

ORGANISATION OF PUBLIC TRANSPORT

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Sustainable Transportation within the Framework of Green Deal - SPHERE

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Types of Public Transport and Their Characteristics

Plan

Types of public transport

Passenger capacity of public transport types

Infrastructure requirements

1. Types of Public Transport

- Public transport is a transport system that provides mass service to the population and operates on designated routes and schedules. Its main function is to ensure that people can travel safely, conveniently, and efficiently to work, education, service, trade, and recreational places.
- Urban public transport includes buses, trolleybuses, trams, metro, suburban rail, ferries, and other transport services for public use.



Importance of Public Transport

Public transport performs the following functions in urban life:

- reduces road congestion;
- increases the mobility opportunities of the population;
- ensures equal access to transport for all segments of the population;
- reduces dependence on private cars;
- reduces fuel consumption and harmful emissions;
- decreases transport pressure in city centers;
- helps use land resources more efficiently.

Types of Public Transport: General Classification

The main difference lies in the operating environment, capacity, speed, and level of control.



Avtobus

flexible, dependent on the road network



Tramvay / LRT

rail-based, medium-capacity, close to the street environment



Metro / MRT

separated, high-capacity, fast



Shahar atrofi temir yo'li

for agglomeration and long-distance trips



BRT

a rapid bus-based system that is close to rail transport in performance

As the level of separated infrastructure increases, speed and reliability also increase, but capital costs also rise.

1. Bus transport

The most flexible, quickly deployable, and basic type of transport for many cities.



Advantages

- operates on the existing street network;
- the route can be changed quickly;
- capital cost is lower compared to rail-based systems;
- suitable for local and trunk routes.

Limitations

- depends on congestion when operating in mixed traffic;
- speed and regularity may decrease;
- requires many drivers and strong operational control;
- stop and lane discipline are important.

Application conditions: areas with low and medium demand, feeder routes, new residential districts, and peripheral connections.

2. Tram and Light Rail Transport

A medium-capacity and environmentally friendly mode of transport operating in the urban street environment.

- requires a rail network;
- provides comfortable, quiet, and stable service for passengers;
- strongly influences street design;
- requires stops, tracks, and signal priority;
- suitable for central streets, tourist areas, and dense urban zones.



Typical capacity range: 5–15 thousand passengers/hour/direction.

3. Metro Transport



The strongest solution in terms of speed, capacity, and reliability on high-demand corridors.

- fully separated track: underground, at-grade, or elevated;
- the highest level of regularity and safety;
- longer distances between stations and higher operating speed;
- the highest capital cost and construction duration.

Metro is chosen when corridor demand is very high and surface street space is insufficient.

4. Suburban Rail Transport

It connects agglomerations, satellite cities, and long-distance trips.

- operates on main railway infrastructure or dedicated suburban lines;
- provides fast and high-capacity transportation over long distances;
- connects to the metro, bus, and BRT through transport interchange hubs;
- timetable, platform, park-and-ride, and integrated fare system are important.



Main function: to make the “home — railway station — city center” travel chain convenient and continuous.

5. BRT — Bus Rapid Transit

A bus-based system that provides speed and reliability close to rail transport.



Element	Function
Dedicated lane	independence from congestion
Station platform	fast and safe boarding
Signal priority	reducing intersection delay
Express service	increasing capacity where demand is high

BRT is not an ordinary bus service; its effectiveness appears when lanes, stations, payment, control, and management work together.

2. Capacity of Public Transport Modes

PPHPD

Passengers per hour per direction
= passengers / hour / direction

Calculation

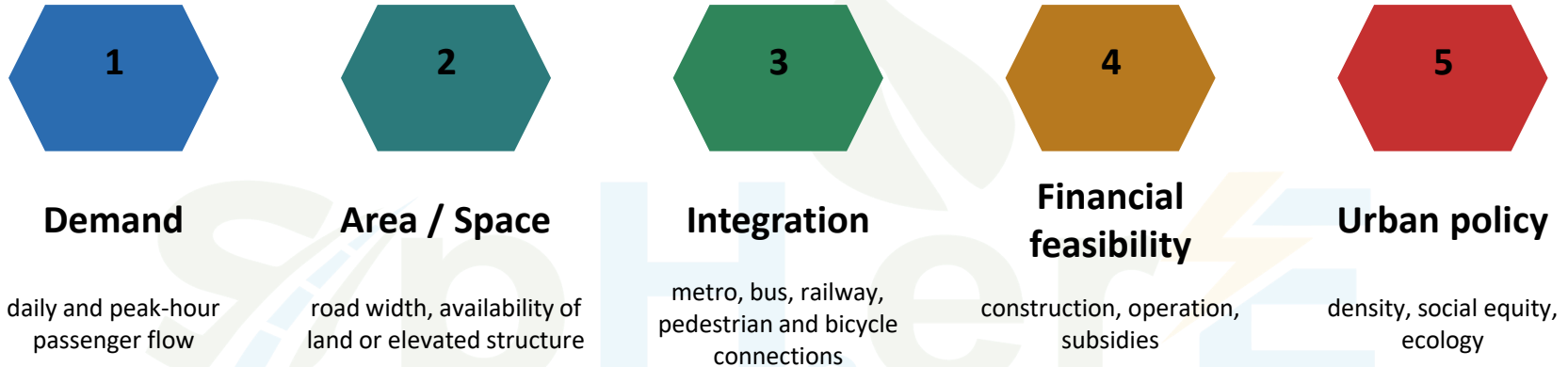
Capacity = vehicle capacity × number of hourly departures × occupancy factor

Transport mode	Capacity, PPHPD	Typical speed
Bus	2,000–6,000	12–20 km/h
BRT	3,000–40,000+	20–30 km/h
Tram / LRT	5,000–15,000	18–24 km/h
Metro / MRT	15,000–90,000	30–40 km/h
Suburban rail	10,000–60,000	35–70 km/h

Capacity is the maximum number of passengers that can be transported in one direction within one hour.

Suitability for Urban Conditions: How Is It Selected?

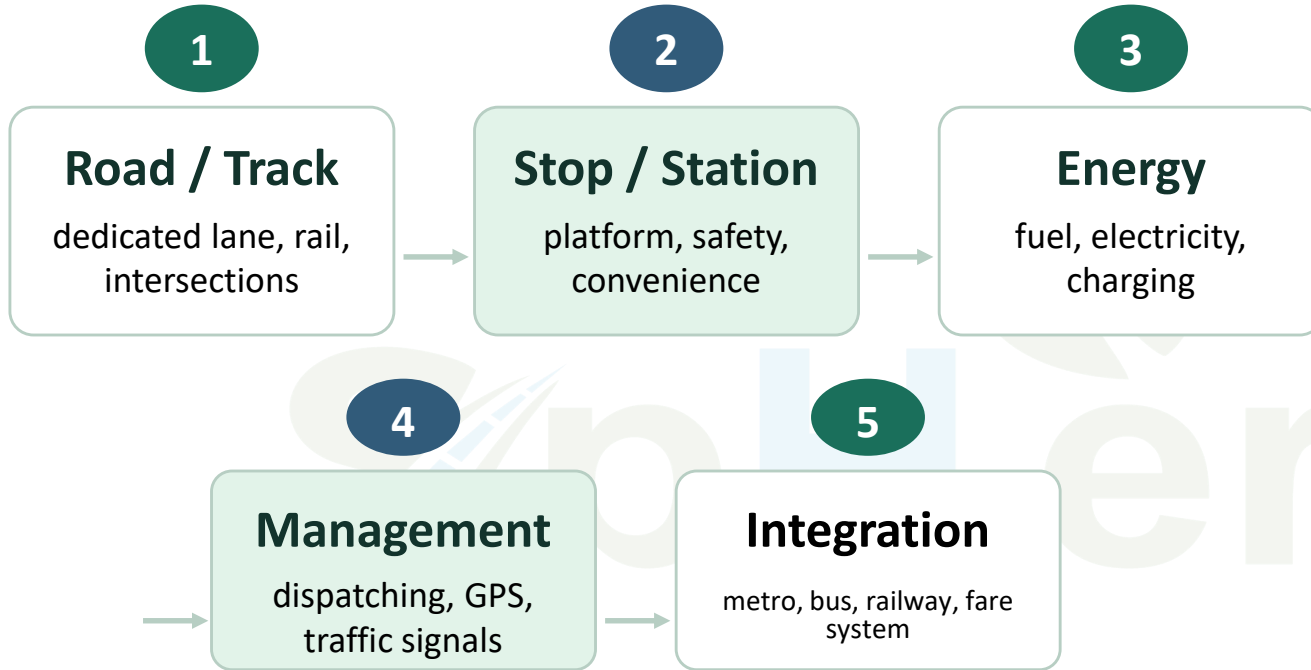
For each corridor, demand, area conditions, financial capacity, and development goals are assessed.



Practical rule:

If demand is low — **bus**;
if demand is medium — **BRT or LRT**;
if demand is very high — **metro or suburban rail**.

3. Infrastructure Requirements



Main idea:

- If the infrastructure is insufficient, even a new transport vehicle will have low speed, reliability, and safety.
- Public transport quality depends not only on the bus or train, but on the entire service chain.

Public transport operates effectively only when the road, stop, dedicated lane, power supply, information system, depot, and management infrastructure work together.

Bus Transport: The Most Flexible Infrastructure

It is used as the main surface public transport mode in Uzbek cities.



Example from Uzbekistan

In Tashkent, dedicated bus lanes, electronic fare payment, and monitoring systems are among the main infrastructure directions for improving the quality of public transport.

Main requirements

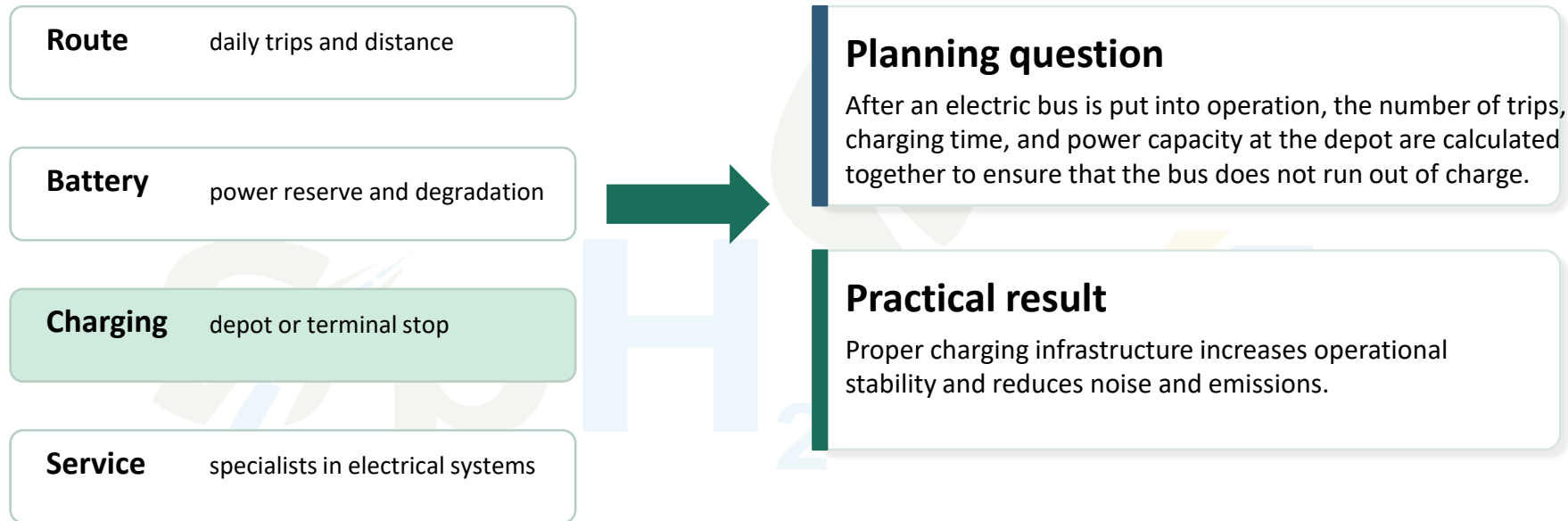
- high-quality road surface and safe traffic scheme;
- bus stop pavilion, lighting, and information signs;
- depot storage, washing, and technical maintenance;
- GPS monitoring and dispatching control.

Important solution for congested streets

Dedicated bus lanes and traffic signal priority reduce bus delays and improve schedule adherence.

Electric Bus: Charging Infrastructure as a Decisive Factor

An electric bus is environmentally beneficial, but its energy supply must be planned in advance.



In Uzbek cities, expanding electric buses requires more than just purchasing vehicles: charging stations, reserve electricity capacity, and a service base must also be prepared at the same time.

BRT: Bus-Based Rapid Transit System

BRT is not an ordinary bus route — it is a corridor system with special infrastructure.



5 main requirements for BRT

1. fully or partially dedicated lane
2. platform-based, safe, and convenient stops
3. pre-paid or fast electronic fare payment
4. traffic signal priority and signal coordination
5. central monitoring and service regularity

In Tashkent and major regional centers, BRT elements are considered a practical solution for increasing bus speed and regularity on congested corridors.

Digital Infrastructure: Managing Speed and Discipline

In modern public transport, the information system is as important as physical infrastructure.

Electronic payment

Dependence on cash is reduced, and boarding and alighting become faster.

GPS monitoring

Schedule adherence and delays are monitored.

Real-time information

Helps passengers estimate waiting time more accurately.

Data analysis

Decisions on routes, headways, and capacity are based on evidence.

In the case of Uzbekistan, digital payment, monitoring, and centralized management are among the key mechanisms for improving the quality of public transport services.

Operating Costs and Management

Cost is not measured only by construction expenses; it is important to operate the service reliably every day.

Cost structure

- driver or train operator labor;
- fuel / electricity;
- maintenance and spare parts;
- depot, stop, station, and signal systems;
- dispatching, monitoring, and data systems.

Management criteria

- service headway and schedule regularity;
- vehicle cycle time;
- dwell time at stops;
- network optimization based on passenger flow;
- gross-cost contracts and quality indicators.

In high-demand corridors, rail-based systems may have lower operating cost per passenger; however, BRT requires more buses and drivers.

Congestion, Energy, and Ecology

- transports more passengers using less road space;
- electric and gas-powered fleets reduce emissions;
- priority for public transport reduces dependence on private cars;
- well-located stops strengthen integration with walking and cycling;
- affordable and convenient service supports social equality.



The effectiveness of public transport is seen not only in passenger transportation, but also in urban ecology and spatial structure.

Conclusion

- 1 It is not the transport mode alone that is evaluated, but first the passenger flow of the corridor and the urban conditions.
- 2 Bus infrastructure can be implemented quickly; BRT provides a higher level of service quality.
- 3 Metro and rail serve as backbone systems for large passenger flows, but they do not provide full efficiency without integration.
- 4 Digital management, electronic payment, and monitoring are an integral part of the infrastructure.

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Thank you for your attention!

