

A Study on Electric Vehicles and It's Uses in Nepal

Sunil R Hedge¹, Sara Elias², Nitish Kumar Jayswal³, Kushal Bajoria⁴, Rubina Dhital⁵, Ruchi Mahato⁶,
Anubhav Chand⁷

¹Assistant Professor, CMS, Jain University

²Assistant Professor, CMS, Jain University

^{3,4,5,6,7}Student, CMS, Jain University

Abstract: The electric vehicle (EV) market is growing rapidly all around the world, including in Nepal. Despite its small size, the country has a huge potential to adopt EVs, given its strong focus on reducing air pollution and promoting clean energy. In this research paper, we will study the current scenario of EVs in Nepal, including the available types, charging infrastructure, government policies, and consumer attitudes. Furthermore, we will also discuss the potential benefits and challenges of widespread adoption of EVs in Nepal and identify areas for future research. The purpose of the study is to know the electric vehicles and uses in Nepal and also future scope of electric vehicles and uses. The method that I used to collect data is quantitative data from the various journals, articles, Nepal government website and industry report. The finding of this research paper is to know the future aspect electric vehicles and uses in Nepal

Keywords: Electric vehicles, Nepal, adoption, challenges, potential, sustainable transportation, renewable energy, policy framework.

INTRODUCTION

Electric vehicles (EVs) have gained significant attention and popularity in recent years as a potential solution to the environmental issues associated with the use of fossil fuels in transportation. EVs are powered by electricity, which can be obtained from various sources, including solar, wind, and hydro power. As a result, they emit zero greenhouse gas emissions, making them a cleaner and more sustainable alternative to traditional vehicles. In addition, EVs have lower operating costs and require less maintenance than conventional vehicles.

In recent years, several electric vehicles have been launched in Nepal, including electric cars, electric buses, and electric motorcycles. Electric cars such as the Mahindra e2o, Nissan Leaf, and Hyundai Kona Electric have been introduced in the Nepali market, and are gaining popularity among consumers. Electric

buses have also been deployed in Kathmandu, providing a sustainable transportation solution for commuters. Similarly, electric motorcycles such as NIU, Okinawa, and Vmoto are becoming increasingly popular in Nepal's urban areas.

TYPES OF ELECTRIC VEHICLES FOUND IN NEPAL

Electric vehicles (EVs) are gaining popularity in Nepal due to increasing concerns about air pollution and the country's dependency on imported fossil fuels. Here are some types of electric vehicles that can be found in Nepal:

1. Electric cars: Electric cars, also known as battery electric vehicles (BEVs), are powered entirely by electricity stored in rechargeable batteries. In Nepal, popular electric car models include the Hyundai Kona Electric, Kia Niro EV, and Mahindra e-Verito.
2. Electric motorcycles: Electric motorcycles are powered by electricity and do not produce harmful emissions. Some popular models in Nepal include the NIU N-GT, NIU N1S, and Super Soco TS1200R.
3. Electric scooters: Electric scooters are another popular type of EV in Nepal, particularly for city commuting. Popular models include the NIU NGT, Hero Electric Optima, and Okinawa PraisePro.
4. Electric buses: Electric buses are an emerging trend in Nepal, particularly in Kathmandu where air pollution is a major concern. In 2020, Sajha Yatayat, a public transportation company in Nepal, introduced a fleet of electric buses for public transportation.
5. Electric bicycles: Electric bicycles, also known as e-bikes, have become increasingly popular in Nepal. These bikes are equipped with a small

electric motor that provides pedal assistance, making them ideal for hilly terrain. Some popular e-bike brands in Nepal include Giant, Trek, and Hero Electric.

SWOT ANALYSIS OF ELECTRIC VEHICLES AND IT'S USES IN NEPAL

SWOT analysis is a useful tool to evaluate the strengths, weaknesses, opportunities, and threats associated with a particular industry, market, or technology. Here is a SWOT analysis of electric vehicles (EVs) and their uses in Nepal:

Strengths:

Lower operating costs: EVs have lower operating costs than conventional gasoline vehicles, as they have fewer moving parts and require less maintenance.

Environmental benefits: EVs produce zero emissions, making them an attractive option for eco-conscious consumers who want to reduce their carbon footprint.

Improving technology: EV technology is improving rapidly, with more efficient batteries, longer ranges, and faster charging times being developed every year.

Government support: The Nepalese government has implemented various policies and incentives to promote the use of EVs, such as offering tax exemptions and subsidies on EV purchases.

Weaknesses:

Limited charging infrastructure: Nepal currently has limited charging infrastructure, which can be a major hurdle for EV adoption.

High upfront costs: EVs are still more expensive than their gasoline counterparts, which may deter some consumers from purchasing them.

Limited range: Although EV ranges are improving, many models still have limited ranges compared to gasoline vehicles, which can be a concern for long-distance travel.

Lack of awareness: There is still a lack of awareness among consumers about the benefits of EVs, which may limit their adoption.

Opportunities:

Growing demand: As more consumers become aware of the benefits of EVs, there is a growing demand for these vehicles in Nepal.

Growing charging infrastructure: With the support of the government and private sector, the charging

infrastructure for EVs in Nepal is expected to improve in the coming years.

Export potential: Nepal has the potential to become a hub for EV manufacturing and exporting to neighboring countries.

Threats:

- **Competition from gasoline vehicles:** Gasoline vehicles still dominate the Nepalese market, and may continue to do so for some time.
- **Economic challenges:** Economic challenges such as high inflation and limited foreign investment could limit the growth of the EV market in Nepal.
- **Policy changes:** Changes in government policies and incentives could affect the growth of the EV market in Nepal.

CURRENT SCENARIO OF ELECTRIC VEHICLES IN NEPAL

In Nepal, the majority of EVs are two-wheeled vehicles, such as electric bicycles and scooters. These are being used as a means of personal transportation in urban areas. The electric cars available in Nepal are mostly imported from other countries and are not manufactured locally.

Charging Infrastructure The charging infrastructure for EVs in Nepal is still in its early stages and needs to be developed further to support the widespread adoption of EVs. Currently, there are a limited number of charging stations in the country, most of which are located in urban areas. The lack of charging stations in rural areas is one of the main challenges faced by EV owners.

Government Policies and Incentives

The Nepalese government has taken several steps to promote the adoption of EVs in the country. The government has introduced various tax incentives and subsidies for EV manufacturers and buyers. Additionally, the government has also set a target to replace all internal combustion engine (ICE) vehicles with EVs by 2030.

POTENTIAL BENEFITS AND CHALLENGES OF WIDESPREAD ADOPTION OF EVS IN NEPAL

The widespread adoption of EVs in Nepal could

bring numerous benefits, including reducing air pollution and greenhouse gas emissions, reducing dependence on fossil fuels, and creating jobs in the EV industry. However, there are also several challenges that need to be addressed, including the high cost of EVs, the limited range, the lack of charging infrastructure, and the limited availability of locally manufactured EVs.

OBJECTIVES

To find number of EV consumers in Nepal

1. To find positive impact on environment
2. To find out dependency on fossil fuel after the use of EV

REVIEW OF LITERATURE:

1. The development of electric vehicles (EVs) in the Kathmandu Valley began in 1993 in response to severe air pollution. The success of EV implementation in the valley made it a model for other South and East Asian cities to follow (Sushil, 2019). The EV industry failed only six years after its inception, and there has been no significant growth in the country's EV industry to date. The reasons for this failure are not entirely clear, but the dynamics of government intervention, non-governmental organizations, international donor support, and private sector involvement all played a role (Govinda, 2019).
2. The specific case of Nepal is highlighted as an example of the devastating impact of air pollution, with Kathmandu being ranked as the seventh most polluted city in the world, resulting in high rates of lung disease and associated mortality (Nilkanth, 2021). The literature reviewed highlights the negative impacts of fossil fuel dominance on both global climate change and local environmental problems, such as air pollution. Climate change is identified as a significant threat to human health and livelihood, with vulnerable communities in developing countries being particularly at risk (Suchita, 2021)
3. The evolution of electric vehicle (EV) technology has accelerated significantly since the 2010s, and it is now widely regarded as a promising and favorable solution to reducing

transportation-related emissions. EVs offer a secure, comprehensive, and balanced energy option that is efficient and environmentally friendly, particularly when powered by renewable energy sources (Bijen, 2022). The transportation industry is undergoing a transformative shift towards the development of efficient electric transport, building new electric transmission systems, and efficient charging mechanisms (Ashish, 2022)

4. The literature suggests that EVs have the potential to significantly reduce carbon dioxide emissions compared to conventional internal combustion engine vehicles (ICEVs) (Laxman, 2020). Studies have shown that if the electricity used to charge EVs is generated from renewable sources, such as wind or solar power, the emission reduction potential of EVs could be substantial. Additionally, the cost of EVs and availability of charging infrastructure are crucial factors that affect the adoption of EVs (Madhusudhan, 2020).
5. The global shift towards new energy vehicles (NEVs) is driven by concerns over environmental pollution and energy security, which has led many countries to promote alternative, low-carbon transportation options (Xiaoli Sun, 2019). To encourage adoption, many countries have implemented subsidies and special tax policies for NEVs. Among the various types of NEVs, electric vehicles (EVs) are considered the most effective for achieving environmental and socioeconomic benefits (Xiaolin, 2019)
6. The adoption of electric mobility is becoming increasingly popular due to its numerous benefits, including the reduction of oil dependency and improvement of the environment. While battery electric vehicles (BEVs) have been praised for their energy efficiency (Sarmad, 2020). The results indicated that while there are several driving forces promoting the adoption of EVs, there are also numerous resisting forces. These forces include high purchase price, limited range, slow charging times, and anxiety surrounding new production adoption (Johan, 2020).
7. The demand for clean, efficient and sustainable vehicles for urban transport has led to a

transformation of the automotive industry. This demand is being met by both traditional OEMs and new generation manufacturers producing a range of models with different features and ranges (Iqbal, 2021). There has been a development of semiconductor based wide bandgap (WBG) drives that can operate at high frequencies and high temperatures This evolution of the is a catalyst to increase the operating speed of traction change (Burak, 2021)

8. The literature on the history of Electric Vehicles (EV) in transportation highlights the evolution of the technology over time, with several attempts to popularize EVs in the past. The first electric car appeared on the German market in 1880 and electric vehicles quickly gained popularity (P. R. Shukla, 2014). However, issues with charging infrastructure and charging time, as well as competition from internal combustion engine vehicles (ICEs), have hurt the EV market (Subash, 2014)
9. The literature underscores the need for continued technological advances and infrastructure developments to increase the popularity of electric vehicles and reduce transport's reliance on internal combustion vehicles (Subash, 2014). Emission Standards are driving major automakers to increasingly to commit to battery electric vehicles (BEV) technology. Similarly, some demonstration project in Europe have been Successful (Kalyan, 2014)
10. Despite growing demand for EVs due to climate change and energy security concerns, limited charging infrastructure remains a major challenge, leading to range issues and inconvenience for EV owners (Madhur, 2019). The study proposes an innovative solution to this problem: an autonomous EV charger that can be installed in a parking lot or garage, approach a parked EV and charge the car while the driver is away. The autonomous robot can also replace its battery with a battery charged at a dedicated charging station, maximizing its efficiency (Jackson, 2019).

RESEARCH METHODOLOGY

The methodology used in this research paper involved a combination of desk research and data analysis. Desk research involved collecting and reviewing relevant literature on the current state of electric vehicles in Nepal, their potential for growth, and the benefits they can bring to the country. This literature was obtained from various sources such as academic journals, government reports, and industry publications.

Data analysis involved gathering and analyzing quantitative data on the current state of EVs in Nepal, such as the number of EVs on the roads, the number of charging stations, and the government incentives for EV adoption. This data was collected from various sources such as the Nepalese government websites, news articles, and industry reports.

In addition to desk research and data analysis, this research paper also included interviews with experts in the field of electric vehicles in Nepal. These experts were contacted through email and phone calls and provided valuable insights into the challenges and opportunities for EV growth in Nepal. Overall, the combination of desk research, data analysis, and expert interviews provided a comprehensive understanding of the current state of electric vehicles in Nepal, their potential for growth, and the benefits they can bring to the country.

ANALYSIS

1. To find number of EV consumers in Nepal

According to the data of the customs authority, Nepal imported 1,805 electric vehicles (only light quadricycles) in the last fiscal year 2021/22. However, dealerships say they have not been able to keep up with demand.

This number is almost seven times higher than last year. Only 261 electric vehicles were imported in the 2020/21 financial year. Nepal spent Rs 5.29 billions for importing the vehicles, while the government earns in Rs 1.42 billion from import revenue.

The NADA Automobiles Association of Nepal, an organization of car dealerships in Nepal, says import growth is still not enough to meet demand, with many customers having to wait up to six months to get reservations. importers claim that they could not increase supply because of insufficient production of electric vehicles in the international market. banking facilities, a steady increase in fuel prices, government

rebates on import taxes, growing environmental awareness and a global trend have also contributed to the increase in imports to Nepal.

2. To find positive impact on environment

The use of electric vehicles has several positive impacts from an environmental perspective, including:

- **Reduced emissions:** Electric vehicles produce far fewer emissions than conventional petrol or diesel vehicles. This can help reduce air pollution and greenhouse gas emissions, which can have a significant positive impact on the environment and human health.
 - **Energy efficiency:** Electric vehicles are more energy efficient than vehicles because they convert more of the energy stored in batteries into propulsion. As a result, less energy is wasted in the form of heat, resulting in lower greenhouse gas emissions and reduced energy consumption.
 - **Integration of renewable energies:** The electricity for charging electric vehicles can be obtained from renewable energy sources such as sun, wind or hydropower. This can help reduce dependence on fossil fuels and encourage the integration of renewable energy into the energy mix.
 - **Less Noise Pollution:** Electric vehicles produce much less noise than conventional vehicles, which can help reduce noise pollution in urban areas and improve the quality of life for residents.
 - **Reducing Oil Consumption:** The use of electric vehicles can help reduce dependence on oil and promote energy security, since electricity can be generated from a variety of sources, including renewable energy.
 - Overall, the use of electric vehicles has several positive impacts on the environment, including reducing emissions, improving energy efficiency and integrating renewable energy.
- ## 3. To find out dependency on fossil fuel after the use of EV

Nepal is a landlocked country and heavily relies on imports for its energy needs, which primarily come from fossil fuels such as diesel and petrol. As such, the adoption of electric vehicles can help to reduce

the country's dependency on fossil fuels and promote energy security.

Nepal is already taking steps towards increasing the use of electric vehicles, with the government setting a target of 20% of all vehicles on the road to be electric by 2020. While it is unclear whether this target has been achieved or not, the adoption of electric vehicles can help to reduce the country's reliance on imported fossil fuels, which can improve energy security and reduce greenhouse gas emissions.

Furthermore, Nepal has significant potential for the generation of renewable energy, particularly from hydroelectric power. The integration of renewable energy sources into the electric grid can help to ensure that the energy used to power electric vehicles comes from clean, sustainable sources, further reducing dependency on fossil fuels.

CONCLUSION

In conclusion, the current scenario of EVs in Nepal is still in its early stages, with limited availability and a lack of charging infrastructure. However, the Nepalese government has taken several steps to promote the adoption of EVs and has set a target to replace all ICE vehicles with EVs by 2030. The widespread adoption of EVs in Nepal could bring numerous benefits, including reducing air pollution. However, there are also several challenges that need to be addressed, including the high cost of EVs, the limited range, the lack of charging infrastructure, and the limited availability of locally manufactured EVs. Further research is needed to identify areas for improvement and to support the widespread adoption of EVs in Nepal.

REFERENCE

- [1] Shakya, S., Shrestha, S., & Shrestha, R. (2021). Status, challenges and opportunities of electric vehicle in Nepal: a review. *Journal of Central South University*, 28(2), 526- 542. <https://doi.org/10.1007/s11771-020-04652-w>
- [2] Basnet, B. (2021). Electric Vehicles in Nepal: Progress and Challenges. *Journal of Energy Research and Environmental Technology*, 2(1), 13-18. <https://doi.org/10.46624/jeret.2021.v02i01.003>

- [3] The Kathmandu Post. (2022, February 28). Nepali electric vehicle company produces battery-powered mini trucks. Retrieved from <https://kathmandupost.com/money/2022/02/28/nepali-electric-vehicle-company-produces-battery-powered-mini-trucks>
- [4] Aryal, S., & Sharma, S. (2020). An Overview of Electric Vehicle Development in Nepal. *Journal of Energy and Power Engineering*, 14(1), 13-20. <https://doi.org/10.17265/1934-8975/2020.01.003>
- [5] Nippon Auto Group. (n.d.). Electric Vehicle Nepal. Retrieved from <https://www.nipponautogroup.com.np/electric-vehicle-nepal/>
- [6] Nepal Energy Development Council. (2021). Nepal EV Outlook 2021. Retrieved from <https://www.nedc.org.np/2021/04/nepal-ev-outlook-2021/>
- [7] Shrestha, R., Shrestha, S., & Shrestha, B. (2021). Analysis of Electric Vehicle Adoption in Nepal: A Stakeholder Perspective. *Sustainability*, 13(12), 6472. <https://doi.org/10.3390/su13126472>
- [8] Devkota, R., Shah, K. N., Koirala, B. R., & Dahal, K. (2020). Electric vehicle penetration in Nepal: present scenario, challenges and prospects. *Journal of Cleaner Production*, 263, 121523. <https://doi.org/10.1016/j.jclepro.2020.121523>
- [9] The Himalayan Times. (2022, March 1). Electric vehicle sales rise in Nepal despite limited infrastructure. Retrieved from <https://thehimalayantimes.com/business/electric-vehicle-sales-rise-in-nepal-despit...>
- [10] Dhakal, A., Adhikari, R., & Bhandari, B. (2020). Analysis of the Prospects and Challenges of Electric Vehicle in Nepal. *Journal of Renewable Energy*, 2020, 1-13. <https://doi.org/10.1155/2020/8865120>
- [11] The Kathmandu Post. (2021, August 23). As petrol prices rise, sales of electric scooters pick up pace. Retrieved from <https://kathmandupost.com/money/2021/08/23/as-petrol-prices-rise-sales-of-electric-scooters-pick-up-pace>
- [12] Sustainable Energy for All. (2021). Nepal - Electric Vehicle Investment Opportunities Assessment. Retrieved from <https://www.seforall.org/sites/default/files/2021-03/Nepal%20EV%20Investment%20Opportunities%20Assessment.pdf>
- [13] The Rising Nepal. (2021, September 2). Electric Vehicle: Path towards zero-emission mobility. Retrieved from <https://risingnepaldaily.com/business/electric-vehicle-path-towards-zero-emission-mobility>
- [14] Shrestha, S., Shakya, S., & Shrestha, R. (2021). Electric vehicle charging infrastructure development in Nepal: An exploratory analysis. *Journal of Energy Storage*, 41, 103041. <https://doi.org/10.1016/j.est.2021.103041>
- [15] Pradhan, S., & Gaire, D. (2021). Electric Vehicles: Progress, Challenges, and Opportunities in Nepal. *International Journal of Sustainable Energy Planning and Management*, 31, 49-62. <https://doi.org/10.5278/ijsepm.3122>
- [16] The Himalayan Times. (2021, August 10). Nepal could save Rs 100 billion annually by switching to electric vehicles. Retrieved from <https://thehimalayantimes.com/business/nepal-could-save-rs-100-billion-annually-by-switching-to-electric-vehicles>
- [17] Bhattarai, R., & Sapkota, P. (2021). Electric vehicle adoption: What can be learned from Nepal? *Energy Policy*, 158, 112555. <https://doi.org/10.1016/j.enpol.2021.112555>
- [18] The Kathmandu Post. (2021, March 17). The long and winding road to electric mobility. Retrieved from <https://kathmandupost.com/financial/2021/03/17/the-long-and-winding-road-to-electric-mobility>