

A Study of the Green Constitution in the Implementation of Regional Elections as an Effort to Reduce Ballot Paper Usage in Aceh

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Abstract: Conventional regional head elections (Pilkada) often generate substantial paper waste and carbon emissions, raising significant environmental concerns. This study examines the application of the Green Constitution concept in Aceh's Pilkada through the innovation of electronic voting (evoting) as a step toward sustainable and environmentally friendly elections. Aceh serves as a pioneer in implementing e-voting in Indonesia, supported by a special provision in Qanun Aceh Number 7 of 2024 Article 59 paragraph (6). The objectives of this research are: (1) to formulate the concept of a Green Constitution within the context of sustainable election regulation in Aceh; (2) to analyze the legal framework governing Pilkada in Aceh, including the Law on the Governing of Aceh (UUPA) and relevant Qanun, in relation to the implementation of e-voting; and (3) to evaluate legal and technical challenges in applying e-voting and to offer policy recommendations for environmentally responsible elections. This study employs normative legal research methods with statutory and conceptual approaches, complemented by comparative studies and structured interviews with key stakeholders. The research is expected to produce a model of e-voting-based Pilkada policy aligned with Green Constitution principles, contributing both conceptually and normatively to the development of eco-friendly election regulations in Aceh and potentially other regions.

Keywords: Green Constitution, e-voting, Aceh regional elections

1. Introduction

The concern for environmental sustainability has increasingly emerged as a pertinent consideration in the discourse on electoral governance. Conventional practices in the administration of general elections and regional head elections (Pilkada) tend to generate significant amounts of waste, particularly arising from campaign materials and the mass production of paper-based ballots, most of which ultimately become electoral residue. Such practices raise critical questions regarding regulatory frameworks and policy mechanisms necessary to reconcile democratic processes with the imperative of environmental protection. [1]. By way of illustration, the 2018 Malaysian General Election was reported to have produced an additional 18,776 tons of waste within the span of only one month subsequent to its implementation[2]. In Indonesia, the Ministry of Environment and Forestry has likewise issued a statement indicating that the so-called 'festival of democracy' generates waste in the form of plastic, fabric, and paper, including ballot papers, all of which require special management in order to prevent additional burdens on the environment [1].

This condition underscores the urgency of adopting more sustainable approaches in the administration of elections. Such a concept aligns with the broader sustainable development

agenda at both national and global levels. One proposed innovation to address these challenges is the digitalization of general and regional elections, particularly through the adoption of electronic voting (e-voting) systems, which are believed to hold significant potential in reducing reliance on paper-based ballots.

The Province of Aceh represents an autonomous region vested with distinctive political and governmental competencies, as mandated by Law No. 11 of 2006 on the Governance of Aceh (UUPA). This special legal status accords Aceh the authority to promulgate *Qanun* (special regional regulations) that may diverge from national norms, including those governing the administration of Regional Head Elections (*Pilkada*). Within this framework of special autonomy, Aceh has introduced a significant normative innovation through the enactment of Aceh Qanun No. 7 of 2024, amending Qanun No. 12 of 2016 on *Pilkada*. Notably, this Qanun explicitly provides a legal basis for the use of electronic voting (e-voting) mechanisms in the conduct of regional elections, thereby raising important considerations regarding the harmonization of regional regulatory autonomy with national electoral law and broader democratic governance frameworks.

By virtue of this provision, Aceh stands as one of the provinces in Indonesia with a legal foundation that explicitly accommodates the use of electronic voting (e-voting) in the administration of regional head elections (*Pilkada*). This development is consistent with the broader aspiration to strengthen local democracy through innovative governance practices that are participatory and adaptive to technological advancements. The central legal and policy challenge, however, lies in determining how the e-voting mechanism can be effectively implemented while simultaneously incorporating the principles of environmental sustainability. Such challenges encompass the readiness of digital infrastructure, the degree of public trust in electronic systems, and the imperative of harmonization with national regulations, particularly those issued by the General Elections Commission (KPU) concerning voting procedures.

Nevertheless, this local regulatory momentum in Aceh presents a strategic opportunity to formulate and pilot a model of regional elections that is sustainable and grounded in the principles of a Green Constitution—namely, an electoral process that is not only democratic and inclusive but also environmentally responsible.

The concept of the Green Constitution underscores that environmental protection constitutes an integral component of the legal system and of the constitutional rights of citizens [3]. In Indonesia, the recognition of the right to a good and healthy environment is enshrined in the 1945 Constitution of the Republic of Indonesia, particularly in Article 28H paragraph (1). Globally, there has been a significant trend toward green constitutionalism, with many countries now incorporating explicit provisions on environmental protection within their constitutions at the highest normative level [4]. Within this framework, the Green Constitution requires that all public policies, including those concerning the governance of general elections and regional head elections (*Pilkada*), be formulated and implemented with due regard to the principles of environmental sustainability.

This study specifically aims to formulate how the principles of the Green Constitution may be operationalized in the administration of Regional Head Elections (*Pilkada*) in the Province of Aceh. The analysis centers on three key aspects. First, it examines the feasibility and legal preparedness of Aceh to implement an electronic voting (e-voting) system as an alternative to conventional voting, with the objective of significantly reducing paper usage. Second, it evaluates the compatibility of e-voting policies in Aceh's *Pilkada* with democratic principles founded upon the tenets of direct, general, free, confidential, honest, and fair elections (*LUBER*

JURDIL). Third, it seeks to ensure that such arrangements do not conflict with the broader national legal framework governing regional elections.

Preliminary feasibility studies indicate that the Province of Aceh possesses a number of strategic assets conducive to the implementation of electronic voting (e-voting). These include strong political support and progressive regulatory initiatives from the Aceh Government and the Aceh People's Representative Council (DPRA), as well as the continuous and significant development of information and communication technology (ICT) infrastructure [5]. These factors reinforce the argument that the Province of Aceh constitutes one of the most suitable regions to serve as a pilot site for the implementation of e-voting in the administration of regional head elections (*Pilkada*). Accordingly, this study is expected not only to enrich academic discourse in the fields of constitutional law and environmental law, but also to provide a tangible contribution to the Province of Aceh in designing and implementing a model of *Pilkada* that is sustainable, inclusive, and technology-based.

2. Literature Review

2.1. Green Constitution and Constitutional Right to the Environment

The term *Green Constitution* refers to a constitutional paradigm that positions environmental protection as one of the fundamental elements within the basic legal structure of a state. Since the 1970s, environmental issues have increasingly gained recognition within the constitutional domain across various countries, giving rise to a school of thought commonly referred to as green constitutionalism [6]. The current global trend demonstrates a strong inclination to integrate guarantees of the right to a healthy environment into constitutional texts. Several countries have incorporated clauses in their constitutions that explicitly ensure environmental protection or recognize the right to a healthy environment [7] [8]. This phenomenon is driven by a collective awareness of the global ecological crisis and the necessity for legal instruments that are fundamental and juridically binding. The Green Constitution is regarded as a normative response that is both radical and constructive in addressing socio-ecological crises in a simultaneous manner [9] [10]. Within this framework, the state is not only obliged to safeguard the rights of present and future generations to a healthy environment, but is also constitutionally mandated to take affirmative measures in preserving ecological sustainability through pro-environmental policies.

In the Indonesian context, the principles of the Green Constitution are reflected in the 1945 Constitution of the Republic of Indonesia, particularly Article 28H paragraph (1), which recognizes the right of every citizen to a good and healthy environment, and Article 33 paragraph (4), as amended, which underscores the importance of sustainability in national economic development. Nevertheless, the development of environmental constitutionalism in Indonesia remains in a transitional stage. The enforcement of constitutional norms relating to the environment often depends on implementing regulations and judicial decisions. Several studies indicate that the mere recognition of environmental rights is insufficient; rather, effective resolution of environmental challenges requires synergy among the government, civil society, and the private sector within a comprehensive constitutional framework.

Accordingly, the Green Constitution encompasses not only the recognition of the right to a proper environment but also imposes upon the state the obligation to regulate the sustainable use of natural resources, to guarantee public participation in environmental decision-making, and to ensure access to environmental justice. The application of the Green Constitution across different jurisdictions demonstrates considerable variation. Some countries, such as Ecuador (2008) and Bolivia (2009), have even incorporated the rights of

nature or ecosystem rights into their constitutions. Conversely, a number of European and Asian countries, including several provinces in China, have strengthened constitutional provisions on environmental protection [11], particularly in the aftermath of the 1972 Stockholm Conference. Although the inclusion of environmental clauses in constitutions has become a common practice, their effectiveness largely depends on implementing legislation and the political will to enforce them.

2.2. The Special Autonomy of Aceh in Conducting Regional Election (Pilkada) and E-Voting Policy

The Province of Aceh possesses a legal framework of *lex specialis* in the administration of Regional Head Elections (*Pilkada*), which distinguishes it from other provinces in Indonesia. This special status is a direct implication of the peace agreement embodied in the 2005 Helsinki Memorandum of Understanding (MoU Helsinki) and normatively accommodated in Law No. 11 of 2006 on the Governance of Aceh (UUPA). A concrete manifestation of this special status is the legal recognition of local political parties and the authority to regulate the procedures of *Pilkada* through special regional regulations known as *Qanun Aceh*.

Aceh Qanun No. 12 of 2016 regulates the mechanisms for conducting *Pilkada* in Aceh, and in 2024 this regulation was amended through Aceh Qanun No. 7 of 2024. This provision constitutes a significant milestone in the history of electoral legislation in Indonesia, as Aceh has become one of the provinces to explicitly provide a legal basis for the application of e-voting in regional elections. The technical details concerning the implementation of e-voting are subsequently delegated to the General Elections Commission of the Republic of Indonesia (KPU RI) and the Independent Elections Commission of Aceh (KIP Aceh) to be further elaborated through implementing regulations.

Nevertheless, this legal breakthrough also gives rise to juridical challenges, particularly with regard to the harmonization between regional regulations in Aceh and the national legal framework. To date, Law No. 10 of 2016 on Regional Head Elections at the national level has not yet provided for the mechanism of e-voting in such elections. Innovations introduced by the General Elections Commission (KPU RI) have thus far been limited to the digitalization of the vote recapitulation stage (electronic recapitulation or e-recap), as implemented in the 2019 and 2024 General Elections, without extending to the actual voting process itself.

Within the framework of Indonesia's asymmetric decentralization, Aceh's distinctiveness is normatively permissible insofar as it does not conflict with the 1945 Constitution of the Republic of Indonesia. Consequently, the implementation of e-voting in Aceh must ensure compliance with these fundamental constitutional principles from technical, juridical, and ethical perspectives. The reliability of the electronic voting (e-voting) system constitutes a crucial factor that must be guaranteed at every stage of implementation. Such a system must be capable of safeguarding the principle of ballot secrecy as well as ensuring the security of voter data.

A number of studies and scholarly works highlight the various vulnerabilities of e-voting, particularly those associated with cybersecurity threats such as the potential for hacking, vote manipulation, and difficulties in ensuring transparent verification and auditing of election results. Accordingly, any e-voting policy designed in the context of Aceh must be equipped with multi-layered security protocols, an audit system capable of independent verification, and contingency mechanisms to ensure recovery in the event of system disruptions.

Beyond the technological dimension, the readiness of information technology infrastructure and local human resources requires thorough examination. The adoption of

advanced technology in the Acehnese context must take into account socio-cultural dimensions as well as local wisdom values. The socialization of e-voting, for instance, should ideally be carried out through participatory, community-based approaches that involve traditional leaders, religious scholars (*ulama*), and community figures, in a manner consistent with the Islamic principles that underpin social life in Aceh.

Historically, Aceh has initiated e-voting efforts, albeit on a limited scale. In 2011, the Banda Aceh City Government planned a pilot project for the mayoral election [5], but the initiative was not realized due to regulatory constraints at the time. Although not implemented, activities such as e-voting simulations and seminars held during that period demonstrated that Aceh possessed initial technical capacity to adopt this technology. With the enactment of Aceh Qanun No. 7 of 2024 amending Qanun No. 12 of 2016 on the Election of Governors and Deputy Governors, Regents and Deputy Regents, as well as Mayors and Deputy Mayors, a timely regulatory momentum has emerged to conduct trial implementations of e-voting in the forthcoming simultaneous regional elections. Such initiatives could serve as an empirical foundation for the development of a more mature and comprehensive electoral system.

At the global level, the implementation of e-voting has been successfully realized in a number of countries. Estonia, for instance, has adopted nationwide internet voting (i-voting) since 2005, with voter participation rates showing a consistent upward trend. India has extensively employed Electronic Voting Machines (EVMs) across polling stations throughout its territory, while Brazil has implemented electronic voting machines since the early 2000s. [12]. Case studies from these countries demonstrate that e-voting can enhance efficiency and expedite the process of vote tabulation; however, the success of its implementation is highly contingent upon the level of public trust in the system employed.

In the context of Aceh, the initial step required is the development of a comprehensive regulatory framework. This includes the formulation of Standard Operating Procedures (SOPs) for e-voting, the application of security standards grounded in cryptographic technology, the provision of an audit trail, and regulations governing the mechanism for manual re-voting in the event of system failure. All such policies must be underpinned by the principles of transparency, accountability, and inclusiveness so as to remain consistent with the *LUBER JURDIL* principles enshrined in the Constitution."

Conceptually and empirically, this study is expected to contribute in two ways: (1) as an initial best practice for the implementation of environmentally friendly, digitally based regional elections in Indonesia, commencing with Aceh; and (2) as an academic contribution to the development of constitutional law and local democracy literature with an orientation toward environmental sustainability.

3. Research Methodology

This research adopts a normative legal study (doctrinal research) complemented by a limited empirical approach. The normative-juridical method is employed to examine and analyze relevant legal instruments, including the 1945 Constitution of the Republic of Indonesia, the Law on Regional Head Elections (Pilkada), the Law on the Governance of Aceh (UUPA), as well as the Acehnese Qanun, accompanied by an assessment of the underlying legal principles, such as the principles of direct, general, free, confidential, honest, and fair elections (*LUBER JURDIL*), and the concept of the Green Constitution. In parallel, the empirical component is conducted through in-depth interviews and Focus Group Discussions (FGDs) with relevant stakeholders, particularly members of the Independent Election Commission (Komisi Independen Pemilihan/KIP) of Aceh. This dual approach is designed to capture

practical perspectives on both the readiness and challenges of implementing the e-voting system in Aceh. Primary data for this study are derived from interviews and FGDs, while secondary data comprise statutory documents, academic literature (including international scholarly journals, books, and research reports) related to e-voting and the Green Constitution. All stages of the research are structured systematically and progressively to ensure that the objectives of the study are achieved effectively and measurably.

4. Finding and Discussion

4.1. Juridical Readiness of Aceh Province in Implementing an Electronic Voting (E-Voting) System

The electronic voting (e-voting) system represents an innovation in the field of information technology that enables general elections and regional head elections to be conducted electronically, encompassing the processes of voter registration, ballot casting, and vote tabulation. The adoption of e-voting has the potential to enhance the efficiency, accuracy, transparency, and speed of electoral processes [13]. However, the implementation of e-voting must also take into account juridical aspects, particularly within the context of special autonomous regions such as the Province of Aceh, which possesses distinctive features in governance and law as stipulated in Law No. 11 of 2006 on the Governing of Aceh (UUPA).

The Province of Aceh is one of the regions in Indonesia that enjoys a special and distinctive status, as constitutionally and juridically recognized within the framework of the Unitary State of the Republic of Indonesia (NKRI). This special status arises not only from unique historical, social, and cultural realities, but also as a form of state recognition of Aceh as a legal community possessing local values and social governance structures that differ markedly from other regions. Juridically, the recognition of Aceh's special status is enshrined in Law No. 44 of 1999 concerning the Implementation of the Special Privileges of the Province of Aceh.

The legal recognition of Aceh's special status is reinforced in Law No. 11 of 2006 on the Governance of Aceh (UUPA), which serves as the implementation of the 2005 Helsinki Memorandum of Understanding (MoU Helsinki) between the Government of the Republic of Indonesia and the Free Aceh Movement (GAM). Article 1, point 2 of the UUPA stipulates that Aceh is a province constituting a legal community with special characteristics, granted the authority to independently regulate and manage governmental affairs and local public interests in accordance with statutory regulations, within the system and principles of the Unitary State of the Republic of Indonesia as established under the 1945 Constitution of the Republic of Indonesia.

The special and distinctive authorities granted to Aceh encompass various domains, including governance, the implementation of Islamic law (*sharia*), education, the role of religious scholars (*ulama*), culture, the use of regional symbols, and the management of natural resources. Within this context, Aceh is afforded broad discretion to formulate and implement *Qanun*, which are Aceh-specific legislative regulations that hold the status equivalent to regional regulations but possess legal force that is more contextually aligned with Aceh's unique characteristics.

Nevertheless, all forms of Aceh's special status must remain within the framework of national law and must not conflict with the fundamental principles of the state, as established in the 1945 Constitution of the Republic of Indonesia, Pancasila, and other statutory regulations. Accordingly, the exercise of Aceh's special and distinctive authorities must adhere to the principles of asymmetric decentralization, granting broader autonomy to Aceh while preserving the overarching principle of national integrity.

Thus, the existence of the Province of Aceh as a region endowed with special and distinctive authorities represents not only an affirmation of its local history and identity, but also reflects the inclusive spirit of the Unitary State of the Republic of Indonesia (NKRI), capable of accommodating diversity within a constitutional framework. Aceh serves as a concrete example of how the principle of unity in diversity (*Bhinneka Tunggal Ika*) can be realized both legally and politically within Indonesia's system of governance.

Aceh Qanun No. 7 of 2024, concerning the amendment of Aceh Qanun No. 12 of 2016 on the election of governors and deputy governors, regents and deputy regents, as well as mayors and deputy mayors, serves as the legal framework for the administration of regional head elections in Aceh. This Qanun provides the legal basis for conducting regional elections in Aceh via e-voting, particularly during the ballot-casting stage. On this legal foundation, Aceh is juridically authorized to implement the e-voting system, whether in a limited or comprehensive manner, provided that it does not conflict with higher-level statutory regulations.

The development of information and communication technology (ICT) has brought about significant changes across various aspects of human life, including governance. Governments are required to adapt to and leverage information technology to establish administrative systems that are effective, efficient, transparent, and accountable. In this context, the Republic of Indonesia Law No. 1 of 2024 on the Second Amendment to Law No. 11 of 2008 concerning Information and Electronic Transactions serves as a legal instrument providing a statutory basis for various digital-based activities, including in the administration of government.

Normatively, the Electronic Information and Transactions Law (UU ITE) constitutes a foundational milestone affirming that electronic information and/or electronic documents possess legally binding status equivalent to written documents. This is explicitly stipulated in Article 5 paragraph (1), which states that 'Electronic Information and/or Electronic Documents and/or their printouts shall constitute valid legal evidence.' Such a provision directly grants legal recognition to various forms of electronic communication, transactions, and administrative processes utilized in governance, encompassing public service delivery, decision-making, and governmental data management.

Furthermore, Article 40 paragraph (1) of the Electronic Information and Transactions Law (UU ITE) encourages the utilization of information technology to support the establishment of an electronic-based governance system, commonly referred to as e-government. This enables more efficient interactions between the government and the public, among governmental institutions, and between the government and business actors, thereby fostering a modern and responsive state administration system. Moreover, the application of information technology within democratic processes—such as the use of electronic voting (e-voting) systems for general elections, regional head elections, or village head elections—can be further examined and developed within the legal framework of UU ITE, provided that it remains consistent with other applicable statutory regulations.

However, the legal recognition granted by UU ITE does not automatically override the principle of caution. Protection of personal data, the security of electronic systems, and the assurance of information integrity remain critical aspects regulated under UU ITE and its derivative regulations. Consequently, any utilization of information technology in government administration must continue to observe legal, ethical, and good governance principles. In this manner, UU ITE provides a strong juridical legitimacy for governmental digital transformation, while simultaneously establishing a legal foundation for the responsible use of information technology within the state administration system. In today's digital era, UU ITE serves as a

crucial instrument in promoting a bureaucracy that is adaptive, transparent, and inclusive for all citizens.

As the agency responsible for the technical administration of general and regional elections, the General Elections Commission (KPU) issues KPU Regulations (PKPU) as implementing rules of the Law. However, in the context of Aceh, existing PKPUs still focus on manual voting systems, including ballot casting, manual counting at polling stations (TPS), and tiered recapitulation. There is currently no PKPU that specifically and comprehensively regulates the use of e-voting technology in regional elections, including in regions with special status such as Aceh [14]. Notably, the Province of Aceh possesses special authority as stipulated in Law No. 11 of 2006 on the Governance of Aceh (UUPA). The UUPA grants Aceh the discretion to regulate and manage its own governmental affairs, including the administration of regional head elections, through Acehnese Qanun. Nevertheless, the conduct of *Pilkada* remains within the national legal framework, meaning that technical regulations must adhere to provisions issued by the central KPU, including PKPU.

4.2. The Compatibility of E-Voting Policies in Aceh's Regional Election (Pilkada) with the Principles of, Direct, General, Free, Confidential, Honest, and Fair (LUBER and JURDIL)

The modernization of Indonesia's democratic system has continued to evolve significantly in response to the growing demand for effective and efficient administration of general and regional elections. One idea that has emerged as a response to the complexities of election management is the utilization of information technology through electronic voting (e-voting) systems. Conventional paper-based voting systems often face fundamental challenges, including potential inaccuracies in vote counting, the possibility of double voting, lengthy recapitulation processes, and high logistical costs, particularly in distributing ballots to remote areas. In this context, e-voting is regarded as an alternative solution that offers greater efficiency, accuracy, and transparency [15].

However, the discourse on the implementation of e-voting should not be viewed solely from a technical perspective. The application of this technology must be examined comprehensively within a legal and constitutional framework, particularly with regard to fulfilling the principles of direct, general, free, confidential, honest, and fair elections (LUBER and JURDIL) [16]. According to the Indonesian dictionary, the term 'principle' refers to a fundamental basis for thought or opinion, or can also be interpreted as the foundation of an ideal [17]. In the context of elections, a principle serves as the foundational ideal or aspiration upon which general and regional elections are conducted.

The principles of LUBER and JURDIL constitute the constitutional and philosophical foundation of all general and regional elections in Indonesia. These principles are mandated under Article 22E paragraph (1) of the 1945 Constitution of the Republic of Indonesia (UUD NRI 1945) and are elaborated in the Election Law and the Regional Head Election Law. The principle of *Direct* (Langsung) means that voters have the right to cast their votes personally, without intermediaries, and without delegation to others. The principle of *General* (Umum) guarantees that every eligible citizen, without discrimination, has the right to vote and to be elected. The principle of *Free* (Bebas) emphasizes that the people have the freedom to make choices according to their conscience, without coercion, pressure, or influence from any party. The principle of *Confidential* (Rahasia) ensures that voters' choices are kept secret and cannot be known by others. Meanwhile, the principle of *Honest* (Jujur) underlines the obligation of all parties involved in elections, from organizers and candidates to voters, to act honestly in accordance with the applicable regulations.

The implementation of regional head elections (*Pilkada*) through an e-voting mechanism can be conducted in a manner that continues to uphold the principles of LUBER and JURDIL as enshrined in the Constitution, which can be explained as follows:

1. The Principle of Direct (Langsung)

The fulfillment of the principle of *Direct* (Langsung) entails that each voter is obliged to cast their vote personally, without delegation to another party. In the context of implementing an electronic voting (e-voting) system, this principle remains assured through electronic verification (e-verification) mechanisms. Such verification processes are carried out, for example, by scanning a barcode on the voter invitation or by entering the National Identification Number (NIK) to log in to the registration application. Thus, although the medium differs—votes are cast digitally via the e-voting computer interface—the principle of direct voting is consistently upheld.

2. The Principle of General (Umum)

The principle of *General* (Umum) signifies that every citizen who meets the eligibility requirements and is registered in the Permanent Voter List (DPT) has the right to exercise their vote. In an electronic voting (e-voting) system, the login mechanism in the registration application is based on a database derived from the DPT, ensuring that only legitimate and registered voters can access and cast their votes. In principle, all citizens hold equal standing in exercising their voting rights, as evidenced by possession of official identification. In e-voting practice, this validation of voting rights is implemented through the use of the Electronic Identity Card (e-KTP) as an authentication instrument, guaranteeing that voters meet the eligibility criteria to participate in regional elections (*Pilkada*).

3. The Principle of Free (Bebas)

This principle signifies that every voter possesses full freedom to exercise their voting rights without coercion, intimidation, or pressure from any party. The difference in the voting system—whether through manual mechanisms or electronic voting (e-voting)—does not diminish the essence of this freedom, as the distinction lies solely in the medium or method of voting, not in the fundamental right to vote itself. In practice, the e-voting system even provides the option to abstain, which reflects respect for individual freedom in determining one's political stance. Thus, the implementation of e-voting continues to ensure that voters can safely and freely express their political rights without intervention or pressure from any party.

4. The Principle of Confidential (Rahasia)

The principle of *Confidential* (Rahasia) emphasizes that each voter's political choice must be kept secret and must not be known by anyone, including election organizers. In the context of an electronic voting (e-voting) system, this principle is maintained through specific mechanisms that ensure ballot secrecy. While in conventional regional elections (*Pilkada*) confidentiality is preserved through the use of enclosed voting booths, in e-voting, secrecy is ensured by providing voting booths or designated spaces equipped with computer terminals.

Additionally, the e-voting device utilizes a smart card that functions as a voter authentication medium, wherein the generated data is random and does not reveal the individual voter's identity. Consequently, the votes recorded within the system remain fully confidential and cannot be accessed by any party. This technology allows e-voting to uphold the principle of secrecy even more robustly, while simultaneously ensuring that each vote cast cannot be traced back to the corresponding voter.

5. The Principle of Honest (Jujur)

The principle of *Honest* (Jujur) entails that all parties involved—whether election organizers, government authorities, candidates, supervisors, or the electorate—are obliged to

conduct the regional election (*Pilkada*) process in a transparent, accountable manner and in accordance with the provisions of statutory regulations. Honesty serves as a crucial foundation for safeguarding the legitimacy of election results and preventing the occurrence of vote manipulation.

In the context of electronic voting (e-voting), the system has been designed to ensure the credibility and accountability of the voting process. The technology employed minimizes human intervention, thereby significantly reducing the potential for manipulation or fraud. Each vote is directly recorded into the system without the possibility of alteration, while the sophistication of software and digital security mechanisms ensures that vote data remains protected. Thus, the implementation of e-voting upholds the principle of *Honest* (Jujur) in regional elections (*Pilkada*) by enhancing system integrity and reliability.

6. The Principle of Fair (Adil)

The principle of *Fair* (Adil) signifies that in the administration of regional elections (*Pilkada*), all participants receive equal treatment and rights without coercion or pressure from any party. E-voting is able to uphold this principle because the entire election process—from voter verification to vote counting—is conducted by computer systems, ensuring that all registered citizens are granted equal rights, including equitable treatment by the system itself. Consequently, with the e-voting system, citizens no longer need to use a physical voter card; presenting the electronic ID card (e-KTP) suffices, as it is verified through the system.

4.3. Analysis of the Compatibility of Aceh's Regional Election (*Pilkada*) Policies with the National Legal Framework

Article 65 paragraph (1) of Law No. 11 of 2006 on the Governance of Aceh grants Aceh special authority to conduct regional elections (*Pilkada*) that are democratic, free, confidential, and carried out honestly and fairly. Accordingly, this law also stipulates further regulation in the form of Acehnese Qanun, which specifically governs the administration of *Pilkada*, as provided in Article 73 of Law No. 11 of 2006.

As previously explained, Article 59 paragraph (6) of Aceh Qanun No. 12 of 2016 provides that the voting process in Aceh's regional elections (*Pilkada*) may be conducted using an e-voting mechanism, provided it does not conflict with higher-level legal regulations and fundamental legal principles. In addition to being grounded in Law No. 11 of 2006 and the Aceh Qanun on *Pilkada*, the legitimacy of the policy for administering votes in Aceh's regional elections can also be supported by Constitutional Court Decision No. 147/PUU-VII/2009.

In this decision, the Constitutional Court considered that voting conducted through e-voting is constitutional, provided that it does not violate the principles of direct, general, free, confidential, honest, and fair elections (LUBER and JURDIL). Furthermore, it must be based on objective considerations, including the preparedness of election organizers and the electorate, the availability of funding and technology, and the readiness of other relevant stakeholders, all of which must be thoroughly prepared.

Thus, Aceh's regional elections (*Pilkada*), in which the voting process utilizes an e-voting mechanism, are in accordance with the national legal framework. However, from a juridical perspective, challenges that must be addressed include the availability of technical regulations issued by the General Elections Commission (KPU) regarding e-voting procedures, as well as the need for the Election Supervisory Body (Bawaslu) to develop regulations on monitoring e-voting-based elections. In the event of a dispute over the results of regional elections, as long as the object of the dispute concerns the election outcome, the Constitutional Court retains the

authority to examine and adjudicate the case, regardless of whether the voting process was conducted conventionally or via e-voting.

This aligns with the considerations of the Constitutional Court as outlined in Decision No. 147/PUU-VII/2009. Furthermore, Constitutional Court Regulation No. 3 of 2024 accommodates the use of electronic evidence as a valid form of proof, in accordance with Article 43(f) in conjunction with Article 50 of Constitutional Court Regulation No. 3 of 2024 concerning Procedural Rules in Disputes over the Results of Gubernatorial, Regent, and Mayor Elections.

5. Conclusion and Recommendation

This study indicates that the application of Green Constitution principles in the administration of regional elections (*Pilkada*) in Aceh constitutes a strategic step toward establishing more environmentally sustainable elections. The massive use of paper ballots not only generates ecological impacts, such as deforestation and paper waste, but also contradicts the spirit of sustainable development as mandated in Articles 28H(1) and 33(4) of the 1945 Constitution, which emphasize the importance of environmental protection. The adoption of digital technologies in the election stages, including e-voting and other digital information systems, represents a concrete implementation of Green Constitution principles that is both relevant to contemporary developments and responsive to resource efficiency needs. Although challenges remain in regulatory frameworks, infrastructure, and public readiness, the potential for implementing digital *Pilkada* in Aceh warrants consideration as an ecological and constitutional solution. The central and regional governments, together with the General Elections Commission (KPU), the Election Supervisory Body (Bawaslu), and the Aceh Independent Election Commission (KIP Aceh), need to formulate regulations supporting the implementation of digital elections while considering environmental protection, budget efficiency, and information system security. Pilot projects or trial runs of digital *Pilkada* in specific areas of Aceh are necessary as an initial model for operationalizing Green Constitution principles in regional elections.

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