



## **50 years of public transportation with trolley buses in the city of Cluj-Napoca**

**SISTEM DE  
MANAGEMENT AL  
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The mobility of population and particularly the public transport are issues of continuous interests of the Public Authorities of the City of Cluj-Napoca, a city with more than 380,000 inhabitants and a very important city of Romania.

The problems of the public transportation in our city are similar to the problems other European cities have in this area.

A great number of inhabitants still consider that using personal means of transportation throughout the city is more comfortable and faster. For this matter, in the late 10 years, the following aspects have been changed, creating several problems:

1. Busy main streets – almost impractical during rush hours,
2. Considerable decrease of the speed,
3. Pollution growth.

The so considered solution for the rise of the mobility actually led to the opposite situation.

As a public transportation operator, we consider that a possible solution for this situation is the improvement of the transport conditions so that it becomes competitive and more attractive for the population.

For these matters, we target as follows:

1. Offering means of transport with extremely comfortable conditions (possibly getting new trolley-busses). This action is held in collaboration with the Town Hall of the City of Cluj-Napoca.
2. Getting special equipment (so called ITS) for handling the large number of vehicles and the processes performed in the interaction with the clients (GPS, ticketing),
3. Increasing the speed of the vehicles by creating especially dedicated transport lanes in the busiest areas of the city. For a large area of the city, this action item has already been accomplished for one of the ways,
4. Following a transportation time table, giving by this the security of a well planned trip,
5. Accessing European funds (non refundable if possible) for improving some of the areas of transportation system.

There are three types of passenger transportation vehicles used in our city: buses, trolley-buses and tramways but we consider that the electrical traction vehicles are the most important nowadays (most then 55 percent of passengers).

# **Trolley-buses transportation system**

Trolley-buses were introduced into circulation in 1959 in Cluj-Napoca being applied from only one power supply station. First, there were 8 trolley-buses (type TV, see picture #1) and a total length of 5.5 Km for their circuit but in the next year other 12 trolley-buses were added and the network was extended with 13.2 km.

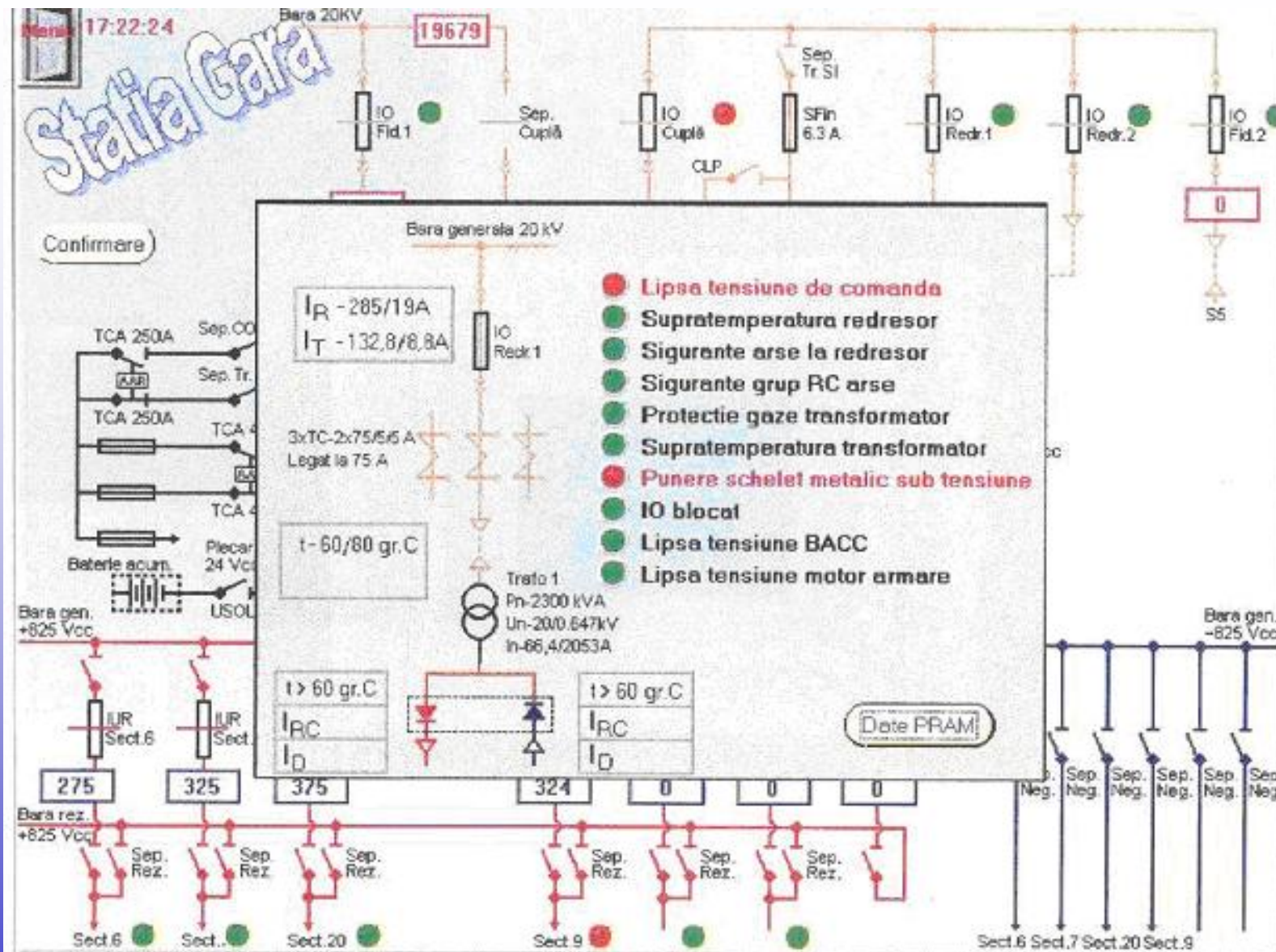


*Picture 1, TV Trolley-bus, 1959*

After that the trolley-bus transportation system grew up, the network has been extended, new power supply stations were built, new models of trolley-buses were purchased. Here are the main steps in the development of the transportation network:

- 1980, modernisation of power supply station S1,
- 1987, 47 trolley-buses(DAC 117) were purchased,
- 1988-1990, building a new maintenance shop for trolley-buses provided with the best quality equipment of that time,
- 2001-2002, modernisation of power supply stations, all stations being equipped by hardware and software systems for real time supervision,
- 2004-2005 27 improved quality trolley-buses (IRISBUS) were purchased.





Picture 2, power supply station supervision

*Picture 3 Trolley-bus 1987*



*Picture 4 Trolley-bus ASTRA IRISBUS 2004*

Currently we plan extending the trolley-buses network because there are reasons to do so, as shown below.

## **Current status of fleet operation:**

1.	Number of trolley-buses	108
2.	Power supply stations	8
3.	Length of double track lines	98.8 km
4.	Length of network	44 km
5.	Number of trolley-bus stations	68
6.	Number of passenger (per annum)	44,942,414

Trolley-buses transport system covers the most important tracks in the city but unfortunately presently the number of vehicles is still insufficient.







## Environmental protection

Regarding the environmental protection of our city we have analyzed the following comparison: if instead of trolley-buses we would be using buses (100 buses at current level) would lead to the following monthly emissions:

- 536 Kg PS (solid particles)
- 3235 Kg NO (nitrogen oxide)
- 57 Kg SO<sub>2</sub> (sulphur dioxide)
- 0,27Kg COV (volatile organic compounds)
- 4 719 Kg CO (carbon oxide)
- 439 178 KgCO<sub>2</sub> (carbon dioxide)
- 17KgN<sub>2</sub>O
- 34KgCH<sub>4</sub>

## **Trolley-busses comparative power consumption analysis**

The analysis takes into account the average 2008 specific fuel consumption referred to in equivalent kcal and equivalent km conventional fuel and purchase prices for diesel fuel and electric power.

Gas Oil(Diesel):

$0,306\text{litri/Km}=0,9948\text{lei/Km}=2632\text{kcal/Km}=0,3816\text{Kg.cc/Km}$

Power consumption:  $2,43\text{Kwh/Km}=0,729\text{ lei/Km}=2090\text{kcal/Km}=0,299\text{ Kg.cc/Km}$

The specific power consumption conventional fuel equivalent represents 78% of gas oil fuel and 73% price base.

The current status (only 30% of trolley-buses are equipped with chopper systems). If the future trend goes on (and all trolley-buses will be equipped with chopper systems) we estimate that the percent decreases to 54%.

The advantages of electric transportation systems are obvious concerning both environmental protection and power consumption.

Total investment costs in electric transport systems are obviously entitled and we consider that this type of transportation must be promoted.