

Environmental justice of nuclear waste policy in Taiwan: Taipower, government, and local community

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Received: 20 November 2012 / Accepted: 3 May 2013 / Published online: 17 May 2013
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Abstract This paper is an investigation into Taiwan's policy on nuclear waste disposal, concentrating on the ways in which dumping sites have been chosen, and on the wider implications of those choices. The central aim was to examine whether this policy breached the distributive and procedural principles of environmental justice by discriminating against disadvantaged areas and minority ethnic groups. The paper first clarifies the meaning of environmental justice and then applies it to the case study of Taiwan's decision announced in 2009 that Da-Ren (達仁鄉) in Taitung County (台東縣) and Wang-An (望安鄉) in Penghu County (澎湖縣) were its two favoured potential sites for the final disposal repository of radioactive waste. The findings of the research suggest that the Taiwan government and the nuclear power provider, Taipower, failed to fulfil the requirements of environmental justice in reaching this decision. The contribution of this case study to the literature on the environmental injustice of nuclear waste siting policies is fourfold. First, it adds to the growing number of studies that show how siting decisions systematically and deliberately disadvantage vulnerable communities. Second, it finds the basis of this discriminatory policy to lie in the wider pattern of inequality that exists in Taiwanese society—a pattern that is rooted in historical traditions of racial and tribal prejudice, reinforced by contemporary forms of corruption. Third, it suggests that a solution to the problem of environmental injustice in nuclear waste siting policy may have to wait until these broader practices of unequal treatment in Taiwan are addressed. Fourth, it speculates that the need for a solution to the nuclear waste problem may be a catalyst for dealing with these broader patterns of unequal treatment.

Keywords Environmental justice · Nuclear waste policy · Taiwan

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1 Introduction

The politics and management of nuclear waste has always been a controversial issue. Much of the controversy has centred on technical difficulties of minimising risks to human safety or on sociological issues of antinuclear movements. Less attention has been paid to the normative issues which it raises, such as the injustice of choosing some sites rather than others. This paper deals with this normative issue, critically assessing the management and politics of nuclear waste disposal in Taiwan from an environmental justice perspective. The nuclear power industry is a major source of energy in Taiwan, providing 17 % of its overall electricity supply. Since the early 1980s, the industry has produced thousands of barrels of low-level/intermediate-level/high-level waste (LLW/ILW).¹ Health hazards from exposure to radiation include cancer, leukaemia, bone marrow failure, central nervous system failure, and reproductive failure, and since LLW/ILW and HLW pose such threats for hundreds and thousands of years, respectively, the issue of nuclear waste disposal is very serious for Taiwanese authorities.

There are two parts to the paper: first, the theory of environmental justice is explained; and second, a case study of nuclear waste siting policy in Taiwan is undertaken. The two parts are integrally related in that the theory of environmental justice informs the case study, giving it meaning and structure. In the first part, we explain that the idea of environmental justice is derived from the environmental justice movement, which originated in the USA in the late 1970s and early 1980s. Environmental justice issues are twofold: distributive justice refers to the distribution of environmental risks among different communities, while procedural justice refers to the access of citizens to decision-making processes that affect their environment.

In the second part, this analysis of environmental justice is applied to a case study of nuclear waste management and politics in Taiwan. In order to obtain the primary data needed to understand the case, *[name deleted to maintain the integrity of the review process]* carried out fieldwork during 2009 in Taiwan, studying published documentation, including government and Taipower documents as well as media coverage, and conducting 32 interviews with activists in NGOs and members of local communities. The data obtained were analysed through the lens of the concept of environmental justice, focusing particularly on the historical development of nuclear waste in Taiwan and the process of protracted attempts to site a new nuclear waste repository. Special attention was paid to the decision-making process and to the involvement of minority and low-income communities in that process. The overall purpose of this paper is to demonstrate that Taiwan's lack of success in its search for a satisfactory site for the disposal of its nuclear waste was in large part due to its failure to fulfil the distributive and procedural principles of environmental justice. In the concluding section, two complementary scenarios are sketched out: (1) that the unjust siting of nuclear waste policies will only end when wider patterns of inequality in Taiwan are addressed; and (2) attempting to address the injustice of nuclear waste policy will serve as a catalyst for addressing the broader issues of inequality in Taiwan. Eight recommendations are made to improve the prospect of rectifying nuclear waste injustice in Taiwan.

2 The meaning of environmental justice

The most widely used definition of environmental justice is provided by the US Environmental Protection Agency (USEPA)'s Office of Environmental Justice:

¹ The case study is exclusively concerned with the siting of low level-nuclear waste in Taiwan, though local people were worried that other types of waste might also be stored in such sites.

to ensure that all people, regardless of race, national origin or income, are protected from disproportionate impact of environmental hazards. To be classified as an environmental justice community, residents must be a minority and/or low income group; excluded from the environmental policy setting and/or decision-making process; subject to a disproportionate impact from one or more environmental hazards; and experience a disparate implementation of environmental regulation, requirements, practices and activities in their communities (USEPA 2000).

Within this definition we can discern two distinct elements: distributive and procedural. Distributive justice is related to issues of unequal distribution of environmental ‘bads’ and ‘goods’. Procedural justice is related to issues of access to decision-making processes which give rise to these unequal distributions of environmental bad and goods. In the case of nuclear waste, it is argued that local communities suffered disproportionate health risks from hosting disposal sites because they lacked power in the decision-making process. In this section, we explain the meaning of distributive and procedural justice

2.1 Distributive justice

The starting point for most discussions of distributive environmental justice is equality—that everyone should experience the same amount of environmental bads and enjoy the same amount of environmental goods. For example, Shrader-Frechette (2002: 26) proposes the ‘Principle of Prima Facie Political Equality’ (PPFPE) which requires that ‘all things being equal, rich and poor, coloured and white, educated and non-educated, be treated equally in the distribution of society’s environmental benefit and burdens’. On her account, we should begin from the presumption that a fair distribution of environmental benefits and burdens is an equal distribution and ‘place the burden of proof on those attempting to justify unequal distributions’ (Shrader-Frechette 2002: 28).

It is widely recognised that nuclear waste disposal raises issues of distributive environmental justice (Shrader-Frechette 2002; Walker 2012). While every person in the society benefits from the electricity which is generated from nuclear power plants, people who live in the communities which host nuclear wastes suffer greater risks from radioactive material, and this unequal distribution of bads is prima facie unfair. For example, in the USA, according to Easterling and Kunreuther (1995), nuclear waste repositories are usually located in Western States despite the fact that Eastern States have a greater population and therefore a larger consumption of electricity (see also Marshall 2005). Likewise in Canada, according to Lois Wilson (2000), the south produces nuclear waste while the north is more often the location of repositories for nuclear waste. Similarly in the UK, most nuclear waste is stored in Sellafield in northwest England and Dounreay in the north of Scotland (IET 2005)—both of which are communities in disadvantaged areas. In Taiwan, over 80 % of nuclear waste is stored in an indigenous people’s island situated 75 km from the main island (Weng 2001).

For a utilitarian, such inequalities in particular communities might be justified because of the greater good experienced by the rest of society. But for an egalitarian, it is a different matter: egalitarians hold that it is inherently bad if some people are worse off than others (Parfit 1998; Temkin 2003). In other words, egalitarians see equality as an intrinsic value. In the case of nuclear waste, communities which host nuclear waste would be worse off than communities far away from radioactive waste, but egalitarians would not accept that this inequality can be offset by a greater benefit to the whole of the country. However, egalitarians have to face up to the so-called levelling-down problem, which arises if we

choose to level down the position of one of the better-off groups to make the position of all the groups equal. In order to achieve a fairer distribution, can we really allocate nuclear waste equally to every person by requiring every community to host the same amount of nuclear waste? Not only is this technologically impossible because managing nuclear waste needs very specific technology, but it would encounter the normative problem that it would impose harm or, at least risk of harm, on everyone.

One way to escape from the egalitarian's levelling-down problem is the principle of sufficiency. Frankfurt (1988: 134) argued that 'what is important from the point of view of morality is not that everyone should have the same but that everyone should have enough' (see also Rosenberg 1995). For Frankfurt, the idea of sufficiency requires a certain level of well-being, and once this level of well-being has been reached, no further action needs to be taken. The central concern for the sufficiencyarian, therefore, is that people have enough rather than the same. As Bell (2004) pointed out, some advocates of environmental justice have proposed a guaranteed minimum standard of environmental quality with variation above that minimum according to personal income and spending choices. As long as all enjoy the minimum standard, any inequality between them can be tolerated. In the context of nuclear waste, the key concern is that a repository may impose health risks that are inconsistent with a minimum standard of environmental quality.

One common response to environmental inequality and the failure to meet minimum standards of environmental quality is to offer compensation to the victims of environmental injustice. At any rate, compensation could be the answer to tackle interregional inequality, taking the form of investments by governments or the nuclear industries to provide public infrastructure for local communities, employment of local citizens, grants, or tax rebates (Openshaw et al. 1989: 9). Such compensation would also serve as an incentive for local communities to accept the proposal of dumping nuclear waste in their area (Boerner and Lambert 1995). Of course, compensation would not reduce any risks caused by dumping nuclear waste—negative health effects on local communities would not vanish because of any compensation. Moreover, some people regard compensation as merely a way to bribe or 'buy off' opposition to nuclear waste dumping in local communities. Furthermore, what guarantee is there that the most disadvantaged communities have sufficient political leverage to secure a fair rate of compensation?

As for compensation for intergenerational inequality, although this would be very difficult far into the future, many countries have established funds to benefit at least the next two or three generations. In Taiwan, the government-owned nuclear industry, Taiwan Power Company, contributes NT\$ 0.17 (approximately £0.0034) per unit of electricity to such a fund, which since 1986 has topped NT\$ 9.97 billion (approximately £199.4 million) (Taipower 2009). This fund is exclusively earmarked for the final disposal of nuclear waste and the decommissioning of nuclear power plants, and it has attracted several local communities and foreign countries to compete for contracts for nuclear waste dumpsites, though it is unlikely to be sufficient to cover the cost of decommissioning a single reactor, let alone disposing of nuclear materials.

In the case study section, we will find arguments about equality, sufficiency, and compensation running through the analysis of our case study of Taiwanese nuclear waste disposal policy.

2.2 Procedural environmental justice

Turning to the second aspect of environmental justice—procedural justice—we focus on the process of decision-making rather than the outcome of those processes (which is the

subject of distributive justice). Procedural environmental justice is as important as distributive environmental justice. Indeed, at times, activists in the environmental justice movement seem to be more exercised by procedural issues than by distributive issues. This may be because they hold that procedural injustice is the cause of much distributive injustice. For example, the reason why people suffer a disproportionately high level of health risk from nuclear waste is often believed to be because those people lack the power to participate in the decision-making process, which, as we shall see, is a form of procedural injustice (Walker 2012).

We can identify six elements of procedural environmental justice, all of which run through our analysis of community perceptions of nuclear waste siting in Taiwan. The first element is non-discrimination. Bullard (2000: 10) describes this element as ‘the extent to which governing rules and regulations, evolution criteria, and enforcement are applied in a non-discriminatory manner. Unequal protection results from...undemocratic decisions, such as exclusionary practices, conflicts of interest, or public hearings held in remote locations and at inconvenient times’. Non-discrimination requires equal treatment for all in the decision-making process, irrespective of their social, economic or cultural characteristics, and their opinions and beliefs.

The second element is political participation (Schlosberg 2003; Freudenberg and Steinsapir 1992). Environmental justice groups call for more thorough participatory local input into, and control over, environmental decisions, demanding ‘participation in assessment, planning, and implementation’ (Schlosberg 1999: 163) so that decisions on environmental issues are properly discussed before decisions are made. This emphasis on public participation reflects the frustration of environmental justice groups with the common governmental practice of undertaking public consultation after decisions have been made—a practice which has been dubbed the ‘Decide-Announce-Defend approach’ (Hunt 2001: 223; Marshall 2005). In some cases, the affected local communities are not even informed before the government announces its decision. The most notorious example of this practice in relation to nuclear waste in Taiwan occurred in the 1980s when the government took the decision to build a repository in an indigenous people’s island. The local people did not realise that a nuclear waste repository was to be built on their land until it began to operate (Fan 2006; Walker 2012).

The third element is access to information, which includes both having that information disseminated in local communities to extend public discussion of issues to everyone affected by decisions and ensuring that people understand the information by removing technical jargon or providing local communities with technical advisors. In some instances, misinformation is cultural rather than technical (Schlosberg 2003), while in other cases, misinformation is deliberately fostered, as when the Taiwan government gained the consent of the people of Orchid Island (蘭嶼 Lan Yu) to store radioactive waste in their area: Orchid Island (Lan Yu) local communities stated that they were told that the government was going to build a fish-canning factory.

The fourth element of procedural environmental justice is the incorporation of local knowledge in decision-making. Most environmental justice movement activists come from communities that have suffered a disproportionate burden of environmental hazards, and their knowledge of the problems arises out of their own experiences, by contrast to the knowledge of the problems possessed by the scientists, which is obtained from site investigations, laboratory analyses, and computer simulations. This community knowledge should be included in the assessment of environmental impact (Schlosberg 1999; Brown and Tandon 1983; Gaventa 1991; Brown 1992; Bryant 1995).

The fifth element is trust between stakeholders, especially between communities and government/industry. Trust is an essential prerequisite of a fair process for resolving nuclear waste management controversies, and many of the other elements of procedural environmental justice such as participation and information presuppose it. A Eurobarometer opinion poll found that 29 % of European citizens were very worried about the way that nuclear waste was handled in their own countries, and only 10 % trusted the information provided by nuclear industries (European Commission 2002; Marshall 2005).

Finally, the sixth element of procedural environmental justice is recognition, which means sensitivity to differences, especially cultural differences, between groups of people. Misrecognition can easily lead to an unequal distribution of environmental risk (Young 1990; Schlosberg 2004). Honneth (1992: 196) connects recognition and participation, stating that ‘citizens are subject to a form of personal disrespect when they are structurally excluded from the possession of certain rights within a given society’. But recognition is also an independent element of procedural environmental justice in that even where there is full public participation, there could still be lack of respect for an aboriginal or indigenous group because of a failure to pay sufficient attention to their cultural identity. Moreover, for such groups, lack of recognition is not only an environmental issue: it is a matter of cultural survival (Schlosberg 2003). In nuclear waste siting, decision-makers are often accused of failing to recognise cultural differences of local communities, especially ethnic minorities (Shrader-Frechette 2002). This is an important issue in Taiwan because one of the potential repository sites, Da-Ren in Taitung County, has over 90 % indigenous Paiwan people.

As we shall see in Sect. 3, local communities that complained about Taiwan’s nuclear waste siting process emphasised failings across all of these elements of procedural justice.

The meaning of the concept of environmental justice is revealed not only in philosophical analysis, but also in social science research on environmental justice activism and the exchange of ideas between the environmental justice movement and political theorists (Schlosberg 2013; Bell 2013). The cases of Love Canal and Warren County in the USA marked the beginning of the environmental justice movement, whose main assertion is that poorer people are the victims of environmental injustice (Dobson 1998). As Szasz (1994: 152) put it, ‘Why don’t I see a toxic waste dump in Beverly Hills or next to the Governor’s house?’ Evidence indicates that minorities who are disadvantaged in terms of education, income, and occupation not only bear a disproportionate share of environmental risk and health, but also have less power to protect themselves (Shrader-Frechette 2002; Walker 2012). There is also evidence that race is a factor, linked with socio-economic status, in predicting the distribution of air pollution, municipal landfills and incinerators, toxics waste dumps, lead poisoning in children, as well as the siting of nuclear testing facilities (Hofrichter 1993; Walker 2012, Kuletz 1998). Often the sources of environmental injustice are the corporations and governments who site questionable facilities among those least likely to be informed about, or able to stop, them. Ishiyama (2003) raises the chicken-and-egg question—which came first, the poor people or the environmental hazards?—noting that in some cases, the poor are attracted to unsafe areas because of cheapness. However, this does not eliminate the injustice (Walker 2012).

A distinctive feature of the environmental justice movement in the USA is its demand for strong participatory local input into, and control over, environmental decisions. The National Environmental Justice Advisory Council to the US Environmental Protection Agency (USEPA) includes a subcommittee on public participation, which in 1996 produced a Model Plan for Participation and Environmental Justice containing a participation

checklist for government agencies to follow. The Model Plan postulated that policymaking procedures shall encourage active community participation, institutionalise public participation, recognise community knowledge, and utilise cross-cultural formats and exchange to enable the participation of as many diverse groups as exist in a community (Schlosberg 2003). Moreover, by using strategies from the civil-rights, anti-war, anti-nuclear movements, these community activists are taking a leadership role in redefining the scope of the environmental movement to include social conditions that people experience in everyday life. So, at the same time as fighting environmental hazards directly, they are doing so indirectly, by uncovering connections between undemocratic production and investment decisions, energy policies, international trade, lending policies, and the inequalities of race and class (Hofrichter 1993). Environmental justice campaigners thus seek change in the social order to bring about more egalitarian environmental decision-making.

3 Applying the environmental justice framework to the case of Taiwan's nuclear waste policy

3.1 Brief history of nuclear waste in Taiwan

Taiwan has six reactors in three nuclear power stations located in the north and south of Taiwan. These three power plants generate 5,144 MW electricity per year, and in 2010, nuclear power accounted for 17.2 % of total electric power generation in Taiwan (Energy Bureau 2010). Taiwan's nuclear power stations are owned and operated by the state-owned Taiwan Power Co. Ltd (Taipower). In 1982, the Taiwanese government began to ship low-level radioactive waste to Orchid Island (Lan yu) which is 70 miles southeast from Taiwan Main Island and occupied by the indigenous Yami people. The Yami people did not know the government had built a national repository for radioactive waste on their island until an environmental NGO found out. Since then, the Yami people have protested and negotiated with the government for many years with little success. In 1999, the government claimed that the repository for radioactive waste on the island was only a temporary repository and promised to remove it by 2002, and it has been searching ever since for replacement repositories for nuclear waste both domestically and internationally (Fan 2006; Walker 2012). Up to now, there are 97,671 barrels of LLW/ILW stored in Lan yu, which represents 80 % of the total LLW/ILW generated by the nuclear power industry in Taiwan since it first began production in 1977 (AEC 2006; FCMA 2010).

Domestically, Taipower conducted a voluntary scheme which offered money to any communities that were willing to host radioactive waste. Many communities initially agreed to host the radioactive waste, but later withdrew because of local opposition. Internationally, Taiwan signed agreements in 1997 and 1998 with North Korea, the Marshall Islands, and Russia to ship nuclear wastes to these countries, but because of strong opposition around the world, none of these agreements came to fruition. With no place willing to host radioactive waste within Taiwan, and the international agreements opposed by other countries, finding a repository for nuclear waste has been a persistent problem for the Taiwanese government.

Before 2006, there was no legal basis for siting nuclear waste facilities in Taiwan. In December 2002, the AEC drafted the 'Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility' (AEC 2006) but because of opposition this draft was not enacted until April 2006 (AEC 2006). The act provided guidance not only for siting a new repository for radioactive waste in Taiwan, but also for public participation in

the siting process. On the siting criteria, it laid down for the first time that the disposal facilities must avoid the following areas:

1. Areas where active faulting or geological conditions could endanger the safety of disposal facility.
2. Areas where the geo-chemical conditions are unfavourable for preventing the diffusion of radioactive nuclides.
3. Areas where the hydrological conditions of surface water or groundwater are likely to endanger the disposal facilities.
4. Areas of high population density.
5. Areas that cannot be developed according to the law (Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility 2006).

The act also stated that a ‘site selection group’ should be established by the implementing authority [in this case the Ministry of Economic Affairs (MOEA)] consisting of 17–21 representatives of relevant government agencies, experts, and scholars (the experts and scholars must be no less than 3/5 of the total members) (Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility 2006). Taipower as a radioactive waste producer was given the responsibility to carry out the works necessary for site survey, safety analysis, public communication, and land acquisition and to provide the site selection group with this data, and the group would draft a disposal facility site selection plan for the MOEA.

With regard to public participation, the ‘Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility’ stated that a local referendum would be held at the county level in which the site is located, and with the consent of the public through the referendum, the site may be listed as a candidate site. The act also decided that the amount of compensation (‘feedback subsidies’ as stated in the act) must be no more than NTD \$5 billion (approximately £100 million). The local township which hosts the radioactive waste should be awarded not less than 40 % of this compensation; the townships nearby not less than 30 %; and the county not less than 20 % (Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility 2006). This compensation package looked very attractive to some of the townships located in very poor areas of Taiwan.

Taiwan’s Ministry of Economic Affairs (MOEA) announced on 17 March 2009 that Da-Ren (達仁鄉) in Taitung County (台東縣) and Wang-An (望安鄉) in Penghu County (澎湖縣) were its two favoured potential sites for the final disposal repository of radioactive waste. The two cases shared many similar features—both were relatively poor rural areas with comparatively sparse populations—but they also differed in significant respects: most notably, Da-Ren was a community made-up almost exclusively of an indigenous tribe (the Paiwan), whereas Wang-An was made-up mainly of people of Chinese Han origin. The announcement intensified discussion and debate in the local communities in Da-Ren and Wang-An, and this provided a good opportunity to conduct qualitative research to investigate how local opponents to nuclear waste constructed their opposition and the experiences they encountered in the decision-making process. During September and October 2009, [*name deleted to maintain the integrity of the review process*] carried out interviews with people from Taitung and Penghu who were active in the movement campaigning against nuclear waste. The interviewees included members of local communities, members of local environmental groups, local village leaders, local county councillors, environmental lawyers, and a local geologist. The interview data were analysed in accordance with the framework of justice/injustice, divided into two sections: distributive environmental injustice; and procedural environmental injustice.

3.2 Distributive environmental injustice

The concerns of local people about distributive environmental injustice emerged very clearly from the interviews. In particular, they raised their anxieties about: the unequal distribution of the benefits of nuclear energy compared with the burdens of nuclear waste; the incompatibility of nuclear energy and nuclear waste with minimum environmental standards; and the inter-generational distributive injustice of nuclear waste. The unequal distribution of the benefits and burdens of nuclear energy and nuclear waste was identified by many of the opponents of a nuclear waste repository in Penghu and Taitung. For example, interviewee D21 said:

Taitung is less populated compared to other counties in Taiwan and we use less electricity. It's not fair to ask us to host nuclear waste. Why should we bear this burden for the whole Taiwanese society?

For these people, storing nuclear waste at Penghu and Taitung is 'not fair' because their communities receive only a very small share of the benefits of nuclear energy, yet a nuclear waste repository in their communities would mean that they would suffer all of the burdens of nuclear energy. These interviewees were arguing for an egalitarian principle of distributive justice—that those who benefit from nuclear energy should also bear the burden rather than benefits and burdens being distributed to different communities. In their view, nuclear waste should be stored in industrial areas and economically advanced areas because those who benefit the most from nuclear energy are those who actually cause the problem. This unfairness was particularly acute in the case of Taitung County, because Lan yu (Orchid Island 蘭嶼) which is an island within Taitung County has stored nuclear waste since 1982. Although in 1996 Taipower stopped adding to the stock of nuclear waste in Lan yu (Orchid Island), the waste has not been removed, so the Taitung area is still bearing the risks of nuclear waste storage. Understandably, therefore, some interviewees in another part of Taitung County, Da-Ren, felt upset about being nominated by the government as a potential site for a new nuclear waste repository. For example, interviewee D5 said:

Since Lan yu [Orchid Island], Taitung has accepted nuclear waste for more than 20 years. Why do we have to accept the rubbish which people do not want? We Taitung have suffered the burden of nuclear waste for more than 20 years. Why should we have to bear this anymore?

Some opponents put forward the more radical argument that the burdens of nuclear waste should not be borne by anyone. In their view, the presence of nuclear waste anywhere in Taiwan was inconsistent with maintaining minimum standards of environmental quality and avoiding unacceptable health risks. They argued for an end to nuclear energy in Taiwan and insisted that nuclear energy should not be used until a solution was found for the problem of nuclear waste. For example, interviewee D1 said:

Nuclear waste is poisonous rubbish. We should stop producing it because we have failed to find a solution for it...I think we should stop building the fourth nuclear power station...Also, we should start to decommission nuclear power stations which are in operation now.

And these opponents wanted the existing nuclear waste stored within nuclear facilities such as nuclear power stations. For example, interviewee D26 said:

Storing radioactive waste in the nuclear waste plants can save the transportation cost. When the nuclear power plants are decommissioned, then the sites can be used as repositories.

The interviewees were also concerned about intergenerational distributive injustice, emphasising the unfair burdens that would be placed on future generations. In particular, they focused on the future generations of their community who are their own descendants. Opponents from the aboriginal tribe in Da-Ren identified a range of damaging future effects on land and traditions of their community, and argued that the tribe would be 'ruined' by accepting nuclear waste. For example, interviewee D12 said:

We have to protect our land for us and for future generations. It is the land our people have been living in, farming, and fishing for generations. It is our responsibility to keep our traditions and keep our land for future generations. Nuclear waste would ruin our land and ruin our traditions. Refusing to accept nuclear waste coming to Da-Ren is not only for us but also for our future generations.

Interviewee D14 suggested that agreeing to host nuclear waste would be 'to sell our land and our soul'.

In sum, the local opponents of nuclear waste appealed to egalitarian and sufficientarian conceptions of distributive environmental justice in their criticisms of Taipower's and the government's policies. In addition, they emphasised the intergenerational distributive injustice of siting nuclear waste in their community.

3.3 Procedural environmental injustice

The opponents of nuclear waste also talked about the procedural environmental injustice that they saw in decision-making about nuclear waste. In this section, we identify themes relating to procedural environmental injustice that emerged from the interviews. In particular, we highlight claims about: (1) direct discrimination and coercive exclusion from decision-making; (2) the absence of opportunities for participation in decision-making and the asymmetry of power between the people and Taipower/government; (3) lack of information from Taipower/government and their attempts at deliberate obfuscation; (4) Taipower's and the government's failure to pay any attention to local knowledge; (5) mistrust of Taipower and the government; (6) the lack of recognition shown to indigenous communities.

First, some of the interviewees reported direct discrimination and coercive exclusion from the decision-making process because they were opposed to the plans for a nuclear waste repository. Interviewees claimed that only one 'public hearing' took place to discuss the siting proposal. This public hearing was held on 17 April 2009 as a result of the demand by local people and environmental groups protesting against a nuclear waste repository after the government announced on 17 March 2009 that Da-Ren and Wang-An were the two favoured potential sites for the final disposal repository for radioactive waste. In this protest, local people and environmental groups handed a petition to Taitung County Council asking for a public hearing on the decision that Da-Ren was one of the sites. The leader of Taitung County Council organised the public hearing, which Taipower officials, local people, environmental groups, Taitung County Councillors, and the leader of Taitung County Council attended. However, during the public hearing, two members of the Taitung Branch of Taiwan Environmental Protection Group were arrested by the police. One of them was interviewee D24, who said:

I was taken by the police when I was attending the public hearing which is held in the Taitung City Council. They (the police) accused me of disturbing the public hearing but I had not said a word. I just held up a banner which stated 'Anti-nuclear waste!'

That is bad for our good health'. The police took me into their car and took me to a very remote place then released me.

The second theme—the absence of opportunities for participation in decision-making and the asymmetry of power between the people and Taipower/government—is illustrated by interviewees both in Penghu and Taitung emphasising inadequate consultation in the siting process. For example, interviewee W2 stated that

I don't think there is any consultation in the process and they just published their decision on their website. They never came to ask us any questions.

Although some interviewees reported meetings with Taipower officials, they explained that these meetings were merely one-sided presentations designed by Taipower to tell people how safe nuclear waste was and how a nuclear waste repository would benefit the local community. For example, interviewee D16 reported:

Taipower asked village leaders to get us together...once we were there, Taipower officials started to talk about how clean and safe the nuclear waste is and said that we will all get free health care, free school fees for kids, free utility bills and all the infrastructures in the town will be well-maintained by the government. They also showed us a film that a nuclear waste repository in Japan has generated lots of tourists to visit local villages and that their most famous agricultural product—apples—were not affected by the nuclear waste and are still very popular around the world. So Taipower said to us that the nuclear waste would not only benefit local people but bring tourism to the communities.

So, the interviewees saw the consultative exercises conducted by Taipower as strategic, manipulative, and dishonest.

Moreover, the interviewees emphasised the asymmetry of power between the people and Taipower/government. This asymmetry was illustrated by the conduct of the government and Taipower in the proposed local referendum on siting. Interviewees portrayed the referendum as a 'David and Goliath' struggle between two sides with very unequal power and resources: local people on the one hand versus Taipower and the state on the other. Interviewee D5 said:

We don't have power and we don't have money. It's so difficult to organise this protest. We need money to organise protests—we need money to hire a coach taking us to Taitung city. What we can do is only to visit our people to tell them about the danger of nuclear waste and the outcome of accepting nuclear waste. But compared to Taipower we have so little resources.

This asymmetry in power between Taipower/government and people was also illustrated by interviewees' claims that Taipower coerced poor people by routinely offering them economic inducements to accept nuclear waste in their area. For example, interviewee D17 reported that Taipower offered to sponsor events in Taitung County in order to persuade people to support nuclear waste siting:

During the harvest festival season, Taipower representatives approached us to offer to pay the expenses. They said they can provide food, drink, and money for the event and the only demand from them is to let them hang a banner saying 'LLW [Low Level Waste] is Clean and Safe' and let them take a photo of this banner in this event.

Interviewees also told of Taipower offering trips to local people in order to persuade them to accept nuclear waste. For example, interviewee D23 said:

Taipower offered local people a trip...Some people did not know the trip was organised by Taipower in the first place. They only realised after they went to visit the nuclear power station and Taipower officials explained to them the benefit of accepting nuclear waste.

Interviewee D12 from the Taitung Branch of Taiwan Environmental Protection Union drew attention to the insidious way in which Taipower and the government used their superior intellectual and scientific resources to overwhelm people who had less educational advantage:

In the law, it stated 'Low Level Radioactive Waste', who knows what this is? The government and Taipower just use this term of LLW to mislead people...because they thought 'Low Level' would decrease people's worries. Most of our local people are not very well-educated; they don't really know what LLW is. But they understand that nuclear waste is not a good thing from Lan yu [Orchid Island]'s experience.

Lack of information and deliberate obfuscation was also emphasised by interviewees. Many interviewees reported that geological investigations began before the public were informed, and that they viewed this level of secrecy and lack of information and transparency as characteristic behaviour of the government and Taipower. For instance, interviewee D1 said:

Taipower never informed local people that they would conduct any investigations in their village. Local people discovered...that they were the sub-contractor from Taipower and doing some work for Taipower to see whether it is suitable for hosting nuclear waste.

Interviewees also accused Taipower of misleading the people by producing misinformation about tourism. For example, interviewee D23 said:

Taipower claimed that people would come to visit the nuclear waste repository. Some local people do believe Taipower's argument. But from the experience of Lan yu [Orchid Island], no one who goes to Lan yu would like to visit the nuclear waste site. We want more people to come to visit us and bring their money in but once you host nuclear waste who will come to visit this place? It is wrong to promote tourism and also accept nuclear waste.

This lack of transparency and local involvement in the decision-making process risked ignoring important local knowledge. For example, according to D11, a local geologist, the suitability of the Da-Ren site was not investigated properly by Taipower's survey work:

From mine and other scholars' reports, we believe this area is very unstable and has lots of earthquakes each year...this area should never be chosen as a site for a nuclear repository because of the earthquakes. Also, the active geological movement would cause leakage of nuclear waste into the sea and soil...I suspected that Taipower's survey had already presumed that Da-Ren is the site before they published their report!

Mistrust of Taipower and the government was widespread among interviewees. Despite the fact that the government and Taipower often reassured local people by claiming that nuclear waste would be safely packed, stored, and monitored, interviewees doubted Taipower's capacity for safeguarding the nuclear materials. For example, interviewee D19 said:

The nuclear waste in Lan yu [Orchid Island] already has a leakage problem. I don't believe Taipower can safely manage the nuclear waste.

Their mistrust extended to the 'murky relationship' between Taipower and local politicians. Indeed, several interviewees explicitly linked Taipower with corruption in local politics, suggesting that local politicians, representatives, and opinion leaders were bribed by Taipower. For example, interviewee D25 said:

Taipower...knows we would listen to our local representatives, local village leaders, or Township mayor. They made these local politicians agree to host nuclear waste and ask them to persuade local people...The Township Mayor was elected in 2004 because of his anti-nuclear waste position, but now he's on the same side as Taipower.

Finally, some interviewees argued that even a fair referendum (if one could be had despite the asymmetries of power) would not be consistent with recognition of the cultural traditions of the Paiwan people. As interviewee D17 pointed out:

In our Paiwan culture, there is no such a thing as majority rule. Every issue related to our tribe would only be decided when all members of our tribe are agreed. So if Taipower would like us to accept nuclear waste in our land, they would have to have the permission from everyone in the whole Da-Ren Town.

So, the interviewees' criticisms of Taipower, the government, and the decision-making process drew on all six of the elements of procedural environmental justice that we outlined in the previous section. They claimed that it discriminated against opponents of the proposal; it did not encourage the participation of the residents in decision-making processes; it was highly selective in the information it provided; it made little or no use of local knowledge; it plainly lacked the trust of the communities; and it failed to accord due recognition to the cultural traditions of ethnic groups.

The distinctiveness of the environmental injustice discourse enunciated by the opponents of the nuclear waste policy perhaps lies less in its content than in the unity of those who shared it. While environmental injustice movements elsewhere contained many of the above distributive and procedural ingredients, few were as united in their opposition as were the Yami and Paiwan tribal communities (Ishiyama 2003).

4 Conclusion and recommendations

The environmental justice framework provides a useful way of interpreting the perspective of opponents of nuclear waste in Taiwan. From data gathered from interviews, it is clear that opponents of nuclear waste felt unfairly treated in the decision-making process. They identified this unfairness in both the inequitable distribution of the benefits and burdens of nuclear energy and nuclear waste, and the procedural failures of decision-making, including the lack of information and consultation. Opponents of nuclear waste perceived their position in Taiwan to be economically marginalised, politically excluded, and culturally patronised. So, their unjust treatment over the nuclear waste issue was seen by them as part of a broader pattern of injustice in the country at large and would be unlikely to end until the government tackled this wider problem. Conversely, it could be argued that the controversy aroused by the opponents of nuclear waste siting in Da-Ren and Wang-An has begun a process of publicising the wider problem of unjust treatment of disadvantaged groups and races in Taiwan which may serve as a catalyst for policies to redress such inequalities. Three considerations support this latter interpretation.

First is the fact that opponents of nuclear waste siting made out a strong case for their opposition, based on important principles of environmental justice. For example, on the principle of distributive environmental justice, opposition to the siting of a nuclear waste repository in communities exposed the unfair treatment meted out to residents by Taipower and the Taiwan government in distributing the harm of a repository (e.g. the risk of radioactive contamination; the loss of tourist revenue) disproportionately to disadvantaged areas, whilst distributing the benefits of nuclear energy (e.g. cheap and reliable electricity supply) disproportionately to advantaged areas (who consume more power). Similarly, on the principle of procedural justice, opposition to the siting policy highlighted the transgressions of Taipower and the government in discriminating against disadvantaged groups; excluding stakeholder participation from decision-making; withholding data; ignoring local knowledge; breaching public trust; and violating cultural identity. These are powerful arguments and attracted some support from the Taiwanese media.

Second, a crucial role was played by environmental non-governmental organisations (ENGOS) in this dispute. A distinction must be drawn between Taipei-based ENGOS and local anti-nuclear waste groups. Taipei-based ENGOS have generally been established by intellectuals who are concerned about a range of environmental issues, including nuclear waste, and they usually have more resources which can enable them to conduct surveys and provide education on environmental issues for members of the public. By contrast, local anti-nuclear waste groups are formed by members of local communities who have personally suffered (or potentially would suffer) from the unequal distribution of risk from dumping nuclear waste, and they often have very limited resources which makes it difficult to compete with the government and Taipower. The support given by Taipei-based ENGOS to local anti-nuclear waste groups was invaluable in educating local communities about nuclear waste, providing information to the public, and developing campaign strategies for the local groups. Unlike the environmental justice movement in the USA, where there was tension between national-based ENGOS which were predominantly white, middle class organisations with a conservationist agenda, and local activists who were mainly working class, ethnic minorities with a radical social agenda, in Taiwan, the ENGOS worked side-by-side with the tribal activists. As a result of these activities of ENGOS, the general issue of discrimination against disadvantaged minorities in Taiwanese society was raised publicly and placed firmly on the political agenda.

Third, there were some signs that the protests by communities and ENGOS had an effect on governmental policy. For instance, national legislation was passed to provide a legal basis for the siting of nuclear waste repositories which included mandatory referendums on potential site selection, and this contributed to the democratisation of policy making on nuclear waste issues in Taiwan. Also, the change of ruling parties in Taiwan in 2000 and 2008 seemed to promise greater sensitivity to these issues. Furthermore, Taipower realised that keeping the whole process of siting nuclear waste repository secret was impossible because Taiwan has become a more democratic and open society. Accordingly, Taipower now hires local people as negotiators, which it hopes will facilitate public acceptance of its plans.

However, Taipower still does not completely share information about nuclear waste with local communities and is still perceived as trying to 'buy off' local communities with support for local events, trips, and other material benefits, especially for local opinion leaders, and local people claim that this strategy continues to divide the local communities. This suggests that a legacy of authoritarian rule in Taiwan is still present in Taipower's company culture. Moreover, it is widely believed that political corruption is still rife in

Taiwan, especially at the local level, and this could affect future referendums in local communities on siting plans for nuclear waste.

So, the outlook is mixed. There are some indications that wider patterns of discrimination in Taiwanese society are being addressed (whether or not as a result of the nuclear waste controversy), and there is some evidence that the particular issue of nuclear waste discrimination is being dealt with (whether or not as a result of the reduction in broader spheres of inequality). But these are incremental and fragile improvements, and much more needs to be done to achieve good governance status. The following eight steps are recommended to help speed-up this process in relation to the nuclear waste issue.

First, given the extreme difficulty experienced by the Taiwan government (and other governments) in finding areas where residents are willing to host permanent storage facilities for radioactive waste, policy makers are advised to reconsider the future of nuclear energy in Taiwan and seek other alternatives such as renewable energy. By doing so, they would not only decrease the scale of the problem of nuclear waste (by reducing the amount of new nuclear waste), but also defuse the tension between opponents and proponents of nuclear energy in Taiwan. Second, policy makers in Taiwan must minimise the unfairness of the impact of existing nuclear waste on the host communities. Although it is impossible to equally distribute nuclear waste, it is possible both to reduce its risk of leakage by tightening up safety standards and to devise a means of compensation that is not manipulative or demeaning but meets standard criteria of equity. Third, policy makers in Taiwan must deal with the inter-generational implications of the nuclear waste storage issue by ensuring not only that safety standards are robust enough to protect residents for the indefinite future, but that compensation should be set aside in a special fund to provide sufficient protection for an endless number of future generations. Fourth, to meet the complaint by opponents of nuclear waste that there was no genuine public participation in the siting process, policy makers must recognise that public participation is a key element for successfully siting nuclear waste facilities. Moreover, policy makers should not only listen to the voices of local communities about nuclear waste facilities, but take their opinions into consideration in the decision-making process.²

Fifth, the decision-makers must provide clear and sufficient information about nuclear waste to people who are concerned about it, especially people in communities hosting or potentially hosting nuclear waste in the future. Information provided to people about nuclear waste should not be opaque propaganda designed to promote the hosting of nuclear waste, but accurate, up-to-date, intelligible, comprehensive, and freely available factual information on the health risks of nuclear waste and other issues concerned with nuclear waste facilities. Sixth, policy makers must explain clearly to local communities who are considering hosting nuclear waste, precisely how the compensation will be distributed to them, and what other benefits they will receive from hosting nuclear waste. This is essential to enable local people to make the right decision for themselves and avoid the suspicion that decision-makers in Taiwan are 'bribing' local opinion leaders to get them to persuade other local people to accept nuclear waste. Decisions about nuclear waste should be transparent and open. Seventh, a public protocol should be created for openly discussing the siting of nuclear waste facilities. This protocol should be enacted into Taiwanese law, prescribing that an independent

² An interesting implication of demands for local control over decision-making is that communities could choose to accept nuclear waste siting, which happened in 1996 when the Skull Valley Band of Goshute Indians decided to host a high-level radioactive waste facility on their reservation in Tooele County, Utah (Ishiyama 2003). Of course, as Ishiyama (2003) points out, even that decision could be interpreted as a consequence of environmental injustice, since the historic discrimination against the Goshute Indians left them with no other economic options.

regulator is appointed to preside over the process and that potential host communities are given the funding and expertise necessary for them to take part in the process. Finally, decision-makers should be aware of the cultural distinctiveness of ethnic minorities, and all decisions regarding nuclear waste should respect local cultures.

If these recommendations are implemented, the system of good governance, thereby characterising the nuclear waste industry, could be a model that informed other sectors of governmental policy and contributed to increased equality in Taiwanese society generally.

References

- Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility. (2006). Taipei: Atomic Energy Council, Executive Yuan (in Mandarin). <http://erss.aec.gov.tw/law/LawContentDetails.aspx?id=FL039264&KeyWordHL=&StyleType=1>. Accessed 8 Oct 2008.
- Atomic Energy Council (AEC). (2006). *Radioactive waste management in Taiwan: Low level radioactive waste final disposal*. <http://www.aec.gov.tw/english>. Accessed 22 Jan 2007.
- Bell, D. (2004). Environmental justice and Rawls' difference principle. *Environmental Ethics*, 26(3), 287–306.
- Bell, D. (2013). Coming of age? Environmental politics at 21. *Environmental Politics*, 22(1), 1–15.
- Boerner, C., & Lambert, T. (1995). Environmental injustice. *Public Interest*, Winter, Issue, 118, 61–82.
- Brown, P. (1992). Popular epidemiology and toxic waste contamination: Lay and professional ways of knowing. *Journal of Health and Social Behavior*, 33(3), 261–281.
- Brown, L., & Tandon, R. (1983). Ideology and political economy in inquiry: Action research and participatory research. *Journal of Applied Behavioral Science*, 19, 277–294.
- Bryant, B. (1995). Issues and potential policies and solutions for environmental justice: an overview. In B. Bryant (Ed.), *Environmental justice: issues, policies, and solutions* (pp. 8–34). Washington, DC: Island Press.
- Bullard, R. (2000). *Dumping in Dixie: race, class, and environmental quality* (3rd ed.). Boulder, CO: Westview Press.
- Dobson, A. (1998). *Justice and the environment: Conceptions of environmental sustainability and dimensions of social justice*. Oxford: Oxford University Press.
- Easterling, D., & Kunreuther, H. (1995). *The dilemma of siting a high-level nuclear waste Repository*. Boston, MA: Kluwer.
- Energy Bureau. (2010). *Report on prediction of total electricity capacity from 2010–2019*. Taipei: Ministry of Economic Affairs, Executive Yuan (in Mandarin).
- European Commission. (2002). *Eurobarometer 56.2: Europeans and radioactive waste*. Brussels: European Commission.
- Fan, M.-F. (2006). Nuclear waste facilities on tribal land: The Yami's struggles for environmental justice. *Local Environment*, 11(4), 433–444.
- Frankfurt, H. (1988). Equality as a moral ideal. In H. Frankfurt (Ed.), *The importance of what we care about* (pp. 134–158). Cambridge: Cambridge University Press.
- Freudenberg, N., & Steinsapir, C. (1992). Not in our back yard: the grassroots environmental movements. In: R. Dunlap & A. Mertig (Eds.), *American environmentalism: the U.S. environmental movements 1970–1990* (pp. 27–38). Washington, DC: Taylor and Francis.
- Fuel Circle and Material Administration. (2010). *Index of environmental sustainability*. Taipei: Atomic Energy Council (in Mandarin). http://gamma1.aec.gov.tw/fcma/environment_lasting_number.asp. Accessed 20 July 2011.
- Gaventa, J. (1991). *Power and powerless: quiescence and rebellion in an Appalachian Valley*. Chicago, IL: University of Illinois Press.
- Hofrichter, R. (1993). Environmental justice for all. In R. Hofrichter (Ed.), *Toxic struggles: the theory and practice of environmental justice* (pp. 3–22). Philadelphia, PA: New Society Publishers.
- Honneth, A. (1992). Integrity and disrespect: principles of morality based on the theory of recognition. *Political Theory*, 20, 187–201.
- Hunt, J. (2001). Framing the problem of radioactive waste: public and institutional perspectives. In K. Anderson (Ed.), *Proceedings VALDOR 2001—The 2nd VALDOR symposium addressing transparency in risk assessment and decision-making* (pp. 222–229). Sweden: Stockholm.
- IET [Institution of Engineers and Technology]. (2005). *Nuclear waste disposal and transportation of spent fuel*. London: Institution of Engineers and Technology. <http://www.iec.org/Policy/Areas/EnvEnergy/nucwaste.pdf>. Accessed 9 May 2009.

- Ishiyama, N. (2003). Environmental justice and American Indian tribal sovereignty: Case study of a land-use conflict in skull valley, Utah. *Antipode*, 35(1), 119–139.
- Kuletz, V. (1998). *The tainted desert*. London: Routledge.
- Marshall, A. (2005). The social and ethical aspect of nuclear waste. *Electronical Green Journal*, 21, 1–22. <http://egj.lib.uidaho.edu/egj21/marshall1.html>. Accessed 17 May 2008.
- Openshaw, S., Carver, S., & Fernie, J. (1989). *Britain's nuclear waste: Safety and siting*. London: Belhaven.
- Parfit, D. (1998). Equality and priority. In A. Mason (Ed.), *Ideals of equality* (pp. 1–20). Oxford: Blackwell.
- Rosenberg, A. (1995). Equality, sufficiency, and opportunity in the just society. *Social Philosophy and Policy*, 12(2), 54–71.
- Schlosberg, D. (1999). *Environmental justice and the new pluralism*. Oxford: Oxford University Press.
- Schlosberg, D. (2003). The justice of environmental justice: reconciling, equality, recognition, and participation in a political movement. In A. Light & A. De-Shalit (Eds.), *Moral and political reasoning in environmental practice* (pp. 77–106). Cambridge, MA: MIT Press.
- Schlosberg, D. (2004). Reconceiving environmental justice: global movements and political theories. *Environmental Politics*, 13(3), 517–540.
- Schlosberg, D. (2013). Theorising environmental justice: the expanding sphere of a discourse. *Environmental Politics*, 22(1), 37–55.
- Shrader-Frechette, K. (2002). *Environmental justice: Creating equality and reclaiming democracy*. Oxford: Oxford University Press.
- Szasz, A. (1994). *Ecopopulism: toxic waste and the Movement for Environmental Justice*. Minneapolis: University of Minnesota Press.
- Taiwan Power Company, Taipower. (2009). *Nuclear backend fund*. (in Mandarin). http://nplbudget.ly.gov.tw/budget_ly_97/txt/document/97pnb4_2_10.doc. Accessed 30 Jan 2009.
- Temkin, L. (2003). Equality, priority or what? *Economic and Philosophy*, 19(1), 61–87.
- USEPA [US Environmental Protection Agency]. (2000). *Office of environmental justice F.A.Q. What is environmental justice?* <http://www.es.epa.gov/oeca/main/ej/faq.html>. Accessed: 9 March 2009.
- Walker, G. (2012). *Environmental justice: concepts, evidence and politics*. London: Routledge.
- Weng, P. S. (2001). *Taiwan's nuclear history*. Taipei: Atomic Energy Council (in Mandarin).
- Wilson, L. (2000). *Nuclear waste: Exploring the ethical dilemmas*. Toronto, ON: United Church Publishing House.
- Young, I. (1990). *Justice and the politics of difference*. London: Routledge.

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