A Study on Policy Change of Locating Radioactive Waste Depository Facilities in South Korea using a Multiple Streams Perspective

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Abstract

This essay provides a snapshot of major policy change in the siting of radioactive waste depository facilities in South Korea during 2005. After 20 years of failing to locate a radioactive waste depository facility, South Korea finally succeeded in locating a facility through a major policy change of delegating decision power from the central government to local residents. The Multiple Streams framework was used to investigate changes in policy streams and politics streams since the 1980s. As Multiple Streams Framework argues, policy windows are opened when problem, policy and political streams are coupled at critical moments in time, thus leading to a major policy change. This study aims to verify whether this case can provide an example that corresponds to the hypothesis of the Mutiple Streams Framework. This study divides 20 years of pursuit to site radioactive waste depository facilities in South Korea into three periods, before and after three focusing events that drew national attention from policy makers and the public. This study shows that in the first and second period, the streams of problems, policies and politics could not be coupled because of underdeveloped policies and non-democratic politics. Yet, in the third period, the streams were coupled during a short period leading to a major policy change that unprecedently increased participation of local residents in the policy making process. Therefore, this study provides an example that confirms the validity of the hypothesis of Multiple Streams Framework.

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1. Introduction

South Korea has experienced rapid economic growth since the 1960s. Its economic development has resulted from an export-led development strategy in which government has been the major player in coordinating industrial policy. To perform this export-led development strategy, most of energy used to produce exports needs to be imported since South Korea lacks energy resources. After the oil crisis in 1970s, South Korea became interested in nuclear energy, which could provide more stable energy for economic development and began to build nuclear power plants in the mid-1970s. Thus, nuclear energy has contributed to the economic development of South Korea.

Yet, nuclear power plants have produced tons of radioactive wastes along with the increasing capacity of producing electricity. The government of South Korea has been trying to build radioactive waste depository facilities since the early 1980s, experiencing continuous failures to site a facility mainly due to the fierce resistance of local residents. However, in 2005, South Korea finally succeeded in locating a radioactive waste depository facility through a major policy change. Before 2005, the central government of South Korea tried to keep the power to decide where to locate the facility. Then in 2005, they determined to let local residents decide whether to accept the facility or not by adopting a competitive voting system. Given that South Korea has been a centralized society in which people have granted the leading role to government in planning and implementing national projects, this major policy change was an extraordinary incident in the history of policy making in South Korea.

This study aims to investigate the variables which led to the major policy change in 2005. And this major policy change cannot be understood properly without recognizing the development of politics and policies in siting radioactive waste depository facilities from 1980s till 2005. During that period, three major focusing events occurred regarding the siting of the facilities. Also during the period, South Korea experienced rapid progress of democracy and significant changes in administration and legislature. This study divides the period into three periods before and after each of the three major focusing events, which drew exceptional attention from policymakers and the public.

1.1 Nuclear Power Plants and Waste Repositories of South Korea

The first nuclear power plant of South Korea was built in 1978, and South Korea continues to construct nuclear power plants with plans to build more nuclear power plants in the future (Yun, 2008). In 2009, 35.6% of the total electricity in South Korea is produced through nuclear power and nuclear power has covered almost 40% of electricity demand in South Korea from 1980s till 2009 (MKE, 2010). In July 2010, South Korea has 20 commercial nuclear power plants, including 16 PWR (Pressurized water reactor) and four BWR (Boiling water reactor); they are located in four different areas including Younggwang, Kori, Wolsong, and Ulchin as shown in Table 1 and Figure 1 (MKE, 2010). Four nuclear power plants are under construction and two plants are planned to be constructed in Kori. Two nuclear power plants are under construction at Uljin and two plants are planned to be

constructed at Wolsung (MKE, 2010).

Table 1. Status of nuclear power plants in South Korea

Location	Number of operation	Reactor type	Remarks
Youngkwang	6	PWR	
Kori	4	PWR	Under construction 4 Planning 2
Uljin	6	BWR	Under construction 2
Wolsung	4	PWR	Under construction 2
Total	20		

Source: MKE 2010

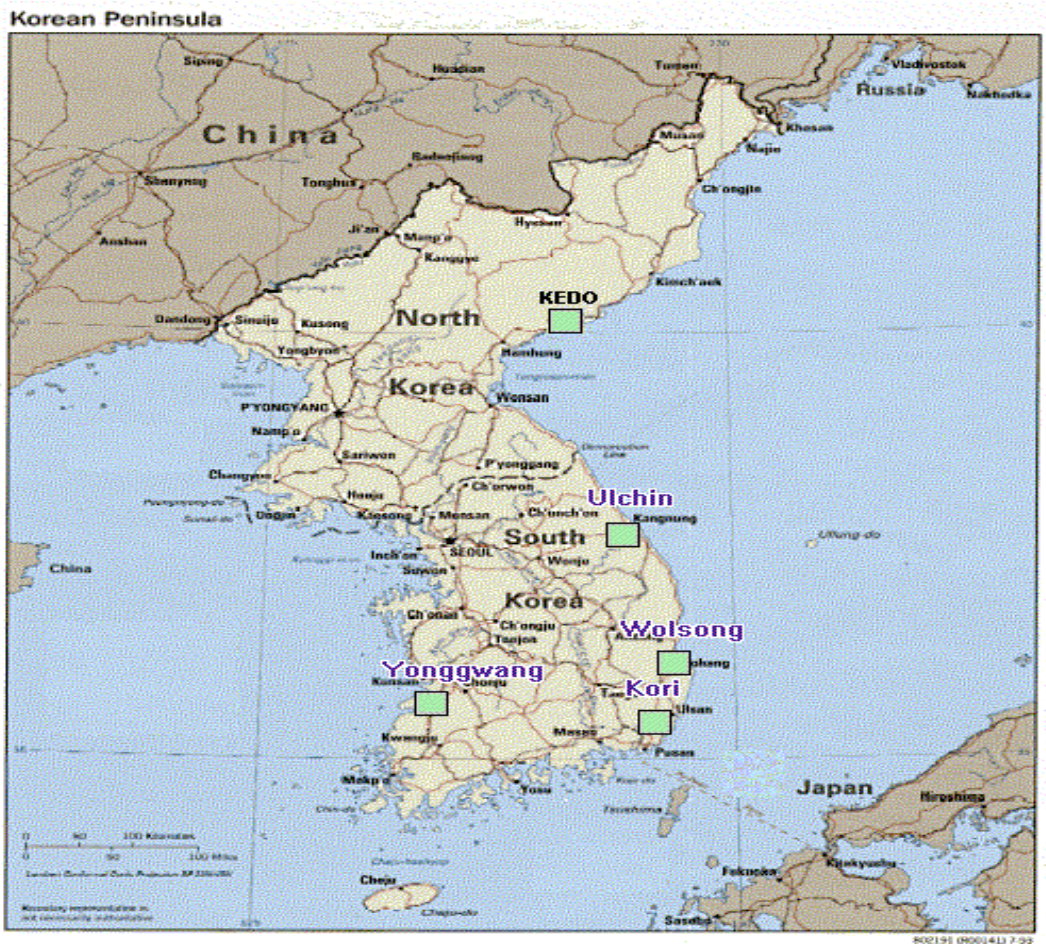

Figure 1: Map of nuclear power plants in South Korea, Source: http://www.cscap.nuctrans.org/Nuc_Trans/locations/korea/korea.htm

These nuclear power plants inevitably produce dangerous by-products of radioactive waste. The radioactive waste can be classified into low and intermediate level waste (LILW), spent fuel (SF) and high level waste according to the level of the emitted radioactivity. LILW originate from hospitals, universities, research institutes and related industries as well as nuclear power plants, but mostly from nuclear power plants (Yun, 2008). According to the Ministry of Education, Science and Technology of South Korea, as of December in 2008, LILW stocks in the nuclear power plants were about 76,000 drums as shown in Table 2

(MEST, 2009).

Table 2. Stocks of LILW in nuclear power plants (unit: drum)

Location	Storage capacity	Cumulative quantity	Year of saturation
Youngkwang	23,300	18,246	2012
Kori	50,200	37,977	2014
Uljin	17,400	13,505	2008
Wolsung	9,000	6,752	2009
Total	99,900	76,481	

Source: MEST, 2009

The year of saturation (i.e., capacity level of being full) has been extended considerably by construction of depositories inside nuclear power plants. Also it has been extended as new technology has enabled compression of nuclear wastes, requiring less space to store them. Yet, the year of saturation has been used by government officials in South Korea as a means of arguing the need to build radioactive waste depository facilities.

1.2 Framework of Analysis

Public policy frameworks

There are lots of public policy frameworks that emphasize different aspects of the public policy process. Among the prominent frameworks of public policy such as Institutional Rational Choice, Multiple Streams, Punctuated Equilibrium Framework, the Advocacy Coalition Framework and Policy Diffusion Framework, the Advocacy Framework

and Multiple Streams Framework appear to be candidates of adequate framework to answer the question that the author has.

The Advocacy Coalition framework (ACF) of Sabatier and Jenkins-smith is concerned with policy change over a decade or more, and the ACF's early research dealt primarily with energy and environmental policy (Sabatier and Weible, 2007). Therefore it can be a candidate to explain the policy changes of locating radioactive waste depository facilities of South Korea because the policy change took 20 years and it deals with the energy and environmental problems. The Advocacy Coalition Framework conceptualizes a three-tiered hierarchical structure of belief system which consists of deep core beliefs, policy core beliefs and secondary beliefs (Sabatier and Weible, 2007). According to Sabatier and Weible (2007), changing secondary beliefs requires less evidence and fewer agreements among subsystem actors and thus should be less difficult while deep core beliefs are very difficult to change. The vast majority of policymaking occurs within policy subsystems and involves negotiations among specialists (Sabatier and Weible, 2007) and the two critical paths to belief and policy change are policy oriented learning and external shocks (Sabatier and Weible, 2007).

The Multiple Streams Framework (MS) is a framework that explains how policies are made by national governments under the condition of ambiguity (Zahariadis, 2007). For MS Framework, the adoption of specific alternatives depends on when policies are made (Zahariadis, 2007). MS contends that three streams of political, policies and problems are flowing through the policy system and each is conceptualized as largely separate from the others, with its own dynamics and rules, yet, at critical points in time, combination of all

three streams into a single package dramatically enhances the chances that a specific policy will be adopted by policy makers (Zahariadis, 2007). An interesting part of the MS Framework is that MS deals with policy making under conditions of ambiguity. Ambiguity is a state of having many ways of thinking about the same circumstances or phenomena and it is different from uncertainty which means the inability to accurately predict an event (Zahariadis, 2007). Thus, more information does not reduce ambiguity when organizations or governments have fluid participation, problematic preferences, and unclear technology (Zahariadis, 2007). Under such conditions, theories based on rational behavior are of limited utility, and who pays attention to what and when is critical (Zahariadis, 2007).

As Zahariadis has argued, "If ambiguity is pervasive and central to politics, manipulation is the effort to control ambiguity; it is a political struggle to create winners and losers, to provide meaning and identity, to pursue self-interest" (2007: 69). Information is not value-neutral, and information is strategically manipulated to serve different aims for different elements in the policy process and in a world replete with ambiguity. The most important aspect of entrepreneurial activity is to clarify or create meaning for those policy makers (Zahariadis, 2007). According to MS, there are two groups; those who manipulate and those who are manipulated. Policy makers are assumed to have problematic preferences and are subject to manipulation, thus MS points out that whether a solution is "good enough" is determined politically by policy makers (Zahariadis, 2007). As Zahariadis has argued, "Policy makers and policy entrepreneurs use labels and symbols that have specific cognitive referents and emotional impact. It is the strategic use of information in combination with institution and policy windows that changes the context, meaning and policies over time." (2007: 70).

Framework of the study

Advocacy Coalition framework has strength in explaining policy change over a decade or more and it appears to be an adequate tool to explain the major policy change in locating radioactive waste depository facilities in South Korea as the framework has been developed and applied to energy and environmental policy. And, Advocacy Coalition framework emphasizes the importance of negotiations among specialists between different coalitions and the role of scientists (Sabatier and Weible, 2007). Furthermore, Advocacy Coalition framework argues that changes in belief system in the dominant coalition is the major factor of policy change. Yet, in the cases of this study, the author couldn't find the existence of serious negotiations among specialists and also could not find any significant role for scientists in the public policy process of siting radioactive waste depository facilities in South Korea. In addition, the author couldn't find the evidence of changes of the core beliefs of the dominant coalition, which prefers the exclusive, unilateral decisions of government to decisions by local residents in selecting the site for the facilities.

On the contrary, Multiple Streams Framework can explain policy changes in the selection of radioactive waste depository facilities in South Korea without emphasizing the significance of negotiation among specialists and importance of the role of the scientists. MS also can provide the political context of the issue, which have less significance in the United States than in South Korea where central governments and politics has had more influence than science until recently. Ambiguity is another important element of Multiple Streams Framework. In this study, policy makers

showed fluid participation and they acted under severe time constraints, often not knowing exactly what they wanted.

MS contends that three streams of problems, policies and politics are flowing through the policy system and at critical points in time, the combination of all three streams into a single package dramatically enhances the chances that a specific policy will be adopted by policy makers (Zahariadis, 2007). The problem stream consists of various conditions that policy makers and citizens want addressed (Zahariadis, 2007). Policy makers find out about these conditions through indicators, focusing events, and feedback. Indicators may be used to assess the existence and magnitude of a condition, as well as the scope of change (Zahariadis, 2007). Indicators can be monitored either routinely or through special studies. The indictors then can be used "politically" to measure the magnitude of change in the hope of catching official attention (Zahariadis, 2007). Focusing events also draw attention to problematic conditions (Zahariadis, 2007). Feedback from previous programs is important in that it helps highlight what works and what may not (Zahariadis, 2007).

The policy stream includes a "soup" of ideas that compete to win acceptance in policy networks. Ideas are generated by specialists in policy communities and are considered in various forums and forms, such as hearings, papers, and conversations. While the number of ideas floating around is quite large, only a few ever receive serious consideration (Zahariadis, 2007). Selection criteria include technical feasibility and value acceptability (Zahariadis, 2007). The politics stream consists of three

elements: the national mood, pressure group campaigns, and administrative or legislative turnover. Government officials sensing changes in the national mood act to promote certain items on the agenda (Zahariadis, 2007). Politicians often view the support or opposition of interest groups as indicators of consent or dissent in the broader political arena. Legislative or administrative turnover frequently affects choice in quite dramatic ways (Zahariadis, 2007).

Policy windows are opened by compelling problems or by events in the political stream when the streams are coupled at critical moments in time, and policy windows are of short duration and coupling takes place during open windows when certain policy makers happen to be in power (Zahariadis, 2007).

In the siting policy of radioactive waste depository facilities of South Korea, problem streams, policy streams, and politics streams appear to be flowing through the policy system. By identifying the three streams and discovering the coupling of the three streams, Multiple Streams Framework is expected to contribute to understand the causes of the 2005 major policy change of in South Korea.

2. Literature Review

The successful locating of a radioactive waste facility in 2005 drew the attention of many South Korean researchers who tried to explain the successful siting. Ju-Yong Jung, in his doctoral dissertation, *Radical Change of Policy Acceptance - A Case Study on the*

Location Policy of Radioactive Waste Depository Facilities in Korea (2008), argues that a radical change of policy acceptance happened in 2005. Using the Catastrophe theory, which emphasizes both artificial input elements from timely flows and interaction among situational conditions, he contends that the adoption of the competitive voting system in 2005 dramatically reduced resistance from local residents against government's siting policy. He argues that the voting system increased acceptance of local residents about siting radioactive waste facilities in their county unprecedentedly.

Kil-soo Kim, in his doctoral dissertation *A Case Study on the Compliance and Resistance of Target Group in Policy Implementation Process in Korea* (1996), explores the causes of the local residents' resistance in building nuclear waste depository facilities. He suggests several alternative policy options which can lessen resistance of the local residents. He argues that the government should convince local residents about the necessity of the facility, and that sufficient economic benefits should be given to hosting regions, and that governmental secrecy in siting procedure should be abandoned.

Hae-Un Yoo, in his doctoral dissertation *A Study on Factors Affecting the NIMBY – With an Emphasis on Siting of Nuclear Related Facilities* (1996), investigates the factors that affect local residents' opposition. He argues that participation of local residents, openness in governmental decision procedure, enhanced public relations, building trust between the government and local residents, appropriate economic compensation to local residents, involvement of environmental groups, and delegation of central government's decision power to local government are important to solve the problem of siting radioactive waste facilities.

Chang-Jin Cho, in his doctorial dissertation *A Study on Alternatives to Solve the Locational Conflict on the Locally Unwanted Facilities – Focusing on Radioactive Waste*

Depository Facilities (2005), tries to seek alternatives to solve the locational conflicts that interrupt the siting of radioactive waste depositories and suggests ways to solve the conflicts. His alternatives include improvement of desirability of policy, consolidated policy making and implementation system, disclosure of information, participation of local residents, and active role of the Assembly of South Korea.

Seung Hwan Lee, in his Masters' thesis *A Study on the Causes that Delay the Construction Programme of Nuclear Waste Disposal Facility* (1999), analyses the construction programme of Nucelar Waste Disposal Facility in Korea with the view of institutional factors, processing factors of policy implementation, responsive factors of the residents and environmental factors surrounding the actors. He argues the importance of proper negotiation procedures and the necessity of neutral organization that can mediate conflict between the government and local residents. And he contends that building trust between the government and local residents are essential to solve conflicts in building radioactive waste depository facilities.

In these previous works, common factors were found to lessen resistance of local residents. Adequate economic compensation, participation of local residents, openness in governmental decision procedure, and building trust between the government and local residents are important factors to lessen public resistance of governmental siting of radioactive waste depository.

There are also many other masters' degree theses since 1990s which analyze the policy of siting radioactive waste depository facilities in South Korea. Most of the theses have been written from the viewpoint of conflict resolution between central government and local residents. It is understandable that much research and many papers focused on conflict

resolution because there have been incurable conflicts between the central government and the local residents with regard to the siting of the radioactive facilities until the conflict were solved in 2005 by adopting the competitive voting system. However, there is not research using the Multiple Streams Framework to investigate why and how this major policy occurred. Specifically, political aspects of this major policy change were not considered seriously and previous research lacks a larger picture of the problem. By adopting Multiple Streams Framework to study this major policy change, gaps in these literatures can be addressed.

3. Methods

Using Multiple Streams Framework, the author conducted a qualitative analysis for the study presented here. There is much previous literature describing and analyzing the problems and solutions about siting of radioactive waste depository facilities in South Korea. Among the literature, doctoral dissertations and master's theses were chosen to get relevant information to explain reason for the major policy change in South Korea. The literatures were searched through the web site of the National Assembly Library of South Korea where most doctoral and master's theses were registered. Literature was searched by using the word "radioactive waste" or "nuclear waste" and literature not related to radioactive waste depository policy were eliminated. Hence, the author could find 19 doctoral dissertations and 72 master's theses from 1992 to 2009 (See Figure 2).

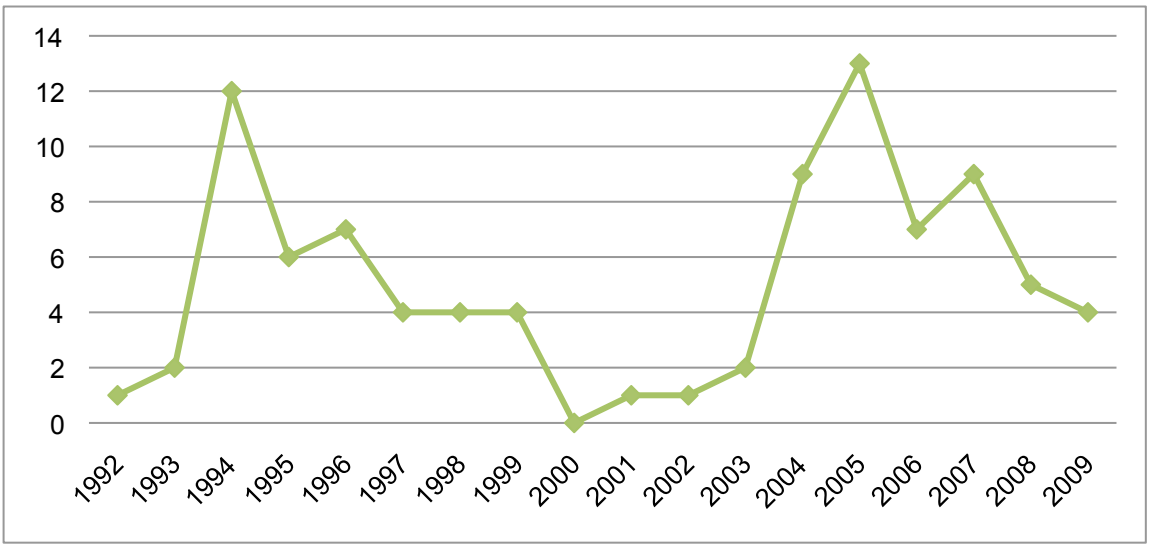

Figure 2. Number of studies from 1992 to 2009

The author organized information from the sources to identify context of problem, policy and politics streams. Problem streams were investigated by identifying indicators and focusing events which drew national attention. Policy streams were organized by emphasizing participation of local residents and economic assistance to hosting regions and changes in governmental organization in charge of the radioactive waste depository siting policy. Political streams were organized by investigating changes of administration and changes of seats in the National Assembly of Korea.

This study focuses on the political and policy changes before and after the focusing events which drew national attention, thus divided the 20 years of trial to site the radioactive facilities into three periods before and after the three focusing events. Thus the author tries to search the reason why the window of opportunity for the major policy change was opened in 2005 using the Multiple Streams perspective.

4. Discussion

To understand properly the major policy change of South Korea in 2005, the author contends that the former decisions on siting radioactive waste depository facilities should be understood as well as the decision of 2005. In detail, seven governmental decisions were made about the locating of radioactive waste depository facilities from 1980s till 2005, and the local residents of the designated site have protested harshly against each government decision.

Among the confrontations between the central government and local residents, three incidents at Anmyeon Island, Gulup Island and Buan County were the most significant because national attention was given to these events owing to the magnitude of the protests, and because meaningful policy changes followed. This study divides the 20 years of attempts to locate the facility into three periods, before and after each three major focusing event, and discusses the problem, policy, politics streams of each period.

4.1 Period 1 (1984-1992): Before and after the Anmyeon Island incident in 1990

South Korea tried to locate radioactive waste depository facilities beginning in 1984, and harsh resistance by the local residents was followed by government decisions on locating the facilities. From 1984 to 1992, three government decisions were made on the siting of the facility including the decision to build the facility in Anmyeon Island, a western seaside area of South Korea. Fierce resistance of local residents on Anmyeon Island in 1990 was the first that drew national attention

regarding the siting of the facilities.

4.1.1 Decisions before the Anmyeon Island incident

In 1984, the Atomic Committee of South Korea, which had extensive jurisdiction on nuclear policy, expressed its interest in building a radioactive waste depository facility. In 1986, the Ministry of Science and Technology and Korea Atomic Energy Research Institute, a government-funded atomic research institute that has close relationships with and under the supervision of the Ministry, had started to search for adequate sites to locate the facility (Jung, 2008). In 1988, after clandestine geological field researches, they secretly selected three sites (Uljin, Young-Duk, and young-Il) as candidates for the facility (Figure 3). The whole process of the siting was kept secret from local residents and even from local administrative agencies in the areas (Lee, 2005). Researchers disguised themselves as hikers while doing their research, yet their suspicious behaviors were detected by a few local residents and rumors spread around the regions (Lee, 1995).

Figure 3: Location of Uljin, Young-Duk, and young-Il (Source: http://www.land.go.kr/enggis/gis_tra.jsp)

Although the central government of South Korea tried to keep the fact of selection secret, the selection was revealed by a legislator who was a representative of Youngduk County. On 23 February 1989, he demanded that the minister of Science and Technology verify the rumors at the Committee of Energy and Resources. The minister acknowledged that a decision was made to locate the radioactive waste depository facility in one of the three counties (Lee, 1995). After the revelation, fierce public protests occurred in the three counties at the same time, and the government withdrew its plan to build the facility in the areas; thus the first attempt at building the facility in 1989 failed (Lee, 1995). Yet, as the three counties are in

one of the remotest areas in South Korea, national public attention was not given to the protests.

4.1.2 Problem streams

Indicators

In 1981, the government of South Korea established a plan to increase the percentage of nuclear energy from 6% to 42% by 1991, trying to use nuclear energy as major energy sources for its economic development (Jung, 2008). Also, the saturation of radioactive waste in existing facilities drove the need to build storage facilities outside the nuclear power plant (See Table 3).

Policy makers recognize the need to adopt public policy through indicators and indicators can be used "politically to measure the magnitude of change in the hope of catching official attention" (Zahariadis, 2007: 71). The year of saturation of radioactive waste has been used as an indicator regarding the siting of the facility. In 1990, year of saturation of the first nuclear power plant of South Korea, Kori, was expected to be 1991 (MER, 1990), and provided justification to build the facility.

Table 3. Year of saturation of LILW in 1990

Location	Storage capacity	Cumulative quantity	Year of saturation
Kori	32,906	20,894	1991
Youngkwang	13,330	1,874	1997
Uljin	5,000	758	1993
Wolsung	9,000	1,075	2020
Total	55, 236	23,501	

Source: MER 1990

Focusing event

Anmyeon Island, located near the western seaside area of South Korea, is 113 square kilometers in size, with 18,234 people in 1990, and is connected to the mainland by a suspension bridge (Figure 4). Its people had experienced a challenging struggle with the developer, Hyundai Industrial Inc, on a reclamation project from 1984 to 1989 (Chun, 1992).

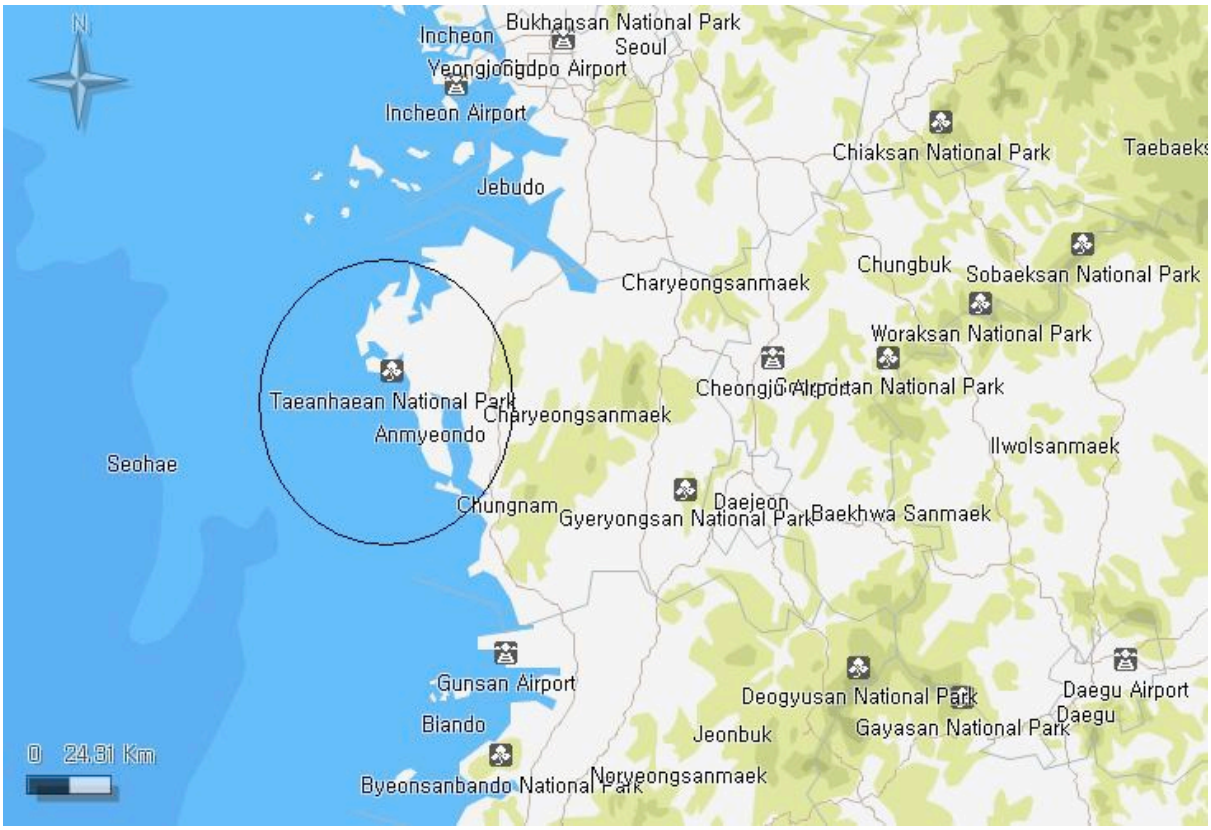

Figure 4: Location of Anmyeon Island (Source: http://www.land.go.kr/enggis/gis_tra.jsp)

Again, in 1990, one year after the failure of 1989, the government tried to locate a radioactive waste depository facility. After the failure of 1989, the government ascribed its failure to leakage of information so it was determined to

intensify security control on the decision (Lee, 1995). On 9 September 1990, the Atomic Committee of South Korea decided internally that Anmyeon Island would be the site for the facility. Yet the government of South Korea classified the decision as confidential. Also, the central government of South Korea bought most of the lands necessary for building the facility from the local government of Chung-Nam province secretly (Jung, 2008). Furthermore, while trying to locate a radioactive waste facility at Anmyeon Island, the Ministry of Science and Technology announced a national project of building "the western seaside science & technology complex". The most important part of the project was to build a radioactive waste depository facility in the complex. Thus, they tried to manipulate people by using the terminology "western seaside science & technology complex" rather than "radioactive waste depository facility" (Chun, 1992:129). Though there were arguments with the local people and research results, which suggested that the main issue was the lack of public participation, policy makers used ambiguity in their policy language, hoping to hide their plans and accomplish their goals.

The day before the final and perfunctory decision was going to be made, a reporter of the newspaper "Hankyoreh" reported the decision of the central government. People of Anmyeon Island organized an anti-nuclear, anti-government protest quickly after the Hankyoreh report (Kim, 1996). As the central government determined to break up the demonstration with police force, people's protests become more and more violent, leading to an assault on public officials including police officers and arson attacks on a police station (Kim, 1996). On 8 November 1990, 15,000 people, almost 80% of the total population of the island, participated in the

rally (Kim, 1996). People also refused to send their children to primary, secondary, and high schools as an expression of dissent with the government policy. Yet, the next day, the minister of Science and Technology confirmed that the central government would construct the facility as planned at a meeting presided by the Premier of South Korea. A few hours later that night, however, the central government changed its policy by saying that it would not pursue construction of the facility at the Island (Kim, 1996). Thus, the crisis was settled. As a result of the incident at Anmyeon Island, the Minister of Science and Technology resigned assuming responsibility for the unrest.

Feedback

Notwithstanding the failures of three counties in 1989, the government appeared to have learned nothing about the policy process of siting a facility at Anmyeon Island in 1990. Moreover, secrecy in the public policy process intensified against the will of the local residents in 1990. Once again, the geological and technological perspectives were the major criteria in deciding the facility in 1990, failing to learn from the 1989 feedback of community members unwilling to host a waste depository.

After the failure of Anmyeon Island, the central government came to recognize that it is impossible to build a facility without the consent of the local residents (Lee, 1995). Central government officials believed that they could get the consent of the local residents by providing additional information about the safety of nuclear energy and the technological safety of waste disposal (Lee, 1999). After the Anmyeon Island

incident, in June 1991, the Minister of Science and Technology announced that government would select the site through open procedure and with the consent of the local residents (Lee, 1995). The cause of failure was, for the central government, not the lack of participation by local people but insufficient information about the safety of the facility. An interview with the newly-appointed Minister of the Science and Technology, Mr. Jin Hyun Kim, shows an example of this kind of recognition by government officials:

> …After I came here and as I reviewed the problems, I found that the biggest problem is that the government officials and scientists of the Korea Nuclear Institute had too much confidence in technological safety of the facility. Thus, there was huge gap between the wariness of the common people and confidence of the specialists. We, the experts in nuclear energy and radioactive waste should provide accurate knowledge to the general most of who lack basic knowledge about nuclear energy and its safety. It was the lack of knowledge which caused the disaster of Anmyeon Island… (Lee, 1999:81)

The Committee of the Economy Technology of the National Assembly of Korea also urged a more open administration, which could promote understanding and cooperation of the people by providing more information about nuclear waste (Lee, 1995)

As the government determined to intensify public relations, government spending in public relations increased rapidly (Lee, 1999). But, the information the government provided was one-sided: positive aspects of nuclear energy, with dull and formal explanations about the safety of the radioactive waste facility. On the contrary, the

information anti-nuclear NGO's provided was full of threatening descriptions about public health and safety by exemplifying the tragic cases of the 1986 Chernobyl disaster in Ukraine and 1979 Three-Mile Island accident in the United States (Lee, 1995).

After the Anmyeon island incident, the government tried to add social science approaches to the technical approach of siting the facility. In a research consortium of six universities funded by the government, researchers found that one of the most important reasons for the failure was that government did not listen to local residents (Chun, 1992). They suggested that the government should spend more time and energy to improve public understanding about the safety of the nuclear wastes and its depository facility.

4.1.3 Policy streams

Participation of local residents

Before the Anmyeon Island incident, policy makers of the Ministry of Science and Technology and the scientists of the Korea Atomic Energy Institute regarded the major problem as technical. Thus, they did not care about what locals thought about locating radioactive waste depository facilities (Cho, 2005). In spite of the failure in 1989, government officials believed that people's participation in governmental decision making was unnecessary and even harmful. Yet, studies showed that the main cause of the Anmyeon Island disaster was the lack of participation by local residents (Lee, 1996). One study analyzed the fliers of locals, anti-nuclear groups, and environmental movement groups and found the major factor for opposing the

government was a result of perceived indifference by the government to public opinion (Kim, 1996). In a leaflet of anti-nuclear organization, a local resident says:

> …the government should respect and accept the opinions of local residents in making important decisions such as locating nuclear waste depository facilities. It is arrogant and insulting to the local residents for the Ministry of the Science and Technology to transform the island where tens of thousands people live peacefully into a nuclear waste dump while disregarding peoples' opinion… (Kim, 1996:72)

The research done by a consortium of six universities also found that participation of locals was the most significant factor in solving the problem (Cho, 2005).

After the Anmyeon island crisis, the government enacted "An Act on the Promotion of the Project of the Radioactive Waste Depository Building and the Assistance to the Neighboring Areas" in 1993. Participation of the local residents was institutionalized in the legislation (Kim, 1996). The legislation mandates that the government should announce publicly the important parts of the radioactive waste depository project, providing more than one month for public review. According to the Act, interested people could present opinions to the Ministry and the Ministry should report their review of the opinions. In addition, a regional consultation body consisting of the local residents and experts should be organized, and public hearings should be held to receive the opinion of both locals and experts (Kim, 1996).

Ostensibly, the legislation appears to introduce a procedure which enhances

public participation. However, as public participation is allowed only after the selection of a site, for the local residents their participation was likely only to be used as a justification for any government decision.

Economic assistance to hosting regions

Before the Anmyeon Island incident, only technical feasibility was considered as a criterion to locate the site. Economic incentives, not to mention the participation of locals, were not considered. While the public in general benefits from a radioactive waste depository facility, negative external effects of the facility fall exclusively on the local residents living in the hosting region. Thus, economic assistance to hosting regions seemed to be rational and inevitable, but any economic incentives were not suggested by the government to the residents of Anmyeon Island (Yoo, 1996). As the site to build the facility at Anmyeon Island was supposed to be bought from the local provincial government, the residents of Anmyeon Island could not get any economic assistance from the central government (Lee, 1999).

After the Anmyeon island incident, the central government realized the need to provide economic incentives to the residents who live near the facility in order to build radioactive waste depository facilities. Thus, economic assistance was institutionalized by the Act of 1993 and the economic incentives were to be determined by the distance from the facility and administrative districts (Kim, 1996). Anti-nuclear groups opposed the proposed bill because they feared that institutionalized economic assistance might increase the possibility of locating the

facility (Lee, 1999). Yet, the bill passed the National Assembly of Korea and was enacted in 1993. The act also allowed the government to offer a preference to a county if it applied to host other governmental development projects, providing more economic benefits to the county to locate the radioactive waste facility (Lee, 1999).

Changes in governmental organizations

After the Anmyeon island incident, the central government recognized that the Ministry of Science and Technology and the Korea Atomic Institute lacked capacity to perform the project by themselves. Also, President Kim Young-Sam decided that it would be better to perform the project with support of the whole government, thus, a new organization was established to deal with the problem (Yeh, 2007). On 29 October 1994, with the support of President Kim, the Committee on Radioactive Waste Management, which has de facto decision power to decide the site of the radioactive waste depository facility, was organized. And a task force team was organized with 43 officials from ministries that have any policy mandate to assist the project of siting the facility (Yeh, 2007).

Summary of policy changes before and after the Anmyeon Island incident

The changes in the policy of siting radioactive waste depository facilities in this period are summarized in Table 4.

Table 4. Summary of Policy changes before and after Anmyeon island incident

	Before	**After**

Participation of the locals	Not allowed	Allowed after the selection
Economic incentives	None	Institutionalized
Government behavior	Secrecy	Openness (superficial)
Approaches	Natural science	Natural + social science
Organization	The Ministry of Science and Technology	Combined Committee of related ministries
Legislation	None	Special law

4.1.4 Political streams

Administrative Turnover

Building radioactive waste depository facilities in South Korea began with the declining power of President Chun Doo Wan who came into power by military coup in 1979. In June 1987, the pro-democracy movement, which brought more than 5 million people onto the streets, resulted in the fall of the military regime and introduction of direct presidential elections in South Korea. Pronouncement of democratization on June 9, 1987 by the presidential candidate of the ruling party, Roh Tae Woo, brought rapid democratization to South Korea. Developing democratization made it more difficult for the government to push ahead with any plan without the consent of the people affected by governmental decisions (Lee, 1999). Yet, President Roh Tae Woo, who had succumbed to the people's demand for democracy in 1987 and won the presidential election of 1988, was reluctant to accept public participation in public policy process during his presidential term (1988-1993). He had an elite military career prior to becoming president and did not appear to have a genuine aspiration to democracy, which means enlarging people's decision

power in policy making.

The Minister of Science and Technology, a scientist, was replaced by a prominent journalist after the Anmyeon Island incident. This change shifted criteria for locating radioactive waste facilities from scientific and technological to public involvement and public relations.

Legislative turnover

Lots of political parties have emerged and disappeared in South Korea since the 1940s. Unlike the long-lived political parties of the United States, no political party of South Korea has existed for more than 20 years. Yet, there were certain streams of conservative parties that favored the strong role of the central government and progressive parties that tried to relegate power of central government to local government and local residents. The Democratic Liberal Party (DLP), born after the merger of three parties in January 1990 has come to represent the conservative mainstream in South Korea. The New Korea Party and the Grand National Party, the descendents of the DLP, have more conservative affiliations than the parties originated under the progressive leader Kim Dae-Jung's influence.

The merger of three conservative parties was a significant event in this period. As a result of the 1988 general election, the ruling Democratic Justice Party became outnumbered by the opposition parties. Opposition democratic leader Kim Young-Sam, leader of the Unification Democratic Party, agreed secretly to merge his political party with the ruling Democratic Justice Party of President Roh Tae-Woo and Democratic Republican Party of Kim Jong-Pil in 1990, contrary to people's

expectations. Kim thought that he could control the new party and become the presidential candidate of the new party in the next election as the merged party did not have other popular political leaders (See tables 5 and 6). This dominant coalition of conservative, pro-industrialization parties of South Korea was formed, and conservatives in the legislature made it increasingly difficult for the government to relegate its decision power to the people.

Table-5. Seats at the National Assembly of South Korea in 1988

Party	Seats (299)	Remarks
Democratic Jusitice party	125	Conservative
Unification Democratic Party	59	Conservative
Democratic Republican Party	35	Conservative
Peace Democratic Party	70	Progressive
Others	10	

Table-6. Seats at the National Assembly of South Korea in 1990

Party	Seats (299)	Remarks
Democratic Liberty party	219	Conservative
Peace Democratic Party	70	Progressive
Others	10	

Pressure group campaign

During the public demonstrations in the three eastern areas of Ulgin, Young-duk, and Young-il, pressure group campaigns were insignificant. At the Anmyeon Island demonstration, engagement of the environmental groups was increasing, but, because of the geographical conditions, the intervention of the environmental groups was somewhat restricted. Also as the Anmyeon Island incident lasted only nine days, environmental groups and experts did not have enough chance to participate and intervene at the incident (Chun, 1992).

A leader of the anti-government organization says that

> …It was true that environmental groups helped us. But they did not lead the strike and did not instigate local people. We, the local people, are protesting against the government decision for ourselves. Environmentalists provided the information about the danger of nuclear waste depositories or just notified us of the situation of other areas' anti-nuclear movement... (Kim, 1996:196)

4.1.5 A Window of opportunity

A Window of opportunity was not open in this period, even after the Anmyeon Island incident. Politically, democracy was developing, but the administration and legislature were all dominated by conservatives who preferred governmental decision making over decision making by local residents. The Anmyeon Island incident succeeded in drawing attention of policymakers, and they began to consider economic incentives and participation of local residents. Yet, participation of people was allowed only after the selection of the radioactive waste depository facility. This kind of participation can only be used to justify that procedures were followed in governmental decisions. In conclusion, although the focusing event of Anmyeon Island drew national attention, political streams and policies streams in this period demonstrated why the window of opportunity could not be opened to a new policy. Streams of period 1 are summarized in Table 7.

Table 7. Summary of the streams of Period 1

	Indicator	Years of saturation
Problem	Focusing events	Anmyeon-do incident
	Feedback	Minor Policy adjustment
Politics	Administration Change	Administration and legislature ruled by pro governmental decision
Policy	Value acceptability	Not acceptable to policymaker
	Technical feasibility	Acceptable

Interes group's intervention	Insignificant

4.2 Period 2 (1992-1996): Before and After the Gulup Island incident

After the Anmyeon Island incident, the central government increased economic assistance and tried to provide more information to people, but kept resisting participation of people in the government decision making process. In this period, the adoption and implementation of the nationwide local election of 1995 played an important role in the making of a new policy for locating nuclear waste depositories.

4.2.1 Problem streams

Indicator

On 27 June 1995, a nationwide local election was supposed to be held in South Korea, the first time since the 1960s. The central government of South Korea believed that newly elected leaders of local governments could be a huge barrier to locating radioactive waste facilities (Lee, 1999). The central government hurriedly tried to site a facility before the new local election system was introduced. As expected, candidates for local government opposed plans for locating a facility in their counties and neighboring counties.

Focusing event

In 1993, the government conducted geological research in ten candidate counties in order to site a radioactive waste depository facility. After the research, the government reached an internal decision to build the facility at Gulup Island. Gulup

Island, a small island 1,7km2 in extent, only nine people in 1994, is located in the western region of South Korea, 8km south of Duk-Jeok Island and 70km southwest of Incheon (Figure 5).

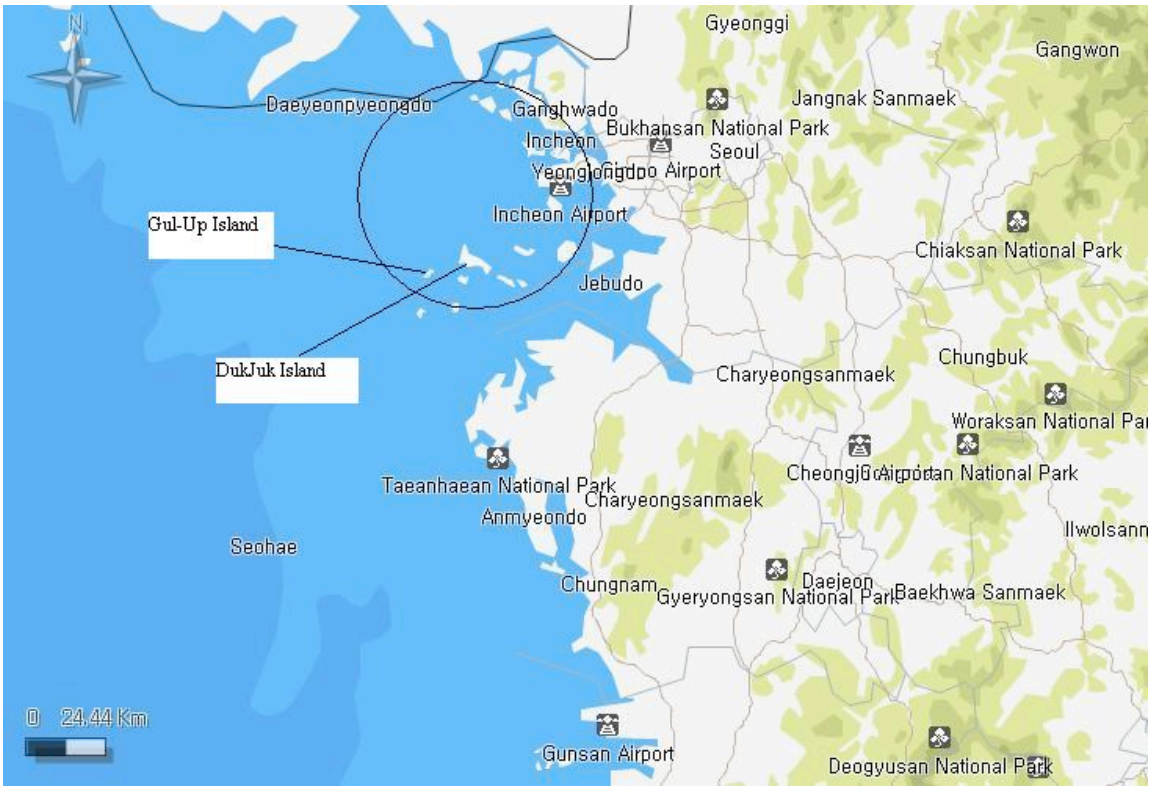

Figure 5: Location of Gulup Island (Source: http://www.land.go.kr/enggis/gis_tra.jsp)

On 22 December 1994, the Ministry of Science and Technology announced that the Island was selected as the site for the radioactive waste depository facility. Administrative procedures such as public reading, public hearing, and consultation with local residents were followed by the announcement in accordance with the Act of 1993 (Lee, 1999). On 15 December 1994, the internal selection was aired in television broadcasts.

After the broadcasts, public protests occurred against the central government decision. Similar to the Anmyeon Island incident, fierce public demonstrations of local residents broke out and drew national attention. Unlike the Anmyeon Island incident, the Gulup Island incident lasted almost a year, from December 1994 to November 1995. Also, more environmental groups and scientists engaged in the incident than the Anmyeon Island incident as Gulup Island is located near the big city of Incheon (Yoo, 1996). On October 1995, a capable fault (i.e. a fault that has ability for movement thus threatens stability and safety of the radioactive waste depository facilities) was found at the bottom of the Island, and the Ministry of Science and Technology withdrew its decision to site the facility at Gulup Island (Cho, 2005).

4.2.2 Policy streams

Participation of local residents

While economic incentives were increasing, the government relied on its unilateral decision power to disregard peoples' opinions. The government, after obtaining the consent of Gulup Island, argued that it had the consent of local residents of the site (Lee, 1999). But, the argument was inappropriate because the negative effects of the facility fell not only on Gulup Island but also onto the residents of neighboring regions including the heavily dense urban area of Incheon. The central government still did not allow local residents to participate in any decision process until after it had decided the site for radioactive waste facility. At an interview, a local resident says that "…We came to know the fact after the broadcast on television, before the broadcast, nobody knew the fact…" (Lee,

1999:114). Though there were procedures such as public hearing and public readings, the local residents argued that the meetings were held after the government decided where to locate the facility and were meaningless (Lee, 1999).

One non-governmental organization (NGO) asserted that the location had to be decided by a local referendum (Jung, 2008). The government argued that although it would collect peoples' opinions, the central government has the power to locate the facility not local residents (Jung, 2008). While the argument of the NGO reflected the opinion of the local residents, at that time officials in the government as well as other NGOs did not take this assertion seriously (Jung, 2008).

Economic assistance to hosting regions

Economic assistance by the central government to the hosting region increased gradually and continually. Based on the Act of 1993, the Ministry of the Science and Technology announced that it would provide 50billion won (approximately 50 million dollars) to the selected site in 1994 (Lee, 1999). As the economic incentives were institutionalized, local residents could make judgments about the benefits and losses of locating the facility. Yet increased economic incentives also provoked a conflict between local residents who favored and opposed the facility (Lee, 1999).

Changes in government organization

After the failure of Gulup Island, the government once again changed the department in charge of siting radioactive waste depository facilities. In accordance

with President Kim Young Sam's direction, in 1996, the Ministry of Commerce and Industry and Korea Electrics, a state owned company, became the organizations in charge of building the facility (Lee, 2005). The changes in the policy of siting radioactive waste depository facilities in this period are summarized in Table 8.

Table 8. Policy changes before and after the Gulup Island incident

	Before	After
Participation of the locals	Allowed after the decision	Allowed before the decision
Economic incentives	Institutionalized	Institutionalized + Increased
Government behavior	Openness (superficial)	Openness
Approaches	Technical + social	Technical + social
Organization	The Ministry of science and technology	The Ministry of Industry and resources
Legislation	Special law	Special law

4.2.3 Political streams

Administrative turnover

Kim Young Sam, the first civilian president (1993-1998) since the 1960s, pledged to pursue a small government, which meant more delegation of central government power to local administration and local residents. This pledge, however, was assessed by political scientists as rhetoric (Chang, 2005). A democratic, but authoritative leader, President Kim preferred central government decisions to decisions by local residents. He seemed to believe that the problem of siting could be solved

by changing the organization in charge of the policy and by increasing economic assistance to the hosting region. There is no evidence that the administration delegated central government authority to local governments or local people during this period in the policy area of radioactive waste depository facilities (Lee, 1999).

Legislative turnover

From 1992 to 1996, the legislature of South Korea was dominated by conservatives who preferred central government decision making, thus making it difficult to bring major policy change to locating radioactive waste depository facilities. In 1992, the Democratic Liberty Party possessed majority seats in the Assembly of South Korea (See Table 9).

Table 9. Seats at the National Assembly of South Korea in 1992

Party	Seats (299)	Remarks
Democratic Liberty party	149	Conservative
Democratic Party	97	Progressive
People's Party of Unification	31	Progressive
Others	22	

In 1996, New Korea Party, the descendent of DLP, and another conservative party, Confederation of Liberty and Democracy, possessed majority seats in the

Assembly (See Table 10.). Therefore, seats at the National Assembly of South Korea in the period showed a strong influence of conservatives who favor central government decisions over decisions by local government or local residents.

Table 10. Seats at the National Assembly of South Korea in 1996

Party	Seats (299)	Remarks
New Korea party	139	Conservative
National Convention for New politics	79	Progressive
Confederation of Liberty and Democracy	50	Conservative
People's Party of Unification	15	Progressive
Independent	16	

Pressure group campaign

Engagement of environmental groups in the Gulup Island incident became direct and active. Because Gulup Island is located near the metropolitan Incheon city, and not far from Seoul, the capital of South Korea, the Gulup incident provided an opportunity for environmental groups including the Korean Federation for Environmental Movement, the biggest environmental organization in South Korea, to participate in the incident more actively (Yoo, 1996; Kim, 1996). The environmentalists spoke for the local residents at the public hearing and also one environmental group raised the issue of the possibility of a capable fault under Gulup Island after they conducted geological surveys of the island with their own experts (Lee, 1999). Responding to the assertion of environmentalists, the central government invited experts from the International Atomic Energy Agency (IAEA) to support its own geological survey. But, on October 1995, the central government finally had to

acknowledge the possibility of a capable fault under the island and was forced to withdraw its decision to site the facility.

4.2.4 A Window of opportunity

In this period, although there was the focusing event of Gulup Island, the politics and policy streams did not allow the window of opportunity to open. The central government relied on increased economic assistance to hosting region and its residents to site a radioactive waste facility. Though the administration of Kim Young-Sam was a democratic government, it also represented the conservatives who favor central government decision making over decision by local government and local residents. The legislature of this period was also dominated by the conservatives.

Delegation of central government authority to local residents in the policy making process could not happen under these circumstances even though there were voices that argued the adoption of a local referendum was necessary to solve the problem of siting radioactive waste depository. Streams of period 2 were summarized in Table 11.

Table 11. Summary of Streams of the Period 2

Problem	Indicator	Adoption of the local autonomy system
	Focusing events	Gulup Island incident
Politics	Administration Change	More democratic yet conservative, authoritative administration with conservative ruling legislature

Policy	Interest group's pressure	Significant
	Value acceptability	Not acceptable to policymaker
	Technical feasibility	Acceptable

4.3 Period 3 (1996-2005): Before and After the Buan incident in 2003

4.3.1 Policy Changes in 2000

The central government of South Korea came to recognize the importance of the participation of local residents to locate a radioactive waste facility. After the introduction of local autonomy in 1995, the central government could not make unilateral policy decisions that affected local interests. Therefore, in June 2000, the central government attempted to find ways to reflect local residents' opinion before it made decisions to site a radioactive waste depository facility and adopted a new system. Under this new system, local residents had the initiative in siting a radioactive waste depository facility. If local residents petition to the head of the local government requesting the siting of a facility in their region, the head of the local government could submit an application to the central government with the consent of the local legislature (Jung, 2008). Then the central government evaluates the technical and geological adequacy of the site and then decides the region as a site for the facility. Under this new system, local residents in a few underdeveloped areas such as Youngkwang County, Kochang County and Hadong County, expressed their interest in siting the facility in the hope of getting economic assistance from the central government (Jung, 2008).

However, wherever a petition of local residents was submitted, anti-nuclear NGOs launched a movement against the siting of the facility, and brought a

confrontation between proponents and opponents in the regions (Jung, 2008). Furthermore, members of the local legislature, who had the key to any application, had to face enormous pressure from anti-nuclear NGOs and local residents who opposed the application. Because the heads of the local government must be aware of the decisions of the majority of voters, most of them announced they were against the siting of the facility. Even when a head of the local government submitted a petition bill requesting the consent of the local assembly, the majority of the legislators of the local assembly rejected the proposed bill to locate the facility for fear that majority of voters opposed the siting of the facility (Jung, 2008).

4.3.2 Problem streams

Focusing event

In 2003, local residents of Wee-Island, located 16km west of Buan county and a part of Buan County (See Figure 6), submitted a petition to the head of the Buan County to locate a radioactive waste depository facility on the island. On July 2003, the county magistrate submitted a bill that asked the consent of the Buan County legislature, but the legislature rejected the proposed bill to locate the facility. But on 11 July 2003, county magistrate Kim Jong-Kyu announced that Buan County would accept the facility in spite of the legislature's rejection for the sake of economic development in the county (Jung, 2008).

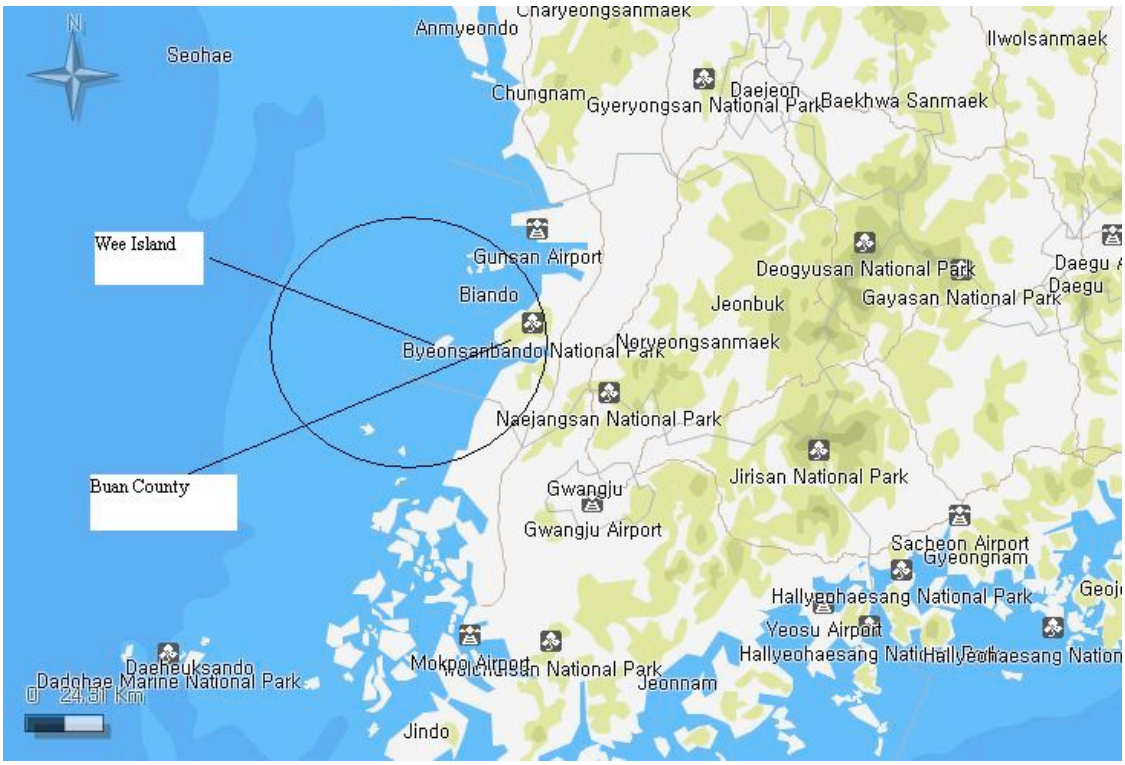

Figure 6: Location of the Wee Island and Buan County (Source: http://www.land.go.kr/enggis/gis_tra.jsp)

However, the day the County Magistrate announced the application, a thousand people gathered in front of the county office and protested against the decision. The numbers of people participating in the rally kept increasing and on 22 July, 10,000 people demanded resignation of the Magistrate and withdrawal of the application. But on 24 July, the central government declared that Wee Island was selected as the site for the facility (Jung, 2008).

After the announcement, public demonstrations were aggravated and the central government decided to suppress the protest with police force. On 13 August, the public demonstration reached its peak by occupying a highway near Buan County. The public protests lasted till the end of the year (2003). Local residents organized

an emergency commission to revoke the decision and many NGOs participated in the commission by providing information and assistance. NGOs raised the issue of local referendum as a way of enhancing public participation in the policy process. On 29 December, the commission demanded that the central government implement a local referendum to resolve the confrontation, yet the central government denied the proposal. But, in February 2004, the commission held a local referendum by themselves and 92% of the local residents opposed the siting of the facility (Jung, 2008). On 16 September 2004, the central government announced its decision not to locate the facility on Wee Island.

4.3.3 Policy streams

Participation of local residents

The system of 2000 considerably enhanced public participation in the policy process to locate a radioactive waste depository facility. Yet, new process did not provide public participation. The central government still possessed the final decision power to determine where and how to site a facility and the process was not prescribed by law. Therefore, implementing the system was only optional for the central government.

During the Buan incident, NGOs argued the necessity of local referendum, and the central government refused to hold a local referendum. Though President Rho Mu Hyun of South Korea privately said that a new system in which each resident of competing counties has the chance to vote simultaneously should be designed (Jung, 2008), officially the central government could not agree to the assertion of a local

referendum because of a lack of legal and administrative procedures (Jung, 2008). The legislation of the "Act on Local Referendum" was pending at the Assembly of South Korea at that time in 2004, and was supposed to be enacted the following year. In 2005, the legislature passed the Act and provided legal ground for adopting local referendum in the policy area of siting radioactive waste depository facilities (Jung, 2008).

After the Buan incident, a mandatory and competitive voting system for siting a radioactive waste depository facility was adopted by the central government. The system, institutionalized in "The Special Law on the Assistance to the Hosting Region of Low and Intermediate Level Radioactive Waste Depository Facilities of 2005" mandates that a local referendum should be held in order to site a radioactive waste depository facility in accordance with the procedures written in the Act on Local Referendum (Jung, 2008). The voting system requires that local referenda be held simultaneously in each county and city that applied to host the facility. Then the county or city that gained the highest percentage of approval from local residents was determined as the final candidate for hosting the facility. On 2 November 2005, the first local referendum was carried out to decide whether to accept a facility or not. Local residents finally held the decision power to determine whether to build a radioactive waste depository facility in their regions or not.

Economic assistance to hosting regions

In this period, economic incentives kept increasing and the central government still had faith in the efficacy of economic incentives even though local referendum

was adopted to solve the problem. The Ministry of Industry and Resources announced that the Ministry would provide 300billion Won to the hosting region according to the Act of 2005 (Jung, 2008). At the April 2003 meeting of his cabinet, President Rho Mu Hyun (elected in 2002), said that the siting should not be delayed. The Ministry of Industry and Resources then increased economic incentives and announced that it would provide a total of 2,100 billion Won in economic packages. Changes in policies before and after the Buan incident are summarized in Table 12.

Table 12. Policy changes before and after the Buan incident

	Before	**After**
Participation of the locals	Partially allowed	Local referendum
Economic incentives	Increased	Increased
Government behavior	Openness (superficial)	Openness
Approaches	Technical + social	Technical + social
Organization	The Ministry of science and technology	The Ministry of Industry and resources
Legislation	Special law	Special law

4.3.4 Political streams

Administrative turnover

President Kim Dae-Jung, the first opposition democratic leader was elected in the 1997 presidential election, pursued government deregulation. As a proponent of democracy who devoted his whole life to the development of democracy in South Korea, he pursued small government and delegation of governmental power. Unlike

his predecessor, his pursuit of small government is evaluated by political scientists as having genuine intent and implementation (Chang, 2005). It can be assumed that he preferred decision making by local residents over decision making by the central government with regard to facility siting. Thus his administration adopted the new system of 2000, yet failed to locate the facility owing to activities of anti-nuclear NGOs.

President Roh Mu-Hyun, the successor to the Kim Dae-Jung's administration, also pursued a policy of decentralization that allowed local governments increased decision power. His administration tried to site a facility through the new system of 2000, but also failed due to opposition of anti-nuclear NGOs until 2005.

Legislative turnover

During Kim Dae-Jung's administration (1998-2003), the ruling party, (National Convention for New Politics), had to collaborate with the conservative party of Kim Jong-Pil, (Conference of Liberty and Democracy), because they could not gain a majority of seats in the 1996 general election (See Table 13). Though the two parties did constitute the majority party of the assembly through changes in party membership in 1998, the administration could not get stable support from the assembly during the term. Furthermore, the collaboration between the two parties was broken up in 2001. Therefore Kim's regime and his New Millenium Democratic Party, descendent of the National Convention for New Politics, had to face strong opposition from conservative parties in pursuing decentralization policy of its own (See table 14).

Table 13. Seats at the National Assembly of South Korea in 1996

Party	Seats (299)	Remarks
New Korea Democratic party	139	Conservative
National Convention for New politics	79	Progressive
Conference of Liberty and Democracy	50	Conservative
Others	31	

Table 14. Seats at the National Assembly of South Korea in 2000

Party	Seats (273)	Remarks
New Millenium Democratic Party	115	Progressive
Grand National Party	133	Conservative
Conference of Liberty and Democracy	17	Conservative
Others	8	

The Roh Mu Hyun administration experienced abrupt legislative turnovers. When he was elected as the President in 2003, his party, the New Millenium Democratic Party, did not possess a majority of seats in the Assembly. Moreover, the party was broken into one wing that supported the President and another wing that opposed the President. On 12 March 2004, in the middle of this political turmoil, opposition parties introduced a bill to impeach the President, which was approved by the

National Assembly in which opponents of the President dominated. However, at the general election the following month, the Uri party, a new party which supported President Roh, became the majority, dramatically changing the political landscapes once again (See Table 15). Though the Constitutional Court overturned the impeachment and the Uri party became the majority party in 2004, the majority was sustained for only one year, collapsing on 28 March 2005. Hence there was short period of time in which a major policy change in the siting of radioactive waste depository facilities could happen in the political streams.

Table 15. Seats at the National Assembly of South Korea in 2004

Party	Seats(299)	Remarks
Grand National Party	121	Conservative
Uri Party	152	Progressive
New Millenium Democratic Party	9	Conservative
Conference of Liberty and Democracy	4	Conservative
Democratic Labor party	10	Progressive
Others	3	

Pressure group campaign

During the Buan incident, environmental and anti-nuclear groups intervened from the first moment and actively engaged in protests against the siting. The groups also

organized an arbitration organization that aimed to resolve the fierce confrontation between the government and local residents. Environmental NGOs forced members of the local legislature to reject the proposed bill to locate radioactive waste facilities. For example, the Korean Federation for Environmental Movement went on provincial briefings tours demonstrating the danger of a nuclear waste depository facility.

4.3.5 A Window of opportunity

The Kim Dae-Jung administration (1998-2003) pursued a small government and deregulation as a principle. The administration was interested in delegating central government authority to local governments. However, the administration lacked stable support from the legislature. Though there were policy streams which emphasized the importance of public participation in the policy making, it lacked a focusing event which drew national attention of policy makers and the public. Therefore, a window of opportunity could not be opened during the Kim Dae-Jung administration.

On the contrary, during the Roh Mu-Hyun administration (2003-2008), the three streams coupled, and major policy changes occurred. First, President Roh had the political will to delegate central government authority to local residents, and in a short period between 2004 and 2005 the legislature supported the president's policy. Also there was focusing event of the Buan incident, which drew the national attention of policy makers and the public. Thus major policy change could occur. Streams of period 3 are summarized in Table 16.

Table 16, Summary of Streams of Period 3

	Indicator	Years of Saturation
Problem	Focusing events	Buan incident
Politics	Administration Change	More democratic, progressive administration and legislature
	Interest group's pressure	Significant
Policy	Value acceptability	Acceptable to policymaker
	Technical feasibility	Acceptable

5. Conclusion

Even though the government of South Korea tried to locate radioactive waste facilities, 20 years of trials resulted in failures. As South Korea had a long tradition of centralized government, officials tried to locate the facilities by pushing the policy unilaterally. Yet, in 2005, South Korea finally succeeded in locating a radioactive waste facility through a major policy change that delegated decision power from the central government to local residents.

On 2 November 2005, under the mandatory, competitive voting system of 2005, four local governments-City of Kyoungju, City of Kunsan, Youngduk County and City of Pohang-applied to host a radioactive waste depository facility and held local referenda simultaneously. The City of Kyoungju was selected as the final site for hosting a radioactive waste depository facility as they had the highest rate of public

approval (Table 17).

Table 17, Percentages of approval during the local referenda of 2005

	Kyoungju	Kunsan	Youngduk	Pohang
Percentages of Approval	89.5%	84.4%	79.3%	67.5%

Multiple Streams Framework argues that major policy changes occur when the political, policy and problem streams are coupled and joined at critical moments in time. Policy windows are of short duration and coupling takes place during open windows when certain policy makers happen to be in power (Zahariadis, 2007). This study is an example that demonstrates the assertions of the Multiple Streams Framework.

In the first period (1984-1992), the policy stream showed underdeveloped policies for participation of local residents. The politics stream showed that the administration and the legislature of that time were not inclined to delegate decision power to local residents. A window of opportunity could not be opened in spite of the focusing event at the Anmyeon Island (September 1990), which drew national attention. Though many local residents and research indicated the importance of local participation, major policy change that would allow such participation couldn't be achieved under the authoritative, conservative political atmosphere and immature policies.

In the Second period (1992-1996), the policy stream showed that participation of local residents was not considered seriously while economic assistance to hosting

regions increased gradually and considerably. The politics stream showed that the administration and legislature still favored central government decision despite the development of democracy in the period. Therefore, even though there was the focusing event at Gulup Island (December 1994-November 1995), that drew national attention, a window of opportunity did not open in this period because the streams of politics, policy and problem streams were not coupled.

On the contrary, in the third period (1996-2005), the policy stream showed development of institutions about local referenda, which meant to increase participation of local residents. The politics stream showed existence of a very short period of opportunity when President Roh Mu Hyun had a supportive legislature for a single year. Thus after the Buan (2003. 7- 2003. 10) focusing event, the three streams coupled in this period, and major policy change in South Korea for siting radioactive waste depository facilities could finally occur.

The major policy change happened under severe time constraints considering the looming deadline posed by the "saturation" of existing waste depositories. This major policy change was determined as a "good enough" solution by policy makers politically. Though the author has doubts on the assertion that the new competitive voting system is a good enough solution, this major policy change is an example of verifying the assumptions of the Multiple Streams Framework.

6. Limitations

More direct data that could explain the 2005 major policy change in South Korea might

be found in the conversations of the politicians and policy makers in charge of the siting policy of radioactive waste depository facilities. Thus, the author searched the parliamentary records of Committee of the Assembly of South Korea, which included the remarks of policy makers, but couldn't find any meaningful remarks which could help to investigate the causes of the major policy change. The author could not find remarks of members of Assembly or ministers of administration about the delegation of central government authority to local residents in the area of siting radioactive waste depository facility. Interviews with the policymakers who involved in the decision making of the 2005 policy change might help to understand the causes of the policy change, and further studies with the interviews are expected to fill the gap of this study.

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