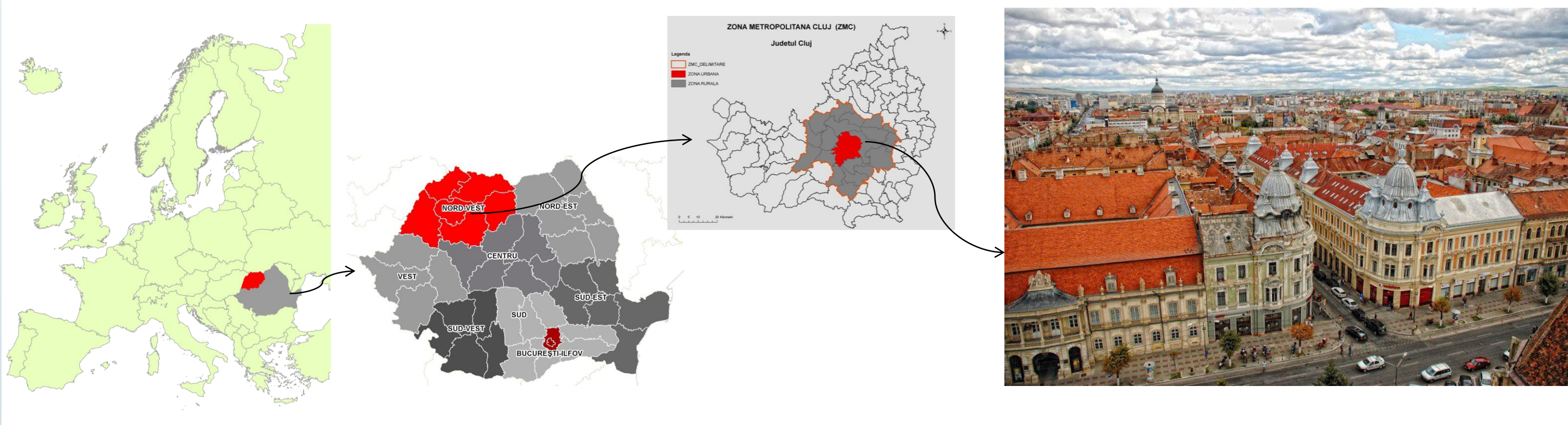


Urban mobility and air quality in Cluj-Napoca

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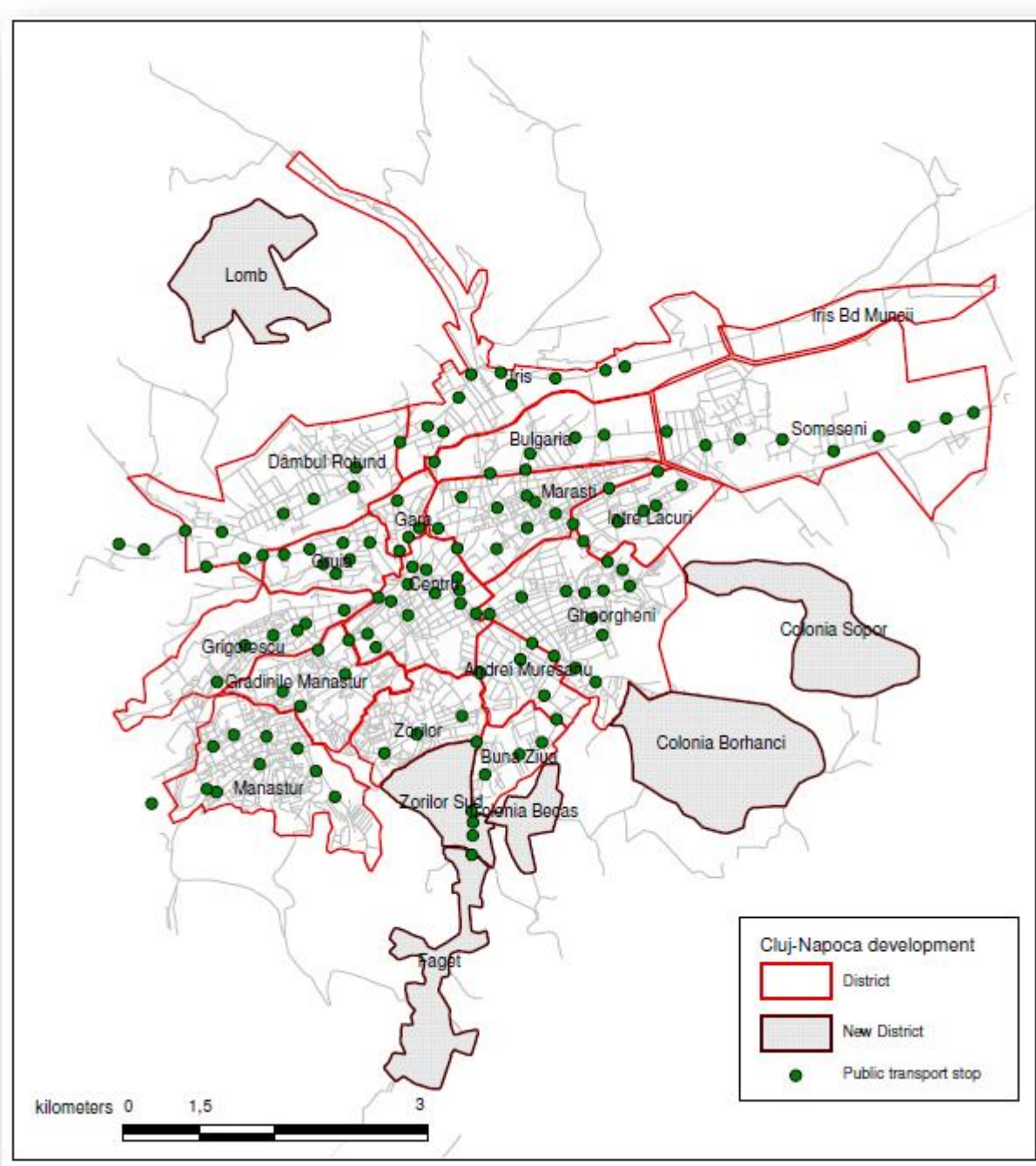
OBJECTIVE

The aim of this paper is to analyze the implications of the reduced development of the public transport in Cluj-Napoca, Romania, during the last decades against the changes in other aspects such as urban form, land-use, population, economic development, motorization indexes, modal share etc. A series of elements should be analyzed in this respect: urban mobility aspects, quality of public transport services, and air quality aspects.

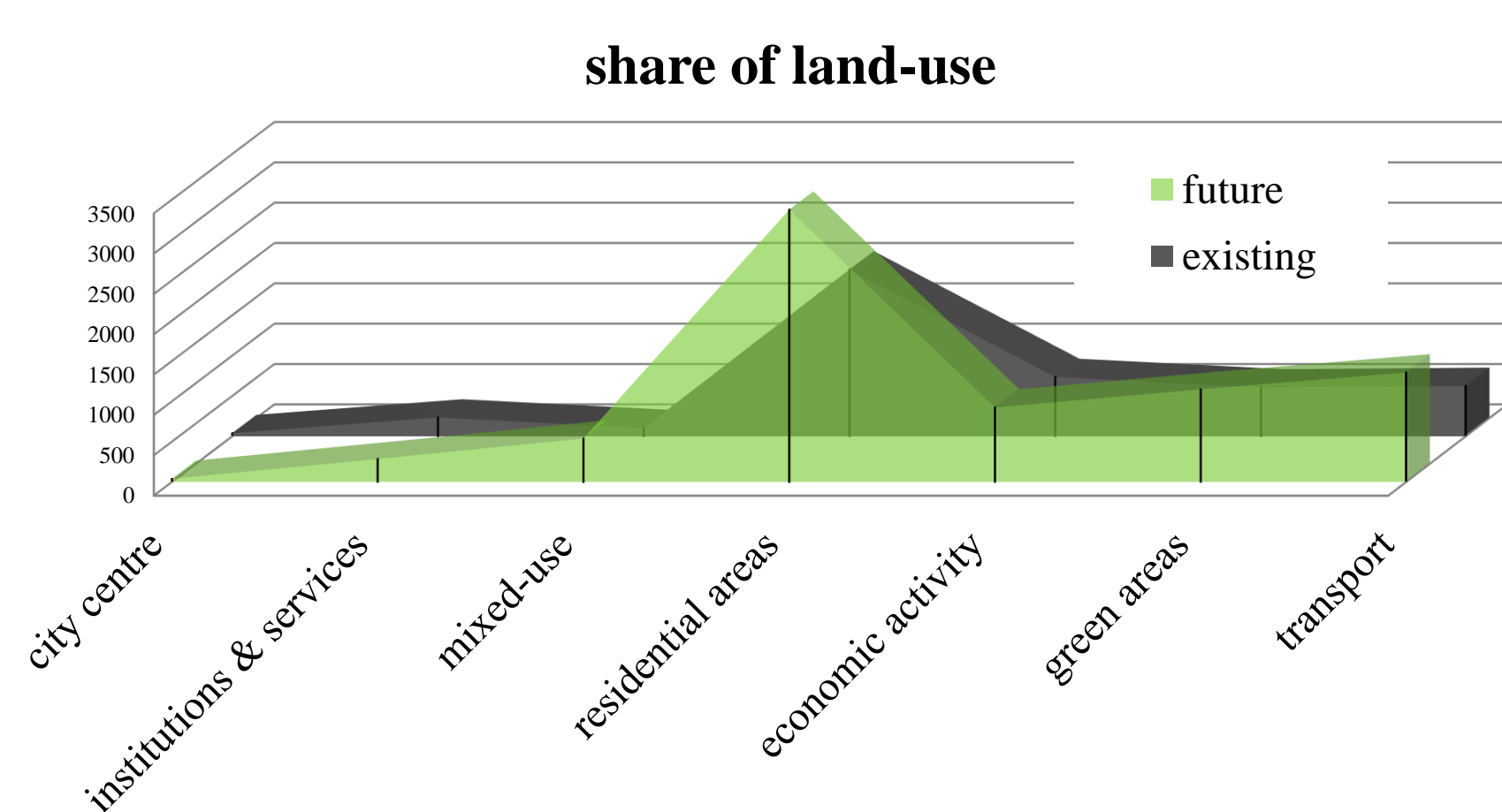
DATA:

The data was collected from authorities and academic research.

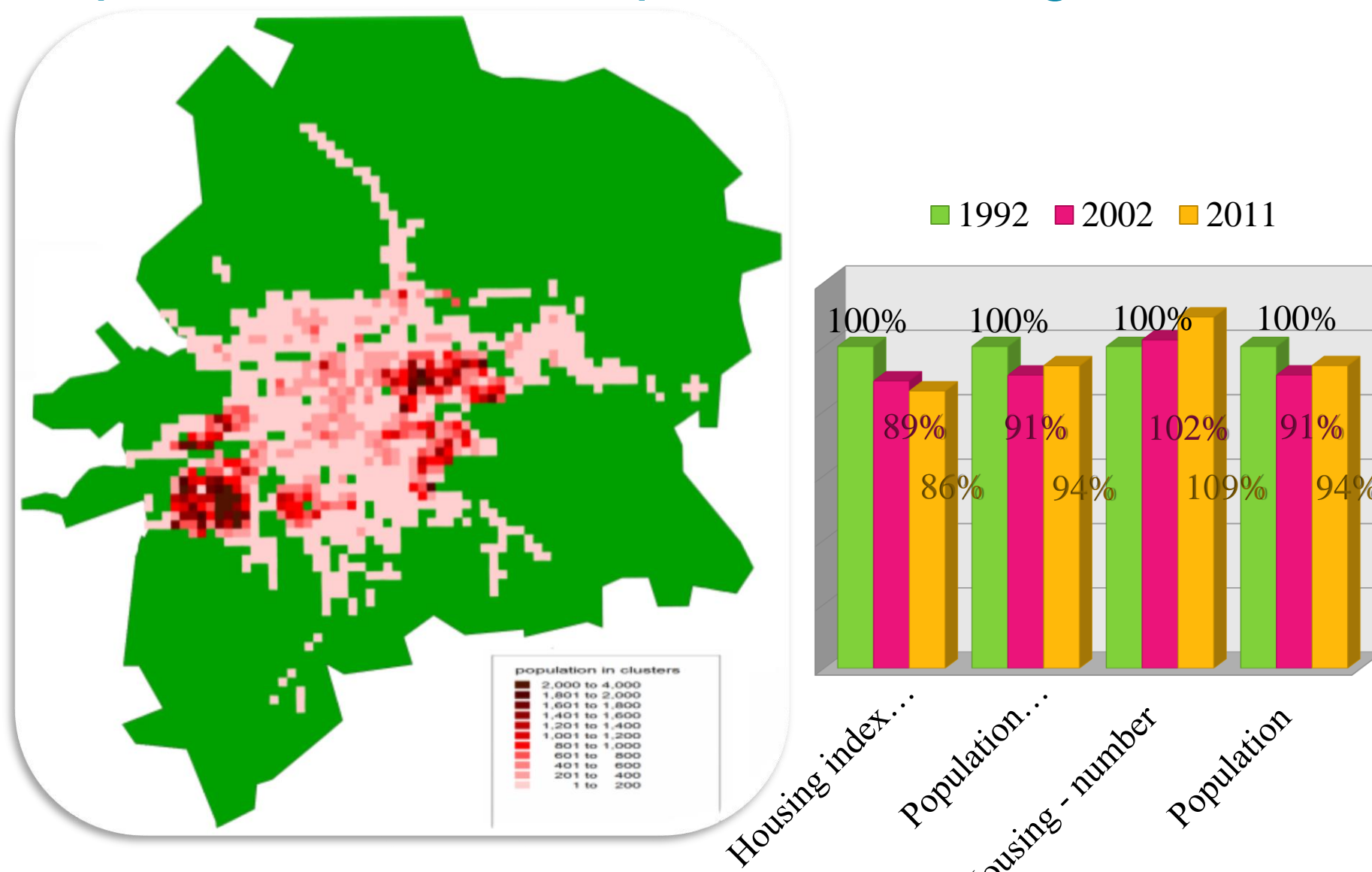
Urban form – developing urban area



Land-use – expanding built-up area

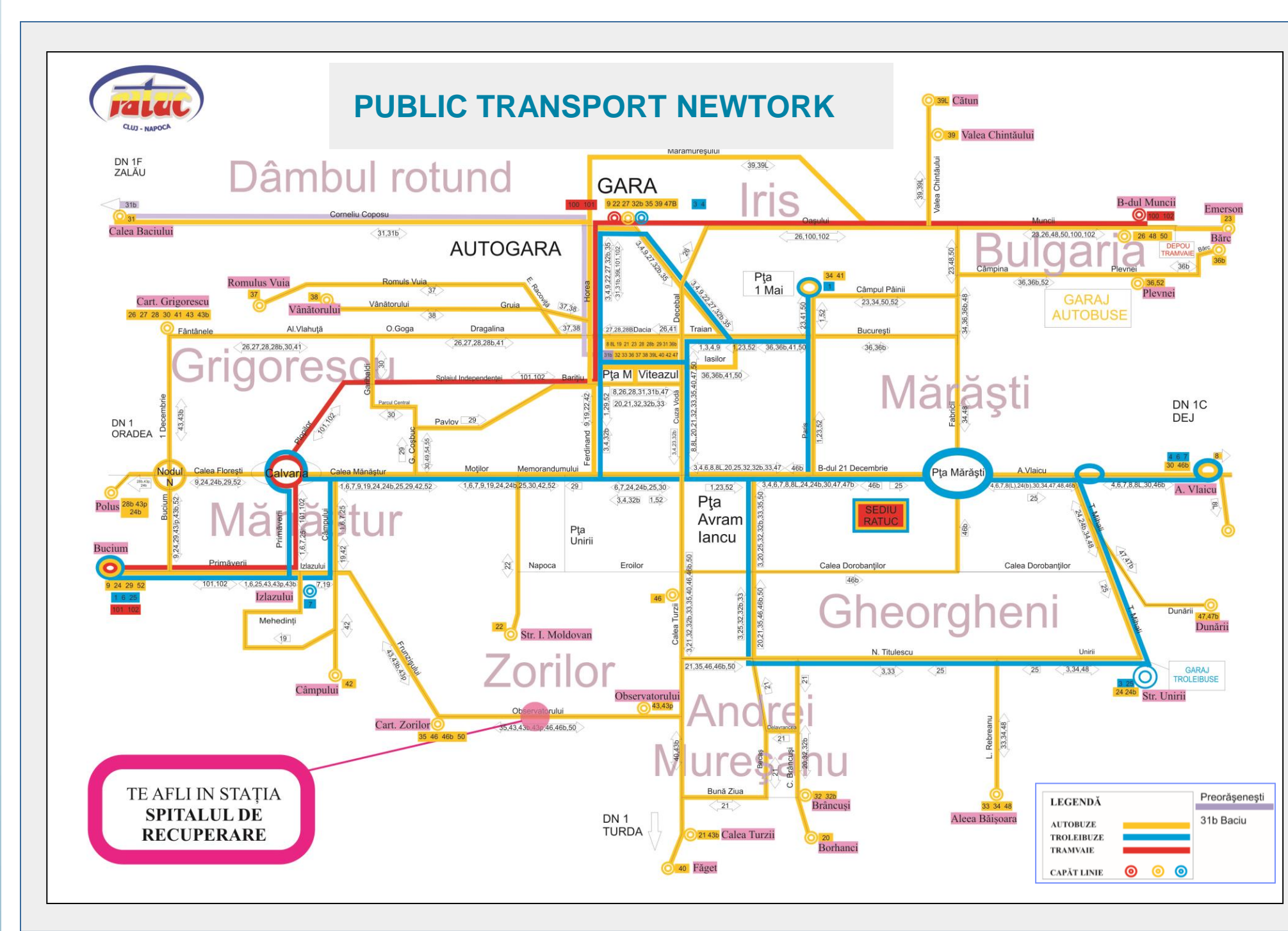


Population – more dispersed housing areas

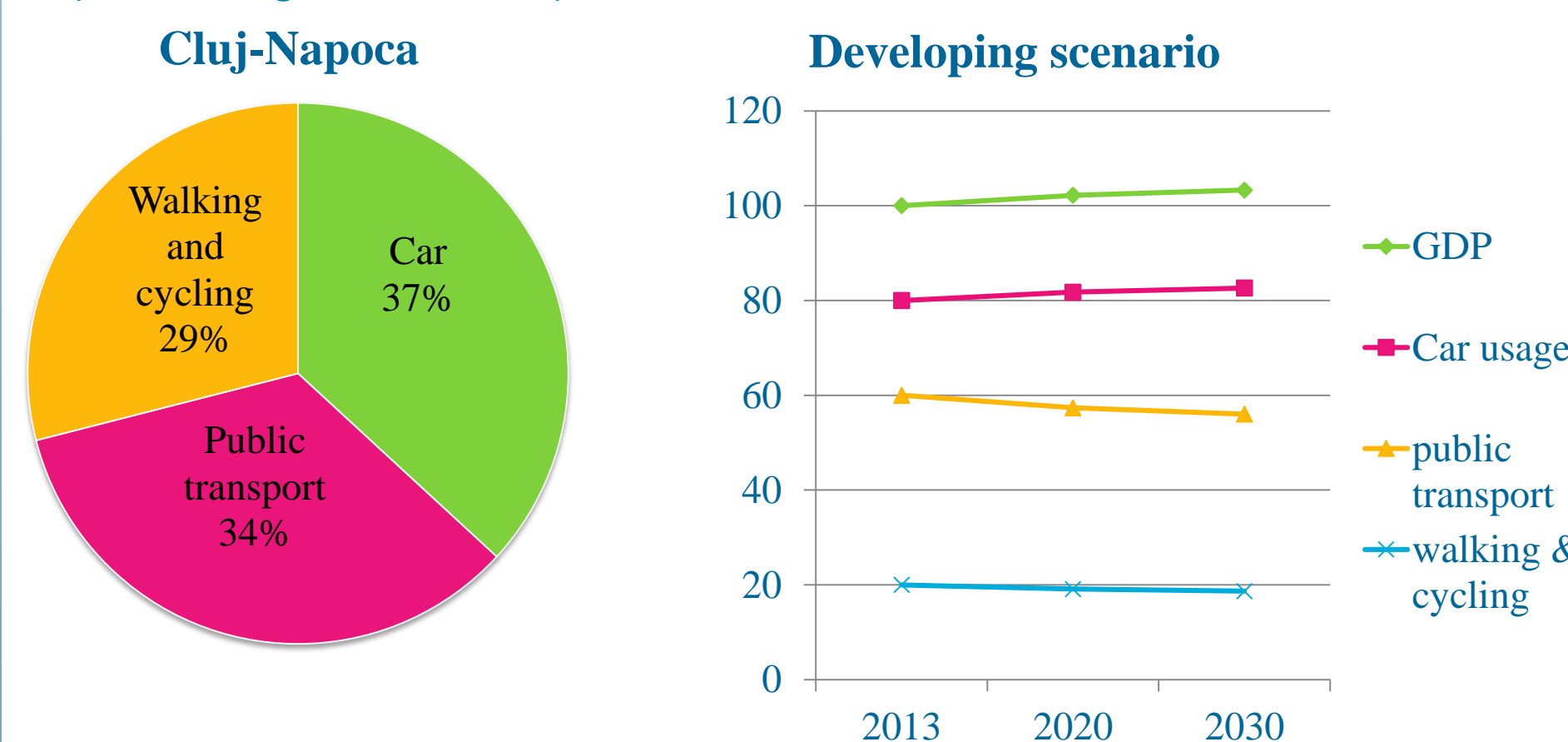


GDP evolution – developing urban area

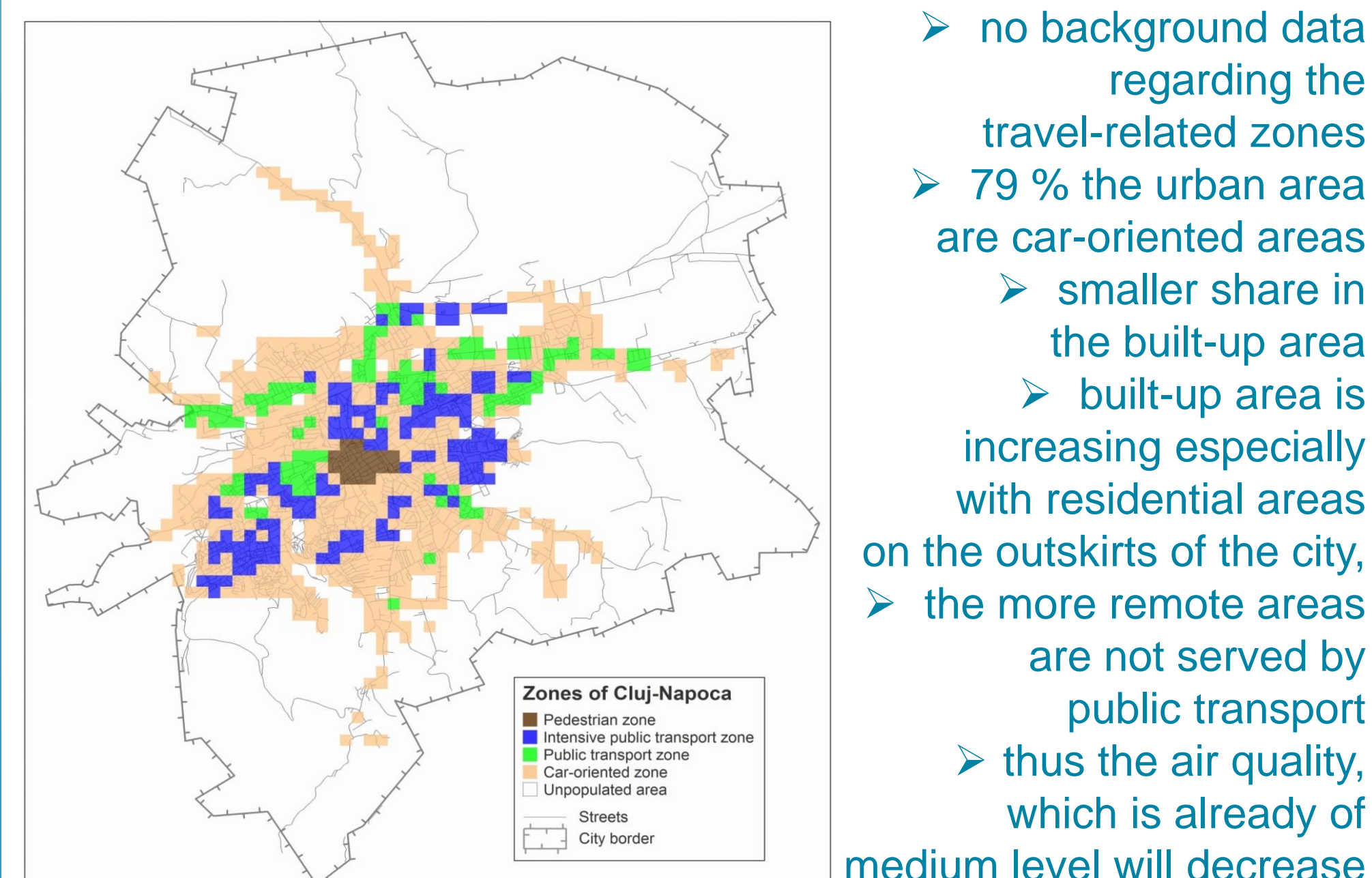
FIB (milioane RON)	2005	2006	2007	2008	2009	2010
ROMANIA	288934.6	344650.6	416006.8	514700	501139.4	523693.3
Cluj	11.505.1	13.558.6	18.020.9	20.400	20.326.1	21.164.4
% din total national	3.98%	3.93%	4.33%	3.96%	4.05%	4.04%



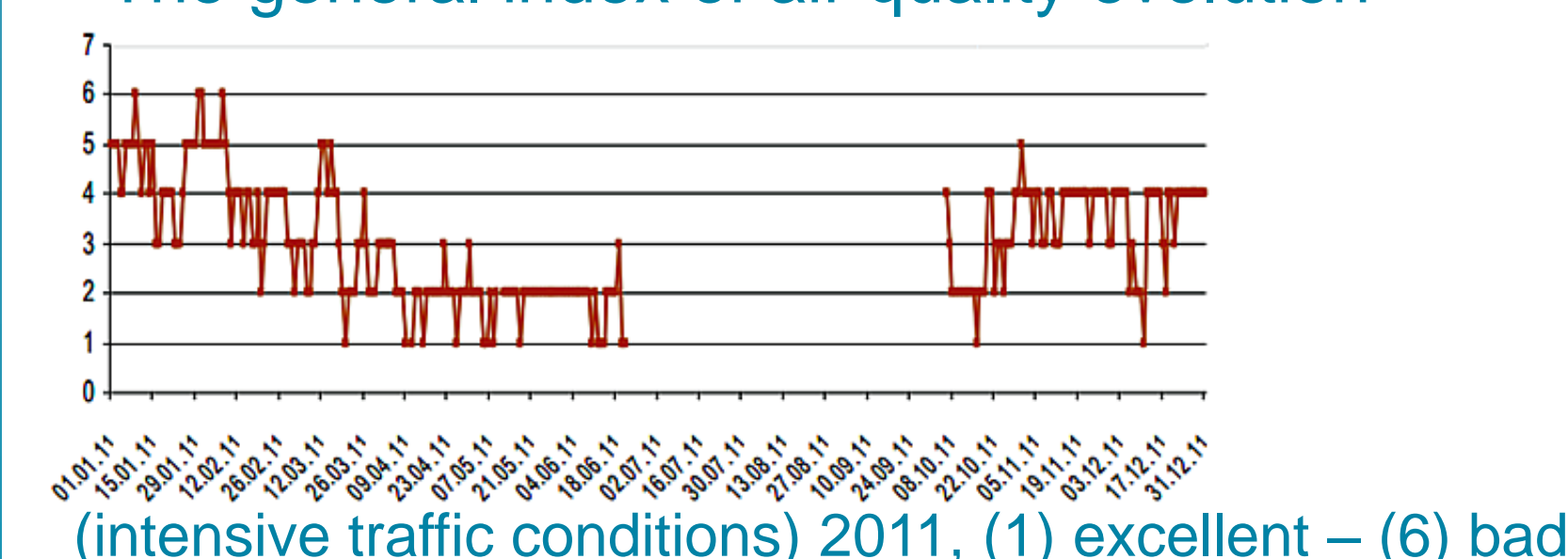
Modal share – car oriented urban area (no background data)



Mobility profile – the travel-related zones



The general index of air quality evolution

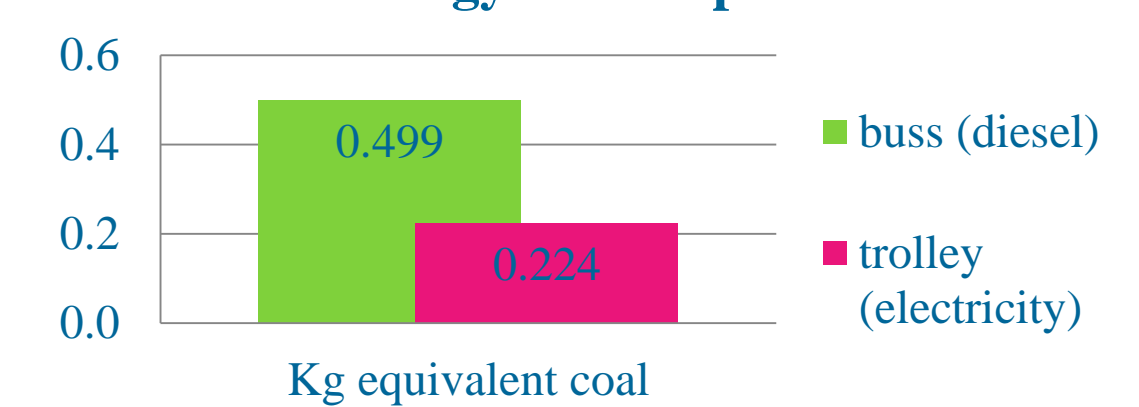


	Trams	Trolleybuses	Buses	Total
1. Lines	3	6	37	46
2. Length(km)	13.2	22	97.3	132.5
3. Vehicles available	36	93	213	342
4. Average fleet at peak hours in a working day	21	64	124	209
5. Average fleet at peak hours in a weekend day	7	23	52	82
6. Percentage of people transported	23%	31%	46%	100%
7. Fleet Usage Rank	62%	69%	70%	

Analysis

Cluj-Napoca is a developing urban area which has to improve the air quality for better living conditions of the citizens in the future. This is directly related to the mobility and transport issues. Improving the public transport services represent one major step in shifting the modal share towards less car usage and thus, fewer emissions. Furthermore, shifting the public transport usage from fossil fueled buses to trolleybuses results into less energy consumption and no emissions.

Energy consumption



Improved public transport cleans the air: the local public transport company from Cluj-Napoca transformed 15 busses into trolleybuses and the following emission reductions were achieved

	CO ₂	CO	NO _x	CH ₄	N ₂ O
Buss emissions (kg/month)	8428.57	90.00	113.83	0.66	0.31

Additional implications of the newly designed trolleybuses are: the higher attractiveness to users, reduced noise, more energy and cost efficient. The transformation costs were about 53% of the price of a new similar trolleybus.

Conclusion

The air quality in Cluj-Napoca resulted of medium value, when it was determined for intensive traffic conditions. Considering the developing trend of the urban area, several improvements are required in order to maintain the air pollution low in Cluj-Napoca: to reduce the car usage by improving the public transport services and furthermore, to improve the public transport fleet even when the investments are reduced, as the local public transport company did.

Bibliography

Boitor R.M., *Alternative strategies for improving the urban mobility in Cluj-Napoca*, Doctoral thesis, 2014.
Neag L., Dobos N., Hoza I., *Electric vehicles for public transport - requirements and possible solutions*, EV 2012 Conference, 4-5 October 2102, Bucharest.

