

Anti-Nuclear Movement in Taiwan: The Past, the Present, and the Way Forward

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Abstract

The anti-nuclear movement in Taiwan has been one of the longest-standing social and environmental movements, shaped by political, environmental, and public safety concerns. This paper examines the historical development of Taiwan's anti-nuclear movement, from its origins in the 1970s to its influence on contemporary policy, including the government's commitment to achieving a nuclear-free homeland by 2025. Taiwan's anti-nuclear movement has evolved from an elite-driven discourse to a mass movement involving grassroots activism, cultural engagement, and intergenerational advocacy. While the movement successfully contributed to the 2017 amendment of the *Electricity Act*, which mandates a nuclear-free Taiwan by 2025, critics argue that the policy is driven more by political allegiance than by scientific and economic considerations.

This study concludes that Taiwan's nuclear energy debate remains highly politicised, with energy security and environmental sustainability at the forefront of national discussions. The future of Taiwan's energy transition will depend on the government's ability to balance public opinion, economic growth, and environmental responsibility while addressing unresolved issues such as nuclear waste disposal and the feasibility of renewable energy expansion. Despite its achievements, the anti-nuclear movement must navigate new challenges to ensure a sustainable and just energy transition for Taiwan's future.

Keywords

Nuclear energy policy, Public participation, Anti-nuclear movement, Taiwan

Introduction

Nuclear Energy has long been one of Taiwan's most prolonged environmental and social issues. The country has six reactors across three nuclear power plants located in the north and south of Taiwan, as well as a controversial fourth nuclear power plant with two reactors that never became operational. In 1985, the three active power plants generated 52.4 % of Taiwan's total electricity, but this share declined to 18.8% in 2014 and further to 9.1% in 2022. Under the current government's "2025 Nuclear-Free Homeland" policy, two operational reactors are scheduled for decommissioning in 2025 (Taipower, 2023). Taiwan's nuclear power plants are owned and operated by the state-owned Taiwan Power Co., Ltd (Taipower).

The anti-nuclear movement in Taiwan can be traced back to the 1970s, when some scholars published articles criticising the government's pro-nuclear policy during the Martial Law period. With the advent of democratisation, the movement gained momentum and formed alliances with the opposition party. Despite the government's continued support for nuclear energy, environmental groups have adopted various approaches and strategies to raise public awareness about of nuclear safety.

This paper will first review the historical development of the anti-nuclear movement in Taiwan from the 1970s to the present. However, the struggle of the indigenous Yami (Tao 達悟族) communities in Lan Yu (蘭嶼; hereafter referred to as Orchid Island) must not be overlooked. Between 1982 and 1996, the Taiwan government stored 97,671 barrels of radioactive waste on the island. Since then, the Yami people have protested and negotiated with the government for decades, though with limited success. The second part of this paper will focus on the Yami people's anti-nuclear waste movement. While this anti-nuclear waste movement is embedded within the broader anti-nuclear movement, it is rooted in local concerns. In contrast, the national anti-nuclear movement has achieved significant success with the planned phase-out of nuclear energy by 2025 under the so-called "Nuclear-Free Homeland" policy. As the anti-nuclear movement remains one of the most prominent and contentious issues in Taiwan, this paper will conclude by examining the current debates surrounding nuclear issues in Taiwan.

Theoretical Background

This paper also applies environmental justice theory, with particular

attention to the concepts of procedural and distributive justice. The siting of Taiwan's nuclear waste on Orchid Island (Lan-Yu), without informed consent from the Tao (Yami) people, exemplifies procedural injustice and systemic marginalisation. These injustices are not merely policy failures, but manifestations of structural inequality—deeply embedded patterns of unequal power relations, institutional bias, and socio-political exclusion that disproportionately burden Indigenous and marginalised communities. In this context, environmental decision-making reflects and reproduces broader social hierarchies, including colonial legacies and ethnocentric governance structures. Such inequality aligns with the concept of environmental racism, as theorised in environmental justice literature, and resonates with the energy justice framework, which bridges the questions of sustainability with fairness in energy production, distribution, and governance.

Moreover, the energy transition in Taiwan has not only involved technological and policy shifts, but also intensified political polarisation. As debates over nuclear power, renewable energy, and fossil fuels became entangled with partisan identity, particularly between the nuclear-free Democratic Progressive Party (DPP) and the historically pro-nuclear Kuomintang (KMT or the Chinese Nationalist Party), energy policy emerged as a symbolic battleground. Public opinion and media narratives around energy issues often reflect deeper ideological divisions, complicating consensus-building and long-term planning. This politicisation of energy undermines deliberative democratic processes and highlights the importance of procedural justice, not only in the outcomes of decision-making but also in fostering inclusive and depolarised civic engagement.

This paper further engages with Taiwan's energy transition through the lens of the just transition framework, which has gained increasing prominence in global energy scholarship. At its core, the just transition paradigm advances the normative claim that shifts toward low-carbon and sustainable energy systems must be socially equitable, ensuring that the benefits and costs of the transition are distributed fairly and that vulnerable populations are not disproportionately burdened (McCauley and Heffron, 2018). While Taiwan's nuclear phase-out is often celebrated as a milestone in the country's environmental movement, it has produced uneven and, at times, contradictory outcomes. The reduction in nuclear energy capacity has raised pressing concerns over electricity affordability, grid reliability, and increased

reliance on imported natural gas and fossil fuels.

In light of these dynamics, Taiwan's energy transition must also be understood as a process mediated by structural inequality, wherein pre-existing socio-economic and political power asymmetries are reproduced or even exacerbated. Structural inequality shapes not only who gains access to clean and affordable energy, but also whose voices are heard in the planning, implementation, and governance of energy systems. Taiwan's case illustrates that energy transitions are not merely technological or economic transformations; they are inherently political and social processes in which justice must be actively negotiated across class, ethnicity, geography, and political identity.

Anti-Nuclear Movement Since the 1970s

The anti-nuclear movement has been one of Taiwan's most prominent and widely discussed environmental movements. Scholars commonly agree that it can be traced back as early as 1979, when Professor Edgar Lin (林俊義) published an article criticising the KMT government's nuclear policy during the Martial Law period. At that time, Taiwan's first nuclear power plant had just begun operations, while the second and third were under construction. Professor Lin highlighted the government's lack of ecological consideration and its neglect of issues related to both nuclear energy and nuclear waste. His article faced strong opposition from nuclear engineers at the state-owned Taipower, sparking the first nuclear debate in Taiwan (Ho, 2003).

However, from 1945 to 1987, civil society in Taiwan was kept under tight control by the KMT regime. During this period, particularly before the 1980s, Martial Law prevailed, and genuine civil society did not exist (Hsiao, 2006), as the KMT regime closely monitored every aspect of social life. The only social groups permitted were those either established by the KMT or subjected to its strict surveillance. Under Martial Law, Taiwan's civil society lacked freedom of speech. The early anti-nuclear movement was led by a group of American-trained academics who primarily focused on publishing highly technical articles. In response, Taipower nuclear engineers issued counterarguments, also filled with technical terms. At this early stage, the issues surrounding nuclear energy were not easily understood by the general public. Nevertheless, this marked the beginning of the nuclear debate in Taiwan.

Anti-Nuclear Movement in the Democratisation of Taiwan

In the late 1980s, the anti-nuclear movement began forming alliances with the political opposition, which in 1986 became the Democratic Progressive Party (DPP). This represented a politically-centred and highly partisan approach (Chen, 2011; Ho, 2014). As the first opposition party ever established in Taiwan, the DPP needed to embrace the ideas of social movements to create a powerful bloc against the KMT's authoritarian regime. In this context, the anti-nuclear movement challenged the KMT's secrecy surrounding its nuclear projects, exposing potential corruption.

Since 1986, opposition magazines began publishing anti-nuclear articles that criticised broader aspects of government policy, including nuclear policymaking and nuclear weapons. In 1987, the formation of the Taiwan Environmental Protection Union (TEPU) by environmentalists and anti-nuclear activists (primarily scholars) also marked a deepening alliance between the DPP and the anti-nuclear activists. In some local branches, TRPU members were also DPP members; in certain cases, they even shared the same office space (Ho, 2005). This development also made the anti-nuclear movement more politicised than other social movements (Ho, 2003), adopting a distinctly partisan position.

Interestingly, even within the KMT, scepticism about the Fourth Nuclear Power Plant (NPP4) began to emerge, with some younger KMT legislators opposing it. In April 1985, 55 KMT legislators and six opposition legislators signed a petition calling for the suspension of its construction. Prime Minister Yu Kuo-Hua (俞國華) later stated that 'the Fourth Nuclear Power Plant (NPP4) was not in a hurry to build' (Ho, 2003). As a result of persistent efforts by anti-nuclear activists, several large-scale public debates were held, and public awareness of nuclear energy issues in Taiwan began to grow.

Moreover, with the advent of democratisation in Taiwan, anti-nuclear scholars began to change their strategies, as anti-government protests became more acceptable. In October 1986, inspired by other environmental protests, anti-nuclear scholars and opposition legislators held the first anti-nuclear demonstration outside Taipower's headquarters (Ho, 2003), marking growing cooperation between anti-nuclear activities and political opposition.

With the support of the DPP, local politicians, and anti-nuclear scholars, a locally led organisation, the Yenliao Anti-Nuclear Self-Defence Association

(YSDA, 鹽寮反核自救會), was established in 1988 in Gongliao (貢寮), the proposed site of NPP4. Anti-nuclear scholars and members of the TEPU played a key role in fostering YSDA's connections with residents. Following its formation, YSDA, together with TEPU and the DPP, organised a large-scale anti-nuclear demonstration in Taipei (Ho, 2003). This event marked the beginning of the annual anti-nuclear demonstrations held in Taiwan each April or May.

The KMT government responded to the anti-nuclear movement and other social movements with harsh measures. In May 1990, former military officer Hao Po-Tsun (郝柏村) became Prime Minister. He strongly associated the growing influence of the anti-nuclear movement with declining economic performance. Hao believed that constructing the NPP4 was essential for reasserting the government's authority and strengthening the investment environment in Taiwan (Ho, 2003). This hard-line stance by the KMT government served to further unite the anti-nuclear movement with the DPP, TEPU, and YSDA. In 1991, when the government approved the *Environmental Impact Assessment (EIA) for NPP4*, local residents staged a major protest in Gongliao—one of the most profound in Taiwan's history. They claimed the EIA process excluded anti-nuclear representatives and failed to notify them about the meeting. Around the same time, DPP member Lin Yi-Hsiung (林義雄), who later became the party's chairman, and other opposition legislators established the Association for Promoting NPP4 Referendum (核四公投促進會), calling for a nationwide referendum on the project.

When the situation intensified, one police officer was killed, and afterwards, 17 individuals involved in the protest were sentenced. One of them, accused of killing the police officer, received a life sentence. This event became known as the so-called "1003 incident" documented in the film *Gongliao, How Are You?* However, this instance of governmental repression did not weaken the anti-nuclear movement. The DPP began to assert its influence by holding referendums in counties under its control, despite the absence of a legal framework for referendums in Taiwan at the time. Between 1994 and 1998, four referendums were held in Gongliao, Taipei County, Taipei City, and I-Lan County (宜蘭縣), respectively.¹ In each case, over 70

¹ Gongliao is a town located in Taipei County. Taipei City and I-lan County are neighbouring jurisdictions to Taipei County. At that time, all three areas were governed by the DPP.

per cent of participants opposed the construction of the Fourth Nuclear Power Plant in Gongliao. Naturally, the KMT refused to recognise the results.

As the DPP gradually gained more parliamentary seats during the 1990s, TEPU also sought support by lobbying younger KMT legislators, who were more environmentally conscious. Notably, between 1992 and 1996, the Fourth Nuclear Power Plant budget bill faced significant opposition each year. Outside the parliament, thousands of anti-nuclear protestors organised sit-ins, hunger strikes, and various other activities (Ho, 2003). Nevertheless, the anti-nuclear movement faced a critical challenge: the DPP was not yet strong enough to persuade a majority to vote against nuclear energy. Attracting support from non-DPP party members and voters remained a persistent difficulty.

Far more damaging for the anti-nuclear movement, from the late 1990s onward, the DPP began to shift its stance on the Fourth Nuclear Power Plant, seeing an opportunity to win the presidential election. Party leaders realised they needed to shed their anti-business image and adopt a less radical posture to appeal to a broader electorate. In 1996, the DPP also recognised that it had no realistic chance of blocking a parliamentary vote in favour of constructing the plant. As a result, the DPP abandoned its anti-nuclear position and tacitly exchanged its newfound support for the nuclear bill in return for KMT's backing within the legislature (Ho, 2003). However, the DPP presidential candidate Chen Shui-Bian (陳水扁) continued to publicly oppose the construction of the Fourth Nuclear Power Plant during his campaign and even signed a pledge with the people of Lan Yu (Orchid Island; 蘭嶼), promising to remove nuclear waste if elected. Many anti-nuclear activists and scholars felt betrayed by the DPP. In response, they established a new Taiwan Green Party.

Major Setback of the Anti-Nuclear Movement in 2001

Indeed, the greatest disappointment for the anti-nuclear movement in Taiwan was the DPP's reversal of its decision to halt the construction of NPP4. In 2000, the DPP won the presidential election, marking the first transition of power to an opposition party in Taiwan's history. President Chen Shui-bian sought to stop the construction of NPP4 to fulfil his campaign promises. Prime Minister Tang Fei (唐飛) disagreed with Chen's decision and resigned after only four months in office. Chen then appointed his political ally, Chang Chun-Hsiung (張俊雄), as Prime Minister and announced an end to the construction of NPP4 in October 2000.

When the DPP government announced the halt, YADA, TEPU, and other social movement groups believed they had accomplished their most challenging task. However, the decision to stop NPP4 created a constitutional gridlock and negatively affected the economy. The stock market lost 47.7 per cent of its value due to fears of an energy shortage that could slow economic development (Lin, 2001). The DPP government lost support within the business community, and foreign companies began questioning Taiwan's ability to honour its long-term contracts. In January 2001, the Council of Grand Justices intervened and declared that the legislature, not the cabinet, had the authority to make such decisions. Subsequently, Prime Minister Chang allowed the construction of NPP4 to resume in February 2001.

Despite the DPP government's failure to stop the construction of NPP4, it passed in 2002, marking the first time the Taiwan government officially declared its goal of becoming a nuclear-free country.² However, the reversal of the decision impacted not only the relationship between the DPP and the anti-nuclear movement but also its relationship with other social movement groups. The reality was that the DPP never secured a parliamentary majority sufficient to halt the construction of NPP4, and the economic consequences of doing so were considered too severe, especially during an economic downturn. As a result, the anti-nuclear movement began to distance itself from both the DPP and KMT governments. Since 2002, the DPP has not been welcomed at the annual anti-nuclear protest by TEPU and YSDA.

From 2002 to 2008, the debate on nuclear power and NPP4 became relatively subdued. Part of the reason was that, after the DPP came to power in 2000, the government implemented many policies originally derived from social movements and NGOs. Despite its decision to resume the construction of NPP4 and its minority status in the Legislative Yuan, the DPP government, during Chen Shui-bian's first term as president, enacted several reformist laws and established institutions aligned with the agendas of social movements from the mid-1990s. These included the *Basic Environmental Act (2002)*, the National Human Rights Commission, and the Committee for a Nuclear-Free Homeland (Ho, 2010).

2 Article 23 of the *Basic Environment Act*: The government must formulate a plan to progressively achieve the goal of a non-nuclear homeland. Nuclear energy safety control, radiation protection, radioactive material management and environmental radiation detection must also be strengthened to ensure that people avoid radiation hazards in their daily lives.

In addition, the DPP government appointed Edgar Lin (林俊義), an anti-nuclear and conservationist biology professor, as Director of the Environmental Protection Administration. This marked the first time an environmental activist occupied the highest government position in environmental regulation. Environmentalists were also appointed to the EIA committee, including the National Council for Sustainable Development, the top advisory body on environmental policy in Taiwan, which incorporated eight environmentalists into its membership in 2002 (Ho, 2005). However, the participation of these environmentalists in government did not lead to significant policy changes, as the aforementioned institutions were relatively powerless compared to the pro-development and pro-business Ministry of Economic Affairs and the Council for Economic Planning and Development, particularly during the economic downturn in Taiwan that began in 2001. On the other hand, the collaboration between the DPP government and environmental activists (including anti-nuclear advocates) did contribute to the institutionalisation of environmental awareness and the de-radicalisation of the anti-nuclear movement.

After 2008, as the KMT returned to power, the anti-nuclear movement became relatively quiet. Political instability and the economic recession exhausted both the public and the media. Meanwhile, environmental groups, including anti-nuclear activists, had fewer opportunities to participate in government institutions due to the KMT's even stronger pro-business and pro-nuclear stance. Furthermore, after the DPP's reversal on the construction of NPP4 in 2001, anti-nuclear and environmental groups sought to distance themselves from the government to retain public support. Nevertheless, despite these disappointing developments for the anti-nuclear movement since 2001, public awareness of nuclear energy and nuclear waste issues in Taiwan has increased significantly. This represents a significant transformation in Taiwan, as it suggests that politicians now feel compelled to appear "greener", even if they continue to hold pro-development views.

However, after the Fukushima nuclear power plant discharged radioactive substances into the surrounding environment during the earthquake in Japan on 11 March 2011, anti-nuclear sentiment gained significant public support in Taiwan. In the 2012 presidential campaign, DPP candidate Tsai Ing-Wen (蔡英文), who later became president from 2016 to 2024, declared her support for ending nuclear power by 2025. The KMT also responded by stating it would

reconsider its stance on nuclear energy. While the nuclear issues may not have been a priority for the KMT government at the time, public debate on nuclear issues never disappeared.

Rebirth of the Anti-Nuclear Movement in the Post-Fukushima Era

The anti-nuclear movement in Taiwan experienced a revival following the Fukushima nuclear incident. In the post-Fukushima era, it adopted a softer and more humanitarian tone. During the DPP administration, TEPU remained critical of the government's stance on nuclear issues. However, its leadership largely refrained from publicly criticising the DPP's shift from an anti-nuclear position to a more pro-business stance. Instead, TEPU focused on lobbying DPP officials through policy channels to promote renewable energy and gradually reduce the reliance on nuclear power (Ho, 2014). In contrast, a group of younger members within TEPU, specifically its Taipei branch, broke away, expressing less tolerance for the DPP's stance on nuclear energy and other environmental issues. This group established the Green Citizens' Action Alliance (GCAA) in 2000 and began openly criticising the DPP's environmental decisions and nuclear policy. While TEPU concentrated on advocating for renewable energy as a replacement for nuclear power, GCAA worked more closely with local communities near nuclear power plants, particularly in Gongliao, adopting a more humanitarian approach to the nuclear debate.

Since 2001, GCAA has focused on issues concerning NPP4 in Gongliao, where the plant is located. Together with local communities, they drew more public attention to the livelihoods of local fisheries, living conditions, and the negative impact of the project on nearby communities. Furthermore, GCAA along with a music group, organised rock concerts featuring performers who staged against the backdrop of the NPP4 site on Gongliao beach.

Over the years, this concert has become one of Taiwan's most prominent music events, with an increasing number of performers and participants publicly expressing their anti-nuclear views. In 2009, GCAA and other cultural groups rebranded the event as the 'No Nuke' concert. By adopting a humanitarian and cultural perspective, GCAA generated significant support for the anti-nuclear movement, particularly among young people, who began to see 'No Nuke' as a trendy fashion. GCAA's efforts helped broaden the support base of the anti-nuclear movement and transform it into a softer and more culturally resonant campaign. As a result, when the Fukushima nuclear

incident occurred, people in Taiwan were more attuned to the safety concerns surrounding NPP4 and, more broadly, to the societal and generational impacts of nuclear energy.

Since the Fukushima incident, several anti-nuclear groups have been established in Taiwan. Among the most prominent are parental groups such as Mommies Do Not Want Nuclear Power Plants (媽媽不要核電廠), and Daddies Do Not Want Nuclear Power Plants (爸爸不要核電廠), which advocate for their children's well-being from the perspective of intergenerational justice. These groups, along with GCAA, opened a new chapter in Taiwan's anti-nuclear movement after 2011. They published reports challenging the KMT government's pro-nuclear and pro-business stance, providing evidence on electricity pricing and energy supply in scenarios without NPP4 and the energy supply in the case without NPP4, in an effort to pursue a more rational debate on nuclear energy based on scientific evidence.

In February 2013, Prime Minister Jiang Yi-Huah announced that the government would support holding a national referendum to resolve the prolonged controversy over nuclear energy (Fox News, 2013). Subsequently, a government-backed referendum proposal was initiated by KMT legislator Lee Ching-Hua (李慶華) on 6 March 2013. The proposed wording of the referendum was "Do you agree that the construction of the Fourth Nuclear Power Plant should be halted and that it should not become operational?" (你是否同意核四廠停止興建不得運轉?). The proposal was scheduled to be reviewed by the Legislature in June (Shih, 2013). Despite the government's announcement, more than 68,000 Taiwanese people participated in demonstrations across major cities in Taiwan in March 2013, demanding an immediate halt to the construction of NPP4 and the decommissioning of existing nuclear power plants (Sun, 2013). However, in September 2013, Lee Ching-Hua withdrew the referendum proposal, stating that it was inappropriate to proceed with the vote at that time (Shih and Wang, 2013).

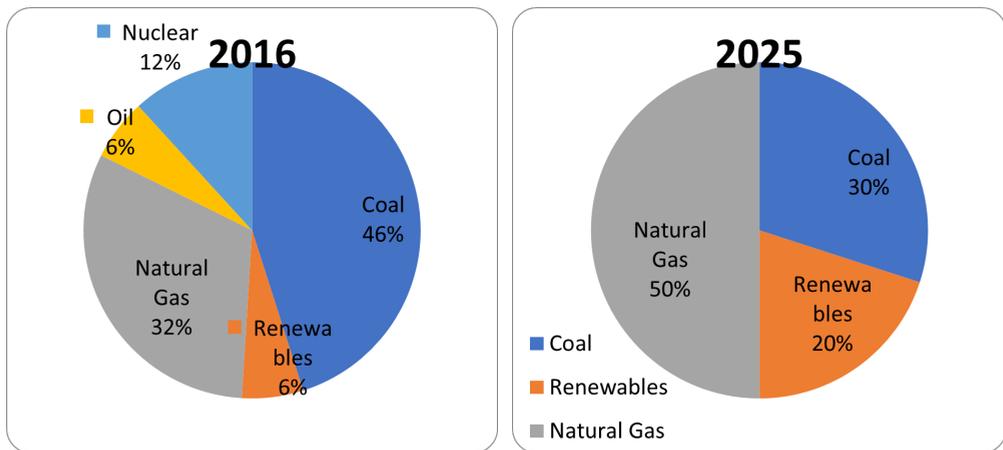
On April 22, former DPP chairman Lin Yi-Hsiung began an indefinite hunger strike to draw attention to the issue of NPP4 and to pressure the government to halt the construction of the plant. The 72-year-old Lin, a political prisoner during the Martial Law era, had suffered the tragic loss of his two daughters and mother, who were murdered on February 28, 1980 (Cole, 2014). Lin's action sparked a major anti-nuclear demonstration on 27 April, during which as many as 50,000 protesters gathered in front

of the Presidential Office, demanding that the government stop work on NPP4. In response, the government announced it would seal off the first reactor of NPP4 after the completion of safety checks and immediately halt the construction of the second reactor. It also pledged to hold a national referendum before allowing the facility to begin operations (Reuters, 2014).

Nuclear-Free Homeland by 2025

Under the leadership of Tsai Ing-wen, the DPP pledged to realise the vision of a “Nuclear-Free Homeland” following its victory in the 2016 presidential election. Tsai’s administration is publicly committed to making Taiwan “nuclear-power-free” by 2025, gradually phasing out the country’s three nuclear power plants, all operated by the state-owned Taipower. To compensate for the reduction in nuclear energy, the government also vowed to increase the share of renewable energy (RE) in the national energy mix to 20 per cent by 2025.

According to the DPP’s energy blueprint, Taiwan’s energy mix in 2025 will comprise 20 per cent renewable energy, 50 per cent natural gas (liquefied natural gas, LNG), and 30 per cent coal. In 2016, nuclear power contributed 12 per cent of total electricity generation, compared with 6 per cent from RE, 46 per cent from coal, 32 per cent from natural gas, and the remaining 6 per cent from other sources such as fuel oil (Table 1).



Sources: Taiwan Power Company

Figure 1. Energy Mix in 2016 and Target for 2025

Taiwan represents a distinctive case within the broader discourse on energy transition, diverging in notable ways from the trajectories typically observed in Western democracies. Specifically, Taiwan's approach to phasing out nuclear energy exemplifies a state-centric, top-down transition model, characteristic of East Asian developmental states. In this context, the central government has played a pivotal role in directing energy policy, reflecting the legacy of a strong bureaucratic apparatus and centralised governance structure.

The DPP, as the ruling party during key phases of the transition, has been instrumental in orchestrating the process. It has actively shaped the transition by selecting strategic political allies, reallocating state resources, reforming regulatory mechanisms, and navigating the interests of various stakeholders. The state thus acts not only as a policymaker but also as a broker and stabiliser, managing societal expectations while maintaining control over the pace and direction of the transition.

However, this highly politicised and centralised model also presents challenges. Political considerations often supersede public engagement, resulting in a limited role for citizen participation and deliberative democratic processes. Decision-making tends to be confined to a narrow circle of state actors, utility unions, and environmental NGOS (ENGOS), with technocrats and local communities occupying a marginal position. Consequently, the energy transition in Taiwan, while ambitious in scope, is often criticised for its lack of transparency, inclusiveness, and genuine public deliberation.

A "Nuclear-Free Homeland" has been formally stipulated in law. The Legislative Yuan approved an amendment to the *Electricity Act* (EA), which took effect in January 2017, requiring all power-generating facilities using nuclear energy to cease operations by the end of 2025.

The DPP's energy transition policy since 2016 can be viewed as a major victory for the anti-nuclear movement. Although Taiwan has implemented an ambitious plan to phase out nuclear energy by 2025, this transition has also raised concerns about environmental injustice. The government's strategy includes the extension of an existing coal-fired power plant, the construction of new coal-fired plants, and the possible reactivation of one or more nuclear reactors (Huang and Chen, 2021a).

The EA amendment established a clear timeline for the nuclear phase-

out by 2025. However, this was not the first piece of legislation in Taiwan to articulate the goal of becoming nuclear-free. The *Basic Environment Act*, enacted in 2001, stated that “the government shall establish plans to gradually achieve the goal of becoming a nuclear-free country”, but it did not specify a timeline. In contrast, the amended EA of 2017 is the first legal document in Taiwan to set a definitive deadline for ending the use of nuclear energy. It is widely regarded as one of the most significant victories for ENGOs in Taiwan.

The anti-nuclear movement has been one of Taiwan’s longest-standing and most widely discussed social and environmental movements. It has adopted a politics-centred approach (Chen, 2011) and is highly partisan (Ho, 2014). To understand the close ties between the DPP and ENGOs within the anti-nuclear movement, it is essential to take a historical perspective on Taiwan’s democratisation during the 1980s and 1990s, as mentioned in the previous sections.

The environmental movement in Taiwan, led by ENGOs, grew and flourished alongside the democratisation process of the 1980s. Relations between ENGOs and the DPP strengthened during this period, as both opposed the ruling KMT. By supporting the environmental movement, DPP members gained publicity both locally and nationally. In turn, environmental groups benefited from the DPP’s resources, which provided financial support for their organisations, staffing, and campaigning strategies. The establishment of the Taiwan Environmental Protection Union (TEPU) in 1987 by environmentalists and anti-nuclear activists (mainly scholars) also marked the deepening ties between the DPP and the anti-nuclear movement. EPU members were also DPP members in some local branches and even shared the same office space (Ho, 2005).

The anti-nuclear movement has remained aligned with the political opposition led by the DPP ever since, despite experiencing a significant setback in 2001. As noted earlier, the DPP needed to embrace the ideas of social movements in order to build a strong opposition bloc against the KMT’s authoritarian regime. In this context, nuclear energy came to symbolise the KMT’s authoritarianism. With the support of the DPP, the anti-nuclear movement criticised the KMT’s secrecy surrounding its nuclear deals, which allegedly concealed corruption. Since then, the anti-nuclear movement has become more politicised than other social movements (Ho, 2003),

adopting a strong partisan stance. More recently, with the backing of DPP legislators, ENGOs successfully blocked the reactivation of nuclear reactors following annual maintenance at nuclear power plants in 2013 and 2015 and halted the Fourth Nuclear Power Plant construction in 2014.

The 2017 amendment of the EA, which legislated the phase-out of nuclear energy by 2025, can be viewed as a reward from the DPP to ENGOs for their longstanding and loyal support (Huang and Chen, 2021b). Some critics argue that the DPP has long been “kidnapped” by anti-nuclear groups (Huang and Chen, 2021b), while others contend that the party has internalised the anti-nuclear stance as part of its ideological identity (Huang and Chen, 2021b). This major victory for ENGOs, however, carries potential risks for Taiwan’s energy supply and energy security due to the tight schedule for phasing out nuclear energy and replacing it with RE. As a result, energy policy in Taiwan has become increasingly politicised (Huang and Chen, 2021b).

The changing position of ENGOs was particularly notable in 2018, when the restart of Reactor No. 2 at the Second Nuclear Power Plant (NPP II) faced less opposition from them. In fact, it was through cooperation between ENGOs and DPP legislators that a decision was made in 2015 to subject the restart of nuclear reactors to legislative approval. At that time, ENGOs held the position that nuclear reactors should be shut down as soon as possible, even if they had not yet reached the end of their operational lifespan. They also firmly opposed any extension of reactor operations. However, interestingly, ENGOs argued that the restart of Reactor No. 2 at NPP II did not contradict their belief in a nuclear-free homeland (Huang and Chen, 2021b).

Nuclear Energy Referendum

In March 2018, pro-nuclear groups and KMT legislators challenged the DPP’s nuclear-free policy by proposing two energy-related referenda. In addition, Nuclear MythBusters, a pro-nuclear group, proposed a referendum to abolish the policy of phasing out nuclear energy by 2025 as stipulated in the EA. All three energy-related referenda passed (Figure 1), including Proposition 7 (against air pollution), Proposition 8 (against the construction of the Shenao coal-fired power plant), and Proposition 16 (to repeal the nuclear phase-out by 2025).

Table 1. List of Energy Referenda in Taiwan 2018

	For	Against	Invalid	Total
Do you agree “to reduce the electricity production of thermal power plants by 1% each year”?	7,955,753 79.04%	2,109,157 20.96%	715,140	10,780,050
Do you agree to establish an energy policy to “stop construction and expansion of any coal-fired thermal power plants or generator units (including the Shenao Power Plant currently under construction)”?	7,599,267 76.4%	2,346,316 23.59%	823,945	10,769,528
Do you agree to repeal Article 95, Paragraph 1 of the <i>Electricity Act</i> : “Nuclear-energy-based power-generating facilities shall cease operations by 2025”?	5,895,560 59.49%.	4,014,215 40.51%	922,960;	10,832,73

Sources: Central Electoral Commission (2018).

However, Huang et al. (2021) identified four instances in which the government deliberately obstructed this referendum process and disregarded the results of public polls.

First, in May 2018, the Central Electoral Commission (CEC), the authority responsible for overseeing national referenda, requested the proposers to revise the main text of the nuclear energy referendum. This action raised concerns about the CEC’s neutrality.

Second, in September 2018, the CEC rejected over 24,000 endorsements collected by the referendum proposers, enabling it to dismiss the proposal without any clear legal justification (Chou and Liu, 2018).

Third, the DPP government downplayed the results of the referendum, disregarding public opinion and undermining democratic participation. The referendum to repeal Paragraph 1 of Article 95 of the *Electricity Act* passed with 59.49% of voter approval. Legally, the paragraph was supposed to lose its effect three days after the vote. Nonetheless, on November 25, 2018, a government spokeswoman confirmed that the administration would continue with its plan to phase out nuclear energy by 2025 (Tsai and Yen, 2018).

Lastly, on June 18, 2019, the DPP amended the *Referendum Act* in a manner that limited democratic participation. Following the ten referenda held on November 24, 2018, seven of which opposed existing government policies, the ruling DPP chose to revise the *Referendum Act* instead of responding to the expressed will of the public. Under the amended Act, referenda can no longer be held concurrently with general elections and are now scheduled to take place on the fourth Saturday of August every two years (Maxon, 2019).

Despite these setbacks, the KMT, encouraged by its 2018 referendum success, proposed another referendum in 2021 regarding the construction of nuclear power plants. The ballot asked: “Do you agree with the activation of Taiwan’s mothballed Fourth Nuclear Power Plant?”. However, with 4,262,451 votes (52.84%) against and 3,804,755 in favour (Lin, 2021), the proposal was rejected, marking the end of NPP4’s prospects.

Table 2. Historical Development of Nuclear Debates in Taiwan, 1978-2021

Year	Events
1978	First Nuclear Power Plant (NPP1) Commissioned
1994- 1998	In 1994 and 1998, four referenda were held in Gongliao, Taipei County, Taipei City, and I-Lan County, respectively, on the construction of NPP4. In each case, over 70% of voters opposed this construction. However, the ruling KMT at the time did not recognise the results. Between 1992 and 1996, the budget bill for NPP4 also faced substantial challenges.
1999	Construction of Fourth Nuclear Power Plant (NPP4) Began.
2000	The DPP won the presidential election and halted the construction of NPP4. The KMT claimed the decision was illegal and threatened to pursue censure or impeachment of the president.
2001	Under pressure from businesses and KMT, the DPP government resumed the construction of NPP4.
2002	The DPP government passed the <i>Basic Environmental Act</i> , marking the first appearance of the term “Nuclear-Free” in an official government document.
2011	The revival of Taiwan’s anti-nuclear movement after the Fukushima nuclear incident.
2012	The KMT responded to “Nuclear Free” for the first time. During the 2012 presidential election campaign, DPP presidential candidate Tsai Ing-Wen (蔡英文) declared her support for ending nuclear energy by 2025. The KMT responded by stating it would reconsider the use of nuclear energy.

Year	Events
Feb 2013	KMT Prime Minister Jiang Yi-Hua announced plans to hold a national referendum on NPP4.
March 2013	A KMT legislator proposed a referendum on NPP4 with the following question: “Do you agree that the construction of the Fourth Nuclear Power Plant should be halted and that it not become operational?”
March 2013	More than 68,000 Taiwanese people joined demonstrations across the country, campaigning to immediately halt the construction of NPP4 and to decommission the existing nuclear power plants.
September 2013	The referendum proposal was withdrawn from the legislature due to internal conflicts within the KMT.
April 2014	The first-ever victory for the anti-nuclear camp in Taiwan. The KMT administration halted the construction of NPP4 following a social movement and a large-scale demonstration against the project. The government also promised to hold a national referendum before the facility becomes operational.
May 2016	The DPP won both the presidential and general elections and subsequently began implementing its energy transition agenda.
January 2017	The DPP government amended the <i>Electricity Act</i> , clearly stating that nuclear would be phased out by 2025.
March 2018	The referendum asks, “Do you agree to repeal Article 95, Paragraph 1 of the <i>Electricity Act</i> , which states: ‘Nuclear-energy-based power-generating facilities shall cease operations by 2025’”? Received 59.49% of the vote. As a result, Article 95, Paragraph 1 of the <i>Electricity Act</i> was abolished.
December 2021	The referendum asking, “Do you agree to the activation of Taiwan’s mothballed Fourth Nuclear Power Plant?” received 52.84% of the vote.

Sources: Compiled by the author, adopted from Ho (2003), Shih and Wang (2013), Sun (2013), and Reuters (2014).

The anti-nuclear movement in Taiwan has successfully achieved the goal of a nuclear-free homeland by 2025. Under this policy, the No.1 and No.2 nuclear power plants, with a total of four reactors, have been decommissioned. The No.3 nuclear power plant was scheduled to cease operations in late 2024. Ironically, the phasing out nuclear energy by 2025 may help alleviate issues of distributive environmental justice for local communities living near nuclear power facilities. However, the decommissioning process could take up to 25 years, and the issue of nuclear waste storage on indigenous Orchid Island

remains unresolved, as no other location is willing to host the waste. The current energy transition has also contributed to rising electricity prices and increased air pollution.

The previous sections of this paper provided an overview of Taiwan's anti-nuclear movement. However, it is important to highlight that the anti-nuclear waste movement, which is deeply embedded within the broader anti-nuclear movement, is one of the most prominent examples of local communities' struggles against environmental injustice. The following will focus on the anti-nuclear waste movement in Orchid Island.

Anti-Nuclear Waste Movement

Anti-nuclear waste movements are often embedded within the greater anti-nuclear movement. However, the anti-nuclear movement also reflects the legacy of authoritarian rule in Taiwan. The siting of nuclear waste facilities represents one of the most notorious cases of environmental injustice in the country and cannot be overlooked in the context of Taiwan's anti-nuclear history.

The decision to build a radioactive waste repository on Orchid Island was highly controversial. Whether the government obtained the consent of local communities remains a matter of dispute. Government officials claimed that the signature of Orchid Island's District Commissioner demonstrated local awareness and approval of the project. However, some reports indicated that residents in Orchid Island were unaware that a nuclear waste repository was being constructed by the government. Instead, they had been led to believe that the facility would be a fish canning factory.

When the Yami people discovered the truth that the government had built a nuclear waste repository on Orchid Island, a resident missionary, Reverend Dong Sen-Yun (董森永), along with other Yami missionaries and youth, began reading extensively about nuclear energy and radioactive waste. They published articles in newspapers, church communiqués, and magazines to express their anger over the threat posed by radioactive waste and the injustice of its placement on their island. In both Taiwan and Orchid Island, these activists educated the Yami community, including elders, about nuclear energy and radioactive waste, ultimately uniting the community in opposition to the repository.

Although the Yami missionaries' efforts could not stop the construction and operation of the radioactive waste repository, by the mid-1980s, most Yami people had become aware of the dangers they were exposed to (Lin et al. 1993: 1). Some elderly Yami leaders asked, "If radioactive waste is as safe as the government claims, why doesn't it dispose of it on Taiwan's main island? If the waste is harmless, why not distribute one barrel to each household or store it in the basement of the Presidential Office in the capital city of Taipei?" (Kuan, 1987). This public reaction widely spread across Orchid Island.

Regardless of whether the people of Orchid Island were told that the facility being built was a fish canning factory or a radioactive repository, it is clear that local residents felt misled by the government, including the Atomic Energy Council (AEC) and Taipower. It is also evident that local people were not allowed to participate in the decision-making process regarding the repository, nor were they consulted by the AEC. It is hardly surprising, therefore, that since 1987, many demonstrations have been organised both in Taiwan and on Orchid Island by residents demanding the removal of radioactive waste from their homeland.

Protest Against Nuclear Waste

The Yami organised their first protest on Orchid Island on 7 December 1987, when 30 aboriginal Yami youth gathered at Orchid Island Airport to protest against AEC's bribing of aborigines and local council representatives with trips to Japan (Kao, 2000). The Yami youth also accused those who had taken such trips of ignoring public opinion on Orchid Island. The protest was effective, as 17 local council representatives cancelled their trip to Japan (Danafu, 1989). Importantly, this was the first time that the people of Orchid Island had publicly expressed their anger about the deception and unfair treatment they had experienced from the government since the Orchid Island project began. Those who participated in this protest would go on to become leaders in subsequent protests and play an essential role in the anti-nuclear waste movement on Orchid Island. Although the protest was small in scale, it attracted the attention of many local people, made them aware that Orchid Island had been hosting radioactive waste for many years, and encouraged them to join the campaign.

On 20 February 1988, six years after the repository began operation, about 350 Yami people held their first large-scale demonstration with the

slogan “Repel the Nuclear Evil” at the repository site on Orchid Island (Kao, 2000). The Yami demanded that the government halt plans to expand the site and set a timetable for removing radioactive waste from Orchid Island. News of this demonstration spread across Taiwan and drew significant attention, raising public awareness of the radioactive waste issue on Orchid Island. Two months later, on 22 April 1988, at the annual anti-nuclear demonstration in the capital city of Taipei, Yami youth leaders Chang Hai-Yu (張海嶼) and Kou Chien-Pin (郭建平) handed a petition from the Orchid Island people to the AEC and Taipower. However, the government neither changed its attitude nor responded to the Yami people’s demands. Instead, AEC offered compensation of \$30 million New Taiwan Dollars (NTD) (approximately US\$1 million) to build a tap water pipeline and purchase engines for the Yami people’s fishing boats (Kao, 2000). The Yami elders strongly rejected the compensation. Mr. Shaman, a Yami artist, recalled in a 2003 interview what the elders had said about the offer: “The government tried to buy us with approximately NTD\$30 million. We do not need to build a tap water pipeline or buy fishing boat engines. We are facing a survival challenge. We will return the money to the AEC” (Huang et al., 2013).

Although the first large-scale demonstration did not change the government’s attitude, the people of Orchid Island did not give up. On 20 February 1991, a group of Yami people, led by Kou Chine-Pin, organised another demonstration on Orchid Island. About one hundred Yami residents, along with representatives from environmental groups, marched to the nuclear waste repository, where they presented a petition once again and issued a declaration requesting the government to:

1. Immediately halt the expansion of the second phase of the storage site.
2. Immediately stop transporting radioactive waste to Lan Yu (Orchid Island); and
3. Set a timetable for the removal of nuclear waste from Lan Yu (Orchid Island) (Kuan, 1991).

The declaration also demanded that Taipower respond to the Yami people’s requests in writing by 30 June 1991. It further warned that if the government or Taipower ignored these demands, the Yami demonstrators would undertake more radical action, such as blockading the repository and harbour until the radioactive waste was removed from Orchid Island (Kuan,

1991).

A Two-Faced Approach?

The United Nations designated 1993 as the Year of Indigenous Peoples. Under the pressure of strong local resistance, on 20 March 1993, the Chairman of the AEC, Dr. Hu, Chin-Piao (胡錦標), declared in the Legislative Yuan that “the radioactive waste stored on Orchid Island will start to be removed by 2001” (Lin, 1995). However, at the same time, Taipower had just submitted plans to the AEC to build six additional ditches on Orchid Island to accommodate another 100,000 barrels of radioactive waste. In response, the Yami people called on Legislators (MPs) to oppose this expansion plan and pressure the government to halt it.

On 26 Apr 1993, Dr. Hu reaffirmed in the Legislative Yuan that “there will be no more expansion of the radioactive waste repository” (Lin, 1995). The Vice-General Manager of Taipower also publicly stated on 12 May 1993 that ‘Taipower guarantees we will negotiate with the Taitung County Council beforehand and no construction will begin without the approval of the local people’ (Lin, 1995). However, at the beginning of May 1993, Taipower simultaneously applied to the Executive Yuan for a “Significant Public Project” permit (Lin, 1995). Under Taiwanese law, such a designation allows the central government to approve projects without the consensus of local governments, councils, or communities if deemed necessary for national benefit.

This two-faced approach brought the people of Orchid Island back to Taipei. On 20 May 1993, approximately 20,000 people joined a demonstration. The protest opened with about twenty Yami elders dressed in traditional attire with bamboo helmets, loincloths, and bamboo chest armour, performing an aboriginal dance in front of the Legislative Yuan. The event attracted widespread attention heightened national awareness of the radioactive waste issue on Orchid Island.

In May 1995, protests against radioactive waste intensified both in Taipei and on Orchid Island. The Yami people placed rocks into the ocean in an attempt to block the harbour, while in Taipei, they demanded that the government investigate the legality of Taipower’s enlargement plan. In response, at the end of 1995, Taipower suspended the enlargement plan and promised to reduce the number of new ditches from six to two, but local

opposition remained strong (Kao, 2000).

During the 10th anniversary of the Chernobyl accident on 24 April 1996, a Taipower freighter carrying a shipment of 186 barrels of radioactive waste was blocked from entering the harbour of Orchid Island by Yami protesters. Strong local resistance made it impossible for Taipower to build more additional ditches at the Orchid Island repository to accommodate more nuclear waste, and the facility effectively reached its maximum capacity (Kao, 2000). Consequently, in July 1996, Taipower ceased transporting radioactive waste to Orchid Island. However, the controversy did not end, as the existing stock of radioactive waste on the island continued to generate significant public concern.

During the 14 years (1982-1996) that Taipower transported radioactive waste to Orchid Island, there were 338 shipments, totalling 97,671 barrels of radioactive waste moved from Taiwan to Orchid Island (FCMA, 2002: 20). In 1998, the AEC estimated that at least 4,000 barrels of radioactive on Orchid Island were rusty, and the number was continuing to increase. On 7 February 1998, the Director of Fuel Cycle and Materials Administration (FCMA) told the *China Times* that “because the natural environment on Lan Yu (Orchid Island) features high temperature, high humidity, and salt exposure, the radioactive waste barrels are expected to last only ten years, but 1982 was more than fifteen years ago. We can undoubtedly assume that the number of rusty barrels is increasing daily” (China Times, 1998a: 9). Rusty barrels could leak radioactive substances into the surrounding water and air, potentially causing illness among the local population.

In response, the AEC instructed Taipower to transfer the radioactive waste into new barrels. In June 1998, Taipower launched a six-year plan to complete this re-packaging process. However, Taipower decided that the most efficient method would involve building an additional ditch to store the newly re-barrelled waste. Strong opposition from the people of Orchid Island prevented the construction of a new ditch. On 17 November 2000, a Taipower ship carrying several barrels arrived at Orchid Island. Residents assumed that the ship was transporting additional radioactive waste and prepared for protest (China Times, 2000: 8) until a Taipower official explained that the barrels were empty containers intended for replacing the corroded ones (China Evening Times, 2000c: 5). Despite this clarification, the Yami people remained dissatisfied with the slow progress of the re-barrelling effort. By

November 2002, only 77% of the rusty barrels had been replaced (FCMA, 2002: 22). Many residents accused Taipower of deliberately delaying the work and suspected that the shipments of “empty” barrels contained radioactive waste, leading them to continue blockading Taipower’s ships.

During a visit to Orchid Island as part of his (successful) 1999 presidential election campaign, Mr Chen Shui-Bian (陳水扁) signed a “New Partnership Agreement” with the people of Orchid Island, committing the government to remove the radioactive waste from the island by 2002 (Chen, 2002: 5). It was the first time a high-profile politician in Taiwan had signed a written agreement with Indigenous community. However, the radioactive waste issue proved too complex for the material to be removed easily – most notably because Taipower had yet to find any site in Taiwan or abroad willing to host the waste.

On 15 February 2001, Vice President Annette Lu (呂秀蓮) apologised for the siting of radioactive waste on Orchid Island during an official visit. She informed the Yami people that Taipower had reportedly signed agreements with other countries to manage radioactive waste by 2002. She stated, “Though I cannot say which countries will receive the waste, the government has never forgotten the demands of people of Lan Yu (Orchid Island)” (Shin, 2001). Ironically, the very next day, Taipower’s general manager reported to the vice president that it would be nearly impossible to remove all radioactive waste from Orchid Island by 2002 (Shin, 2001).

On 2 May 2002, the largest protest in the history of Orchid Island was launched, with nearly 2,000 residents participating. Yami children, women, elders, and youths marched around the island in traditional dress to express their anger, calling on the government to honour its promise to remove the radioactive waste from Orchid Island. The Minister of Economic Affairs, Mr. Lin Yi-Fu (林義夫), responded to the Yami people by fax, confirming that the government’s policy was to gradually phase out nuclear energy and achieve a nuclear-free homeland in Taiwan. He also stated that Wuciou (烏坵鄉) had been designated as the final disposal site and that work had already begun on its environmental impact assessment (Chen, 2002: 5). However, the Yami people were not satisfied with the faxed reply from the Minister of Economic Affairs. They threatened to burn the repository if the government could not provide a more concrete response. On 4 May 2002, the Minister of Economic Affairs and the Chairman of Taipower travelled to Orchid Island, where

the Minister publicly apologised for the government's failure to remove the radioactive waste by 2002 (BBC News, 2002) and signed an agreement with the people of Orchid Island stating that:

1. The Minister of Economic Affairs, Mr. Lin Yi-Fu, as a government representative, apologised for years of failure to remove the radioactive waste stored in Orchid Island. He also apologised for the government's disrespect for the human rights and environmental rights of all people of Orchid Island.
2. The government would enact legislation to protect the rights of the Yami people on Orchid Island.
3. The government would establish a committee to oversee the removal of radioactive waste stored on Orchid Island. The committee would include anti-nuclear waste leaders from Orchid Island, members of environmental groups, experts, representatives from the Ministry of Economic Affairs, the AEC, Taipower, Yami representatives from the Council for Indigenous People, and Indigenous members of Parliament. This committee would immediately set a timetable for the removal of radioactive waste.
4. The government would establish a committee within a month to improve health care, living conditions, and education on Lan Yu (Orchid Island). After the removal of the waste, the government would clean up all radioactive materials and restore the site's natural landscape.
5. If the government failed to comply with this agreement, it would face further demonstrations organised by the Yami people.
6. This agreement would be formally recorded in the Legislative Yuan (Shin, 2002).

The Yami signed this agreement with the Minister of Economic Affairs. However, Taipower later stated that the Yami would have to wait at least seven years for the complete removal of radioactive waste from Orchid Island. In November 2002, the Committee for the Lan Yu (Orchid Island) Repository Removal (CLYRR) was established by the Executive Yuan to promote the removal of radioactive waste from the island. However, because Taipower had not identified a new disposal site, the committee did not set a timetable for Taipower – a failure criticised by Mr Sharman, a Yami artist, who stated:

“We believe the government sincerely wants to remove the radioactive waste from Orchid Island. However, the committee is useless. It has no timetable. If the government does not remove the rubbish, I am afraid some of the young generation will resort to radical means of protest”. The most recent recorded meeting of the CLYRR was held on 14 August 2007. However, with no site identified to host radioactive waste, the discussion focused mainly on hypothetical procedures for siting a new repository. In contrast, committee members representing the people of Orchid Island were more concerned with securing compensation and employment opportunities for local residents. Since 2007, the committee has ceased to function, and the CLYRR website has not been updated.

After 2002, Taipower changed its strategy towards the people of Orchid Island. Prior to that time, there were no employees from Orchid Island working at the repository; however, since 2002, Taipower has hired more local residents. By 2006, 22 of the 37 employees at the repository were local people (United Daily, 2006). Moreover, whereas before 2002, negotiations between Taipower and the local community were conducted by employees from Taiwan’s main island, since 2002, 6 of the 22 local employees have taken on responsibilities for communicating and negotiating with the community (United Daily, 2006). Their duties include liaising with local elders and distributing compensation to residents of Orchid Island who require assistance.

These negotiators face a difficult position: on the one hand, they must contend with criticism from their community regarding their cooperation with Taipower. On the other hand, they are employed by Taipower to assist local residents. Financial compensation has continued to increase over time. According to the *United Daily News*, between 1982 and 2006, Taipower provided a total of approximately NTD 760 million (approximately USD 25.33 million) (United Daily, 2006), and since 2002, Orchid Island has received about NTD 200 million each year, which has been spent on medical and educational services, public infrastructure, community development, emergency aid, and electricity bills (Taiwan Indigenous TV Station News, 2011).

Taipower’s strategy has helped to defuse the anti-radioactive waste movement in Orchid Island, and more local residents have returned from Taiwan’s main island to work on repairing rusty radioactive waste barrels

in the repository. However, progress on establishing a new repository for radioactive waste has been very slow. The government was originally supposed to announce the new site for a radioactive waste repository by June 2005. However, due to the enactment of the *Law on Site Selection of Low-Level Waste Final Disposal* in 2006 and strong local opposition from potential host sites, the siting process had to restart in both 2009 and 2013. As of December 2014, none of the radioactive waste has been removed from Orchid Island.

Nuclear waste storage on Orchid Island also exemplifies environmental injustice. The reason people suffer from disproportionately high health risks from nuclear waste is often attributed to their lack of power to participate in decision-making, a clear example of procedural injustice. From 1980 to 1996, low-level nuclear waste was stored on Orchid Island, located 65 kilometres off Taiwan's southeast coast and home to the Tao people (達悟族). They have been fighting for the removal of the nuclear waste for 40 years. However, the issue has reached a deadlock in Taiwan, with no location willing to take the waste.

Although President Tsai apologised to the Indigenous people, she was reluctant to commit to a more proactive stance on nuclear waste removal, and the government has made little progress in this area. In 2019, the DPP eventually withdrew its relocation decision (Aspinwall, 2019). During a visit to Taitung in November 2019, President Tsai, while seeking re-election, pledged NTD 2.55 billion (USD 83.57 million) in damages to Orchid Island's Tao people. Capen Nganean, a Tao elder and anti-nuclear campaigner, stated that he felt Tsai was "a liar" and accused her of trying to buy off the Tao before the elections (Lin, 2019). With no alternative site for storing nuclear waste, Taipower and the government have continued to store it at existing locations, offering increased compensation in an attempt to justify the procedural injustice.

Recent Debates on Nuclear Power

For many years, issues concerning the NPP4 have dominated the debate on nuclear power and the anti-nuclear movement in Taiwan. To this day, controversies surrounding nuclear energy, particularly NPP4, remain ongoing. Pro- and anti-nuclear camps continue to debate the safety of NPP4, electricity prices, potential energy shortage, the future use of nuclear power, and the NPP4 referendum, making nuclear power one of the most critical issues in Taiwan's political history.

Safety

Safety has been the central issue in dispute over NPP4. Safety concerns are closely tied to perceptions of risk. Environmental risks associated with nuclear power are often highly technical; making them uncertain and unfamiliar to the general public. Consequently, people tend to rely on experts to assess and inform them about the likelihood of risks.

Concerns over NPP4's safety have persisted over the years. First, it was reported that the construction contract for NPP4 was not awarded as a single package; instead, General Electric built the reactors, Mitsubishi Heavy Industries supplied the turbines and the generators, and various other contractors managed additional components. The complexity of coordination among different contractors led to several shortcomings that raised serious concerns about the plant's operational safety. Second, Taipower's overall safety record in managing nuclear power plants has been less impressive. In 2011, the AEC also criticised Taipower's management of the NPP4 project (World Nuclear Association, 2014). Furthermore, a report by the Natural Resources Defence Council, an environmental NGO, evaluated the seismic hazards facing reactors worldwide. According to data from the Global Seismic Hazard Assessment Program, Taiwan's six existing reactors were ranked among the 21 reactors located in areas of very high seismic risk (Jacobs, 2012).

Finally, another major safety concern regarding NPP4 was raised by environmental activists, who argued that the plant was built on the Circum-Pacific seismic zone. They warned that if a major earthquake struck Taiwan, a Fukushima-like disaster could occur. The anti-nuclear camp also questioned Taipower's and the government's ability to manage such an incident safely.

These concerns contributed significantly to public awareness of NPP4 and shaped pro- and anti-nuclear attitudes in Taiwan. Although the government attempted to reassure the public by conducting safety reviews of NP4 and other nuclear power plants and claimed that they were all safe, environmental activists criticised the government's safety reviews, comparing them to a player acting as a referee.

Safety remains a key factor for public acceptance of NPP4 and nuclear energy in Taiwan. Since the Fukushima disaster, many new anti-nuclear groups have emerged. Notably, this trend has involved parental organisations

such as “Daddies Who Do Not Want Nuclear Power Plants” and “Mommies Who Do Not Want Nuclear Power Plants”. This reflects an intergenerational concern for the safety and well-being of future generations.

The second key question concerning nuclear power is whether there will be an electricity shortage if NPP4 is not operational. According to *Commonwealth* (天下) magazine, Taipower remains uncertain about the likelihood of an electricity shortage without NPP4, but acknowledges that the possibility would be higher (Chen and Kao, 2014). This issue has generated extensive debate among scholars, environmental activists, officials, government officials, and business leaders. Anti-nuclear activists argue that there has been no electricity shortage over the past 20 years, even without NPP4. However, the government, Taipower, and the business sector remain concerned about the reliability of future energy supply. As Taipower and the government are responsible for power generation and industrial policy, accurately forecasting future energy needs for the general public remains challenging.

The third issue in the nuclear dispute concerns the price of electricity. It has been reported that Taiwan’s electricity prices are relatively lower compared to those of other countries. Without NPP4 or nuclear power, electricity prices are projected to rise by as much as four times. However, environmental activists argue that the rise in electricity prices is due to Taipower subsidising industrial users, which has contributed to its mounting debts. As a state-owned enterprise, Taipower, they claim, has forced the future generation to bear the cost of its financial mismanagement.

Based on the discussion above, all three issues, safety, electricity shortage, and price, are strongly associated with participation, information, and trust. If we accept that we are obligated to future generations and must avoid harming them, we must choose better options for our posterity. However, a major problem is that the government and Taipower control access to information concerning safety, electricity shortages, and pricing. Given the technical complexity of nuclear power, this information is often difficult for laypeople to understand.

Moreover, the availability of information about nuclear power and related issues still largely depends on the government’s willingness to disclose it. More importantly, in Taiwan, the nuclear energy debate continues to be complicated by a multitude of arguments from researchers, media outlets,

the nuclear industry, government officials, and environmental groups, all presenting conflicting claims about safety, electricity shortages, and pricing. In this environment, trust in experts or government authorities is increasingly at stake. Scientific knowledge, which should be treated as neutral and objective, is often misused by both pro- and anti-nuclear campaigners to serve their respective agendas. These conditions leave the public confused and make it even more difficult to make informed decisions for the well-being of future generations.

Nuclear Waste in Taiwan

Nuclear waste certainly poses intergenerational injustices. Environmental activists argue that if we cannot properly manage nuclear waste, we should not deploy nuclear power. The management of nuclear waste in Taiwan has been largely unsuccessful. From 1982 to 1996, the Taiwanese government stored 97,671 barrels of low-level radioactive waste on Orchid Island, located 65 km off Taiwan's southeast coast. Efforts to site a permanent nuclear waste repository have been unsuccessful, raising significant environmental and cultural justice concerns. To date, Taiwan has not identified a permanent solution for its nuclear waste. Consequently, both the present and future generations in Orchid Island and local communities near nuclear power plants continue to suffer from the disproportionate distribution of health risks associated with nuclear waste, compounded by a lack of accurate information on safeguarding it.

Conclusion

Since Taiwan's first nuclear power plant began operations, debates over nuclear energy have never ceased. Figure 2 illustrates the historical development of the nuclear debate in Taiwan. The issue of nuclear energy has become highly partisan. Nuclear energy policy was initiated during the long rule of the KMT, which remains a strong proponent of nuclear power. In contrast, the ruling DPP (long the opposition) adopted an anti-nuclear position as part of its broader campaign against the authoritarian KMT during Taiwan's democratisation process. Since then, the anti-nuclear camp has become one of the DPP's most substantial support bases. This is why, when the DPP is in power, it pursues a nuclear-free policy despite the associated risks of electricity shortages, rising electricity prices, and other challenges (Huang et al., 2021).

From a historical perspective, the construction of nuclear power plants in Taiwan began during the authoritarian period, characterised by a centralised political system and limited public participation. Neumann et al. (2020) show that less free political environments tend to enhance the adoption of nuclear energy. The development of nuclear energy in Taiwan reflects the characteristics of the “Asia development state” model within a centralised political system (Lee, 2021). In this context, nuclear energy served as a foundation for rapid economic development and created a path dependency on nuclear energy for the country. The strong dominance of the state and the centralised decision-making process in nuclear energy (as well as broader energy policy) have shaped an enduring stakeholder structure, with the government remaining the principal actor (Kim and Chung, 2018). These historical and structural conditions have made the current energy transition even more difficult.

The 2018 referendum in Taiwan demonstrated the difficulty of dismantling the entrenched interest structure surrounding nuclear energy, particularly in the context of pursuing high economic growth. Interestingly, in implementing their ambitious nuclear phase-out, nuclear-sceptic administrations in Taiwan have also relied on a centralised decision-making system to push through their nuclear-free agenda, which successfully halt the construction of NPP4 in 2021. However, the nuclear-free energy transition has given rise to numerous complex challenges, such as power shortages and rising electricity prices.

Under pressure from the public and the KMT, the ruling DPP is eager to demonstrate that it can manage energy issues without relying on nuclear power. As a less popular administration, the DPP remains firmly committed to the nuclear phase-out, in part because it cannot afford to lose support from the anti-nuclear constituency (Huang et al., 2021). As a result, the party has prioritised its political interests, drawing significant criticism.

On the other hand, policymakers in Taiwan must recognise that public participation is essential for addressing the challenges posed by nuclear energy. Effective communication and transparency with anti-nuclear groups and local communities are key to resolving disputes. Information about nuclear energy must be both accessible and understandable to the general public. Failure to do so risks deepening public distrust towards Taipower and the government. Establishing trust between citizens and the government

is inherently challenging. However, the more transparent the government becomes, the more trust it can foster, and the more citizens will be willing to engage in participatory processes. This, in turn, will improve the quality of decision-making, enhance the legitimacy of current nuclear energy policy, and help consolidate democratic governance in Taiwan.

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臺灣反核運動：現在、過去與未來

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摘要

臺灣的反核運動是臺灣現代公民社會中最具持續性且最具象徵意義的社會運動之一。自 1970 年代核能政策首次引起爭議以來，反核運動歷經政治解嚴、政黨輪替、重大核能事故等歷史轉折，逐漸從早期以菁英與專業團體為主的論述性批判，轉變為具有高度動員力的社會運動，涵蓋基層行動者、非政府組織、文化界與青年世代的廣泛參與。透過街頭抗爭、公民投票、文化倡議與政策游說等多元策略，該運動成功地將核能議題納入主流公共討論。

雖然反核運動成功推動 2017 年《電業法》修正，正式將「2025 非核家園」目標納入國家能源政策架構之中，然而，研究結果指出，臺灣的核能爭議高度政治化，能源安全與環境永續議題已成為國家治理中的關鍵議題。未來能源轉型的成敗，將取決於政府是否能在回應民意、促進經濟發展與履行環境責任之間取得平衡，並妥善處理核廢料處置與再生能源推展的可行性等未解課題。儘管反核運動在政策層面已有重要成果，其未來仍須面對新興挑戰，方能引導臺灣邁向永續且公平的能源轉型之路。

關鍵字

核能政策、公共參與、反核運動、臺灣
