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Reducing Carbon Emissions Through Bike-Sharing Model: A Case Study of Yulu

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ABSTRACT
The importance of studying Yulu from a climate change perspective lies in the potential impact that the company's operations can have on reducing carbon emissions and promoting sustainable transportation.

_VO**IS Planet** portal primarily focuses on environmental sustainability covering various aspects: **Low carbon, Renewable energy usage** and **E-waste management.**

It is aimed at aggregating and helping co-create knowledge and information on environmentally responsive behaviours and concurrently pursuing result-oriented social media campaigns to encourage people and specifically the youth, to take proactive actions in promoting sustainable lifestyle and creating a positive impact on the environmental ecosystem in their surroundings

By: _VO**IS Planet**

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1. INTRODUCTION

Yulu is an Indian company that provides electric scooter-sharing and bicycle-sharing services in urban areas. The company was founded in 2017 with the aim of providing a sustainable and eco-friendly mode of transportation that is affordable and convenient for users. Yulu's services have gained popularity in India due to the increasing demand for affordable and sustainable transportation solutions.

The importance of studying Yulu from a climate change perspective lies in the potential impact that the company's operations can have on reducing carbon emissions and promoting sustainable transportation. Transportation sector is one of the largest contributors to greenhouse gas emissions, and traditional modes of transportation using non-renewable energy-based fuels, such as cars and motorcycles, can have a significant impact on air quality and the environment. By offering a shared electric bike service, Yulu has the potential to reduce the carbon footprint associated with transportation and promote sustainable transportation options.

By examining Yulu's carbon footprint, usage patterns, impact on air quality, partnerships and collaborations, and future plans and scalability, this case study provides valuable insights into the potential impact of Yulu's operations on promoting sustainable transportation and mitigating the impact of climate change.

2 BACKGROUND AND CONTEXT

2.1 THE TRANSPORTATION SECTOR'S ROLE IN CLIMATE CHANGE

The transportation sector plays a crucial role in Greenhouse Gas (GHG) emissions, contributing approximately 17% of global GHG emissions. According to the International Energy Agency (IEA), road transportation is responsible for about three-quarters of these emissions, with the remainder coming from aviation, shipping, and rail transportation. The primary GHG emitted by the transportation sector is carbon dioxide (CO2), which is produced from the combustion of fossil fuels such as gasoline, diesel, and aviation fuel.

The primary driver of emissions from transportation is the increasing use of personal vehicles in developed and developing countries. The number of cars on the road has increased significantly in recent decades, with the total number of cars worldwide exceeding 1.4 billion in 2023. The growth in vehicle use has led to an increase in demand for fossil fuels, with transportation accounting for over 50% of global oil consumption. Furthermore, the use of aviation and shipping for goods and people transport has also increased, contributing to GHG emissions.

Climate change poses significant risks to the global environment, including rising sea levels, more frequent and severe weather events, and damage to ecosystems and biodiversity. Mitigating climate change requires a reduction in GHG emissions, and the transportation sector must play a critical role in reducing these emissions. The sector can do this by adopting cleaner fuels, improving fuel efficiency, and implementing alternative modes of transportation, such as public transit, cycling, and walking.

One solution to reducing GHG emissions from the transportation sector is to promote the use of electric vehicles (EVs). EVs use batteries that can be charged from renewable sources like solar or wind power, reducing their carbon footprint. However, due to the lack of infrastructure, many EVs are currently charged from household electricity, which often comes from coal-based plants. Furthermore, advancements in battery technology have made EVs more practical and affordable, with the cost of batteries falling significantly over the past decade.

The Indian government has launched several such initiatives to promote electric vehicles (EVs) in India. For example, under the new GST system, GST on EVs is reduced from 12% to 5% against the 28% GST rate with up to 22% for conventional vehicles. The government has also proposed exemption of registration fees for battery-operated/electric vehicles. Additionally, there are purchase incentives provided by both central and state governments which may be as consumer capital subsidies or demand generation incentives.

Another solution is to promote the use of public transportation, cycling, and walking. These modes of transportation are environment-friendly and can significantly reduce GHG emissions. Furthermore, governments can invest in infrastructure to make cycling and walking more accessible and safer for commuters. Developing countries can also implement mass transit systems such as bus rapid transit, which can provide low-cost and efficient transport.

Improving the fuel efficiency of vehicles is another way to reduce GHG emissions. The adoption of fuel-efficient technologies such as hybrid vehicles and improved engine efficiency can significantly reduce the amount of fuel consumed by the transportation sector. Furthermore, the use of alternative fuels such as biofuels, hydrogen, and natural gas can also reduce GHG emissions.

2.2 URBANIZATION AND TRANSPORTATION IN INDIA

India is undergoing rapid urbanization with an increasing number of people moving from rural to urban areas. According to the United Nations, India is projected to add 416 million urban dwellers by 2050, making it the fastest-growing urban population in the world. This rapid urbanization has put pressure on India's transportation infrastructure, which has struggled to keep up with the rising demand.

Urbanization in India has been rapid and uneven. In 1901, only 11% of India's population lived in urban areas. By 2011, the urban population had grown to 31%. However, this growth has not been uniform across the country. While some cities have grown rapidly, others have not. Mumbai, Delhi, and Kolkata are among the largest and fastest-growing cities in India, while smaller cities and towns have grown at a slower pace.

Urbanization has led to an increase in transportation demand in Indian cities. As more people move to cities, there is a growing need for transportation to access employment, education, healthcare, and other services. This has led to an increase in the number of vehicles on the road and the demand for public transportation.

The demand for public transportation has also increased in Indian cities. However, the public transportation system has struggled to keep up with this demand. Many cities have an inadequate public transportation system, which makes it difficult for people to access employment and other services. The lack of reliable public transportation also leads to an increase in the number of private vehicles on the road, exacerbating congestion and pollution.

India's transportation infrastructure is under strain, with the existing systems struggling to cope with the rising demand. Congestion is prevalent on roads and highways, while public transportation frequently falls short of requirements. Furthermore, the transportation infrastructure in numerous Indian cities is outdated and requires modernization.

To address these challenges, the Indian government has launched several initiatives to improve transportation infrastructure. These initiatives include the construction of new highways and the expansion of the metro system in cities like Delhi and Bangalore. The government has also launched programs to promote the use of electric vehicles and improve public transportation services.

3 YULU

3.1 OVERVIEW OF YULU

Yulu, headquartered in Bengaluru, India, is a technology-based mobility platform that facilitates Integrated Urban Mobility, encompassing public and private modes of transportation. Established in 2017, the company operates in six cities across India, including Bangalore, Pune, Mumbai, Bhubaneswar, Ahmedabad, and Delhi.

To enable seamless mobility, Yulu employs Micro Mobility Vehicles (MMVs) such as electric bikes and scooters, available to rent through a user-friendly mobile app. The company leverages IoT, machine learning, AI, and cloud computing to provide a hassle-free experience. Their dock-less vehicles can be rented with ease on a pay-per-use basis, facilitated by IoT technology. Users can effortlessly reserve a ride using the iOS or Android app, and the smart bikes can be unlocked with QR codes.

Yulu aims to transform urban mobility in India into a shareable, sustainable, and seamless experience. The company has partnered with various public and private entities, including metro stations, bus stops, corporate parks, and malls, to provide convenient access to its vehicles.

3.2 YULU'S BIKE-SHARING MODEL

Yulu aims to reduce traffic congestion, air pollution, and greenhouse gases by providing an eco-friendly alternative to private vehicles and cabs through shared micro-mobility (SMM). SMM involves the use of small and light vehicles like bikes, e-bikes, e-scooters, and e-mopeds for short-distance trips in urban areas, and it has emerged as a promising solution for addressing the challenges of urban mobility.

Yulu uses MMV (Micro Mobility Vehicles), which are custom designed for Indian roads and provide better access and convenience to take a ride right when you need it.

Every bike has an IoT device, making it trackable, and the device sends data to the server every five minutes. Yulu is available usually near metro stations and bus stations, and users can locate, unlock, ride, and park Yulu vehicles at designated zones near public transport hubs, office complexes, residential areas, and other places of interest.

Yulu's bikes are electric vehicles that run via battery, and the electric bikes are recharged by swapping batteries at Yulu energy stations that are powered by solar panels. Yulu launched its electric bike in February 2019, which is a micro, battery-powered vehicle that helps users commute longer distances at a maximum speed of 25 km per hour. The bike is below standard regulations in terms of size and speed, allowing users to ride it without a license or helmet (although Yulu recommends that users wear a helmet for their own safety), making the vehicle accessible and comfortable.

Yulu is a very affordable mode of transportation as it has a base fare of 10 rupees and charges an additional 10 rupees for every 10 minutes.

Yulu also offers last-mile delivery services for e-commerce and food delivery platforms using its vehicles. The bikes that Yulu operates are fitted with a secure lock system, and if stolen, they can be traced almost immediately. The Yulu platform works on a pay-per-use model, from renting to returning to paying, everything is on a Do-It-Yourself basis.

"I found these bikes to be light, easy to navigate and very comfortable. The upright handles and classic saddle seats automatically create a straight seating position. The bikes have a unisex frame and come in a standard bright blue shade for easy identification. These are single speed hybrid commuter models available for use 24×7 and 365 days a year. A basket fitted in front can come very handy but are definitely not designed to accommodate load. Both front and rear wheels are protected with fenders and a lock situated on the back "I have the freedom to get around & swiftly cover short distances with Yulu".

Vijay Malhotra
Blogger
Pedalandtringtring.com

"I have been in Bangalore, for the past 3 weeks and among all things, this is the best things in Bangalore I have recently explored. It's been some 43 rides and almost 200 km for me with #yulu.I have to say I am blown away by the utility of it and the potential/ability to transform the short distance or last-mile commute and with that the positive impact on our carbon footprint. Aren't we fed up of our cities taking more than 50% of the spots in those top 10/xx polluted cities in the world? I hope the state governments realize it's potential soon enough and start integrating it in their civic plans."

Rakesh Khajuria
Associate Director
Marketing at Grofers, Bengaluru

3.3 REACH, SCALE-UP & PARTNERSHIPS

Yulu offers sustainable transportation solutions in India. Since its launch in 2017, the company has rapidly expanded its services to several cities, including Pune, Mumbai, Bhubaneswar, Ahmedabad, Delhi, and Bangalore, where it first started as a bicycle-sharing service.

The company has made significant progress in promoting sustainable transportation solutions in India by introducing its electric vehicle sharing model in 2019, which has grown significantly in the past few years. Yulu currently has a fleet of over 10,000 electric vehicles and more than 3 million users, making it one of India's largest bicycle-sharing and electric scooter-sharing.

Yulu has raised a total of $118.2M in funding over 7 rounds. Their latest green funding was raised in Nov 2022 where they raised $9 million through debt financing from US International Development Finance Corporation (DFC). Some of their investors include U.S. International Development Finance Corp, Magna International, Bajaj Auto Limited, and Blume Ventures.

Yulu is almost profitable from the standpoint of unit economics, and expects to be operationally profitable by the end of March 2023. Yulu is expecting to generate $100 million in revenues this financial year.

In November 2022, Yulu signed an MoU with Government of Karnataka to invest 1200 crore rupees and create 7000+ jobs by deploying 1 lakh electric vehicles in Karnataka.

Apart from bicycle-sharing and electric scooter-sharing services, Yulu has also launched a new service called Yulu Miracle, aimed at reducing the carbon footprint of last-mile delivery in urban areas. This service provides electric cargo bikes that promote sustainable transportation solutions in the logistics sector.

Yulu has entered into several partnerships and collaborations with local governments, non-profit organizations, and other stakeholders to promote sustainable transportation and reduce the impact of climate change, some of which include:

- Delhi Metro Rail Corporation (DMRC)
- Mumbai Metropolitan Region Development Authority (MMRDA)
- Local city authorities like the Bruhat Bengaluru Mahanagara Palike (BBMP), Directorate of Urban Land Transport (DULT), and Namma Metro (BMRCL), Capital Region Urban Transport (CRUT), and Pune Municipal Corporation (PMC).
- Co-living spaces like CoLive, RentMyStay, Zolo, and CoHo for commuting.
- Delivery services such as Uber and Swiggy

Yulu has secured investments from some large companies. In addition, Yulu is actively exploring new markets and partnerships in order to expand its reach and scale-up even further.

In conclusion, Yulu's partnerships and collaborations with local governments, non-profit organizations, and other stakeholders are critical to its success in promoting sustainable transportation and mitigating the impact of climate change. These partnerships and collaborations have the potential to make a significant impact on reducing carbon emissions and improving air quality in urban areas while promoting a healthy and active lifestyle.

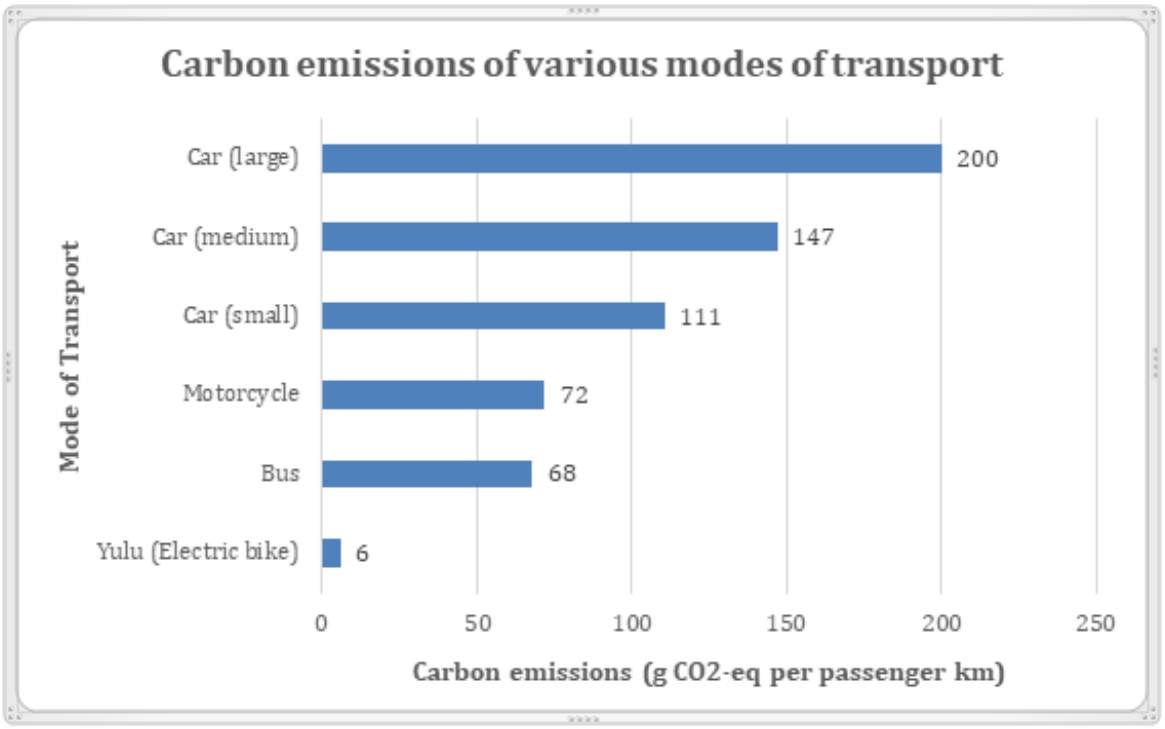
Yulu has ambitious plans for the future. It intends to expand its operations to other cities in India.

4 IMPACT

Yulu has made a significant impact on the Indian transportation sector by offering an affordable, convenient and eco-friendly alternative to conventional modes of transport.

1. **Reduction in greenhouse gas emissions:** Yulu's bicycles and electric scooters are powered by clean energy sources and emit very little greenhouse gas emissions. By promoting the use of these vehicles, Yulu is contributing to reducing the carbon footprint and air pollution in cities. Since Yulu began its operations, Yulu has prevented over 15,000 metric tons of CO2 emissions. This has been calculated by looking at the total mileage covered by Yulu vehicles and what the emissions would have been (based on existing statistics) if that distance was covered by other vehicles that run on fossil fuels.

Below is a graph comparing the carbon emissions of different modes of passenger vehicles per kilometer to that of Yulu's:



As it can be seen, Yulu bikes have very low carbon emissions compared to other modes of transport.

2. **Reduced traffic congestion:** Yulu's bicycles and electric scooters help reduce traffic congestion by providing a faster and more flexible mode of transportation for short distances. This can help reduce the number of vehicles on the road, reducing the amount of emissions produced by cars and other vehicles.
3. **Reduced demand for fossil fuels:** Yulu's bicycles and electric scooters run on electricity, which is generated from renewable energy sources like solar energy. By promoting the use of electric vehicles, Yulu is reducing the demand for fossil fuels and promoting the use of clean energy.

4. **Improved air quality:** Air pollution is a major environmental problem in many cities in India, and Yulu's vehicles help improve air quality by emitting zero pollutants. This can have a positive impact on the health and wellbeing of people living in these cities.
5. **Increased awareness of environmental issues:** By promoting the use of eco-friendly modes of transportation, Yulu is helping to raise awareness of environmental issues and the importance of reducing carbon emissions. This can encourage more people to adopt sustainable practices in their daily lives.
6. **Last-mile connectivity:** Yulu has also addressed the problem of last-mile connectivity in urban areas, which refers to the challenge of reaching one's final destination from a public transportation stop or station. By providing bicycles and scooters for short-term rental, Yulu has made it easier for people to cover the last few kilometers of their journey.
7. **Job creation:** Yulu has created job opportunities for many people, including those who work as mechanics, operators, and customer service representatives. This has had a positive impact on the local economy.
8. **Social impact:** Yulu has also had a positive social impact by providing affordable and accessible transportation options to people from different socio-economic backgrounds. This has helped improve mobility for people who may not have had access to private transportation before.

Overall, Yulu has had a significant impact on the Indian transportation industry, promoting sustainability, reducing traffic congestion, and improving last-mile connectivity. Its success has also paved the way for other companies to enter the shared micro-mobility space in India, which could further accelerate the shift towards sustainable transportation in the country.

5 CONCLUSION

Yulu's carbon footprint is relatively low compared to traditional modes of transportation, such as cars and motorcycles. The usage patterns of Yulu's electric bikes are also encouraging, with users using the bikes for short trips and reducing the overall number of vehicles on the road. The company's impact on air quality is significant, as it promotes the use of electric bikes instead of traditional gasoline-powered vehicles.

Yulu's partnerships and collaborations with local governments, non-profit organizations, and other stakeholders have also been instrumental in promoting sustainable transportation and mitigating the impact of climate change.

Furthermore, Yulu's future plans and potential for scalability have the potential to make a significant impact on mitigating the impact of climate change in the long run. By expanding its operations and developing new products and services, Yulu can provide a convenient and sustainable mode of transportation for commuters, while reducing carbon emissions and improving air quality in urban areas.

Future research on Yulu's operations from a climate change perspective should focus on analyzing the impact of the company's expansion to other cities in India and international markets, as well as the potential for further innovations in technology and partnerships with local governments and other stakeholders. By continuing to study Yulu's operations, we can gain insights into how the company can continue to promote sustainable transportation and mitigate the impact of climate change in the long run.

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