

Analysis of Natural Gas Network Development Policy for Households

Eka Septria Jaya¹, Vishnu Juwono¹

¹Universitas Indonesia, Indonesia

Corresponding author e-mail: yjuwono@ui.ac.id

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Abstract: Based on data (ESDM, 2022), the realization of the construction of a natural gas network for households means that in 2021 there will only be 799,000 house connections (*sambungan rumah/SR*). This shows that the target of the National Energy General Plan (RUEN) cannot be fulfilled even by half by 2021. RUEN's target for the construction of natural gas networks in 2025 is 4.7 million house connections. Departing from these problems, researchers conducted an analysis of the natural gas network development policy for households. This research was conducted using the literature review method. The results of the study found that there were several obstacles to the implementation of natural gas development policies for households. These constraints are resources, communication, disposition, and bureaucratic structure. However, the most significant impediment is a lack of budgetary resources to complete the construction of natural gas networks for households.

Keywords: Household Sector, Natural Gas, Natural Gas Network, Policy Analysis.

A. Introduction

The Indonesian government in 2007 firmly decided to convert kerosene to Liquefied Petroleum Gas (LPG). This policy was chosen with the aim of maintaining energy security by reducing people's dependence on kerosene. In addition, LPG is more environmentally friendly and economical, and in terms of subsidies, it is cheaper than kerosene (Directorate General of Oil and Gas, 2011). However, the problem is that domestic LPG production has not been able to meet people's needs. This has caused the government to have to import LPG since 2008, and the volume of imports continues to increase every year. The following is a chart regarding LPG supply-demand in Indonesia:

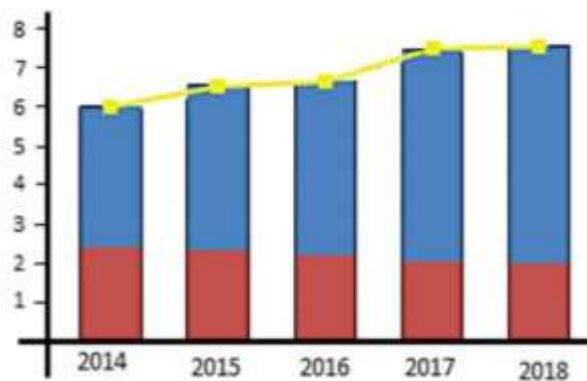


Figure 1. LPG Production, Import and Consumption in Indonesia (Ditjen Migas, 2019)

Based on the graphic data above, it can be seen that the amount of LPG production in Indonesia has not increased. Meanwhile, the level of consumption continues to increase every year. In 2018, for example, Indonesia was only able to produce LPG for 26% of total community needs. This means that the Indonesian state must import as much as 74% of its LPG needs, or around 5.5 million tons, to meet the needs of the community (ESDM, 2019). In addition to the problem of high LPG imports, LPG subsidies are also considered to be still not on target, even though there is a policy that regulates them, namely Regulation of the Minister of Energy and Mineral Resources Number 26 of 2009 concerning the Supply and Distribution of Liquefied Petroleum Gas.

These various problems eventually prompted the government to build a city gas network in Indonesia. According to the government, by building a city gas network, more benefits will be obtained by the state and society. These advantages are: first, the composition of the city gas network is light gas, namely methane (C1) and ethane (C2). Natural gas production, especially methane production, is abundant in Indonesia; in fact, this country exports 41% of its natural gas production. It is hoped that the city's gas network will be able to meet the needs of the community. Second, the use of natural gas in households has a higher level of safety compared to the use of LPG.

Third, this transition can also be a gateway for the energy transition to renewable energy because it emits less and has a higher heating value. This can promote energy efficiency and natural gas reserves. Seeing the various potentials and benefits of the city gas network, starting in 2009, the government finally started building a city gas network specifically for the household sector. In accordance with Presidential Regulation Number 22 of 2017 concerning the National Energy General Plan (*Rencana Umum Energi Nasional/RUEN*), the target for the construction of the city gas network is 4.7 million SR (or the equivalent of 0.7 million tonnes of LPG) by 2025. However, based on data from the Directorate General of Oil and Gas, it is known that the realization of the development of the city gas network until 2019 has only reached 564,382 SR.

Based on this explanation, it can be seen that there is a large gap between the plans and achievements of the city gas network development being carried out. This is of course a problem because it means that in order to achieve the RUEN target, it is still necessary to build a city gas network of 4,135,618 SR, and by 2025 it must have been achieved. The development is estimated to cost around 45.5 trillion rupiah (assuming a cost of 11 million rupiah per SR). Departing from this problem, researchers conducted research to analyze the policy of building natural gas networks for households. The aim is to find out how far the optimization of this policy is carried out regarding the use and development of natural gas energy for the household sector as an alternative to LPG on a national scale. In addition, it is also to find out the problems that hinder the implementation of natural gas network development policies for the household sector.

B. Methods

This study discusses issues regarding the policy of building natural gas networks for households. This policy is considered not to be running effectively because there is a very large gap between what was planned and what has been realized. These problems will be analyzed using the literature review method as the method in this study. Through literature reviews, researchers can understand ideas from existing work, then turn these ideas into unique ones by analyzing the same ideas differently (Castleberry & Nolen, 2018). It is very important for a researcher to understand the existing literature as well as identify prospective areas for future research on a particular research topic (Naik & Reddy, 2021).

In this study, literature is used to identify and analyze research problems. The literature used comes from three databases (Google Scholar, Scopus, and Garuda Ristekdikti). keywords to find the desired literature, namely policy, policy analysis, natural gas networks, and also the household sector. After the selection, five articles were obtained from the three databases, which will then be used in this literature review. Three articles come from Garuda Ristekdikti, one article comes from Scopus, and one article comes from Google Scholar.

C. Results and Discussion

This research analyzes the natural gas network construction policy for households. The analysis was carried out because of the problems found, namely that the realization of the construction of the gas network is still far from the target to be achieved in 2025. Of course, this problem cannot be ignored because the natural gas network was built using a lot of funds. Therefore, it is important to identify and also analyze the problems in implementing natural gas network development policies for households.

As previously explained, this research uses the literature review method to analyze the policy of building natural gas networks for households. Various articles were collected and then selected according to the problems raised in the research. The following is a matrix table of the five articles used in the literature review of this study:

Table 1. Matrix of Journal in Literature Review

No.	Researcher Name, Year, Title, Source	Research Methods	Research Result
1.	Syukur, M. H. (2016). Potensi Gas Alam di Indonesia. Swara Patra : Majalah Ilmiah PPSDM Migas.	Literature review	Utilization of natural gas in Indonesia is used for households, transportation, and industry. Products from natural gas used are liquid petroleum gas (LPG), compressed natural gas (CNG), liquid natural gas (LNG), and coal bed methane (CBM), which are non-conventional sources being developed in Indonesia.
2.	Triyatno, J. (2018). Perbandingan Penggunaan Gas Alam terhadap LPG dalam Memenuhi Kebutuhan Rumah Tangga di Bontang. Al Ulum Sains dan Teknologi.	Survey Method	Natural gas can replace LPG as a household fuel. This is because natural gas is actually relatively cheaper and more environmentally friendly than LPG. The people who are the object of this research also say that the use of natural gas is more cost-effective, more practical (because you don't have to bother lifting cylinders when they run out), safer, and that people don't have to worry about running out because it's always available.
3.	Lestari, S. N., & Puspa, N. M. (2019). Perlindungan Pengguna Gas Bumi Atas Kebocoran Pipa Penyalur Milik PT Perusahaan Gas Negara (Persero) Tbk. Diponegoro Private Law Review.	Empirical juridical research	The results of the investigation show that PT. PGN Tbk, as the owner of a gas distribution company, is extremely concerned if there is any deterioration in the distribution of gas.
4.	Lestari, L., & Aliasuddin. (2016). Willingness to Pay Masyarakat terhadap Pembangunan Jaringan Gas Bumi untuk Rumah Tangga di Kota Lhokseumawe. Jurnal Ilmiah Mahasiswa (JIM).	Qualitative	Public willingness to pay for the construction of natural gas networks According to the results of a survey of 100 respondents in the Lhokseumawe area, the willingness to pay for the construction of the natural gas network amounted to Rp. 26,140,880, with an average value of Rp. 2,614,088. There are factors that significantly affect the willingness to pay for the construction of natural gas networks for households, namely income and community education.
5.	Wilson, J. P., & Conroy, M. M. (2021). Planning for Natural Gas Pipelines in Ohio: Governance and Other Complexities. Planning Practice & Research	Literature review	Each region has its own policies and programs. As a result, the development of the natural gas network must be tailored to the regional government in order for the policy to be implemented optimally.

Source: Research Processed Data, 2022

Based on the results of the literature review of the five journal articles above, the discussion in this study will be divided into two parts. First, discussing the factual conditions of the implementation of the current natural gas network development policy for households Second, discussing the obstacles faced in implementing natural gas network development policies for households The following is an explanation of the two discussions:

Factual Conditions for the Implementation of a Natural Gas Network Development Policy for Households.

Indonesia has abundant energy sources. Apart from oil and coal, natural gas is one of the energy sources utilized by the Indonesian government. Natural gas is used for household, transportation, and industrial purposes. Currently, the role of natural gas in Indonesia is more dominant, especially after the government took steps to reduce petroleum as the main energy source. This is done because the Indonesian government has committed to the Clean Development Mechanism in the Kyoto Protocol. In addition, natural gas also has a lower level of pollution (Syukur, 2016).

One of the government's steps in reducing the role of petroleum is to build a gas network for households and provide LPG for the community. However, over ornament's steps in reducing the role of petroleum is to build a gas network for households and provide LPG for the community. However, over time, the use of LPG has become more popular than the gas network for households. This ultimately makes the Indonesian government unable to meet the demand for LPG, which continues to increase every year. The government finally had to import as much as 74% of its LPG, or 5.5 million metric tons (ESDM, 2019). This problem has caused the government to intensify the construction of gas networks for households or city gas.

According to research results (Triyatno, 2018), natural gas can replace LPG as a household fuel. This is because natural gas is actually relatively cheaper and more environmentally friendly than LPG. The people who are the object of this research also say that the use of natural gas is more cost-effective, more practical (don't need to bother lifting cylinders when it run out), safer, and that people don't have to worry about running out because it's always available. Based on this explanation, it can be seen that the gas network for households provides more benefits compared to LPG.

The government has established various policies to support the development of natural gas networks for households. One of the policies, namely Presidential Regulation Number 22 of 2017, concerns the RUEN. In addition, there is Presidential Regulation Number 6 of 2019 concerning the supply and distribution of natural gas through natural gas transmission and distribution networks for households and small customers. These various regulations were formed with the hope of properly realizing the construction of natural gas networks for households.

However, in reality, realizing the objectives of the policy is not easy. Based on Presidential Regulation Number 22 of 2017 concerning the RUEN, the target for the construction of a city gas network is 4.7 million SR by 2025. Meanwhile, until 2021, the target for building a natural gas network for households has not reached half its goal.

The following is an illustration of the realization of the construction of a natural gas network for households:

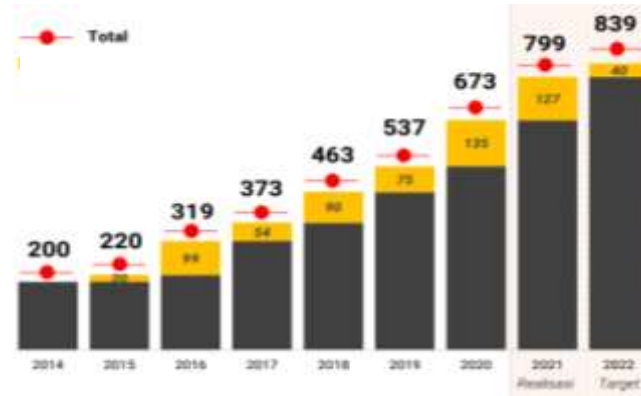


Figure 2. Realization of Natural Gas Network Development for Households (ESDM, 2022)

Based on the graph above, it can be seen that the realization of the construction of a natural gas network for households in 2021 has only reached 799,000 house connections. This means that by 2025, the government must build another 3,901,000 house connections to achieve the target of building a natural gas network for households. Meanwhile, it is known that this development requires a lot of money, which comes from the state budget.

Acceleration of the construction of natural gas networks for households must be carried out, with the aim that the target of the National Energy General Plan (RUEN) in 2025 can be achieved optimally. So that the goals to be achieved by constructing a natural gas network for households can also be achieved. Therefore, the next step that must be taken is to look for obstacles that impede the implementation of the natural gas network development policy for households.

Constraints in the Implementation of a Natural Gas Network Development Policy for Households

According to Edwards III (1980) and Tacjan (2006), there are four important variables in policy implementation. The four important variables are communication, resources, disposition, and bureaucratic structure. Using these four variables, researchers attempted to analyze the constraints in implementing natural gas network development policies for households in this study. The following is an overview of the four important variables in policy implementation:

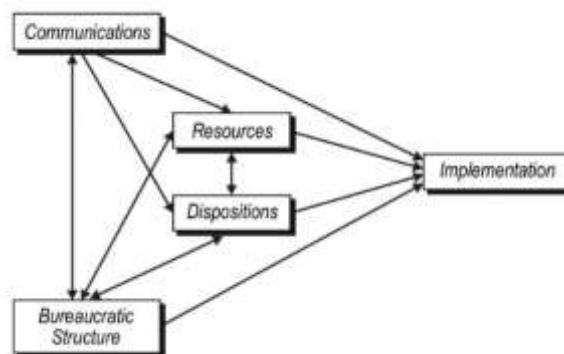


Figure 3 Four Variables in Policy Implementation (Tachjan, 2006)

Based on the picture above, it can be seen that each variable is related to another and influences the process of implementing the policy. There are no independent variables, so it is important to look at the relationships between variables. as well as how these variables affect the policy implementation process. The following is an explanation of the four variables associated with the implementation of natural gas network development policies for households:

Communication

Communication becomes an influential variable in the implementation of a policy. The process of implementing policies can run effectively if the policies that have been formed are then well communicated to those who carry them out. The goal is for policy implementers to be well-versed in and understand the policies they will be implementing. If the policy is not communicated properly, then its implementation cannot be carried out optimally. As a result, it is critical to effectively communicate the policy for constructing a natural gas network for households to the community as well as the local government whose territory is the goal of constructing a natural gas network.

The government communicates the natural gas network development policy for households through outreach. One of them is the socialization carried out by PT Perusahaan Gas Negara Tbk (PGN) for the community in the Special Region of Yogyakarta and southern Central Java. The areas in question are Karanganyar, Cilacap, Kebumen, Sukoharjo, Solo, Purworejo, Yogyakarta City, Magelang Regency and City, Bantul, Sleman, Klaten, Kulon Progo, and also Gunung Kidul. This socialization was carried out in an effort to accelerate the construction of a gas network (jargas) by explaining to the public the utilization of natural gas (Hayati, 2022). In addition, communication related to the development policy of natural gas networks for households is also carried out with the local government. usually through a memorandum of understanding on the construction of jargas with the relevant local

government. One of them is the memorandum of understanding for the construction of gas network in 2018 with 16 local governments (Ditjen Migas, 2019).

Based on the various explanations above, it can be seen that the government has actually communicated well, regarding the policy of building natural gas networks for households, to the community and local governments. However, the obstacle is that the territory of Indonesia is very large, so it takes a long time to socialize this policy. This makes it difficult to communicate policies regarding gas network development as a whole at the same time. This is one of the obstacles to implementing the natural gas network development policy for households.

However, even though there are obstacles, communication must continue to be carried out regarding the policy of building a natural gas network for households. The central government and local governments must work together to communicate this policy. This is because the public has the right to obtain information related to the natural gas network. According to research (Lestari & Puspa, 2019), under Law Number 39 of 1999 concerning Human Rights, everyone has the right to obtain information. One of them is a potential customer from PGN who will use the natural gas network. The information that must be conveyed starts with the requirements to become a customer, the safe use of gas, the volume of gas used, how to detect leaks, and safety procedures in the event of a leak.

Resources

When the policy has been communicated to the executors, another factor that is important to note is resources. Resources are needed so that the policy can be implemented; if the policy has been communicated but the resources are not available, the policy cannot be implemented. One of the resources needed to implement the natural gas network development policy for households is natural gas itself. Natural gas in this case is not an obstacle because natural gas in Indonesia is quite abundant. In 2018, Indonesia was able to produce 2.9 million MMSCF of natural gas. where 40% of natural gas production is then exported (ESDM, 2019). This shows that natural gas is not an obstacle to the implementation of this policy.

Obstacles in implementing natural gas network development policies for households related to resources include the budget. As is known, the construction of natural gas networks for households uses funds from the state budget, which are still very limited. so that incentive policies from the government are needed. In addition, the COVID-19 pandemic in 2020 caused the government to reduce the target for the city gas network that had been built (from 316,000 SR to 127,894 SR) because part of the funds was diverted to handling the COVID-19 pandemic (Pusparisa, 2020). This is one of the obstacles to implementing natural gas network development policies for households related to resources.

Disposition

The next variable that influences the implementation of the policy is the disposition or attitude factor. A good policy implementer must have a good

disposition, especially when carrying out the policies that have been set. If implementers have a good attitude towards a policy, it means that they support the policy and are likely to implement it in accordance with what is expected by policy makers. The opposite will happen when the attitude of implementers differs from that of policymakers. It is certain that the implementation of the policy is not going as expected.

Until now, the regional government and the community have shown a good attitude towards the implementation of the policy for building natural gas networks for households. This can be seen from the results of research conducted by Lestari and Aliasuddin (2016), which found that the community is willing to pay for the development of natural gas networks. According to the results of a survey of 100 respondents in the Lhokseumawe area, the willingness to pay for the construction of natural gas networks amounted to Rp. 26,140,880, with an average value of Rp. 2,614,088. There are factors that significantly affect the willingness to pay for the development of natural gas networks for households, namely income and education in the community.

There are still people who reject the construction of natural gas networks. One of them is the people of Lubuk Batang Lama Village, Lubuk Batang District, Ogan Komering Ulu Regency, South Sumatera, who refuse to build a natural gas network for households because the construction of gas jars in the village is suspected of not being up to standard. However, this problem was immediately handled by sending officers to the field to make improvements if there were indeed problems in the construction of the gas network (Purmana, 2020). So it can be concluded that this obstacle can be overcome directly by the government. The local government also continues to make efforts so that no community objects to the implementation of this policy.

Bureaucratic Structure

According to Edwards III, the implementation of the policy will run effectively if the bureaucratic structure also supports the implementation of the policy well. Especially related are standard operating procedures (SOP) and organizational fragmentation. SOPs are needed because implementing policies will require the cooperation of many parties because policies are complex. Organizational fragmentation has a major influence on policy implementation. This is because often the responsibility for a policy is spread among several organizations. Power or authority over policies is often decentralized to achieve various goals.

The policy to develop natural gas networks for households is a central government program in which the Ministry of Energy and Mineral Resources is given the mandate to provide natural gas networks to the public. Furthermore, the Directorate General of Oil and Gas coordinates with Cooperation Contract Contractors (KKKS) to obtain natural gas supplies as well as select pipe tapping locations. In addition, coordination was also carried out with the city or regional local government to determine the selected *kelurahan* or village and prepare the front-end

engineering design (FEED) and detailed engineering design for construction (DEDC), including for prospective customers. Then those who get priority to manage the gas network are BUMD (Ditjen Migas, 2013).

Based on the explanation above, it can be seen that many parties are involved in implementing the natural gas network development policy for households. so that clear SOPs and organizational fragmentation are needed, and for these two things, there are no obstacles work development policy for households. so that clear SOPs and organizational fragmentation are needed, and for these two things, there are no obstacles. This is because the government always ensures that SOPs are carried out strictly during the construction and management of natural gas networks. In addition, the division of tasks and responsibilities is also carried out clearly in the implementation of natural gas network development policies for households. One of the obstacles to worry about is related to the agreement with the local government. This is because, according to research by Wilson and Conroy (ies are involved in implementing the natural gas network development policy for households. so that clear SOPs and organizational fragmentation are needed, and for these two things, there are no obstacles. This is because the government always ensures that SOPs are carried out strictly during the construction and management of natural gas networks. In addition, the division of tasks and responsibilities is also carried out clearly in the implementation of natural gas network development policies for households. One of the obstacles to worry about is related to the agreement with the local government. This is because, according to research by Wilson and Conroy (2021), each region has its own policies and programs. As a result, the development of the natural gas network must be tailored to the regional government in order for the policy to be implemented optimally. However, this has been done well in Indonesia, with the existence of a memorandum of understanding with the local government for the development of natural gas networks.

D. Conclusion

Based on the various explanations above, it can be concluded that the implementation of the natural gas network development policy for households in Indonesia has not yet reached the target of the National Energy General Plan (RUEN). Even though half of the RUEN target has not been achieved, the Indonesian government still has to build another 3,901,000 house connections to be able to achieve the natural gas network development target in 2025. This problem occurs due to obstacles in communication, resources, placement, and bureaucratic structure. However, the most prominent problem is the issue of budgetary resources to build the natural gas network itself. This happened partly because Indonesia is facing the COVID-19 pandemic, which has diverted a lot of minds to addressing this problem.

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