Public transport: reframing of governance for quality of life

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Contents

1) Public transport **goal** is to reduce cost and externalities for mass transportation, quality of life in the cities;

2) More **vehicle capacity** – closer to the goal;

3) Effective large capacity vehicle usage is possible via **route network optimization**;

4) Public transport **financial stability** can be achieved by transferring social risks to the public authority;

5) A city can balance farebox income and public transport expenses via fare and quality regulation;

6) PPP mechanism is effective on infrastructure and rolling stock recovery. A city creates tramway efficiency conditions, an investor – recovers infrastructure and carries technical transport operations.

Every city, even after years of transit underfunding, can rise quality of life in 3-4 years
on the base of recovered light rail transit
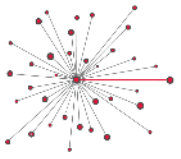
What is the goal of public transport?

The right goal matters.

The public transport goal is to reduce direct cost and externalities for mass transportation, i.e.

- Direct expenses;
- Land usage;
- Environmental pollution;
- Road traffic accidents*.*

Public transport is the main tool to provide quality of life in the cities.

Notably, it suites best to implement the national goals and strategic tasks, secured in the Presidents act of 7 May 2018:

1) Increase in life expectancy;
2) Reduction of death rate;
3) Drastic increase in urban environment quality;
4) Essential (by 20%) decrease in air pollution;
5) Decrease of crowded roads;
6) Decrease of road accident concentration places, etc.
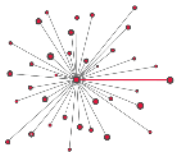
Externalities: larger vehicle capacity – lower damage

What vehicle should we use to transfer 1 mln. Passengers and reduce land use, accident rate, pollution?

1. **Safety:** per 1 mln. trips, bus driver causes 30 times less deaths, tramway driver – 140 times less deaths, compared to private car driver.

№	Transport mode	Ridership, mln/year	Amount of road accidents (due to a fault of driver)			Road accidents per 1 mln. riders		
			Accidents	Died	Injured	Accidents	Died	Injured
1	2	3	4	5	6	7	8	9
1	Private car	19 027	115 428	13 100	157 846	6,07	0,688	8,30
2	Bus	11 722	5 294	257	8 194	0,45	0,022	0,70
3	Trolley bus	1 483	402	10	434	0,27	0,007	0,29
4	Tramway	1 397	149	7	201	0,11	0,005	0,14

2. **Environmental criteria**: public transport emissions are ten to hundred times less then private car per 1 mln trips.

3. **Land usage**: road network usage is 3-10 less for public transport, parking space demand – 100 times less compared to private car.

4. **Travel time**: for cities of more than 300 thousand inhabitants, public transport is the only reliable means of transport.

Direct costs: larger vehicle capacity – lower damage

What transport should we use to transfer 2 000 passengers in peak direction for 10-kilometer route?

№	Parameters	Transit vehicles capacity				
1	2	3	4	5	6	7
1	Capacity, passengers	22	60	90	130	188
2	Service frequency (to serve 2000 per hour), units per hour	91	34	22	16	11
3	Fleet for 10-km route with required frequency	180	57	33	24	14
4	Amortization expenses, mln RUR/year	86	33	47	45	28
5	Driver and conductor expences, mln RUR/year	137	67	25	18	10
6	Fuel and energy, mln RUR/year	37	28	25	19	18
7	Fleet service and repair, mln RUR/year	86	52	35	32	24
8	Infrastructure service, mln RUR/year	30	30	30	30	40
9	Total, operation expences for 2000 people to transfer daily	375	210	161	142	120
10	Relation of expences per minimum level (tramway)	3,13	1,75	1,34	1,19	1,00

Larger vehicle – closer to the public transport goals

How to make high-capacity vehicle usage effective?
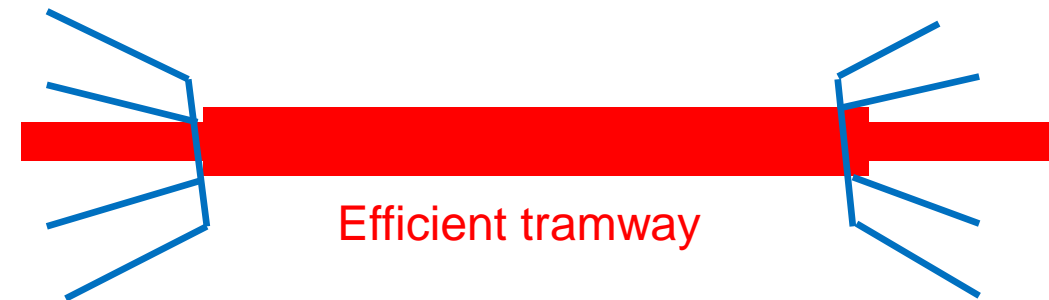
1. Inefficient route network

- Low driver productivity,
- Crowded road network;
- Low speed and reliability.
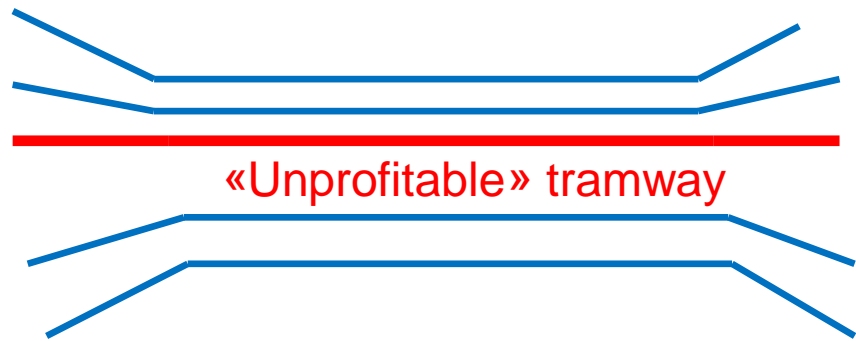
1. Efficient route network

- High driver productivity,
- Less road space demand;
- High speed and reliability.

Bus 1

Bus 2

Tramway

Bus 3

Bus 4

«Unprofitable» tramway

Efficient tramway

Efficiency of large capacity vehicles can be achieved only by means of passenger flow concentration on trunk routes, with removal of duplicate routes.

«Profitability» of high-volume transit – is the full responsibility of a city authority, not a transit operator.

We need to transfer 300 passengers per hour.
The price depends on the quality standard:

1. High standard:
   1. Headway: *10 minutes*
   2. Load: *1 passenger / m²*
   Expenses: 6 buses on a route

2. Low standard:
   1. Headway: *30 minutes*
   2. Load: *6 passengers / m²*
   Expenses: 2 buses on a route

Public transport City quality standard (e.g.):
1. Service speed (15 km/h with transfers);
2. Reliability (95% journeys on time);
3. Stop accessibility (500 m from an apartment);
4. Trunk route stop accessibility (2 km);
5. Trunk route headway: 10 minutes all-day;
6. Occupancy rate (4 pass/m² on 95% journeys);
7. Disabled accessibility (30 min headway each route);
8. Ecology (Electric only vehicles);
9. Affordability (monthly pass in 7% of family income);
10. Etc.

Each requirement costs money – for the passengers (and the budget – for affordability).

Social standards are responsibility of a city authority, not a transit operator

Fare collection – the main city tool of financial stability

Public transport expenses   =   Farebox income   +   Budgetary transfers
(quality of service)

In order to balance income and expenses, the city either:

- Increase the passenger fare, revise fare benefits;
- Increase public expenditure (~ give fare benefits to everybody to meet affordability standard);
- Optimize route network (use high-capacity vehicles, increase speeds, etc);
- Decrease the quality of service (parameters of quality standard).

Fares, fare social benefits, quality standards are responsibility of a city authority, not a transit operator

# PPP in public transport – means to speed up renovation

City responsibilities:

1. Route network optimization to trunk-feeder network, according to Quality standard;
2. Public transport priority (lanes, signals);
3. Create all-city IT infrastructure:
    1. Fare collection;
    2. GPS control on operator contracts;
    3. Passenger information.
4. Create Transport inspection:
    1. Fare inspection;
    2. Operator inspection;
    3. Parking inspection and accident processing.
5. Prepare infrastructure land plots for an investor.

Investor responsibilities:

1. Infrastructure and fleet recovery;
2. Technical operation of infrastructure and fleet;
3. Acquisition of operation fee per operation-km (operation-hour) from the city.
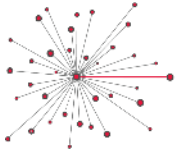
Thank you for your attention

What are your challenges and answers?

How to make public transport high-quality and stable?

How to recover underfinanced systems?

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