

# The Limits of Indonesia's Legal Framework for Electromobility: Regulatory and Sustainable Issues

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**ABSTRACT:** The rise in global temperature indicates the impact of climate change, encouraging more countries to adapt and seek practical solutions. Several countries, including Indonesia, have begun to regulate electric vehicles because of the commitment to reduce carbon dioxide emissions. It simultaneously provides opportunities for developing electric vehicles to prevent more use of fossil fuels. This study aimed to discuss and explore Indonesia's trajectory to develop a legal framework for electromobility that started to be drafted in 2019. This framework has resulted in legal fissures because of the lack of regulations to promote electric vehicles against the environmental aspects, whereas it tends to focus on industrial development. Finally, this study discussed regulatory issues and predicted the future of Indonesia's electromobility legal development through the lens of sustainability. This study used normative legal research whose analysis inventoried and identified several laws and regulations on electromobility in Indonesia with particular criteria. This study showed that Indonesia's legal development of electromobility is being accomplished by autonomous and inconsistent delegated regulations with technical and non-technology aspects. Adopting a legal instrument through Presidential Regulation is insufficient to build an electromobility ecosystem that involves many sectors. In contrast, an imbalance in the regulatory framework, the three pillars of sustainability, and the economic dimension outweigh the social and environmental factors. Insofar, the regulations adopted prioritize the economic aspect, and the framework has impacted other industries, including mining and international trade, due to the need for nickel and manganese as raw materials for electric vehicle batteries.

**KEYWORDS:** Electromobility, Indonesia, Legal Framework, Sustainability.



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## I. INTRODUCTION

Climate change has worried the world following the increase in global temperature by more than 1°C over 20 years which has resulted in weather anomalies and a number of natural disasters yearly.<sup>1</sup> While Asia has become one of the fragile regions most affected by the rise in global temperatures,<sup>2</sup> some countries, such as China and Japan, have massively begun to introduce EV technologies to the public as a solution to reduce carbon dioxide emissions from the transportation sector.<sup>3</sup> At the same time, Indonesia also aims to reduce carbon dioxide emissions by 29% in 2030 without international aid.<sup>4</sup>

Electric vehicle (EV) technology is one of the keys for humankind to adapt to climate change.<sup>5</sup> The adoption of progressive regulation at the national level is prominent to transform the use of conventional vehicles into EVs and achieve the goal of reducing carbon dioxide emissions. EVs are the technology trusted to decrease carbon dioxide emissions.<sup>6</sup> They do not instantly solve the problems posed by climate change. However, compared to fossil fuel vehicles, EVs are far superior.<sup>7</sup> Several countries in Asia, as mentioned above, such as China and Japan, have adopted the technology to

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<sup>1</sup> Stephen E Schwartz, “Unrealized Global Temperature Increase: Implications of Current Uncertainties” (2018) 123:7 *Journal of Geophysical Research: Atmospheres* 3462–3482 at 3462.

<sup>2</sup> M Rezaul Islam & Niaz Ahmed Khan, “Threats, vulnerability, resilience and displacement among the climate change and natural disaster-affected people in South-East Asia: an overview” (2018) 23:2 *Journal of the Asia Pacific Economy* 297–323 at 2.

<sup>3</sup> Ning Wang, Huizhong Pan & Wenhui Zheng, “Assessment of the incentives on electric vehicle promotion in China” (2017) 101:2017 *Transportation Research Part A: Policy and Practice* 177–189 at 178.

<sup>4</sup> *Indonesia Energy Outlook 2019*, by Secretariat General of the National Energy Council Indonesia (Jakarta, 2019) at 57.

<sup>5</sup> Barry Barton & Peter Schütte, “Electric vehicle law and policy: A comparative analysis” (2017) 35:2 *Journal of Energy and Natural Resources Law* 147–170.

<sup>6</sup> Jamie Morgan, “Electric vehicles: The future we made and the problem of unmaking it” (2020) 44:4 *Cambridge Journal of Economics* 953–977; José M Cansino, Antonio Sánchez-Braza & Teresa Sanz-Díaz, “Policy instruments to promote electromobility in the EU28: A comprehensive review” (2018) 10:7 *Sustainability (Switzerland)* 1–27.

<sup>7</sup> Barton & Schütte, *supra* note 5.

replace conventional fossil-fuel vehicles, responsible for a considerable amount of emissions from the transportation sector. EVs that run entirely on electricity will emit no exhaust gases and cause no pollution.<sup>8</sup> For instance, since 2015, China has mass-produced EVs, and its domestic market has become one of the largest worldwide.<sup>9</sup> Moreover, China currently seeks to enlarge the market and strengthen it with the research and development of EV technology.<sup>10</sup> Japan has been developing EV technology even with the development of a domestic market that is not as large as China. Nonetheless, Japan has been developing EVs with hybrid car production since 1997.<sup>11</sup>

Indonesia is another country in Asia that desires to reduce carbon dioxide emissions by developing the EV market and generating EV products. The country's population and economic growth buttresses this agenda, which is considered an auspicious plan for the massive use of EVs. In 2020, the number of EVs certified by the Indonesian Ministry of Transportation reached 2,176, consisting of 1,947 electric motorbikes and 229 electric cars. In 2021, this number significantly increased to 5,486 electric motorbikes and 2,012 electric cars, with a total of 7,498 electric vehicles.<sup>12</sup> However, this sum is still far from the ambitious target to be achieved by 2030; 15 million EVs that consist of 13 million electric motorbikes and 2 million electric cars. This step will subsequently transform hundreds of millions of conventional users into electric vehicles.<sup>13</sup> In doing so, the government should firstly suppress the growth of conventional vehicles and increase the

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<sup>8</sup> Heidi Auvinen et al., "Electromobility Scenarios: Research Findings to Inform Policy" (2016) 14 *Transportation Research Procedia* 2564–2573 at 2565.

<sup>9</sup> Jiuyu Du, Minggao Ouyang & Jingfu Chen, "Prospects for Chinese electric vehicle technologies in 2016–2020: Ambition and rationality" (2017) 120:2017 *Energy* 584–596 at 586.

<sup>10</sup> *Ibid* at 589.

<sup>11</sup> Karol Tucki, Olga Orynych & Mateusz Mitoraj-Wojtanek, "Perspectives for mitigation of CO2 emission due to development of electromobility in several countries" (2020) 13:6 *Energies* 1–24 at 3.

<sup>12</sup> *Indonesia Energy Transition Outlook 2022*, by IESR (Jakarta, 2021) at 60–61.

<sup>13</sup> In 2020, the number of motor vehicles in Indonesia was more than 136 million units, with an average growth rate of 4.95% yearly. Badan Pusat Statistik (BPS) Indonesia, *Statistik Transportasi Darat 2020 (Land Transportation Statistics 2020)* (Jakarta: Badan Pusat Statistik, 2021) at 24.

purchase of EVs by the public. It requires high financial and social costs in the form of public support.

The implications of the EV ecosystem project in Indonesia will be widespread. They are not only on the national and regional levels in Southeast Asia and have the potential to span the global scale. In connection with this development, the government has adopted Presidential Regulation 55/2019 on Electric Vehicles,<sup>14</sup> an emerging legal framework for Indonesia's vast industrialization of EV technology. The government's intervention in transforming industry and technology is paramount, even though it is fraught with bearing difficulties, with the primary rationale to deal with unfamiliar new technologies to the public.<sup>15</sup> In addition, the widespread usage of cutting-edge technology serves to resolve social issues and adhere to sustainability standards.<sup>16</sup>

Scholars have studied EV policy in developing and developed countries. Naumanen, et al. conducted a comparative study on the development strategy of the EV battery industry in China, the EU, Japan, and the USA.<sup>17</sup> Tucki et al. studied EV ecosystem development, focusing on Poland and the EU.<sup>18</sup> Furthermore, the results of a study discussing EV policies in countries in the Southeast Asian region have been conducted by Schröder discusses the limitations of EV policies in Thailand.<sup>19</sup> However, scholars have not conducted much with particular emphasis on legal research on electromobility in Global South countries like Indonesia since

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<sup>14</sup> *Presidential Regulation on Accelerating Programs of Battery Electric Vehicle for Road Transportation*, Presidential Regulation Number 55 Year 2019.

<sup>15</sup> Jonas Meckling & Jonas Nahm, "When Do States Disrupt Industries? Electric Cars in Germany and the United States Working Paper Series" (2017) March MIT Center for Energy and Environmental Policy Research 1–38 at 521.

<sup>16</sup> Adrian J Bradbrook, "Creating Law for Next Generation Energy Technologies" (2011) Winter 201 Journal of Energy & Environmental Law 17–38 at 18.

<sup>17</sup> M Naumanen et al., "Development strategies for heavy-duty electric battery vehicles: Comparison between China, EU, Japan and USA" (2019) 151:June Resources, Conservation and Recycling 104413.

<sup>18</sup> Karol Tucki et al., "The development of electromobility in Poland and EU states as a tool for the management of CO2 emissions" (2019) 12:15 Energies 1–22.

<sup>19</sup> Martin Schröder, "Electric vehicle policy in Thailand: Limitations of product champions" (2021) 0:0 Journal of the Asia Pacific Economy 1–26.

this technology has not been widely implemented. While Setiawan,<sup>20</sup> Mahalana et al.,<sup>21</sup> Kresnawan et al.,<sup>22</sup> and Maghfiroh et al.<sup>23</sup> published some studies on the development of electromobility in Indonesia, most of them examined EVs in terms of policy and their possibilities for deployment in Indonesia. Numerous studies have clarified the legal framework underpinning Indonesia's electromobility policy, but none addressed electromobility in Indonesia thoroughly from the regulatory issue.

This study aimed to analyze and discuss the legal framework for Indonesia's EV ecosystem or electromobility from a sustainability standpoint. This study is limited to analyzing Indonesian regulations adopted throughout 2019 and 2020 on electromobility. This paper is organized into two main sections of analysis. The first part discusses the legal framework for electromobility developed in Indonesia. The second part examines the impact of Indonesia's new electromobility regulations. These two main parts of the discussion guide an analysis preceded by the literature review on the idea of electromobility, legal norm issues, delegated legislation, and sustainability.

## II. METHODS

The study used normative legal research, with a particular emphasis on the hierarchy of legal norms. This study inventoried and identified several laws and regulations on the legal development of electromobility in Indonesia using specific criteria and the criterion for picking legislative instruments was that they control electromobility precisely in Indonesia. To catalog and identify rules, authors consult the Legal Documentation and Information

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<sup>20</sup> Indra Chandra Setiawan, "Policy simulation of Electricity-based Vehicle utilization in Indonesia (electrified vehicle- HEV, PHEV, BEV, and FCEV)" (2019) 2:1 *Automotive Experiences* 1–8.

<sup>21</sup> *Indonesia transport electrification strategy*, by Aditya Mahalana, Zifei Yang & Francisco Posada, 36 (2021).

<sup>22</sup> Muhammad Rizki Kresnawan et al., *Electric Vehicle Readiness in Southeast Asia: a PEST Policy Review* (ASEAN Centre for Energy, 2021).

<sup>23</sup> Meilinda Fitriani Nur Maghfiroh, Andante Hadi Pandyaswargo & Hiroshi Onoda, "Current readiness status of electric vehicles in Indonesia: Multistakeholder perceptions" (2021) 13:23 *Sustainability* (Switzerland) 1–25.

Network (Indonesian: *Jaringan Dokumentasi dan Informasi Hukum-JDIH*), maintained by multiple Indonesian Ministries. As a result, regulations were collected exclusively at the national level, and this study did not discuss local government regulations. The further step was to analyze the legal instrument under Indonesia's legal norm hierarchy. This study conducted a vertical and horizontal legal harmonization study to see whether there is a connection and connectedness between legislation in Indonesia's electromobility legal development.

### III. LEGAL FRAMEWORK FOR ELECTROMOBILITY IN INDONESIA

Indonesian legal norm hierarchy recognizes the presence of written laws in the form of statutes and regulations (*wetelijk regelling*), administrative regulations (*beleidregels*), and decrees (*beschikking*).<sup>24</sup> Through Legislative Drafting Law 12/2011,<sup>25</sup> the system of laws and regulations is regulated hierarchically from the national to regional levels.<sup>26</sup> As a government conforming to the legal hierarchy, Indonesia also recognizes delegated regulations under several titles or nomenclatures, including Government Regulations, Presidential Regulations, and Ministerial Regulations.<sup>27</sup> However, two well-known issues often arise in Indonesia's delegated law. First, the law governs far too many common issues, allowing delegated regulations to regulate them more precisely. Second, the law enacted by Parliament in collaboration with the President makes no explicit reference to delegated legislation in regulation or the institution's authority to regulate it.<sup>28</sup> A recent study indicates that the bulk of delegated legislation

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<sup>24</sup> Ramadhani Puji Astutik & Anita Trisiana, "Formation of Indonesia's National Law System" (2020) 7:2 *Jurnal Hukum Prasada* 85–90 at 86.

<sup>25</sup> *Law of Legislative Drafting*, Law Number 12 Year 2011.

<sup>26</sup> Bayu Dwi Anggono, "Tertib Jenis, Hierarki, dan Materi Muatan Peraturan Perundang-undangan: Permasalahan dan Solusinya" (2018) 47:1 *Masalah-Masalah Hukum* 1–9 at 2.

<sup>27</sup> Moh Fadli, *Peraturan Delegasi di Indonesia* (Malang: UB Press, 2011) at 2–3.

<sup>28</sup> Zaelani, "Pelimpahan Kewenangan Dalam Pembentukan Peraturan Perundang-undangan (Delegation of Authority The Establishment of Legislation Regulation)" (2012) 9:1 *Jurnal Legislasi Indonesia* 119–134 at 122.

is in the form of government regulation (39%), presidential regulation (5%), ministerial regulation (20%), provincial and municipal regulation (8%), and other regulations (25%).<sup>29</sup>

On the other hand, climate change that affects the globe encourages many countries to implement environmentally friendly technology.<sup>30</sup> The developed countries have experienced clean technologies such as EVs and non-coal power plants for two decades. In contrast, Global South countries like Indonesia are struggling to implement the new technology on a massive scale.<sup>31</sup> In other words, electromobility development in Indonesia is one of the indicators of how the country tries to implement clean technology. In its practice, electromobility's legal ecosystem in Indonesia was built by adopting various delegation regulations, especially Ministerial Regulations. The term "electromobility" has a relatively broad definition in the European Union (EU) and its member states. Its emphasis is limited to EVs, and it explores in detail how to establish sustainable transportation networks, particularly in metropolitan areas.<sup>32</sup>

Furthermore, it is commonly agreed that European researchers extensively investigate this topic. This notion has spread around the globe as a viable answer to environmental challenges, particularly in industrialized nations.<sup>33</sup> Then, the EU, the United States of America (USA), and Japan analyzed the benefits and drawbacks of building electromobility ecosystems in their

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<sup>29</sup> Maizathul Baizura, Emilda Firdaus & Mexsasai Indra, "Penataan Pendelegasian Perundang-Undangan dalam Pembentukan Peraturan Daerah Dikaitkan Dengan Realisasi Program Pembentukan Peraturan Daerah Undang-undang Dasar Negara Republik Indonesia Tahun 1945 (UUD 1945), sebagai dasar dalam kehidupan berbangsa dan" (2021) 5:2 Riau Law Journal 240–263 at 244.

<sup>30</sup> Xiangbai He, "Legal and policy pathways of climate change adaptation: Comparative analysis of the adaptation practices in the United States, Australia and China" (2018) 7:2 Transnational Environmental Law 347–373.

<sup>31</sup> Indah Dwi Qurbani & Ilham Dwi Rafiqi, "Prospective green constitution in new and renewable energy regulation" (2022) 30:1 Legality: Jurnal Ilmiah Hukum 68–87.

<sup>32</sup> Krystian Pietrzak & Oliwia Pietrzak, "Environmental effects of electromobility in a sustainable urban public transport" (2020) 12:3 Sustainability (Switzerland) at 4.

<sup>33</sup> Oliwia Pietrzak & Krystian Pietrzak, "The economic effects of electromobility in sustainable urban public transport" (2021) 14:4 Energies at 1.

respective regions.<sup>34</sup> The EU implemented strict transport policies to support concrete climate change adaptation measures. Low emission vehicles and electromobility ecosystems are policy priorities implemented by the EU.<sup>35</sup> It is not surprising that the region is leading the penetration of electric vehicles to its public. In contrast, the USA adopted different strategies compared to the EU. Each state in the USA plays a significant role in building an EV ecosystem. Furthermore, this policy includes incentives that reduce the selling price of EVs until they are affordable to the public.<sup>36</sup>

Electromobility deployment includes managing charging stations, power delivery, and driving and public transit customer services. In this regard, electromobility is not only about EVs because it encompasses a whole clean energy and transportation ecosystem, from upstream to downstream.<sup>37</sup> However, this criterion precludes all nations from implementing electromobility due to the complicated ecosystem that must be developed and the need to monitor the automobile industry's environment nationally and worldwide.<sup>38</sup> Nonetheless, the global electromobility business is exploding and garnering the attention of several nations interested in becoming leaders in such sectors.<sup>39</sup>

Electromobility legal development is strategically one of the efforts to promote EVs on a massive scale to the public.<sup>40</sup> The massive EV use by the public will depend on the supportive ecosystem. The ecosystem is from the upstream sector, such as easy purchases and affordable prices, to

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<sup>34</sup> Tucki, Orynycz & Mitoraj-Wojtanek, *supra* note 11 at 12.

<sup>35</sup> Pietrzak & Pietrzak, *supra* note 32.

<sup>36</sup> Evanthia A Nanaki, Spyros Kiartzis & George A Xydis, "Are only demand-based policy incentives enough to deploy electromobility?" (2020) 0:0 Policy Studies 1–17.

<sup>37</sup> Erika Farkas-csamangó, "The legal environment of electromobility in Hungary" (2020) 28 Journal of Agricultural and Environmental Law 181–190 at 182.

<sup>38</sup> Tilman Altenburg, Eike W Schamp & Ankur Chaudhary, "The emergence of electromobility: Comparing technological pathways in France, Germany, China and India" (2016) 43:4 Science and Public Policy 464–475 at 464.

<sup>39</sup> Anna Skowrońska-Szmer & Anna Kowalska-Pyzalska, "Key factors of development of electromobility among microentrepreneurs: A case study from Poland" (2021) 14:3 Energies at 4.

<sup>40</sup> Nanaki, Kiartzis & Xydis, *supra* note 36.



downstream sectors, for instance, after-sales service, workshop availability, including charging facilities. Furthermore, the adoption of various regulations on a national and local scale can also promote the use of electric vehicles to the public.<sup>41</sup> The adopted regulation should assure the public that EVs are more profitable than conventional vehicles. These advantages include price, fuel, and the comfort of the EV itself. All of these things must be promoted and campaigned massively to the public.<sup>42</sup> Therefore, electromobility legal development carried out by the Indonesian government must include programs for the public and private sectors so that the target of penetration of the use of electric vehicles can be achieved.

The Presidential Regulation on Electric Vehicles is the primary legal instrument guiding Indonesia's electromobility legal framework. The most intriguing aspect of the Presidential Regulation is that it is not based on any laws (Indonesian: *Undang-Undang*). Instead, the Presidential Regulation explicitly refers to the 1945 Constitution and three Government Regulations, including energy conservation,<sup>43</sup> business activities related to the provision of electric power,<sup>44</sup> and motor vehicles.<sup>45</sup> This fact is exciting because delegations from the Law and Government Regulation can produce the Presidential Regulation in Indonesia's hierarchy of legal norms.<sup>46</sup> The question is whether the Presidential Regulation on Electric Vehicles is the three Government Regulations' delegated regulation or not. None of the three government regulations cited is tied explicitly to accelerating the development of battery-based electric car initiatives. As a result, the Presidential Regulation on Electric

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<sup>41</sup> Pietrzak & Pietrzak, *supra* note 33.

<sup>42</sup> Makena Coffman, Paul Bernstein & Sherilyn Wee, "Electric vehicles revisited: a review of factors that affect adoption" (2017) 37:1 *Transport Reviews* 79–93.

<sup>43</sup> *Government Regulation on Energy Conservation*, Government Regulation Number 73 Year 2009.

<sup>44</sup> *Government Regulation on Electricity Supply Business Activities*, Government Regulation Number 14 Year 2012.

<sup>45</sup> *Government Regulation on Vehicles*, Government Regulation Number 55 Year 2012.

<sup>46</sup> Ahmad Husen, "Eksistensi Peraturan Presiden Dalam Sistem Peraturan Perundang-Undangan" (2019) 3:1 *Lex Scientia Law Review* 69–78 at 74.

Vehicles can be classified as an autonomous presidential regulation.<sup>47</sup> The establishment of autonomous presidential regulation results from Indonesia's adoption of the presidential system, which vests the President, who serves as head of state and head of government, with authority to issue presidential regulations.<sup>48</sup>

Numerous government functions are delegated to appropriate ministers under the Presidential Regulation on Electric Vehicles; according to the authors' findings, at least eleven different ministerial regulations were adopted as delegated regulations under the Presidential Regulation on Electric Vehicles.<sup>49</sup> Thus, delegations must adopt fourteen ministerial regulations from the Presidential Regulation on Electric Vehicles in greater detail. Nonetheless, until 2021, the Coordinating Minister for Maritime Affairs and Investment, the Minister of Home Affairs, the Minister of Finance, the Minister of Trade, the Minister of Industry, the Minister of Energy and Mineral Resources, the Minister of Transportation, and the Minister of Environment and Forestry have established eleven ministerial regulations (excluding amendments).

Indonesia's electromobility legal ecosystem relies heavily on delegated regulations, particularly Presidential and Ministerial Regulations. However, there are distinctions in Indonesia's hierarchy of legal norms between Presidential and Ministerial Regulations. On the one hand, Presidential Regulations are expressly stated to be part of a hierarchy; on the other hand, Ministerial Regulations are not expressly stated to be part of a hierarchy under Law Number 12 of 2011 on Law and Regulation Formation. Nonetheless, in the practice of government administration in Indonesia, Ministerial Regulations are frequently adopted to regulate

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<sup>47</sup> Prisca Listiningrum, "Eksistensi Dan Kedudukan Peraturan Presiden Dalam Hierarki Peraturan Perundang-Undangan Di Indonesia" (2019) 12:2 *Arena Hukum* 337–355 at 350.

<sup>48</sup> Fathorrahman, "Peraturan Delegasi dalam Sistem Peraturan Perundang-undangan Indonesia" (2018) 7:2 *Rechtens* 193–212 at 202.

<sup>49</sup> Asrul Ibrahim Nur & Andrian Dwi Kurniawan, "Proyeksi Masa Depan Kendaraan Listrik di Indonesia: Analisis Perspektif Regulasi dan Pengendalian Dampak Perubahan Iklim yang Berkelanjutan" (2021) 7:2 *Jurnal Hukum Lingkungan Indonesia* 197–220 at 209.

government affairs, as they are regarded as a type of policy regulation (*beleidsregel*).<sup>50</sup>

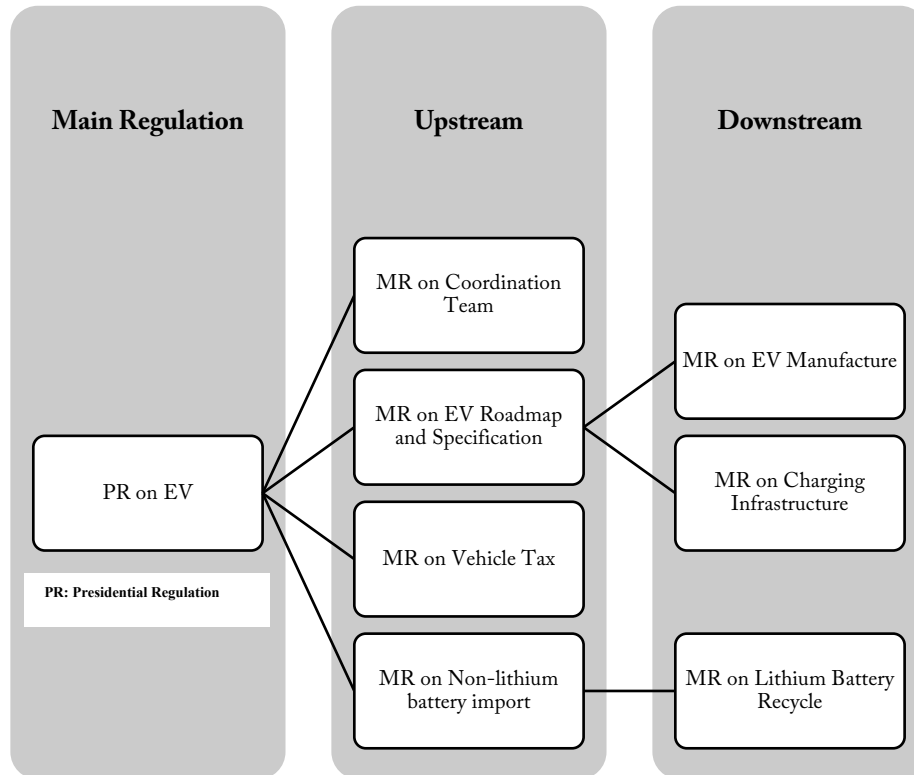


Figure 1. Indonesian EV Regulations Structure

Figure 1 shows the author's classification of several ministerial regulations into two categories: upstream and downstream. Ministerial regulations governing the coordination team and EVs manufacturing business, including battery manufacture and fiscal incentives, constitute the upstream dimensions. The downstream dimension includes ministerial regulations governing EVs manufacture, battery waste management, and charging infrastructure.

The government has been trying to establish a legal ecosystem for electromobility from the upstream to the downstream. Regulations governing downstream aspects include establishing work teams, fiscal incentives in tax reductions, regulation of lithium battery raw material

<sup>50</sup> Victor Imanuel W Nalle, "Kedudukan Peraturan Kebijakan dalam Undang-Undang Administrasi Pemerintahan" (2016) 10:1 Refleksi Hukum 1–16 at 8.

imports, arrangements for EV assembly manufacturing, and developing electromobility roadmaps with production targets of 400,000 electric cars and 1.76 million motorcycles by 2025.<sup>51</sup> The lofty goal is backed up by legislative tools that govern downstream issues such as electric vehicle testing, conversion of conventional engines to electric motors, battery charging infrastructure, and lithium-ion battery waste management.

The government's regulation of the upstream and downstream sectors through the Presidential Regulation and Ministerial Regulation is a type of state intervention in the legal development of electromobility. Furthermore, this phase is required to bring government policies aligned with those of the industrialized world.<sup>52</sup> Moreover, the Presidential Regulation on Electric Vehicles, as the fundamental regulation on the legal framework for electromobility in Indonesia, also has a significant legal impact, notably in the quest to cut emissions and enormously increase EV usage drastically.<sup>53</sup>

Indonesia's legal framework for electromobility is guided by regulating technological and non-technological characteristics. Nonetheless, concerns have been raised about the sustainability and viability of this program after 2024, when President Joko Widodo's second term ends. The successor president has the legal authority to amend legal instruments equal to the Presidential and Ministerial Regulations. The authors assert that Indonesia's legal development of electromobility is governed by autonomous and inconsistent delegated legislation. The term autonomous and inconsistent means that the legal instruments on electromobility in Presidential Regulations and Ministerial Regulations lack a firm legal foundation in legislation. However, as the author will show below, this condition has extremely broad ramifications.

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<sup>51</sup> Kresnawan et al, *supra* note 22 at 106.

<sup>52</sup> Jonas Meckling & Jonas Nahm, "When do states disrupt industries? Electric cars and the politics of innovation" (2018) 25:4 *Review of International Political Economy* 505–529 at 521.

<sup>53</sup> Maghfiroh, Pandiyaswargo & Onoda, *supra* note 23 at 2.

#### IV. THE FUTURE OF ELECTROMOBILITY REGULATION AND ITS SUSTAINABILITY IN INDONESIA

Integrating economic, social, and environmental considerations into sustainability practices is a substantial challenge for the public and commercial sectors.<sup>54</sup> Environmental, social, and economic aspects are fundamental dimensions integratively mandatory in sustainability. These three aspects must be adopted integratively if applied in policies or regulations related to EVs. In short, sustainability reaches aspects of the planet, people, and profit together.<sup>55</sup> As a result, the public and private sectors must collaborate on economic, social, and environmental issues.<sup>56</sup> The collaboration between public and private sectors is carried out to ensure that the three dimensions of sustainability are well adopted in regulation and implementation. Combining these three facets poses difficulties and may balance economic, social, and environmental concerns.<sup>57</sup> Sustainability may be defined as a framework prioritizing current profitability and future security.<sup>58</sup> Therefore, economic, social, and environmental factors are visible when assessing sustainability levels.

Sustainability cannot be determined in a short period because the enhancement of economic, social, and environmental dimensions must be accomplished over numerous generations. Sustainability as a research-based concept encompasses several integrated, dynamic, interconnected, and complicated characteristics.<sup>59</sup> As a result, detailed research is required to ameliorate humanity's destiny. The research on the legal development of

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<sup>54</sup> Justice Mensah, “Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review” (2019) 5:1 Cogent Social Sciences at 5.

<sup>55</sup> Ralph Hansmann, Harald A Mieg & Peter Frischknecht, “Principal sustainability components: Empirical analysis of synergies between the three pillars of sustainability” (2012) 19:5 International Journal of Sustainable Development and World Ecology 451–459 at 451.

<sup>56</sup> Mensah, *supra* note 54 at 9.

<sup>57</sup> Hansmann, Mieg & Frischknecht, *supra* note 55.

<sup>58</sup> Beate Sjøfjell, Tiina Häyhä & Sarah Cornell, “A Research-Based Approach to the UN Sustainable Development Goals. A Prerequisite to Sustainable Business” (2020) 02 University of Oslo Faculty of Law Legal Studies Research Paper Series at 31.

<sup>59</sup> *Ibid* at 25.

electromobility in Indonesia attempts to envision and forecast the future from regulatory and sustainable viewpoints in one of the industries most closely associated with human progress.

EVs have long been considered superior to traditional vehicles in technology, environmental friendliness, low noise, and low maintenance costs.<sup>60</sup> As a result, every country, including Indonesia, is attempting to increase public adoption of EVs. The Government of Indonesia is advancing the legal framework for electromobility, bypassing associated regulations. However, considerable research indicates that implementing the strategy will be difficult.<sup>61</sup> Moving from conventional to EVs is costly and requires a well-developed charging infrastructure. It is also inextricably linked to the technology employed, particularly in developing countries like Indonesia.<sup>62</sup> Another hurdle is the difficulty of accepting such cutting-edge technology in a less illiterate community.<sup>63</sup> This issue is also related to the economic and market aspects of EVs in Indonesia; penetration of EV products and variants will become increasingly difficult if a country's populace generally does not embrace the technology.<sup>64</sup>

The Government of Indonesia appears to have identified and mitigated these impediments, as seen by adopting numerous rules on electromobility within a year. The Presidential Regulation on Electric Vehicles serves as a primary regulation for electromobility in Indonesia. It focuses on four main

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<sup>60</sup> Barton & Schütte, *supra* note 5; Franziska Bühler et al., "Is EV experience related to EV acceptance? Results from a German field study" (2014) 25:PART A Transportation Research Part F: Traffic Psychology and Behaviour 34–49.

<sup>61</sup> Barton & Schütte, *supra* note 5; Simone Steinhilber, Peter Wells & Samartha Thankappan, "Socio-technical inertia: Understanding the barriers to electric vehicles" (2013) 60 Energy Policy 531–539.

<sup>62</sup> F H Syamnur et al., "Barriers to the adoption, acceptance and public perceptions of Electric Vehicles (EV) in Indonesia: Case studies in the city of Surakarta" (2019) 1402:4 Journal of Physics: Conference Series 6–11 at 4.

<sup>63</sup> Ona Egbue & Suzanna Long, "Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions" (2012) 48:2012 Energy Policy 717–729 at 718.

<sup>64</sup> Iana Vassileva & Javier Campillo, "Adoption barriers for electric vehicles: Experiences from early adopters in Sweden" (2017) 120 Energy 632–641; Yolanda Natalia, Irvanu Rahman & Akhmad Hidayatno, *Conceptual Model for Understanding the Policy Challenges of Electric Vehicle Adoption in Indonesia* (Macau, 2020).

areas: industrial development acceleration and fiscal incentives, charging infrastructure provision and tariff regulation, technical and specification of electric vehicles, and environmental protection.<sup>65</sup> The authors assert that addressing three dimensions of sustainability is the triple bottom line idea: economic, social, and environmental.

Environmental indicators are the physical part of sustainability in the triple bottom line concept, implying that environmental changes can be seen and felt.<sup>66</sup> As a result, indicators in the form of particular figures are typically provided to measure sustainability on environmental dimensions.<sup>67</sup> A comparable study was conducted in the economic dimension, which quantified the necessary expenses and prospective profits.<sup>68</sup> The final component of sustainability is the social dimension.<sup>69</sup> The assessment focuses on the individual's and community's social impact in the social dimension.<sup>70</sup> In general, Indonesian regulations on electromobility have governed the three elements of sustainability; the following is the author's analysis of the following stated in Table 1:

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<sup>65</sup> Nur & Kurniawan, *supra* note 49 at 211.

<sup>66</sup> Shamraiz Ahmad, Kuan Yew Wong & Srithar Rajoo, "Sustainability indicators for manufacturing sectors: A literature survey and maturity analysis from the triple-bottom-line perspective" (2019) 30:2 *Journal of Manufacturing Technology Management* 312–334 at 317.

<sup>67</sup> Joe Miemczyk & Davide Luzzini, "Achieving triple bottom line sustainability in supply chains: The role of environmental, social and risk assessment practices" (2019) 39:2 *International Journal of Operations and Production Management* 238–259 at 251.

<sup>68</sup> Ahmad, Wong & Rajoo, *supra* note 66 at 317.

<sup>69</sup> Murat Kucukvar & Omer Tatari, "Towards a triple-bottom-line sustainability assessment of the US construction industry" (2013) 18:5 *International Journal of Life Cycle Assessment* 958–972 at 962.

<sup>70</sup> Ahmad, Wong & Rajoo, *supra* note 66 at 321.

Regulations	Sustainable Aspects		
	Economy	Social	Environment
Presidential Regulation on Electric Vehicles	Research, development, and industrial innovation	Non-fiscal incentive	Fossil-fueled vehicles limited restrictions
	Domestic Component Level	Development of charging infrastructure	Battery waste handling
	Fiscal incentives	the type and specifications of a viable electric vehicle	Non-fiscal incentive
	Charging infrastructure	After-sales service of electric vehicles	
	Electricity tariffs		
	After-sales service of electric vehicles		

*Table 1. Sustainable Dimension of Indonesia's Electromobility Legal Development*

According to the table above, the Presidential Regulation on Electric Vehicles is out of balance on the three elements of sustainability. The economic dimension predominates over the other two. Previous research has demonstrated that economics is a factor in the comparatively high rate of public adoption of EVs due to the low cost compared to conventional automobiles.<sup>71</sup> On the other hand, environmental and societal issues dominate the widespread adoption of EVs.<sup>72</sup> Additionally, Indonesia is advancing the legal framework for electromobility by adopting delegated rules covering technological and non-technology factors. Therefore,

<sup>71</sup> Elena Higuera-Castillo et al., "Adoption of electric vehicles: Which factors are really important?" (2021) 15:10 International Journal of Sustainable Transportation 799–813 at 4.

<sup>72</sup> Kenan Degirmenci & Michael H Breitner, "Consumer purchase intentions for electric vehicles: Is green more important than price and range?" (2017) 51:2017 Transportation Research Part D: Transport and Environment 250–260 at 256.



economic, social, and environmental sustainability are the two pillars of the sustainable perspective.

There is an imbalance in regulation due to its emphasis on economic factors. Therefore, the Indonesian authorities must carefully evaluate these criteria if they wish to see the expedited rollout of EVs succeed as planned. Another issue to consider is education and promotion regarding the critical nature of EV use. Increased public awareness and interest in EVs are positively connected with increased sales and use.<sup>73</sup> Consumers' willingness to buy EVs and abandon conventional vehicles is also influenced by the availability of clear and balanced information regarding the EV advantages.<sup>74</sup> In developing countries such as Indonesia, EVs have often been considered a luxury item that certain circles can only purchase. Balanced promotion and information will eliminate this public opinion.

Discourse on sustainability exists in Indonesia's 1945 Constitution and Environmental Protection and Management Law 32/2009.<sup>75</sup> Article 33(4) of the 1945 Constitution states that principles adopted in implementing the national economy are sustainable and environmentally friendly. The provisions in this Article are generally about managing Indonesia's natural resources. Therefore, the use of EVs to reduce carbon emissions and mitigate climate change has a strong constitutional basis in the 1945 Constitution. Sustainability is one of Indonesia's principles adopted in environmental protection and management.<sup>76</sup> Therefore, if electromobility legal development in Indonesia makes the environment one of the essential aspects, sustainability will certainly be one of the principles used as a reference. In the long run, electromobility legal development that does not

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<sup>73</sup> Joram HM Langbroek, Joel P Franklin & Yusak O Susilo, "The effect of policy incentives on electric vehicle adoption" (2016) 94 Energy Policy 94–103; Xiang Zhang, Xue Bai & Jennifer Shang, "Is subsidized electric vehicles adoption sustainable: Consumers' perceptions and motivation toward incentive policies, environmental benefits, and risks" (2018) 192 Journal of Cleaner Production 71–79.

<sup>74</sup> Coffman, Bernstein & Wee, *supra* note 42 at 10.

<sup>75</sup> Pan Mohamad Faiz, "Perlindungan terhadap Lingkungan dalam Perspektif Konstitusi" (2016) 13:4 Jurnal Konstitusi 766.

<sup>76</sup> I Gede Yusa & Bagus Hermanto, "Implementasi Green Constitution di Indonesia: Jaminan Hak Konstitusional Pembangunan Lingkungan Hidup Berkelanjutan" (2018) 15:2 Jurnal Konstitusi 306.

favor the environment will experience legal problems and even enter the realm of constitutionality.

the legal development of electromobility in Indonesia has a cascading influence on other industries. The most prominent example is the prohibition of nickel ore exports to fulfill the country's developing lithium-ion battery industry.<sup>77</sup> The export embargo is economically tied to the increased nickel ore prices on the international market.<sup>78</sup> This requirement drew a response from the EU, which declared Indonesia's policy unlawful and then requested a panel hearing at the World Trade Organization (WTO).<sup>79</sup> The ramifications of Indonesia's legal development in electromobility for the transportation, mining, and foreign trade sectors, including restrictions on nickel ore exports. The authors' study has limitations in that it does not detail the impact of Indonesia's electromobility legal development. However, with Indonesia's rising ambitious output objectives and EVs, the impact on other industries is projected to dominate. As a result, determining how much this impact exists can be an exciting subject for authors and academics.

## V. CONCLUSION

Given the recent global energy crisis, the change from fossil to electronic automotive has been increasingly inevitable. The steadfast development of electric vehicle is a part of the adaptation of this change, despite the issue of climate change becoming the main impetus for driving this transformation. The government has responded to this situation by establishing an electromobility legal ecosystem and providing incentives

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<sup>77</sup> Andante Hadi Pandyaswargo et al., "The Emerging Electric Vehicle and Battery Industry in Indonesia: Actions around the Nickel Ore Export Ban and a SWOT Analysis" (2021) 7:4 Batteries 80 at 3.

<sup>78</sup> Byungkwon Lim, Hyeon Sook Kim & Jaehwan Park, "Implicit interpretation of Indonesian export bans on LME nickel prices: Evidence from the announcement effect" (2021) 9:5 Risks 1–7 at 6.

<sup>79</sup> European Commission, "EU files WTO panel request against illegal export restrictions by Indonesia on raw materials for stainless steel," (2021), online: *European Commission Press Release* <[https://ec.europa.eu/commission/presscorner/detail/en/IP\\_21\\_105](https://ec.europa.eu/commission/presscorner/detail/en/IP_21_105)>.

both fiscal and non-fiscal to support the massive use of EVs. Indonesia's legal framework on electromobility was established through autonomous delegated legislation, such as presidential and ministerial regulations, to facilitate technological transfer that results in considerable fissures in Indonesia's current legal framework for electromobility. As a result, Indonesia's regulatory framework for electromobility is prone to inconsistency and develops against sustainability. The latter is indicated by the primary emphasis on economic interest instead of social and environmental aspects. The adoption of strong legal instruments is the key to promoting clean technology transportation transformation ecosystem but fulfilling social and environmental aspects is an anticipatory phase so that electric vehicle technology will not experience resistance from the public because of incompatibility with people's culture and customs.

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## COMPETING INTEREST

The author declared that he has no competing interests.

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