Ministry of Knowledge and Economy & Korea Hydro Nuclear Power Co., 2008). At the beginning, 7 local governments — Youngkwang, Gangjin, Jindo, Gochang, Boryong, Wando, Uljin — applied. In the end, however, all of them had to withdraw their applications because of their internal political difficulties. Such a result was very encouraging, notwithstanding.

The auction strategy had eventually turned out to be not fruitful. It also seemed clear that some localities would be willing to accept a nuclear waste storage, given that the package was set up with enough inducements. With this realization, the central

government turned again to a somewhat top-down style strategy, having the Korea Hydro Nuclear Power Co. to study and designated a site. In line with this, Korea Hydro Nuclear Power Co. announced the proposed sites for nuclear waste storage -Namjung in Yeongdeok County, Gunnam in Uljin County, Hongnong in Youngkwang County, and Haery in Gochang County, based on the findings performed by the resaerch services, Dongmyung Tech Corporation in 2002.

In 2003, the Ministry of Commerce, Industry and Energy determined to select the site for nuclear waste storage among these candidate sites, if local government does not apply to host it anymore. In May, 2003, the ministry received the application to host the nuclear waste storage and then announced the revised requirement in July. As mentioned earlier (see table1), Buan County had made a bid to house it on Wido Island and was selected as the final site at last.

But unexpected violent protests by environment activists and residents forced the local government to abandon its ambitions. On the other hand, almost 89.5% of residents in Gyeongju selected in November 2005 had highly supported this project. The important reason of this positive change seems that the ministry has improved the procedures after the failure in Buan. Table 2 shows the differences between the procedures in 2003 and in 2005.

Preemption and provision of inducement constitute two main approaches to locate 'locally undesired social infrastructure' (Bacow and Milkey, 1987). As far as the preemptive measures of the central government, no noticeable change was made during the period between the incidence in the Buan county in 2003 and the one in the city of Kyeongju in 2005. Besides, the amount of monetary incentives offered by the central government was not changed much between those two cases. The amount of the remuneration to the hosting locality was set at about 300 billion won by MCIE in 2003. The decision to locate proton-based engineering technology projects in the hosting locality was already made in 2003. More specifically, although the effort in 2005 could lead to a better legal support with the establishment of the Special Law to Support the Region Hosting Low and Middle Level Nuclear Waste Disposal Facilities, the monetary incentives of 300 billion won as a special grant and 6.2 trillion won for local economic development was also offered in both cases.

Ⅱ. Polycentric and Decentralized Governance as an Institutional Innovation

A society or policy-making system can be organized in either directed order or polycentric order. Under directed order, a monolithic authority such as Ministry of Science and Technology in the case of nuclear waste management in 80's and 90's in South Korea would control and coordinate social tasks. In polycentric order, however, tasks are carried out through the processes of mutual adjustment among various components that operate independently under a certain system of rules (Polanyi, 1951). In a similar vein, Ostrom (1972) also put forth that a polycentric political system is characterized by

the existence of various organizations and decision-making structures, which can have privileges only within limited arenas of decision making. He also claimed that organizations in a polycentric political system are to be commonly governed by the rule of law.

Polycentric governance is characterized by the coexistence of multiple decision-making centers. The mutual adjustment between these centers could result in a system-wide coordination. This section tries to address how citizen engagements and DM are conducive to polycentric governance, what polycentric governance implies concerning the nuclear waste management, and how polycentric governance could help resolve the public conflicts involved in nuclear waste management.

The processes of deciding on nuclear waste facility siting gradually started to become polycentric from the year 2000, when the Ministry of Commerce, Industry and Energy (MOCIE) and Korea Hydro & Nuclear Power Co. (KHNP) first tried to accept the nuclear facility siting applications from local governments. However, it was in 2003 after the failure in Buan that the decision-making processes became practically polycentric. These changes toward polycentric governance took place in several dimensions, including the enlargement of the role played by the local residents, local councils, and mayors, strengthening of the status of the Nuclear Facility Siting Committee, and pluralization of the decision-making processes in the central government.

1. Choice by local residents and deliberative polling

The ultimate unit of analysis in the study of polycentric political systems should better be individual citizens (Ostrom, Tiebout, Warren, 1961). In a similar vein, individual citizens may constitute the ultimate unit of actor. A very important reason why the polycentric governance system could be more efficient in terms of resource allocation than the monocentric governance system may lie in the fact that citizens can choose more easily the option of 'exit' in the polycentric system. While 'voice' as a political option for citizens is attainable in the monocentric system, probably at a higher cost than in the polycentric system, 'exit' is hardly an option in the monocentric system.

In the sphere of nuclear facility siting decision making, local residents had traditionally been 'the subjects to be chosen by the central government,' and not vice versa. This aspect of 'reversed choice' had been unchanged even until the year 2003 when the Wido in the Buan County was selected as the site for nuclear waste disposal facilities. As noted in Table 1, the MOCIE was supposed to resort to citizen voting in the four localities, which the MOCIE had pre-designated on the basis of scientific research in 2002, only on the condition that "it did not have any voluntary application for hosting nuclear facilities submitted by the head of the local government by July 15, 2005" (MOCIE, 2003).

As the governor of the Buan County submitted an application to host the nuclear facilities, residents' voting did not take place in 2003. However, voting by residents became the most important factor in determining the nuclear facility site in 2005. After the fail-

ure in the Buan County in 2003, the MOCIE significantly changed the siting decision-making procedures in 2005. Among other changes, the MOCIE indeed decided to rely on the results of residents' voting in determining the locality to host the nuclear waste disposal facility. Specifically, according to the new rule set by the MOCIE, the locality with the highest rate of residents' approval is to host the nuclear facility given that at least one third of the eligible voters participate in the referendum and more than half of those who vote approve hosting of the nuclear facility.

It was the results of general voting of local residents that could justify the selection of Kyungjoo as the location of low and medium radioactive waste storage facility amongst the four local governments that applied. As shown in Table 2, Kyungjoo marked the highest approval rating in accepting the nuclear waste storage facility.

Table 2 : The Results of Approval Voting for Low & Medium Waste Facility Siting

	Kyungjoo	Gunsan	Youngduk	Pohang
Number of eligible voters	208,607	196,980	37,536	373,697
Number of those who voted	147,636	138,192	30,107	178,586
Voting rates	70.8	70.2	80.2	47.7
Approval rates	89.5	84.4	79.3	67.5

(Adapted from Ministry of Knowledge Economy and Korea Hydro & Nuclear Power Company, 2008, p. 255; modified by the author)

Deliberative polling is often adopted as a part of deliberative democratic processes. When deciding whether to continue on constructing Shin-Gori 5&6 nuclear power reactors, the deliberation committee adopted a deliberative polling. As the deliberation committee was established, the Moon administration had already stopped the construction of Shin-Gori 5&6 reactors while it was already underway. Table 3 summarizes the deliberative polling result.

Table 3 : The Results of Deliberative Polling concerning the Construction of Shin-Gori 5&6

		Response results			Change of opinions		
		Resume construction	Stop construction	Undecided	Resume construction	Stop construction	Undecided
1st round (20,006 people)		36.6	27.6	35.8			
Citizen panel (471)	1st	36.6	27.6	35.8			
	2nd	44.7	30.7	24.6	8.1	3.1	-11.2
	4th	57.2	35.4	3.3	12.5	8.7	-21.3
	last	59.5	40.5	–	2.3	1.1	-3.3

(Adapted from the Public Deliberation Committee on Shin-Gori Reactors No. 5&6, 2017, p. 86; modified by the author)

The result of deliberative polling turned out to be the one to revoke the governmental decision to stop the construction. Whether or not the policy makers in the government like the result, they had to accept the result of the deliberative polling. By going against the result of the deliberative polling, the government would have to risk too much in terms of its popularity and legitimacy. It goes without saying that the acceptance of the deliberative polling result by the government and resuming the construction were generally well received by the citizen. This incidence of the deliberative polling may comprise a good example of how a public conflict, which could possibly developed into a more serious and intractable problem, could be rather smoothly handled by a system of polycentric governance.

2. Role of the local council

Up until the year 2000 when the MOICE started to solicit applications to host the nuclear facilities, the local government did not have much role in the nuclear facility siting decision making except being a subject of the central government's preemptive designation. However, this atmosphere gradually changed as the MOCIE adopted the approach of voluntary hosting in 2002.

With the adoption of voluntary hosting, the head of the local government at least could choose whether to apply for hosting the nuclear waste disposal facilities. In 2003, the Buan County indeed positively responded to the solicitation for application. Receiving the voluntary application, the MOCIE tried to designate the Wido in the Buan County as the location for nuclear waste disposal facilities, but only to be confronted by severe civil unrest and protests.

The incidence at the Buan County seemed to be a clear indication that the head of the local government could not effectively function alone in behalf of the locality he or she represented. Consequently, the MOCIE revised the decision-making procedures so that the head of the local government had to acquire consent by the local council to apply for hosting the nuclear facilities, and the hosting locality is determined by the rate of approval revealed by resident's voting.

Under the new procedures, it may not be an exaggeration that the national endeavor of selecting nuclear waste facilities site in 2005 was overwhelmed by the competition among four localities, which were Kyeonjoo, Pohang, Gunsan, and Youngduk. Their heated competition was reported in various national newspapers.

3. Strengthening of the independent ruling of deliberative committees

The Nuclear Waste Disposal Siting Committee existed even before 2003. However, its status and function as an independent committee was far from strong enough to significantly help legitimate the decision-making processes of the nuclear waste facility siting. However, such a situation was changed as "the Special Law for Supporting the Regions Hosting Low and Middle Level Nuclear Waste" was enacted in 2005. In particular, the Special Law empowers the status of the Siting Committee as it expands the scope of

committee members to include more civilian opinion leaders from academia, mass media, legal profession, and NGOs. The Special Law also strengthened the functionality of the Siting Committee as it required the MOCIE to consult with the Committee concerning the deliberation over the siting decision-making procedures, evaluation of the appropriateness of the sites selected, establishment of criteria for site selection, etc.

The Siting Committee commenced on March 11th, 2005 with 17 members. The Committee engaged in more than 30 different activities including meetings, site visits, hearings, etc. until it issued the final report and announcement on June 16th, 2005.

In the case of the Shin-Gori 5&6, the Public Deliberation Committee played a key role in determining whether to continue with the construction of the nuclear reactors despite some criticisms especially in terms of the ways the polling questions are posed and interpreted (Park, 2017). Had there not been the independence and significant presence of the Public Deliberation Committee on Shin-Gori Nuclear Reactor No. 5&6, the polycentric governance and its legitimated resolution of the public conflict would not have been possible.

The Public Deliberation Committee was overall polycentric in term of its internal governance as the committee was chaired by a former Supreme Court judge and its membership was mostly filled by professors and experts from research institutes. Pro and Con interest groups concerning nuclear power plants were excluded from the membership. The administrative support was provided by the deliberation support team comprising 22 public employees from the Prime Minister's Office. The governing context of the public deliberation concerning the Shin-Gori 5&6 could also be generally regarded polycentric as the President declared he would accept the whatever result of the deliberation produced by the Public Deliberation Committee.

Ⅲ. Concluding remarks: effects of the polycentric and deliberative governance

Before the MOCIE adopted the approach of voluntary hosting in 2000, the local government was merely a subject of the central government's preemptive siting decision. This situation had gradually changed as the MOCIE started to solicit applications for hosting the nuclear waste facilities and put together a package to provide significant regional economic incentives in 2003. However, this package with the incentive of 300 billion won failed again in 2003. After the failure in the Buan County, still another change - polycentric governance - was added to the existing solution package. The polycentric governance is also found in the overall undertaking of the Public Deliberative Committee on Shin-Gori Nuclear Reactor No. 5&6 as described above. Most recently, in May 2019, the South Korean government established the Reassessment Committee for Spent Nuclear Fuel to deal with the issue of the permanent storage for spent nuclear fuel. The Reassessment Committee will not be operating in vacuum. And the governmental influence, as well as pressures from pro and con NGOs, would be inevitable to a certain extent. Notwithstanding, the Reassessment Committee is meant to be an independent

committee, and its internal governance structure is mostly polycentric as it is also membered by civilian experts and professors. Pro and con interest groups were again excluded from its membership. Would this work? How has polycentric governance affected the resolution of public conflicts?

Distrust is at the center of conflict concerning building of locally unwanted social infrastructure (Choi, et al., 2003a). Besides, those who oppose siting and building of such social infrastructures tend to think that the core problems of social conflicts generally lie in the lack of transparency and, thereby, the lack of legitimacy in the decision-making processes on the part of the government and the developers (Joo, et al., 2003b).

The distrust in the context of siting and building of social infrastructure is sparked by the perceptions that 'the other side turns a deaf ear to our voice' and that 'the other side is not straightforward and is hiding something from us.' (Choi, et al., 2003a, p. 184). The distrust created as such could be amplified or reduced by the sense of efficacy, individualized dialogues, fluoroscoping of the other side's positions, endurance testing by the other side — i.e. challenges or tormenting (Choi, et al., 2003a).

The increased polycentricity in the nuclear facility siting decision making seemed to help reduce the amount of distrust. It also worked as intervening conditions that hindered the existing distrust from resulting in confrontations and disregards.

From the standpoint of local residents, local governments are much closer than the MOCIE or the MOST. It is much harder for local governments, than the central government, to turn a deaf ear to residents' voice and hide some import aspects from them. As the new procedures established in 2005 allow for the local council to play a significant role in the process of applying for hosting the nuclear waste facility, it helped reduce the level of distrust generated in the initial stage of siting decision making. The local government is also in the superior position in terms of individualized dialogue, provision of the sense of efficacy, and fluoroscopic visioning of the other side's position.

Residents' voting seemed to help greatly increase the sense of efficacy on the part of local residents. Their sense of efficacy in the siting decision making was instrumental in enhancing the legitimacy of the siting decision making and, thereby, the acceptability of the decision results. Besides, involvement of multiple central ministries and reforming of the Nuclear Waste Disposal Facility Siting Committee also seemed to help reduce the level of distrust in the first place, as they help enhance the residents' perception on the attentiveness and transparency of the government.

The effectiveness of scientific knowledge is quite limited as an instrument for persuasion in conflicting situations. It is even so in the situation where residents' distrust on the government is high. In the case of the nuclear waste facility siting in Korea, the effectiveness of scientific knowledge seemed to become even lower after the incidence at the Gulup island in 1995, where the claim by the MOST that the Gulup island was

one of the safest place was defied by the later finding of an active fault in the area.

The central ministries and their subsidiary institutions may have more scientific knowledge, but not 'time and place knowledge.' Time and place – or local - knowledge is a type of knowledge that has to do with conditions in a certain place at a certain time, which is better available to the one who are/were in such a place at such a time. When it comes to building of a certain social or environmental infrastructure, the scientific knowledge about social and natural regularities frequently compete with and often give way to time and place knowledge (Choi, et al., 2003a).

Local residents are often better persuaded by those who know more about social and physical conditions of localities. It was the case with the nuclear waste facility siting decision making in 2005. As revealed in the following reports by the national news papers, it was the local politicians and local government officials that were most active in persuading local residents using their time and place knowledge. The residents were persuaded by the explanations based on local knowledge, rather than scientific and systematic knowledge provided by the central authorities.

The polycentric deliberative arrangement worked in the case of resolving the conflict involved in the construction of the Shin-Gori nuclear power reactors 5&6. It is still an open question whether it would work for the Reassessment Committee for Spent Nuclear Fuel. The polycentric deliberation alone may not be enough and other necessary conditions have to be met for any public conflicts to be resolved. It seems, however, that the polycentric deliberative governance constitutes an important innovation to deal with public conflicts.

Notes

1 Low-level wastes are materials lightly contaminated by radioactive materials with short half-life period. These include clothing, gloves, waste paper, machine tools, etc. Intermediate-level wastes are more severely contaminated materials, which include the filters to screen out gaseous radioactive particles, ion-exchange resin to purify coolant of the reactor, waste oil for coolant-circulation pump, etc. High-level wastes are highly radioactive materials, which include spent fuel (Lee, 2002).
2 Some portion of them is being treated to extract nuclear fuel as they contain some Uranium 235 and Plutonium 239. However, the rest is being stored in the nuclear power plants.
3 The KAERI and KINS are subsidiary organization of the MOST.

References

Choi, Heungsuk. 2005. "Polycentric Governance: Case of Nuclear Waste Storage," Proceedings of Korean Association of Policy Studies Winter Conference, 291–297.

Choi, Heungsuk, Sung Man Hong, and Kyung-il Joo. 2003a. "Grounded Theory for Social Conflict: The Case of Dam Construction," Korean Public Administration Review 37(4), 2003, 169–191.

Joo, Kyung-il, Heungsuk Choi, and Sung-man Hong. 2003b. "Frame Analysis of Water Resource Management Conflict," The Korean Journal of Public Administration 41(4), 2003, 193–220.

Ministry of Commerce, Industry and Energy, 2003. "Public Notice for Nuclear Waste Disposal Facility Site Auction."

Ministry of Knowledge Economy and Korea Hydro & Nuclear Power Company, 2008. White Paper on Nuclear Power Plant Safety.

Lee, Pillyul. 2002. How Long Will the Petroleum Age Last? Seoul: Green Discourse

Park, Taesoon. 2017. "Four Problems and Limitations of Public Deliberations on Shin-Gori 5&6." http://www.pressian.com/news/article/?no=174711#09T0.

Bacow, Lawrence S. and J.R. Milkey. 1987. "Overcoming Local Opposition to Hazardous Waste Facilities."In R.W. Lake, ed. Resolving Locational Conflict. New Brunswick: Center for Urban Policy Research. 159–183.

Marks, G. 1992. "Structural Policy in the European Community." in A. Sbragia ed., Europolitics: Institutions and Policymaking in the "New" European Community. Washington, D.C.: The Brookings Insitute.

Ostrom, E., Schroeder, L. and Wynne, S.(1990), Institutional Incentives and Rural Infrastructure Sustainability, Burlington: Associates in Rural Development.

Ostrom, V., Tiebout, C.M., and Warren, R.(1961), "The Organization of Governmentin Metropolitan Areas: A Theoretical Inquiry," American Political Science Review 55(4), 831–842.

Polanyi, Michael. 1951. The Logic of Liberty. Chicago: University of Chicago Press.

The Public Deliberation Committee on Shin-Gori Reactors No. 5&6. 2017. Results of Participatory Surveys for Public Deliberation on Shin-Gori Nuclear Reactors No. 5&6.