Aspirasi: Jurnal Masalah-Masalah Sosial | Volume 14 No 1, June 2023
ISSN: 2086-6305 (print) ISSN: 2614-5863 (electronic)
https://doi.org/10.46807/aspirasi.v14i1.3143
link online: http://jurnal.dpr.go.id/index.php/aspirasi/index

Mapping Survey of Public Acceptance on Development Nuclear Power Plant in Bangka Belitung Province

Survei Pemetaan Penerimaan Masyarakat terhadap Pembangunan PLTN di Provinsi Bangka Belitung

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Received: April 27, 2022 | Revised: December 31, 2022 | Published: June 30, 2023

Abstrak: *Indonesia sebagai negara yang belum memiliki Pembangkit Listrik Tenaga Nuklir (PLTN) masih perlu melakukan riset untuk mengkaji penerimaan masyarakat. Bangka Belitung merupakan kandidat lokasi pembangunan PLTN oleh* BATAN

dan kepulauannya diprediksi akan menjadi pionir energi baru dan terbarukan dari mineral ringan yaitu torium. Oleh karena itu, penelitian di Bangka Belitung bertujuan untuk mengetahui penerimaan masyarakat terhadap pembangunan PLTN. *Penelitian ini menggunakan metode gabungan* (mixed-method), *dan pengumpulan data dilakukan dengan survei pada 1.500 responden yang terdiri dari penduduk Bangka Belitung. Analisis kuantitatif dalam penelitian ini menggunakan statistik deskriptif dan uji* Chi-Square, *sedangkan analisis kualitatif dengan kualitatif deskriptif. Hasil penelitian menunjukkan bahwa sebagian besar masyarakat Bangka Belitung menyambut baik rencana pembangunan* PLTN *tersebut. Total penerimaan masyarakat di Provinsi Bangka Belitung sebesar 73,73 persen, yang didukung oleh persepsi masyarakat yang setuju dengan manfaat* PLTN *sebesar 94,27 persen, risiko* PLTN *sebesar 70,93 persen, itikad baik pengembang* PLTN *sebesar 92,53 persen, dan kompetensi operator* PLTN *sebesar 93,53 persen. Terkait jarak, masyarakat yang setuju pada pembangunan pembangkit listrik ini menginginkan jarak sejauh 30 km dari pemukiman penduduk. Belum ada indikasi fenomena not in my backyard di Bangka Belitung, tetapi masih ada kesalahan persepsi di masyarakat mengenai risiko* PLTN. *Dikarenakan peran pemerintah yang terbatas, Dewan Perwakilan Rakyat (DPR) perlu memfasilitasi pendampingan masyarakat dan mendorong pemerintah untuk mengimplementasikan strategi sosialisasi untuk mengedukasi manfaat dan risiko pembangkit listrik tenaga nuklir.*

***Kata Kunci*:** not in my backyard (NIMBY); *pembangkit listrik tenaga nuklir*; *penerimaan masyarakat*; *torium*

Abstract: Indonesia, as a country that does not have nuclear power plant (NPP), still requires research to examine public acceptance. Bangka Belitung is a candidate for NPP locations by BATAN, and the islands are predicted to become pioneers of new and renewable energy from a light mineral, thorium. Thus, research in Bangka Belitung aims to determine the public acceptance of an NPP development. This study used a mixed method, and the data were collected by survey with 1,500 respondents consisting of residents in Bangka Belitung. The quantitative analysis in this study was descriptive statistics and Chi-square test, while the qualitative analysis was with descriptive qualitative. The result showed that most Bangka Belitung people welcomed the NPP's development plan. Total public acceptance in Bangka Belitung Province is 73.73 percent. Public perceptions agree with the benefits of NPP at 94.27 percent, the risks of NPP at 70.93 percent, the goodwill of NPP developers at 92.53 percent, and the competence of NPP operators at 93.53 percent. Regarding the distance, the neighbourhood wanted for this electric power plant to be 30 km away from the residential areas. There was no indication of the NIMBY phenomenon in Bangka Belitung, but there were still misperceptions in the community caused by perceptions of the risk of NPP. Due to the limited government role, the DPR RI must step in and facilitate community assistance while encouraging the government to devise effective strategies to develop a dissemination strategy to educate the benefits and risks of nuclear power plants.

Keywords: not in my backyard (NIMBY); nuclear power plant; public acceptance; thorium

Introduction

Nuclear power plants (NPPs) are complex projects that often face challenges related to public acceptance. Research on public acceptance of NPPs has been conducted in various countries, both with and without existing NPPs. Studies have revealed varying levels of public acceptance in different nations, with Slovenia at 15.70 percent,

Finland at 24 percent, Brazil at 31 percent, Germany at 34 percent, Japan at 42 percent, China at 42 percent, the United States at 52 percent, France at 66 percent, and the United Arab Emirates 83 percent (Ipsos, 2011; Wang & Kim, 2018; WIN-Gallup International, 2011; World Nuclear Association, 2017). In Indonesia, research has focused on national-level support, experimental power reactor development plans, and the role of trust in influencing acceptability. However, there needs to be a survey on accepting the NPP development plan in Bangka Belitung.

Bangka Belitung has been identified as a potential location for NPP due to its suitability for new and renewable energy (NRE) initiatives using thorium (Kusumo, 2021). A feasibility study conducted by the National Nuclear Energy Agency (BATAN, 2017b) has identified Bangka Belitung and the Muria Peninsula in Jepara, Central Java, as feasible sites for NPP construction. Public acceptance of the NPP construction plan in Bangka Belitung Province reported in 2016 was 67.50 percent (BATAN, 2017a). The region possesses abundant natural resources, including the potential for thorium, which is believed to be a by-product of tin mining (BPS Bangka Belitung, 2021). The development plan for the NPP is tied to public acceptance and will play a significant role in its implementation.

The escalating energy demand driven by population growth and industrialization in Indonesia is expected to become a significant challenge. The national energy policy aims to distribute a power-generating capacity of approximately 115 GW by 2025 and around 430 GW by 2050 (Kementerian Energi dan Sumber Daya Mineral, 2019). The target for NRE is a minimum of 23 percent by 2025, which includes nuclear as one of the sources. The depletion of fossil energy resources and commitments to address climate change necessitates exploring alternatives, with NPPs offering significant potential for carbon-free energy production.

Public acceptance of NPPs plays a crucial role in addressing concerns and challenges related to their development. The "not in my backyard" (NIMBY) phenomenon reflects a public reluctance to have NPPs near their homes or workplaces. Three big nuclear accidents worldwide affected the public acceptance of NPP for a long duration: Three Mile Island (TMI) in 1979, Chernobyl in 1986, and Fukushima in 2011 (Jang & Park, 2020; Rankin et al., 1981; Invernizzi, 2020; IAEA, 2017). However, the government of China acted against this trend, implementing an ambitious nuclear power strategy (Wang et al., 2020). Public acceptance varies due to personal, psychological, and contextual factors (Wright, 2008). In addition, a standard is created to determine an acceptable level of acceptance for NPP development (Kartono et al., 2023). Therefore, analyzing public acceptance and perceptions is essential, particularly within the local communities affected by NPP development. The study aims to determine the level of public acceptance in Bangka Belitung and explore public perceptions regarding the benefits and risks of NPPs, trust in authorities, and the proximity to NPP development. This study has two research questions. First, what is the level of public acceptance of the NPP in Bangka Belitung? Second, what are the public's perceptions of the benefits of NPP, the risks of NPP, the level of goodwill trust, the level of competence trust, and the distance to the development of NPP? The survey results will provide a benchmark for developing public education programs and will be conducted annually to monitor changes in public acceptance over time.

The current regulatory framework for nuclear power in Indonesia includes laws addressing safety, security, and environmental protection. These regulations are undergoing amendment to align with national energy policies and plans. The responsibility for constructing and operating nuclear reactors lies with BATAN. The issue of

public acceptance of NPP development needs to be addressed by the DPR RI due to its legislative role, the importance of public support for successful project implementation, implications for national energy security and sustainability, economic opportunities, and the democratic and participatory nature of the issue. By proactively engaging with this issue, the DPR RI can contribute to shaping policies and decisions that align with public expectations, promote sustainable development, and ensure the welfare of the Indonesian.

Most of the previous research on nuclear in Indonesia was conducted by BATAN. The results from 2010 to 2017 show that public acceptance tends to increase; the latest data from 2017 was 77.53 percent of Indonesia's population supported constructing NPPs (BATAN, 2017a). Public acceptance of the reactor experiment in Puspiptek Serpong conducted by Mudjiono et al. (2019) showed that 75 percent of respondents agreed with the development plan to meet electricity needs. Sugiawan and Managi (2019) researched the role of trust in affecting NPP acceptability in Indonesia. Indonesia does not yet have an NPP, but research is needed because there was already a plan to develop an NPP in Jepara, but the public has rejected it (Laksono et al., 1995). Badruddin's research (2010) also shows that there was community resistance by carrying out demonstrations at the Jepara government center and sealing off the NPP research area. Problems with public acceptance made NPP development experience some considerable setbacks. This research differs from previous studies; the variables studied include public acceptance, including perceptions of NPP's benefits, NPP's risks, the level of goodwill trust, the level of competence trust, and the distance to the development of NPP.

Research on public acceptance of the NPP in Bangka Belitung was conducted by survey method in 2021, with 1,500 respondents determined by proportional area random sampling. The study results will be the basis for preparing the initial public education design. The quantitative analysis in this study was discrete with frequency and percentage tables. Analysis of the relationship between variables was completed with the Chi-square test. The qualitative method approach was conducted with a focus group discussion attended by 30 representatives of the strategic stakeholder community in Bangka Belitung. The qualitative analysis was performed with descriptive qualitative.

Measurements of Public Acceptance

Studies about the acceptance of nuclear energy usually focus on people's attitudes toward nuclear energy. At the individual level, many studies about people's attitudes toward nuclear energy have focused on the risk perception toward nuclear power energy, despite the survey data revealing the existence of visible cross-country variations in attitudes (Jäckle & Bauschke, 2012). Those studies analyzed individual perspectives within the country regarded as a given context, not a viable predictor (Wang & Kim, 2018). Venables et al. (2012) measured NPP acceptance by asking subjects if they agreed with the local construction of a new NPP. Xiao et al. (2017) added a new item to measure residents' acceptance of nuclear energy; the respondents were asked whether nuclear energy is acceptable for power generation. In addition, subjects were also asked if they involuntarily lived next to an NPP. These items measure respondents' acceptance of NPPs from individual-centered, community-centered, and society-centered positions, respectively. Three big nuclear accidents worldwide affected the public acceptance of NPP for a long duration: Three Mile Island in 1979, Chernobyl in 1986, and Fukushima in 2011 (Jang & Park, 2020). Rankin et al. (1981) explain that the

Three Mile Island (TMI) accident in April 1979 made the public somewhat evenly split in believing that reactors were safe or unsafe. However, the percentage of people who were previously undecided about the reactor safety issue decreased in the late 1970s. In contrast, the rate of those who believe reactors are unsafe has increased. These changes were evident before TMI. A plurality of most of the public still believes that an NPP can explode like an atomic bomb. Finally, the public believes the government should help ensure NPP safety.

Public Acceptance

Xiao et al. (2017) measured residents' trust by the feeling of trust in NPP authorities (including government departments, the operators of NPPs, research institutes, and experts). All the items for trust assessment were divided into two dimensions: goodwill trust and competence trust. The former focuses on evaluating sincerity and reliability, while the latter concerns feelings about the capabilities to manage risk. The risk perception of NPPs with three variables: perceived health threats, perceived harm to the next generation, and perceived chance of nuclear accidents. Generally, the perceived risk and perceived benefit are critical factors for the public acceptance of nuclear power. The model of public acceptance of NPP developed by Xiao et al. (2017) is shown in Figure 1.

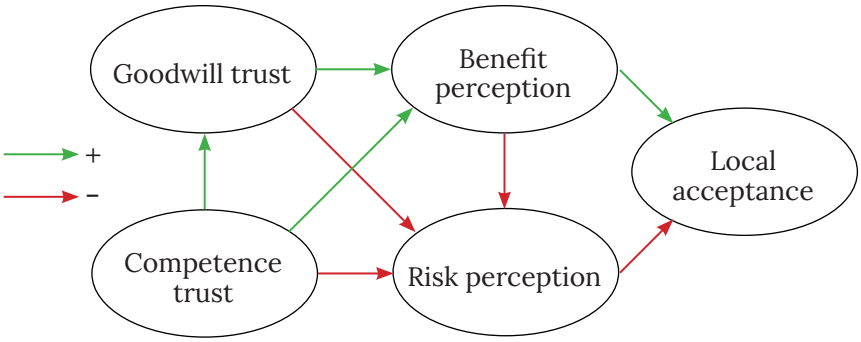

Figure 1. Public Acceptance of Nuclear Power Plants Model
Source: Xiao et al. (2017, p. 5).

Based on research conducted by Xiao et al. (2017), four variables affect public acceptance of NPP: goodwill trust, competence trust, benefit perception, and risk perception. The present study used five variables supporting total public acceptance in Bangka Belitung. The new variables include perceptions of the benefits of NPP, the risks of NPP, the level of goodwill trust, the level of competence trust, and the development distance.

Public Acceptance of NPP in Bangka Belitung

Public acceptance is one of the essential aspects of the plan to develop NPP in Bangka Belitung Province. Public acceptance plays a crucial role in facilitating the establishment and development of NPP for local, national, and international interests. Based on the survey results of 1,500 respondents in Bangka Belitung Province, the results can be seen in Figure 2.

According to Figure 2, the graph of 1,500 respondents indicates that as many as 1,106 respondents (73.73 percent) agreed, and the remaining 394 respondents (26.27 percent) disagreed. It denotes that residents of Bangka Belitung accept and agree to construct an NPP. It is based on the survey that implies that the community agrees that power plants benefit people's lives. In addition, the community also agrees and

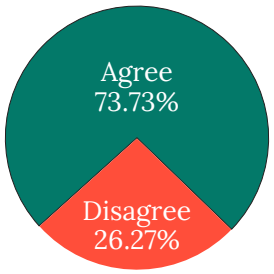

Figure 2. Percentage of Public Acceptance of Nuclear Power Plants
Source: Survey Results (2021).

believes that experts and professionals manage NPPs. However, the community is uneasy regarding several factors, such as the risk of NPPs and the distance of the power plant construction.

Bangka Belitung province comprises six regencies and one city, including Bangka, Belitung, Pangkal Pinang, West Bangka, Central Bangka, South Bangka, and East Belitung. Each region's level of public acceptance is undoubtedly different because the above factors influence it. The distribution of public acceptance of NPPs by region is shown in Figure 3.

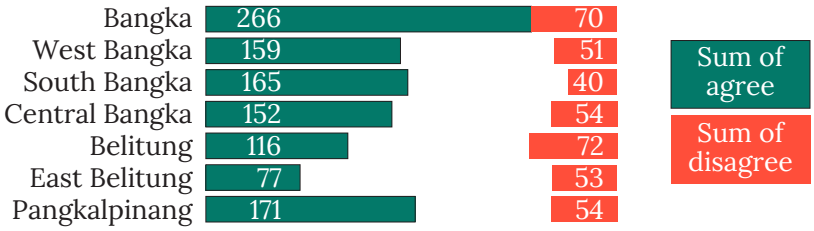

Figure 3. Distribution of Public Acceptance of Nuclear Power Plants by Region
Source: Survey Result (2021).

Figure 3 shows variations in acceptance between regions, with the highest level of acceptance in Bangka and the lowest level in East Belitung. Meanwhile, the highest rejection was in Belitung, and the lowest was in South Bangka. In addition, Figure 3 also shows that Pangkalpinang as a city has a public acceptance result that is not higher than the regencies in Bangka Belitung.

Based on empirical public opinion studies by Sundström & McCright (2016), few public attitudes about nuclear power analyzed possible gender differences. Their review from the early 1970s to the mid-1990s examines women more concerned with the safety and concern of others than men. To determine the distribution of gender on public acceptance of NPPs can be seen in Figure 4.

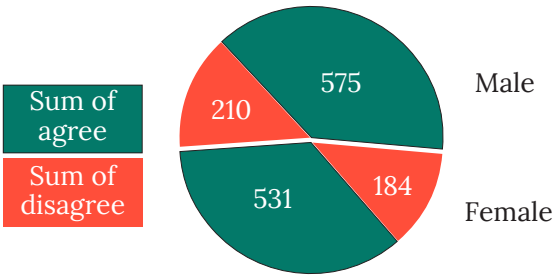

Figure 4. Comparison of Total NPP by Gender
Source: Survey Result (2021).

Figure 4 implies that 1,106 respondents (73.73 percent), including male and female, agreed to develop an NPP in their area. The details of the gender distribution are as

follows: 35.40 percent female (531 respondents) and 38.33 percent (575 respondents) male. According to a study by Wisnubroto et al. (2019), women tend to be more careful in supporting the NPP program. Consequently, the focus of nuclear technology socialization can be directed more toward women groups. Socialization for women groups aims to increase their understanding and afterward be able to influence their families.

Data collection on respondents' last education and knowledge related to NPPs was carried out to determine the distribution of the respondents' educational backgrounds. The highest number of respondents with high school education/equivalent (36.07 percent), elementary school/equivalent (28.87 percent), junior high school/equivalent (16.06 percent), university (10 percent), and elementary school dropout (7.87 percent), and others did not answer (0.60 percent). The data in Table 1 were obtained after calculating the frequency of each answer related to knowledge about NPPs.

Table 1. Knowledge about NPP

Level of Education	Frequency	Percentage (%)
Yes, I know and have heard about NPP	323	21.53
I have heard but not understood	604	40.27
I have never heard	568	37.87
No answer	5	0.33
Total	**1,500**	**100.00**

Source: Survey Result (2021).

Table 1 signifies respondent knowledge about NPP. It interprets that most respondents have heard but have yet to understand, reaching 604 respondents who have never heard at all, 568 respondents who know and have heard the information, 323 respondents, and five respondents who have yet to answer.

After processing the survey data, the results about public acceptance of NPP based on respondents' level of education are shown in Figure 5.

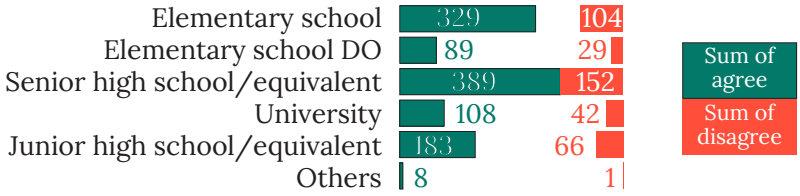

Figure 5. NPP Acceptance by Level of Education
Source: Survey Result (2021).

Figure 5 elaborates that based on level of education, 1,106 respondents from various education levels agreeing or accepting the plan to develop NPPs in their area. The details of the respondent's level of education are as follows: respondents from higher education level were 150 respondents; from high school, as many as 541 respondents; junior high school comprised 249 respondents; an elementary school with 433 respondents; elementary school dropout of 118 respondents; and those who did not answer or did not fill in the education level column were nine respondents. There were 1,500 respondents, and senior high school graduates did most of the questionnaires.

Data collection on the background of the respondent's occupation was conducted to determine the distribution of public acceptance based on the respondent's work. The majority of respondents were identified as homemakers/housewives (33.87 percent), followed by farmers/fishermen/labors (26.27 percent), entrepreneurs (16.40 percent), private employees (8.80 percent), unemployed (4.33 percent), students (4 percent), government employees (3.93 percent), retiree (1.53 percent) and respon-

dents who provided other occupations (0.87 percent). After analyzing the survey data, the results regarding the public acceptance of NPP among different occupational groups are illustrated in Figure 6.

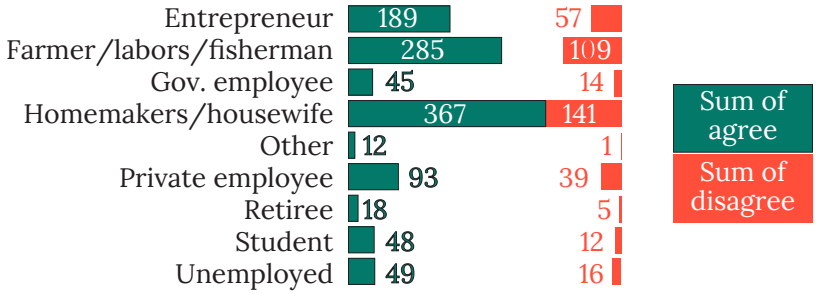

Figure 6. NPP Acceptance by Occupation
Source: Survey Result (2021).

Based on Figure 6, it can be explained that based on type of occupation, 1,106 respondents from various types of work agreed or accepted the plan to develop NPPs in their area. The details of the kinds of fields of the respondents are as follows: respondents working as entrepreneurs (246 respondents); farmers/fishers/laborers (394 respondents); government employees (59 respondents); homemakers (508 respondents); others (13 respondents); private employees (132 respondents); retired (23 respondents); students (60 respondents), and unemployment (65 respondents). Most of the questionnaire was done by homemakers.

The issue that the Bangka Belitung Provincial Government is most looking forward to and paying attention to now. The results in Figure 7 were obtained after conducting a survey and processing survey data.

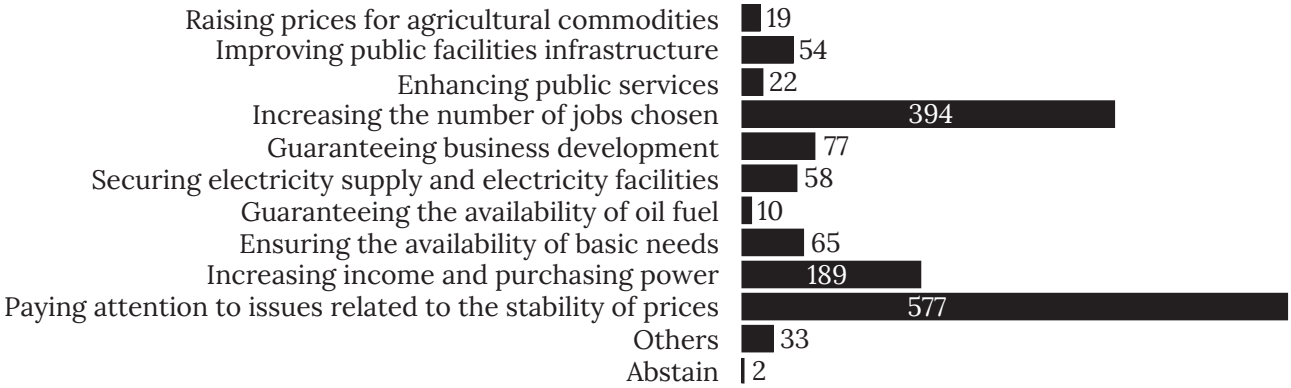

Figure 7. Issues Addressed by the Provincial Government of Bangka Belitung
Source: Survey Result (2021).

Figure 7 shows that 577 respondents wanted the Babel Provincial Government to pay attention to issues related to the stability of prices for necessities. This issue was chosen by the community of Babel the most. Then, it is followed by other issues, i.e., increasing the number of jobs (394 respondents), increasing income and purchasing power (189 respondents), guaranteeing business development (77 respondents), ensuring the availability of basic needs (65 respondents), securing electricity supply and electricity facilities (58 respondents), improving public facilities infrastructure (54 respondents), enhancing public services (22 respondents), raising prices for agricultural commodities (19 respondents), guaranteeing the availability of fuel oil by ten respondents, selecting the other 33 respondents, and choosing to abstain by two respondents. Yudha & Tjahjono (2019) indicated that Indonesia's policies are imperfect, given that the renewable energy industry is still minimal, especially with falling

oil prices. In the future, it is hoped that the government can formulate a breakthrough policy to improve existing policies in the renewable energy sector, such as by giving ease to investors in the renewable energy sector, including the effective and efficient supply chain management of renewable energy.

Information about NPPs can influence people's perceptions. Based on research conducted by Nakayama et al. (2019), considering that the source of information may affect resident anxiety, the literature indicates that media plays an essential role in providing information and shaping perceptions. Sources of information about NPPs play a crucial role in disseminating information. Table 2 shows the source of information regarding NPP in Bangka Belitung.

Table 2. Source of Information regarding NPP

Source of Information	Frequency	Percentage (%)
Friends/family/local opinion leader/village officers	275	18.33
Mass media and social media	704	46.93
School/textbook/NGO	56	3.73
Governor/mayor/member of local parliament	3	0.20
Do not have an information source	416	27.73
No answer	46	3.07
Total	**1,500**	**100,00**

Source: Survey Result (2021).

Table 2 indicates the respondents' sources of information about NPPs. Most respondents' sources of information are mass media, including local/national TV, radio, and newspapers/online newspapers, and social media (46.93 percent). NPP information sources from friends/family/local opinion leaders/village officers were 18.33 percent, schools/textbooks/NGO socialization activities were 3.73 percent, respondents answered who do not have information source about NPP were 27.73 percent, and 3.07 percent did not respond. The smallest percentage is the governor/mayor/member of local Parliament, which is only 0.02 percent (3 respondents).

The government, including governors, the mayor, and the local parliament, acts as a local source of information on NPPs in Bangka Belitung Province. However, in this study, the percentage of the government as a source of information related to NPP still needs to be higher. This role needs to be increased, considering the importance of NPP information for developing NPPs in Bangka Belitung and Indonesia nationally. Based on research conducted by Clarkson (1995), accepting or rejecting responsibility for results and effects on stakeholders is central to characterizing and evaluating a company's strategy or posture. Taherdoost (2018) defined acceptance as "an antagonism to the term refusal and means the positive decision to use an innovation." Decision-makers need to know the issues that influence users' decisions to use a particular system so they can take them into account during the development phase.

Public's Perceptions of The Benefits of NPP, The Risks of NPP, The Level of Goodwill Trust, The Level of Competence Trust, and The Distance to The Development of NPP

The total public acceptance in Bangka Belitung Province is 73.73 percent, supported by public perceptions of the NPP's benefits, the NPP's risks, the NPP developers' goodwill, and the NPP operators' competence. Overall, supporting factors of total public acceptance are presented in Figure 8.

According to Figure 8, more than 90 percent of the people of Bangka Belitung agree on the benefits of NPP, the goodwill of NPP developers, and the competence of NPP operators. Respondents who considered NPPs' help for the community's lives were 94.27 percent. The benefits include NPP producing environmentally friendly electricity that can be used in the long term, and NPP also can create new jobs that impact the community welfare. The goodwill of NPP developers was received by 92.53 percent of the residents of Bangka Belitung, which implies that the respondents agree that the developers have goodwill in managing NPP. NPP competence resulted in 93.53 percent of respondents agreeing that NPP will be adequately handled by compatible and professional managers in their fields. However, 70.93 percent of respondents also agree that NPPs have risks to human life.

Figure 8. Distribution Percentage of Public Acceptance of Nuclear Power Plants
Source: Survey Result (2021).

There are still misperceptions in the community caused by perceptions of the risk of NPP. After calculating per question item, the results of each item will be compared from the sub-perceptions of risk. Figure 9 shows the comparison.

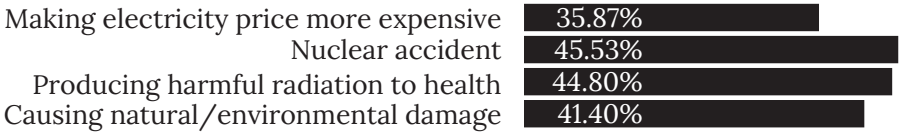

Figure 9. Percentage of NPP Risk Comparison
Source: Survey Result (2021).

Figure 9 shows that most respondents answered constructing an NPP has a risk of a nuclear accident (45.53 percent). After having the trouble of a nuclear accident, the most chosen in the perception is a chance. It is followed sequentially by the risk of producing radiation that is harmful to health (44.80 percent), causing environmental damage (41.40 percent), and making electricity prices more expensive (35.87 percent). Bronfman et al. (2012) identified that the risk of threatening future generations' lives might be due to specific attributes of hazards related to these technologies that cause people to perceive them as unknown, dreadful, and with a high sign of social amplification, and therefore, highly uncertain.

After calculating per item, the results for each item from the sub-benefits will be compared. Figure 10 shows the NPP benefits comparison.

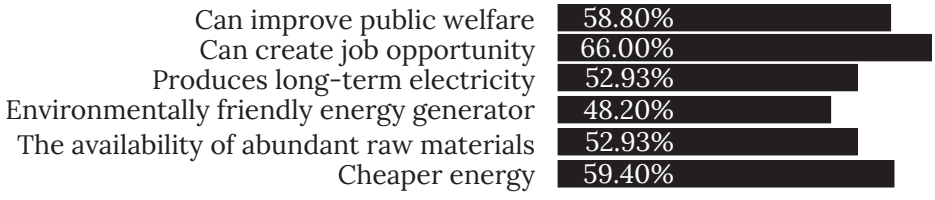

Figure 10. Percentage of NPP Benefits Comparison
Source: Survey Result (2021).

Figure 10 indicates that most respondents answered that constructing an NPP can open new jobs (66 percent). It means that the benefits that will be obtained by the community from the construction of this power plant are the availability of new

job vacancies. After opening new job opportunities, in terms of advantages, it is then followed sequentially by the availability of cheaper energy (59.40 percent), improved public welfare (58.80 percent), availability of long-term energy (52.93 percent), availability of abundant raw materials (52.93 percent), and environmentally friendly energy (48.20 percent).

Due to the NIMBY phenomenon, the construction of NPPs in remote areas (far from settlements) is also determined by the distance to the NPP locations that are acceptable to the public. After calculating the questions per item, the per-item results of the NPP sub-distances are compared. Figure 11 shows the comparison.

Figure 11. Acceptable Distance of NPP Location
Source: Survey Result (2021).

According to Figure 11, the acceptable distance of the NPP location shows that it should be built within 30 km of residential areas (1,185 respondents), 25 km (117 respondents), 20 km (99 respondents), 15 km (84 respondents), and within 5 km from residential areas (15 respondents). It implies that residents agree and accept the construction of an NPP if it is far from residential areas, which is 30 km.

People's acceptance at the farthest distance from the NPP site is a kind of NIMBY phenomenon. It means people agree on NPP's development but still worry about the impact. This worry is because of their unknown situation living around the nuclear reactor. In Indonesia, there are three nuclear reactors: (1) Triga Mark Bandung Reactor, (2) Kartini Reactor, Babarsari, Sleman, Yogyakarta, dan (3) Serba Guna Reactor, Serpong. Mudjiono et al. (2019) conducted research among people living around Serba Guna Reactor, Serpong. The result concluded that 75 percent of people agreed, seven-percent disagreed, and 18 percent had no answer for reactor experiment for electrical power plan.

Based on the report of Murakami and Anbumozhi (2019), it is getting easier to site or operate a nuclear facility after gaining public acceptance from stakeholders, including residents. More efforts are needed to improve further public involvement, understanding, and approval of nuclear power for the future. In addition, more must be done, especially in non-host adjacent areas and municipalities, to secure public awareness and acceptance.

After calculating the per-item question, the results per item from the NPP sub-distance were compared. Figure 12 shows the comparison.

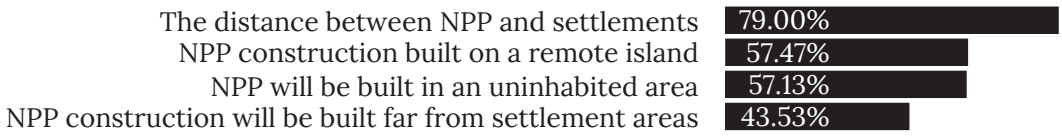

Figure 12. Percentage of NPP Distance Comparison
Source: Survey Result (2021).

Based on Figure 12, it can be inferred that the majority of respondents expressed a desire for NPPs to be constructed at a minimum distance of 30 km from populated areas (79 percent). Then, it is followed sequentially by development done on remote islands (57.47 percent), built-in uninhabited areas (57.13 percent), and built-in

settlement areas (43.53 percent). Based on the data above and supported by previous research related to the NIMBY phenomenon, there is no indication of the NIMBY phenomenon in Bangka Belitung.

Overall, only risk perception has lower acceptance in one of the five variables that affect public acceptance. The percentage of perceptions of risk is 70.93 percent, while other variables have an acceptance level above 90 percent. Differences in acceptance of each variable are influenced by gender, level of education, occupation, and region. Thus, we can develop a strategy to increase public acceptance in Bangka Belitung.

The existence of society's resistance, no matter how small, cannot be regarded as something that can be ignored. In the social context, community rejection is an obstacle to the social function of society. Society's rejection causes a gap between the attitudes expected by the environment and the attitudes that occur in the environment. In the plan to develop an NPP in the Bangka Belitung Province, which considers the broader public interest, the public's attitude who can accept the presence of an NPP in their neighborhood. The public's attitude who refuse is not in line with expectations. The results of the BATAN (2017a) and this research show that rejection by the Bangka Belitung people has occurred. Even though the rejection percentage is small, this requires particular action to respond. The response is directed at changing the attitude of those who refuse to accept. The form of response can be done in the form of social intervention. In line with its meaning, the goal to be realized through social intervention is a change in people's attitudes that lead to the functioning of social functions. When refusal becomes an obstacle to the implementation of social functions, then social interventions must be designed in such a way as to achieve acceptance.

Historical experience related to the development of NPPs became qualitative data obtained through FGDs. Although most of the public agreed (77.53 percent) on the public acceptance research conducted by BATAN (2017a), they doubted the results because there was no socialization regarding the research results. In addition, the community also wants to participate in the development of NPPs. The development of the tin industry in Bangka Belitung has also influenced the community's desire to be involved in developing an NPP. Previously, the community was not engaged as a workforce and in its utilization. Therefore, there is concern among the people that if the NPP development does not involve the community, then they will not get the benefits either.

Implementation of a qualitative approach in this research through 2 stages. The first stage that must be taken is to identify the problem. In the problem-solving stage, there are several sub-stages, where the first sub-stage is problem identification and determination. The public acceptance survey conducted on April 3-12, 2021, is a sub-stage of problem identification and determination of the problem identification stage. Problem identification has been obtained. The survey results show 394 or 26.27 percent of respondents disagreed with the development of NPP in the Bangka Belitung Islands Province, which is a valid problem identification to be defined as a problem that needs intervention. The second sub-stage of the problem-solving stage is the analysis of the dynamics of the social situation related to (1) Perceptions of the uselessness of NPPs by 5.73 percent; (2) Perceptions of the dangers of NPPs by 70.93 percent; (3) Perceptions of distrust of goodwill from developing NPPs by 7.47 percent; (4) Perceptions of distrust of the competence of NPP managers by 6.47 percent; and (5) Perceptions of the distance the community accepts for the NPPs development site, the majority chose the farthest distance of 30 km.

After the survey, the second stage of the qualitative approach is FGD. It was held on Thursday, 12 August 2021, at the Pasir Padi Room, the Office of the Governor of the Bangka Belitung Islands Province, and attended by 30 representatives of the strategic stakeholder community in a hybrid method. The purpose was to explore the condition of the acceptance of the Bangka Belitung community towards the NPP, particularly regarding the community's rejection of the development of the NPP. The community who are neutral and rejects cannot be denied. Therefore, actions are needed to change the attitude of the people who are still neutral or rejected. The reasons for the rejection and hearing of the community's request for NPP development were examined through this FGD.

The collection of qualitative data through FGD resulted in the reasons for the rejection of NPP development by the community, including (1) Rejection due to errors in providing information and education both in terms of content and method; (2) Rejection due to disappointment; (3) Rejection due to failure of past and future expectations; (4) Rejection because of an a priori attitude; (5) Rejection due to structural relationship with the government. In response to these five objections, through FGD with strategic urban actors and rural communities in several areas, resulting in recommendations for community involvement in the resolution. The recommendations in the FGD are included in 3 strategies for community involvement.

First, multiple entities should be involved in disseminating education and information to increase public awareness and knowledge about Nuclear Power Plants (NPPs). Apart from UBB, UNS, and PT. Thorcon Power Indonesia, the provincial and district-city governments, DPR RI, universities in Bangka Belitung Province, and non-governmental organizations actively participate in this effort. They utilize various media channels, including formal education, television, radio, and social media, to distribute information and education to the community.

Second, community empowerment, particularly in business development, is aimed at enhancing people's welfare. The survey results reveal that the community primarily expects the benefits of NPPs to be increased employment opportunities to ensure that the community is not solely reliant on the NPP for employment. Instead, it aims to strengthen the economic diversity of the community by generating new jobs through the availability of abundant electricity across the province.

Third, community engagement is crucial in environmental conservation when NPP development occurs in archipelagos or coastal areas. By prioritizing environmental conservation efforts in these regions, we enhance the well-being of the local coastal communities and safeguard the rich diversity of plants and wildlife inhabiting the beaches.

Based on these needs, it is necessary to formulate suitable social intervention models based on communities, educational institutions, government initiatives, and communication strategies. Based on research conducted by Bratspies (2009), regulatory institutions wishing to become trustworthy should consider introducing basic rules of procedural fairness and public involvement to ensure that procedures related to the assessment of electricity generation activities, such as environmental impact assessments, creation of ecological, social, and economic laws, among others remain fair, open, transparent, and inclusive.

Bronfman et al. (2012) researched the government's role in NPP development. The research results are that the high levels of uncertainty regarding the risks and benefits associated with using these electricity generation technologies reflect the true importance of trust in regulatory institutions regarding the public acceptability of contro-

versial technologies. This could affect decisions that will have a long-term impact on energy policies and, subsequently, on the country's development. Regulatory agencies must react quickly to develop and implement trust-enforcing strategies considering the current energy scenario and its projected evolution. Regulators must remember that today's decisions shape the country's energy landscape of tomorrow.

Apart from BATAN, DPR RI also plays an essential role in developing nuclear technology in Indonesia. According to Law (UU) No. 10 of 1997 concerning Nuclear, the Government determines the construction of an NPP after consulting with DPR RI. Due to the limited government (Governor/Mayor/Member of Local Parliament) role in disseminating information, there is a need for DPR to facilitate community assistance. A dissemination strategy can be developed to educate those who need to acknowledge the benefits and risks of NPPs. In the end, the public perception of the NPPs in their area is expected to change so that public acceptance of NPPs will be better.

Conclusion

This research draws several conclusions. The public acceptance of Nuclear Power Plants (NPP) in Bangka Belitung Province is 73.73 percent. This acceptance is supported by public perceptions that recognize the benefits of NPPs at 94.27 percent, the risks at 70.93 percent, the goodwill of NPP developers at 92.53 percent, and the competence of NPP operators at 93.53 percent. Public acceptance of NPPs is also analyzed based on geographical regions, gender, education levels, and respondents' occupations.

The study reveals that the region with the highest acceptance level is Bangka, whereas Belitung has the highest rejection rate. Among the respondents, males show a higher inclination toward accepting NPP development with 38.33 percent in favor. Respondents with a high school education background represent the highest number of acceptances 389 respondents, but 152 respondents with this background also express their rejection of NPP development. Homemakers demonstrate the highest public acceptance based on occupation (367 respondents).

However, it is noteworthy that the public recognizes the risks associated with NPPs, including potential threats to human life. The preferred location for the construction of NPPs is 30 km away from residential areas. Despite some misperceptions in the community regarding the perceived risk of NPPs, there is currently no evidence of the "Not In My Backyard" (NIMBY) phenomenon in Bangka Belitung.

Qualitative research findings indicate that the perception of risk contributes to people's refusal of NPPs, even though such rejection often stems from misconceptions, misinformation, and unmet expectations, such as employment opportunities and improved welfare. To address public rejection of NPPs, the following recommendations for community involvement are proposed: (1) dissemination of education and information about NPP by involving multiple entities; (2) community empowerment, especially in terms of business development to improve people's welfare; and (3) environmental conservation.

The findings of the research highlight the importance of the Republic of Indonesia's House of Representatives (DPR RI) taking an active role in the development of Nuclear Power Plants (NPPs). As the government's involvement in this matter is limited, it is crucial for the DPR RI to step in and facilitate community assistance while encouraging the government to devise effective strategies to educate individuals who may lack a comprehensive understanding of the advantages and risks associated with

NPPs. Moreover, the DPR RI should actively encourage both national and local governments to conduct additional studies on public acceptance of NPPs. By doing so, they can gather more insights and data to inform decision-making processes regarding the implementation of NPPs in the country.

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