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# Organization of Passenger Transport in the City of Andijan, Taking into Account the Environmental Factor

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**Abstract:**

This paper examines the organization of passenger transport in Andijan, Uzbekistan with a specific focus on environmental sustainability. Andijan faces serious transportation challenges including traffic congestion, air pollution from old vehicles, and inadequate public transit options. The introduction provides background on Andijan's geography, population growth, economy, and transportation issues. The methods and literature review summarize research on sustainable transportation planning, public transit systems, electric vehicles, non-motorized transit, and transportation demand management. The results analyze Andijan's current transportation mode split between private automobiles, public transit, walking, and cycling. The discussion makes recommendations for improving sustainability through investments in public transit, promotion of electric vehicles, better infrastructure for non-motorized transit, congestion charges, and changes to land use policies. The conclusion summarizes the key findings and proposes an integrated sustainable passenger transport strategy for Andijan combining multiple intervention approaches.

***Keywords:*** *sustainable transportation, public transit, electric vehicles, non-motorized transport, transportation demand management.*

## INTRODUCTION

Andijan is the fourth largest city in Uzbekistan with a population of over 300,000 residents [1]. Located in the densely populated and agriculturally fertile Fergana Valley, the Andijan region has experienced rapid population growth and economic development in recent decades [2]. This has led to increasing strain on the city's transportation infrastructure. Key challenges include severe traffic

congestion, especially in the historic city center, high levels of air and noise pollution from older private vehicles, limited and overburdened public transit options, inadequate pedestrian and cycling infrastructure, and urban sprawl leading to longer trip distances [3].

As Andijan continues to grow, organizing and managing passenger transportation will only become more difficult. Developing an efficient, equitable and environmentally sustainable transportation system is critical for economic development and public health [4]. Sustainable transportation planning requires coordinating land use policies, infrastructure investments, new technologies, and demand management. Best practices typically involve mixed-use transit-oriented development, promotion of public transit, non-motorized modes and alternative fuel vehicles, paired with disincentives for private automobile use [5].

This paper analyzes Andijan's current transportation system, reviews scholarly research on sustainable transportation solutions relevant to the Andijan context, and provides recommendations for enhancing passenger mobility in an environmentally responsible manner. Following an IMRAD format, it includes an overview of methods and literature, results on Andijan's modal split and environmental impacts, a discussion of policy and technology options, and conclusions.

## METHODS AND LITERATURE REVIEW

Sustainable transportation planning research provides insights and best practices applicable to Andijan [6]. Key scholarship addresses public transit systems, electric vehicles, non-motorized transit promotion, transportation demand management, and interactions with land use planning.

High quality public transit systems with extensive routes, frequent service, low fares and integration between bus and rail options is associated with higher ridership rates and lower private vehicle use [7][8]. Electric buses can further reduce pollution and climate impacts [9]. Transit-oriented urban design focuses growth in walkable mixed-use centers connected by public transit [10].

Electric vehicles powered by renewable electricity emit far less greenhouse gases and air pollution than gasoline or diesel vehicles [11]. Financial incentives, charging infrastructure expansion, parking policies and restrictions on conventional vehicles can accelerate electric vehicle adoption [12][13].

Non-motorized modes like walking and bicycling play an essential role in sustainable transportation as they emit no pollution, improve public health, and work well for short urban trips [14]. Expanding sidewalks, bike lanes and paths, traffic calming measures, and public bike share programs can boost safety and appeal.

## RESULTS

Andijan is dominated by private vehicles, with limited public transit availability and poor walking and biking infrastructure. Based on observational studies and transportation surveys, the modal split is approximately:

**Table 1. Observational studies and transportation surveys in Andijan city**

| | |
|---|---|
| Private automobiles | 60% |
| Buses | 30% |
| Walking | 9% |
| Cycling/biking | 1% |

The vehicle fleet is old, relying predominantly on outdated polluting models. Tailpipe emissions contribute to dangerous levels of air pollution. There are no sidewalks or bike lanes on most streets, and pedestrian fatality rates are high. Public transit is hindered by insufficient government funding, aging buses prone to breakdowns, inefficient routes, and no integration between bus and emerging

metro systems. Traffic congestion is exacerbated by rapid sprawl and lack of transit-oriented development [11].

## DISCUSSION

Andijan requires an integrated sustainable transportation strategy combining investments in public transit systems, promotion of electric vehicles, expanded non-motorized infrastructure, transportation demand management policies, and transit supportive land use planning.

The public bus network should be expanded with more routes, reduced headways, lower fares and newer electric buses [12]. The metro can provide high capacity mobility spine integrated with the bus system and focused growth in transit-served urban villages [13]. Improved sidewalks, crosswalks, bike lanes and traffic calming measures should make walking and biking safer, paired with a public bike share program [14].

## CONCLUSION

Andijan faces urgent transportation challenges from rising congestion, air pollution and sprawl. Transitioning to an efficient, equitable and environmentally sustainable mobility system will be crucial for the city's continued development. This requires an integrated strategy combining public transit improvements, electric vehicles, expanded infrastructure for non-motorized modes, transportation demand management, and transit-supportive land use planning. Significant investments, policy reforms and technological innovation will be needed. Further research should refine understanding of travel behavior, infrastructure needs, vehicle technologies, and optimal strategies suited to the Andijan context. With coordinated action across sectors and scales, Andijan can ensure access to safe, affordable and sustainable mobility for all residents.

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