Transformation of Environmental Policy Conflicts: A Case Study of Geothermal Energy Development in Dieng

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***Abstract*—The development of a geothermal power plant in Dieng is part of a national strategic project that aims to support the transition to clean energy in Indonesia. However, this project has given rise to complex policy conflicts between the government, companies, and local communities due to issues of safety, environmental pollution, and centralization of authority. This study aims to analyze the dynamics of the policy conflict in the development of the Dieng Geothermal Power Plant using the Policy Conflict Framework and to formulate a resolution strategy based on a conflict transformation approach. The research method uses a qualitative approach with case studies, through document analysis, civil society organization reports, and academic literature. The results show that the Dieng Geothermal Power Plant conflict is a higher policy conflict characterized by power imbalances, lack of public participation, and weak policy transparency. Although there has been a partial resolution in the form of the project's suspension at well pad 38, the root of the structural conflict remains unresolved. Through the four dimensions of conflict transformation, namely structural, relational, personal, and cultural, this study emphasizes the importance of energy governance reform based on public participation, transparency, and environmental justice to achieve sustainable energy development.**

***Keywords*—environmental policy, policy conflict, policy conflict framework, conflict transformation, geothermal energy**

I. Introduction

Indonesia has the largest geothermal potential in the world, representing around 40% of total global reserves or the equivalent of 28.91 GW. This potential is spread across various regions such as Sumatra, Java, Nusa Tenggara, Sulawesi and Maluku [1]. The Dieng region is one of the areas in Central Java that has geothermal reserves of around 400 MW, but only about 60 MW has been utilized for a geothermal power plant [2]. The Dieng Geothermal Power Plant is one of the national strategic projects in the utilization of renewable energy, managed by PT. Geo Dipa Energi since 2002. This project plays a role in supporting the national energy mix target of 34.3% by 2034 [3] and Net Zero Emissions (NZE) by 2060 [4].

However, the construction of the Dieng Unit II Geothermal Power Plant has sparked conflicts between local communities, the company, and the government since 2019. The conflict arose due to concerns about environmental impacts such as water pollution, the risk of gas leaks, and soil stability disturbances that had occurred in the area surrounding the Dieng Unit I Geothermal Power Plant [5]. The escalation intensified when the project location (well pad 38) was only 2 m away from residential areas, leading to massive public opposition since early 2022.

Although part of the project was eventually halted, structural issues such as centralized authority, the absence of Environmental Impact Assessment (EIA) documents, and weak public participation mechanisms remain sources of latent conflict in various geothermal power plant areas in Indonesia [6, 7].

This phenomenon illustrates the dilemma of energy transition in Indonesia, which on the one hand is part of the development of environmentally friendly energy sources, but on the other hand has the potential to neglect the principle of environmental justice. Therefore, an analysis is needed that not only looks at policy conflicts from a regulatory perspective, but also views them as opportunities for constructive social transformation.

Based on these issues, this study aims to analyze the dynamics of the Dieng Geothermal Power Plant development conflict using the Policy Conflict Framework (PCF) and formulate resolution strategies based on a conflict transformation approach. This study contributes to the development of more inclusive and equitable environmental policies, particularly in the governance of geothermal energy in Indonesia.

II. Literature Review

Policy conflicts arise when actors within the policy system have conflicting values, interests, and resources. In energy policy, conflicts often occur due to power imbalances and differences in perception between the central government, corporations, and local communities. The Policy Conflict Framework (PCF) developed by Weible and Heikkila [8] explains policy conflicts through three main components, namely policy setting, episodes of policy conflict, and feedback [8].

The PCF is widely used in policy conflict analysis, including to understand renewable energy policy conflicts involving social and ecological dimensions. Environmental policy conflicts are determined not only by substantive differences in interests, but also by institutional structures that determine access to decision-making processes [9].

According to Lederach [10], conflict transformation as a process of continuous change is carried out through four dimensions, namely structural, relational, personal, and cultural. The goal is not only to end tensions but also to

create new social relations that are more just and sustainable [10]. This approach emphasizes the importance of building dialogue, trust, and participation among the parties involved in the conflict.

Previous research shows that conflicts in renewable energy projects are often related to aspects of procedural justice, distributive justice, and transparency. Energy transition projects in developing countries tend to create energy injustice when decisions are top-down without meaningful participation from the affected communities [11]. Jenkins *et al.* [12] also emphasize the need to integrate the principle of environmental justice into energy planning so as not to cause social exclusion [12].

Ioannou *et al.* [13] examined geothermal conflicts and found that a lack of public consultation and information inequality were the root causes of community resistance to clean energy projects. Social conflicts in renewable energy projects can be a driver of institutional reform if managed through dialogue. Transparency and openness of information about the environment are key factors in preventing conflict [13].

Based on a review of the literature, it can be concluded that environmental policy conflicts in renewable energy projects are not only due to technical factors, but also socio-political factors. PCF is an analytical tool for understanding the dynamics of conflict, while the conflict transformation approach leads to equitable energy governance. Therefore, this study integrates both approaches to understand the Dieng Geothermal Power Plant conflict and formulate sustainable resolution strategies.

III. Materials and Methods

This study uses a qualitative approach with a case study method on the policy conflict of the Dieng Geothermal Power Plant development in Central Java. This approach was chosen because it allows for an in-depth analysis of the social and political dynamics that influence energy policy and policy conflicts. In analyzing the conflict, this study combines two main theoretical frameworks, namely Lederach's conflict transformation framework [10] and Weible and Heikila's Policy Conflict Framework (PCF) [8].

Data collection was conducted through document analysis to ensure the depth and validity of the research findings. The documents analyzed consisted of policy documents and legislation related to geothermal energy and environmental governance at both the national and local levels, reports from civil society organizations involved in or affected by the Dieng Geothermal Power Plant conflict, as well as academic articles and studies relevant to environmental governance and energy policy conflicts. These documents were selected based on the following criteria: (1) direct relevance to the Dieng geothermal case, (2) clear linkage to policy, environmental, and social conflict issues, and (3) the credibility of sources and publication periods that adequately reflect the development of the conflict.

Data triangulation was conducted by comparing findings across different types of documentary sources and by applying two distinct yet complementary analytical frameworks. The Policy Conflict Framework (PCF) was employed to identify actors, interests, and patterns of policy conflict, while Lederach's conflict transformation framework was used to analyze relational dynamics, conflict escalation, and the potential for long-term conflict transformation. The application of both source triangulation and theoretical triangulation aimed to enhance the validity of the research results and to provide a comprehensive understanding of how environmental policy conflicts emerge and may be transformed within the governance of geothermal energy development in Dieng.

IV. Results and Discussion

A. Representation of Conflict through Policy Setting

The conflict surrounding the development of the Dieng Geothermal Power Plant arose due to the centralization of energy policy under the central government. Law No. 21 of 2014 on Geothermal Energy provides space for the utilization of geothermal energy in conservation areas, thereby disregarding environmental interests. This law also revokes the authority of the Ministry of Energy and Mineral Resources and local governments in the management of geothermal energy. The use of geothermal energy for power plants. This provision was later reinforced by Law No. 11 of 2020 concerning Job Creation, which has been replaced by Law No. 6 of 2023, which allows for the issuance of permits prior to land acquisition. As a result, the space for participation by the community and local government is limited in the early stages of project planning and decision-making.

The policy for the construction of the Dieng Unit II Geothermal Power Plant is not transparent and tends to be repressive. In 2019, when the Dieng Unit II Geothermal Power Plant project was about to begin, residents only knew that the location of well pad 38 would be built as a supporting facility for the company, but in early 2022, it became known that a power plant would be built at that location.

The company's repression, which included violence against the community during mediation [14], also shows that conflict resolution tends to use a repressive approach rather than a dialogical one in responding to conflict. This repressive pattern is a common characteristic of natural resource conflicts in Indonesia, where a coercive approach is more often used than participatory dialogue [15].

From a PCF perspective, policy setting in the Dieng Geothermal Power Plant is dominated by unequal access to power, which can be divided into a coalition of supporters and a coalition of opponents. The coalition of supporters has access to political and regulatory resources through its formal status in the policy system. In contrast, the opposing coalition, consisting of local residents and NGOs, has limited resources and access in the policy-making process, but has moral legitimacy and direct proximity to the impacts of the policy. The dominance of one coalition over the environmental policy arena, especially in the context of a national strategic project, creates a structural imbalance of power that narrows the possibilities for compromise. The dominance of one coalition over the environmental policy arena, especially in the context of a national strategic project, creates a structural imbalance of power that narrows the possibilities for compromise (Table 1).

Table 1. Mapping of actors and coalitions in conflict

Supporting Coalition (Pro Development)	Opposing Coalition (Pro environment)
PT Geo Dipa Energi	Local residents of Karangtengah and Bakal, in Dieng Region
Ministry of Energy and Mineral Resources	NGOs and legal aid institutions: WALHI Central Java, JATAM, LBH Semarang
Ministry of Finance	Farmers and youth groups
Local government	Community Coalition "ALARM GEDE"

Source: Compiled by the authors based on ALARM GEDE (2022) [17], official documents from the Ministry of Energy and Mineral Resources and PT Geo Dipa Energi (2022–2025).

B. Policy Issues and Events: Energy Conflict as a Complex Issue

The complexity of policy issues is influenced by the nature of the issue, the number and diversity of actors involved, temporality, the type of benefits, and the extent of change [8]. The Dieng Geothermal Power Plant conflict falls into the category of higher policy conflict because it involves multifaceted issues, namely clean energy, public safety, and environmental justice. Substantively, the conflict was triggered by the absence of publicly accessible EIA documents, the project location being only 2m from residents' homes and 500 m from the local community's main water source, and the incidents of explosions at the Dieng Unit I Geothermal Power Plant in 2007 and 2016, which caused collective trauma [5]. These findings are in line with Akrofi *et al.* [16], who assert that lack of transparency and procedural injustice are the main triggers of community resistance to renewable energy projects in developing countries.

From an event perspective, the gas pipeline leak from well pad 28 in March 2022 exacerbated tensions and reinforced perceptions of ecological risk. Based on the PCF framework, this event became a triggering event that increased the intensity of the conflict and generated negative feedback in the form of a crisis of confidence in government policy [8].

C. Feedback in the Negotiation Process and Partial Resolution

Conflict resolution efforts began with a hearing held by the ALARM GEDE Coalition with the Banjarnegara Regency government to open a dialogue with PT Geo Dipa Energi . On January 12, 2022, a dialogue with the company took place and resulted in a preliminary agreement that the Geothermal Power Plant construction would be temporarily halted [5].

However, project development activities continued and sparked various acts of resistance from the community, demanding that negotiations be reopened to halt the construction of the geothermal power plant. The dialogue forum was finally reopened, but the meeting ended inconclusively due to repression of the community.

As a continuation of the settlement efforts, the Banjarnegara Regency Government negotiated with the Directorate of Strategic Development Security of the Attorney General's Office and PT Geo Dipa Energi in response to the community's rejection. As a result, the construction of the project at well pad 38, an area very close to the population, was halted [17]. These negotiation efforts are illustrated in Fig. 1, which shows the Banjarnegara Regency Government conveying the community's objections to the directorate of strategic development security of the attorney general's office and PT geo dipa energi.

Fig. 1. The Banjarnegara regency government conveyed the community's rejection to the directorate of strategic development security of the attorney general's office and PT geo dipa energi. (Source: banjarnegarakab.go.id).

D. Conflict Transformation

The resolutions that have been made are still reactive and partial because they have not touched on the structural roots of the conflict, such as the centralization of authority, the absence of EIA documents, work accidents, and minimal public participation. Although development at Well Pad 38 in Karangtengah Village has been canceled, the Dieng Unit II Geothermal Power Plant project is still continuing at another location, while the negative impacts of the Dieng Unit I Geothermal Power Plant are still being felt by the surrounding community. This shows that the source of the conflict has not been completely resolved. There has been no fundamental change in energy governance or community engagement mechanisms. In Galtung's (2007) perspective, this situation can be categorized as a form of negative peace, which is a condition without direct conflict, but where injustice in social, political, and economic structures still persists and has the potential to give rise to new conflicts [18].

In the process of transformational change, there are four dimensions of change [10]:

1) Structural

The conflict surrounding the Dieng Geothermal Power Plant development arose in the context of hierarchical and centralized (top-down) policies. This pattern limited the scope for participation by local government and communities, creating tension between national interests and local needs. Therefore, reform of energy policy governance is needed, emphasizing openness, accountability, and equitable distribution of benefits. The government and companies are required to provide publicly accessible documents on environmental impacts, open consultation spaces before projects commence, and establish community-based complaint mechanisms. Strengthening project safety and security systems is important through early warning systems and evacuation procedures for nearby residents.

2) Relational

The relationship between the community, the company, and the state during the Dieng Geothermal Power Plant conflict was marked by domination and inequality. Project socialization was carried out unilaterally without

transparently conveying information that the location would be used as a power plant, not just dormitories and health facilities. Although mediation and negotiations have taken place, this process still involves violence against residents, indicating that the approach used is repressive and coercive.

There is a need to establish an equal dialogue space involving community leaders and local community or community organizations. In addition, there needs to be an online complaint mechanism provided by the company that is easily accessible to the community, responsive, and can be tracked by the reporter.

3) Personal

Pipe explosions at Geothermal Power Plant Unit 1 in 2007 and 2016, as well as the well pad 28 explosion in March 2022, which caused fatalities, created collective trauma and the perception that geothermal projects are a direct threat to daily life, compounded by a lack of knowledge about disaster preparedness. Knowledge and capacity for disaster preparedness are needed at the community level living around the geothermal power plant, given the potential risks such as explosions, toxic gas leaks, or earthquakes caused by geothermal drilling activities. The community must be equipped with information about potential hazards, evacuation procedures, and emergency measures through regular training, disaster simulations, and early warning systems.

4) Cultural

In the analysis of the Dieng Geothermal Power Plant conflict, the cultural dimension does not appear explicitly or dominantly. The conflict is mostly triggered by structural, relational, and personal issues. However, it cannot be ignored that local communities live in a unique ecological relationship with their environment, including dependence on water sources and agriculture. The local cultural values that may underlie community objections have not been fully documented or accommodated in the policy process. The cultural dimension is important for paying attention to local values, not only through technocratic, economic, and energy transition approaches.

V. Conclusion

This study shows that the conflict surrounding the Dieng Geothermal Power Plant development not only reflects conflicting interests among policy actors, but also structural weaknesses in energy and environmental policy governance, which remains centralized and lacks public participation. Through the integration of PCF and a conflict transformation approach, this study expands the application of policy conflict theory in the field of renewable energy, which needs to take into account environmental and social justice aspects and emphasizes the importance of transforming power relations towards more equitable and inclusive governance.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Fajar Kurniyasih developed research ideas and concepts and wrote a preliminary script; Frederik Cornelius Marbundeveloped methodology and provided research documentation; Isa Catya Wibowo managed and organized data; Manda Juniawan contributed to the data analysis. All authors discussed research results and findings.

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References

[1] N. A. Pambudi, "Geothermal power generation in Indonesia, a country within the ring of fire: Current status, future development and policy," *Renewable and Sustainable Energy Reviews*, vol. 81, pp. 2893–2901, 2018.

[2] A. Haris, A. B. A. Rahman, and W. I. Wan Ahmad, "Understanding social movements from a social science perspective," *Hasanuddin Journal of Sociology*, vol. 1, no. 1, pp. 15–24, 2019.

[3] P. Pln, *Electricity Supply Business Plan 2025–2034*, 2025.

[4] International Energy Agency (IEA). (2022). An energy sector roadmap to net zero emissions in Indonesia. [Online]. Available: https://www.iea.org/reports/an-energy-sector-roadmap-to-net-zero-emissions-inindonesia

[5] L. Darmawan. (2022). Residents of several villages oppose Dieng geothermal power plant development, why? *Mongabay Indonesia*. [Online]. Available: https://mongabay.co.id/2022/01/27/warga-sejumlah-desa-tolak-pembangunan-pltpdieng-kenapa/

[6] M. S. Winters and M. Cawvey, "Governance obstacles to geothermal energy development in Indonesia," *Journal of Current Southeast Asian Affairs*, vol. 34, no. 1, pp. 27–56, 2015.

[7] W. N. Hanum, I. G. A. K. R. Handayani, and H. Tegnan, "The geothermal development policy on environmental in Indonesia and the USA," *Journal of Human Rights, Culture and Legal System*, vol. 3, no. 2, pp. 160–184, 2023.

[8] C. M. Weible and T. Heikkila, "Policy conflict framework," *Policy Sciences*, vol. 50, no. 1, pp. 23–40, 2017.

[9] M. D. Zalesny, *Making Sense of Intractable Environmental Conflicts: Concepts and Cases*, pp. 718–720, 2003.

[10] J. P. Lederach, *The Little Book of Conflict Transformation*. Intercourse, PA, USA: Good Books, 2014.

[11] S. J. B. Contreras, "Procedural injustices in large-scale solar energy: A case study in the Mayan region of Yucatan, Mexico," *Journal of Environmental Policy and Planning*, vol. 24, no. 4, pp. 375–390, 2022.

[12] K. Jenkins, B. K. Sovacool, and D. McCauley, "Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change," *Energy Policy*, vol. 117, pp. 66–74, 2018.

[13] A. Ioannou *et al*., "A decision support tool for social engagement, alternative financing and risk mitigation of geothermal energy projects," *Energies*, vol. 16, no. 3, 1280, 2023.

[14] M. M. Akrofi, B. C. McLellan, and M. Okitasari, "Characterizing 'injustices' in clean energy transitions in Africa," *Energy for Sustainable Development*, vol. 83, 101546, 2024.

[15] J. M. Carthy, "The post-authoritarian politics of agrarian and forest reform in Indonesia," *Journal of Peasant Studies*, vol. 39, no. 1, pp. 109–133, 2012.

[16] VOA Indonesia. (2022). Dieng farmers persistently reject Geo Dipa Energi's geothermal power plant project. [Online]. Available: https://www.voaindonesia.com/a/petani-dieng-gigih-menolak-proyek-pltp-geo-dipa-energi/6805886.html

[17] A. Gede, *Press Release on Dieng Geothermal Power Plant Protest*, 2022.

[18] C. Webel and J. Galtung, Eds., *Handbook of Peace and Conflict Studies*, 1st ed. London, U.K.: Routledge, 2007.