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Compliance of Public Fuel Filling Stations (SPBU) with Fuel Pump Accuracy in Consumer Protection Efforts

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Abstract. *The accuracy of fuel pumps at public fuel filling stations (SPBU) is an essential factor in ensuring fair transactions and consumer protection. This study aims to analyze the level of compliance of SPBUs with fuel pump accuracy standards and examine the role of the Ministry of Trade in monitoring potential measurement discrepancies. The research method used is a normative juridical approach supported by empirical data from several cases of measurement manipulation, such as the installation of printed circuit boards (PCBs) in Sukabumi, measurement reduction in Serdang Bedagai, and the use of remote control devices in Bogor. The study's results show that gas station compliance remains partial. Formally, some gas stations have carried out calibration and recalibration. However, substantively, there are still practices of manipulation that violate Law Number 2 of 1981 concerning Legal Metrology and Law Number 8 of 1999 concerning Consumer Protection. The Ministry of Trade conducts supervision through calibration/recalibration, field inspections, and the enforcement of sanctions, supported by internal oversight from Pertamina, a state-owned enterprise. However, the effectiveness of supervision is still hampered by limited resources, the development of technical manipulation methods, and low legal awareness among business actors. This study emphasizes the need for intensive, multi-layered supervision, the digitization of metrology, and strict law enforcement to ensure accurate fuel measurements and optimal consumer protection.*

Keywords: *Accuracy; Compliance; Consumer; Gas Station; Protection.*

1. Introduction

Fuel oil (BBM) is a strategic commodity and a basic necessity in the daily lives of Indonesians, supporting individual mobility and playing a vital role in the industrial, logistics, and public service sectors. Accurate measurement of fuel oil volume is very important because it concerns consumers' rights to receive products in accordance with the value they paid. Accuracy in fuel transactions is not merely a technical issue, but reflects the integrity of the trading system and economic justice. Therefore, the urgency of reliable, transparent, and auditable measurement

is the primary foundation in building public trust in Public Fuel Filling Stations (SPBU) as providers of services with integrity (Megawati et al., 2022)

The urgency of accurate fuel volume measurement is a concrete expression of consumer rights protection and business ethics. In fuel purchase transactions, the public is entirely dependent on the digital system and measuring devices used by public fuel filling stations. This is in line with the principle of consumer protection, which affirms that every consumer has the right to comfort, security, safety, and accurate information in every transaction involving goods or services (v et al., 2025). Therefore, reliable, verified, and auditable measurements are a fundamental aspect that cannot be compromised. Discrepancies between the volume of fuel indicated by the measuring device and the volume actually delivered to consumers are not only a violation of the law but also a betrayal of the principle of fairness in transactions. Furthermore, inaccuracies in the fuel measurement system can distort the market, weaken people's purchasing power, and undermine a healthy, competitive business climate. In the long term, this can harm many parties, from individual consumers and law-abiding businesses to the State, which loses its legitimacy in ensuring economic justice. Therefore, strict and continuous supervision of the fuel measurement system is an integral part of the government's efforts to ensure consumer protection and create honest, fair, and responsible business governance (Nasution, R., & Irwansyah, I. 2023).

However, fraudulent practices in fuel dispensing, including the manipulation of measuring pumps, remain a serious problem that harms consumers and undermines the principles of fair trade. One common form of fraud is reducing the volume of fuel delivered to consumers below the amount displayed on the dispenser machine. This practice is not only financially detrimental but also creates a crisis of confidence in public fuel station service providers and can disrupt the overall stability of the fuel market. In supervising and controlling fuel pumps, the Indonesian government, through the Ministry of Trade, specifically the Directorate of Metrology, has the legal authority to ensure that all measuring instruments used in commercial transactions meet legal metrology standards. The Directorate of Metrology is responsible for the calibration and recalibration of measuring instruments to verify their accuracy, which must be carried out periodically by public fuel filling station operators. This obligation is regulated in Law Number 2 of 1981 concerning Legal Metrology, which stipulates that every measuring instrument used for trade purposes must first obtain a valid mark from the metrology authority. In addition, business operators are required to comply with the provisions of Law No. 8 of 1999 concerning Consumer Protection, specifically Article 8, paragraph (1), letter c, which prohibits the distribution of goods and/or services that do not conform to their actual size, measurement, or weight. Non-compliance with these regulations not only has legal implications but also threatens the sustainability of public fuel filling stations, as it could potentially lead to a loss of legitimacy and consumer trust (Kurniawan, A., & Setiawan, B. 2022). PT Pertamina (Persero), as a State-Owned Enterprise (SOE) that carries out public service obligations (PSO), plays an important role in ensuring that all public fuel filling stations under its license operate in accordance with the government-set accuracy standards. As a State entity in the energy sector,

Pertamina is not only tasked with distributing fuel to the public but also has a moral and legal responsibility to maintain the integrity of the distribution system and protect consumer rights.

Pertamina carries out internal oversight functions through various mechanisms, including operational audits of gas stations, technical inspections of fuel dispensers, and the imposition of internal sanctions, such as suspending supply, imposing fines, or revoking partnership licenses (de-branding) for gas stations found to have manipulated measuring devices. This policy implements the principles of Good Corporate Governance (GCG), emphasing accountability, transparency, and integrity in the business operations of state-owned enterprises. Thus, Pertamina's role as a state-owned enterprise is not only economic but also social and legal, namely ensuring that the entire fuel distribution network complies with legal metrology regulations and upholds the value of fairness in transactions.

Cases of violations involving fuel pump accuracy underscore the urgency of strict oversight and consistent law enforcement. Throughout 2024–2025, various fraud incidents occurred across several regions in Indonesia. In the city of Sukabumi, a gas station with the code 34-43111 was found to be manipulating fuel measurements for consumers. The gas station manager is suspected of installing a Printed Circuit Board (PCB) or circuit printer unit containing electronic components with an electric current regulator transformer. This additional device was installed and hidden in an empty compartment between the pump compartment and the fuel measuring device compartment (Rahmani, 2025). Meanwhile, in March 2024, Trade Minister Zulkifli Hasan sealed three fuel pump units at the KM 42 Rest Area gas station on the Jakarta-Cikampek Toll Road because they were suspected of using additional devices in the form of switches or jumpers that illegally interfered with the volume of fuel dispensed from the dispensers (Wahyuni, 2024). This modification results in a significant difference between the numbers displayed on the measuring device and the actual volume delivered to consumers. In addition, one of the public fuel filling stations in Sleman Regency was found to have committed a violation by installing a PCB (Printed Circuit Board) manipulator device on the gasoline pump. The addition of this device reduced fuel measurements by an estimated average of up to 600 millilitres per 20 litres (Sutarmi, 2024).

In addition to the above case, other cases indicate a gap between das sollen (regulations) and das sein (implementation in the field). The law violated was Law No. 2 of 1981 on Legal Metrology, which explicitly requires accuracy and periodic recalibration. However, the phenomenon occurred, as in the case at the KM 42 Rest Area gas station on the Jakarta-Cikampek Toll Road - Cikampek in 2024, where ministry officials discovered illegal additional devices, or switch jumpers, installed to manipulate fuel volume. These cases deviate from the principles of legal justice and justice as outlined by Gustav Radbruch, which should be realised through the use of metrology standards. However, what actually happened was technical manipulation, revealing the weaknesses of the legal structure and the actors' business culture. Similarly, when linked to the factor of legal effectiveness as described by Soerjono Soekanto, the law is influenced by the law itself, law enforcement, facilities, society, and culture (Soekanto, 2007).

These findings indicate that internal and external controls over fraudulent practices at gas stations remain weak and reveal gaps in the field of legal metrology monitoring systems. This situation shows that although regulations are in place and explicitly protect consumer rights, their implementation still faces various structural challenges. Fraudulent fuel dispensing practices blatantly violate the basic principles of consumer protection, particularly the rights to accurate information and to be treated fairly. These challenges include limited human resources for supervision, a lack of utilisation of advanced technology to verify the accuracy of measuring instruments, weak sanctions against violators, and low public awareness of their consumer rights. These conditions indicate that consumer protection efforts have not been fully effective in preventing losses from such fraudulent practices.

Considering the urgency of the problem and its widespread impact, this study is necessary to analyse the extent of legal protection provided to consumers against fraud in fuel filling. This study also aims to evaluate the effectiveness of the implemented regulations and the authorities' performance in guaranteeing consumers' rights to transparent and accurate services. It is hoped that the results of this study will inform strengthening the monitoring system and encourage policy reforms that are more responsive to consumer protection in the energy and trade sectors.

2. Research Methods

This study uses a normative legal method that focuses on norms and principles in legal science, which are examined based on legislation. The use of the normative legal research method in this legal issue is due to the fact that normative research is a type of research that examines norms and principles. This study also examines the norms and principles specific to the legal gap between legislation (the Legal Metrology Law and the Consumer Protection Law) and the reality of fraudulent practices in society.

As a normative research style, this research will examine written legal materials as the basis for analysis of the legal issues raised, namely regarding the compliance of Public Fuel Filling Stations (SPBU) with fuel pump accuracy standards, in an effort to protect consumers. The approaches used are the statute approach and the case approach. The statute approach is used to examine all regulations and rules related to consumer protection and legal metrology. In contrast, the case approach is used to analyse court decisions relevant to the legal issues under study. As explained by Soerjono Soekanto and Sri Mamudji, normative juridical research is legal library research, so data collection was conducted through library research.

The legal materials used include primary legal materials such as Law Number 8 of 1999 concerning Consumer Protection and Law Number 2 of 1981 concerning Legal Metrology, secondary legal materials in the form of legal literature, journals, and scientific works, and tertiary legal materials such as legal dictionaries and directories of laws and regulations. The data obtained from these various legal materials were then analysed descriptively and qualitatively, namely by describing the relevant legal norms, assessing their suitability for

practices in the field, and drawing deductive conclusions from general provisions to address specific problems in this study.

3. Results And Discussion

3.1 Compliance of Public Fuel Filling Stations (SPBU) with Fuel Pump Accuracy Standards in Indonesia

Fulfilling fuel pump accuracy standards by gas stations is an important aspect in protecting consumers and maintaining trust in the energy trading system. In addition to being a form of administrative compliance based on legal metrology provisions, this compliance is also a manifestation of the social and moral responsibility of business actors to respect and ensure the fulfilment of consumer rights as stipulated in Law Number 8 of 1999 concerning Consumer Protection. Moeljatno argues that legal compliance is reflected when every action is carried out in accordance with applicable norms, as this is the basis for the creation of social order and justice (Moeljatno, 2019).

Normatively, provisions regarding the accuracy of fuel pumps are regulated in Law No. 2 of 1981 concerning Legal Metrology. This regulation requires that all measuring, weighing, and filling instruments and their accessories (UTTP) used in commercial activities be calibrated and recalibrated periodically by authorized metrology officials. Article 25 stipulates that the use of measuring instruments without a valid calibration, or with modifications that could affect the measurement results, is an illegal act. Meanwhile, Article 8 paragraph (1) letter c of Law Number 8 of 1999 concerning Consumer Protection also explicitly prohibits business actors from producing or trading goods or services that do not conform to the actual size, measure, weight, or quantity.

Compliance in ensuring the accuracy of fuel pumps essentially reflects the values of fairness and honesty in every transaction. According to Gustav Radbruch, ideal law must be based on three central values, namely justice (gerechtigkeit), legal certainty (rechtssicherheit), and expediency (zweckmäßigkeit) (Radburch, 2006). In practice at gas stations, the three values mentioned by Radbruch are combined in the aspect of measurement accuracy. Justice is realized by ensuring that consumers receive their rights in accordance with the amount paid, legal certainty arises through the use of clear and objective measurement standards, while utility is reflected in the creation of efficiency and trust in trading activities. Therefore, gas station compliance can be understood not merely as an administrative obligation, but as a concrete manifestation of the application of fundamental legal values in national economic practice.

According to Tyler in Why People Obey the Law, legal compliance does not always arise from fear of sanctions, but rather from the legitimacy of legal authority accepted by society. Theoretically, this view is known as compliance theory (Tyler, 1990). Compliance by gas stations with fuel pump accuracy should stem from moral and professional awareness, not merely from

fear of legal sanctions. Only on this basis can compliance become a tangible manifestation of social responsibility in providing fair and honest service to consumers.

Minister of Trade Regulation No. 68 of 2018 requires every gas station to periodically recalibrate its measuring, weighing, and related equipment every year. This obligation is part of the implementation of metrology standards, which also require fuel pumps to meet Indonesian National Standards (SNI).

Calibration and recalibration are carried out by the Technical Implementation Unit (UPT) of Legal Metrology under the authority of the Local Government to ensure that the numbers displayed on the pump match the actual volume of fuel. As stipulated in Article 19 paragraph (1) of Law Number 8 of 1999 concerning Consumer Protection, every business actor is responsible for providing compensation if their products or services do not comply with the agreement (Miru, A., & Yodo, S. 2011). Thus, when gas stations do not comply with accuracy standards, such violations not only violate legal provisions but also contradict the moral and reputational obligation to maintain public trust.

According to Sudikno Mertokusumo, legal certainty is a situation in which the law provides guarantees for the exercise of individual rights without interference (Mertokusumo, 2014). In the context of gas stations, legal certainty is achieved through clear recalibration procedures, objective SNI standards, and consistent metrological supervision to protect consumers' rights to accurate fuel measurements.

Although metrology regulations have been strictly designed, in reality, gas stations' compliance with accuracy standards still faces various challenges. The 2024–2025 report from the Directorate of Metrology of the Ministry of Trade notes several violations, one of which is the manipulation of measuring pumps through the installation of additional electronic devices that affect accuracy (Directorate of Metrology, 2025). The findings are consistent with various cases in the field, such as in Sukabumi, where the Criminal Investigation Unit of the Indonesian National Police discovered the installation of printed circuit boards (PCBs) that reduced fuel volume by around 3% from the required amount. In Serdang Bedagai, a pump at the Suka Damai gas station was sealed by the Industry and Trade Office on suspicion of reducing fuel volume through technical manipulation. The Inspectorate General of the Ministry of Trade also revealed the existence of remote-control devices that enabled manipulation of pump output at gas stations in Bogor Regency. In another case in the Sukabumi area, consumer losses are estimated to reach Rp. 14 billion per year due to systematic volume reduction. These various cases show that some gas stations still do not adhere to the principles of honesty and accuracy in trade, while also illustrating that the implementation of metrology regulations is not yet fully effective.

If analyzed through Tyler's compliance theory, such manipulation practices indicate a low level of perceived legal legitimacy among business actors. When the risk of sanctions is considered low and supervision is deemed inconsistent, business actors are not motivated to comply with the rules. This may explain why measurement manipulation can occur repeatedly and

systematically, as gas stations do not see any certainty that violations will be immediately detected and sanctioned. In the context of Sudikno Mertokusumo's theory of legal certainty, these cases also illustrate the gap between written norms and their implementation. Legal provisions that are supposed to protect consumers are not effective if the oversight mechanisms are weak and the enforcement of sanctions does not have a deterrent effect.

The level of compliance of gas stations with accuracy standards can be measured through two approaches, namely normative and operational indicators. Normatively, gas stations are categorized as compliant if all fuel pumps have undergone calibration and recalibration in accordance with regulations, and there are no modifications to the measuring devices. However, as shown by various cases of manipulation, normative compliance does not always reflect substantive compliance. Substantive compliance is only achieved when gas stations not only fulfill their administrative obligations, but also engage in practices that are honest, accurate, and do not harm consumers. Substantive compliance is the main measure in compliance theory and legal certainty theory, where rules are not only formally obeyed but also actually implemented in practice.

Thus, violations of fuel pump accuracy standards are not only a form of administrative non-compliance but also a failure to realize the principle of legal certainty, which is the foundation of consumer protection. Weak supervision and law enforcement contribute to low compliance levels at gas stations, ultimately harming consumer rights and undermining the integrity of the energy trading system. Therefore, efforts to improve gas station compliance must focus on strengthening metrological supervision, imposing strict and consistent sanctions, and encouraging business actors to recognize that compliance is not only a legal obligation but also part of their moral and professional responsibility to provide fair services to the public.

3.2 The role of the Ministry of Trade in monitoring the inaccuracy of fuel pumps at public fuel filling stations (SPBU)

Monitoring the accuracy of fuel pumps at public fuel filling stations (SPBU) is an important component of the consumer protection system regulated by national law. In this regard, the Ministry of Trade (Kemendag), through the Directorate of Legal Metrology, plays a central role in ensuring that all measuring, weighing, and counting instruments (UTTP) used in commercial transactions, including fuel pumps, meet accuracy standards. However, this supervisory function cannot be carried out alone, as PT Pertamina (Persero), a state-owned enterprise (BUMN) that manages the national SPBU network, also bears legal, moral, and operational responsibility for ensuring measurement integrity. Thus, the SPBU monitoring system is built through a layered mechanism that combines government regulation and internal corporate supervision.

The Ministry of Trade's authority is based on Law Number 2 of 1981 concerning Legal Metrology. Article 25, paragraph (1) requires that every measuring instrument used for commercial transactions must obtain a valid calibration mark from a metrology official as proof

that the instrument meets accuracy standards. Articles 32 and 33 stipulate criminal penalties for any party who deliberately uses measuring instruments that have not been calibrated or have not been appropriately recalibrated, or who falsifies calibration results, as a form of legal protection for consumers against fraudulent measurement practices. This authority is regulated in more technical detail in Minister of Trade Regulation No. 68 of 2018 concerning Calibration and Recalibration of Measuring Instruments, Gauges, Scales, and Their Accessories, which stipulates that calibration and recalibration activities are carried out by the Technical Implementation Unit (UPT) of Legal Metrology under the district/city Trade Office. This regulation strengthens the decentralized supervision system, enabling more effective fuel pump accuracy inspections closer to gas station locations.

From an administrative law perspective, Philipus M. Hadjon emphasizes that the supervisory function encompasses three key dimensions: a preventive function to deter violations, a repressive function to take action when violations occur, and a corrective function to rectify administrative errors (Hadjon, 2015). In practice, the Ministry of Trade performs preventive functions through calibration and recalibration activities that aim to prevent fraud or manipulation of measurements before measuring instruments are used at gas stations. Repressive functions are applied when violations have occurred, namely by imposing administrative and criminal sanctions in accordance with applicable regulations. The corrective function is realized through improvements to the monitoring system, increased competence among metrology officials, and education for business actors. Thus, the Ministry of Trade's duties do not end with law enforcement but also include efforts to build a sustainable and fair monitoring mechanism.

Basically, government supervision in the field of legal metrology stems from the idea of consumer protection as explained by N.H.T. Siahaan. He emphasized that consumer protection is a state responsibility, aimed at maintaining a balance between the interests of business actors and consumers' rights. In this case, the state has an important role to ensure that every transaction is carried out honestly, openly, and in accordance with the actual measurements (N. H. T. Siahaan, 2015).

The Ministry of Trade supervises gas stations through several stages. First, legal metrology officers routinely conduct field inspections to ensure the accuracy of the volume of fuel dispensed. These inspections aim to ensure that measurement discrepancies do not exceed the 0.5 percent tolerance limit, in accordance with SNI standards. Second, suppose violations are found, such as failure to perform recalibration or the use of unauthorized measuring instruments. In that case, the Ministry of Trade can impose administrative sanctions, including revocation of calibration permits, sealing of dispensers, and even the temporary closure of operations. Third, if the violation involves criminal elements, such as manipulation of the digital system on the measuring pump, the Ministry of Trade will coordinate with law enforcement agencies such as the police and the prosecutor's office to follow up.

The Ministry of Trade also performs an educational function, fostering legal awareness among business actors. Through the National Legal Metrology Development program, the Ministry of Trade regularly provides training and socialization to gas station managers on the importance of measurement accuracy as part of good business practices. This effort aligns with Roscoe Pound's theory of Law as a Tool of Social Engineering, which views Law not only as serving to create order but also as a means to shape social behavior in accordance with the values of justice (Pound, 1954).

In addition to the government's role, PT Pertamina (Persero), a state-owned enterprise in the energy sector, also has an important responsibility for conducting internal oversight of the accuracy of fuel pump measuring devices. Under Law Number 19 of 2003 concerning State-Owned Enterprises, SOEs have an obligation to fulfill public service obligations (PSOs), namely providing services to the community in accordance with the principles of efficiency and fairness. In the context of implementing PSO, Pertamina is obliged to ensure that all gas stations operating under its license comply with legal provisions and conduct business activities in accordance with business ethics principles. In addition, Article 74 of Law Number 40 of 2007 concerning Limited Liability Companies also emphasizes social and environmental responsibility (CSR), which includes consumer protection and the prevention of fraudulent practices in business activities.

Pertamina carries out its supervisory function through various internal mechanisms. One of these is routine operational audits of gas stations, which include technical inspections of measuring pumps, recording of distribution volumes, and assessment of management performance. This audit process is generally carried out by the Fuel Terminal Manager team or the Marketing Operation Region (MOR) unit. In addition, Pertamina implements standard operating procedures (SOPs) requiring every gas station to periodically recalibrate measuring pumps and report the results to Pertamina. If violations are found, the company can impose internal sanctions in the form of fuel supply suspension, fines, and even revocation of partnership licenses (de-branding). According to Pertamina, these measures are part of its efforts to maintain public trust in the integrity of its brand and reputation.

Pertamina's role as an internal supervisor aligns with the concept of good corporate governance introduced by the Cadbury Committee (1992). This concept emphasizes the importance of three main principles in corporate management, namely accountability, transparency, and integrity. As a state-owned company, Pertamina has a moral and legal responsibility to apply these principles to ensure that public services are carried out in accordance with legal provisions and values of justice. Thus, compliance with fuel pump accuracy not only reflects responsibility towards consumers but also serves as a tangible manifestation of efforts to maintain the state's legitimacy in meeting the community's energy needs (Amboro, 2021).

In practice, the cooperation between the Ministry of Trade and Pertamina is realized through a memorandum of understanding (MoU) on joint supervision of legal metrology at gas stations. Through this agreement, both parties can conduct joint inspections of fuel pumps in various

regions in Indonesia. This collaboration forms a dual compliance mechanism, whereby the government acts as an external regulator, while Pertamina acts as an internal supervisor. This supervision model reflects the application of the principle of checks and balances, which aims to prevent abuse of authority while strengthening the reliability and integrity of the national measurement system (Rahmah, 2024).

Although the monitoring system has been designed to be quite comprehensive, its implementation in the field still faces various structural obstacles. Based on the findings of research by Gunawan Sri Guntoro and Mien Rukmini (2020), several factors, including the limited number of metrology officers in the regions, suboptimal coordination between agencies, and low legal awareness among business actors, are the main causes of the ongoing practice of manipulating fuel pumps (Sri Guntoro & Rukmini, 2020). The incidents that occurred at the Sukabumi gas station (2024) and the Cikampek Toll Road Rest Area KM 42 show that some businesses are still able to make technical modifications to fuel pumps by using printed circuit boards (PCBs) or switch controls to change the volume of fuel dispensed without being detected by the automatic system. This fact shows that even though regulations are in place, direct supervision in the field is still not optimal.

From the perspective of the theory of legal effectiveness proposed by Soerjono Soekanto, the success of supervision carried out by the Ministry of Trade and Pertamina is primarily determined by five main factors, namely legal substance, legal structure, supporting facilities or infrastructure, the role of society, and the legal culture that has developed in the relevant environment. Clear and firm legal substance will not be effective if it is not supported by a strong institutional structure and competent apparatus. On the other hand, the public's role as consumers is also very important. Legal awareness needs to be increased so that they dare to report any discrepancies in measurements at gas stations. However, the biggest challenge still lies in the community's legal culture, which tends to be permissive towards small-scale fraud, thereby hindering the establishment of an honest, integrity-based trading system.

From a criminal law perspective, the manipulation of fuel pumps by gas station managers can be classified as an economic crime. This view aligns with Barda Nawawi Arief's argument that violations of the trading system that cause losses to consumers constitute economic crime, as they directly undermine public trust in market mechanisms. Therefore, law enforcement in such cases should not stop at administrative sanctions alone, but should continue in the criminal realm in order to create a deterrence effect for business actors who commit fraud (Arief, 2016).

In addition to government and company supervision, the community and the media also play important roles in ensuring the accuracy of fuel pump measurements. For example, media reports such as those by Tempo.co (2025) on gas station fraud in Sukabumi show that social control can enhance the effectiveness of formal law enforcement. (Nurcahyo, E. 2025). According to Emile Durkheim, social control serves to uphold moral norms in society and encourages individuals and corporations to act in accordance with social expectations. In this

context, public participation through reporting or independent monitoring of gas stations is a tangible manifestation of the social function of law itself (Durkheim, E. 1984).

To strengthen future oversight, institutional reform is needed through the implementation of digitalization in metrology. The use of the Internet of Things (IoT) and integrated digital sensors on fuel pumps enables direct monitoring of filling volumes. In this case, the Ministry of Trade and Pertamina can work together to build a national monitoring dashboard that connects calibration data, sales volumes, and reports from consumers. This approach will increase transparency, reduce the risk of manual manipulation, and make supervision more efficient. This technology-based strategy is also in line with Gustav Radbruch's principle of legal expediency (doelmatigheid), whereby law is used as a tool to achieve social welfare and efficiency.

To overcome the challenges of manual monitoring, which is highly susceptible to technical manipulation, the Ministry of Trade has responded by implementing the Smart Metrology program. This program essentially utilizes digital technology and the Internet of Things sensors that have been integrated into gas station measuring devices. The implementation of smart metrology is intended to comprehensively monitor the accuracy of fuel pumps (online), so that attempts at manipulation can be detected immediately. The implementation of smart metrology is also aimed at improving the efficiency of monitoring and strengthening the transparency of the system (Ulum, A.M et al. 2024).

Thus, the roles of the Ministry of Trade and Pertamina in monitoring the accuracy of fuel pumps are complementary and mutually reinforcing. The Ministry of Trade functions as an external regulator, ensuring legal certainty and consumer protection through public legal instruments, while Pertamina acts as an internal supervisor, ensuring operational compliance through corporate mechanisms. Both share the responsibility to maintain honesty in transactions, prevent fraudulent practices, and ensure that every liter of fuel purchased by the public is in accordance with the price paid.

4. Conclusion

SPBU compliance with fuel pump accuracy standards is basically demonstrated through compliance with legal metrology requirements, namely the implementation of periodic calibration and recalibration, the use of unmodified measuring devices, and the provision of measurements that correspond to the volume paid for by consumers. However, various findings of manipulation cases, such as the installation of PCBs in Sukabumi, the reduction of measurements in Serdang Bedagai, and the use of remote controls in Bogor, show that compliance is still partial and not yet fully substantive, so that the principles of honesty, fairness, and legal certainty are still not being optimally implemented. In the context of supervision, the Ministry of Trade has an important role through its legal metrology function, which includes calibration/recalibration, field inspections, the imposition of administrative and criminal sanctions, and coordination with law enforcement agencies to crack down on manipulative

violations. This role is reinforced by Pertamina's internal oversight mechanism, as a state-owned enterprise, which ensures gas station operational compliance through audits, technical SOPs, and enforcement of corporate sanctions. Thus, the level of compliance by gas stations with fuel pump accuracy depends on the effectiveness of layered oversight between the Ministry of Trade and Pertamina, as well as on the legal awareness of business actors in implementing honest and compliant trading practices. To improve gas station compliance with fuel pump accuracy standards and strengthen the Ministry of Trade's supervision, strategic steps are needed that include regulatory, technological, and operational enhancements. First, the Ministry of Trade needs to increase the frequency and coverage of calibration/recalibration, increase the number and competence of legal metrology officers, and ensure that administrative and criminal sanctions are enforced strictly to create a deterrent effect. Second, the implementation of IoT-based Smart Technology must be prioritized to detect manipulation in real time and minimize technical modifications, such as installing PCBs or remote control devices. Third, Pertamina, as the internal supervisor, needs to tighten technical audits, improve gas station management SOPs, and strengthen corporate sanctions for partners who violate them. In addition, increasing education for business actors and active community participation in reporting measurement discrepancies will help strengthen social supervision, enabling the consumer protection system in the fuel sector to operate more optimally.

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