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Public Communication in the Campaign to Utilize Biogas from Animal Manure as Renewable Energy

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Abstract. This research analyzes the public communication strategies used in the campaign to utilize biogas from livestock manure as renewable energy. This research understands the effectiveness of public communication strategies in raising public awareness about the potential of renewable energy from animal waste. The research method used is a qualitative approach, campaign theories, such as innovation diffusion theory and participatory communication theory, to analyze the effectiveness of the communication strategies used. Data were collected through interviews with campaign-related stakeholders, direct observation, and analysis of related documents. The results showed that public communication strategies were used, such as counseling, workshops, social media campaigns and mass media, successfully increasing the understanding of public interest in the utilization of livestock manure biogas. The campaign **"Green Energy Revolution: Biogas for a Sustainable Future."** The campaign will focus on promoting the utilization of biogas from livestock manure as an environmentally friendly and sustainable renewable energy solution. The findings provide insights into the development of effective public communication strategies in supporting the utilization of biogas, livestock manure as a renewable energy source at the local level. This research contributes to positive, sustainable policy and program development promoting animal manure renewable energy. A better understanding of effective public communication strategies, it is expected that the community will be more involved and supportive of efforts to create a sustainable and environmentally friendly energy future

keywords: Biogas, Campaign, Environment, Pulosari, Public Communication Strategy

INTRODUCTION

In this modern era, the need for clean and sustainable energy sources is increasingly urgent. World Economic Forum - Renewable Energy Growth in 2023: This article reports that global

renewable energy capacity increased by 50% in 2023 compared to the previous year, driven by significant solar PV capacity additions. COP28 emphasized the importance of accelerating the energy transition and called for a tripling of renewable energy capacity and a doubling of energy efficiency by 2030. The article also highlights the financing challenges for developing countries and the importance of community engagement in the energy transition(1).

Dependence on fossil fuels not only has negative environmental impacts, but also threatens the sustainability of natural resources. Therefore, innovations in renewable energy technologies are becoming increasingly important solutions to implement. One promising innovation is the utilization of animal manure as a new clean and renewable energy source. Utilizing animal waste for energy, through technologies such as biogas, offers a range of benefits, including reduced greenhouse gas emissions, more efficient waste management, and increased energy independence for local communities. However, despite the clear benefits, the adoption of this technology still faces various challenges, including a lack of public awareness and understanding, negative stigma, and lack of support from stakeholders.Untuk itu adanya kesadaran yang dibangun oleh masyarakat harus ditingkatkan terutama dalam peningkatan kapasitas pola komunikasi dalam memberikan informasi dan mengkampanyekan pola hidup sehat dari sampah rumah tangga. Pola komunikasi merupakan sebagai model atau sistem yang berhubungan satu sama lain untuk mencapai tujuan literasi di dalam situasi Masyarakat(2).

The importance of communication strategies in the form of effective and innovative campaigns. Communication not only serves as a tool to convey information, but also as a means to change perceptions, build support, and encourage active participation from the community. Through appropriate communication campaigns, innovations in renewable energy technologies can be widely introduced, accepted and implemented(3). This campaign helps the government, and the community needs to work together to encourage the utilization of animal waste as a new energy source. By increasing public education and awareness, animal waste as a new energy source. developing biogas processing technology, biogas processing technology needs to be developed to make it cheaper and more accessible to the community. Providing incentives and support, the government can provide incentives and support to communities and entrepreneurs who want to build biogas installations.

This campaign uses Diffusion of Innovation Theory and Relevance. This theory examines how new innovations (in this case, biogas technology) spread within a social group. It identifies five categories of individuals based on the speed at which they adopt innovations: innovators, early adopters, early majority, late majority, and laggards. Relevance, helps to identify key target groups for your campaign and design messages that match the characteristics of each group. Rogers, explains that there are four main theories related to the diffusion of innovations, namely the innovation decision process theory, individual innovation theory, adoption rate theory, and perceived attribute theory. As such, this study is expected to provide valuable insights into how innovative communication campaigns can support the development and adoption of renewable energy technologies in communities.

Raising Awareness: PR campaigns help people understand the benefits and importance of renewable innovations. Building a Positive Image: The campaign can build a positive image for the company or organization that developed the innovation. Encouraging Adoption: Effective PR campaigns can encourage communities, businesses and governments to adopt new technologies. Build Networks: The campaign can help build a network of collaboration between various stakeholders.

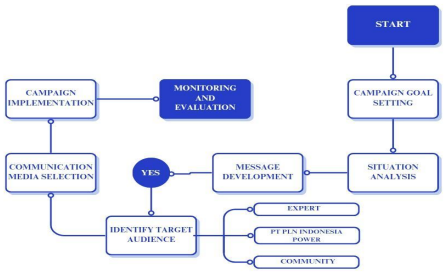


Figure 1: Steps of the campaign conducted

METHODS

This research uses a qualitative approach with a case study method to understand and evaluate the effectiveness of public relations (PR) campaigns in promoting renewable energy innovations, especially the use of animal waste as a new energy source. Qualitative methods seek to understand a symptom as understood by the respondents studied, with an emphasis on the subjective aspects of a person's behavior(4). Then Taylor and Bogdan state that qualitative research provides an opportunity for researchers to understand how respondents describe the surrounding world based on their way of thinking(5). The research was conducted at PT Indonesia Power and the area where the CSR program was implemented. The research subjects include CSR managers, related staff, local partners, and beneficiary communities.The research subject is a character characteristic, or value of a person, object, or action that has a predetermined variable from which conclusions will be formed(6). The subjects in this study are those who are responsible and really master and know the research theme. Therefore, the author took 5 sources, 2 sources from internal parties from Indonesia Power and 3 from external parties, namely residents in Pulosari Village.

Table 1. List of Names of Research Subjects

No	Department
Mulyano Kusumah S.T	Unit Manager of Gunung Salak PLTP
Muchtar	Comdev Officer of Gunung Salak PLTP Unit
H. Marwan Hamami, MM	Regent of Sukabumi
Arif Solihin	Head of Kalapanunggal sub-district
Dirja Miharja	Head of Pulosari village Kalapanunggal

Data collection techniques are techniques used to collect data to be studied. This technique requires strategic and systematic steps to obtain valid data and also in accordance with reality to produce the data we need in this study, thus researchers use data collection techniques as follows:
1) Primary Data

According to Sujarweni Primary data is data that has been collected from sources such as interviews conducted by researchers or those participating in the research process(7).

a. Interview

An interview is a meeting of individuals with the aim of sharing knowledge and understanding of a subject through the use of a question and answer format. Having a discussion with a definite purpose is what makes it an interview. This method of data collection relies at least in part on reports of personal knowledge and beliefs. The researcher will use unstructured interviews to obtain information from key informants. Interviews with informants are conducted according to the place and time determined by the researcher and the research subject. To gather information, unstructured interviews do not follow a predetermined protocol. The interview guide only provides a synopsis of the questions to be asked.

b. Observation

Researchers will make observations by means of field observations. By seeing firsthand the activities carried out by Indonesia Power when conducting socialization related to the use of animal waste.

2) Secondary Data

Secondary data is data collected or obtained by researchers from previous sources (Hasan Z, 2002). Initial information collected from literature, library materials, previous research, books, and other relevant sources is used to support this research. Secondary data collection procedures were also assisted by literature and additional data sources.

Data analysis is defined as the act of ordering, organizing, and categorizing data into fundamental description units. Efforts to work with data, organize it, arrange it into manageable stages, synthesize it, explore and make patterns, find something significant to learn, and determine something that can be shared with others are about analyzing data(8).

This in this study, the qualitative data analysis process will be carried out by:

1. Collecting reduced information (Data Reduction). Raw information obtained from the field and other sources can be simplified, abstracted, and transformed through a process known as “data reduction”.
2. Displaying information (Display Data) It is possible to make conclusions and take
3. action based on the way this data is organized. Narrative text is a frequently used format for previously qualitative data.
4. Draw conclusions (Verification) The importance of the information collected will be discussed in this study. Preliminary, vague, rigid, and dubious conclusions can be drawn from this fact, but they need to be validated before use. Data reduction and data display are re-examined to ensure that the findings reached are consistent.

Following these principles helps researchers determine the validity of data. Triangulation is a method of evaluating the accuracy of data using different sources versus information used to demonstrate that all the Information that has been collected and investigated is accurate. Thus, it is ensured that the data obtained and collected is accurate. Sugiyono claims that triangulation in this trust test is determined by comparing information from various sources in different ways and at different periods. Therefore, researchers use methods to assess the truth of data through triangulation(6). Among the triangulation applications, the author uses source triangulation,

carried out by checking back to the source of information obtained from the previous source. This is done in a method of comparing data from observations with data from interviews.

RESULTS AND DISCUSSION

In forming communication in this program, it creates a change (behavior change) in society, where initially people who previously managed livestock traditionally, which gave less results and had potential environmental impacts, switched to a more modern livestock model. Campaign Issues in Public Communication Research on the Campaign to Utilize Biogas from Animal Manure as Renewable Energy. This research focuses on several main issues related to the campaign to use biogas from livestock manure as renewable energy. The following is a narrative regarding these issues:

Effectiveness of Communication Messages

First, this research will evaluate the effectiveness of the communication messages used in the campaign. Clarity and simplicity of messages are very important so that they are easily understood by the public. In addition, the relevance of the content will also be evaluated to ensure that the campaign message is appropriate to the needs and conditions of the local community. This research will also examine the effectiveness of the communication channels used, such as mass media, social media, and direct outreach, in spreading campaign messages.

Public Acceptance and Perception

The second issue is public acceptance and perception of this campaign. This research will evaluate the level of public acceptance of the idea of using biogas from livestock manure. In addition, this research will assess whether the public understands the benefits of biogas from an economic, environmental and health perspective. Community concerns and resistance to the adoption of biogas technology will also be identified.

Community Participation and Involvement

This research will also discuss the level of community participation and involvement in this campaign. The level of participation of communities actively involved in the program and adopting biogas technology will be evaluated. The role of local communities, NGOs and local government in supporting and facilitating the campaign will also be analyzed. In addition, the inclusivity of the campaign, namely whether it covers all levels of society, including vulnerable groups and minorities, will also be examined.

Inter-Stakeholder Support and Collaboration

This research will evaluate support and collaboration between stakeholders in this campaign. The role of government, including policy support and facilities provided, will be analyzed. Collaboration between government, NGOs, the private sector and society in implementing campaigns will also be studied. In addition, the availability of funds and resources to support the implementation of biogas technology in the community will also be evaluated.

Program Sustainability

This research will also discuss the sustainability of the biogas program. The community's ability to maintain and manage the biogas installation after the initial phase of the campaign will be evaluated. The maintenance systems and technical support available to the community will also

be analyzed. Mechanisms for evaluating and monitoring the development and long-term impact of the program will also be examined.

Obstacles and Challenges

Finally, this research will identify the obstacles and challenges faced in this campaign. Technical obstacles in biogas installation and maintenance will be analyzed. Social and cultural barriers influencing the adoption of biogas technology will also be identified. Apart from that, the economic challenges faced by the community in accessing and utilizing biogas technology will also be discussed. By examining these issues, the research is expected to provide a comprehensive picture of the dynamics of public communication in biogas utilization campaigns and identify effective strategies to increase public awareness and participation.

Social Innovation as an Answer to Problems

Based on this problem, PT Indonesia Power PLTP Gunung Salak is committed to addressing the problem through a CSR program based on empowerment and the environment with the program title "PERRISAI (Program for Making Bioslurry from Biogas By-Products)". So starting from 2019, PT Indonesia Power Unit PLTP Gunung Salak collaborated Local Hero (Mr Ade Iwan) who was the driving force to pioneer the cultivation of sheep farming in Pulosari Village which was replicated by the group assisted by IP in Cibereum Village, Purwabakti Village which had successfully implemented the program. This cultivation program can help the community improve the community's economy independently. From the sheep cultivation program that is already running PT Indonesia Power Unit PLTP. Gunung Salak developed the program into making a biogas digester. The results of waste processing in the form of gas are used by the community to replace LPG gas. After this program was running, results were obtained that answered problems in the community, one of which was reducing costs for purchasing LPG gas. After being successful with this program, PT Indonesia Power developed an innovation derived from biogas, namely PERRISAI. PERRISAI is an extension of the Bioslurry Making Program from Biogas By-Products. This innovation is an activity of processing and utilizing biogas waste as a mixture of fish feed, liquid fertilizer and solid fertilizer. This activity was carried out in ring 2, Raksamala Village, Pulosari Village, Kalapanunggal District, Sukabumi Regency. People in general are farmers, who really need the basic needs of organic fertilizer. To meet these needs, and make the village an "Energy and Environmentally Friendly Village". This innovation has a positive impact on society because people can reduce the use and purchase of chemical fertilizers because they can use organic fertilizer produced from bioslurry.

PERRISAI is an extension of the Bioslurry Making Program from Biogas By-Products. This innovation is an activity to process and utilize biogas waste as a mixture of fish feed, liquid fertilizer and solid fertilizer. The program, which was launched in 2019, is planned to be effective until 2023 with the achievement target being that the community can become independent and continue the impact of the program that has been built together. This community empowerment-based CSR program is a synergy between PT Indonesia Power PLTP Gunung Salak and various parties included in the innovation leveling category disruptive which creates new product value in the use of sheep manure into products with selling value by implementing real actions and producing 1 integrated program and four derivative products, namely:

1. Waste to energy: Utilization of sheep manure waste into alternative energy products biogas (7.62 tons/year)
2. Utilization of biogas waste: Utilization of Biogas by-product waste into liquid

fertilizer products bioslurry (3,840 liters/year) and solid fertilizer 1,350 kg
3. Use of a gas storage system: Biogas is able to save energy using fossil fuels of 17.26 GJ/year and reduce emissions of 465.5 kg CO2/year
4. Reducing waste water pollution: Reducing the burden of water pollution from sheep waste TDS 0.0034 tonnes, TSS 0.0015 tonnes, COD 0.0002 tonnes, BOD 0.001 tonnes

The innovations carried out in the PERRISAI program are carried out through four main approaches, namely access to community fuel energy needs, access to farmer groups' fertilizer needs, access to conservation area negotiations, and economic access. With each output, it is hoped that in the end an Energy Independent and Environmentally Friendly Village can be created

CONCLUSION

This research method is designed to provide an in-depth understanding of the effectiveness of PR campaigns in promoting renewable energy innovation. With a qualitative and case study approach, this research can identify successful strategies, challenges faced, and the impact of the campaign on public perception and participation. there are three points that are concluded:

In the initial condition, the community has not optimally utilized sheep manure into something useful. There is no competent cultivation, animal husbandry group. Lack of knowledge. The intervention, with this research, is the development of livestock manure, the development of manure product innovation. Facilities and infrastructure assistance, support. The monitoring of activities and also the evaluation of the Final Condition, After the campaign of Biogas Utilization from Livestock Manure as Renewable Energy, in livestock groups, increased, the creation of production of livestock and product innovation derived from the cultivation of farmers developed. Waste from farmer cultivation and management is utilized.

Together with stakeholders, capacity building of livestock groups, development of sheep manure product innovation, provision of supporting facilities and infrastructure, and monitoring and evaluation. In the current process, it is found that the capacity of livestock groups has increased, the creation of competent livestock groups, the productivity of sheep farming derivative product innovations continues to grow, and all waste from livestock cultivation and processing is utilized. This gives confidence that in 2023 the fostered partners will soon be weaned considering the level of maturity has shown good development.

I express my gratitude and thanks to various parties who have supported and contributed to the completion of this research. First of all, I would like to thank PT Indonesia Power and its stakeholders as well as the Regent of Sukabumi, Subdistrict Head and Head of Pulosari Village who have given permission and full support during the research process. Thank you also to all staff and managers who have taken the time to share their insights and experiences, as well as to local partners and the community who have participated in interviews and observations. My thanks also go to colleagues at [Name of Institution or University] who have provided moral support, constructive discussions, and useful feedback throughout the research process. Your presence and support is very helpful in overcoming the various challenges faced. I would also like to express my thanks to my family who always provide endless support and motivation. Without your support, this research would not have been completed successfully. Lastly, thank you to all parties who I cannot mention one by one who have contributed to this research. Every support, whether big or small, means a lot to the success of this research, hopefully this research can have a significant impact on the wider community.

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