

# Public Response on Twitter: The Urgency of Government Policy on Electric Vehicles

Luth<sup>1\*</sup>, Kismartini<sup>2</sup>, Dyah Lituhayu<sup>3</sup>, Rani Maswati<sup>4</sup>, Tawakkal Baharuddin<sup>5</sup>

<sup>123</sup> Doctor of Public Administration, Universitas Diponegoro, Semarang, Indonesia, 50275

<sup>4</sup> Political science, Institut Ilmu Sosial dan Ilmu Politik Yapis Biak, Papua, Indonesia, 98111

<sup>5</sup> Departement of Government Science, Universitas Muhammadiyah Makassar, Indonesia, 90221

**Abstract.** Recent policies have encouraged the adoption of electric vehicles in Indonesia. The purpose of this study is to determine the urgency of the policy and how the public responds on Twitter about electric vehicle policies. This study used a quantitative approach with descriptive content analysis. The object of research is seen from the involvement of Twitter social media users in issues of electric vehicle policy. The subject of this research is Twitter social media users. Data capture focuses on keyword searches (electric vehicles) based on Tweets. The number of keywords obtained is 5789 Tweets. Data is analyzed relying on units of analysis such as sentiment analysis and text search queries. The findings from this study indicate that the urgency of electric vehicle policy is to address environmental problems such as air pollution, dependence on imported fuels, potential cost savings, energy efficiency, reducing greenhouse gas emissions, and climate change. This study also found that adopting electric vehicle policies in Indonesia could be hampered by several factors, namely limited vehicle mileage, high cost of electric vehicles, and limited charging infrastructure. This negative sentiment has hindered public acceptance to use electric vehicles in the future.

**Keyword:** Environmental politics, electric vehicle, vehicle charging, energy saving, environmentally friendly, social media

## 1 Introduction

Some studies argue that electric vehicles can help reduce air pollution and improve air quality in large cities [1,2], while others argue that the infrastructure and costs required to build a charging network and new electric vehicles are still too high and not yet accessible to the wider community [3,4]. In addition, there are still obstacles to adopting electric vehicles in

---

\* Corresponding author: [author@email.org](mailto:author@email.org)

Indonesia, such as limited vehicle coverage and a need for electric charging centers in some areas [5], thus making people less interested in switching to electric vehicles.

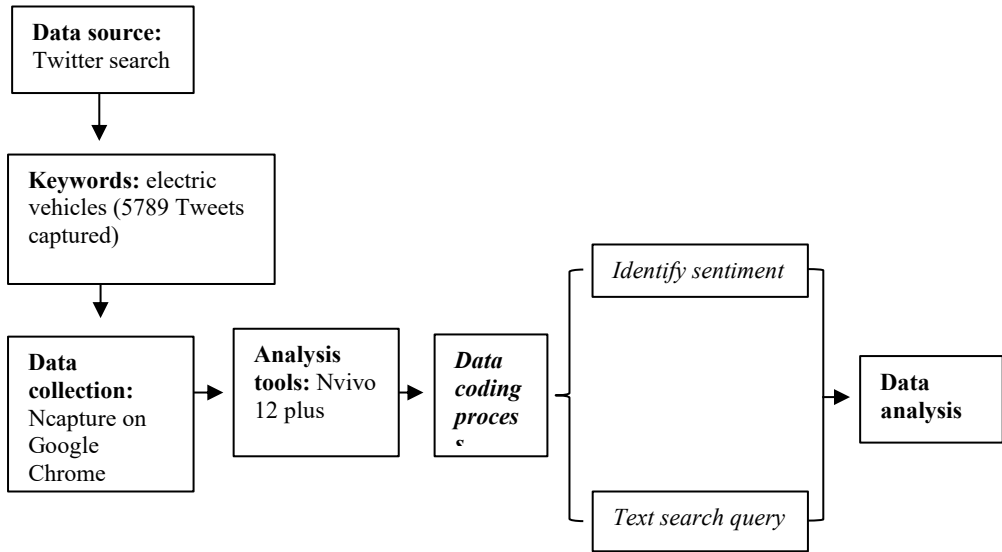
However, the Indonesian government has issued several policies and incentives to encourage using electric vehicles in Indonesia, such as exemption from import duties and taxes for electric vehicles [6]. In addition, several automotive companies have also launched their electric vehicles on the Indonesian market [6]. Although there is still controversy regarding the electric vehicle policy in Indonesia, the government and several automotive companies continue to introduce electric vehicles to the public and improve infrastructure and charging networks to support the adoption of electric vehicles in Indonesia.

Several studies have been conducted on the policy of using electric vehicles in Indonesia, but this research still needs to be completed. Research that links the policy of using electric vehicles with assessing public response on social media is still very rare. However, some results of previous studies are still considered relevant. First, governments in many countries have tried introducing electric vehicles to society [7,8]. Second, the adoption of electric vehicles is strongly influenced by public acceptance and concern about environmental issues [9,10]. Third, electric vehicles are more energy efficient than vehicles powered by fossil fuels [11]. Fourth, electric vehicles are considered more environmentally friendly [12]. Fifth, public response to government policies can be traced to the results of discussions on online social networks such as social media [13].

The purpose of research related to the policy of using electric vehicles by assessing public response on social media is to gain an understanding of the public's attitudes, opinions, and views regarding the use of electric vehicles. In this case, social media can be a very important source of information. The research questions are: (a) What is the urgency of the policy on the use of electric vehicles in Indonesia (b) How is the public response on Twitter about the policy on the use of electric vehicles? These two questions can identify the urgency of the policy and help the government and industry to understand the extent to which the public accepts the policy of using electric vehicles in Indonesia.

## **2 Method**

This study used a quantitative approach with descriptive content analysis. The object of research is seen from the involvement of Twitter social media users in issues of electric vehicle policy. The subject of this research is Twitter social media users. Source of data obtained from social media Twitter.



**Fig. 1.** Data analysis process

Figure 1 is the process of collecting data from a Twitter search. Twitter was chosen because it can accommodate the results of large public discussions. The data collection process focuses on searching for keywords (electric vehicles). These keywords are selected based on search results that capture many Tweets. The number of tweets obtained was 5789 Tweets captured. The Tweets are collected using Ncapture in Google Chrome. The collected data is then transferred into an analysis tool, namely Nvivo 12 Plus. They are using Nvivo 12 Plus for the data coding by maximizing the Identity sentiment and Text search query features. Identify sentiment is maximized to find out the public's response to the topic being analyzed, while the Text search query is used to search for words or text that appear frequently. The coding results on these data are then visualized and analyzed to answer research questions, especially public responses to policies regarding electric vehicles.

### 3 Findings and Discussion

#### The urgency of policy on the use of electric vehicles

The electric vehicle policy has a very important urgency because several environmental problems need to be addressed. Some of the policy urgency of using electric vehicles include air pollution problems [14], dependence on fuel, potential cost savings, energy efficiency, reducing greenhouse gas emissions, and climate change [15,16]. The problem of air pollution is a serious environmental problem in Indonesia, especially in big cities. Motorized vehicles that use fossil fuels are one of the main causes of air pollution [17]. Environmentally friendly electric vehicles can help reduce air pollution and improve air quality in big cities in Indonesia [15].

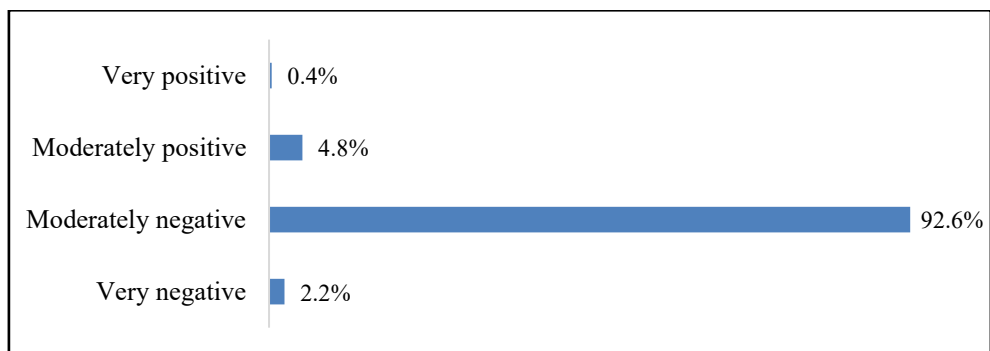
Most of the fuel used in Indonesia is still imported from abroad. This makes Indonesia highly dependent on imported fuel supplies which are unstable and risky. By adopting electric vehicles, Indonesia can reduce dependence on imported fuel and increase national energy security [18]. Although electric vehicles require higher costs to purchase, their operational costs are lower than those of conventional motorized vehicles [19]. With the adoption of electric vehicles, people can save on vehicle operating costs. Indonesia's government and the automotive industry have shown a strong commitment to promoting the use of electric vehicles in Indonesia.

Governments in many countries, including Indonesia, have provided favorable fiscal and regulatory incentives for the use of electric vehicles [15,20,21]. While the automotive industry continues to innovate and introduce vehicles' electricity [5], electric vehicles are considered much more efficient energy use than conventional motorized ones using internal combustion engines [22]. This can help reduce energy consumption and improve energy efficiency in Indonesia. Conventional motorized vehicles are also a major cause of greenhouse gas emissions. By adopting electric vehicles, Indonesia can help reduce greenhouse gas emissions and positively contribute to global climate change. The policy of using electric vehicles can be one of the solutions to address this serious environmental and climate change problem.

The policy on using electric vehicles in Indonesia is very important for dealing with various environmental problems that exist in Indonesia, increasing national energy security, and helping people save on their vehicle operating costs. Therefore, the government and the automotive industry in Indonesia must continue to strive to promote the adoption of electric vehicles in Indonesia and improve the infrastructure and charging network for electric vehicles throughout the country. In order to address these exigencies, the government and the automotive industry in Indonesia need to work together to promote the use of electric vehicles and improve the infrastructure and electric vehicle charging network throughout the country. In addition, the government also needs to provide favorable fiscal and regulatory incentives for the use of electric vehicles and encourage research and development of technology related to electric vehicles in Indonesia.

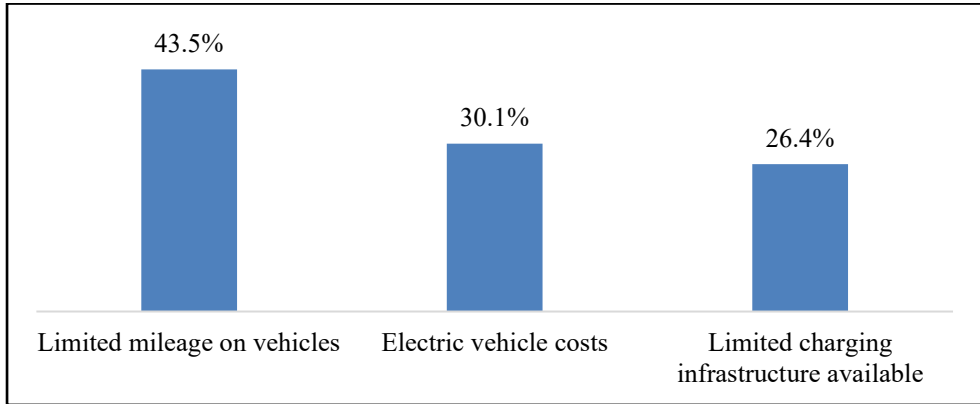
### Public response on Twitter about the policy on the use of electric vehicles

Public response is very important in the electric vehicle policy because it can influence the adoption and acceptance of electric vehicles in society [23]. The public response can influence consumer purchasing decisions, automotive industry investment, and government and civil society support. Social media can be one way to assess the public's response to the policy of using electric vehicles in Indonesia. Currently, social media is one of the biggest platforms for interaction. The public's response on social media, such as Twitter, regarding the policy on the use of electric vehicles is as follows:



**Fig. 2.** Public sentiment on Twitter toward acceptance of the electric vehicle policy

Figure 2 shows that the government's policy of adopting electric vehicles still gets negative sentiment from the public on Twitter. This negative response impacts public acceptance of switching to using electric vehicles. Several dominant factors influence the negative response and acceptance. The dominant factor is shown in Figure 3.



**Fig. 3.** Dominant factors influencing negative sentiment and public acceptance

Figure 3 shows that several dominant factors influence the results of negative sentiment and public acceptance of efforts to adopt electric vehicles in Indonesia. These dominant factors include the limited mileage of the vehicle, the cost of electric vehicles, and limited charging infrastructure. Electric vehicle mileage is still shorter than fossil fuel-powered vehicles. This can be a barrier for consumers who frequently travel long distances. Several studies have also found the same problem regarding the limited mileage of electric vehicles [24].

The limited reach of electric vehicles can be an obstacle to adopting electric vehicle policies [25]. Electric vehicles have a shorter range than fossil fuel-powered ones, especially those with smaller batteries. This could limit the use of electric vehicles by consumers who frequently travel long distances or live in remote areas with limited availability of charging infrastructure. However, electric vehicle battery technology continues to develop, and the energy storage capacity of batteries is increasing [26]. The expensive cost of electric vehicles also negatively affects public sentiment and acceptance. Electric vehicle costs are considered unaffordable or expensive and require subsidies from the government [27]. The price of electric vehicles that are still expensive can be an obstacle to the adoption of electric vehicles by the public. The higher price of electric vehicles compared to vehicles powered by fossil fuels makes them difficult to access for consumers on a budget. This can be a barrier for consumers to switch to electric vehicles even if they want to switch to environmentally friendly vehicles.

The price of electric vehicles is generally higher than similar fossil fuel-powered vehicles. This is due to higher production costs and relatively new and expensive battery technology [28]. The price of electric vehicle batteries has decreased significantly in recent years but is still one of the main factors influencing the price of electric vehicles. However, it is believed that the price of electric vehicles will become more affordable, along with improvements in technology and production efficiency [28]. In addition, the Indonesian government is encouraged to provide incentives and subsidies to encourage the adoption of electric vehicles and reduce consumer prices [21]. Another thing that can reduce the price of electric vehicles is the resources that Indonesia has to produce its electric vehicles with the availability of raw materials in several regions in Indonesia [29,30].

Another factor influencing negative sentiment and public acceptance is the limited charging infrastructure. The limited charging stations for electric vehicles can prevent consumers from switching to electric vehicles. Several countries still have limitations in providing the necessary charging infrastructure, especially in remote areas [25,31]. It requires wider distribution [25]. The availability of electric vehicle charging infrastructure in Indonesia still needs to be improved. The number of public charging stations (SPDU) for

electric vehicles in Indonesia still needs to catch up to the number of gas stations for vehicles powered by fossil fuels. According to data from the Ministry of Energy and Mineral Resources, as of semester 2021, the number of Electricity Charging Infrastructure (IPL) in Indonesia has only reached 240 units. The infrastructure consists of 166 Public Electric Vehicle Charging Stations (SPKLU) and private electric vehicle (EV) charging station installations, as well as 74 Public Electric Vehicle Battery Exchange Stations [32].

This condition is still challenging for adopting electric vehicles in Indonesia, especially for consumers who frequently travel long distances. However, the Indonesian government can make several efforts to increase the availability of electric vehicle charging infrastructure, such as by accelerating the construction of SPDUs and providing incentives for SPDU development by the private sector. Developing a wider and faster charging station network can also help overcome the limited range of electric vehicles. Therefore, the government's response is needed to accelerate the required infrastructure development. This can positively impact the adoption of environmentally friendly electric vehicles in Indonesia.

## 4 Conclusion

This study found that adopting electric vehicle policies can be hampered by several factors, including limited vehicle mileage, high cost of electric vehicles, and limited charging infrastructure. It is known based on the findings of this study regarding policies on electric vehicles which have resulted in negative sentiment on social media. This negative sentiment has hindered public acceptance to use electric vehicles in the future. This study recommends accelerating the infrastructure development needed to reduce existing problems. This can be done by considering other aspects, especially public response.

## References

1. Ferrero E, Alessandrini S, Balanzino A. Impact of the electric vehicles on the air pollution from a highway. *Appl Energy* [Internet]. 2016;169:450–9. Available from: <http://dx.doi.org/10.1016/j.apenergy.2016.01.098>
2. Lin WY, Hsiao MC, Wu PC, Fu JS, Lai LW, Lai HC. Analysis of air quality and health co-benefits regarding electric vehicle promotion coupled with power plant emissions. *J Clean Prod.* 2020;247:119152.
3. Baumgarte F, Kaiser M, Keller R. Policy support measures for widespread expansion of fast charging infrastructure for electric vehicles. *Energy Policy* [Internet]. 2021;156:112372. Available from: <https://doi.org/10.1016/j.enpol.2021.112372>
4. Xiao D, An S, Cai H, Wang J, Cai H. An optimization model for electric vehicle charging infrastructure planning considering queuing behavior with finite queue length. *J Energy Storage* [Internet]. 2020;29:101317. Available from: <https://doi.org/10.1016/j.est.2020.101317>
5. Veza I, Abas MA, Djamari DW, Tamaldin N, Endrasari F, Budiman BA, et al. Electric Vehicles in Malaysia and Indonesia: Opportunities and Challenges. *Energies.* 2022;15(7):1–24.
6. Subekti R, Iftinani FN, Rahmawati I. Tax Policy of Electric-Based Vehicles to Realize Human Rights for a Good Environment in Indonesia. In: Strielkowski W, editor. *Proceedings of the International Conference For Democracy and National Resilience (ICDNR 2021)*. Surakarta: Atlantis Press; 2021. p. 19–25.
7. Rajper SZ, Albrecht J. Prospects of electric vehicles in the developing countries: A literature review. *Sustain.* 2020;12(5):1906.
8. Li Y, Kimura S. Economic competitiveness and environmental implications of

- hydrogen energy and fuel cell electric vehicles in ASEAN countries: The current and future scenarios. *Energy Policy* [Internet]. 2021;148:111980. Available from: <https://doi.org/10.1016/j.enpol.2020.111980>
9. Wu J, Liao H, Wang JW, Chen T. The role of environmental concern in the public acceptance of autonomous electric vehicles: A survey from China. *Transp Res Part F Traffic Psychol Behav* [Internet]. 2019;60:37–46. Available from: <https://doi.org/10.1016/j.trf.2018.09.029>
  10. Krishnan VV, Koshy BI. Evaluating the factors influencing purchase intention of electric vehicles in households owning conventional vehicles. *Case Stud Transp Policy* [Internet]. 2021;9(3):1122–9. Available from: <https://doi.org/10.1016/j.cstp.2021.05.013>
  11. Verma S, Dwivedi G, Verma P. Life cycle assessment of electric vehicles in comparison to combustion engine vehicles: A review. *Mater Today Proc.* 2021;49(2):217–22.
  12. Zhang X, Li Z, Luo L, Fan Y, Du Z. Review on Thermal Runaway of Lithium-Ion Batteries for Electric Vehicles. *Energy.* 2022;238:121652.
  13. Baharuddin T, Jubba H, Nurmandi A, Qodir Z. Online Social Trust in Government: Analysis of Government Policy During the Covid-19 Pandemic. In: *Proceedings of the First International Conference on Democracy and Social Transformation, ICON-DEMOST 2021.* EAI; 2022.
  14. Guo J, Zhang X, Gu F, Zhang H, Fan Y. Does air pollution stimulate electric vehicle sales? Empirical evidence from twenty major cities in China. *J Clean Prod.* 2020;249:119372.
  15. Sudjoko C, Sasongko NA, Utami I, Maghfuri A. Utilization of electric vehicles as an energy alternative to reduce carbon emissions. In: *IOP Conference Series: Earth and Environmental Science.* IOP Publishing; 2021. p. 012094.
  16. Jones EC, Leibowicz BD. Contributions of shared autonomous vehicles to climate change mitigation. *Transp Res Part D Transp Environ* [Internet]. 2019;72:279–98. Available from: <https://doi.org/10.1016/j.trd.2019.05.005>
  17. Surya B, Hamsina H, Ridwan R, Baharuddin B, Menne F, Fitriyah AT, et al. The complexity of space utilization and environmental pollution control in the main corridor of Makassar City, South Sulawesi, Indonesia. *Sustain.* 2020;12(21):1–41.
  18. Laxamanahady MSDS, Firdaus SU. Legal Politics of Electric Vehicle Development in Indonesia. *Proc Int Conf Democr Natl Resil (ICDNR 2021).* 2022;620:45–51.
  19. Wu G, Inderbitzin A, Bening C. Total cost of ownership of electric vehicles compared to conventional vehicles: A probabilistic analysis and projection across market segments. *Energy Policy* [Internet]. 2015;80:196–214. Available from: <http://dx.doi.org/10.1016/j.enpol.2015.02.004>
  20. Lévy PZ, Drossinos Y, Thiel C. The effect of fiscal incentives on market penetration of electric vehicles: A pairwise comparison of total cost of ownership. *Energy Policy* [Internet]. 2017;105:524–33. Available from: <http://dx.doi.org/10.1016/j.enpol.2017.02.054>
  21. Huda M, Aziz M, Tokimatsu K. The future of electric vehicles to grid integration in Indonesia. *Energy Procedia* [Internet]. 2019;158(2018):4592–7. Available from: <https://doi.org/10.1016/j.egypro.2019.01.749>
  22. Wu X, Freese D, Cabrera A, Kitch WA. Electric vehicles' energy consumption measurement and estimation. *Transp Res Part D Transp Environ* [Internet]. 2015;34:52–67. Available from: <http://dx.doi.org/10.1016/j.trd.2014.10.007>
  23. Jena R. An empirical case study on Indian consumers' sentiment towards electric vehicles: A big data analytics approach. *Ind Mark Manag* [Internet]. 2020;90:605–16. Available from: <https://doi.org/10.1016/j.indmarman.2019.12.012>
  24. Yang JY, Chou L Der, Chang YJ. Electric-Vehicle Navigation System Based on Power

- Consumption. *IEEE Trans Veh Technol.* 2016;65(8):5930–43.
25. Ahmad F, Iqbal A, Ashraf I, Marzband M, Khan I. Optimal location of electric vehicle charging station and its impact on distribution network: A review. *Energy Reports* [Internet]. 2022;8:2314–33. Available from: <https://doi.org/10.1016/j.egy.2022.01.180>
  26. Xie P, Jin L, Qiao G, Lin C, Barreneche C, Ding Y. Thermal energy storage for electric vehicles at low temperatures: Concepts, systems, devices and materials. *Renew Sustain Energy Rev.* 2022;160:112263.
  27. Goetzel N, Hasanuzzaman M. An empirical analysis of electric vehicle cost trends: A case study in Germany. *Res Transp Bus Manag.* 2022;43:100825.
  28. Burd JTT, Moore EA, Ezzat H, Kirchain R, Roth R. Improvements in electric vehicle battery technology influence vehicle lightweighting and material substitution decisions. *Appl Energy* [Internet]. 2021;283:116269. Available from: <https://doi.org/10.1016/j.apenergy.2020.116269>
  29. Gultom T, Sianipar A. High pressure acid leaching: A newly introduced technology in Indonesia. *IOP Conf Ser Earth Environ Sci.* 2020;413(1):012015.
  30. Hasan MH, Mahlia TMI, Nur H. A review on energy scenario and sustainable energy in Indonesia. *Renew Sustain Energy Rev.* 2012;16(4):2316–28.
  31. Deb S, Tammi K, Kalita K, Mahanta P. Review of recent trends in charging infrastructure planning for electric vehicles. *Wiley Interdiscip Rev Energy Environ.* 2018;7(6):1–26.
  32. Pribadi A. Semester I 2021, Ini Daftar Penambahan Infrastruktur Pengisian Kendaraan Listrik di Indonesia [Internet]. Kementerian Energi dan Sumberdaya Mineral. 2021 [cited 2023 Mar 2]. Available from: <https://www.esdm.go.id/id/media-center/arsip-berita/semester-i-2021-ini-daftar-penambahan-infrastruktur-pengisian-kendaraan-listrik-di-indonesia>