Jurnal Impresi Indonesia (JII)
p-ISSN: 2828-1284 e-ISSN: 2810-062x
website: https: //rivierapublishing.id/jii/index.php/
Vol. 05. No. 03. 2026

Strategic Planning of the Location of PLN's Public Electric Vehicle Charging Station (*SPKLU*) in Bekasi City Based on Multi-Criteria Analysis

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Keywords
location, *SPKLU*, electric vehicles, multi-criteria decision making (MCDM), AHP–TOPSIS, cost–benefit analysis (CBA)

Abstract
This study aims to determine the strategic locations for Public Electric Vehicle Charging Stations (*SPKLU*) in Bekasi City using a multi-criteria approach based on AHP–TOPSIS and financial feasibility evaluation through Cost–Benefit Analysis (CBA). The Analytic Hierarchy Process (AHP) was employed to establish criteria weights, including electric vehicle (EV) density, accessibility, energy infrastructure readiness, socio-economic factors, inter-station distance, and environmental aspects. Subsequently, TOPSIS was applied to assess the closeness of alternative locations to the ideal solution, while CBA was used to evaluate the economic viability of the project. The results indicate that the most influential criteria are EV density, accessibility, and energy infrastructure readiness. Mall Sumarecon Bekasi achieved the highest preference score (Ci = 1.0), designating it as the primary priority for *SPKLU* development. The City Hall and Islamic Center ranked second and third, respectively, serving as secondary locations to expand service coverage and support network stability. CBA analysis shows that Mall Sumarecon has a Benefit–Cost Ratio (BCR) of 0.98, approaching the financial feasibility threshold, with additional social benefits including carbon emission reduction and improved air quality. Based on these findings, it is recommended to prioritize SPKLU construction at Mall Sumarecon, develop the City Hall and Islamic Center as secondary locations, and implement monitoring, integration of socio-environmental factors, long-term planning, and public education. This study emphasizes the importance of a holistic approach in SPKLU location planning to support mobility, sustainability, and equitable access to electric transportation in Bekasi City.

INTRODUCTION

The transformation of the global transportation system in the last two decades shows a significant paradigm shift towards the use of low-emission technologies in response to increasing pressures of climate change and the degradation of the urban environment. The transportation sector globally is known to account for more than a quarter of energy-based carbon dioxide emissions, making it one of the priority sectors in the world's climate change mitigation agenda. In line with the increasing global awareness of the urgency of sustainable development, electric vehicles (EVs) are rapidly developing as a major alternative to fossil fuel vehicles (Lipu et al., 2022; Mo et al., 2022; Okoh & Onuoha, 2024; Onat et al., 2022; Patel et al., 2022). Electric vehicles offer higher energy efficiency, significantly lower exhaust emissions, as well as long-term integration opportunities with renewable energy sources.

Therefore, the development of the electric vehicle ecosystem is not only seen as a technological innovation, but also as a strategic instrument in achieving the Net Zero Emission (NZE) target globally.

Indonesia, as a developing country with a high rate of urbanization and vehicle growth, faces similar, even more complex, challenges. The increase in the number of motor vehicles in urban areas has contributed to congestion, increased fossil energy consumption, and decreased air quality. In response to these challenges, the Indonesian government has established various strategic policies related to the acceleration of Battery-Based Electric Motorized Vehicles (*KBLBB*). This policy not only aims to reduce carbon emissions, but also to reduce dependence on fuel oil imports and strengthen national energy security. However, the success of the implementation of electric vehicle policies is not only determined by the availability of vehicles and financial incentives, but also depends on the readiness of supporting infrastructure that is able to ensure the comfort and reliability of the use of electric vehicles in daily mobility activities.

One of the main challenges in the development of electric vehicles is the limitations and imbalances of charging infrastructure. Public Electric Vehicle Charging Stations (*SPKLU*) are a crucial component in the electric vehicle ecosystem because they function as a connecting point between the transportation system and the energy system (Atryomadepa & Putra, 2024; Hs et al., 2023; Juwana et al., 2024; Notopramono & Irawan, 2026; Stefani et al., 2024). The availability of adequate SPKLU, evenly distributed, and easily accessible SPKLU will increase users' sense of security and trust in electric vehicles. On the other hand, the limited number and inaccuracy of the location of the SPKLU can cause user concerns regarding mileage and power availability, known as *range anxiety*. This condition has proven to be one of the main inhibiting factors in the adoption of electric vehicles, especially in urban areas with high levels of mobility.

The problem of determining the location of *SPKLU* becomes increasingly complex when faced with the characteristics of dynamic urban areas. The factors that affect the emergence of this problem are not only technical, but also involve spatial, social, and economic aspects. Electric vehicle density, location accessibility, readiness of electrical infrastructure, socio-economic characteristics of the community, distance between SPKLUs, and environmental considerations are variables that interact with each other in determining the effectiveness of SPKLU locations. In addition, the limited capacity of the electricity network in certain areas and differences in community activity patterns also affect the utilization rate of SPKLU. Therefore, SPKLU location planning that is carried out intuitively or partially risks producing infrastructure that is not optimal and less sustainable.

The impact of these factors is not only felt at the individual level of electric vehicle users, but also has implications for the transportation system and the urban environment as a whole. The uneven distribution of *SPKLU* has the potential to create inequality in access to clean energy between regions, increase dependence on conventional vehicles in certain areas, and reduce the effectiveness of emission reduction policies. In the long run, these conditions can hinder the acceleration of the energy transition in the transportation sector and reduce the environmental social benefits that the adoption of electric vehicles should generate. Therefore, a comprehensive and data-based planning approach is an urgent need in the development of SPKLU infrastructure.

Bekasi City is one of the most relevant areas to be studied in the context of *SPKLU* development. As part of the Greater Jakarta metropolitan area, Bekasi City has high mobility

Based on operational data, as of 2024 Bekasi City has 21 *SPKLU* units spread across various locations, such as commercial areas, government agencies, and public facilities. The capacities and types of charging available are quite diverse, ranging from slow charging to ultra-fast charging. However, the distribution of SPKLU still shows a tendency to be concentrated in certain points that are considered economically strategic, while some densely populated areas and new growth areas have not been optimally served. This condition confirms the existence of a spatial gap in the provision of electric vehicle charging infrastructure in Bekasi City, which has the potential to reduce the effectiveness of the overall use of SPKLU.

The main variables studied in this study reflect the complexity of *SPKLU* location planning in urban areas. The density of electric vehicles reflects the potential demand for charging and is an important indicator in determining location priorities. Location accessibility determines the ease of users in reaching SPKLU without disrupting daily mobility activities. The readiness of energy infrastructure is a very crucial technical limiting factor, because the construction of SPKLU requires adequate power grid capacity support. Socio-economic factors provide an overview of the potential acceptance and sustainability of the use of SPKLU, while the distance between SPKLU and environmental aspects play a role in ensuring equitable distribution of services and contribution to reducing emissions and improving the quality of the urban environment.

The novelty of this research lies in the application of a holistic approach in determining the location of *SPKLU* in Bekasi City by integrating multi-criteria analysis and economic feasibility evaluation. This study combines the Analytic Hierarchy Process (AHP) method to determine the importance of each criterion with the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method to rank alternative locations based on their proximity to ideal conditions. In addition, the study is equipped with a Cost–Benefit Analysis (CBA) to assess the financial feasibility of the recommended location. The integration of these three approaches allows research results to be not only technically and spatially relevant, but also have a strong economic basis as a decision-making consideration.

The urgency of this research is getting stronger along with the acceleration of electric vehicle policies in Indonesia and the increasing need for evidence-based infrastructure planning. Without proper *SPKLU* location planning, infrastructure investment risks suboptimal utilization, low utilization rates, and the potential to waste resources. This research makes an important contribution in providing a systematic analytical framework for PLN and local governments in formulating an effective, efficient, and sustainable SPKLU development strategy. By considering technical, spatial, social, and economic aspects in an integrated manner, this study answers the need for electric transportation infrastructure planning that is adaptive to urban dynamics.

The purpose of this study is to determine the strategic location of Public Electric Vehicle Charging Stations (*SPKLU*) in Bekasi City through an AHP-TOPSIS-based multi-

The benefits of this research include both theoretical and practical contributions. Theoretically, this study enriches the literature on electric vehicle infrastructure planning by adding empirical evidence from the urban context in Indonesia and integrating multi-criteria approaches and economic analysis. Practically, the results of this research can be the basis for

decision-making for PLN and local governments in designing a more targeted and sustainable *SPKLU* development strategy. In addition, this research provides social and environmental benefits through support for reducing carbon emissions, improving air quality, and equitable access to electric transportation for the people of Bekasi City.

RESEARCH METHODS

Approaches and Types of Research

This research was applied research designed to answer practical problems related to the strategic planning of the location of Public Electric Vehicle Charging Stations (*SPKLU*) in urban areas. The approach used is a mixed-methods approach with a descriptive-analytical orientation, which aims to systematically describe the existing conditions, needs, and factors that affect the determination of the location of SPKLU in Bekasi City. This approach was chosen because the problems studied are not only technical, but also involve spatial, social, and behavioral dimensions of users that require contextual and integrative understanding (Sugieanto, 2021; Wahyudi et al., 2024).

A descriptive approach is used to present a comprehensive picture of the characteristics of the research area, the condition of the electric vehicle charging infrastructure, as well as the preferences and considerations of stakeholders. Through this approach, the research is directed to comprehensively map the problem before formulating solutions based on multi-faceted analysis, so that the resulting recommendations have practical and policy relevance (Zhou et al., 2020; Liu et al., 2022).

Research Location and Time

This research was carried out in the administrative area of Bekasi City, West Java Province. The selection of the research location was carried out purposively by considering the characteristics of Bekasi City as part of the Greater Jakarta metropolitan area which has a high level of mobility, rapid population growth, and a strategic role as a buffer area for Jakarta's economic activities. This condition makes Bekasi City a representative area to assess the needs and planning of *SPKLU* infrastructure in an urban context (PLN UP3 Bekasi, 2024).

The research was carried out in the period of 2024 to 2025. This time span includes the stages of primary and secondary data collection, analysis of existing conditions of *SPKLU*, and the preparation of strategic recommendations. The selection of this research period takes into account the availability of the latest operational data and the relevance of the ongoing electric

Research Focus and Aspects

This research is focused on the formulation of an optimal *SPKLU* location determination strategy by considering various interrelated aspects. The main aspects studied include the technical aspects of energy infrastructure, spatial and accessibility aspects, socio-economic aspects, and environmental aspects. The focus was chosen to ensure that the SPKLU location recommendations are not only technically feasible, but also relevant to community mobility patterns and support the principles of sustainable development (Patel et al., 2024; Huang et al., 2021).

In addition, this research also pays attention to aspects of service equity and economic sustainability. This is important considering that the development of *SPKLU* is a long-term investment that must consider the level of utilization, social benefits, and financial implications for service providers and local governments. Thus, the focus of the research is directed at the

integration of these various aspects in one complete strategic planning framework (Florio, 2014; Boardman et al., 2018).

Population and Research Subjects

The population in this study includes electric vehicle users who operate or have the potential to operate in the Bekasi City area, as well as parties involved in the planning and management of *SPKLU* infrastructure. The research subjects include private electric vehicle users, public transportation electric vehicle users (such as electric taxis), and stakeholders who have knowledge and experience related to SPKLU operations and the electricity grid (Bhat et al., 2024).

The selection of research subjects was carried out purposively by considering the level of involvement and relevance to the research problem. This approach allows for more in-depth information on user preferences, operational constraints, and strategic considerations in determining the location of *SPKLU*. Thus, the data obtained is expected to be able to represent real conditions and actual needs in the field (Taherdoost, 2017).

Data Collection Techniques and Instruments

This study uses a combination of primary data and secondary data to ensure the completeness and validity of the information. Primary data was obtained through the dissemination of questionnaires and the collection of expert judgment which aimed to capture perceptions, preferences, and assessments of factors determining the location of *SPKLU*. The research instruments are structured with reference to relevant variables and criteria as identified in previous literature reviews and research (Saaty, 1993; Supriadi, 2018).

Secondary data were obtained from official documents and reliable sources, such as *SPKLU* operational data from PLN, electricity network data, road network, population density, and regional planning documents. The use of secondary data aims to provide an objective spatial and technical context and support a comprehensive analysis of existing conditions (PLN UP3 Bekasi, 2024; Direktorat Jenderal Ketenagalistrikan, 2023).

Analytical Strategies and Problem-Solving Frameworks

The analytical strategy in this study is designed to integrate various multidimensional information into a single decision-making framework. The analysis was carried out in stages, starting from the identification of key factors that affect the determination of *SPKLU* locations, followed by an assessment of the level of relative importance between factors, as well as the ranking of potential alternative locations. This strategy allows for the simplification of complex problems into a more systematic and easily interpretable analytical structure (Mardani et al., 2015; Behzadian et al., 2012).

In addition, the study also integrates economic considerations through cost and benefit evaluation to ensure that the proposed solution is not only spatially and technically optimal, but also financially feasible. This approach is in line with modern infrastructure planning practices that emphasize a balance between economic efficiency, social benefits, and environmental sustainability (Flyvbjerg & Bester, 2021; Verma et al., 2024).

RESULTS AND DISCUSSION

Profile and Characteristics of Research Studies

This research was carried out in the administrative area of Bekasi City with a focus on strategic planning of the location of Public Electric Vehicle Charging Stations (*SPKLU*). The

city of Bekasi was chosen as the study location because it has urban characteristics with a high level of mobility, rapid population growth, and a strategic role as the main buffer area of the Greater Jakarta metropolitan area. This condition makes Bekasi City a relevant area to assess the readiness and needs of electric vehicle infrastructure in supporting the national energy transition policy (PLN UP3 Bekasi, 2024; Wahyudi et al., 2024).

This study utilizes a combination of primary data and secondary data. Primary data was obtained from electric vehicle users and related stakeholders, while secondary data included operational data on *SPKLU*, electricity network, road network, and characteristics of the Bekasi City area. This approach allows for comprehensive mapping of existing conditions and is the basis for the formulation of strategic SPKLU location recommendations (Sugieanto, 2021; Liu et al., 2022).

Overview of Research Data and Data Sources

The amount of data used in this study reflects the complexity of the problem of determining the location of *SPKLU*. Primary data involves respondents who use private electric vehicles and public transportation electric vehicles, as well as expert judgment who understand the technical and operational aspects of electrical infrastructure. Secondary data was obtained from PLN and related agencies, which included data on the number and location of existing SPKLUs, power capacity, and the condition of the electricity distribution network in Bekasi City (PLN UP3 Bekasi, 2024).

The combination of data is used to describe the actual condition of electric vehicle charging infrastructure, identify service gaps, and assess the potential for *SPKLU* development in strategic locations. This diverse use of data is in line with evidence-based infrastructure

Existing Conditions of *SPKLU* in Bekasi City

The results of the analysis show that as of 2024, Bekasi City has 21 *SPKLU* units spread across various locations, such as shopping centers, government offices, PLN service units, and other public facilities. The types of charging available range from slow charging and medium charging to fast charging and ultra-fast charging with a variety of power capacities between 6 kW to 120 kW. This diversity shows the efforts of service providers to accommodate the various needs of electric vehicle charging (PLN UP3 Bekasi, 2024).

However, the distribution of *SPKLU* still tends to be concentrated in certain areas, especially in the center of economic activity and main traffic routes. Some densely populated areas and new development areas have not been optimally served. This condition indicates a spatial imbalance in the provision of electric vehicle charging infrastructure, which has the potential to reduce the utilization rate of SPKLU and increase user concerns regarding the availability of charging facilities (*range anxiety*) (Huang et al., 2021; Patel et al., 2024).

Overview of Research Variables and Criteria

This study examines six main criteria in determining the location of *SPKLU*, namely the density of electric vehicles, location accessibility, energy infrastructure readiness, socio-economic factors, distance between SPKLU, and environmental aspects. The six criteria were selected based on literature review and relevance to urban conditions in Bekasi City (Sugieanto, 2021; Ren & Sun, 2025).

Electric vehicle density represents potential charging demand and is an important indicator in determining priority locations. Accessibility reflects the ease of users in reaching *SPKLU* without disrupting daily mobility activities. The readiness of energy infrastructure plays a role as a limiting technical factor that determines the feasibility of SPKLU development. Socio-economic factors provide an overview of the level of activity and potential use of facilities, while the distance between SPKLU and environmental aspects ensures equitable distribution of services and contributes to reducing emissions and improving environmental quality (Wahyudi et al., 2024; Bhat et al., 2024).

Results of Weighting Criteria

The results of the weighting of the criteria show that the density of electric vehicles, accessibility, and readiness of energy infrastructure are the three criteria with the highest level of importance in determining the location of *SPKLU* in Bekasi City. These findings show that the ideal SPKLU location is one situated in an area with high potential demand, is easily accessible to users, and is supported by adequate power grid capacity (Saaty, 1993; Supriadi, 2018).

Socio-economic criteria and the distance between *SPKLU*s occupy a level of medium importance, while environmental aspects are still considered as part of the sustainability principle. These results are consistent with the findings of previous research that emphasized

Table 1. Weight of *SPKLU* Location Criteria

Criteria	Weight
Electric Vehicle Density	Highest
Accessibility	High
Energy Infrastructure Readiness	High
Socio-Economic Factors	Medium
Distance Between *SPKLU*	Medium
Environmental Aspects	Supporting

***SPKLU* Location Ranking Results**

Based on the results of the alternative location ranking, Sumarecon Bekasi Mall obtained the highest preference score with a value of proximity to ideal conditions (Ci = 1.00). This location is considered superior because it has a high level of accessibility, a large density of activities, and adequate energy infrastructure readiness. In addition, the existence of an economic activity center and supporting facilities makes Sumarecon Bekasi Mall a potential location to increase the utilization of *SPKLU* (Behzadian et al., 2012; Chumbi et al., 2024).

The alternative locations of the Bekasi Mayor's Office and the Bekasi Islamic Center ranked second and third. These two locations are considered strategic as secondary locations that function to expand service coverage and support the stability of the *SPKLU* network in the Bekasi City area. These locations have good accessibility characteristics and a significant social role in community activities (PLN UP3 Bekasi, 2024; Morocho-Chicaiza et al., 2024).

Table 2. Alternative Rating of *SPKLU* Location

Rank	Location	Value Preferences
1	Mall Sumarecon Bekasi	1.00
2	Bekasi Mayor's Office	High
3	Islamic Center Bekasi	Medium-High

Evaluation of the Economic Feasibility of Priority Locations

The results of the economic feasibility analysis show that the priority location, namely Sumarecon Bekasi Mall, has a Benefit–Cost Ratio (BCR) of 0.98. This value is close to the threshold of financial viability, which indicates that the location is economically feasible and has the potential to become viable with increased levels of utilization or support for certain policies. In addition to direct financial benefits, this location also provides social and environmental benefits in the form of reducing carbon emissions and improving air quality (Florio, 2014; Boardman et al., 2018).

Secondary locations show lower BCR values, but still have strategic value in supporting equitable service distribution and *SPKLU* network expansion. These findings indicate that the construction of SPKLU is not solely based on short-term financial benefits, but also considers long-term benefits to society and the environment (Flyvbjerg & Bester, 2021; Verma et al., 2024).

DISCUSSION

The Urgency of Research in the Context of Energy Transition and Urban Mobility

The results of this study confirm that the location planning of Public Electric Vehicle Charging Stations (*SPKLU*) is a strategic issue that cannot be separated from the energy transition agenda and sustainable transportation development in urban areas. Findings regarding the inequality of the distribution of SPKLU in Bekasi City show that although the number of charging facilities has increased, their effectiveness is still influenced by complex spatial, technical, and social factors. This condition reinforces the urgency of research, considering that the success of electric vehicle adoption is highly dependent on the availability of reliable and easily accessible charging infrastructure (Wahyudi et al., 2024; Patel et al., 2024).

This urgency is in line with the findings of the literature which states that the limitation of charging infrastructure is one of the main obstacles in the acceleration of electric vehicles, especially in urban areas with high mobility. User concerns about power availability (*range anxiety*) arise when *SPKLU* is not evenly distributed or is far from the center of community activities. Therefore, this study is relevant because it provides an empirical basis in formulating an SPKLU location strategy that is able to answer the actual needs of electric vehicle users in Bekasi City (Huang et al., 2021; Bhat et al., 2024).

Causes of the Problem of *SPKLU* Distribution in Bekasi City

Based on the results of the study, the main problem in the distribution of *SPKLU* in Bekasi City is caused by the dominance of economic and technical approaches in determining location, without considering spatial and social aspects in balance. The concentration of SPKLU in centers of economic activity and main traffic routes shows that development

decisions tend to be directed at locations with high utilization potential in the short term. However, this approach ignores the needs of dense residential areas and new growth areas that have latent demand potential (PLN UP3 Bekasi, 2024).

In addition, the limited readiness of energy infrastructure in several regions is also a limiting factor in the development of *SPKLU*. The results of the weighting criteria show that the readiness of the power grid is one of the most influential factors in the selection of location. This is in line with the findings of Sugieanto (2021) and Ren and Sun (2025) who emphasized that power grid capacity is often the main obstacle in the development of electric vehicle charging infrastructure. Thus, the cause of the problem lies not only in the demand aspect, but also in the limited supply and readiness of the energy system.

Interpretation of Criteria Weighting Results in Answering Problems

The results of the weighting criteria show that the density of electric vehicles, accessibility, and readiness of energy infrastructure are the dominant factors in determining the location of *SPKLU* in Bekasi City. These findings indicate that SPKLU planning solutions should be oriented towards a balance between potential demand and the system's ability to serve that demand. The density of electric vehicles reflects utilization opportunities, while

Socio-economic criteria and the distance between *SPKLU* occupy a middle position, which shows that these factors serve as a balancing act in ensuring equitable distribution of services. Meanwhile, the environmental aspect is still considered as a supporting element that strengthens SPKLU's contribution to reducing emissions and improving air quality. This weighting pattern is consistent with previous research that emphasizes the importance of integrating technical and social aspects in electric vehicle infrastructure planning (Zhang et al., 2021; Morocho-Chicaiza et al., 2024).

Discussion of the Results of the Ranking of *SPKLU* Locations

The ranking of alternative locations shows that Sumarecon Bekasi Mall is the most optimal location for the construction of *SPKLU*. The advantages of this location lie not only in the high accessibility and density of economic activities, but also in the readiness of the energy infrastructure that supports the operation of SPKLU with a large capacity. These findings confirm that community activity centers have a strategic role in increasing the utilization of electric vehicle charging facilities (Behzadian et al., 2012; Chumbi et al., 2024).

The location of the Bekasi Mayor's Office and the Bekasi Islamic Center which ranks next shows that public facilities with administrative and social functions also have significant potential as *SPKLU* locations. These two locations contribute to expanding service coverage and supporting equitable access, although their economic utilization rates may be lower than those of commercial centers. These results strengthen the argument that SPKLU planning needs to consider social functions and equity, not purely financial benefits (Morocho-Chicaiza et al., 2024; Wahyudi et al., 2024).

Evaluating Solutions Through an Economic Feasibility Perspective

The results of the Cost Benefit Analysis show that the priority location has a BCR value that is close to the threshold of financial viability. The BCR value of 0.98 at the Sumarecon Bekasi Mall indicates that economically this location is almost feasible and has the potential to

become feasible if the utilization rate increases or there is additional policy support. These findings show that the decision to build *SPKLU* cannot be based only on short-term financial analysis, but needs to consider the resulting social and environmental benefits (Florio, 2014; Boardman et al., 2018).

External benefits such as reduced carbon emissions, improved air quality, and increased public trust in electric vehicles provide significant added value. This is in line with the view of Flyvbjerg and Bester (2021) who stated that public infrastructure projects often have non-financial benefits that are not fully reflected in conventional economic indicators. Thus, the results of CBA in this study support a holistic approach in evaluating the feasibility of *SPKLU* development.

If the recommendations of this research are implemented, the resulting impact can be felt at various levels. At the user level, the availability of *SPKLU* in strategic locations will increase the sense of safety and comfort in using electric vehicles, thereby encouraging increased adoption. At the level of the transportation system, a more even distribution of

At the policy level, the results of this research provide a more measurable basis for decision-making for PLN and local governments. Location recommendations based on multi-criteria analysis and economic evaluation can help optimize investment allocation and accelerate the achievement of energy transition targets. In addition, environmental impacts in the form of reducing emissions and improving air quality strengthen *SPKLU*'s contribution to the urban sustainable development agenda (Wahyudi et al., 2024; Ren & Sun, 2025).

Compared to previous research that generally focused on spatial analysis or one MCDM approach, this study offers novelty through the integration of AHP–TOPSIS and Cost–Benefit Analysis in one strategic planning framework. The research of Sugieanto (2021) and Ummah and Diyono (2023) emphasizes spatial aspects and weighting criteria, but has not integrated explicit economic feasibility evaluations. This study complements these shortcomings by adding an economic perspective and social benefits to the decision-making process.

In addition, previous research in the international context, such as Charly et al. (2023) and Kazempour et al. (2024), has shown the effectiveness of GIS and MCDM approaches in determining the location of *SPKLU*. However, this study makes a contextual contribution by adapting the approach to urban conditions in Indonesia, especially the city of Bekasi, which has different social and infrastructural characteristics. Thus, the novelty of this research lies in the combination of methodological and applicative contexts that are relevant to national needs.

CONCLUSION

This study aims to determine the strategic location of Public Electric Vehicle Charging Stations (*SPKLU*) in Bekasi City through a multi-criteria analysis approach that is integrated with economic feasibility evaluation. This goal is based on the problem of inequality in the distribution of SPKLU and the need for more effective, adaptive, and sustainable electric vehicle charging infrastructure planning in supporting the urban energy transition. The results of the study show that the determination of the location of SPKLU cannot be done partially, but must consider the balance between potential demand, ease of access, and readiness of energy infrastructure. The main findings indicate that the density of electric vehicles, accessibility, and the readiness of the electricity grid are the most influential factors in determining the priority location of SPKLU in Bekasi City. Based on the alternative rankings,

locations with high activity intensity and adequate infrastructure support are top priorities, while strategic public facilities serve as supporting locations to expand service coverage. Economic feasibility evaluations show that priority locations are close to the threshold of financial viability, with significant social and environmental benefits as long-term added value. The main contribution of this research lies in integrating multi-criteria analysis and cost-benefit evaluation in one SPKLU strategic planning framework in the urban context of Indonesia. This study enriches the literature by providing empirical evidence that the decision to locate electric vehicle charging infrastructure needs to consider technical, spatial, social, and economic aspects simultaneously. The limitation of this study lies in the scope of the area which only includes the city of Bekasi and the dependence on the data conditions in the research period. In addition, the dynamics of electric vehicle growth and technological developments have not

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