

## WHY DOES ENERGY SUBSIDY REFORM REALLY MATTER? THE CASE OF LPG AND ELECTRICITY SUBSIDIES IN INDONESIA

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### Abstract

The purpose of energy subsidies is to alleviate the financial burden on expenditures for poor and vulnerable communities, and the government invests significantly in these subsidies. However, these subsidies have resulted in unintended consequences. A majority of the subsidies are actually being enjoyed more by wealthier segments of society. Through a descriptive analysis approach, utilizing various published and unpublished documents and analyzing micro-statistical data sourced from the Integrated Social Welfare Data (DTKS), the research concludes that the current household-based energy subsidy policy fails to function as a welfare instrument. The primary criticism of energy subsidy policies revolves around issues of equality and social inclusion. A significant number of poor and vulnerable households lack access to these subsidies and to energy resources in general. This includes women, people with disabilities, and elderly individuals. Additionally, these policies burden the government budget and increase dependence on imported fossil energy. To rectify these issues, there is a need for a paradigm shift in policy – moving from subsidizing goods to implementing targeted energy subsidies for households. This shift in policy can restore the intended role of current household-based energy subsidies as genuine welfare instruments.

**Keywords:** Energy Subsidy, Energy Subsidy Reform, Public Policy, Policy Reform, Indonesia, LPG, Electricity

### INTRODUCTION

In the case of Indonesia, household-based energy subsidies (electricity subsidies and LPG subsidies) are intended to alleviate the burden on households in accessing energy, as explained in Law Number 30 of 2007 concerning Energy (“Undang-Undang Negara Republik Indonesia No. 30 Tahun 2007,” n.d.). In this law, it is stated that the government formulates an assistance program to ensure the availability of clean, modern, and environmentally friendly energy to the poor community groups, with the aim of achieving sustained improvement in the poor's access to energy. Law Number 30 of 2007 refers to Article 33 of the 1945 Constitution which states that the allocation of natural resources is aimed at the prosperity of the people. Therefore, the state's obligation to provide energy subsidies is clearly an instrument to enhance the welfare of the society, especially for the poor and vulnerable households. As they are intended as welfare instruments, the government's investment in electricity and LPG subsidies is substantial, even the largest. These two types of subsidies are the largest assistance and subsidy on the State

Budget (APBN). In 2020, the allocation for electricity subsidies in the State Budget (APBN) amounted to IDR 54.8 trillion. The amount of electricity subsidies even reached IDR 103.3 trillion in 2012. The budget for LPG subsidies is also substantial and continues to increase. In 2015, the budget allocation for LPG subsidies was around IDR 25.87 trillion, which increased to IDR 49.39 trillion in 2020. In addition to subsidies, the government also allocated IDR 17.94 trillion as compensation for electricity customers. Although using different budget nomenclature, this compensation for electricity customers is essentially a form of subsidy. When combined, the budget allocation for electricity and LPG subsidies as well as compensation for electricity customers in 2020 reached IDR 122.13 trillion, or one-third of all government assistance and subsidies. This condition has limited the government's fiscal flexibility to finance other productive programs aimed at improving well-being, such as education, healthcare, infrastructure development, and poverty alleviation.

Although intended as welfare instruments, energy subsidy policies that are not implemented appropriately actually have opposite effects. In addition to burdening the government budget, they also have environmental and health impacts, causing distortions in energy economic prices, wasteful energy consumption, and reducing incentives for the development of more environmentally friendly energy sources (Coady et al., 2013; Vagliasindi, 2012). The issue of energy subsidies improperly executed is indeed faced by Indonesia, where energy subsidies that should serve as welfare instruments actually yield contrary results.

The majority of electricity and LPG subsidies, which should help the poor and vulnerable communities access energy, are actually enjoyed more by wealthier segments of the population. In 2013, the poor and vulnerable communities received only about 26 percent of the electricity subsidy, while the remaining 74 percent was enjoyed by more affluent groups. In terms of subsidy value, the poorest 10 percent of the population received only IDR 64,399 per month, while the richest 10 percent enjoyed nearly three times that amount. The same inequality is observed in LPG subsidies, with only about 32 percent of poor and vulnerable households benefiting, while 68 percent is enjoyed by more affluent households (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020, 2021).

The inequality in energy subsidies is closely related to commodity-based subsidy policies or price subsidies without restrictions on the utilization of subsidized electricity and LPG, limiting the benefits to the poor and vulnerable populations. With this policy, electricity tariffs and LPG prices charged to the public are lower than the production costs or market prices. Because these subsidies are given based on selling prices, they become regressive, benefiting those who consume more energy commodities and allowing wealthier groups to enjoy larger subsidies.

The primary criticism of energy subsidy policies is related to issues of equality. With a budget allocation of IDR 54.8 trillion in 2020, paradoxically, more than 7.6 million poor and vulnerable households do not have access to these electricity subsidies. If we use 2019 data from the Central Statistics Agency that states each poor household has an average of 4.58 members, this means more than 34 million poor and vulnerable individuals do not have access to subsidies and adequate electricity. Among the 7.6 million households without subsidy access, 560 thousand are headed by women, 290 thousand have family members with

disabilities, and 490 thousand have elderly family members (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2021). The situation is even more ironic for LPG subsidies. Out of a total of 52 million households benefiting from LPG subsidies, only 12.28 million come from the poor and vulnerable groups. Moreover, with a budget allocation of IDR 49.4 trillion for LPG subsidies in 2020 and a total consumption of 7.75 million metric tons, with 72 percent being imported, there are still 12.51 million households in several provinces relying on firewood as their primary cooking fuel. They do not have access to the LPG subsidies they should rightfully receive. Using an average of 4.58 members per household, this means more than 57 million poor and vulnerable individuals are not receiving LPG subsidies. Among the total of 12.51 million households using firewood and not benefiting from LPG subsidies, there are 2.7 million households led by women, 760 thousand households with disabled family members, and 4.06 million households with elderly family members (Tim GEDSI – MAHKOTA Project, 2020b). Therefore, the research question addressed in this study is: How can household-based energy subsidy policies be designed to support societal well-being?

## METHODS

In this study, a qualitative research method was chosen as the primary approach. The principal rationale for selecting this approach is its capability to provide rich narrative and detailed descriptions, emphasizing processes, and focusing on explanations (Hu, 2012). The research's focus is to comprehend and analyze energy subsidy policies. The qualitative approach is deemed appropriate for this study as it can offer comprehensive descriptions, underscore processes, and provide in-depth explanations. Data collection methods in this research involved participatory observation and document analysis. The utilization of these methods was undertaken by considering the availability of existing data, both published and unpublished, as well as the researcher's access during the study. Consequently, primary data collection from the field was not conducted.

In participatory observation, the researcher engaged by attending various meetings and discussions concerning energy subsidy policies with the Ministry of Energy and Mineral Resources (ESDM), the Fiscal Policy Agency (BKF) of the Ministry of Finance, and the National Team for the Acceleration of Poverty Reduction (TNP2K). Meanwhile, document analysis encompassed the collection and scrutiny of documents related to energy subsidy policies. This document analysis method is a form of qualitative research in which the documents are gathered and interpreted by the researcher to provide perspectives and meanings related to the research topic (Bowen, 2009). Additionally, tabulation analysis was also performed on aggregated microdata containing names and addresses sourced from the Integrated Social Welfare Data (DTKS), managed by the Secretariat of TNP2K, and processed data from the National Socioeconomic Survey (SUSENAS) issued by the Central Statistics Agency (BPS). The DTKS data utilized constitutes an aggregation of microdata encompassing information such as names, addresses, and other social economic variables for the lowest 40 percent of the social strata. The application of aggregated microdata represents a novel aspect in policy analysis, given that access to such microdata is typically limited.

The data analysis process was executed in four stages as follows: (1) analysis of available secondary data such as policy documents, policy study outcomes, publications concerning energy subsidy reform, and other documented sources, (2) analysis of the aggregated microdata from the DTKS source and processed SUSENAS data, (3) confirmation of the outcomes of the first-stage analysis through discussions with the Ministry of Energy and Mineral Resources (ESDM), the Fiscal Policy Agency (BKF) of the Ministry of Finance, and the Secretariat of TNP2K, and (4) final analysis and conclusions.

## LITERATURE REVIEW

Energy subsidy policies have been a recurrent subject of investigation in diverse energy studies. In the context of energy sustainability, energy policies are driven by three primary objectives: supply security, energy market competitiveness, and environmental protection (Doukas, 2008). Energy subsidies, as part of broader energy policies, are commonly perceived as instruments to facilitate access to energy for poor and vulnerable communities. Nevertheless, in some developing countries, energy subsidies have ignited debates due to their counterproductive impacts.

Energy subsidies are observed to potentially lead to deadweight losses and reduced consumer welfare within the energy sector (Khalid & Salman, 2020). In line with this perspective, Inchauste, Victor, and David (Inchauste & Victor, 2009) assert that energy subsidies, though often intended to benefit the impoverished, predominantly advantage individuals with higher socioeconomic statuses. Similar sentiments are echoed by studies such as Schaffitzel et al. (Schaffitzel et al., 2020) and Timilsina & Pargal (Timilsina & Pargal, 2020), which emphasize the regressive nature of energy subsidies, disproportionately favoring more affluent groups. Negative repercussions of poorly executed energy subsidy policies include market price distortions that foster excessive energy consumption, promoting a preference for subsidized energy products while diminishing demand for market-reflective energy commodities (Inchauste & Victor, 2009; Vagliasindi, 2012). Additionally, these policies dampen incentives for energy efficiency and renewable energy development (Vagliasindi, 2012).

Given the mounting evidence of predominantly adverse effects of energy subsidy policies across multiple countries, calls for subsidy reform have gained traction. Inchauste, Victor, and David (Inchauste & Victor, 2009) outline three primary rationales for energy subsidy reform: (1) fiscal pressures on governments, (2) burdens on influential interest groups, and (3) inefficient targeting of subsidy benefits to the poor. Furthermore, the goals of subsidy reform encompass ensuring that subsidies reach deserving recipients, thus minimizing socio-economic ramifications in conjunction with fiscal objectives (Acharya & Sadath, 2017). Such reforms aim to bolster the economy and enhance GDP (Timilsina & Pargal, 2020) while simultaneously mitigating environmental impacts (Breton & Mirzapour, 2016).

Energy subsidy reform strategies commonly entail raising energy prices to narrow the gap between production costs and market prices, subsequently reducing the subsidy magnitude (Vagliasindi, 2012). Complementary to price hikes, many countries have implemented cash

transfer policies for the impoverished and vulnerable as compensation to counteract the economic implications of rising essential commodity costs (Breton & Mirzapour, 2016; Timilsina & Pargal, 2020; Vagliasindi, 2012). Alternative methods include distributing vouchers for specific energy types, such as liquefied petroleum gas (LPG) vouchers, enabling disadvantaged populations to access subsidized energy (Clements et al., 2015; Schaffitzel et al., 2020). However, these supplementary policies, like cash transfers and LPG vouchers, are typically temporary safety nets activated during price shocks.

Indonesia has also undergone energy subsidy reform through similar strategies. Energy policies involving reductions in fuel subsidies, executed in 2005, 2008, 2013, and 2014, constitute instances of energy subsidy reform. Accompanying measures such as cash transfers to the impoverished and vulnerable during fuel price hikes were implemented from 2005 to 2013 and were of temporary nature. Indonesia has also increased electricity tariffs to reduce the disparity between consumer tariffs and electricity production costs. The 2017 targeted electricity subsidy program, designed for households, serves as an instrument for household-based energy subsidy reform.

Prior research demonstrates that energy subsidy policy reforms often lead to fiscal savings resulting from reduced allocated subsidy budgets (Vagliasindi, 2012). These reforms also bolster economies, contributing to increased GDP (Solaymani & Kari, 2014; Timilsina & Pargal, 2020). In terms of environmental impacts, price-induced subsidy reforms decrease aggregate energy demand, thereby curbing carbon emissions (Solaymani & Kari, 2014; Timilsina & Pargal, 2020). Moreover, they drive annual electricity savings of about 7% compared to a scenario without reforms (Burke & Kurniawati, 2018). Given these generally positive outcomes, Breton and Mirzapour (Breton & Mirzapour, 2016) conclude that energy subsidy reform, especially regarding fossil fuels, is often hailed as a swift environmental mitigation policy that efficiently reallocates substantial portions of state budgets to more productive targets.

Nonetheless, not all instances of energy subsidy reform have yielded successful outcomes. Some countries, Indonesia included, exhibit persistent energy consumption patterns despite subsidy reforms (Vagliasindi, 2012). In certain cases, cash transfer policies have failed to effectively ameliorate welfare levels or have been seen as populist measures with limited impact (Breton & Mirzapour, 2016; Timilsina & Pargal, 2020). Energy price-driven subsidy reforms have also negatively impacted welfare. Khalid and Salman (Khalid & Salman, 2020) report that subsidy reforms render energy prices unaffordable for disadvantaged communities. A parallel argument is advanced by Acharyaa & Sadathb (Acharya & Sadath, 2017), who contend that energy subsidy reform through price hikes erodes real income, consequently affecting overall welfare. Similarly, Solaymania and Karib (Solaymani & Kari, 2014) note that energy price-driven subsidy reforms lead to significant declines in household consumption and welfare.

Furthermore, to ensure effective energy subsidy reform, prior studies advocate for a gradual approach to subsidy removal to mitigate resistance from interest groups benefitting from subsidies (Clements et al., 2015). Moreover, establishing an optimal subsidy level, which yields

minimal economic impact while maximizing beneficiary coverage, is crucial (Khalid & Salman, 2020). In general, to ensure the sustainability of subsidy policy reform, concurrent reforms across various related sectors are required. Key measures include enhancing energy services, expanding energy access, providing discounts on energy-efficient appliances, and promoting public transportation use (Vagliasindi, 2012).

## RESULTS AND DISCUSSIONS

### 1. Energy Subsidy Policy in Indonesia

Since 1977, when the government began providing energy subsidies to nearly all energy commodities, several policy reforms have indeed been undertaken. Policy reforms are generally carried out by removing subsidies (2004 – four types of subsidies eliminated; 2014 – gasoline had their subsidies removed) and increasing the prices of subsidized energy commodities to reduce the gap between market and subsidized prices in 2005, 2008, and 2013.

The main reason for these subsidy policy reforms is the increase in global oil prices, which has put pressure on the national budget. Furthermore, there have been several other forms of energy subsidy policy reforms since 2005, such as implementing the Direct Cash Assistance (Bantuan Langsung Tunai or BLT) program aimed at mitigating the impact of rising fuel prices on the poor and vulnerable communities (2005, 2008, and 2013); linking subsidy reduction policies with social protection programs (2014); converting subsidized kerosene to subsidized LPG usage (2007); and implementing targeted electricity subsidy policies (Subsidi Listrik Tepat Sasaran or SLTS) in 2017, which removed 18 million capable households from the list of electricity subsidy recipients (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2018). The LPG subsidy policy began with the kerosene-to-LPG conversion policy in 2007. Initially, it seemed beneficial but ended up creating new issues, such as ineffective targeting of LPG subsidies, social inequality problems, and burdening the government budget (Direktorat Jenderal Minyak Dan Gas Bumi Kementerian Energi dan Sumber Daya Mineral, 2008). LPG consumption, especially the subsidized type, continued to rise, indicating dependence on subsidized LPG (92 percent). The amount of imported LPG also increased significantly, reaching 72.1 percent, highlighting a growing reliance on imports. The allocation of LPG subsidies ballooned to IDR 49.5 trillion (2020 national budget), the largest among government aids/subsidies (second only to electricity subsidies at IDR 54.79 trillion) (Badan Kebijakan Fiskal, 2019).

Price disparity also led to negative effects, with a preference for subsidized LPG among all wealth groups (> 60 percent of the wealthiest 10 percent of society consuming subsidized 3kg cylinders rather than the non-subsidized 5.5kg and 12kg types). From a welfare standpoint, LPG subsidies were predominantly enjoyed by the wealthy, while vulnerable communities didn't gain access to the government-subsidized clean energy, despite the substantial budget allocation for subsidies and imported LPG expenditures. Only 32 percent of LPG subsidies were enjoyed by the poor and vulnerable (or the bottom 40 percent in terms of socioeconomic status). This means that 68 percent were enjoyed by the affluent.

There are 12.51 million poor and vulnerable households currently using firewood, among which 2.7 million households are headed by women; 4.6 million are elderly households; 760 thousand are households with disabilities; and 5.27 million are households with children (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020). In general, it can be concluded that the LPG subsidy policy has increased dependence on imported fossil energy, strained the government budget, exacerbated energy access disparities due to greater subsidy benefits for the wealthy, and led to exclusion in terms of gender and social factors due to entry barriers: (1) limited LPG distribution in remote areas, (2) limited ability of communities to afford gas stoves, (3) higher LPG prices compared to other fuels, and (4) inadequate promotion of gas and LPG stove safety.

The electricity subsidy policy also faces similar problems, with wealthier groups receiving larger electricity subsidies. Although fundamental policy reforms such as the Targeted Electricity Subsidy (Subsidi Listrik Tepat Sasaran or SLTS) were implemented in 2017, improving targeting accuracy, over 50 percent of subsidies still go to wealthier groups, and access inequality and inequality problems remain significant. More than 7.6 million households do not have access to subsidies, including 560 thousand female-headed households, 290 thousand households with disabilities, and 490 thousand elderly households from poor and vulnerable backgrounds. Several reasons for not accessing subsidies include: (1) Lack of availability of LPG and/or electricity due to uneven distribution, (2) not having LPG cylinders and stoves, as well as being unable to afford electricity connection costs (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020, 2021).

The inequality of access to electricity subsidies arises from limitations in coverage, high installation costs, and the necessity of being a customer of the state-owned electricity company (PLN). PLN's limitations in providing electricity to remote areas far from major cities, result in high connection costs that exceed monthly incomes for many households. Many communities lack electricity access entirely or resort to using electricity drawn from other households that are already PLN customers or from sources other than PLN. This affects communities living in off-grid or inaccessible areas. As the electricity subsidies are provided by PLN, only those who are PLN customers and/or have access to PLN electricity benefit from the subsidies (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2021).

From the facts regarding the implementation of these LPG and electricity subsidy policies, it can be concluded that household-based energy subsidy policies in Indonesia have failed to fulfill their role as welfare instruments. This argument is supported by the comparison analysis of various assistance and subsidies' contributions to inequality using the Benefit Incidence Analysis approach, as done by TNP2K (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020) and the Fiscal Policy Agency of the Ministry of Finance (Badan Kebijakan Fiskal, 2019). The analysis shows that energy subsidy groups, including LPG, kerosene, and diesel subsidies, are relatively off-target, thus not effectively reducing inequality. Electricity subsidies are relatively better targeted. Meanwhile, social assistance programs like the Family Hope Program (Program Keluarga Harapan or PKH), the Smart Indonesia Program (Program Indonesia Pintar or PIP), and the Rice for the Poor Program (Program Beras Untuk Masyarakat

Miskin or Raskin) tend to contribute to inequality reduction. Analysis using Susenas data to further investigate inequality in the utilization of energy subsidies based on expenditure groups also reveals similar patterns. The higher the level of prosperity, the greater the consumption of subsidized energy commodities, whether LPG, electricity, or kerosene. Moreover, the subsidy value increases with higher prosperity levels for LPG and electricity. Thus, the current energy subsidy policy actually benefits the wealthy more and widens inequality (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020).

## **2. Shifting Paradigms in Energy Subsidy Policies in Indonesia**

Currently, there are several supportive factors for a more effective paradigm of household-based energy subsidy policies. These supporting factors include prioritizing developmental issues such as gender equality, socio-cultural transformation, and technological advancement. Additionally, the presence and accessibility of data on the poor and vulnerable population (Integrated Social Welfare Data/DTKS) based on names and addresses, the digital transformation, the government's experience with implementing direct cash assistance programs and targeted social protection programs, the successful utilization of technology for subsidy and social aid distribution, and numerous international lessons learned contribute to this paradigm shift.

In the household-based energy subsidy policy paradigm with a targeted approach, the government can distribute subsidy funds to households by utilizing the banking system. This involves non-cash transfers directly from the government to the bank accounts of subsidy recipients. This approach also promotes financial inclusion for groups that have previously been underserved. However, two conditions need to be fulfilled: the availability of beneficiary data and the availability of reliable distribution mechanisms and technology.

The presence of Social Welfare Data (DTKS) enhances the accuracy of subsidy targeting. With data on the names and addresses of poor and vulnerable households, energy subsidies can be directed straight to the intended households, transforming them into direct household-based subsidies. Based on DTKS data managed by TNP2K until 2020, there are 29.3 million families or 27.2 million in household units, while the total number of individuals reaches 99.3 million. All of this data includes variables such as names and addresses as well as other welfare indicators, including energy utilization.

Concerning reliable mechanisms and technology, the government has conducted various trials and technology developments for subsidizing schemes under G2P (Government to Person) since 2012. The goal is to enhance accuracy and effectiveness in implementing government assistance programs. These technology trials include Near Field Communication (NFC) technology, Debit Cards with Electronic Data Capture (EDC) machines, Quick Response (QR) Codes, Short Message Service (SMS) via mobile phones, and the utilization of facial biometric fintech (Tim Nasional Percepatan Penanggulangan Kemiskinan (TNP2K) et al., 2020). Integration trials with other government aid and subsidy programs like Non-Cash Food Assistance (BPNT) have also been executed (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2019). With a success rate reaching up to 97 percent, facial biometric fintech



proves to be a viable technology choice for driving the paradigm shift in energy subsidy policies (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2019). This technology is effective and convenient for beneficiaries, eliminating the need for card storage, carrying cards, or remembering Personal Identification Numbers (PINs). Moreover, it doesn't demand expensive transaction infrastructure as it doesn't require recipients, often from impoverished communities, to possess transaction tools such as debit cards, QR codes, smartphones, or even basic cell phones (Tim Nasional Percepatan Penanggulangan Kemiskinan (TNP2K) et al., 2020; Tim Nasional Percepatan Penanggulangan Kemiskinan, 2019).

With data availability, distribution mechanisms, and technology in place, the household-based energy subsidy policy paradigm shift with a targeted approach can be implemented as follows:

- a) Electricity and LPG commodities are sold at economically viable prices, equivalent to non-subsidized commodities, to eliminate price disparities in the market.
- b) Shifting the policy mechanism from subsidizing goods to Direct Subsidies, where subsidies are directly provided in non-cash form to eligible households/families. Recipients can then use these subsidy amounts to purchase LPG and electricity commodities. Ultimately, the poor and vulnerable can continue to afford LPG and electricity at subsidized rates (or even cheaper). This policy resembles LPG coupons, as described by Schaffitzel et al. (Schaffitzel et al., 2020) and Clements et al. (Clements et al., 2015) in the case of energy subsidy reform in Ecuador. However, the difference lies in the transfer mechanism. This approach enables the government to control the subsidy amounts given to the poor based on their conditions and needs.
- c) Subsidy amounts are provided at a fixed monthly rate and directly transferred by the government to beneficiaries' accounts.

Furthermore, to promote inclusivity, two main conditions should be added to improve the household-based energy subsidy policy paradigm:

- a) Transferred subsidy amounts can be used for access, such as purchasing LPG cylinders and regulators or paying electricity installation fees.
- b) Freedom to utilize subsidies if electricity and LPG are not available in the area of residence for the poor and vulnerable. Subsidy recipients can use the value to finance alternative energy sources available locally.

With this paradigm shift, there are benefits for the government, including reducing the misallocation of subsidies (inclusion error), ensuring that subsidies are received only by those truly in need, and simplifying oversight of LPG distribution and other subsidized energy commodities to the public. Concerning subsidy amounts, a fixed amount of Rp 95,000 per household per month for electricity subsidies and Rp 45,000 per household per month for LPG subsidies leads to a total potential subsidy of Rp 130,000 per household per month for poor and vulnerable families (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020).

If this paradigm shift from subsidizing goods to direct subsidies and providing subsidy flexibility is implemented, there will be positive impacts on women (Tim GEDSI – MAHKOTA Project, 2020a, 2020b), including:

- Time savings for cooking, ranging from 8 to 61 minutes per day.
- Time savings in collecting firewood, amounting to 4 hours per week.
- Increased opportunities for women to develop small-scale businesses.
- Enhanced job prospects and opportunities.
- Reduced likelihood of diseases due to air pollution from wood burning, a result of exposure to solid fuels in poorly ventilated homes.

Another impact of this paradigm shift is the reduction of poverty and inequality rates. For example, if a direct LPG subsidy of Rp 45,000 per household per month is provided, the poverty rate would decrease from 9.82 percent to 9.75 percent. Furthermore, increasing the subsidy to Rp 60,000 per household per month would lead to a poverty rate reduction of 9.50 percent. Similarly, inequality levels are predicted to decrease. The Gini ratio would decrease from 0.392 to 0.388 with a direct LPG subsidy of Rp 45,000 per household per month. Elevating the subsidy to Rp 60,000 per household per month would further reduce the Gini ratio to 0.387 (Badan Kebijakan Fiskal, 2019).

Aside from GEDSI considerations, there is a significant opportunity to promote local renewable energy development, such as microgrid solar and microhydro projects, which generally contribute to energy diversification. Socially, this policy shift can stimulate an increase in the number of school-going children (including girls), create employment opportunities (including for women), and boost local economies (Halimatussadiah et al., 2021). The impacts of the paradigm shift on renewable energy development available locally are as follows (Tim GEDSI – MAHKOTA Project, 2020a, 2020b):

- Enhancing community participation, especially that of women, in renewable energy provision.
- Subsidy funds can drive the expansion of renewable energy provision in areas without access to electricity and LPG.
- Encouraging household expenditure savings.
- Boosting energy diversification.

Socially, the paradigm shift can also lead to an increase in the number of school-going children (including girls), generate employment opportunities (including for women), and stimulate local economic growth. With a fixed subsidy amount of Rp 95,000 per household per month for electricity subsidies and Rp 45,000 per household per month for LPG subsidies, the total subsidy of Rp 130,000 per household per month for poor and vulnerable families can cover the costs of investing in and operating local renewable energy facilities, such as microhydro plants or local waste treatment facilities (TOSS - Tempat Olahan Sampah Setempat) (Halimatussadiah

et al., 2021). Furthermore, covering the costs of investing in and operating local renewable energy facilities, as examples: (1) The electricity subsidy amount (Rp 95,000 per household per month) is sufficient to cover the investment costs for developing microhydro facilities. For target groups in West Papua and Papua, the required investment is Rp 401.84 billion. (2) The LPG subsidy of Rp 45,000 per household per month is adequate to cover all investment and operational expenses for constructing TOSS facilities, with an investment value of Rp 1.096.56 billion (Halimatussadiyah et al., 2021).

Another benefit of this policy change is the potential budgetary savings. In the case of LPG subsidies, if subsidies are only received by the poor and vulnerable, this would result in budgetary savings that could be channeled into more productive programs (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020). According to simulations conducted by TNP2K (National Team for Accelerated Poverty Reduction, 2020), potential budgetary savings could reach Rp 33.6 trillion with a subsidy of Rp 45,000 per month for 29 million beneficiary families. Moreover, if the subsidy amount is increased to Rp 60,000 per month for the same number of households, potential savings could be around Rp 28.3 trillion. Even if subsidies are also extended to families, Micro, Small, and Medium-sized Enterprises (MSMEs), farmers, and fishermen, budgetary savings can still occur, ranging from Rp 11.1 trillion (at Rp 60,000 per month) to Rp 20.7 trillion (at Rp 45,000 per month). Similarly, using the same simulations, total savings from electricity subsidies reach around Rp 28.6 trillion (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2020). With these substantial savings, the government can allocate more funds to other productive programs such as education, healthcare, infrastructure, and poverty alleviation.

### 3. Policy Recommendation

Based on the findings and analysis in this research, household-based energy subsidy policies should be directed towards direct targeted subsidies to beneficiaries, using the following approaches:

- Subsidies should be directly provided to beneficiaries in non-cash form. Cash distribution should be avoided due to the high likelihood of it not being used for energy access purposes. Direct cash assistance methods can involve bank account transfers or the use of smart cards (Vagliasindi, 2012). This approach ensures compliance with Regulation No. 30 of 2007, which states that energy subsidies are intended solely for the energy access needs of the less privileged. Other needs, such as food assistance (BPNT), education (PIP), health (PBI Jaminan Kesehatan Nasional), and conditional cash transfers (Program Keluarga Harapan), are addressed separately. By using the same target audience, potential recipients of household-based energy subsidies can also benefit from these programs.
- Subsidized energy commodity prices should be aligned with market prices. This is necessary to eliminate price disparities in the market. This applies to products like 3 kg LPG cylinders, which should have their prices equalized with non-subsidized size like 5 kg and 12 kg. Eliminating price disparities would allow wealthier individuals to

purchase the 3 kg LPG cylinders according to their needs at market price. As a result, 3 kg LPG would no longer be exclusively subsidized and could become an alternative for consumers. Removing price disparities also simplifies distribution and supervision for the government and the State-owned Oil and Gas Company Pertamina. The risks of hoarding and tampering would also decrease. The same principle applies to electricity. Subsidized 450 VA and 900 VA households should have their tariffs equalized with non-subsidized tariffs, similar to non-subsidized customers. Even though LPG and electricity would be sold at market prices, the less privileged can still purchase them at a discounted rate through the non-cash assistance provided by the government.

- Subsidy amounts should be calculated based on average consumption and provided in fixed amounts monthly. Unlike the current policy where subsidized amounts vary according to monthly consumption, the new subsidy paradigm calculates amounts based on yearly average usage and disburses a fixed monthly amount. This simplifies distribution, encourages conservation, and promotes efficient usage.
- Beneficiaries should have the freedom to utilize the subsidy amount. For those without access to LPG or PLN electricity, the transferred subsidy amount can be used to buy LPG stoves, regulators, or pay for electricity connection fees. Additionally, if LPG and electricity are unavailable in certain areas, beneficiaries can use the subsidy to support locally available alternative energy sources, promoting inclusivity.

In terms of target determination, as stipulated in Regulation No. 30 of 2007 and in line with the essence of subsidy policies, the beneficiaries of household-based energy subsidies should be the poor and vulnerable households. Strengthening social assistance and refining targeting mechanisms are crucial. Strengthening social assistance involves improving implementation design, while enhancing targeting mechanisms means refining the identification methods for eligible households. For effectiveness, a simple yet transparent targeting criterion should be applied, ideally using integrated data or a unified registry (Acharya & Sadath, 2017; Vagliasindi, 2012). Beneficiary selection can be done using data from the government's Database of Poor and Vulnerable Households (DTKS). DTKS has proven accuracy, as demonstrated during the accurate targeting of electricity subsidies in 2017 with a 95 percent accuracy rate. Nevertheless, the government needs to refine the data on poor and vulnerable populations. Updating DTKS and syncing it with other databases is essential. In addition to household beneficiaries, the government could consider providing subsidies to micro and small enterprises (UMK). To ensure data consistency, UMK households' selection should also rely on DTKS data. DTKS managed by TNP2K includes UMK variables that can be used for UMK beneficiary determination. However, DTKS has limitations. Methodological updates are necessary to encourage inclusion of households not captured by the system, such as those without official identification documents.

For distribution, it's advisable to utilize the banking system, where each beneficiary household is provided with a Basic Savings Account (BSA). This not only simplifies distribution but also promotes financial inclusion for the poor and vulnerable. For transactions, financial technology (Fintech) solutions can be employed in collaboration with technology-affiliated financial

institutions. Contrary to card-based methods, using Fintech for transactions is easier and more cost-effective. All subsidized LPG purchases would be conducted electronically. After receiving funds in their designated electronic wallets, beneficiaries can buy LPG from partnered retailers equipped with electronic transaction readers.

In distributing and utilizing subsidized electricity and LPG, alongside the card-based system, biometric technology can also be used. Compared to card-based distribution, biometric distribution would save costs related to card printing, delivery, and card loss. However, biometric distribution comes with challenges that governments need to address, such as the requirement for smartphones at the merchant level, which relies on internet connectivity. Poor connection quality can impact transaction processes. Additionally, readiness of shopkeepers is important, as many might not be accustomed to handling such transactions. The crucial aspects of socialization and education need to be emphasized in the implementation of biometric technology for electricity and LPG subsidies.

Furthermore, the shift to targeted subsidies requires regulatory changes and public understanding. Public education is paramount for the successful implementation of energy subsidy reforms. The government needs public trust to ensure the smooth execution of subsidy policy reforms and to minimize resistance. Effective communication strategies, including media and public campaigns, should be developed to reach both impoverished and severely affected groups (Clements et al., 2015; Vagliasindi, 2012).

Therefore, intensive and extensive public education and socialization efforts are necessary. Public education should be integrated into policy planning and execution stages. Important aspects to communicate include policy objectives, benefits, and aspects of behavior change communication. To ensure policy effectiveness, monitoring and evaluation are critical to measure its impact and provide feedback for policy improvement.

## CONCLUSION

Based on the empirical findings of this research, the conclusion is that the current household-based energy subsidy policy in Indonesia fails to fulfil its role as a welfare instrument. This failure arises from the fact that subsidies are provided based on the selling price, leading to a regressive subsidy structure where those who purchase more energy commodities and benefit more from the subsidies are the more affluent groups. Vulnerable groups, including women, persons with disabilities, and the elderly, are actually excluded from receiving these subsidies. This study underscores that a more effective policy paradigm involves directly targeted energy subsidies to households. Shifting the policy paradigm towards direct targeted subsidies can yield positive impacts such as budgetary savings, improved societal well-being, reduction in poverty and inequality levels, promotion of social inclusion, and substantial opportunities to drive local renewable energy development.

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