Conflict Management: A Case Study of Waste-to-Energy Power Plant Development in Pathumthani Province

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Abstract

The construction of a waste-to-energy power plant in Pathumthani Province has elicited significant conflicts and resistance from the affected populace. This study aimed to explore the conflict situations concerning the project and apply a conflict management method to resolve the conflict. It was found that while the project is anticipated to be beneficial in addressing escalating waste problems, it was met with intense opposition from local communities. This opposition is primarily attributed to insufficient involvement or understanding provided by the project's owner and relevant authorities. The lack of community engagement is a critical factor that significantly impacts confidence in the project, as individuals feel inadequately heard or informed by project officials. Consequently, local residents harbored uncertainties regarding the project's impacts, leading to robust resistance. This study implemented the conflict resolution method, which involved the collaboration of stakeholders by identifying and analyzing the causes of the conflict and stakeholders and conducting three stakeholder meetings. The method was quite effective, as all stakeholders, especially the opposition groups, had opportunities to express and exchange their opinions, concerns, and information concerning the power plant project. Moreover, they worked together to seek solutions to the waste problems in the province that went beyond the issue of constructing the project and received acceptance from all groups. After the participation process, the relationship among the different groups noticeably improved.

Keywords: Conflict Management, Waste-to-energy Power Plant, Pathumthani Province, Participation

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การจัดการความขัดแย้ง: กรณีศึกษาการพัฒนาโครงการโรงไฟฟ้าเชื้อเพลิงขยะ จังหวัดปทุมธานี

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บทคัดย่อ

โครงการก่อสร้างโรงไฟฟ้าเชื้อเพลิงขยะในจังหวัดปทุมธานีนำไปสู่ความขัดแย้งและการต่อต้านจากประชาชนที่ได้รับผลกระทบอย่างรุนแรง การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาวิเคราะห์สถานการณ์และสาเหตุของปัญหาความขัดแย้ง และประยุกต์วิธีการจัดการความขัดแย้งมาใช้แก้ไขปัญหา ผลการศึกษา พบว่า ถึงแม้ว่าโครงการนี้เกิดขึ้นเพื่อช่วยลดปัญหาขยะที่ทวีความรุนแรงมากขึ้นในทุก ๆ ปี แต่ปัญหาสำคัญ คือ การคัดค้านอย่างรุนแรงของประชาชนในพื้นที่ที่จะทำการก่อสร้างโครงการ สาเหตุสำคัญเกิดจากการที่หน่วยงานที่เกี่ยวข้องและเจ้าของโครงการนั้นไม่ได้มีการเปิดโอกาสให้ประชาชนมีส่วนร่วมหรือทำความเข้าใจในการดำเนินงานของโครงการอย่างเพียงพอ ทำให้ประชาชนขาดความเชื่อมั่นในตัวโครงการโดยเฉพาะอย่างผลกระทบจากโครงการ ประชาชนจึงเกิดการต่อต้านอย่างรุนแรง การศึกษานี้ได้ประยุกต์วิธีการจัดการความขัดแย้งมาใช้แก้ไขปัญหาโดยเลือกวิธีการสร้างความร่วมมือผ่านกระบวนการมีส่วนร่วมของผู้มีส่วนได้ส่วนเสีย ประกอบด้วยการระบุและวิเคราะห์สาเหตุของความขัดแย้งและผู้มีส่วนได้ส่วนเสีย และจัดการประชุมผู้มีส่วนได้ส่วนเสียจำนวน 3 ครั้ง ซึ่งการดำเนินการได้ผลค่อนข้างดีเนื่องจากผู้มีส่วนได้ส่วนเสียโดยเฉพาะอย่างยิ่งกลุ่มที่ต่อต้านโครงการได้มีโอกาสในการแสดงความคิดเห็นและแลกเปลี่ยนข้อมูลและความกังวลอย่างเต็มที่และยังได้มีโอกาสได้ร่วมกันพิจารณาหาทางออกสำหรับปัญหาขยะมูลฝอยของจังหวัดปทุมธานี ซึ่งเป็นการพิจารณาทางออกในระดับสูงกว่าระดับโครงการและได้รับการยอมรับจากทุกฝ่าย หลังจากกระบวนการมีส่วนร่วมของผู้มีส่วนได้ส่วนเสียดังกล่าวความสัมพันธ์ระหว่างกลุ่มต่าง ๆ ดีขึ้นอย่างชัดเจน

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Introduction

The escalating generation of waste poses a significant threat to both human health and environmental integrity. In Thailand, the solid waste problem is also considered one of the critical environmental concerns of the country. In 2013, the Pollution Control Department (PCD) examined the amount of solid waste nationwide and found a significant increase in solid waste accumulation. This crisis is a major national issue that urgently needs resolution (PCD, 2014). Most developed countries, such as Japan, the USA, and European countries, have adopted the Polluter Pays Principle (PPP) in environmental policies as incentives to create awareness among residents and entrepreneurs toward the environment (Eric, 2005). Fortunately, in 2014, the National Council for Peace and Order (NCPO) considered waste management as one of the national agendas that require immediate solutions. It stipulated a roadmap for solid waste and hazardous waste management, urging provincial governors, local authorities, and the private sector to work according to this roadmap by addressing existing waste dumping sites, reducing new waste, separating waste at the source, utilizing mixed technologies in disposal, transforming waste to energy, and encouraging the private sector's role in management (PCD, 2014).

Several waste-to-energy power plants in Thailand have encountered substantial public opposition and complaints, primarily due to concerns about waste causing pollution in the community. For instance, the construction of a waste-to-energy plant by the Bangkok Metropolitan Administration in Nhong Khaem District initially faced strong opposition from the local people in the surrounding area. It took the BMA and the project operator several years to settle the conflict (Tanityarat, Poboon and Chomphan, 2019). Moreover, in Hat Yai district, citizens have lodged complaints about pollution impacts from the Hat Yai waste-to-energy plant, operational since 2014, producing 6.7 megawatts of electricity. Despite being operated by a private company, the plant has been subject to several directives for improvements from the Office of the Ombudsman. The Pollution Control Department found that emissions from the plant exceed standard levels for dioxin,

cadmium, and hydrogen chloride. Consequently, the Songkhla Provincial Industry Office, under the Factory Act B.E. 2535 (1992), has ordered a temporary suspension of certain plant operations (specifically the incinerators) and mandated improvements to be completed by a specified deadline. Non-compliance with these directives could result in severe legal penalties (Tanityarat, Poboon and Chomphan, 2019).

Pathumthani is one of the provinces that has been facing solid waste problems for many years. The amount of waste generated has been increasing steadily, from 866 tons/day in 2005 to 1,933 tons/day in 2022. Although the province and relevant government and local agencies have adopted the national government policy and the National Council for Peace and Order (NCPO)'s roadmap for solid waste and hazardous waste management, the situation is not likely to improve, as seen from the increase in the amount of waste and the problems of finding disposal sites accepted by local communities. Worst of all, there has been a continuous serious conflict between local communities and the government/ local agencies regarding the construction of a waste-to-energy power plant project, especially in the Chiang Rak Yai district area. This conflict has led to a struggle in solving waste problems and disputes in waste management for several years.

Objectives of the Study

1. To explore the conflict situations concerning the construction of the waste-to-energy power plant in Pathumthani Province and the causes of the conflict.
2. To apply a conflict management method to solve the conflict.

Literature Review

Waste Management and Waste-to-Energy Initiative

Addressing the challenge of managing vast amounts of waste is crucial for current and future societies. A viable strategy involves minimizing waste through extensive reuse and recycling. For residual waste that cannot be recycled, energy

recovery emerges as a practical solution. This process entails converting non-recyclable and non-reusable waste into valuable energy sources, such as electricity and heat (The World Energy Council, 2016). Various technologies like combustion, gasification, pyrolysis, and anaerobic digestion are employed in energy recovery from waste, with combustion being the most prevalent for handling diverse waste types (Astrup et al., 2015). Sweden exemplifies successful implementation, operating numerous waste-to-energy combustion plants and achieving high per capita energy recovery from waste (Grosso et al., 2010). In 2017, Sweden processed over 6 million tonnes of waste, generating substantial energy output, thereby significantly reducing waste volume and mass (Eboh et al., 2019; Menikpura et al., 2016).

Conflict Management

Since 1974, scholars have defined the term "conflict" following Mortenson's definition (Putnam, 2013), which states that it means "the expression of conflicting interests in the distribution of limited resources." For example, Wilmot and Hocker (2001) defined interpersonal conflict as "an expression of disagreement between at least two persons in a relationship when the other prevents them from achieving their goals or because of the understanding that the resources required by both parties are insufficient." It could be summarized that conflict is a social phenomenon in which individuals, groups, and parties compete for resources, positions, powers, and interests. This may be a direct or indirect conflict between different groups.

Environmental Conflict Dynamics

The rise of environmental conflicts is a global phenomenon posing challenges to both public and private sectors. Often, environmental damage arises due to the market's failure to account for non-economic costs. Such conflicts typically occur when entities exert power to override community objections to environmentally impactful projects. Resolving these conflicts frequently necessitates policy and institutional reforms (Heikkila & Schlager, 2012). A variety of stakeholders, including government bodies, courts, and mediators, are increasingly engaged in

addressing these conflicts, driven by public aspirations for a say in their future (Hodge, 2014). The United States, in particular, has developed a substantial body of research on environmental conflict resolution. Notably, NGOs and local communities play crucial roles in these dynamics, often demanding more from management than legal obligations (Griewald & Rauschmayer, 2014; Jaskoski, 2014).

Types of conflict

Conflicts are divided into two types (Moore, 1986):

1) Unnecessary Conflicts

1.1) Relationship conflicts caused by incorrect perception, having a negative attitude, miscommunication or inappropriate behavior of a person.

1.2) Data conflicts are caused by lack of data or receiving incorrect information. There is a disagreement over the reliability of the information. Different interpretations of information or differing opinions on valuation methods.

1.3) Value conflicts arising from different belief systems. There will be no conflict until the other party is compelled to share his or her own beliefs or to attack the beliefs of others.

2) Genuine conflicts are divided into

2.1) Structural conflicts caused by improper relationship structure. Those who may have conflicts may be disadvantaged due to improper organization or spatial arrangement.

2.2) Interest conflicts arising from a decision and decision-making methods such as credibility, fairness, the need for participation. Conflict arises when one party considers that the benefits received by their party are inappropriate or less than the benefits received by the other party.

Causes of conflict

Conflict does not necessarily arise from a single cause. It may be caused by many reasons. Causes of conflicts arising from the current development projects, especially conflicts related to public policy as explained by Wattanasap (2007) are as follows:

1) Complexity of development. Conflicts at present are interconnected, caused by a variety of factors, including the diversity of parties involved. A variety of issues may arise due to involving different cultures with deep-rooted values and different perspective as well as various laws and different interests. In this regard, the issue of complexity of development mentioned by Wattanasap here is consistent with Wankaew (2004) who summarized the consequences of development as being caused by:

    1.1) Implementation of an unbalanced development strategy which is a cause in and of itself.

    1.2) The development process is a multilayer process.

2) Conventional management with little or no involvement such as conduct of a public hearing, which is where the public can take part, but it has participation in the final stages of the development process that takes place after conducting an environmental impact analysis. Therefore, there is no opportunity for people to participate in designing the development.

3) There are many groups with different views. Therefore, information from documents from authors with different opinions has occurred in various ways.

4) Democracy that has changed from participatory democracy to representative democracy has given power to its representatives. But the representatives make decisions without taking into account who they represent. Thus, there are impacts on people, the environment as well as natural resources.

5) A project has been developed, the follow-up can be flawed and the problems rarely resolved in any serious manner. This results in less trust in the government.

6) Laws and legal compliance cannot be changed or updated to be in line with the rapid changes in society. In some cases, this causes conflicts, such as the National Reserved Forest Act of 1964, where enforcement or compliance with the law is not strictly enforced. This is another reason that can lead to conflicts in the future.

Conflict Resolutions

Herrity (2023) stated that different people use different methods to resolve conflict, depending on their personalities and preferences. The five most common strategies, known as the (Kenneth) Thomas-(Ralph) Kilmann model, used to resolve conflicts in the workplace include:

1) Avoiding

This method involves simply ignoring that there may be a conflict. People tend to avoid conflict when they don't want to engage in it. Avoiding allows them to ignore that there is a problem. There are situations when avoiding conflict can be an appropriate response, such as when there is no clear solution or a frustrated party needs time to calm down before confrontation. However, avoidance can require more effort than merely facing the problem and can cause friction between the disagreeing parties. When confict is avoided, nothing is resolved.

2) Competing

Competing is an uncooperative, overly assertive method used by people who insist on winning the dispute at all costs. It's known as a win-lose strategy. This method is not often identified as bringing satisfactory resolutions, as it doesn't allow for collaborative problem-solving.

3) Accommodating

This strategy, also known as smoothing, involves one party acquiescing, giving the opposing party exactly what it needs to resolve the problem. This method allows you to resolve a problem in the short-term while working toward a long-term solution.

In some cases, accommodating can be an appropriate resolution to a conflict. For example, if your opinion on the matter is not very strong, it is often easier to comply.

4) Collaborating

Like the compromising method, collaboration involves working with the other party to find a mutually agreeable solution to a problem. It's known as a win-win strategy. For example, a salesperson and client may work together to negotiate contract terms until both parties find it agreeable.

5) Compromising

This strategy, also known as reconciling, seeks a mutual agreement to settle a dispute. It's known as a lose-lose strategy since both parties willingly forfeit some of their needs in the interest of reaching an agreement. This can be a quick way to resolve a conflict without it becoming a bigger issue. Compromise can also be used as a temporary method to avoid conflict until the parties involved can implement a more permanent solution.

It is appropriate to compromise when it would not be possible to make both sides completely happy while still moving forward.

Tristancho (2023) proposed the conflict resolution steps of the conflict resolution process, which are widely used, as follows:

1) Identify the Root Cause of the Conflict

Before anything, it's important to understand what the conflict is and then find the main causes of the problem. When dealing with conflicts

among team members, it's important to hear what the parties have to say about the incident. You can use root cause analysis techniques for more complex conflicts that involve lots of causes and contributing factors.

2) Identify the Concerns of Both Parties

Once you've understood the overall nature of the conflict and its main causes, you'll need to understand what the opposing parties want from this conflict resolution process, which will consist in finding a solution that's accepted by both.

3) Identify Conflict Resolution Barriers

Before finding a solution, take time to identify the barriers that might slow down the conflict resolution process and try to eliminate them.

4) Choose a Conflict Resolution Style

Take into account the previous steps to choose the conflict resolution style that best fits your particular case. In some cases you might need to tell someone they're wrong, find a partially satisfactory middle ground, or build a win-win solution that satisfies both parties. This analysis should be done on a case-by-case basis.

5) Find a Solution to the Problem

After implementing a conflict management style, you should have a viable solution that solves the conflict. Before implementing any solutions, make sure that the conflict participants agree on the solution and commit themselves to it.

6) Check If the Conflict Persists

The conflict resolution process shouldn't finish once you solve the conflict by finding a solution. It's very important that you follow up with the team to make sure the conflict has been successfully resolved.

Typology of Government Responses to Conflicts

Li et al. (2016) categorized government responses into four types: (1) Hierarchical Problem Solving, (2) Tension Reduction, (3) Collaborative Governance, and (4) Meta-Governance.

Response 1: Hierarchical Problem Solving involves government pursuing solutions independently, often employing top-down approaches and resisting opposition (Koppenjan and Klijn, 2004; Van Rooij, 2010).

Response 2: Tension Reduction recognizes resistance and seeks to address it through expert involvement and symbolic compromises (Cai, 2008; Li et al., 2016).

Response 3: Collaborative Governance focuses on negotiation and consensus, embracing a shift from traditional governance to collaborative approaches (Mandell, 2001; Sørensen and Torfing, 2007).

Response 4: Meta-Governance aims to facilitate interaction among various actors and mediate conflicts, influencing interaction conditions and setting participation frameworks (Koppenjan and Klijn, 2004; Chen et al., 2007).

Related Studies

There are several studies related to conflict management in power plant project development. The following are some of them that provide an understanding of the conditions and resolutions of the problems.

Poboon, Phoochinda, and Chomphan (2012) studied the environment of public participation in energy project development by conducting a case study on a coal-fired power plant project in Krabi Province. This is a large electric power development project. The study found that developments in various fields could have an impact on the environment and the quality of life of people in the area. Some areas have conflicting development strategies in each sector. Therefore, the use of a tool to assess the potential of environmental quality in the area, or the Strategic Environmental Assessment (SEA), could help assess the potential

of supporting the area appropriately and in accordance with the development activities that will occur in the future. An overview of development linked to sectoral development in an integrated manner with people participating in such development activities was provided. Raksasri (2014) studied community knowledge management to resolve conflicts between Saha Cogen Green Bio-Energy Power Plant and villagers in Pa Sak Subdistrict, Mueang District, Lamphun Province. It was found that the villagers reversed their opposition to the project because, in the past, they had no knowledge of biomass power plants and had only received information that biomass power plants were not good. Word of mouth in the community created an understanding that the project would bring problems. However, when knowledge was managed through meetings to change their understanding and by taking community leaders on a field trip to illustrate the actions taken to prevent environmental problems, the villagers were more accepting of biomass power plants. Additionally, Sukkamnerd (2000) conducted case studies of conflict and public participation in energy projects in Thailand. Three case studies were used: 1) Pak Moon Hydroelectric Power Plant Project, 2) Thai-Myanmar Gas Pipeline Project, and 3) Coal Power Plant Project in Prachuap Khiri Khan Province. The study found that conflicts arose from unfair distribution of interests and consequences. The process of compensation and mitigation from the project was inefficient and had not been generally accepted. Decision-making mechanisms were based on government agencies that often made decisions from the beginning without listening to information about the interests and impacts of all parties. Public participation was therefore an important conflict reduction mechanism, but the public participation process remains ineffective because the perspectives of the public sector were still different in many respects, especially in regard to the level of steps and nature of participation. The public sector wanted their participation to be elevated from awareness to decision-making for the project. Formal and equal participation should be accepted from the planning stage, not only participating after the project has already been decided on, including wanting to participate in supervising the implementation of the project according to the agreement.

Phantasen (2000) researched conflict with political economic analysis of energy projects in Thailand. It was found that in terms of economics, conflicts arising in Thailand in the case of large energy projects are referred to as "reasonable conflicts" because they had economic interests. The country's elite always adopts a development approach that focuses on large-scale investment projects because they believe that the development of the country must be in the direction that has been practiced in the past and has been successful to some extent by having mutual benefits with hidden foreign investors, without considering or making efforts to look for better alternatives to develop the country, especially in terms of small investment projects that use technology and domestic raw materials. An important measure that should be used to prevent conflicts is to have relevant parties support large projects when it has been publicly proven that there was no better alternative. All possible alternatives were to be presented by presenters who could freely express their opinions and be allowed time for the public or relevant civil society groups to oppose or propose alternatives that they see as superior and openly hold a thorough public hearing of those options.

In conclusion, the related studies indicated that conflicts in power plant or energy project development often arose from differences in opinions, knowledge, and interests concerning the development that different groups had. The opposition groups mainly believed that the development of the project could pose serious impacts on the environment and their health as well as on their ways of living, whereas the developers and the related government agencies believed that they had effective technology and efficient management to control the adverse consequences of the projects. Moreover, the participation processes during the initiation of the projects were not effective as the developers often ignored the comprehensive and meaningful engagement of the local people and the opposition groups. However, all of the related studies have not proceeded to the implementation of a conflict management method. Hence, this study aims to explore the conflict in the construction of the power plant project in Pathumthani Province and attempts to put into practice the conflict resolution method to see if the method works in this context. The results of this study would be very beneficial to be adopted for other cases of conflict in Thailand.

Methodology

To resolve the conflict, this study adopted the collaborating method as suggested by Herrity (2023), working with the different parties to find a mutually agreeable solution to the problem. In this case, the public participation process, which is the most common practice of collaboration, was adopted to seek resolutions for conflicts arising from the development of a waste-to-energy power project in Pathumthani Province. The participation process was adapted from the conflict resolution steps proposed by Tristancho (2023) to fit the context of this case. It was organized into 3 major steps as follows:

Step 1: Identify the Root Cause of the Conflict

To explore the conflict situations concerning the construction of the waste-to-energy power plant in Pathumthani Province and the causes of the conflict, this study used the document review method to collect the data. In addition, the information from the first public meeting was also added to the secondary data to summarize the findings.

Step 2: Identify the Stakeholders and Their Interests

The stakeholder analysis approach was employed for this step. The stakeholders were classified into 3 main groups based on 2 criteria - their interests and their power towards the project- as suggested by Freeman (1984):

1. The primary stakeholders were the individuals or groups of local people living in the area around the development project who were subject to direct negative or positive consequences of the waste-to-energy power plant project.
2. The secondary stakeholders were organizations, and institutions that involved in the development of the project or expected to have benefit from the project such as local authorities in the area, relevant government agencies, project developers, etc.

3. The tertiary stakeholders were outsiders who were not directly tied to the people in the area but had significant roles or influence that could affect the project's success or failure.

4. The fourth stakeholders were local authorities and people who lived in the other areas in Pathumthani Province.

Key Informants

Key informants in this study were formal and informal local leaders and local people, the waste-to-energy project opposition groups, especially those who were active in protesting against the power plant development project, and officers of relevant government agencies and local governments. Key informants were derived from the stakeholder analysis described above and were purposively selected by the researcher as:

1. The groups that faced direct impact from the development or policy, which were the local people who lived around the project and the local leaders (150 persons).

2. The agencies which had influences in the development of the project, e.g., the Pathumthani Provincial Office, the Provincial Office of Natural Resources and Environment, and local authorities in the area, particularly the Chiangrakyai Sub-District Administrative Organization and the project developers (20 persons).

3. The outsiders who had significant roles or influence that could affect the project's success or failure, for example, NGOs (non-governmental groups), academics, and opponent groups (20 persons).

4. The groups that could receive indirect impact or had minimal influence on the project, which were the people, local authorities, businesses, and education institutes located further from the surrounding communities (50 persons).

For the local leaders and local people in the area, the study covered both the power plant supporting group and the opposing group. This is in accordance with Huailuek (2020) and Sriruang (2019), who studied the conflict in power plant development in Krabi Province and found that there were 2 main conflict groups in the area with very serious opposition to each other. They suggested that to solve the conflict, these two groups must be involved in the process of the power plant development.

Step 3: Organize the Stakeholder Participation Process

The participation process was a key method for the conflict resolution of this case. This study organized 3 stakeholder meetings as follows:

1. **The 1st meeting:** Organizing a meeting to facilitate the exchange of opinions and data among stakeholders regarding the challenges of waste management in Pathumthani Province. The discussion also addressed their concerns related to the development of the waste-to-energy project.
2. **The 2nd meeting:** Stakeholders collaborated to conduct a comprehensive analysis of the strengths, weaknesses, opportunities, and threats (SWOT) related to solid waste management in the province.
3. **The 3rd meeting:** Stakeholders worked collectively to envision a common future for waste management, defining a shared vision. They also collaborated on developing measures and strategies to achieve this vision.

Data Collection Methods

This study used both primary and secondary data collection methods as follows:

1. Collected primary data through the organization of the meetings of key informants or the stakeholders. The issues in each meeting were as stated in the 3 meetings of the participation process mentioned above.

2. Studied secondary data from documents and reports related to Pathumthani Province's waste management, such as the national waste policies and plans, the Pathumthani Province's waste management plan, the Pathumthani Province's state of solid waste reports, related laws and regulations, and relevant studies on Pathumthani Province's waste management.

Data Analysis

The data were overall analyzed by the content analysis method. The data from the first meeting was initially analyzed to find the problems in solid waste management in Pathumthani Province and concerns of the stakeholders over the development of the waste-to-energy project. The data from the second meeting was analyzed and summarized in terms of the SWOT Analysis, which consisted of the internal and external environment in solid waste management of Pathumthani Province. The conclusion of the SWOT Analysis was adopted as a basis for the stakeholders in finding the measures or strategies for Pathumthani Province's waste management and conflict resolutions in the third meeting.

Results

1. Pathumthani's Solid Waste Management Situation and Problems

Solid Waste Situation

Pathumthani Province is located north of Bangkok. During the last 4 decades, the province has experienced rapid population growth due to an increasing number of factories, educational institutes, and housing projects. At present, there are around 1.2 million registered residents plus 0.5 million unregistered residents (Pathumthani Provincial Office, 2022b). The location and map of Pathumthani Province are shown in Figure 1.

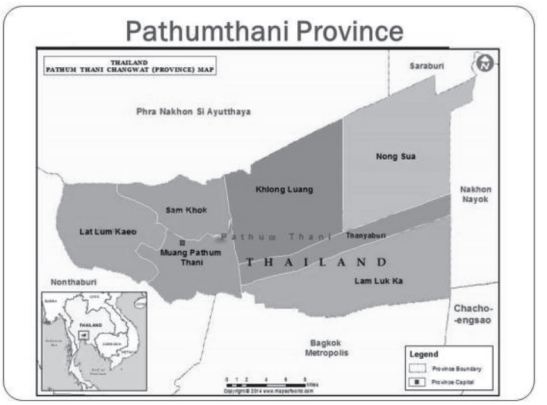

Figure 1: Map of Pathumthani Province
Source: Pathumthani Provincial Office, 2022a

In line with growth, there has been a concurrent rise in various social and environmental challenges. One of these predicaments is the solid waste problem. The volume of solid waste has witnessed a substantial increase from 866 tons per day in 2005 to 2,031 tons per day in 2015. Only 15% of collectable waste is disposed of in local authorities' dump sites within the province, while the remaining 85% must be transported to a neighboring province. Regrettably, the majority of dump sites are not operationally sanitary. Furthermore, a significant volume of solid waste is illegally discarded along roadsides or on vacant land.

The primary driver of this issue is the local opposition to the construction and operation of any solid waste landfill sites. Despite the efforts of relevant agencies to address these challenges, the quantity of solid waste continues to escalate annually. Compounding the issue, the proportion of waste disposed of correctly remains at approximately half of the total waste generated, as illustrated in Table 1.

Table 1: Solid Waste Situation in Pathumthani Province from 2016 to 2022

Year	Waste Generation (Tons/Day)	Waste Properly Disposed (Tons/Day)	Waste Improperly Disposed (Tons/Day)
2016	1,676.00	218.33	597.20
2017	1,676.00	367.16	649.89
2018	1,676.00	494.00	776.73
2019	1,658.00	681.00	964.33
2020	1,691.78	464.26	846.33
2021	1,722.93	464.30	890.91
2022	1,933.50	360.94	970.09

Source: Pathumthani Natural Resources and Environment Provincial Office, 2016

From the relevant reports and the first meeting of the stakeholders, the problems of solid waste management of Pathumthani Province can be summarized and prioritized as follows:

1. The amount of solid waste that requires final disposal remains high due to inefficient waste separation at the source within communities.
2. A high proportion of solid waste is disposed of incorrectly, e.g., open dumping.
3. There is a lack of land available for the disposal of solid waste.
4. Strong opposition to waste disposal site construction from local communities in nearby areas. Thus, the disposal sites that were constructed could not be operated, and new disposal sites could not be constructed.
5. Local authorities lack technical knowledge in preparing projects to obtain financial support for the construction of solid waste management systems.
6. Some local authorities have not managed solid waste in their areas, e.g., there are no waste collection and transportation systems for disposal.
7. Some local authorities could not manage solid waste in their areas properly due to the long distance from disposal sites and high transportation costs.

8. Hazardous waste is not managed effectively, e.g., lack of areas for waste collection as there is no responsible agency.

The Conflict and Its Causes

On August 27, 2014, the National Peace Keeping Commission declared the solid waste issue a national agenda and approved the roadmap for solid waste management in Thailand. Pathumthani Province was identified as one of the initial target provinces to implement this roadmap, focusing on the clearance of old accumulated waste and the proper management of new waste. One of the key measures outlined in the roadmap was the construction of a waste-to-energy power plant. The Pollution Control Department, which proposed the roadmap, believed that a waste-to-energy power plant represented a highly intelligent alternative for addressing the severe solid waste problems across Thailand. This solution required significantly less construction and operation space compared to a landfill, and additionally, it had the capability to generate electricity for nearby communities.

The problem emerged immediately after the approval of a plan to construct 3-9.9 megawatt waste power plants by a private company sanctioned by the Chiang Rak Yai Sub-district Administration Organization. This proposed plant, spanning an area of approximately 145 rai (about 58 acres), aimed to process 1,800 tons of waste per day across three separate units within the same location. The project site is in close proximity to local communities, a school, temples, a large running water production plant that provides drinking water for Pathumthani province and Bangkok, and two universities (see Figure 2).

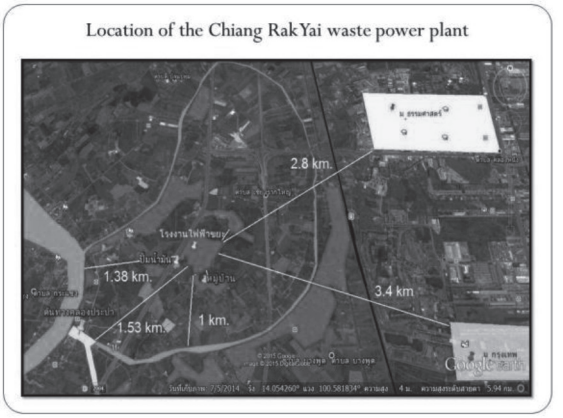

Figure 2: Location of the Chiang Rak Yai Waste Power Plant
Source: http://thaipublica.org/2015/01/waste-15/

According to Thai law, any power plant with a capacity of 10 megawatts or more is required to undergo an environmental impact assessment (EIA). Local residents had observed that the project proposal appeared to be deliberately structured to circumvent the EIA study. The community was deeply apprehensive about potential impacts from the project, particularly concerning air pollution, odors, and wastewater. Furthermore, local residents alleged that the project was strategically situated near a running water production plant, posing the risk of contaminating the raw water.

The opposition to the project has intensified, with more individuals joining the movement, including a well-educated group residing in close proximity to the area and non-governmental organizations (NGOs) from external sources. Protests have been articulated through various channels, including meetings or workshops related to the project, as well as through social media platforms such as websites. Their opposition has been conveyed to the National Peace Keeping Commission (NPKC), the Ministry of Natural Resources and Environment, the governor, and relevant provincial offices. Figure 3 illustrates an example of a banner expressing strong opposition to the project.

Figure 3: A Banner Expresses Strong Opposition to the Project
Source: https://youtu.be/ww8MrFKU_U8

Despite robust protests from the local populace, the project owner has proceeded with the construction. The company has initiated land clearance and site preparation, which has, in turn, intensified opposition from the local community.

The opposition from local communities to this waste-to-energy power plant project was so pronounced that during the first meeting of the public participation process organized by the researcher, opposition groups took to the stage, vehemently condemning the project and requesting the cancellation of the meeting. They believed the meeting was convened to endorse the project's development (see Figure 4).

Figure 4: The Local People Demonstrated their Serious Opposition to the Project in the first stakeholder meeting
Source: Photo by the author

The protest compelled meeting participants to vacate the room, given the potential for violence between protesters and government officers. Nevertheless, the researcher perceived this crisis as an opportunity to engage with the protesters. Subsequently, representatives from the opposition group were invited to articulate their opinions and exchange information about the power plant project (see Figure 5). This unique meeting provided valuable insights into the conflict.

Figure 5: Special Meeting with Representatives of the Opposition Groups
Source: Photo by the author

The primary drivers of opposition to the Pathumthani Province's waste-to-energy power plant project were rooted in the deep concerns of local residents and academics regarding severe impacts on their communities, particularly health and environmental risks. These concerns were magnified by the understanding that waste-to-energy plants typically give rise to problems and impacts on nearby residents, including indirect exposure to contaminated ash and heavy metals.

The underlying causes of the conflict encompassed low public participation, a lack of transparency in local government operations, restricted citizen access to information, and apprehensions about health impacts. This was particularly evident concerning potential carcinogens such as dioxins and furans, as well as other toxic substances and particulate matter anticipated to be released from the power plant. This lack of transparency manifested in a top-down decision-making process, where

the project received approval before undergoing sufficient and comprehensive public hearings and consultations. Furthermore, the concerns voiced by local communities were disregarded by the relevant government agencies.

2. The Way Out

Following the initial meeting, the second gathering was organized with a genuine commitment to public participation. Opposition groups and other stakeholders were invited to actively engage. A representative from the opposition group was also extended an invitation to express their opinions and share data related to the power plant project (Figure 6). All participants were given opportunities to voice their perspectives on the issues at hand. The researcher primarily assumed the role of a facilitator, emphasizing that addressing solid waste problems is a collective responsibility involving local communities and all stakeholders. Furthermore, it was underscored that finding solutions to these problems should be a shared responsibility, not solely that of government officials.

Figure 6: Presentation by a Representative of the Opposition Group
Source: Photo by the author

For the second stakeholder meeting, a focus group discussion format was adopted to ensure that all participants had the opportunity to delve into the issues within smaller groups. Subsequently, representatives from each group presented their group's opinions to all participants, fostering a broader discussion and aiming to reach a consensus by the meeting's conclusion (Figure 7).

Figure 7: Focus Group Discussion in the Second Stakeholder Meeting
Source: Photo by the author

The results derived from the second stakeholder meeting encapsulate the current situation and challenges of solid waste management in Pathumthani Province. These findings, pertaining to the environmental aspects of solid waste management, can be succinctly summarized through a SWOT analysis as follows:

The Environment of Pathumthani Province's Solid Waste Management

Table 2: Internal Environment of the Pathumthani Province's Solid Waste Management

Issues	Strengths	Weaknesses
1. Policy and plans	Have a solid waste management plan. There is a working group to prepare the plan. How to proceed is determined. Implementation time targets and projects related to solid waste management.	Lack of integration in the implementation of solid waste management plans with other relevant agencies, and some strategies and strategies are not consistent with the context of the area.

Table 2: Internal Environment of the Pathumthani Province's Solid Waste Management (Cont.)

Issues	Strengths	Weaknesses
2. Management	There is a structure of the department, including the appointment of a public relations committee for the public and the promotion of participation of various agencies.	Campaigns to create public understanding of solid waste management, from promoting according to the 3R principle to raising awareness, are not enough.
3. Budget	Budget is allocated and approved for solid waste management.	The budget set may not be enough to complete the entire project.
4. Personnel	There are personnel with knowledge in both the government sector. private sector and educational institutions in the area.	Personnel have insufficient knowledge and expertise and have little interaction with local residents.
5. Materials, equipment and technology	Have the power to make decisions and determine qualifications and conditions in procurement or joint venture, as well as select good and appropriate technology for maximum benefits.	Materials, equipment, vehicles, tools, machinery of each unit involved are insufficient. Defective condition Lack of maintenance, including lack of proper technology adoption and lack of coverage

Table 3: External Environment of the Pathumthani Province's Solid Waste Management

Issues	Opportunities	*Threats*
1. Area conditions	There are some areas that can be improved as sanitary solid waste disposal facilities.	Most areas cannot be used for solid waste management because they are already used in other fields or are close to the community
2. Society & Culture	A large population works in industrial facilities, making it easy to ask for cooperation. Another part of the population is engaged in agriculture. The amount of waste from this part can be reduced with the right technology.	Society and culture exhibit diversity due to the coexistence of urban and rural communities, as well as the influx of foreign labor for employment and residency. Consequently, this has led to a variation in the composition of waste types and materials.
3. Political conditions	At present, the government (NCPO) pays attention to solid waste management problems, so it has an urgent policy to manage solid waste, and Pathum Thani province is one of the target provinces.	The lack of political stability, coupled with changes in governmental leadership, has resulted in an increased emphasis on specific policy areas. For instance, policies related to waste management have also undergone changes.
4. Technology	Currently, there are various technologies that can be used in integrated solid waste disposal to suit the context of each area.	There is a lack of adopting new information technology for managing various data, including instances where certain technologies are not suitable within the context of the area.

Table 3: External Environment of the Pathumthani Province's Solid Waste Management (Cont.)

Issues	Opportunities	*Threats*
5. Cooperation and Community support	There is a gathering of communities and PTT.A joint meeting was held, making it possible to asked for cooperation	The migrant population's presence has weakened local attachment and belonging. Inadequate public relations campaigns persist, and many still believe waste management is solely the government's responsibility."
6. Cooperation from various agencies and the private sector	There are various agencies, both government and private sectors. Educational institutions and the public sector with diverse knowledge and expertise.	The lack of collaborative integration among various related agencies may lead to overlapping efforts and conflicts between these units in their operations.

During the third stakeholder meeting, participants were afforded the opportunity to contemplate the future of Pathumthani Province regarding the ultimate outcomes of solid waste management. Ultimately, a consensus was reached on a vision that reflects their collective commitment to developing the province and striving for sustainable solid waste management. The envisioned future is articulated as follows:

> "***Pathumthani, the clean city,***
> ***With unity of the people, the government and all sectors,***
> ***Make waste a resource."***

Following their consensus on the vision, participants were divided into smaller groups to deliberate on the strategies necessary to achieve the envisioned future. Subsequently, these groups presented their findings to the main meeting, fostering an exchange on the feasibility and impact of the proposed measures (Figure 8). Eventually, a compilation of major strategies to realize the vision was reached.

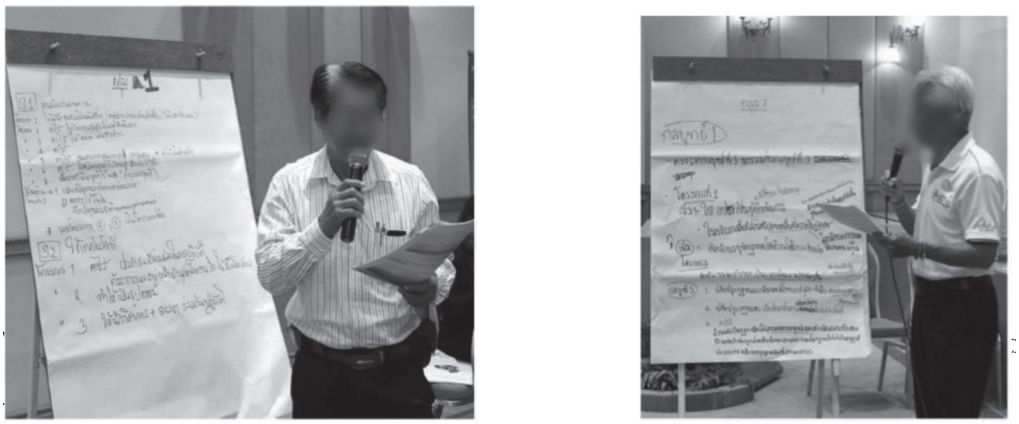

Figure 8: Focus Group Discussion and Presentations in the Third Stakeholder Meeting
Source: Photo by the author

The final major solid waste management strategies for Pathumthani Province are as follows:

Strategy 1: Increasing efficiency in solid waste management process
Strategy 2: Discipline and promotion of participation of all sectors in solid waste management
Strategy 3: Promotion of environmentally friendly production processes and services
Strategy 4: Strengthen the process of resolving and reducing conflicts of all sectors in solid waste management.
Strategy 5: Proper integration of solid waste management processes
Strategy 6: Developing solid waste management potential of Pathum Thani Province and local administrative organizations
Strategy 7: Determine and implement legal and economic measures related to solid waste management.
Strategy 8: Research and development of knowledge and technology in solid waste management

In addition to the eight strategies outlined, the waste-to-energy power plant opposition group emphasized a crucial point. In the event of any power plant project development within Pathumthani Province, it is imperative that the project

undergoes a comprehensive public participation process. Furthermore, this participation process should be characterized by transparency and must receive approval from the public before any decisions are made.

Conclusion and Discussion

The opposition to the construction of waste-to-energy power plants poses a significant challenge, instigating conflicts and resistance among the affected populace. Despite the perceived benefits of such projects in addressing escalating waste issues, robust opposition emerges from local communities. The conflict has been experienced not only from the case of Pathumthani Province's waste-to-energy power plant, but also from several cases of power plant projects around Thailand as demonstrated in the literature review above. This resistance is primarily fueled by a perceived lack of involvement or understanding extended by the project authorities. The dearth of community engagement is critical and detrimentally impacts confidence in the project, as residents feel inadequately heard or informed by project officials. Citizen involvement, as a democratic imperative, grants people the right to comprehend project details. In the context of waste-to-energy power plant construction, a discernible gap in understanding within the community, coupled with unclear information from project owners, contributes to the prevailing uncertainty among local residents regarding the project's impacts, both during and after its construction, thereby fostering resistance.

The aforementioned issues of conflict in the case of Pathumthani Province's waste-to-energy power plant can be analyzed according to Moore (1986) as follows:

1. Data Conflict: Notable issues revolve around insufficient or unclear information concerning the waste-to-energy power plant project. Concerns encompass inadequate data on the project's appropriateness, environmental impacts, waste disposal sites, and the proximity of the project area to water sources, instigating anxiety among local residents. This aligns with the study of Raksasri (2014), who studied conflicts between Saha Cogen Green Bio-Energy Power Plant and villagers

in Lamphun Province and found that the villagers strongly opposed the project because they had no knowledge of biomass power plants and only received information that biomass power plants could pose serious impacts to the local people, especially air pollution.

2. Interest Conflict: The establishment of waste-to-energy plants or waste disposal sites in close proximity to communities raises concerns that the majority may not reap benefits from the project but could instead encounter adverse consequences such as issues related to waste incineration or problems arising from waste transportation, thereby fostering substantial opposition. This is in line with the study of Sukkamnerd (2000), who conducted case studies of conflict and public participation in three energy projects in Thailand and found that conflicts arise from the unfair distribution of interests and consequences. The process of compensation and mitigation from the project is inefficient and has not been generally accepted.

3. Relationship Conflict: Limited communication and negotiation between project management and local residents precipitate this form of conflict. Projects of this nature necessitate substantial community relationship building. Moreover, some residents might dissent against current government policies on waste-to-energy projects, further contributing to opposition. This was also found by Hajima and Poboon (2024), who studied the conflicts from coal-fired power plant construction projects in southern Thailand and found that the main cause of the problem was the lack of effective and inclusive involvement of local people and stakeholders.

Regarding the results of the conflict resolution implemented by this study, it is evident that the method adopted, which was collaboration by the public participation process, has been quite effective. All stakeholders, including the opposition groups, had opportunities to express and exchange their opinions, concerns, and information concerning the power plant project. Moreover, they worked together

to seek sustainable and possible solutions to the waste problems in the province that went beyond the issue of constructing the project. After the three public meetings, the relationship among the different groups manifestly improved. Hence, it can be concluded from this study that the resolution of the conflict must concentrate mainly on the investigation of the causes of the conflict and the meaningful participation process of the project development groups (see also Beierle & Konisky, 2000; Santiso, 2001).

The overall findings of this study are illustrated in Figure 9.

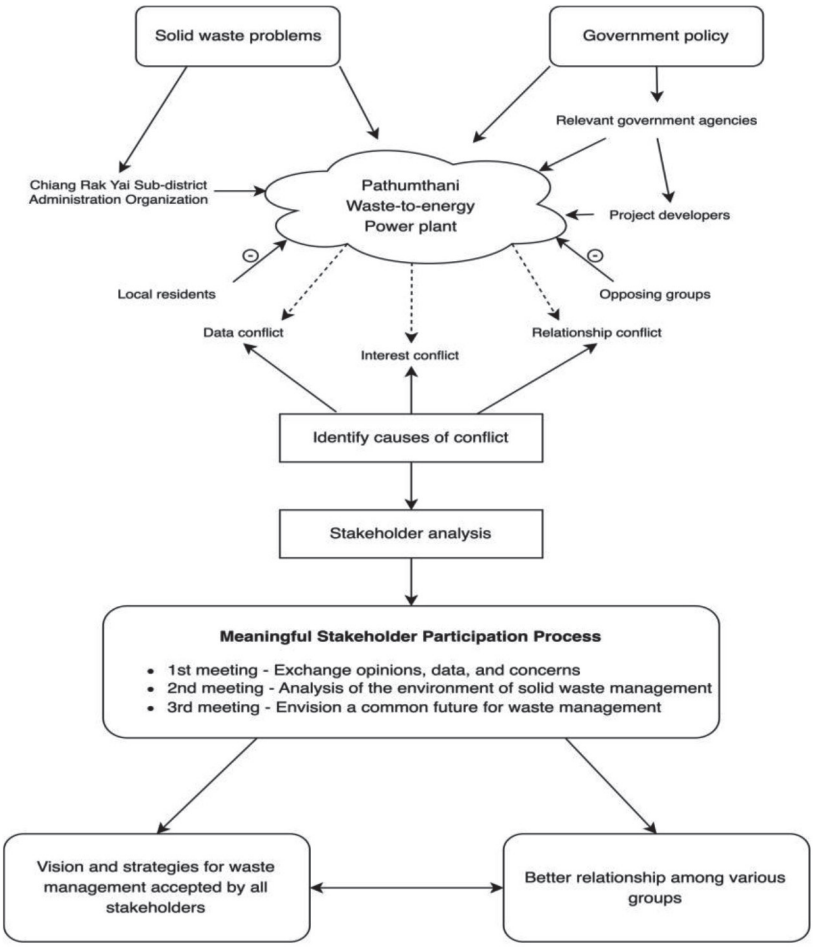

Figure 9: The Overall Findings of this Study

Recommendations

Recommendations for the construction of power plant projects based on lessons learned from this study to avoid or resolve the conflicts are as follows:

1. Complete Information Dissemination: Providing comprehensive and genuine information to local communities is crucial. This transparency aids in building trust between project owners, related agencies, and the affected population.
2. Establishing a Tripartite Committee: Involving government representatives, project owners, and local communities in a tripartite committee can facilitate negotiations and conflict resolution.
3. Environmental Impact Assessment: Conducting a thorough environmental and health impact assessment is necessary for waste-to-energy projects. Addressing community concerns and predicting potential issues during project execution can alleviate their worries.
4. Expert Personnel: Hiring specialized personnel for efficient waste management is vital. Adequate staffing ensures timely work and minimizes project shortcomings and adverse impacts.
5. Compensation Budget Allocation: Allocating funds to compensate and alleviate the impacts on affected communities showcases responsibility towards the public and ethical conduct.
6. Comprehensive Waste Disposal Centers: Establishing efficient waste disposal centers managed by government or provincial authorities, away from residential areas, is crucial. These centers should employ effective waste disposal methods, ensuring maximum benefit and minimal community impact.

By implementing these solutions, conflicts related to waste-to-energy projects can be mitigated, promoting better community understanding and acceptance, and, ultimately, leading to the sustainable development of the area.

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