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The Electric vehicle transition in Russia and Indonesia

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Abstract
Due to worries about global warming and its effects on the environment, economy, and society, a lot of emphasis has been paid to the switch to electric vehicles (EVs). This essay focuses on the switch to electric vehicles in Indonesia and Russia. Green technology, such as EVs, have been introduced in Indonesia in order to lower carbon dioxide (CO2) emissions and enhance air quality. The study emphasizes the advantages of EVs, including their simplicity and improved comfort when compared to conventional vehicles, as well as their free highway use, parking, and tax incentives. The restricted affordability, ambiguous national policies, and inadequate public infrastructure provide difficulties for Indonesia. However, relative to its enormous auto fleet, Russia has lagged behind in the development of EVs, with just a tiny number of registered electric vehicles. However, the Russian government has approved a plan to increase the infrastructure and production of electric road transport. The strengths, weaknesses, and transitional strategies for EVs are assessed using a case study approach and comparative analysis. In order to encourage the use of EVs, it is stressed the significant of incentive programs and supportive policies, such as tax breaks and regional manufacture. The study comes to the conclusion that although both nations have made progress in the transition to electric vehicles, more has to be done in terms of policy creation, infrastructure development, and technological improvements in order to hasten the adoption of EVs in Russia and Indonesia.
Keywords: electric vehicles (EVs); Indonesia; Russia; green technology; transition

1. Introduction

As considering some issues, it leads to the ecosystem, ecological and economic, also society, global warming has gained prominence in recent years (Ziemba, 2020). Regarding future plans, it is also possible to mention that by 2050, more than 70% of the world's population would reside in urban regions, as predicted by the United Nations (UN) (de Mello Bandeira et al., 2019). In order to keep global warming below 1.5°C as required by the Paris Agreement, Indonesia, as to talk about the world's top emitters of carbon dioxide, has to decrease its emissions from 1817 metric tonnes of CO2 equivalent (MtCO2e) to below 662 MtCO2e in 2030 (Setiawan et al., 2022). Two-wheeled vehicles predominate in the Indonesian transportation industry, particularly in metropolitan areas. However, as per capita wealth rises and public transit is widely used, the need for this kind of car would diminish (Rukmana, 2018).

Environmentally friendly technologies have been introduced to try and decrease greenhouse gases, which came out from air pollution, chemicals that may contribute to global warming. The electric vehicle (EV) is a product that is currently in development and is expected to help reduce pollution (Singla & Bansal, 2022). In order to effectively maintain clean air in the atmosphere and improve air quality, EV deployment should be combined with clean energy sources like hydro, wind, nuclear, and solar power plants (Veza et al., 2021).

But we must also recognise that the problems that mankind is currently experiencing, such as air pollution, global warming, and the usage of renewable energies, cannot be solved by simply switching from conventional to electric vehicles (Singla & Bansal, 2022). Due to the fact that one of the most important components of an electric car is its battery, which is often constructed of lithium, the principal component of most electric vehicle batteries. Cobalt has a high energy density and is quite reactive. Nickel is another frequent element used in electric vehicle batteries, particularly in the cathode (positive electrode) of lithium-ion batteries. It offers stability and increases energy density (Kumar et al., 2021a).

Research from the European Union claims that transportation is responsible for 28% of the carbon dioxide (CO2) in the atmosphere, making it one of the primary causes of global warming (Sanguesa et al., 2021). Because of this, many nations believe and act as though using EVs and environmentally friendly energies is the only way to solve this issue (Ajanovic et al., 2021). It must be noted that there are several benefits to using electric vehicles, including free highway use, free parking, and free taxes (in some countries). In addition, we can see that EV engines are much simpler and smaller than those of conventional automobiles (Sanguesa et al., 2021). Due to the interior's extreme quietness, lack of vibration, and absence of engine noises, EV comfort is also superior to that of conventional vehicles (Chan, 2007). Furthermore, speaking of charging, it is also quite convenient since a battery needs 6 to 8 hours to fully charge whereas a quick charge only needs 30 minutes for 80% (Ajanovic et al., 2021).

In order to improve urban resilience and inhabitants' quality of life, sustainable vehicle use must not just focus on electric mobility but also on reducing transportation externalities (Nemoto et al., 2021). The notion of sustainable mobility is broad and crucial, but different organisations have operationalized it. The most restricted conceptualization is the one that just focuses on environmental sustainability and operationalizes it as renewable resources (Kumar et al., 2021b). Let's discuss what affordability means and how everyone may get it. A city's diversified transport options, sensible expansion, effective transport pricing, and system diversity are also covered by broader definitions (Wibowo & Susilastuti, 2022). Because of this, it is important to discuss both the transition and the overall decline of them (Olabi & Abdelkareem, 2022).

It has been shown that electric vehicles (EVs), which include battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), are viewed as a practical solution to lower pollution example: cars like sportive or pick-up lorries which are considered not so harmful to the environment usually emit greenhouse gases (Tomšić, et al., 2020). Hybrid electric vehicles (HEVs) have the decreasing the high-speed use of energy by vehicles which contributes to gasoline in cities 55%-75% and in highways 20% respectfully, if we compare it 8 years before by Indonesia (Sałabun & Karczmarczyk, 2018). According to the Global EV Outlook (2019) published by the International Energy Agency, the number of electric vehicles on the road today has increased significantly over the past ten years, reaching 5 million units in 2018 (Yuniza et al., 2021).

There are numerous uses for numerous factors, including electric motor size, weight, range, battery capacity, energy consumption, charging time, etc., define electric cars. These components frequently conflict with one another, thus enhancing one results in the degradation of another (Sanguesa et al., 2021). However, it is important to note that the first functions are extremely interdependent. For example, the charging station determines how long it will take for a battery to charge, and a battery's capacity determines how long it will last (Iclodean et al., 2017). We cannot claim that once one problem is solved, all others will follow suit. These processes must be strengthened concurrently because they are interrelated (Hsieh et al., 2022).

Unfortunately, Indonesia is lagging behind other nations in the development of electric vehicles. The community's limited ability to purchase electric vehicles and the fact that several corporations in the automotive industry are still debating whether to build BEVs in Indonesia are the main issues. Entrepreneurs' uncertainties are almost usually connected to national policies, conceptions, and technological policies. The government's

public infrastructure is also insufficient to assist the development of electric automobiles (Rachman et al., 2021). The number of national electric automobiles used in Indonesia is not known with accuracy. However, as of January 2020, the DKI Jakarta Bapenda records show that less than hundred electric automobiles registered in Jakarta alone. This information comes from ruler of the local revenue office (Veza et al., 2022).

Although one must be mentioned that the use of power grids which has been using in Indonesia in order to generate renewable energy has a good impact on reducing air pollution, high adoption of these renewable energy sources lead to a big problem due to instability in which most renewable energy has unpredictability (Huda et al., 2019). Indonesia, like any other country, must increase the use of electric vehicles even more because the population of Indonesia is very high and it is very obvious that the demand for vehicles and the amount of air pollution automatically increases (Setiawan et al., 2022). Coal-fired steam power plants, which will make up the majority of Indonesia's energy mix, cannot fix this issue (Kolpakov & Galinger, 2020).

When it comes to power system applications, the battery is the most common energy storage device since it has the ability to convert one type of energy into another, or more specifically, electricity (Bhattarai, 2022). Currently, lead-acid batteries, nickel-based batteries, and lithium-based (Li-based) batteries are the three primary types of batteries suited for road transportation applications (Song et al., 2022). Additionally, there are three rare battery kinds available on the market: flow batteries, metal-air batteries, and sodium sulphur (NaS) batteries. The battery, which makes up the majority of an electric car nowadays, must be taken into consideration. Additionally, the batteries play a significant impact when it comes to how people view electric cars (Babu et al., 2023).

Many other nations, even those with highly advanced technological systems, haven't yet given the transition to electric transportation the attention it deserves (Sanguesa et al., 2021). In particular, just little bit more than 10,800 electric automobiles were imported in Russia in the beginning of 2021, despite the country having a fleet of roughly 45 million passenger automobiles (S&P Global Commodity Insights, n.d.). Russian statistics on the prevalence of environmentally friendly automobiles are still only gathered by personal organizations, and as a result, they vary greatly. But Russian government authorized the plan for growth of the road of electric vehicles production and use by Russian government for the years up to 2030 (hence referred as the Concept). For the period up to 2030, this notion represents the initial formal record to define goals promoting the production of electric vehicles and the growth of Russian charging infrastructure (Iosifov & Ratner, 2022). Discussion of electric automobiles in Russia and Indonesia is the focus of the current paper. (Yuniza et al., 2021; Iosifov & Ratner, 2022) are the two primary studies from two separate countries that will be concentrated in the current paper's review methodology. We will discuss about the papers mentioned before, considering their view point and also in the end we will give some suggestions for making better the journals mentioned before.

2. Methods

This review used a case study method, or a qualitative descriptive technique, in which data were evaluated and the findins were presesnted in a descripitive manner. The technique employed is a literature study with comparative analysis, which entails looking for similarities, differences, benefits,, and drawbacks of the examined things. The goals are the

advantages and disadvantages as well as the transitional plans for electric vehicles in Russia and Indonesia.

The major goal of the current study is to determine the strnenght and weakness of the two countries under the considiration – Russia and Indonesia. The article that has been utilized as a source details where their research was conducted in the two counties under discussion. The current publication only makes use of resent reserch from Indonesia and Russia. Additionally some appropriate ideas or other data will be added in order to improve and maximize the effectiveness of the papers under discussion.

3. Results and Discussions

1.1. Electric Vehicle Transition in Indonesia

Electric Vehicles technology is now being carried out globally, including in Indonesia. This could revolutionize vehicle powertrains by switching from internal combustion engines to electric motors (Guerra, 2019). According to its Nationally Determined Contribution (NDC) since 7 years ago, Indonesia committed in order to reduces 29% of its GHG emissions under the status quo and up to 41% with financial and other assistance from other countries by 2030.(Hea et al., n.d.) The electrification of transportation is one of several policies the Indonesian government is putting in place to help it reach this objective.(Huda et al., 2018) The nation intends to increase EV adoption in order to reduce toxic waste, notwithstanding recent advancements in biofuels (Palit et al., 2022). The transport sector in Indonesia produced 134.5 million tons of greenhouse gas emissions in 2016, which is 318% more than the amount of greenhouse gases produced by the sector in 1990.(Jaman et al., 2020) In terms of greenhouse gas emissions, the transport industry ranks second after the energy sector with a contribution of 24.71 percent (Veza et al., 2022).

According to a regulation of the government under the number 79/2014 pertaining to National Energy Policy is also discussed in the main paper which is in the main purpose of the current paper, and it discusses Article 22's provision on incentives for electric vehicles (Mutiarin et al., 2019). It mandates also the government of federal, the local governments offer financial and non-monetary rewards to promote the development of renewable sources of energy and the diversity of energy sources (Farda & Balijepalli, 2018). Additionally, there is Government Regulation No. 70/2009 about Energy Conservation, which addresses both Those who use more energy or equal 60% out of 1000 tons of oil every year and producers of energy-saving equipment who successfully implement energy conservation (Yuniza et al., 2021).

The importance of incentive programs in the adoption of BEVs may be seen in the adoption of electric vehicles throughout nations (Suyitno, 2019). Because, the policy about financial incentives also exists in the current packages which can bring potential customers has been demonstrated, there is an interaction between the exception of electric automobiles and has rules in America significantly increased success through the increase in EV sales (Nimesh et al., 2021). The Car Allowance Rebate System, a $3 billion financial incentive that offers consumers $3,500 or $4,500 if they trade in their less eco-friendly car for a vehicle with improved fuel efficiency, is an intriguing financial incentive from the United States (Kivevele et al., 2020). Subsidies, the tax exemptions, plates, parkings, and also infrastructure construction subsidies are crucial factors in the interaction between the acception of EVs and rules. These measures act as incentives for the use of EVs (Debnath et al., 2021).

There is a regulation by the president under number 55 of 2019 on the increasing the speed of battery electric vehicles program for road transportation must also be mentioned because it is significant (Fragkos et al., 2021). With a minimum percentage of local components and the extension of the charging infrastructure, this rule aims to permit both commercial and non-commercial incentives for regional manufacturers (et al., 2018). As a result, Indonesia broadens its focus to include domestic EV development employing localized production and supply chains in addition to the EV market. This was a significant improvement over 2013, when various initiatives to build national EVs failed due to

insufficient regulation. Several local businesses are currently prepared to create electric buses with a 35% local component (Veza et al., 2022).

In order to buy lower price and yearly tax expenses, also encourage the use of electric automobiles, the government of Indonesia is implementing EV tax reductions (Joshi & Pinto Pius, 2020). Incentives for electricity prices were also implemented in order to lower PLN charge costs. To test the effectiveness of these regulations in the face of potential future uncertainty regarding the development of electric automobiles technology, also the desire of personal parties in order construct the stations that for electric automobiles, there was created tow scenarios. The following is a description of the scenarios.(Indonesia, n.d.) Also must be mentioned that, in order to maintain the electric vehicles themselves, the adoption of electric vehicles necessitates supplemental services (Ziemba, 2020). As a result, it is essential to make sure that there is a complete infrastructure that supports the development of electric automobiles (Irawan et al., 2018). The capacity to construct the requisite roadways and charging stations is one of the infrastructures made possible by the commercial launch of electric vehicles (Lazzeroni et al., 2021). It is discovered that the biggest deterrent to consumers buying electric vehicles, aside from cost and driving range, is a lack of convenient access to charging stations (Nazari-Heris et al., 2022).

The present leadership of Indonesia is working hard to grow the EV market and has also been doing a lot to pique the interest of the two main sides, the buyer and the seller (Maghfiroh et al., 2021). Indonesia has a large motorbike and moped population, thus the government started making electric vehicles and electric mopeds (Irawan et al., 2018). As in Indonesia, manufacturing of electric vehicles and motorbikes is progressing thanks to a very noticeable government initiative that lessens reliance on importing parts from other nations while continuing to import some parts, particularly the battery (Setiawan et al., 2022). Another significant initiative is the government's current endeavour to limit the importation of electric vehicles, which enables it to strengthen the economy and reduce dependency (Choi et al., 2022).

The government's expectations for the sale of electric vehicles in 2020 were not met. The government or private sellers must address some issues that are preventing the sale of electric vehicles (*The Political Economy Theory*, n.d.). The first is less promotion of electric vehicles, which is needed more to increase their popularity. Second, less sales of electric vehicles may be due to a lack of public awareness (Setiawan et al., 2022). The government must make an effort to spread awareness about electric vehicles among the populace, as this is crucial. The third factor for the lower sales of electric vehicles may also be related to governmental law (Noel et al., 2019). The government must research the policies that other nations used to encourage the use of electric vehicles, compare them to Indonesia, and select the ones that are best for the country (Bibak & Tekiner-Mogulkoc, 2022). Consider the tax incentives for electric vehicles as an example. In addition to the road fee reduction and price reduction for electric vehicles, parking lot charges can also be reduced for electric vehicles (Say et al., 2023).

Regarding the resources of the energy used in electric vehicles, Indonesia holds a significant position as the second-biggest resource in the world and the nation with the largest reserves (Ravi & Aziz, 2022). Around 24% of the world's nickel deposits are found in Indonesia, and 70% of those are in the form of nickel limonite (Pirmana et al., 2023).

1.2. Electric Vehicles Transition in Russia

Russia ratified the Paris Agreement via its government resolution under the number n 1228, 2019, in order to procede adopting the Paris Agreement. Russia signed the Paris Agreement in 2016, (Fuinhas et al., 2021) with an aim of a 25–30% decrease in O2 below the 1990 level by 2030. A statement was also made on how it was unacceptable to utilize the Paris Agreement and its instruments to obstruct the member countries' sustainable socioeconomic development. This emphasizes the significance of a thorough effect assessment of the policy which is about climate applied to Russia and the analog of potential dangers and methods to mitigate them (Kolpakov & Galinger, 2020).

Russia's reliance on imported technology is currently an important barrier to the adoption of low-carbon technologies because it is economically inefficient. As a result, the following is the conclusion: in addition to internal risks brought on by the Russian economy's structure not being ready for the spread of low-carbon technologies, there are also external risks brought on by the the global fight in order to prevent from climate change and a potential decrease in sell of Russian energy resources (Rajaeifar et al., 2022). This issue must be taken into account in Russia's climate policy, which must also provide a lot of connected institutional, economic, structural, and also technological measures in order mitigate the unfavorable socioeconomic effects in terms of execution. First and foremost, steps must be taken to localize innovative energy technology and set up the associated domestic businesses. Given that this market in Russia is still in its early stages of development, prompt action to begin process used to replace imports could eventually be replaced by organic and natural alternatives that are better in the long term (Kolpakov & Galinger, 2020).

It would be preferable if the current article covered the idea of introducing financial and tax incentives to encourage the purchase of electric vehicles by both individuals and businesses, as well as the opinions of various stakeholders in reaction to this government initiative (Rajaeifar et al., 2022). Additionally, there is a growing corpus of information about the mobility of electric vehicles. While some nations have already achieved a significant market share for electric vehicles, many others are only just beginning their transition to an all-electric transportation system (Xia et al., 2022).

It is crucial for both the nation and the ecosystem of the world because Russia controls the largest portion of the planet. It must be noted that EVs still have issues with the restricted driving range they can achieve on a single charge and the accessibility of charging facilities within driving distance. Long charging times are now a problem for the users (Kolpakov & Galinger, 2020). The majority of wealthy nations are also working to increase public interest in electric automobiles. This is why switching to electric vehicles is becoming increasingly common and there are more of them on the road. However, if we travel to Russian Federation. Renault is the only manufacturer of electric automobiles at the moment. It demonstrates how underdeveloped the country is in terms of EV (S&P Global Commodity Insights, n.d.).

The capital of the Russian Federation, Moscow, is the city with the most electric vehicles and the most advanced electric vehicle industry. But overall, compared to developed nations, the technology behind electric vehicles is not as advanced (Kolbasov et al., 2018). If we examine the cause, one possibility is that Russia's charging infrastructure is only available in major urban areas rather than small towns. Additionally, numerous businesses offer the current pricing methods. This circumstance results in a lack of centralised information delivery to clients and drivers (Bamisile et al., 2021).

There must be taken a crucial step in order to increase the popularity and affordability of electric automobiles. According to (Zhgulev et al., 2018) the shift from conventional to electric vehicles can be aided by marketing. Additionally, the significant financial necessity for the Russian market for electric vehicles must be addressed. And for this reason, it is believed that the capital is necessary for the organisation of a vast network of electric charging stations in the Russian Federation in addition to production, consumer loans, and service support (Safari et al., 2021).

There are other projects that are carried out yearly and follow the trends of the modern world in Russia, one of which is the development of conceptual approaches for the transformation of the transport sector into a low-carbon development in order to identify and reduce risks to economic development in the Russian Federation. They only have a time frame of until 2035 (Trofimenko et al., 2020).

Despite worries about its effect on the need for hydrocarbon fuels and its reliance on imported models, Russia's burgeoning electric vehicle (EV) sector exhibits promise. A developed local market with clear demand prospects and few institutional impediments is essential to luring foreign manufacturers and easing the entry of EVs into the Russian market. By approving a Concept for its production and usage through 2030, the Russian

government has taken action to assist the development of the electric road transport industry. With few EVs sold and a tiny selection of models available, the EV market is still in its infancy (Semikashev et al., 2022).

Regarding electric vehicles, it is important to note that there are only 6,000 of them in Russia. However, when compared to other European cities, Moscow, the capital of the Russian Federation, has the most electric-powered public transportation, including trolleybuses and buses. However, the volume of the above mentioned transport is rising every year. And the Russian Federation's administration is paying particular attention to this issue, which is part of its global strategy at the moment (Rakov et al., 2020).

Additionally, Russia has no customs duties on the import of electric vehicles when we discuss charging stations and tariffs while importing. And this demonstrates unequivocally that there is a state-stimulated demand for electric automobiles.
In the upcoming years, the infrastructure for the network of electric vehicle charging stations will also grow dramatically (Zhukovskiy et al., 2020).

Let's talk about the cars themselves. The vehicles were scheduled for maintenance during an expected lifetime of 150,000 km, which included replacing several tyres, lubricant, and brake pads (every 30,000 km), one entire battery, and 10% of the outer body panels (due to impact damage). That is important to note, on the one hand. All of them must be taken into account, and if at this time we only take into account the existing location without taking into account any of the additional costs listed before, a sustainable shift won't be as successful. For this reason, every expense associated with electric vehicles must be taken into consideration. For instance, just as traditional vehicles need petrol, electric vehicles required power, therefore consideration must be given to the cost of electricity (Raugei* & , Allan Hutchinson, n.d.2018).

The daily existence of an individual depends on electricity. And let's take it that even while it is more expensive in the nations where the current research is taking place, there are still many benefits, such as the ability to generate electricity from solar power at home, which may assist both the environment and save money. There are several ways to produce it, including thermal power plants, hydropower, nuclear power, solar power, wind power, etc. Any given country's ability to generate electricity depends on the resources that are present there. Coal and natural gas play a significant role in the scenario for global power generation. When compared to non-renewable fossil fuel sources, the share of renewable power generation sources is substantially lower.

The majority of decision-makers and energy stakeholders are aware that they must set goals that are both realistic and difficult if they are to make any real progress on energy efficiency (Rietmann & Lieven, 2019). The use of electricity for transportation is one of the primary ways to use or discover a technique of using electric vehicles sufficiently. However, it should be noted if the electrical source is clean. The countries may have a distinct economic advantage thanks to their emphasis on sustainability and energy efficiency, particularly in the small company sector (Rietmann & Lieven, 2019).

Russia's switch to electric vehicles is essential for combating climate change and global warming. Energy efficiency, the modernisation of power systems, and the transition to a carbon-free economy are priorities for governments everywhere (Zhang et al., 2019). Despite difficulties like antiquated infrastructure and ineffective management, the Russian energy sector has a lot of promise. Key actions include promoting environmentally friendly energy usage and expanding distributed generation. Russia's economy is primarily dependent on energy exports, particularly oil. For a sustainable future, Russia must migrate to electric vehicles and renewable energy sources, and steps are being taken to modernise the industry and boost energy effectiveness (Strielkowski et al., 2021).

One crucial part of encouraging sustainable and low-carbon development in the transport industry in Russia is the switch to electric vehicles. By 2030, compared to 2011, the government wants to cut greenhouse gas (GHG) emissions from several forms of transportation (Liu et al., 2020). A long-term prognosis for the growth of the transport sector has been developed to address this. It entails identifying GHG emission indicators for various modes of transportation, performing quantitative analyses of emissions from

different modes of transportation and the road building sector, and establishing goals for lowering emissions through workable solutions (Makarov et al., 2020). Russia can advance in lowering GHG emissions and enhancing the environmental sustainability of its transport sector by analysing and putting into practise low carbon transport initiatives utilising these metrics (Trofimenko et al., 2018).

4. Conclusions

In conclusion, the switch to electric vehicles (EVs) in Russia and Indonesia is a critical step in decreasing carbon emissions and mitigating the effects of global warming. Both nations have recognised the value of green technology and have taken steps to encourage the use of electric vehicles. To hasten the transition, however, there are still many difficult issues that must be resolved.

Given that Indonesia is one of the world's top emitters of carbon dioxide (CO2), the need to cut emissions is urgent. The government has made a commitment to lowering emissions and has put laws and regulations in place to encourage the development of EVs. However, barriers to widespread EV adoption include limited price, hazy national rules, and poor public infrastructure. Many prospective purchasers still find electric vehicles to be out of their price range, raising questions about their affordability. The delayed development of charging infrastructure and the absence of clear and consistent rules on EV subsidies also restrict the expansion of the EV market. Indonesia must concentrate on developing encouraging legislation, expanding the network of charging facilities, and encouraging homegrown EV production in order to overcome these obstacles.

In contrast to its vast auto fleet, Russia is lagging in the development of electric vehicles. The government has authorised a plan to enhance infrastructure and production of EVs in the upcoming years despite the fact that there are just a few registered electric vehicles. This shows that the administration understands the significance of EVs. A important step has been taken to encourage EV adoption in Russia with the Concept, which specifies the objectives for EV production and charging infrastructure. However, there remain barriers to mainstream acceptance, including a lack of public awareness and a shortage of EV vehicles. To increase the number of EV models available on the market, Russia must give priority to awareness efforts, encourage consumers with tax breaks and subsidies, and work with foreign partners.

In order to encourage the adoption of EVs, both nations can benefit from sharing their experiences and best practises. While Russia may learn from Indonesia's concentration on domestic production and encouraging EV purchases, both countries can gain from each other's attention on legislative measures and infrastructure development. In both countries, incentive programs—such as tax incentives and favourable policies—play a critical role in promoting the usage of EVs. To ensure that these programmes are effective in facilitating the transition, they must be efficiently executed and regularly assessed.

The widespread use of EVs also depends on technological developments and innovations in battery technology. Electric vehicles' batteries are a key component, and improvements in battery technology can allay worries about range anxiety and charging times. By offering more effective and inexpensive solutions, ongoing battery research and development as well as partnerships with international partners help hasten the transition to EVs. While there has been progress in the switch to electric vehicles in Indonesia and Russia, there is still work to be done in terms of developing policies, infrastructure, and technology to overcome the obstacles and speed up the adoption of EVs. The governments of both nations should give priority to putting supportive legislation into place, providing incentives for EV purchases, enhancing the infrastructure for charging EVs, and fostering partnerships with foreign nations. Indonesia and Russia can pioneer the way for a sustainable and environmentally friendly future in the transport industry by tackling these issues and putting comprehensive strategies into place.

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