

Challenging Nuclear: Antinuclear Movements in Postauthoritarian Indonesia

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Abstract In mid-2006, the Indonesian government announced a plan to build nuclear power plants geared towards meeting soaring demands for energy in the country. After prolonged procrastination, the government is determined that time is ripe for Indonesia to go nuclear. While discussions on adopting nuclear power are steadily gaining currency among high officials and political elites, it is simultaneously being contested by an antinuclear alliance consisting of multiple groups that form an organized resistance. The organized resistance is primarily driven by suspicions that the current government does not possess the capacity to handle high-risk technology. Using combined approaches of STS and social movement studies, the paper discusses the contestation of nuclear risk discourses and how lack of trust in the government has led to the ascendancy of antinuclear movements. In situating the paper within postauthoritarian Indonesia, this paper observes how shifts towards democratic change has allowed a network of civil society groups to organize resistance against nuclear power both at the national and local levels. The paper also highlights the way in which civic epistemology guides antinuclear groups to produce popular risk assessments that confront scientific calculations of nuclear risk. Lastly, it presents a vignette of how civil society groups mobilize local resources to explore alternative energy systems that ultimately undermine the government's nuclear ambitions.

Keywords Nuclear power · Indonesia · Risk and distrust · Antinuclear movements · Organized resistance · Civic epistemology

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1 Introduction

Cold War politics have shaped the landscape of Southeast Asian throughout the 1950s to 1960s. During this time, triumphant postcolonial regimes promoted development as a driving force for social change, promising a replication of Western history to societies in this region. Indonesia, Malaysia, and Singapore were among some of the noted examples of developmental states which undertook planned economic developments to bring about socioeconomic progress within their respective countries—a process in which technology was deeply embedded. One characteristic shared by these Southeast Asian nations was the placement of technology under centralized control of the state.

In Indonesia, centralized control of technology placed in the hands of the state was strongly practiced under the New Order regime (1966–1998) led by President Suharto. During this period, the New Order government undertook a massive effort to pursue the regime's ambitious desire for building technological supremacy through the establishment of expensive, large-scale, and sophisticated aircraft manufacturing in Bandung, a project spearheaded by Suharto's devoted minister of research technology, B.J. Habibie (Amir 2007). Being ideologically technological, the New Order regime relied heavily on the expertise of technocratic elites who held unassailable authority in public decision making, rendering technocracy as the foundations of the nation's developmental process (Amir 2008). Under such circumstances whereby public affairs became dependent on technical knowledge, state technocrats were politically dominant in defining technology discourses.

When the 1997 Asian monetary crisis struck Southeast Asian economies, a reform movement emerged to challenge the hegemonic control of the New Order state. As the events in May 1998 unfolded, the reform movement took Suharto down from power, breaking down the New Order's power structure that was soon replaced by a new democracy. As democratic movements proliferated, a wave of political change swept through all spheres of society. Such dramatic changes prompted a redirection of development practice as well as the reconfiguration of participating actors. The domain of technological discourse once monopolized by state technocrats is no longer exclusive to technocratic authority. In this light, democratic movements paved the way for nonstate actors to openly engage in a variety of public decision making, including those related to technology.

Against the backdrop of democratic trends in Indonesia, this paper observes the political effects of democratic change in technology discourses in postauthoritarian Indonesia. Sociopolitical shifts resulting from the rupture of Suharto's New Order regime have opened up the possibility for and enhanced the capacity of the public to challenge the authority in overseeing, examining, and determining technoscientific agendas. As democratization encourages the public to be more critical in scrutinizing decisions made by the central government, it inevitably forces the government to be more transparent—a process that requires the establishment of reciprocal communication between those who are affected and things that affect.¹

Among several astounding cases that could be conveyed for the present purpose, the nuclear issue is perhaps the most striking example whereby state technocrats and

¹ An edited volume by Latour and Weibel (2005) eloquently illustrates this notion of reciprocity.

the public are engaged in a heated debate. Given the nature of the Indonesian nuclear program and how it has evoked massive public resistance since its revival in mid-2006, the conceptual arena in the STS scholarship to which this paper seeks to contribute revolves around the growing literature in science, technology, and social movement studies.

Studies on social movements in Western societies have been around for decades. An in-depth discussion of social movement literature is beyond the objective set in this paper. Instead, this paper places its focus on the recent development of social movements commonly termed as “new social movements” that marks the shift from class-based conflicts to issues of global democracy that deal with public matters such as environment, health, human rights, and peace (Scott 1990).

Concerned with increased unintended impacts of technoscientific products to humans and the environment, one school of thought in social movements pioneered by environmental groups is concentrated on depressing problems caused by accelerated production and utilization of science and technology in society. As contemporary societies are increasingly exposed to an unprecedented scale of risks produced by science and technology (Beck 1992), new social movements are akin to “risk movements” (Halfmann 1999). The most contentious technoscientific issue challenged by this social movement is nuclear proliferation. Antinuclear movements started in the 1960s during the Vietnam War as part of worldwide peace movements. It gained momentum and grew significantly by the end of 1960s through the early 1970s, switching their focus to environmental concerns. At this point, antinuclear protests transformed into a more powerful movement that sought to impede the growing number of nuclear power plants in North America (Price 1982).

A number of scholars have developed distinct theoretical concepts that explain mobilization, goals, and strategies of antinuclear movements in the context of industrialized nations. One study paid attention to the way political opportunity structures antinuclear movements in mature democracies (Kitschelt 1986), while others turned to dynamics, fluid, and contingent processes to explain social movements, elite responses, and policy outcomes in the nuclear arena (Flam 1994). Despite this important contribution, literature on antinuclear movements seems to leave technoscientific elements untouched. As a result, it tends to overlook how antinuclear movements have reached a point to offer nonnuclear energy options.

This gap in antinuclear movement literature brings this paper to the merging of social movement theories and STS. Recent developments show efforts taken by STS scholars to incorporate social movement theories to understand the role of nonstate actors and groups in questioning, challenging, and shifting the direction of scientific and technological production that are dominantly occupied by the interests of governmental bodies and multinational corporations (Frickel 2004; Epstein 1996). Social movement theories inform research in STS to look at possible ways to increase democratic participation in scientific and technical decision making (Sclove 1995; Fischer 2000; Woodhouse and Breyman 2005). Reciprocally, STS helps extend approaches in social movement studies by contributing particular concepts helpful to understand how scientific knowledge is socially produced and technological design politically constructed. This results in a sophisticated explanation of the emergence of alternative technologies as most notably demonstrated in open-source software and

renewable energy movements which David Hess (2007) has termed technology- and product-oriented movements.

Situated within the combined approaches of STS and social movements studies described above, this paper illuminates on current developments of antinuclear movements in postauthoritarian Indonesia. Three observations are conveyed in this paper. One relates to a set of political conditions in which a newly established democracy fuels the antinuclear movement to arise and to challenge a state policy. The other highlights the dynamics and diversity of antinuclear groups that share a common agenda. The last element discusses the extent to which the antinuclear movement goes beyond protest by offering and materializing risk-minimal and environmentally friendly alternative energy that contribute to solving ensuing energy crises in Indonesia, in particular in the rural areas.

By emphasizing three observed elements, this paper argues that the growing resistance against nuclear power in contemporary Indonesia is largely facilitated by macrotransformations in the country's political systems that have undergone a massive shift towards democracy. As democratization process unravels, it provides unprecedented opportunities for civil society to engage in the governance of public matters especially those involving risk. Enjoying greater freedom than before, a number of civil society groups concerned with possible hazards of nuclear power have come to the fore to challenge the state's nuclear energy program. These contemporary movements against the proliferation of nuclear power, in my view, have increasingly progressed into an organized resistance. Conceptually, organized resistance refers to the scale of a social movement in which a solid form of coalition has been established between civil society groups seeking to dismantle imposed agendas by the governing authority. As shown in the case of Indonesian antinuclear movements, organized resistance is characterized by large participation of multiple groups across social class, religious affiliation, and political orientation. It constitutes a formidable structure that facilitates the organization of frontline opposition against nuclear power by exposing potential hazards that accompany nuclear energy.

The underlying power of this opposition lies in the knowledge-producing capacity that begins with the engagement of citizen groups in politicizing technoscientific risks. Sheila Jasanoff's (2005) concept of civic epistemology is relevant in this particular context. This paper shares Jasanoff's criticism where she contends the assumption that controversies over science and technology are caused by public ignorance or their lack of knowledge. As shown in the paper, public resistance against nuclear power is not evoked by lack of understanding but rather resistance results from an entirely different form of epistemology, i.e., a sort of civic epistemology that informs Indonesian citizen groups in assessing nuclear risks based on their lived experiences. In contrast to expert epistemology, civic epistemology puts on the table the credibility of science and technology and assesses its implications against public interests. Referring to "the institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices" (Jasanoff 2005: 255), the notion of civic epistemology is conceptually productive in comprehending how ordinary citizens are able to question expert assumptions, which justify the necessity of nuclear energy in the wake of an energy crisis. Thus, civic epistemology embodies the whole organized resistance of antinuclear groups. Furthermore, it serves to

integrate multiple actors and groups into an extended network of the antinuclear alliance and to mobilize various resources for the opposition. Lastly, it is the same social energy produced in civic epistemology that fuels concerted initiatives by grassroots groups to seek alternative solutions for the ensuing problem of energy crisis. This is the point where antinuclear movements gain a momentum to transform itself into an alternative energy movement as this paper illustrates.

2 Nuclear Desire

The introduction of nuclear power in Indonesia dates back to the 1950s when Indonesia was then only one decade from being an independent state. The first Indonesian President, Sukarno, who studied engineering at Technische School in Bandung (now Institut Teknologi Bandung), had an ambitious vision for the young state to possess nuclear capacity. Thus, in 1959, Sukarno inaugurated the Institute of Atomic Energy, which later became the National Agency for Atomic Power (BATAN). Indonesia's desire for nuclear materialized under the auspices of the US's Atom for Peace program, a brainchild of President Eisenhower, to enlarge the commercial market for America's nuclear technology. This was part of a larger effort to collect financial resources for its military-oriented atomic projects. Subsequently, in 1961, a Triga-Mark II research reactor was established in Bandung.² With the increasing tension between Indonesia and its newly established neighbor, Malaysia, Sukarno switched the objective of the nuclear program to military purposes by announcing a shocking plan to build Indonesia's first atomic bomb.³ But this was short-lived. In 1965, Sukarno was ousted through a silent coup led by Suharto, who later came to power under the banner of the New Order, an America-supported regime that brought about development agendas.

The proximity of the New Order regime to Western states confined Indonesia's nuclear program to peaceful uses. From the outset, the New Order regime realized the importance of maintaining a nuclear program for its own self-interests. This was clearly demonstrated from the considerable amount of funds that the New Order government granted to BATAN for the purposes of building two additional research reactors. From these funds, BATAN constructed a 100-kW research reactor in Yogyakarta in the late 1970s, followed by a 30-MW reactor in Serpong a few years later. Preceding these reactors was a cobalt radiator-equipped research facility in Pasar Jumat, Jakarta.

One of the key foundations of New Order authoritarianism lied in an elitist vision that placed technological supremacy as the end and means to be achieved for the sake of state prestige and power. History has informed us that nuclear power precisely serves such grand images. For example, Gabrielle Hecht's (1998) historical analysis of French nuclear power projects has shown how nuclear power provided the means to create national identity, while Itty Abraham's (1998) study on the nuclear power in India reveals how the postcolonial state saw nuclear power as a form of modernity. By the same token, the generous funding that the New Order

² For an account of the early period of Indonesia's nuclear program, see Poneman 1982.

³ An analysis on this turn of events is presented in Cornejo 2000.

state provided to parties involved in the nuclear program confirmed its commitment to pursuing its own ideological interests. Accordingly, beginning from the early period of the New Order, BATAN was tasked to look into the possibility of developing nuclear power. The first effort took place in 1972 when the International Atomic Energy Agency (IAEA) assisted BATAN to study the feasibility of nuclear power in Indonesia. However, the materialization of nuclear power in Indonesia was not smooth sailing. Indonesia's fervent pursuit for nuclear clashed with the politics of energy that was mostly driven by oil which fueled most of the New Order regime's political economy. Consequently, a proposal for the production of nuclear power that BATAN conceived was delayed for many years, and up until the fall of Suharto in 1998, a feasible nuclear program in Indonesia never became reality.

Despite the dreadful impact of the Asian monetary crisis on the Indonesian economy that led to the postponement of BATAN's nuclear power program, the desire for nuclear power did not cease. By the end of the millennium, Indonesia's oil reserves began to decline rapidly, and this greatly impacted the stability of governments in the post-Suharto era. Overreliance on oil resulting from the legacy of Suharto's energy politics threatened Indonesia's energy security. Seizing this opportunity, nuclear technocrats offered nuclear energy as a long-term solution, and this idea was well-received by political leaders after Suharto. After being left on the shelf for a few years, BATAN's nuclear power program was revived under Megawati's presidency (2002–2004). The revival was marked by a decree issued by the Ministry of Energy and Mineral Resources entitled the 2004 National Energy Policy. It was essentially a transformation of a report based on a study conducted by an interdepartmental taskforce led by BATAN, with financial and technical assistance flowing from IAEA. The ministerial decree was later reinforced by a presidential decree launched in January 2006, which set out the Energy Mix—a scenario of Indonesia's energy composition within the next 20 years. The mix included 2% of contribution from nuclear power, making this the first time nuclear power was officially acknowledged as part of the national energy strategy. Following this policy, BATAN made a detailed roadmap through which Indonesia would pursue its nuclear program which would include establishing four power-generating reactors, yielding up to 4,000 MW by 2025. The Nuclear Regulatory Agency (BAPETEN) assisted the planning. In the projection, the Muria Peninsula in Central Java was discussed as the most potential candidate for the location of Indonesia's first nuclear power plant.⁴

The contemporary revival of an Indonesian nuclear program continues to enjoy growing popularity, especially among state elites, technocrats, and politicians.⁵ They share a similar conviction that it is timely for Indonesia to go nuclear on two counts. First, the fluctuation of oil prices in the international market comes at the time when Indonesia has become a net oil importer, a reality that compels the government to look for alternative energy sources reliable for large-scale, long-term production. Nuclear power thus looms as an inevitable option given its relatively inexpensive costs as claimed by nuclear proponents. Second, Indonesia's escalating production of

⁴ BATAN, *Energi Nuklir Sebagai Bagian Dari Sistem Energi Nasional Jangka Panjang*, Jakarta, 2005.

⁵ For an account of the revival of nuclear regime in contemporary Indonesia, see Amir (2009).

greenhouse emission—the third largest in the world after the USA and China—paves the way towards nuclearization because it is believed that nuclear energy could reduce greenhouse effects significantly. Perceived technoeconomic advantages of nuclear energy, however, are not the sole factors in pushing the Indonesian government to eventually materialize BATAN's old dream. Other factors that contribute to a firmer nuclear program come from nationalist sentiments shared by majority of members within the Parliament's Commission VII, which is responsible for supervising technology, environment, and energy policies. They have prompted the government to take necessary measures to accelerate the nuclear program as a result of a larger nationalist agenda. Underlying this agenda is a firm belief that building the first nuclear power plant in Southeast Asia would be an achievement of great national pride and prestige. As one pronuclear parliament member said:

This project is a commitment to our nationalism. If Indonesia has no nuclear power, our country will be at a great loss. Vietnam is going to have nuclear power by 2015 and Malaysia by 2025. By the time they succeed with those projects while we have nothing just because we are too scared, we will feel embarrassed and suffer from an energy crisis. For that I am determined that Indonesia must go nuclear. If we do not have a vision to that direction, our country will be in jeopardy.⁶

3 Risk and Distrust

As in many other places where nuclear power was first introduced, opposition marks public responses in Indonesia.⁷ In spite of BATAN's meticulous research on ensuring the safety aspects of the Muria plant, resulting in detailed guidelines that follow IAEA standard safety system,⁸ antinuclear activists remain deeply concerned about the likelihood of the plant to repeat the Chernobyl tragedy.⁹ Such trepidation could not be exaggerated if one realizes the unique geography of Indonesia, which sits precisely on the so-called Ring of Fire—a region encircling the basin of the Pacific Ocean with frequent volcanic eruptions. Responding to this fear, BATAN picks the exemplary case of Japan, a country whose 40% of electricity supply is produced by 55 nuclear power reactors. BATAN officials argue that although earthquakes hit Japan nearly every year there were no major accidents in Japan's nuclear power plants.¹⁰ Furthermore, they are convinced that Indonesia's geological condition is not a significant issue because, for many years, BATAN has operated and maintained three research reactors safely and securely. With this experience and duplicating

⁶ Interview with Tjatur Sapto Edy, Jakarta 12 September 2007.

⁷ It is necessary to note that the rejection against nuclear power does not gain solid supports from the whole Indonesian population as some people unabashedly showed their favor for nuclear power. Yet, BATAN seemed to have taken more efforts to counter the opposition rather than to mobilize supporting groups.

⁸ Interview with Asnatio Lasman, Jakarta, 27 February 2007.

⁹ Interview with Nur Hidayati, Jakarta February 27, 2007.

¹⁰ "PLTN Muria Siap Di Bangun Tahun 2010." [Nuclear plant to be built in 2010] *Sinar Harapan* (Semarang, Indonesia), January 8, 2007.

Japanese reactor technology, BATAN scientists are confident that Indonesia could benefit from nuclear power with very minimal risk. Such confidence is drawn from an argument that a future nuclear power reactor will follow a universal standard that applies multilayered safety systems.¹¹ To calm the public, a researcher at BATAN explained this safety system as follows:

The safety of nuclear power reactors relies on multilayered protection systems. The first protection layer lies in the fuel matrix. More than 99% of the fuel will stay within the matrix. During the operation or if an accident occurs, the fuel containment will function as the second barricade to avert the release of radioactive material. If some radioactive managed to escape the second protection, there is a third one, that is the cooling system. Beyond this point is the fourth layer consisting of biological protectors. If this protection failed, the fifth layer will stand up. This two-meter wide layer is constructed out of steel and concrete.¹²

The manner in which BATAN experts define and anticipate nuclear risks appears to undermine the public opinion. They firmly uphold an assumption that public opinions against nuclear power would change through education and intensive distribution of knowledge of nuclear safety standards. With funding from the Ministry of Research and Technology that was approved by the Commission VII in early 2007, crash programs for nuclear socialization were thus rolled out to garner public support and to smoothen the path towards nuclear power. These programs were particularly addressed to local communities in the Jepara district where the Muria plant is to be erected. They were implemented in a variety of activities such as workshops, seminars, and public discussions. To complement this measure, BATAN has produced a film demonstrating the safety aspects of nuclear power and made copies of the film to be distributed to residents in Jepara.¹³

The perception of nuclear risk embodied in BATAN's technical calculations reminds us of Ulrich Beck's (1992) criticism of the propensity in technical expertise to quantify risk on the basis of probable accidents. As Beck points out, in expert risk analysis "the dimension of hazards are limited from the very beginning to *technical manageability*" (p. 29). Quantifiable concepts of risk, Beck emphasized, have fatal shortcomings for they deny dissimilarities in damaging forces across technological accidents. From another viewpoint, BATAN's assumption that opposition from the public against nuclear energy was attributed to their lack of knowledge is deeply problematic because it judges the fear of the public from a narrow standpoint. Public perceptions of the reality of nuclear risk remarkably vary. In their pioneering work on risk and culture, Mary Douglas and Aaron Wildavsky (1982) have explained that risk must not be reduced to universally applicable measurements since the perception of risk is broadly shaped by a multitude of social factors in society. Risks calculated by one social group are likely to be given different meanings by another group whose values and knowledge are structured by different lived

¹¹ Personal communication with Adiwardojo, Singapore, 1 September 2007.

¹² Suharyo Widagdo, "Momok Nuklir." *Republika* 13 March 2008.

¹³ Interview with Ferhat Aziz, Jakarta 6 September 2007.

experiences and social conditions. This underlines BATAN's failure to grasp the reason their purportedly objective calculations of nuclear risk are unacceptable by the Indonesian public. While BATAN experts place an emphasis on technoeconomic dimensions in perceiving nuclear risk, the public holds a more complex picture that links nuclear safety to a broader social context. At this juncture is where the issue of risk and distrust begins to surface.

In democratic societies, risk acceptance is influenced by the level of trust that exists between lay citizens and experts. In this reciprocity, expert measurement of risks is fully communicated to ordinary people, and it would be seen as tolerable if they hold a certain degree of trust in respective experts. As Langdon Winner (2004) puts it, "an understanding of trust informs the structure and operation of technological systems themselves." In the context of Indonesia, which saw the rise of democracy over a decade ago, trust is luxurious. It has degraded to the extent that increasingly damages the relationship between the governing and the governed. With nuclear experts being part of the troubled bureaucracy, the public sees them as carrying on the incompetence of the government. This inevitably has worn down the degree of public trust on the state's nuclear power program. Consequently, efforts in educating public in an attempt to lessen their fear remain fruitless. The apprehension that nuclear disaster is imminent remains high. The failure is rooted in the government's treatment of public concerns, believing that the latter does not possess sufficient knowledge to understand nuclear risk. The government has failed to understand that the public is less concerned about the promised benefits of nuclear energy and more concerned about the government's own capacity to handle high-risk technology such as nuclear power.

To understand public perceptions of nuclear risk in Indonesia, timing is crucial. Constant deterioration in public trust of the government's credibility is attributed to recent experiences in the poor quality in public service management that Indonesian people have witnessed for the past few years. Three malignancies that conspicuously demonstrate chronic incapacities of government agencies in maintaining the safety and security of the Indonesian populace vindicate public fear of prospective dangers brought about by the proposed construction of the nuclear power plant in central Java. The first surfaces from repeated accidents in public transportation which for the past few years have worsened rather than lessened. A few months after the government announced the decision to go nuclear, a series of tragic events coincidentally unfolded in public transportation sectors. One shocking transportation disaster that captured media attention was an incident involving a Senopati boat that carried almost two hundred passengers and sank tragically in the Java Sea on the eve of 2007. The next morning, an airplane of privately operated Adam Air departing from Surabaya to Manado crashed on an unknown site just off Sulawesi Island. None of the passengers and crew was safe, and the first rescue team failed to discover neither the plane nor dead passenger bodies. Another accident that occurred a month later was the incident of a Levina ferry catching fire only a few minutes after it departed from Jakarta's harbor, killing tens of trapped passengers. Given no warning, three journalists who incautiously jumped into the boat to take a closer look just a moment before it sank were also killed. It was not until another month when the worst of the transportation accident series happened when Garuda

Indonesia, a government-owned airline which held high safety records, crashed in Yogyakarta instantly killing 38 people. Following these tragic occurrences, the European Union decided to ban Garuda Indonesia flights from the region to force the Indonesian government to improve its flight safety systems. The images of these horrible accidents spread throughout printed, electronic, and online media evoking public traumas. A widely shared conviction among most Indonesians was that those accidents were largely caused by negligence and could have been averted if the government possessed adequate competence and considered public safety more seriously. More importantly, poor records in maintaining an accident-free transportation system were seen as an undeniable proof that the government's decision to go nuclear is inconsiderate and badly timed. Even ordinary people were aware that the operation of a nuclear power plant requires a tight regime of safety of which the government fell short. Such a view was expressed in plenty personal blogs and internet-based chat rooms whereby negligence of the government was pointed as the prime factor that would possibly increase the risk of a nuclear meltdown. One interesting opinion from a discussion thread in a popular Indonesian web portal is stated as follows:

I personally disagree a nuclear power plant to be built in Indonesia at this moment due to our weak government. Technically speaking, the government may have the knowledge and expertise in nuclear technology, but the discipline, mentality, and morality are not well established yet. No need to mention how reckless our bureaucrats are in handling things. A concrete example is the high number of airplane accidents that makes the EU boycott our airplanes. If they can't even tackle small things, how can you be sure they are able to manage a risky project like a nuclear power plant?¹⁴

Another malignancy that degenerates the credibility of the government is the absence of a well-run disaster mitigation program. Aside from rich natural resources, thanks to its geographical situation, Indonesia is also known as a country with a high frequency of natural disasters from earthquakes, tsunamis, typhoons, and floods to landslides and volcano eruptions. Despite being aware of this given condition, the government seems to have failed to take substantial measures to improve national disaster mitigation. Among several examples of their shortcoming is when the Asian tsunami hit the northern part of Sumatera in December 2004 and an earthquake of 6.2 at Richter scale shook Yogyakarta in May 2006. Both events demonstrated how sloppy the central government in Jakarta was in their response causing unnecessary prolonged suffering of disaster-stricken communities. The most intense controversy over the mitigation of disasters came about during the wake of a mud volcano eruption in the Sidoarjo district of East Java. This disaster was partially man-made and triggered by an engineering malpractice. It began in May 2006 when a privately operated oil company, Lapindo Brantas, drilled an oil well in the location without utilizing a protective casing. The reason was to reduce drilling expenses, but the impact was extremely costly. It led to an eruption of a mud volcano lying below the oil well which instantly released massive volumes of hot mud. Three years after

¹⁴ <http://forum.kafegaul.com/showthread.php?t=145337&page=9>, retrieved 23 April, 2009.

the incident, the hot mud has submerged thousands of acres of productive lands while thousands of people were displaced.¹⁵ Looking at the magnitude of this particular disaster, residents of Jepara render a plausible link between what unfolded in the Sidoardjo mud volcano (popularly called the Lapindo mudflow after the company responsible for the drilling) and nuclear risk. As they witnessed the government's failure to serve an effective solution for the Sidoardjo people, they believe that they would experience the same misery should the government insist to build a nuclear power plant in their district while having no capacities in dealing with extraordinary accidents. One of the leading figures of Jepara's antinuclear movements explicitly expressed this concern:

The people here are extremely worried [by nuclear power]. Who can guarantee that it will be safe? What happen if the operator is ignorant like what they did in the Lapindo case? If the reactor leaks, they won't be able to overcome the problem like what is happening now with the people in Sidoardjo. They are still lucky though because you still can see the mudflow. But in a nuclear meltdown, you can't see radiation leakage. If it happens, the next thing you know is that everything just melts away. We strongly doubt that the government has the reliable operator for that nuclear plant. Even worse, the government is always inconsistent in doing things. At the beginning of a project, they seem very eager but after a while they cannot consistently maintain discipline.¹⁶

Distrust in the government is further exacerbated by corruption cases in the bureaucracy. The demise of the corrupt New Order regime in 1998 did not reduce corruption in the government but, in fact, made it worst. Although the current government has launched a nationwide initiative to eradicate corruption, in reality, the initiative is limited to only a few high-profile cases, overlooking the fact that corruption is an endemic and systemic problem rooted in the structure and culture of the bureaucracy. It is a chronic disease that plagues the implementation of every public project. For antinuclear groups, the issue of corruption places the proposed nuclear project at stake. A prominent professor at Jakarta's Driyakara College of Philosophy made a strong note on this issue:

Corruption has rampantly spread to all government projects; in fact it has been internalized to bureaucratic practices in Indonesia. Consequently, we have no reason to hope that the nuclear power project would not be infected by the corruption virus. On the other hand, the mega project opens up magnificent possibilities for corruption cases which are difficult to imagine it will never happen. We are compelled to question whether the proposed plan to build a nuclear power reactor in Muria was not in the first place motivated by that kind of opportunity to enrich themselves. We all know that there are no government projects that do not offer lucrative side incomes to those involved in the project (Suseno 2008).

¹⁵ For a detailed account of the Sidoardjo mudflow, see Jim Schiller et al. (2008).

¹⁶ Interview with Lilo Sunaryo, Jepara 15 December 2008.

Pronuclear technocrats may deny the possibility that corruption could plague the nuclear program. They argue that abusive practices would unlikely take place because all nuclear energy production programs are under strict supervision of the IAEA. However, it did not take much to prove that the threat of corruption was real. By the end of 2007, a corruption case in the BAPETEN was disclosed to the public. It involved two officials, one of which was the chief secretary responsible for a project involving land acquisition designated for the agency's training center. The court sentenced both officials to 5 and 7 years in jail, respectively.¹⁷

Overshadowed by a set of predicaments described above, the Indonesian people, especially those living in the vicinity of the Muria Peninsula, feel incredibly threatened by the future presence of nuclear power. The three aforementioned factors form the basis of justification for antinuclear groups to disapprove of the presence of nuclear power in Indonesia—at least not during this point in time. With the government's plunging credibility in providing safe and secure facilities to the public, in the eyes of concerned people, nuclear power appears to be a daunting project that would carry more risks than possible benefits. It is precisely this lack of trust between the government and the people that fuels the massive growth of antinuclear movements in Indonesia who are united under the chief agenda of curbing the construction of the Muria nuclear power plant.

4 Organizing Resistance

Today, civil society in Indonesia enjoys a more democratic atmosphere as a result of the 1998 reform that led to the breakdown of Suharto's 32-year authoritarian rule. The new democracy provides ample opportunities for civil society groups to cultivate their own power in the form of critical feedback and creative responses to deal with complex socioeconomic problems. Since the introduction of greater democratic freedom, associational life has grown tremendously, reinforcing the production of new social capital across a broad range of communities, both in urban and rural localities. The contemporary antinuclear movement was born to this democratic milieu.

Historically, the seeds of the antinuclear movement were rooted in the early 1990s at the height of Suharto's authoritarian rule. During this period, student activists in Jakarta, Yogyakarta, and Surakarta formed the Indonesian Antinuclear Society. The organization was aimed at responding to the New Order's nuclear program in the Muria Peninsula. However, it failed to last long and began to cripple after the crackdown of student activists by the New Order regime in 1996. For the next few years, the antinuclear movement dwindled, and some of its leaders broke away.

The revival of nuclear power in the national policy in 2004 reawakened this antinuclear group. Gaining a new force from the strengthening of civil society, the movement became more vigorous in challenging the government's seemingly malicious policy. The main distinguishing feature between the post-Suharto antinuclear movement and its predecessor is the scale and level of mobilization and group diversity. Today, the contemporary antinuclear alliance has succeeded to form an organized resistance that involves building intensive cooperation and

¹⁷ "Staf BAPETEN Dituntut 5 dan 7 Tahun Penjara" *Koran Tempo* 31 January 2008.

discourse mobilization among various grassroots organizations, thereby constituting an extended network all the way from Jakarta to Jepara. These broad networks are not just marked by strong antinuclear campaigns organized by the public in various arenas, they also produce a counter-discourse intended on questioning the assumptions from which the decision to go nuclear was drawn. The counter-discourse inherently raises economic, political, social, and ethical problems embedded in the government's nuclear ambition that would potentially damage the life of society at the local, national, and regional levels.

Overwhelmingly concerned by the dreadful reality in the government's capacity to deliver a safe and secure nuclear power program, a number of nongovernmental organizations are determined to take more organized actions against the government's nuclear ambition. Three civil society groups stand on the frontline of this organized resistance. The first group, a veteran of the antinuclear movement, is the *Wahana Lingkungan Indonesia* (Walhi) that bases its headquarters in Jakarta. Walhi is the largest forum of environmental NGOs in Indonesia and has representatives in nearly every province in the country. Established in 1980 as an environment-oriented organization based on grassroots politics, Walhi was founded as a venue for environmentalists to tackle many ecological damages caused by reckless developmental projects during the Suharto period (see Culla 2006). Globally linked to the Friends of the Earth, the strength of Walhi is sourced from the large number of its members called *sahabat* (friend), making up a broad network of environmental activists throughout the country. Dealing with the issue of nuclear power is Walhi's energy campaign division assisted by a central Java representative residing in Semarang, the capital of the Central Java province. Walhi's antinuclear campaign reaches down to the local level where Walhi members actively mobilize local residents in the Balong village, one of the future sites of the Muria plant, where they have formed the United Community of Balong (*Persatuan Masyarakat Balong*). Hand in hand with Walhi is Greenpeace Indonesia, which started its campaign activities in 2000. Following its mother organization, Greenpeace Indonesia is committed to keeping Indonesia away from nuclear power. Young volunteers, mostly university students in large cities such as Jakarta, Bandung, and Surabaya, support the organization. Although nuclear power is only one of the numerous issues tackled by Greenpeace Indonesia, they give it much more attention because of the risks involved. Adding on to this antinuclear force is the Indonesian Antinuclear Society (Manusia). Composed of professionals and academics, Manusia cultivates pervasive support from concerned scientists and engineers. It has established a global connection through participation in the No Nukes Asia Forum.

Coming from different organizational trajectories, Walhi, Greenpeace Indonesia, and Manusia share the goal of protecting the public and the environment from the perceived nuclear menace. The engagement of these groups in the organized resistance against nuclear power is substantially driven by a number of daunting factors encompassing technical, environmental, and institutional precariousness rendered in the government nuclear power program. One activist conveyed how these antinuclear groups perceived pervasive risk in the nuclear project:

One can see that despite the advancement of nuclear power, it is still plagued by many unsolvable problems. In Indonesia, the problems are even more

staggering due to its geographical condition, which is prone to natural disaster such as an earthquake and tsunami. Preparedness of human resources is another big question. BATAN always looks up to Japan's experiences. But look at that country. The society is very discipline but scandals and accidents in nuclear industry are frequent. After all, safety is not about technology per se. BATAN tells us nuclear technology is very advanced. It will stop automatically if anything goes wrong. But there are a lot of variables in safety, both technical and non-technical factors. In Indonesia, the latter is very terrifying. That is what we see as additional risks. BATAN claims that they have operated three reactors with no accident records. That is absolutely different because those are research reactors with smaller capacity. From the viewpoint of construction, reactors for research are largely different from those for energy production. So it is awfully misleading to equate both. The fact that they manage to operate those reactors safely cannot guarantee that they will be able to operate nuclear power reactor. Besides, who knows there have been no accidents in BATAN? BATAN never releases any information of what they are doing to the public. We do not know what is actually going on inside. Even worse, BAPETEN, which is supposed to monitor nuclear programs, is also promoting it. This is problematic because BAPETEN staff is from BATAN. So there is overlap of institutions as well as interests that could jeopardize people's interests.¹⁸

Two forms of activities constitute the main agenda of the antinuclear movement in Jakarta. One is aimed at conducting research on the assessment of nuclear risks, taking into account social, political, economic, and environmental concerns. The bulk of this research has been supplied by a network of independent engineers and scientists along with those from universities, e.g., University of Indonesia and Bandung Institute of Technology. Results of this research and assessment are published to the public mostly on websites. One interesting example is a comic created by Greenpeace activists. Addressed for a younger audience, the comic teaches the reader gruesome impacts of nuclear power on future generations.¹⁹ In addition, the activists also regularly hold seminars and public forums to disseminate their studies to a wider audience.

The other activity is materialized in the form of street actions targeting to evoke public awareness of nuclear risk. Following what Helena Flam (1994) has identified, massive protests organized by the three groups mentioned above are put into action through three methods, namely movement-activated, state-activated, and public media. In the first sphere, the antinuclear groups regularly organize massive protests in open spaces to create public awareness of the risks in nuclear power. For example, when Indonuclear, a 2-day seminar and exhibition on Indonesian nuclear program, was held by the Ministry of Research and Technology in Jakarta, a large group of antinuclear activists uninvitedly showed up at the seminar glaringly demonstrating their strong rejection through a theatrical performance. Another striking action was when a few Greenpeace members daringly sneaked into the building of Medco Energi located at the busiest business district in Jakarta to place a giant banner

¹⁸ Interview with Nur Hidayati, Jakarta 27 February 2007.

¹⁹ The comic is available for download here http://www.greenpeace.org/seasia/id/campaigns/akhir-dari-zaman-nuklir-2/Komik_anti-nuklir, retrieved 1 May 2009.

urging Medco to end its project. A leading energy company in Indonesia, Medco Energi has shown interest in participating in the ongoing production of nuclear power. Playing in the state-activated arena is Manusia. This group has planned to take the 1997 Nuclear Act to the Constitutional Court on the grounds that it was a product of Suharto's authoritarian law and therefore incompatible with the spirit of democratic governance. By probing perceived flaws contained in the act, Manusia hopes the court would give careful consideration to annul the act, thus impeding the implementation of nuclear power.

It is perhaps public media that proves to be the most effective channel through which antinuclear activists are able to extend their concerns to the public. Printed and electronic media circulated at the national and local levels are very accommodating in publicizing activities of the antinuclear movement. With the improvement of information technology infrastructure in Indonesia, the internet has proved useful for these groups to disseminate information on nuclear risks to a broader audience. Each group has their own website or at least maintained a weblog to update their members with new information and to consolidate activities. All these undertakings are aimed at balancing what the antinuclear activists see as disinformation deliberately spread by BATAN's socialization program to ordinary people:

There is no transparency in the planning of nuclear power. Results of their studies are inaccessible and no detailed information was shared to us. Even local communities are not given adequate information with regards to the impact of nuclear power. The socialization program does not touch specific issues such as risk and safety systems. They keep talking only about the benefits of nuclear power but refuses to discuss embedded risks. All information given to the local community is reductive and simplified.²⁰

5 Local Environmentalists

As previously noted, the democratic nature of post-Suharto politics that is inclined to empower civil society in many public sectors allows the antinuclear movement to extensively develop into broader spheres. Encouraged by a more open political climate, the emergence of organized resistance at the local level is another striking feature of the antinuclear movement in postauthoritarian Indonesia. While Walhi and Greenpeace Indonesia mobilize public protests mostly aimed at interrupting the central authority in Jakarta, the knowledge of nuclear risk produced and disseminated by these two groups is channeled down to the local level through local grassroots organizations that concentrate efforts in fighting against planned nuclear power in Jepara. The stronghold of local resistance is an environmentally concerned organization, *Masyarakat Reksa Bumi* (Marem), loosely translated as an earth-loving society that was founded by a group of local elites who came from various backgrounds.

²⁰ Interview with Nur Hidayati, Jakarta 27 February 2007.

Marem was formed in 2006 by a small group of people who were deeply concerned with rapid environmental deterioration around the Jepara district. Their utmost attention was first placed on deforestation that threatened the sustainability of the local furniture industry, one of the pillars of Jepara's economy for many years. Another concern was related to the energy crisis where Marem sought to help local farmers in biofuel production by linking them with external investors. However, the announcement of a resurrected nuclear power program by the government in May 2006 instantly created anxiety among residents in Jepara. Marem felt compelled to take immediate action to counter the return of BATAN to their neighborhood. Since then, Marem's chief agenda shifted towards mobilizing local resources to put an end to the likelihood of nuclear power production in the Muria Peninsula. This strong resistance is grounded on two critical considerations: technological and ethical. One of Marem's advisory board members elaborated these points as follows:

We have two reasons why we are against the construction of nuclear power in Jepara. One deals with technological aspect of nuclear power. We are aware that our science is not capable enough to control nuclear process. No scientific knowledge is able to predict and control the complex process of energy production in nuclear. Our knowledge only allows us to estimate without full certainty. As a result, we are in continuous anxiety. Moreover, the uncertainty of nuclear technology comes from a number of aspects such as technology, the operator, inadequate infrastructure and superstructure, not to mention geological situations. The second consideration is that the decision to produce nuclear power is unethical because it only profits a small group of elites while harming local citizens. If the government wishes to help the people, it should make a policy that would spread benefits equally to the whole population, not only those involved in the project.²¹

Since its inception, Marem was led by Lilo Sunaryo, an owner of small hotel in Jepara who holds a doctoral degree in power engineering from Taskhin, Uzbekistan. Sunaryo built an engineering career in Jakarta for two decades before moving back to his hometown to run his family hotel business. His concerns with increased poverty and environmental damages in Jepara encourage him to join other local elites to set up Marem as a venue for organizing socioeconomic developments aimed at the people living in the surroundings of the Muria Peninsula. His extensive knowledge in engineering proves to be very helpful for Marem to decipher the level of risk embodied in the nuclear program BATAN is pushing forward. The strategic role Sunaryo played is backed by a couple of individuals from the academia who sat in Marem's advisory board. These include Iwan Kurniawan, a former nuclear physicist at BATAN who changed positions and became a strong critic of nuclear energy, Liek Wilardjo, a physics professor at Satya Wacana Christian University of Surakarta, and Budi Widianarko, an environmental scientist at Soegijapranata Catholic University in Semarang. This group of academics constantly supplies Marem with critical assessment of nuclear risk from their respective expertise. For

²¹ Interview with Djoko Herryanto, Kudus 3 September 2007.

instance, in May 2007, Marem held a public seminar on critical assessment of the development of Indonesian nuclear power plant. Residents across the Muria peninsula attended the seminar, and the speakers of the seminar included experts from a wide range of fields from electrical engineering, environmental science, sociology, and law to philosophy. The results of the seminar were published as a book and distributed to the public.

Another group that constitutes a larger part of Marem's membership comes from businessmen. Some of them are managers of local industries, most notably Kudus-based major cigarette company Djarum and the packaging company Pusaka Raya. These two companies are major financial sources for the activities of antinuclear groups in Jepara that are organized by Marem. The motivation behind the investment made by these companies and other business groups is the perceived threat of future presence of nuclear power in Muria to the continuity of their business. They are worried that the operation of nuclear power would produce far-reaching radiation that would damage the image and marketability of their products. Activists and students constitute the last sizeable component of Marem's membership. This group plays a role in distributing information about the risk and dangers in nuclear power among the public. They also help mobilize local residents in large antinuclear demonstrations.

Built up by three different groups playing different roles, Marem has transformed into a powerful antinuclear organization never before seen in Jepara. The scale of the organization is very effective in countering the government's nuclear socialization programs among Jepara residents. Marem has access to almost every village in Jepara selected as the location for the planned nuclear power plant. Through a broad network of Marem memberships in these localities, the organization runs antinuclear campaigns by forming a media center where local residents collect information and updates regarding the nuclear program.

Marem's nuclear opposition was first showcased in large-scale protests taking place in Jepara, Kudus, and Pati during June 2007. Filled with performances of folk singer Franky Sahilatua and noted religious poet Emha Ainun Nadjib, this series of events involved more than 5,000 protesters in each town and successfully stole the attention of both local and national media. Interestingly, joining the antinuclear wagon were local politicians whose interest were obviously to increase their own popular standing among local residents. Since Indonesian democracy stipulated governors and resident heads to be directly elected by the people, local politicians who ran for office are prone to follow the demands of their local constituents, instead of resonating the policies of the central government. As a result, antinuclear groups in Jepara receive further support from participation of local politicians and bureaucrats.

6 Religious Opposition

Antinuclear movements in developed nations are traditionally driven by dissenting arguments that undermine the necessity of nuclear power as a strategic energy source. These arguments typically involve technological, economic, political, and environmental factors that are taken into account as variables that determine how

unfeasible nuclear power was to respond to the ensuing energy crisis. Indonesia's antinuclear movement offers a unique case in point because the nuclear controversy has penetrated into a religious domain through the engagement of *ulama* (Islamic scholars) from the Jepara branch of the *Nahdlatul Ulama* (NU), Indonesia's largest Islamic organization whose adherents constitute the majority of local residents around the Muria Peninsula. They are considered the guardians of Islamic values, who devote their time, efforts, and resources to sustain the righteousness of the NU community.

This was not the first occasion where NU leaders participated in the antinuclear movement. Back in the 1990s, Abdurrahman Wahid, then chair of NU and a key proponent of Indonesian democracy took on a strong opposing stance against nuclear power when he announced that he was going to go on a hunger strike in Muria where the nuclear reactors were to be built. Ten years later, Wahid's recalcitrance turned into collective action as the NU *ulamas* in Jepara organized themselves to curb Jakarta's agenda. They were compelled to take real action against the government's policy that had caused public anxiety in Jepara, particularly after a mob of local residents in the village of Balong coercively shut down one of BATAN's research facilities. Worried that more troubles might ensue, the leaders of the NU branch in Jepara (PCNU) decided to hold a public dialog followed by a *bahtsul masa'il*, a tradition where Islamic scholars undertake an in-depth examination of an unsettling issue and make a decision with reference to the teachings of the Al-Qur'an. This time, the *bahtsul masa'il* was seen as necessary to examine the calculated benefits gained from establishing a nuclear power plant in Muria with its possibly extreme detriments. The underlying reason for this undertaking was that

as a religion which addresses all aspects of life (*syamil*) thoroughly (*kamil*), Islam is expected to be able to respond the issue of the Muria nuclear power plant through an investigation from the norms of Islam, which include both basic principles as well their application, as well as both argument and reasoning (*nash*) and the historical experience of the Islamic community, so that the issue of the Muria nuclear power plant is dealt with according to the best characteristics of humanity.²²

In view of the role of Islam in society, in September 2007, PCNU held a public forum attended by representatives from every NU boarding school throughout Central Java. The organizer also invited expert speakers from both pronuclear and antinuclear camps. These two groups were put together in a full-day seminar where they had the opportunity to present and persuade the NU community to accept their standpoints. From the pronuclear end, three government scientists used the chance to convince the local community of economic and technological advantages of nuclear power, emphasizing its strategic role in maintaining energy security of the country.

²² "The Decision of PCNU Religious Scholars: The Muria Nuclear Power Plant is Forbidden." PCNU Press Release 2 September 2007. English translation available at <http://www.globalcollab.org/Nautilus/australia/reframing/aust-ind-nuclear/ind-np/>, retrieved 26 April 2009.

Likewise, another three speakers from the dissenting view took the opportunity to highlight negative consequences of the government's nuclear policy. They conveyed social, legal, and technical problems possibly emanating from the erection of nuclear power plant in Jepara. They made a point on irreversible damages caused by nuclear power once the Muria plant is constructed.

Based on information from both sides, at the night of the meeting, all NU scholars engaged in a heated debate to determine whether they would have to favor or oppose the construction of Indonesia's first nuclear power reactor in Muria (see Fig. 1). This debate was conducted in a democratic way in which every member had equal rights to voice their interpretations. As a result, the meeting was full of interruptions, arguments, and disagreements. Close to midnight, despite a minority view that was inclined to approve nuclear power, the forum eventually decided to launch a consensus that shocked the public.

After balancing the arguments of experts, both for and against, holding firmly to the doctrine of *ahlussunnah wal jama'ah* and the principles of *tawassuth*, *i'tidal*, *tasamuh*, *tawazun*, *al-shidqu*, *al-amanah* and *al-wafa-u bil al-'ahd*, the discussion forum determined that...(t)he development of the Muria nuclear power plant is *haram* (forbidden) in Islamic law, because while the Muria nuclear power plant project has within it both positive and negative aspects, the disadvantages predominate. Accordingly then the principle of preventing the



Fig. 1 The Jepara PCNU meeting on the issue of nuclear power (photo by Sulfikar Amir, with permission)

negative aspects must take precedence, in accordance with the rule *dar'ul al-mafasid muqaddam 'ala jalb al-mashalih*.²³

Fierce as it sounds, the PCNU statement prohibited the construction of nuclear power in the Muria peninsula for it would perceivably spawn more detriments than benefits for the whole local community. One could easily sense a NIMBY syndrome in this decision as the consensus exclusively applied to the Muria region. However, considering the influences of Muslim leaders in Indonesian politics, the denouncement of nuclear power by the NU *ulamas* in Jepara seemed to have increased the leverage of antinuclear groups to halt the implementation of BATAN's nuclear power program in Jepara.

7 Beyond Protest

The organized resistance exhibited by antinuclear groups is a response to the state's nuclear ambition; in declaring that nuclear is a poor solution to solve the current energy crisis that slows down Indonesia's economic growth, antinuclear groups insist that the decision to include nuclear power in the national energy planning is hasty and presumptuous. Antinuclear activists deeply suspect that the obsession and vested interests of state officials and pronuclear business groups allow intolerable risks to threaten the safety of the Indonesian people.

Scrutinizing the set of assumptions used by nuclear advocates to justify nuclear power, antinuclear experts point to a fatal mistake in the nuclear planning which lies in the energy demand calculation. It is calculated nationally while economic growth is concentrated in Java. Geographically, Indonesia is made up by several big islands where 60% of the population resides in Java. For many years, Indonesian development has been plagued by a huge chasm of economic development between Java and the outer islands. Nuclear advocates in the government seem to deliberately ignore this fact. They calculated the national demands for energy without realizing that Indonesian electricity system was not completely integrated. The government still has very limited capacity to connect the whole national grid due to archipelagic geography. As one antinuclear activist argued: "if the energy planning is conceived by taking into account the real condition of Indonesia's energy system, the nuclear option would not seem feasible."²⁴ Another activist concurred with this argument and further emphasized the fallacy of going nuclear that does not base on rational consideration providing that Indonesia is rich in natural resources.

What we sense from those pronuclear experts is narrowed nationalist sentiments. They are oblivious of the long-term impact of their decision to next generations. There are certain conditions in Indonesia that cannot be compared to nuclear countries like Japan. Japan has no natural resources and Indonesia is rich of them. Therefore, we better exploit that kind of resources, which is much safer than nuclear power. We do not see proper rationalization for nuclear power in this context since we have plenty alternative sources not

²³ Ibid.

²⁴ Interview with Pantoro Tri Kuswardono, Jakarta August 22, 2007.

explored yet. If the government is consistent with its goal of increasing electrification, it then must encourage the development of small and middle-scale power generation systems rather than risky megaprojects like nuclear power.²⁵

Questioning the underlying rationale that mistakenly necessitates the presence of nuclear power in Indonesia marks the path of contemporary antinuclear movements in postauthoritarian Indonesia. Interestingly, some elements of this social movement who are already frustrated with the government's failure in providing sufficient energy in many areas of the country decided to take a direction beyond protesting government policy. They call for the restructuring of the energy system and revisiting the growth-oriented development paradigm that has been concentrated on Java. In this light, the movement seeks another option more suitable for the real condition of Indonesian society and geography. The path taken by this movement looks into more sustainable, locally resourced, and less risky energy options that include a variety of energy systems more well suited to enhancing community development at the local level. The argument for such a radical direction is derived from the awareness of the importance to empower rural communities throughout the country that before were sidelined in energy planning.

One inspiring example that appears to undermine the necessity to have nuclear power emanated from the initiative to develop microscale hydropower systems (popularly called micro-hydro) organized by independent groups. Projects on micro-hydropower suitable for hinterland locations began in the 1990s, but massive efforts took off in 2005 when the energy crisis turned more acute due to oil price hikes that affected electricity supply. These groups of engineers from nongovernment organizations felt necessary to invest time and efforts in developing micro-hydro systems for rural people. They were aware of readily available water resources scattered throughout the Indonesian archipelago that could be exploited for energy production. Indonesia naturally possesses topographical conditions that are characterized by abundant small rivers flowing through hilly lands—such uniqueness is a good reason to introduce a hydro system.

An example of a successful story of rural-based micro-hydro systems comes from the work of Tri Mumpuni, a nongovernment organization activist who strongly disagrees with the application of nuclear power. She is convinced that Indonesia had other alternative options before considering nuclear.²⁶ Along with her husband, Mumpuni cofounded the nonprofit organization, *Institut Bisnis dan Ekonomi Kerakyatan* based in Subang, West Java. For the past few years, Mumpuni has assisted over 100 villages across Indonesia to set up micro-hydropower, and each installation could produce up to 100-kW electricity for domestic use. The system is completely operated by villagers, while Mumpuni and her team promote and introduce micro-hydro to rural communities, share their technical knowledge, and assist local residents to organize themselves. Once the system is set, it belongs to the local community who are responsible for operating and maintaining the system. This approach proves sustainable because knowledge dissemination flows from the

²⁵ Interview with Nur Hidayati, Jakarta 27 February 2007.

²⁶ Conversation with Tri Mumpuni, Jakarta March 6, 2007.

experts to the users. The impact of this program is profound not only in terms of energy production but also for rural economic development and environmental protection. As the system requires continued supply of water flow, locals feel obliged to protect their environment in order to keep the electricity flowing into their houses and providing energy for their small business activities. Worth noting is the program's reliance on nongovernmental budget because activists engaged in this energy movement found that the government was inclined to ignore the option to harness small-scale systems such as micro-hydro. This was partly because government regulations hindered the involvement of local communities in energy decision making.²⁷

The rural-based micro-hydro projects show how civil society groups respond to the government's nuclear policy. An interesting point to observe is the disagreement and dissatisfaction that has led the movement to seek for other alternatives that are seen more suitable for the socioeconomic conditions of their society. Thus, social forces are absorbed into the antinuclear movement and this in turn transforms the movement into more organized action where they mobilize alternative energy sources to replace the nuclear option strongly promoted by state technocrats. David Hess (2007) has called this phenomenon "alternative pathway," a form of technological transformation powered by a productive capacity of social movements, which "help to develop and diffuse alternatives" that are "linked to community control and social justice" (p. 85). This spirit is embodied in the people-based micro-hydro initiatives Mumpuni and her colleagues are keen to impart to rural communities throughout the archipelago. As Mumpuni emphasized:

Our main goal is not merely to produce electricity but to develop rural potentials so that the villagers are able to empower themselves.²⁸

8 Conclusion

In an emerging democracy like Indonesia, the role of civil society appears to be pivotal in contesting power and resource management and also in monitoring the social production of risk emanating from government policies. Democratic conditions allow civil society groups to penetrate into spheres once monopolized by technoscientific experts. They pose a powerful challenge to science and technology policies deemed as carrying a fatal risk threatening public safety and security. The significance of civil society groups in the discourse of technological risk is exemplified in contemporary antinuclear movements discussed earlier. The development of antinuclear movements resulted from a democratic transition that emerged after the collapse of Suharto's 32-year authoritarianism. As argued in the paper, the movements found its roots in collective distrust of the government's capacity to handle high-risk technology such as nuclear power. Lack of knowledge is not the main impetus of the nuclear controversy as pronuclear bureaucrats has

²⁷ Interview of Tri Mumpuni in *Kompas* 15 July 2007.

²⁸ *Ibid.*

mistakenly assumed. Rather, it is due to a different epistemology used by citizen groups in assessing nuclear risk. From this standpoint, the antinuclear movements resemble a risk movement that attempts to curb the desire of the state to have nuclear power that follows on its own rationale and self-interests.

Two points can be made from this observation of antinuclear movements in postauthoritarian Indonesia. The first relates to structure. As was discussed earlier, the embryo of antinuclear movements in Indonesia appeared during the 1990s period and managed to survive before it gradually diminished by the end of the New Order era. The movements have gained momentum to revive in post-Suharto periods. Democratic conditions in the post-Suharto era provide the space for contemporary antinuclear movements to openly challenge the government's determination to go nuclear, which proceeds without public consent. A stark difference between the old and new antinuclear movements lies in the ability of the contemporary movements to establish an extended network of an antinuclear alliance that comprises of multiple groups across social class, religious affiliation, and political orientation. These groups are notably rooted in different organizational trajectories and have brought different interests into actions. Despite this fragmentation, these groups share common concerns regarding perceived risks and suspicion of the government nuclear enterprise and, from there, proceed to build up organized resistance. Integrated networks allow these groups to consolidate a strong opposition against nuclear power both at the national and local levels, which are linked to global antinuclear movements.

The second point highlights the way in which civic epistemology informs the way antinuclear groups draw up opposition. This is a knowledge-producing capacity that has allowed Indonesian antinuclear groups, e.g., Walhi, Manusia, Greenpeace Indonesia, Marem, and PCNU, to mobilize intellectual resources to assess nuclear risks from different dimensions as opposed to narrowed technical calculations presented in BATAN's proposal. In contrast to BATAN's risk analysis that rests on scientific production fed by dominating nuclear industries, in civic epistemology, antinuclear groups take on nuclear risk assessment by harnessing social and cultural capital and combine it with people's lived experiences. This endeavor forms a repertoire of popular risk assessment that, in light of the government's downgrading capacity, seems more reasonable. This debunks the assumption that the resistance against nuclear power is due to the public's lack of knowledge. The case discussed in the paper confirms that antinuclear groups utilize different epistemological resources, thus giving a different meaning to nuclear power. While BATAN experts are prone to generalize varying situations of nuclear risk, civic epistemology enables antinuclear groups to complexify the spectacle by taking into account richer dimensions such as social, political, cultural, environmental, and religious factors, all of which are overlooked in BATAN's risk calculations. Embodied in this capacity is the ability of antinuclear groups to protest state policies that they fundamentally disagree on and also organize initiative for searching more suitable alternatives. As presented in the last section, antinuclear groups not only criticized nuclear-supporting energy policies that require centralized system of control. They move on to research better solutions—one of which is the micro-hydropower system developed for rural communities. This documented achievement displays how antinuclear movement gradually focused its energy into collective action, therefore

marking a shift towards an alternative energy movement. How far this movement will move on to transform the national energy system remains to be seen. However, the movement will continue to advance using sociocultural resources that are produced by a democratic society.

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