

Strengthening The Valid Data Verification System And Supervision Of 3 Kg LPG Distribution For Beneficiary Communities

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Abstract

This research aims to analyze the strategies for strengthening the data verification system and supervising the distribution of 3 kg Liquefied Petroleum Gas (LPG) to ensure precise targeting for designated beneficiaries. The background of this study is driven by high fiscal inefficiency caused by inclusion error phenomena, where non-target affluent groups consume subsidized commodities. The research employs a descriptive qualitative method with a literature review approach and secondary data analysis concerning national energy policies for the 2021-2026 period. The findings indicate that the integration of an integrated distribution system with the Social Welfare Integrated Data (DTKS) through National Identity Number (NIK)-based validation significantly reduces potential deviations. The full digitalisation of the 3 kg LPG distribution ecosystem from agents, depots, sub-depots, to beneficiaries can help to achieve national energy equity through a modern governance system, efficient and free from corrupt practices, whilst also facilitating oversight.

Keywords: 3 kg LPG Subsidy, Data Verification, DTKS, NIK, Digital Supervision, Targeting Accuracy.

INTRODUCTION

Energy is a fundamental instrument in the national development structure, serving as both a driving force for the economy and a catalyst for social welfare within the framework of a welfare state. In the Indonesian context, the transformation of household energy through the

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kerosene-to-3-kg Liquefied Petroleum Gas (LPG) conversion program since 2007 is one of the most massive public policies aimed at providing access to clean, efficient, and affordable energy for lower-middle-class communities (Sudaryanto & Kurniawan, 2021). As a subsidized commodity, 3-kg LPG is a manifestation of the state's constitutional obligation to protect the purchasing power of low-income communities and micro-enterprises. However, the dynamics of distribution governance currently face significant challenges related to targeting accuracy, fiscal efficiency, and the integrity of the monitoring system from the base level to the end consumer (Pertamina, 2023).

The disparity between the availability of subsidy budgets and the reality of distribution on the ground is a crucial issue in the current political economy of energy in Indonesia. According to the State Budget Financial Note, the budget allocation for 3-kg LPG subsidies continues to experience significant escalation, with realization reaching over IDR 117 trillion in 2023 alone due to fluctuations in CP Aramco prices and increasing consumption volumes (Ministry of Finance RI, 2024). This phenomenon indicates a distribution leakage, or inclusion error, where wealthy groups and the commercial industrial sector benefit from commodities that should be the exclusive right of vulnerable groups. This aligns with the theory of distributive justice, which emphasizes that subsidy policies must provide maximum benefits to the most disadvantaged members of society to maintain social stability (Rawls in Prasetyo, 2022).

The main problem hampering the program's effectiveness is the weak integration of a dynamic and valid data verification system. To date, beneficiary data often experiences a disconnect between the Integrated Social Welfare Data (DTKS) and identity documents at official distribution centers. This data inaccuracy creates loopholes for adulteration, hoarding, and uncontrolled consumption migration from non-subsidized to subsidized cylinders (Basyir & Hamdani, 2023). From a public policy perspective, subsidy distribution failures are often caused by implementation mechanisms that are unresponsive to market incentives and weak information infrastructure owned by managing authorities (Friedman in Hidayat, 2023). Targeted 3-kg LPG cylinders, which require KTP registration for consumers, are a strategic step to shift the subsidy scheme from a commodity-based to a person-based (targeted subsidy). This step requires strengthening a digital verification system capable of real-time identity validation to ensure that every cylinder leaving the depot is received by the individual registered in the national database (Ministry of Energy and Mineral Resources RI, 2023). The efficiency of public organizations in this context depends heavily on the accuracy of bureaucratic procedures and the use of objective



data as a basis for operations (Weber in Ramadhan, 2024). Data validity is an absolute prerequisite, as policies based on biased data will only widen the energy access gap in remote areas.

Beyond data verification, oversight within the supply chain, from agents to retailers, plays a vital role in maintaining the stability of the Highest Retail Price (HET). Weak oversight at the regional level often causes prices at the end-consumer level to soar far beyond established regulations, which in turn erodes the effectiveness of the subsidy itself (Supreme Audit Agency, 2023). In state administrative law, supervision is an absolute control function to ensure that every action by officials and business partners remains within accountable legal boundaries (Atmosudirdjo in Suryani, 2025). Without a strict oversight system and firm sanctions for abusers, even the most sophisticated data integration will be unable to resolve distribution problems in the field (Wicaksono, 2024).

Data from various research institutions shows that approximately 40% to 50% of the total 3-kg LPG subsidies still go to households with middle to upper-income levels (World Bank in Arifin, 2022). This creates enormous fiscal inefficiency and burdens state spending on other productive sectors such as education and primary healthcare. In the Industry 4.0 era, the adoption of Big Data Analytics and Artificial Intelligence (AI)-based technologies should be used to detect transaction anomalies and precisely map consumption patterns across geographic regions (Sutrisno & Wijaya, 2023). However, this technological transition must be accompanied by strengthening digital literacy for base managers so that the verification process does not hinder public access to energy (Bappenas, 2023).

The complexity of distribution in an archipelagic nation like Indonesia also demands more harmonious cross-sectoral coordination between the Central Government, Regional Governments, PT Pertamina (Persero), and law enforcement officials. This synergy is necessary to mitigate the risk of illegal distribution practices, which often harm the common people in underdeveloped, frontier, and outermost regions (Law No. 22 of 2001 in Firmansyah, 2022). Philosophically, national energy management must remain grounded in the spirit of the constitution, which mandates that all natural resources are controlled by the state for the greatest prosperity of the people in a just and equitable manner (The 1945 Constitution in Saputra, 2023). Inaccurate subsidy targeting is not merely a technical budgetary issue, but also a moral issue of policy that must be immediately addressed to achieve social justice for all Indonesians.



Based on all the data presented and theoretical review above, strengthening the valid data verification system and intensifying distribution oversight are two key pillars that cannot be separated. Successfully improving this system will provide legal certainty for business actors while guaranteeing the rights of the poor as the primary beneficiaries (Setyawan & Pratama, 2024). This study seeks to analyze strategies for optimizing integrated data-based supervision to create a transparent, accountable, and efficient energy distribution system for national energy security (Sakti & Nurhayati, 2022). Thus, the transformation towards targeted subsidies can be achieved without causing counterproductive social unrest within the community (Coordinating Ministry for Economic Affairs, 2023).

Therefore, the urgency of this research lies in finding concrete solutions to minimize deviations in the distribution of 3-kg LPG canisters through technological integration and strengthening supervisory regulations at the base level. The primary focus is identifying barriers to identity data verification and formulating a collaborative supervisory framework that is more responsive to market irregularities (Harahap & Lubis, 2024). With a valid data base and a credible oversight system, the government is expected to maintain the country's fiscal sustainability while ensuring that every rupiah of subsidies reaches those who truly need them (BPK RI, 2023). This arrangement is a crucial step in supporting Indonesia's long-term development vision of a more inclusive and energy-independent economy (Bappenas, 2024).

RESEARCH METHOD

This study employs a descriptive qualitative approach combined with a systematic literature review and secondary data analysis. The materials analyzed include official national energy policy documents for the 2021–2026 period, financial notes, audit reports, and peer-reviewed journal articles. Data collection was conducted through electronic database searches focusing on energy subsidy governance, data validation frameworks, and public distribution oversight. The data analysis procedure encompasses data reduction, thematic synthesis across policy and institutional dimensions, and qualitative interpretation to evaluate the operationalization of NIK and DTKS validation in subsidized LPG management.



RESULTS AND DISCUSSION

3.1 Theoretical Foundations

3.1.1 Public Policy Theory and Subsidy Distribution

Public policy is a series of actions established and implemented by the government with specific objectives for the benefit of the wider community. In energy management, subsidies are a fiscal policy instrument used to intervene in market prices to ensure essential commodities remain affordable for vulnerable groups (Dunn in Nugroho, 2021). However, the effectiveness of subsidies depends heavily on targeting accuracy. Failure to establish beneficiary criteria often triggers mistargeting, where non-target groups benefit from economic benefits that should be allocated to the poor (World Bank in Prasetya, 2023).

Theoretically, an ideal subsidy should be dynamic and responsive to changes in public welfare data on the ground. Shifting subsidies from commodity-based to person-based subsidies represents a paradigm shift to minimize state budget leakage (Ministry of Finance RI, 2024). This policy aligns with the principle of allocative efficiency, which states that every rupiah spent by the state must maximize the welfare of those most in need (Friedman in Hidayat, 2023). Therefore, the theoretical basis of public policy in the context of 3-kg LPG emphasizes the importance of regulatory design that can close loopholes for irregularities through a rigorous verification system.

3.1.2 The Concept of Distributive Justice in Energy Allocation

Distributive justice is a moral principle that governs how wealth, rights, and obligations are distributed fairly among members of society. From an energy economics perspective, the state has a moral obligation to ensure energy accessibility for the poor as part of fulfilling human rights (Rawls in Prasetyo, 2022). The unequal distribution of 3-kg LPG cylinders, where people can afford subsidized goods, is considered a form of social injustice that violates the social contract between the state and its citizens. Justice does not mean providing equal amounts to everyone, but rather providing greater support to those with economic limitations (Sen in Saputra, 2023).

In the Indonesian context, this concept is rooted in Article 33 of the 1945 Constitution, which mandates that sectors of production that are important to the state and affect the livelihoods of many must be controlled by the state for the prosperity of the people. The misuse of subsidized energy is a form of inefficiency that harms the public interest and hinders the achievement of social justice (Suryokumoro et al., 2021). Therefore, strengthening the data



verification system is a legal and ethical effort to restore energy rights to those who truly deserve them, in order to create a balanced distribution of national wealth (Coordinating Ministry for Economic Affairs, 2023).

3.1.3 State Administration and Oversight Theory

Oversight is an organic management function that aims to ensure that the implementation of organizational tasks is in accordance with established plans and regulations. In state administrative law, oversight of the distribution of subsidized goods is carried out to prevent maladministration, abuse of authority, and illegal practices in the market (Atmosudirdjo in Suryani, 2025). Effective oversight must include preventive (pre-event) and repressive (post-event) oversight to ensure the integrity of the supply chain from producer to end consumer (Wicaksono, 2024).

The oversight function in the distribution of 3-kg LPG cylinders involves complex multi-agency coordination. According to bureaucratic theory, successful oversight depends heavily on standardized operational procedures and information transparency at every level of distribution (Weber in Ramadhan, 2024). Weak oversight at the base level often becomes a weak point exploited by unscrupulous individuals to hoard or sell above the Highest Retail Price (HET). Therefore, it is necessary to strengthen the control function through the involvement of local governments and law enforcement officials to provide legal certainty for beneficiary communities (BPK RI, 2023).

3.1.4 Bureaucratic Digitalization and Big Data Analytics

Digital transformation in public administration, or e-government, is the use of information technology by government agencies to improve the efficiency and transparency of services. In the 3-kg LPG data verification system, the use of digital identity cards (KTP) and web-based applications serves as an integrated database to validate beneficiaries in real time (Sudaryanto & Kurniawan, 2021). Digitization enables the government to conduct more accurate, data-driven oversight compared to manual systems that are vulnerable to manipulation (Sutrisno & Wijaya, 2023).

The use of Big Data Analytics enables management authorities to detect anomalies in consumption patterns in a particular region. Theoretically, the system's ability to quickly process large volumes of data can provide early warnings of potential shortages or stock deviations



(Bappenas, 2023). However, the effectiveness of this technology still requires the support of equitable infrastructure and digital literacy from operators at official bases. Integration between information technology and distribution policies is key to realizing a modern and accountable energy governance system (Sakti & Nurhayati, 2022).

3.1.5 Good Corporate Governance (GCG) Theory in State-Owned Energy Enterprises

As the implementing agency for the distribution mandate, PT Pertamina (Persero) is required to implement the principles of Good Corporate Governance, including transparency, accountability, responsibility, independence, and fairness. In managing subsidized LPG, transparency of distribution data from agents to depots is a key parameter for GCG success (Pertamina, 2023). Public accountability demands that every gas cylinder subsidized by public funds be accounted for until it reaches its rightful consumer (Firmansyah, 2022).

The implementation of GCG in energy distribution is also related to the protection of consumer rights. The state, through state-owned enterprises, must ensure stock availability and price stability in the market as a form of corporate social responsibility. Failure to maintain the distribution chain is not only financially detrimental but also undermines the institution's reputation in the public eye (Setyawan & Pratama, 2024). Therefore, synergy between government regulations and accountable company operational standards is absolutely necessary to ensure national energy sustainability (Ministry of Energy and Mineral Resources RI, 2023).

3.1.6 Data Synchronization and Integrated Information Systems

Data validity is at the heart of targeted subsidy policies. Synchronization between the Integrated Social Welfare Data (DTKS) and population data (NIK) is a crucial step in eliminating duplicate data or fictitious recipients (Basyir & Hamdani, 2023). Information management theory emphasizes that information quality is determined by the accuracy, timeliness, and relevance of data in supporting strategic decision-making (Harahap & Lubis, 2024). Without strong synchronization, subsidy policies will consistently face exclusion errors (where the poor do not receive) and inclusion errors (where the rich do).

An integrated information system for the distribution of 3-kg LPG canisters is expected to create a closed and controlled distribution ecosystem. With verification at the point of delivery (base), the government has a control instrument to limit purchasing quotas per individual or per household according to their welfare profile (Ministry of Finance RI, 2024). Strengthening this



information system is not just a technical issue, but rather part of bureaucratic reform to realize more inclusive and equitable public services (Bappenas, 2024).

3.2 Integration of the Integrated Distribution System with the Integrated Social Welfare Data (DTKS)

Transforming energy subsidy policy from commodity-based to beneficiary-based is a key pillar of the national fiscal resilience strategy, which demands efficient allocation of the state budget amid fluctuating global energy prices. As a commodity subsidized by the State Budget (APBN), 3-kg LPG often experiences distribution deviations due to inaccurate targeting data, resulting in a ballooning fiscal burden without optimal welfare impacts (Ministry of Finance RI, 2024). Therefore, integrating the integrated distribution system with the Integrated Social Welfare Data (DTKS) is a fundamental solution to ensure that every rupiah of the subsidy reaches the poor with precision and accountability (Bappenas, 2023). The DTKS, managed by the Ministry of Social Affairs, is a single state instrument that includes demographic information and individual welfare status that is periodically verified, thus serving as a primary filter to separate deserving consumers from those in need (Ministry of Social Affairs RI, 2023). In practice, this synchronization ensures that national energy policy aligns with the extreme poverty alleviation program, a priority of the central government (Coordinating Ministry for Economic Affairs, 2023).

Technically, the connectivity between PT Pertamina (Persero)'s customer database and the DTKS Application Programming Interface (API) system enables real-time identity validation when consumers make transactions at depots by scanning the National Identification Number (NIK) on their ID cards (Ministry of Energy and Mineral Resources RI, 2023). This process provides legal certainty that the individual is registered as a legitimate poor household or micro-enterprise, while minimizing manual intervention by depot officers, who are vulnerable to data manipulation (Pertamina, 2023). Full digitization of the supply chain includes tracking the movement of cylinders from upstream to downstream, creating a digital footprint that allows the government to map consumption patterns geographically and detect anomalies in the event of an unusual surge in demand (Sutrisno & Wijaya, 2023). The presence of an integrated oversight dashboard further strengthens this control function, allowing authorities to simultaneously monitor daily transactions and take corrective action if hoarding or misuse of subsidies is detected (Supreme Audit Agency, 2023). This data-driven oversight is a manifestation of good governance, which prioritizes transparency and speed in strategic decision-making (Suryani, 2025).



This systemic effort is also designed to minimize the margin of data error, both in the form of inclusion and exclusion errors, through continuous and collaborative population data updates between the central and regional governments (World Bank in Arifin, 2022). NIK-based validation ensures that subsidy quotas cannot be claimed by those who have economically exceeded the poverty threshold, thus creating a closed distribution system that is more equitable for the common people (Basyir & Hamdani, 2023). From a macroeconomic perspective, this targeted accuracy has a positive impact on the country's fiscal health by suppressing uncontrolled consumption volumes by the commercial sector, which in turn provides more budgetary space for productive sectors such as education and basic healthcare (Hidayat, 2023). Despite facing technological infrastructure challenges in remote areas, the government remains committed to increasing digital penetration so that targeted subsidy policies can be enjoyed equally by all Indonesians without exception (Bappenas, 2024). Philosophically, this integration is a concrete step in restoring the spirit of social justice as mandated by the constitution, where natural resources are managed to the maximum extent possible for the prosperity of the people through a modern, transparent, and future-oriented energy management system (Sakti & Nurhayati, 2022).

3.3 Subsidy Recipient Validation Mechanism Based on the National Identification Number (NIK)

The implementation of a subsidy recipient validation mechanism based on the National Identification Number (NIK) is an absolute control instrument within the closed subsidy policy architecture, aimed at transforming energy distribution from commodity-based to person-based. Technically, this mechanism positions the NIK as a single identity (unique identifier) that links consumer economic profile data with the transaction authorization system at the point-of-sale level (Ministry of Energy and Mineral Resources RI, 2023). This integration enables the digital system to instantly verify an individual's eligibility for benefits based on the welfare parameters established in the national database (Pertamina, 2023). By eliminating anonymity in the purchase of 3-kg LPG cylinders, the government can close the distribution gap, which has often been exploited by wealthy groups or the commercial industrial sector, which are not entitled to receive subsidized goods (Basyir & Hamdani, 2023).

The validation process begins when a consumer submits their ID card to be scanned or entered into the database, where the system then performs data fetching through an Application Programming Interface (API) connected to the population and social protection database



(Sutrisno & Wijaya, 2023). If the NIK is registered and the status is valid as a beneficiary, the transaction can proceed with the recording of the purchase volume, which is automatically accumulated in the individual's profile (Sakti & Nurhayati, 2022). This mechanism functions not only as a verification tool but also as a quota capping tool to prevent hoarding or repeat purchases that exceed reasonable household consumption limits (Supreme Audit Agency, 2023). From the perspective of modern public administration, the use of NIK as a validation basis is a strategic step towards achieving radical transparency in state budget management, so that every subsidized gas cylinder can be accounted for its existence all the way to the end consumer (Wicaksono, 2024).

Furthermore, NIK-based validation provides the foundation for data-driven oversight, enabling management authorities to conduct precise digital footprint audits across Indonesia's geographic regions (Ramadhan, 2024). This is crucial for addressing chronic issues related to inclusion errors, where distribution accuracy is a key parameter in maintaining fiscal stability and national energy sustainability (Ministry of Finance RI, 2024). Although its implementation faces challenges related to the availability of internet infrastructure in remote areas, the system is designed with flexibility that allows for regular data synchronization to ensure smooth public services (Bappenas, 2023). Ultimately, strengthening NIK-based validation demonstrates the state's commitment to fulfilling its constitutional mandate to distribute natural resources fairly and equitably, while ensuring that subsidies truly serve as a social safety net for those most in need (Suryani, 2025).

3.4 Digitalization of the Transaction Ecosystem: From Agents to Beneficiary Communities

Digital transformation in the 3-kg LPG distribution ecosystem is a revolutionary step in modernizing the national energy supply chain, involving system integration from the upstream level at agents to the endpoint at the beneficiary community. This digitalization aims to eliminate manual recording practices that have been a weak point for data manipulation, adulteration, and price disparities that harm state finances (Sutrisno & Wijaya, 2023). Based on operational data, the implementation of a digital platform-based system has reached more than 250,000 official bases throughout Indonesia, allowing every gas cylinder movement to be electronically recorded within an integrated logistics system (Pertamina, 2023). With the digitalization of the supply chain, the government now has full visibility into the volume of stock moving from LPG Bulk Filling and Transportation Stations (SPPBE) to agents and bases, allowing for early detection of potential



hoarding at the intermediary level through daily distribution data anomalies (Ministry of Energy and Mineral Resources RI, 2023).

At the agent level, the digital system plays a role in managing predetermined quota allocations based on real regional needs, preventing stockpiling in one area while others experience shortages (Bappenas, 2023). This integration is supported by the use of information technology devices at each base that require real-time transaction data input, where each cylinder sold must be paired with a valid consumer ID (Wicaksono, 2024). Data from the Ministry of Finance indicates that through the digitization of this ecosystem, potential subsidy budget savings can reach trillions of rupiah per year because the system is able to block transactions from parties not included in the DTKS beneficiary category (Ministry of Finance RI, 2024). Administratively, this digitization creates radical transparency that allows state auditors to trace digital footprints down to the smallest transaction level, ensuring public accountability is maintained in accordance with Good Corporate Governance standards (Supreme Audit Agency, 2023).

For beneficiaries, the digitalization of the transaction ecosystem guarantees access and price stability in accordance with the Highest Retail Price (HET) set by the local government (Ramadhan, 2024). The existence of a digital system at the base ensures that subsidy quotas cannot be "hijacked" by speculators or non-subsidized users, as each transaction requires valid identity verification (Sakti & Nurhayati, 2022). Furthermore, the use of monitoring applications allows the public to report any service issues or inappropriate prices, creating a responsive feedback mechanism to field conditions (Hidayat, 2023). Although geographical challenges in archipelagic countries often hinder internet signal penetration, the use of hybrid technology that enables offline transactions with regular synchronization is a technical solution to ensure smooth distribution in remote areas (Sudaryanto & Kurniawan, 2021). Ultimately, full digitalization from agents to communities is not simply a hardware change, but a manifestation of the state's commitment to realizing national energy justice through a modern, efficient, and corrupt-free governance system (Suryani, 2025).

3.5 Implementation of Real-Time Monitoring through an Integrated Monitoring Dashboard

The implementation of real-time monitoring through an integrated monitoring dashboard is the culmination of the digital transformation in national energy distribution governance, serving as a strategic control center to ensure accountability for precise distribution of 3-kg LPG



cylinders. Technically, this dashboard integrates massive data streams (big data) sourced from every transaction point at the depot, population profiles from the National Identity Number (NIK) validation system, and logistics data from the agent supply chain to the Fuel Stations (SPPBE) (Sutrisno & Wijaya, 2023). This platform enables managing authorities, both regulators such as the Ministry of Energy and Mineral Resources (ESDM) and operators, PT Pertamina (Persero), to have total visibility into the movement of every subsidized gas cylinder throughout Indonesia without the time lag typically found in conventional reporting systems (Pertamina, 2023). With dynamic data visualization capabilities, the monitoring dashboard provides detailed regional consumption mapping, enabling any potential anomalies or distribution deviations to be identified within minutes (Ministry of Energy and Mineral Resources RI, 2023).

Recent data shows that this integrated monitoring system is capable of processing millions of daily transaction data simultaneously, providing an accurate picture of subsidy absorption patterns in every sub-district down to the smallest base level (Supreme Audit Agency, 2023). Through an anomaly detection algorithm, this dashboard will automatically provide notifications or an early warning system if a base distributes LPG volumes beyond the established quota or if a National Identification Number (NIK) is found to have made suspicious repeat purchases exceeding reasonable household limits (Wicaksono, 2024). Macro data analysis from the Ministry of Finance revealed that digital dashboard-based monitoring contributed significantly to controlling subsidy volumes, where in the 2024-2025 fiscal year, the efficiency resulting from reducing distribution irregularities is estimated to reach a significant percentage of total energy subsidy spending (Ministry of Finance RI, 2024). This proves that the data transparency generated by the real-time monitoring system is a very powerful fiscal instrument in maintaining the stability of the state budget from unproductive budget leaks (Bappenas, 2023).

From a state administrative law perspective, the integrated monitoring dashboard serves as authentic digital evidence that strengthens the government's control over distribution partners and minimizes maladministration in the field (Atmosudirdjo in Suryani, 2025). Synchronizing this dashboard with geographic data (GIS) enables local governments to accurately map areas prone to shortages, allowing interventions such as market operations to be carried out precisely based on factual data, rather than mere assumptions or verbal reports (Sakti & Nurhayati, 2022). This system's advantage also lies in its ability to integrate data across ministries, including synchronization with the DTKS to ensure that consumer profiles displayed on the dashboard truly align with the criteria for legitimate beneficiaries (Ministry of Social Affairs RI,



2023). In the Industry 4.0 era, adopting real-time monitoring technology is no longer merely a technical option but an urgent necessity to ensure national energy sovereignty through a responsive, transparent, and results-oriented bureaucratic system (Ramadhan, 2024).

Furthermore, the implementation of this integrated monitoring provides security for the public as the primary beneficiaries, as stock availability at the depot can be transparently monitored, preventing speculators from creating artificial shortages to raise prices above the HET (Hidayat, 2023). This transparency also increases public trust in the government's commitment to eradicating energy mafias, which often exploit dark and unrecorded distribution chains (Setyawan & Pratama, 2024). Supported by reliable cloud computing infrastructure, this dashboard can serve thousands of users from various agencies simultaneously, creating a collaborative monitoring ecosystem involving all stakeholders (Bappenas, 2024). Ultimately, strengthening the monitoring system through an integrated dashboard is a manifestation of the transformation towards "Smart Government" in Indonesia, where every public policy is based on a valid data foundation (evidence-based policy) to realize social justice and prosperity for all people as mandated by the constitution (Saputra, 2023).

3.6 Analysis of the Effectiveness of System Strengthening on Subsidy Targeting Accuracy

An in-depth analysis of the effectiveness of system strengthening on the targeting accuracy of 3-kg LPG subsidies shows that the integration of digital technology and population data validation are key determinants in reducing inefficiencies in state budget allocation. The success of this transformation is measured not only by technical operational aspects, but also by its ability to mitigate the risk of inclusion and exclusion errors, which have been a pathology in subsidized energy distribution in Indonesia (Sudaryanto & Kurniawan, 2021). Based on released performance audit data, strengthening the National Identification Number (NIK)-based verification system has successfully identified and blocked purchasing attempts from economically disadvantaged groups, allowing the subsidy volume to be diverted exclusively to poor households, targeted farmers, fishermen, and micro-businesses registered in the system (Pertamina, 2023). This significant impact is evident in the declining trend in abuse rates at the base level, where every transaction now has strong legal accountability due to its direct link to the national social protection database (Ministry of Energy and Mineral Resources RI, 2023).

The effectiveness of this system is also reflected in the strengthening of fiscal transparency, where the correlation between real consumption data and realized subsidy



spending in the State Budget has become increasingly linear and can be accurately predicted (Ministry of Finance RI, 2024). The use of digital platforms that facilitate automated reporting from agents to end consumers has eliminated loopholes for stock manipulation practices often used to create artificial scarcity in the market (Bappenas, 2023). Data from the Supreme Audit Agency (BPK) shows that strengthening the oversight system through an integrated dashboard has significantly contributed to reducing potential state losses due to subsidy leakage into the industrial sector or other non-targeted uses (Supreme Audit Agency, 2023). Theoretically, the effectiveness of public policy depends heavily on the authority's ability to enforce rules through credible control instruments, and in this case, the digitalization of distribution has functioned as a digital "panopticon" that ensures every actor in the supply chain acts in accordance with applicable regulations (Weber in Ramadhan, 2024).

Furthermore, this effectiveness analysis encompasses a social dimension, as beneficiaries now have guaranteed availability of goods at a stable Highest Retail Price (HET), free from price speculation often practiced by unofficial retailers (Sakti & Nurhayati, 2022). The existence of a verification system at official bases provides a sense of security for vulnerable consumers that their subsidy rights will not be usurped by economically stronger parties (Hidayat, 2023). Furthermore, data integration with the DTKS ensures that the dynamics of community welfare status can be accommodated quickly, allowing individuals newly categorized as poor to immediately access subsidies without cumbersome bureaucratic obstacles (Ministry of Social Affairs RI, 2023). This achievement demonstrates that system strengthening is not merely a technical change, but a moral effort to maintain social justice and ensure that the state's presence is directly felt by those living below the poverty line (Saputra, 2023).

However, maintaining a high level of effectiveness requires a sustained commitment to upgrading technological infrastructure in areas with extreme geographic challenges. Data analysis shows that although the overall system is effective, there are variations in success rates between urban areas and underdeveloped, frontier, and outermost (3T) regions, which are still hampered by internet network stability (Sutrisno & Wijaya, 2023). Therefore, strengthening human resource capacity at the base level through digital literacy training is a critical variable in determining the system's long-term success (Wicaksono, 2024). Administratively, the continued effectiveness of this program also depends on regulatory synergy between the central and regional governments in taking firm action against distribution violations (Firmansyah, 2022). Ultimately, the transformation towards a targeted subsidy system through strengthened data



verification and digital oversight is a crucial step in supporting Indonesia's vision of sustainable development that is more inclusive, energy independent, and highly competitive (Suryani, 2025).

CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

Based on an in-depth analysis of efforts to strengthen the data verification and monitoring system for 3-kg LPG distribution, it can be concluded that the integration of digital technology and population data validation is an absolute prerequisite for the success of Indonesia's targeted subsidy policy. Synchronizing the integrated distribution system with the Integrated Social Welfare Data (DTKS) has proven to be an effective strategic instrument in minimizing distribution deviations, allowing subsidized energy allocation to be directed exclusively to those in genuine need (Ministry of Finance RI, 2024). The use of the Population Identification Number (NIK) as the primary validation key at each official depot guarantees legal accountability and transaction transparency, automatically closing the gap for hoarding or use by non-targeted sectors that have burdened the State Budget (Bappenas, 2023).

In addition to the verification aspect, the implementation of supervision through real-time monitoring and an integrated dashboard has revolutionized the bureaucratic control pattern from a manual-reactive model to a digital-preventive system that is more responsive to field dynamics (Pertamina, 2023). The presence of this technology provides total visibility for the government in monitoring the movement of gas cylinders from agents to end consumers, while simultaneously detecting distribution anomalies in real time to maintain the stability of the Highest Retail Price (HET) at the community level (Supreme Audit Agency, 2023). Philosophically and legally, strengthening this system is a manifestation of the state's commitment to carrying out the mandate of Article 33 of the 1945 Constitution, which states that national energy management must be based on the principles of social justice and the prosperity of the people (Saputra, 2023). The success of this transformation not only maintains the country's fiscal sustainability but also strengthens the social safety net for the poor in accessing their energy rights in the digital era (Suryani, 2025).

4.2 Recommendations

Based on the analysis and conclusions formulated, several strategic recommendations are proposed for key policy stakeholders:



1. **Accelerate Connectivity Infrastructure in 3T Regions:** The Ministry of Communication and Digital needs to prioritize internet network expansion in underdeveloped, frontier, and outermost (3T) regions to support real-time NIK verification at remote bases without technical disruptions (Sutrisno & Wijaya, 2023).
2. **Continuous Synchronization of Dynamic Data:** The Ministry of Social Affairs and regional governments must increase the frequency of updating the DTKS to ensure that validation databases reflect dynamic changes in community economic status on a monthly basis (Ministry of Social Affairs RI, 2023).
3. **Strengthen Regulations and Sanctions Enforcement:** Strict law enforcement and administrative sanctions—including permanent business license revocation—should be applied to agents or depots manipulating digital data or selling LPG above the established HET (Firmansyah, 2022).
4. **Digital Literacy and Depot Capacity Building:** PT Pertamina (Persero) should conduct continuous training for depot operators on using transaction dashboards and verification procedures to minimize input errors and accelerate public services (Wicaksono, 2024).
5. **Massive Public Campaigns on Targeted Subsidies:** The government should expand public communication campaigns to encourage affluent households to switch voluntarily to non-subsidized LPG (Bright Gas), protecting state fiscal space for vulnerable groups (Ministry of Finance RI, 2024).

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