

# Foreword



Metrorex is one of the main Bucharest network public transport operators which, throughout its history, has provided transportation for billions of passengers. As the capital's population has grown, the need to solve traffic problems has become to a head.

The development of the metro infrastructure is an essential policy to avoid overcrowding, accidents, noise, pollution and fuel consumption, and the authorities' intensive involvement in optimising and promoting this type of public transport is reflected in their constant support for new metro lines.

Therefore, the policy of Metrorex is to extend and modernise the metro network, a system with increased capacity, speed parameters and characteristics, capable of handling current and forecast traffic on the major transport demand directions.

In terms of achieved objectives, we firstly note the commissioning of Metro Line 5 which took place in September 2020, as a benchmark for increasing the transport capacity and the metro network attractiveness. Metro Line 5, Section Râul Doamnei – Eroilor, including Valea lalomiței station, gallery, and depot, provides a high-capacity transport mean by connecting the Bucharest South-West (Drumul Taberei neighbourhood) with the downtown, on a route of around 7 km length, 10 stations and one depot, built at European standards, with the most state-of-the-art endowments and technologies.

Once the works related to the traffic control system on Metro Line 4: Laminorului - Străulești Depot had been completed, important steps were made and, consequently the headway could have been decreased with about 40%.

At the same time, it was implemented the payment by contactless card at the automatic vending machines and, also payment by intelligent devices such as smartwatch and smartphone, both at access gates, and the automatic vending machines, an important result that has included Bucharest on the map of European cities offering such modern metro access facilities. The approach to European transportation and the new requirements for increased mobility became even more apparent with the integration of public transport by metro with the surface public

transport by rail, on the route from Gara de Nord to Henri Coandă International Airport, thus offering the passengers the possibility to use a single trip title for all transportation means available within Bucharest – Ilfov area: metro, bus, tram, trolleybus and train (on the route from Gara de Nord to Henri Coandă International Airport).

Also, the implementation of the online portal to recharge the Metrorex contactless card with the previous uploaded trip titles and introduction of the mechanisms for digitalization of processes necessary to issue the passes for pupils and students were considered.

Apart from this, we also intend to increase mobility in the South-East of Bucharest city and, in this respect, we are closely working with the Municipality of District 4 to the extension of Metro Line 2, beyond the Ring Road on the future new metro station named Tudor Arghezi, currently under development in terms of civil works and rolling track.

We are responsible to the community and, in this regard, within the operation and development strategy, Metrorex assumed the plan to extend the facilities for the people with special needs, so that the transport system to become more accessible. Therefore, we are in the process of implementing the project whose scope is to make the metro stations more accessible for the visually impaired people. The project includes the installation of special strips made of ceramic tiles and stainless-steel elements indicating direction for visually impaired people, as well as guide information panels in Braille to provide them the necessary information about the station they are at, the metro map etc.

In the future, we intend to maintain the same good relationships with our collaborators and customers, in order to be a reliable partner and to provide passenger-oriented services, but also to remain an important element in the development of the public transport in Bucharest, the capital of Romania.

METROREX MANAGEMENT TEAM

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The history of metro is dating back in year 1908 when Dimitrie Leonida chosen the subject of his bachelor's degree, namely the one related to the construction of a metro network in Bucharest.

The first attempts for building a metro network in Bucharest were made during 1909 – 1910 when took place negotiations with Siemens & Halske company with regard the construction of the city tram lines. As the cost required by the Belgian company for the tram lines was very high and could have covered the costs of metro, the engineers Elie Radu and Dimitrie Leonida, at that time members of the Bucharest Technical Council, proposed the construction of a metro network.

The proposal had been resumed in 1929 and 1930 within the committee chaired by the architect Duiliu Marcu who discussed about the "Capital town planning", but the solution was not retained in the final document because it was considered that Bucharest city could still had been covered by the ground urban public transport.

As of 1940, the issue regarding the metro construction showed again a great interest. Three lines were proposed for construction: one between Hipodrom and Piața Unirii, one from Eastern Railway Station until Șoseaua Academiei and one between the main railway station, Gara de Nord and Piața Victoriei, but the outbreak of the World War II put also this initiative to an end.

In 1971, it came up to the conclusion that the sole adequate solution for that time would be the execution of an underground metro network and in 1975, the execution works had actually commenced, Metroul S.A. being the construction company in Bucharest.

In 1977, it was set up "Întreprinderea de Exploatare a Metroului", which in 1991 turned into "Regia de Exploatare a Metroului București" and, by reorganization, according to the Government Decision no. 482/1999, it became "Societatea Comercială de Transport cu Metroul București METROREX S.A.", under the authority of the Ministry of Transport and Infrastructure having as scope of activity "the passengers transport by metro using the ground and underground railway network under specific safety traffic and comfort conditions".

METROREX is a joint-stock company owned by the state performing activities of public and strategic interest.

On September 15, 2020, Metro Line 5: Râul Doamnei – Eroilor 2, Romancierilor – Valea Ialomiței, consisting of 10 metro stations and 17,341 km unrolled line, was opened for service.

Built, equipped, and put into operation in stages, on certain extensions, starting with 1979, the current metro network integrates 77 km double track, structured on 5 metro lines, 63 metro stations, 3 running sheds and 6 depots.

The metro transport system is continuously monitored and coordinated by a Central Traffic Centre, which subordinates some other six branch dispatching centres: lines, tunnels, stations, public address, traffic control, electro-energetic, electro-mechanic and commercial.

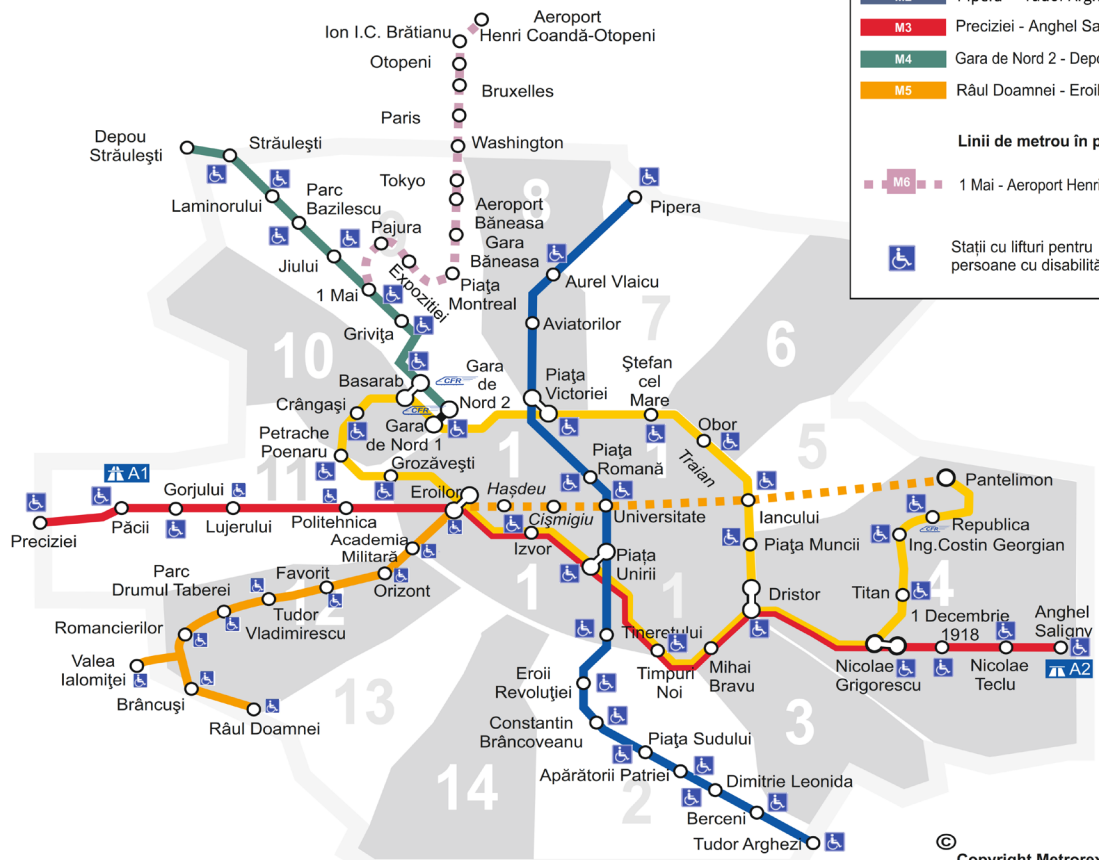
## **METROREX market share**

Although it covers only 4% of the Bucharest entire public transport network, by providing a high transport capacity due to its comfort, regularity, and safety traffic conditions, Metrorex supplies transportation for about 20% of the total passengers using the Bucharest urban public transportation means.



## METROREX

### HARTA REȚELEI DE METROU DIN MUNICIPIUL BUCUREȘTI



#### Linii de metrou în exploatare:

- M1 Dristor - Pantelimon
- M2 Pipera - Tudor Arghezi
- M3 Preciziei - Anghel Saligny
- M4 Gara de Nord 2 - Depou Străulești
- M5 Râul Doamnei - Eroilor

#### Linii de metrou în pregătire:

- M6 1 Mai - Aeroport Henri Coandă-Otopeni

Stații cu lifțuri pentru persoane cu dizabilități

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#### LEGENDĂ SEMNE:

- Pasaj de corespondență între linii de metrou cu taxare la trecerea de la o stație la alta
- Stație de corespondență între linii de metrou
- Corespondență cu CFR
- Autostrada A1/A2/A3

#### LEGENDĂ ZONE:

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>Zona 1: Centru</li> <li>Zona 2: Cartierul Berceni</li> <li>Zona 3: Cartierele Mihai Bravu și Vitan</li> <li>Zona 4: Cartierul Titan</li> </ul> | <ul style="list-style-type: none"> <li>Zona 5: Cartierul Pantelimon</li> <li>Zona 6: Cartierul Colentina</li> <li>Zona 7: Cartierele Lacul Tei și Floreasca</li> <li>Zona 8: Cartierele Aviatorilor și Aviației</li> <li>Zona 9: Cartierele Grivița și Bucureștii Noi</li> </ul> | <ul style="list-style-type: none"> <li>Zona 10: Cartierul Giulești</li> <li>Zona 11: Cartierul Militar</li> <li>Zona 12: Cartierul Drumul Taberei</li> <li>Zona 13: Cartierul Rahova</li> <li>Zona 14: Cartierul Ferentari</li> </ul> |
|---|--|---|

# The operating metro network is structured as follows:

Metro Line / Extension	Route	Km	Stations	Commissioned
Metro Line I	PANTELIMON - REPUBLICA - EROILOR - GARA DE NORD - DRISTOR 2	31,01	22 (out of which,7 common stations with Metro Line III)	In stages 1979 - 1990
Extension	Petrache Poenaru - Timpuri Noi	8,63	6	November 1979
Extension	Timpuri Noi - Republica	10,10	6	December 1981
Extension	Petrache Poenaru - Crângași	0,97	1	December 1984
Extension	Crângași - Gara de Nord	2,83	2	December 1987
Extension	Gara de Nord - Dristor 2	7,8	6	December 1989
Extension	Republica – Pantelimon	0,68	1	January 1990
Metro Line II	BERCENI - PIPERA	18,68	14	
Extension	Berceni - Piața Unirii 2	9,96	8	January 1986
Extension	Piața Unirii 2 - Pipera	8,72	6	October 1987
Metro Line III	ANGHEL SALIGNY – N. GRIGORESCU - EROILOR - PRECIZIEI	22,2	16 (7 common stations with Metro Line I)	
Extension	N. Grigorescu - Eroilor	8,67		
Extension	Eroilor - Preciziei	8,83	5	August 1983
	Gorjului - Platform 2 - Platform 1			Iulie 1996 Noiembrie 1999
Extension	N. Grigorescu 2 – Anghel Saligny	4,7	4	November 2008
Metro Line IV	LAC STRĂULEȘTI - GARA DE NORD - GARA PROGRESU	7,44	8	
Extension	Gara de Nord - 1 Mai	3,24	4	March 2000
Extension	1 Mai - Parc Bazilescu	2,3	2	July 2011
Extension	Parc Bazilescu - Străulești	1,9	2	March 2017
Metro Line V	Râul Doamnei - Eroilor 2, Romancierilor - Valea Ialomiței	7,0	10	Septembrie 2020

### 3.1. MODERNISATIONS, UPGRADING

In compliance with the medium-term modernisation and development strategy of Bucharest metro, in 2022, continued the modernisation and refurbishment works of the hereinafter fixed infrastructure installation, as here below:

- rail rehabilitation works on the areas with exceeded load capacity, by mounting new rail type 60 of 120 m length, procured from Austria, on the following inter-stations: Eroii Revoluției - Tineretului, track 1; Piața Sudului - Constantin Brâncoveanu, track 1; Piața Unirii 2 - Bibescu, track 1; Politehnica – Lujerului, track 2 (3.120 m rail).

In November 2022, the rail type 60E1 was accepted and used for the maintenance works associated to the rolling track of the entire metro network in order to replace the rail with exceeded load capacity, and to maintain and provide proper safety and comfort conditions on the transport network.

- replacement of railroad switches located in the following metro stations: Piața Victoriei 2, Gara de Nord 1,

Mihai Bravu, Ciurel Depot, Anghel Saligny;

- replacement of 555 third rail insulators and 268 third rail support devices
- replacement of 509 normal wooden sleepers and 30,91 m<sup>3</sup> special wooden sleepers.

On Metro Line 2, there were mounted 10 concrete sleepers with guard rail support and 10 wooden sleepers, replaced the broken stone on 20m distance, replaced 2 transition coupons 49/60 and 2 rails of 40m in order to secure the rail stability (speed restriction of 5km/h during works).

#### Fare collection system modernisation:

Subsequent to fare collection system modernisation, the trip titles are issued at the pay offices located in the metro stations under tax system.

Also, with the technical support of the Romanian Commercial Bank, Metrorex has implemented the payment by contactless bank card in the software of the trip titles automatic vending machines



### 3.2. TRAFFIC AND ROLLING STOCK FLEET IMPROVEMENT

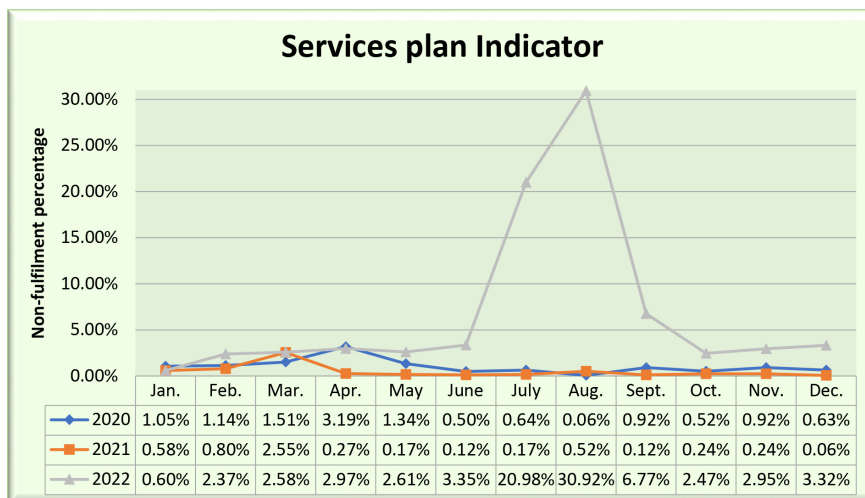
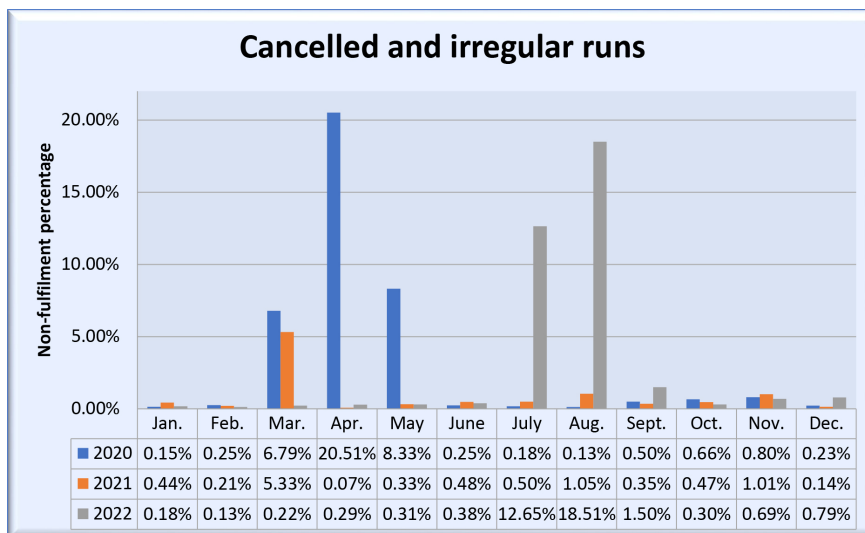
1. There were taken measures to organize the traffic in order to take over the passengers' flows during various time slots, by introducing of metro trains which performed 609 additional runs;

2. In 2022, the traffic flow was achieved in a percentage of 97,14%, compared with the planned runs, while due to significant staff retirements, the company faced with a shortage of metro train drivers and, thus, the trains operated according to the summer timetables, when the passengers' traffic was low;

3. As per the provisions of the "Public Transport Services Contract for 2020 - 2024", signed with the Ministry of Transport and Infrastructure, the performance indicators were monitored, as follows:

- the number of "Cancelled and irregular runs" should not to exceed 5% of the total planned runs, the highest rates of 12,65% and 18,5% being recorded in July and August 2022, as the maintenance services provider had decreased the level of services during 11.07.2022 – 21.12.2022;

- for „Services Plan" (rolling stock fleet in use, compared with the planned rolling stock fleet), the non-fulfilment percentage should not exceed 5%, the highest rate of 30,92% being recorded in August 2022, due to the maintenance provider's decision to reduce the level of services during 11.07.2022 – 21.12.2022.



### 3.3. TRAVEL AND ACCESS CONDITIONS IMPROVEMENT

Further the modernisation of the fare collection system, Metrorex introduced the nominal rechargeable nominal cards. They could had been purchased from the pay offices located in the metro stations where the fare collection system had been upgraded, but could be used in all metro stations, upgraded or not.

If, during the first stage, the nominal rechargeable nominal cards were distributed only for pupils, students and for all other types of passes, as of 2022, the nominal rechargeable nominal cards were issued for all types of trip titles.

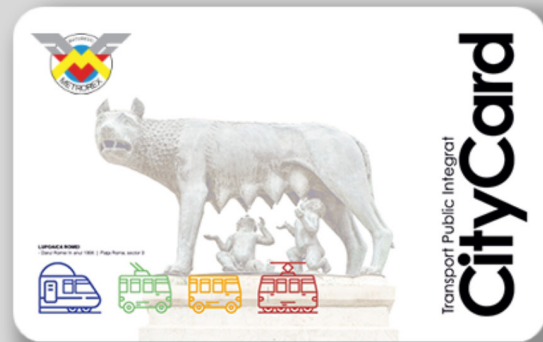
In order to meet the pupils and students' needs, as of May 2022, Metrorex allocated for them additional 50 points of sales and, thus, the number of pay offices dedicated to pupils and students increased to 62.

Also, it was implemented the payment with intelligent devices (smartwatch and smartphone) directly at the entrance gates, so that the access to the metro to be easily made, by simply approaching them to contactless icon.

Metrorex, with the technical support of the Romanian Commercial Bank, has implemented the payment by contactless bank card in the software of the trip titles automatic vending machines.

As of February 17, 2022, Metrorex had diversified the fare offer by launching the first integrated metropolitan trip titles of the surface transportation (in the region Bucharest – Ilfov) with the metro and rail (on the route Gara de Nord – Otopeni Airport). By this measure it was envisaged the creation of an efficient connection of Henri Coandă Airport with the urban public transportation, using a single trip title on all transport means available in Bucharest – Ilfov region, either metro, bus, tram, trolleybus, or train (from Gara de Nord to Henri Coandă Airport) and increase the use of public transport, having real benefits in terms of decreasing the environment pollution because of reduced traffic volume. For a better visual image of the integrated metropolitan cards STB – Metrorex – Railway, Metrorex had used new graphics showing the main monuments of touristic interest in Bucharest.

## Discover Bucharest





An important component of the modernisation of the fare collection system was represented by the automatic vending machines, as close to each entrance into the metro stations there were placed at least two vending machines equipped both for the payment by bank card and, also to give change and recharge contactless cards.

As of 2022, in the metro stations of Metro Lines 1, 2, 3 and 5, there were mounted contactless terminals to the automatic vending machines, in order to enable

the passengers, the possibility to pay by bank card, smartphone and smartwatch when purchasing trip titles.

By the implementation of these measures, Bucharest city was included on the map of the European cities providing such modern access facilities to the metro.

Metrorex efforts shall not stop here. The modernisation strategy of metro operation conditions shall continue to offer pleasant conditions for the passengers.



### 3.4. ATTENDANCE TO LOCAL AND INTERNATIONAL EVENTS

In 2022, Metrorex specialists had the opportunity to attend to technical inspections, tests, acceptances, and trainings, in compliance with the provisions of the contracts concluded with the company's suppliers, within seven business abroad trips, as shown below:

No.	Period	Country	Participare la
1.	29.01.2022 – 6.02.2022	Germany	Training session on usage and surveillance of the lifting equipment for the derailed rolling stock type LUKAS/ Transport equipment for derailed rolling stock type DIPLORY
2.	24.04.2022-28.04.2022	Poland	Factory Acceptance Inspection tests for bogie frame
3.	17.05.2022-19.05.2022	Poland	Quantitative and qualitative acceptance and Acceptance tests for Eurobalises
4.	31.07.2022-06.08.2022	Italy/Belgium	Factory Acceptance Inspection tests for braking system and traction inverter/auxiliary converter
5.	17.10.2022-19.10.2022	Austria	Factory Acceptance Inspection tests for intercommunication corridor
6.	07.11.2022-09.11.2022	Austria	Rail Preliminary Acceptance
7.	16.11.2022 -27.11.2022	Brazil	Factory Acceptance Inspection tests for pantograph, cabin door, traction, and electrical converter, carbody, couples, drive axle.

#### Events attended by Metrorex in 2022

In 2022, Metrorex carried out promotion actions through press releases, information distributed on social networks, conferences, press conferences, reports, interviews, articles etc. upon the company's activity. Thereby, press releases were submitted and distributed on social media networks regarding the following actions attended by Metrorex representatives:

- **Railway Days** summit organized by Club Feroviar during 22 – 24.03.2022 at Politehnica University of Bucharest where it was opened an exhibition booth and there were offered information upon the metro development projects. Also, a technical presentation was delivered on this topic during the summit sessions;

- **Builder in Romania Conference** organized on 24.03.2022 when the General Director of Metrorex presented the development metro projects;

- **Romanian Railway Club Conferences**, XVI edition - Infrastructure Conference, organized in May 2022 at the Technical University of Civil Engineering where Metrorex specialists delivered information upon the underground public transport network;

- **Railway Days** summit organized by Club Feroviar during 18 – 19.10.2022;

- **National Railway Symposium**, XIX edition, organized during 27 – 28.10.2022 by the Faculty of Railways, Roads, and Bridges;

- **Reunion of Public Operators, Producers and Authorities in Public Transport (ROPAT 2022)** - the most important event dedicated to public transport

in Romania, organized during 27 – 28.10.2022 at the Chamber of Commerce and Industry of Romania.

#### Other events:

- In February 2022, it was organized a press conference and the General Director of Metrorex provided the mass-media representatives information related to both economic and financial activity and, also, investment and operation activity and answered to their questions.

- On November 18, 2022, on the occasion of celebrating 43 years of activity, it was organized the **Open Days event at Metrorex Control Traffic Centre**. Over 600 people visited the central control room of the metro network, meeting the place from which the traffic is daily organized.



### 3.5. COMMUNICATION AND PUBLIC RELATIONS

In 2022, the main scope of the communication and press relations activity was to deliver for public, in a transparent and efficient manner, the information associated to the company activity.

In this respect, free access to information of public interest was provided through specific actions: press releases and press information submitted to interested journalists (in writing and by telephone), direct correspondence, by submission of the answers to mass-media requirements, interviews, press conferences, events, dissemination of materials of public interest.

Thus, according to Law no 544/2001 on free access to public information with subsequent modifications and amendments, there were received, registered, and solved 205 written press requests and 80 telephone requests. Also, it was delivered a reply to about 500 phone calls/WhatsApp messages submitted by the press officials when occurring unforeseen situations in the metro network such as train failures, congestion, commercial issues etc.

The company image has been reflected in the press in a positive manner by means of press reports and films created by TV stations and publications, whose representatives missioned into the metro stations in order to obtain the necessary information for covering the documentaries upon the activity of Metrorex.

#### **A few examples of the media reports filmed in 2022 in the metro network are shown below:**

- Report in Eroilor 2 metro station on how a visually impaired person can travel by metro;
- Report at the Control Traffic Centre;
- Report on Metro Line 6
- Report on underground site about the rail change

between Lujerului and Politehnica metro stations;

- Report on rail rehabilitation works during night shifts;
- Report on the responsibilities of a metro driver;
- Reports on traffic and headways;
- Reports on a child's interest for the metro trains;
- Report on the activity of female metro drivers;
- Report on prospective modernisation of nine metro stations in cooperation with Municipality of District 4;
- Report on metro travel fare discounts for students;
- Report on Metrorex activity;
- Report on Santa Claus metro train.

In 2022, Metrorex has permanently developed the interaction with the public using the metro by means of social media pages. In this regard, apart from the Facebook page, available since 2016, new official pages had been opened on Instagram and LinkedIn in order to publish useful information for our customers and also less known details on Metrorex activity, such as:

- Rail switch changing procedure in Piața Victoriei 2 metro station;
- Surprise visit to the Control Traffic Centre or the less known technical rooms of the metro organized for the children having a major interest in Metrorex activity;
- Visit to Depot for a group of ten pupils interested in transportation;
- Letters travelling by metro event when the passengers discovered calligraphic letters with an emotional message on the chairs in the cars





Metrorex has ensured the support and promotion in mass media and on social media networks of the cultural partnerships which consolidated the good reputation of the company. Thus, there were performed around 60 public actions (reports, films, events attendance etc.) In 2022, 49 press releases were submitted to press agencies and also published on the company's website: [www.metrorex.ro](http://www.metrorex.ro).

By means of press releases, social media networks and official Metrorex web page, the company issued and disseminated notices to wide public upon the projects and actions promoted in order to modernize and improve the travel by metro, on various topics of interest, such as:

- Works contract signature related to improvement of „Accessibility of the metro stations into operation for visually impaired passengers“;
- Optimization of the tariff offer by introducing the first integrated metropolitan tickets for the surface transportation in Bucharest – Ilfov region, the underground and railway transportation on the route from Gara de Nord to Henri Coandă Airport;
- Rehabilitation works of Entrance C in Gara de Nord metro station;
- Works contract signature related to „Bucharest International Airport Rail Access Link (Metro Line 6. 1 Mai – Otopeni). Designing services and civil works of Lot 1.1: 1 Mai - Tokyo“;
- Specific works for renovation of Aviatorilor metro station entrance;
- Opening of 50 additional Metrorex points of sale

of discounted trip titles for pupils and students;

- Mounting of contactless terminals to the automatic vending machines located in the metro stations;
- Infrastructure and superstructure work with high level of complexity of the rolling track on Metro Line 2;
- Repair works to one of the entrances in Piața Romană metro station;
- Maintenance works to entrance C – exit to Politehnica University of Bucharest;
- Repair works to the entrance towards Universitate of Piața Romană metro station;
- Completion of works related to mounting of contactless terminals to all automatic vending machined located in the metro stations.

#### **Resolution of petitions**

In 2022, there were registered and solved 2.200 petitions submitted by official e-mail addresses or correspondence/secretariat/register office address.

The passengers' feedback consisted in 300 thank you letters submitted to Metrorex with regard the quality of services. These thank you letters were considered as proofs of client satisfaction for the services rendered, the active involvement in the project's development and modernisation and for the promptness and accuracy of communication with the public.

### 3.6. INFORMATION AND PUBLICITY ASSOCIATED TO PROJECTS UNDER FOREIGN

For the information and publicity of the projects financed under non-reimbursable European funds, there were issued four press releases having as scope the correct, prompt, and constant information of public upon the activities within the projects, and to increase the citizens' awareness about the non-reimbursable financial support granted to Romania by the European Union. The information covered the following projects:

- improvement of „Accessibility of the metro stations into operation for visually impaired passengers” (3 press releases);
- Bucharest International Airport Rail Access Link (Metro Line 6. 1 Mai – Otopeni). Designing services and civil works of Lot 1.1: 1 Mai – Tokyo (1 press release).



# ORGANIZATION AND PERSONNEL DEVELOPMENT

## CHAPTER 4.

The organizational structure complies with the scope of the company's activity and clearly define each position in the Organizational and Operating Rules.

Every position within the organization chart represents the scope of activity of each department and specialized division. They distinctly precise the company's tasks necessary to be performed in the related areas of expertise: operation, revisions-repairs, commercial, informational, strategy, planning, accounting, economic-financial, human resources, traffic safety, labour protection and medical services for the employees etc.

The company's organizational assembly is pyramidal built, so that every department and sub-division to have a single operational subordination.

Since the company's organizational structure defines the hierarchical subordination and control levels, it continuously determines the operational relationship between the departments and sub-divisions to meet the final goal: the passengers' satisfaction.

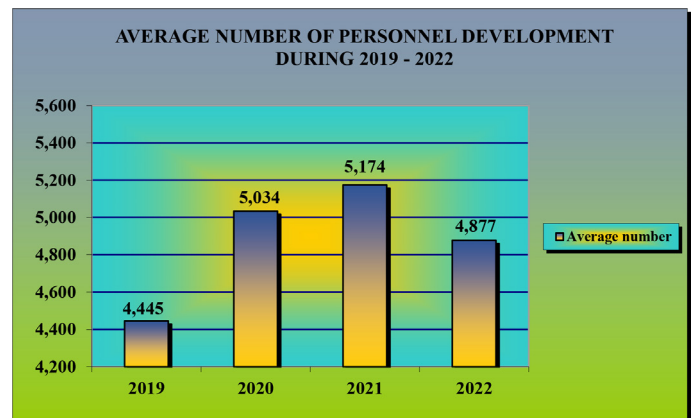
The organization structures which operated in 2022 followed the hereinafter main objectives:

- establishment the functional relationship between departments and sub-divisions;
- organizational structures with simple subordination, so that the information flow to be provided as directly and promptly possible;
- distribution of tasks and specific activities, in compliance with the department or sub-division scope of activity.

The infrastructure and technological installation operation, maintenance and repair were performed by the existing personnel of 5.213 employees, distributed in main sub-divisions, as follows: electro-energetic, electro-mechanic, automatic lines block signalling installation, automation and telecommunications, lines-tunnels, metro stations administration and maintenance, traffic control, commercial, depots.

**The average number of personnel's development during 2019 - 2022**

	YEAR			
	2019	2020	2021	2022
Average number	4.445	5.034	5.174	4.877



## 5.1. INFRASTRUCTURE

### 5.1.1. STATIONS AND INTER-STATIONS

When the site was chosen, there were considered the total number of urban conditions: the concentration of passengers' flows, the characteristics of public utilities in each area, as well as the real possibilities of execution, and, in the same time, avoiding major disruptions of the surface transportation during construction.

The inter-stations route generally follows the main streets in town, the tunnels and metro galleries were performed using the technologies known at the time of execution, since the most of the pierced soils could had been included in the category of the "weak" ones, the groundwater sheet being nearly close to the ground's surface (between 2 m and 5 m).

The rolling track levels are located at 12,00m depth, on average, and may vary between 7,80m and 19,60m. The main public areas and stations accesses were dimensioned in order to take over flows over 50.000 passengers per hour and direction.

In order to provide the passengers upright traffic, there are used elevators, fixed stairs, and escalators with a difference level between 5,00m and 10,30m.



There were used a diversified range of solutions and finishing materials in accordance with the assembly conception concerning the ambient of each station. Consequently, the floors are from natural stone (granite, marble), sandstone or mosaic with granite aggregates.

There are constantly used the granite steps for the access stairs. The walls and pillars are plated with travertine or marble and with ceramic plywood, decorative mortars, enamelled sheet metal elements (alpatron), Trespa panels etc.

There are two ways of ceilings treating, correlated with the solutions for structure, lighting installation, ventilation, signalling etc.:

- suspended ceilings made of light panels, metal grates etc.
- apparent plastered ceilings.

Given the age of the suspended ceilings, the company has launched and promoted a safeguarding program with a view to be further modernised.

On inter-stations operate, as technological endowments, ventilation, and pumping stations. They permanently keep the necessary conditions for a normal metro operation, by evacuating the waters provided from infiltrations, polluted air and by replacing it with fresh air.

### 5.1.2. INSTALLATION

The normal and continuous operation of the existing installation in the metro network ensures the continuity, railway safety and traffic regularity of trains and, in the same time, provides the passengers full security and comfort. The specific conditions of the metro network generated complex technical problems of a great variety.

In order to solve them, there were involved technological engineering and scientific research institutes, technical education institutes and specialized companies of the electronic and mechanical engineering industries in Romania.



### 5.1.2.1. INSTALLATION IN PASSENGERS' SERVICE

#### Each station also has:

- general lighting system;
- escalators;
- public address system to warn the passengers in the stations and to make public announcements;
- electronic clocks (exact hour and recording the elapsed time from the last train's operation);
- installation of passengers' dynamic information (info-kiosks, displays with information for passengers, S.O.S balises);
- installation for continuous surveillance and limiting to non-dangerous values the electrical voltages of touch and step in the embarking areas;
- installation for warning, signalling, and monitoring of fires & intrusions;
- installation for fare collection, passengers control access and automatic vending machines;
- buttons for traction power emergency disconnecting;
- closed circuit television;
- elevators and platforms for vertical transportation.

#### Străulești Multimodal Terminal is equipped with:

- Closed Circuit Television (CCTV);
- Public address system;
- Radio installation;
- Fire detection system;
- Parking fare collection system.

The access areas, escalators, entrances, and stations' platforms are supervised by the operating personnel, by a closed-circuit television system.



### 5.1.2.2. VENTILATION INSTALLATIONS

For a normal traffic, the air discharge that must be circulated on a station – inter-station assembly is of about 300.000 m<sup>3</sup>/h.

The ventilation of this assembly is in reverse mode. During the summer the cleaned conventional air is been introduced by the ventilation station from the station and is evacuated, by the inter-station ventilation.

During winter, the entrance-exit circuit being inverted, the system's heat clearings are used for warming up the public areas in stations.

During summer, there are provided air conditioning and cleaning installations, so that in stations to be maintained a maximum temperature of +27°C.

It is also provided a ventilation system of the sub-platforms in order to prevent dust particles scattering lifted by the trains' traffic and to take over the warmth cleared up when braking in stations. This system provides the air's suction at the level of rolling track and its evacuation to the inter-stations in the trains' operating direction.

The technical rooms are ventilated by specialized independent systems compared with the functional requirements of the various categories of equipment and devices. These ones also provide the smoke exhausting in case of fires.





### 5.1.2.3. SANITARY, WATER SUPPLY & SEWAGE AND FIRE EXTINGUISHMENT INSTALLATION

The stations are provided with water installation necessary for specific consumption, ventilation air treating, extinction of certain fires and washing technical and public areas. The consumption is provided by two independent sources: the municipal network and own deep-water wells, respectively.

In stations and inter-stations, there were provided hydrants and fixed installation for extinction with pulverized water in some technical rooms of increased fire danger or difficult access, in order to be supplied the emergency fire-fighting equipment.

The collected waters, as well as the infiltration waters, are evacuated in the municipal sewerage network with a special pumping installation, both in stations and inter-stations.



### 5.1.2.4. ACTIVITY SURVEILLANCE INSTALLATION

Every station was equipped with a surveillance room, attended by permanent staff, making available a series of endowments providing a global image upon the operational status of installation and conditions in which the surveyed traffic is carried out, such as:

- surveillance monitor of train's traffic, in ATP complex, having 2, 3 or 5 stations;
- telecommunications desk with operative telephony stations on selective calls, local phone lines, automatic telephony stations, transmitter – receiver station for radio communications with the operating trains and the stations sounding installation;
- local dispatching panel for surveillance and control the main installation and equipment: ventilators, water supply plants, pumping stations, escalators, general lighting etc.;
- displays of the closed television circuit in station;
- automatic warning station of incipient fires in technical rooms;
- intrusion detection warning station in pay desks and areas containing important values;
- S.O.S. balises on Metro Line 3 and the connecting stations.

All these endowments enable taking the best decisions and operative interventions in case of disturbances or failures.





### 5.1.2.5. POWER SUPPLY

The electro-energetic installation provides the power supply for 63 metro stations and 6 depots, both for traction and the entire operation activity of metro infrastructure (normal lighting for public and technical rooms, safety lighting, signalling and exit, ventilation installations, pumping installations, escalators installations, elevators and platforms installations for passengers with disabilities, signalling and control traffic installations, public address system, fire detection installations etc.).

The necessary power supply is provided by the national energetic system, by feeders of 20 and/or (10) kV voltage. The concept of this installation considered the continuous operation of the system, altogether, the traffic disruption being admissible only when the municipal power supply would totally fall down. For the situations when the electro-energetically system would become fully non-operational, there were provided independent power supply sources. They supply some vital consumers: the stations and tunnels passengers' evacuation lighting, information transmission between Control Traffic Centre and stations, traffic dispatching centre and trains, as well as control devices for the normal activity's resumption when voltage restarted.

Due to the great territorial dispersion of installation, the imperious need of operatively correlation with the national energetic system when setting up the functional regimes and avoiding the disturbance and damages, there was necessary a centralized coordination and control system. This system has a vital importance in providing the continuity in supply.

For this reason, it operates a central power dispatch unit which takes over all these functions on the entire metro network and provides the here below endowments for every line:

- a group of monitors with automatic display of the operational diagram and control desks;
- telemechanics equipment and communication lines for information taking over and automatic

transmission from and into the process;

- automatic displays, control and fast recording, brackets for the information exchange with the process computer etc.;
- internal telecommunications equipment providing the connection with the national power dispatcher.

### 5.1.2.6 TRAFFIC SAFETY, CONTROL AND AUTOMATION

The complex system of equipment and safety & automation installation of passengers' metro trains operation was designed for a maximum train speed of 80 km/h.

The system consists of the following sub – systems, according to the fulfilled functions:

- installation for automatic train operation, type Westrace, incorporating the optimised train control by process computers, automatic stopping at platforms and trains speed continuous control (automatic pilot);
- automatic train control system (ATC) including the automatic protection subsystem (ATP) – monitors the speed of trains, send the speed codes from the rolling track (rail) to the on-board equipment, detects the rolling stock presence on the involved area, verifies the racks continuity and the automatic train operation subsystem (ATO) – the train stopping in a specific point by fixed programmable balises, indications about the doors opening side, information for not stopping in a certain station, information about the speed regulation.
- installation for automatic train operation, including the traffic telemechanics installation, vehicle identification and automatic display installation in the control traffic centre of the train number (AVI);
- installation for automatic train protection (safety) including the punctual speed control installation (INDUSI) and speed continuous control installation by repeating the signals on board (for BM metro trains), driver's surveillance (surveillance foot board device).

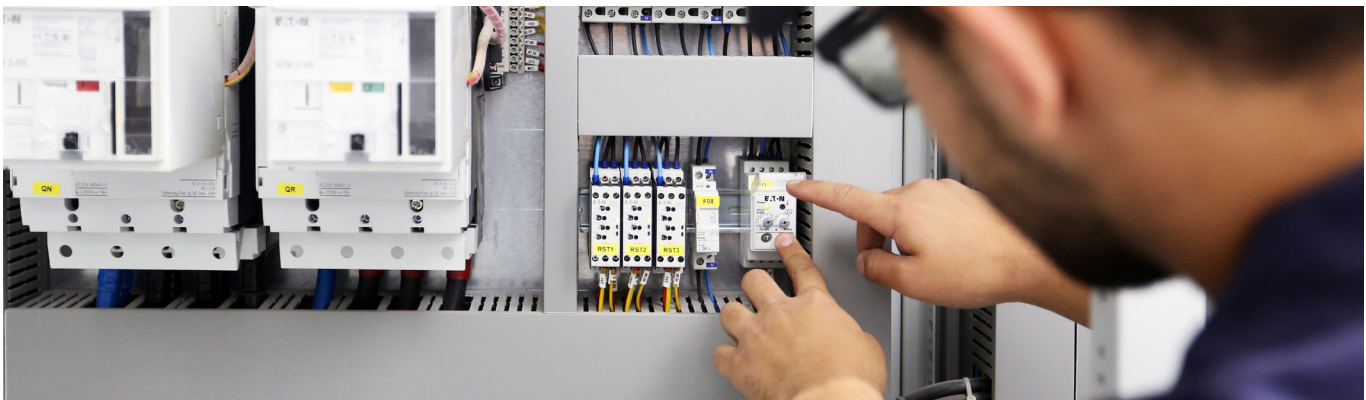
### 5.1.2.7. TELECOMMUNICATIONS

The system provides rapid and safe communication channels, according to the specific operating requirements, integrating in its structure:

- own automatic telephone exchange located in the Control Traffic Centre interconnected with the urban automatic telephone exchange in the area, and with the mobile telephony operators;
- telephony installation with selective call within vocal frequency including a station installed in the Control Traffic Centre and secondary stations mounted in metro stations, parking lines and depots;
- a radio – communication system train - dispatcher operating in normal conditions or with selective call, in order to provide the communications with the operating trains;

- own assigned local frequencies for transmissions;
- underground – ground communication system for emergency situations (this system provides the interconnection with entitled authorities such as the Inspectorate for Emergency Situations, Metrorex management, Police station etc.) operating in parallel with the radio-communications system, to manage the traffic.

The system contains a transmitter/receiver station in the central traffic centre, fixed transmitter/receiver stations in metro stations and depots and on-board transmitter/receiver stations. The personnel performing works in tunnels can also use the system when the metro trains are not into operation and during traffic hours, if the case is strongly justified.



### 5.1.3. INSTALLATION MAINTENANCE ACTIVITY

#### 5.1.3.1. REVISIONS AND REPAIRS ACTIVITY

To normally maintain into operation these installations, it is provided a planned preventive maintenance system consisting of daily maintenance activities, regular inspections, and daily repairs and overhauling. These works are performed based upon annual services programs, split into monthly working activities issued for each installation type.

These works are periodically performed, in strictly compliance with the manufacturer's instructions mentioned in the equipment users' guide.

In 2022, the installation divisions performed 100% of the planned services activities and maintained the installations into normal and safety operation conditions at the technical designed parameters.

#### 5.1.3.2. FAILURES

In 2022, the installation operation was troubled by certain failures occurrence or casual damages mainly incurred by technical reasons due to the reduced reliability of some subassemblies or components, many of these installations being produced with the technology of year 1980.

No failures leading to metro trains safety operation incurred, the maintenance personnel promptly intervening in order to remedy the failures.

The completion of the installations modernisation and upgrading programs, and also the commissioning of new installations had led to decreasing of failures and also the intervention periods of time.





#### 5.1.4. ROLLING TRACK

Considering the physical condition of the rails (with exceeded load-bearing capacity or at the limit of stability), in order to provide the traffic under safety conditions, in 2022, it was purchased new rail manufactured in Austria with the rail coupon of 120 m length. The supplied quantity was of 42 rails type 49E1 and 108 rails type 60E1, in total amount of Lei 6.468.186,66, no VAT, and also 1.740 third rail insulators and 697 clamps, in total amount of Lei 610.875, no VAT.

In compliance with the approved programs applicable in 2022 for the execution of lines maintenance and repair works, there were supplied the necessary materials, such as: one Simple switch S49-1/6-R100, with RH 400 and two simple frogs for left/right S49-1/6-R100 rail switch, in total amount of Lei 262.954,50 no VAT.

#### 5.1.5. LINES, TUNNELS AND SPECIAL CONSTRUCTIONS MAINTENANCE ACTIVITY

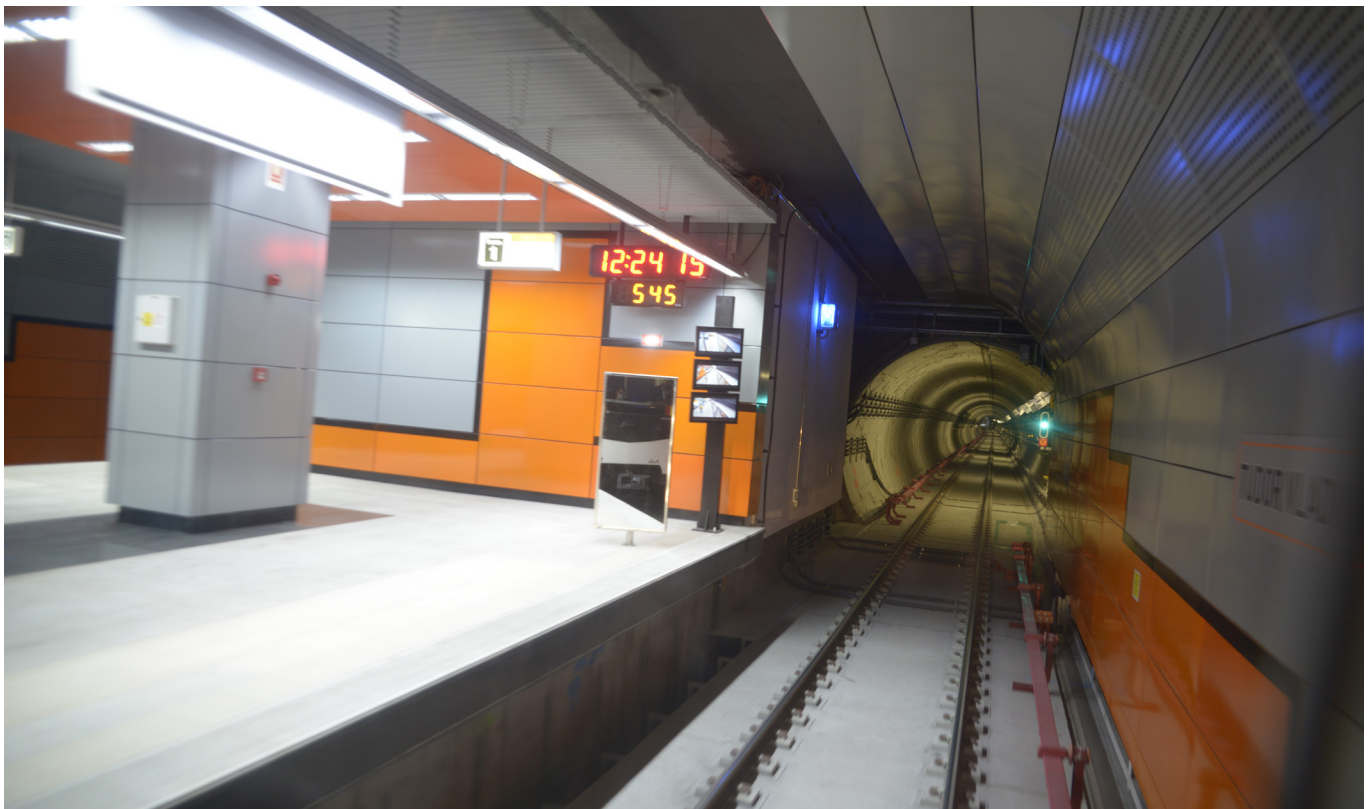
For the rolling track, tunnels, and suspended ceilings there were performed and are still ongoing maintenance and repair works with a view to increase the passengers' comfort conditions and to maintain the metro trains' traffic safety, as follows:

- Current lines maintenance: 149,837 km (simple uncoiled line);
- Rolling track recurrent maintenance: 35,28 km (simple uncoiled line);
- Switches recurrent maintenance: 21/-/4/1;
- Tunnel and gallery maintenance: 161,118 km;
- Metro stations suspended ceilings and ditches maintenance: 102.604 m2



Activity / Metro Line	Current lines maintenance [rail km]	Rolling track recurrent maintenance [rail km]	Switches recurrent maintenance [units]	Tunnel and gallery maintenance [km]	Metro stations suspended ceilings and ditches maintenance [m2]
<b>Metro Line I</b>	55,197	14,884	7/-/2/1	64,735	58.565
<b>Metro Line II</b>	36,656	9,546	8/-/-	37,671	6.361
<b>Metro Line III</b>	28,408	6,043	4/-/1	25,003	17.005
<b>Metro Line IV</b>	13,904	4,807	2/-/1	18,711	20.673
<b>Metro Line V</b>	15,672	-	-	14,998	-
<b>TOTAL</b>	149,837	35,280	21/-/4/1 *	161,118	102.604

\*21 simple switches + 4 by-passes + 1 half by-pass



There were also executed some other major works using significant material and human resources, such as:

- rail rehabilitation works on the areas with exceeded load-bearing capacity, by fitting new rail type 60 of 120 m length, purchased from Austria, on the here below distances: Eroii Revoluției-Tineretului, track 1; Piața Sudului -Constantin Brâncoveanu, fir 1; Piața Unirii 2-Bibescu, track 1; Politehnica-Lujerului, track 2 (3/120m rail);
- rail switches replacement – switch no. 3 Piața Victoriei 2, switch no 5 Gara de Nord 1, switch no. 6 Mihai Bravu, switch no. 8 Mihai Bravu, switch no. 6 Ciurel Depot, switch no. 15 Anghel Saligny;
- current refurbishment works to suspended ceiling in Constantin Brâncoveanu metro station (painting metallic structures, rolling track and platform metal boards, replacing safety glasses with expanded aluminium grates) 210 m2;
- dismantling works of plate glasses/cement-asbestos

plates of the apparent ceiling in the following metro stations: Piața Sudului, Universitate, Piața Victoriei 1, Piața Victoriei 2, Crângași and Gara de Nord 1, these works being necessary due to the physical wear and tear of this system, as potential deficiencies might lead to incidents having impact upon the passengers;

In compliance with the Services Plan approved for 2022, as well as the directives concerning the dismantling/clearance action of temporary constructions located in the metro stations, the here below activities were performed at:

- Piața Romană, platform level, lines 1+2: surface stripping, repair of pillar arches, execution of wall plastering + coating, varnish painting, varnishing (varnish applied); platform level, line 2 - filling of voids with metal joinery (doors, walls); entrance level - surface stripping, wall plastering
- Piața Sudului, entrance level, access, rolling track: walls plastering repair, lime and varnish paintings, dyeing works;

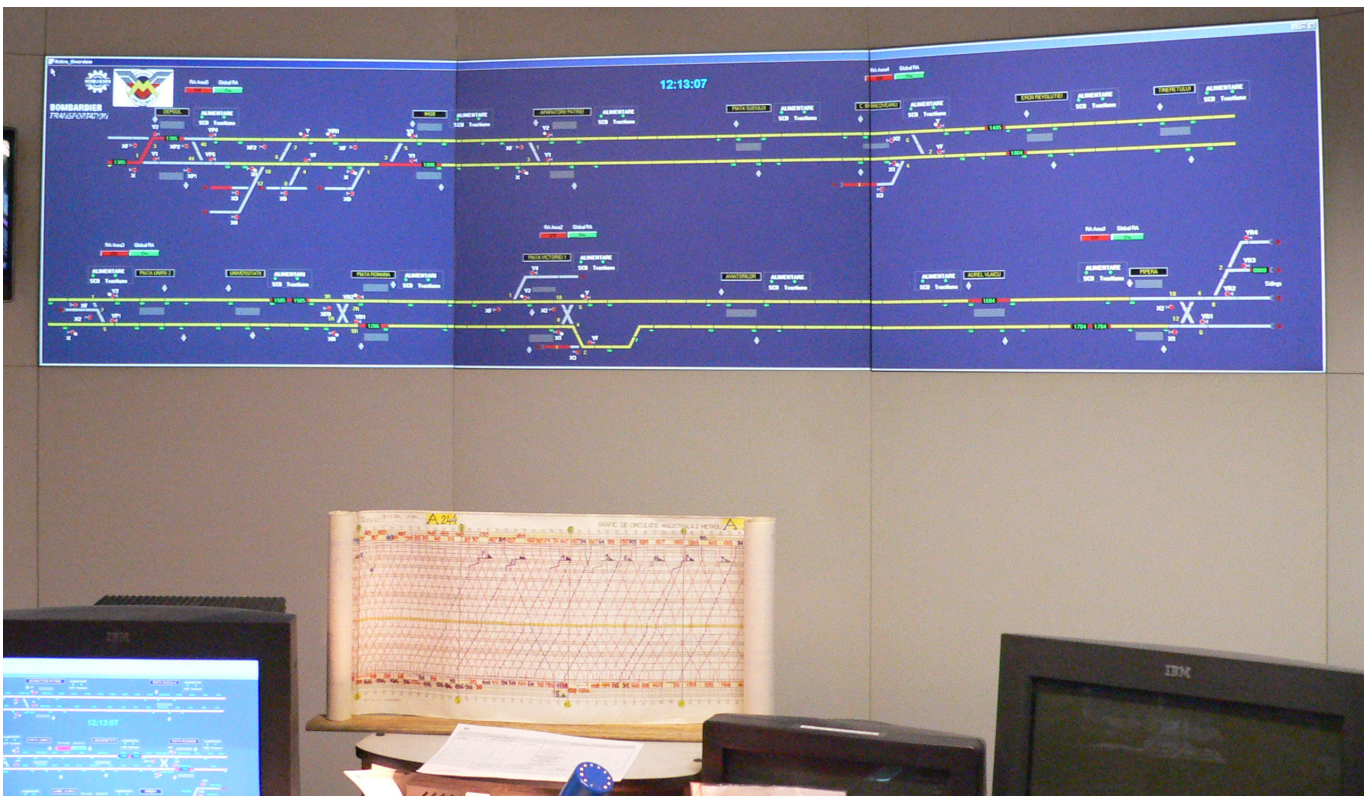
- Aurel Vlaicu, entrance level access: dismantled support layer (concrete screed) in order to insert cables ducts and to pour concrete support layer, and mounted tiled flooring, other fittings (racks, metal joinery etc.), replaced metal carpentry, installed windows, repaired guard rails of fixed stairs soffit setting, plastering, varnish paintings and dyeing, oil painting at platform level walls, metal carpentry painting, other varnish paintings;
  - Piața Victoriei, connecting passageway: finishing dismantling works, plastering restoration works, grouting layer application, flooring repair and mounting tiled flooring;
  - Piața Victoriei 2, entrance level: stair treads removal works, restoration of supporting surfaces, mounting granite stairs, joints grouting, plastering and walls restoration, grouting layer application, flooring repair, dividing technological rooms, dry plastering, paintings, dyeing;
  - Piața Victoriei 1, Y entrance level: surfaces stripping, dry plastering;
  - Mihai Bravu, rolling track platform level (pillars) – plastering repairs, varnish paintings;
  - Republica: walls cladding works, floors and walls restoration by tiling and overcoating;
  - Berceni and depot - firefighting shed: thermal rehabilitation by plastering, polystyrene layering, plaster, finishing works on exterior, installation of attics and jambs, and masking the existing cables on the building;
  - Politehnica Access C: finishing stripping, plastering restoration, paintings, dyeing, and boards mounting; for platform level: plastering rehabilitation, redecorations, dyeing ceilings, and pillars;
  - Universitate – Y entrance passageway: surface stripping, dry plastering, painting, and dyeing, filling voids by metal joinery; escalator area: rehabilitation of metal structure, railing renovation, concrete pouring, granite floor mounting;
  - Titan, X, Y entrance passageway: plastering repair, washable paintings;
  - Tineretului, X entrance passageway: technological rooms dividing with metal structures; platform level: rolling track walls limestone plastering,
  - Gara de Nord 1, rolling track platform level (pillars) – plastering repair works, washable paintings, paintings of wall finishings on lines 1 and 2;
  - Dristor 1, rolling track platform level (pillars) - plastering repair works, washable paintings; platform level - plastering repair works, spackling; Y entrance passageway - plastering repair works, dyeing, paintings;
  - Eroii Revoluției – inter-station: ventilation outlet reinforced concrete pouring;
  - Pantelimon - plastering repair works, dyeing, paintings;
  - Grozăvești, entrance B - plastering repair works, washable paintings, finishing dyeing, flooring repairs, mounting metal structure and float glazing;
  - Eroilor, Izvor, Ciurel Depot, Grozăvești, Petrace Poenaru, Crângași, Timpuri Noi, Republica, Nicolae Grigorescu 1+2, Titan, Costin Georgian, Preciziei, Gorjului, Păcii, Anghel Saligny, Pantelimon, 1 Decembrie 1918, Nicolae Teclu, Berceni, Apărătorii Patriei, Gara Nord 2, Basarab 2, Grivița, Ștefan cel Mare, Obor, Piața Iancului, Piața Muncii, Dristor 1+2 – entrances redecoration - plastering repair works, dyeing, paintings;
  - Politehnica, Grozăvești, Preciziei, Ștefan cel Mare, Preciziei, Aviatorilor - rooftops + outdoor elevator terrace: partial stripping and full roof waterproofing.
- In 2022, the entire metro network length was available for the normal traffic operation.





### 5.1.6. WORKING CONDITIONS IMPROVEMENT

In compliance with the Plan of works and facilities to improve the labour conditions in 2022, approved by Metrorex management and in addition to it, in 2022, there were performed works in the technical rooms in the metro stations and depots, as follows: painting, dyeing, plastering, walls painting, metal/wood joinery and skirting boards painting, plastering repair, ceramic plywood repair, tiled and concrete floor repair, caulking voids, PVC flooring replacement/repair, laminate flooring dismantling, loft repair, furniture manufacture/repair, door manufacture/assembly/repair, door frame repair and key lock fitting, office door hinge replacement, dismantling polycarbonate panels, mounting/removing plexiglass panels, polystyrene insulation, fitting steps/counter-steps, polyurethane resin injections, replacing gutters to trap leaks, overhauling/repairing/replacing sanitary ware, overhauling/repairing/replacing/adding electrical installation, mounting lamps, bulbs, sockets, normal lighting intervention, fitting socket circuits.



## 5.2. ROLLING STOCK

### 5.2.1. ROLLING STOCK FLEET - STRUCTURE

The structure of the rolling stock fleet during 2019 – 2022 is shown in the table below:

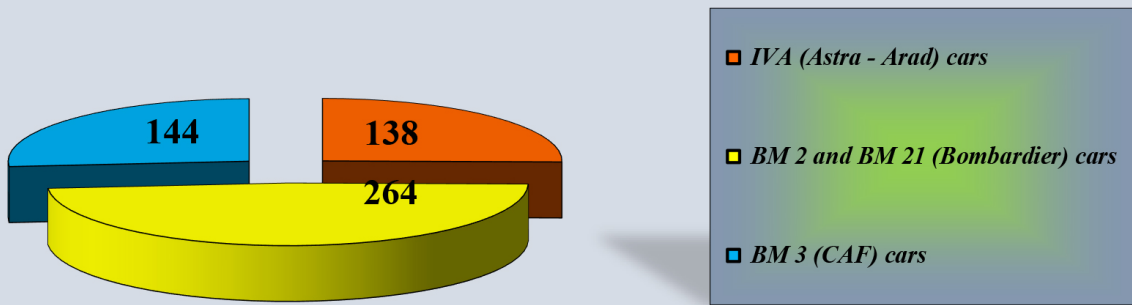
Indicators	2019	2020	2021	2022
<b>Inventory rolling stock fleet, from which:</b>	<b>594</b>	<b>574</b>	<b>574</b>	<b>546</b>
a) IVA (old) metro cars, manufactured by Astra Arad, Romania	186	166	166	138
b) new metro trains generation:	<b>408</b>	<b>408</b>	<b>408</b>	<b>408</b>
- BM 2 and BM21	264	264	264	264
- BM3 (CAF)	144	144	144	144
<b>Operating rolling stock fleet, from which:</b>	<b>324</b>	<b>354</b>	<b>360</b>	<b>360</b>
a) IVA (old) metro cars, manufactured by Astra Arad, Romania	30	36	42	42
b) new metro trains generation	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>
- BM 2 and BM 21	222	228	228	228
- BM 3 (CAF)	96	90	90	90
<b>Total operating rolling stock fleet, from which:</b>	<b>330</b>	<b>330</b>	<b>342</b>	<b>342</b>
a) IVA (old) metro cars, manufactured by Astra Arad, Romania	24	30	36	36
b) new metro trains generation:	<b>306</b>	<b>300</b>	<b>306</b>	<b>306</b>
- BM 2 and BM 21	216	216	222	222
- BM 3 (CAF)	90	84	84	84



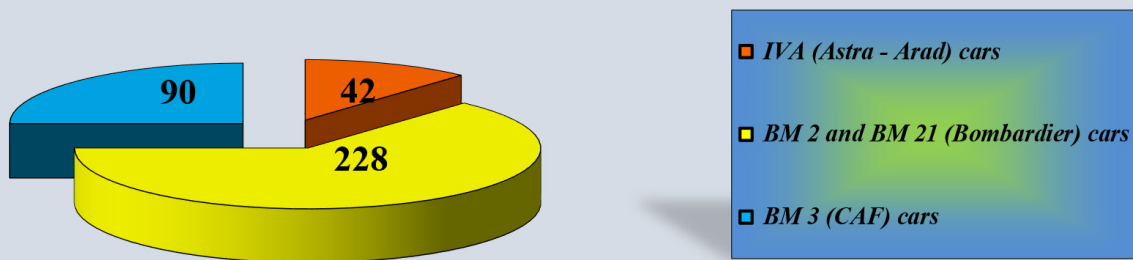


The rolling stock fleet structure in 2022 is shown below:

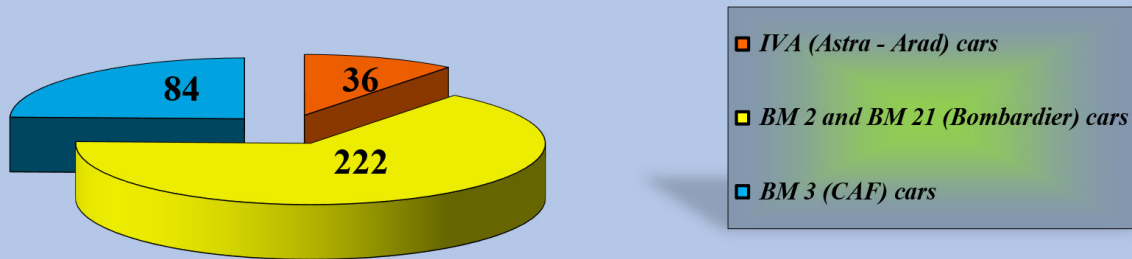
### TOTAL INVENTORY ROLLING STOCK FLEET IN 2022



### OPERATING ROLLING STOCK FLEET IN 2022



### TOTAL OPERATING ROLLING STOCK FLEET IN 2022



## 5.2.2. METRO TRAINS CONSTRUCTIVE CHARACTERISTICS

The existing rolling stock fleet at the end of 2022 comprised both old electric metro trains manufactured by "Întreprinderea de Vagoane Arad" (IVA), configured in 2 metro cars units, BM2 and BM21 new metro trains manufactured by Bombardier Transportation Sweden, configured in 6 permanently coupled metro cars, and BM3 new metro trains manufactured by Construcciones y Auxiliar de Ferrocarriles (CAF), configured in 6 permanently coupled metro cars.



### 5.2.2.1. BM1 (IVA) METRO TRAINS OF OLD GENERATION

Technical characteristics of the IVA type metro unit, manufactured by Astra Arad (configuration of 2 metro cars)	
Length of unit over couplers	2 x 19.000 mm
Maximum width (with closed doors)	3.100 mm
Maximum height from NSS (over pantograph in the lower position)	3.590 mm
Floor height from NSS	1.165 mm; ± 10 mm
Gauge	1.432 mm
Tare Weight	2 x 36 tons
Seating capacity	34
Standing capacity for 4 passengers/m <sup>2</sup>	166
Standing capacity for 8 passengers/ m <sup>2</sup>	264
Supply voltage	750 Vcc (-30%, +20%);
Traction power	4 x 215 Kw
Driving with starting series – parallel controller and braking with auto-compensatory separate excitation	
Control voltage	110 Vcc ± 20% și 24 Vcc ± 20%
Automatic control system for metro unit car starting and braking	SACVAM
Service braking	Electro-dynamic with automatic changing - over on the electro-pneumatic system
Braking when stopped	with spring
Emergency braking	Pneumatic, in addition with the spring braking, except electric brake
Maximum speed	80 km/h
Commercial speed	36 km/h

- The IVA bodyshell is a self - supported structure made of highly alloy steel profiles provided with fixed and hinged windows and four doors on each side of the metro car.
- The metro unit is powered from the third rail, laterally mounted to the rolling track, via some catches mounted on bogie.
- For manoeuvres, in depots and parking areas, the metro car was provided with a pantograph on roof that allows running with a speed of 15 km/h.
- For the communication between the driver and passengers, it was provided an audio installation and for the communication between the driver, operator, and

- traffic centre a radio transmitting/receiving station;
- The IVA type trains, operating on Metro Line 4 – Gara de Nord 2 – 1 Mai, were equipped with automatic protection and operation installation ATP/ATO Dimetronic.

In order to improve the transport conditions, during 2011 – 2013, Metrorex and the metro trains maintenance supplier had initiated a major process for modernisation of 90 cars – 15 IVA metro trains.

### 5.2.2.2. BM2/BM21 (BOMBARDIER) METRO TRAINS OF NEW GENERATION

During 2003 - 2004, on Metro Line 2 were commissioned 18 new metro trains type BM2 (Bombardier) manufactured in compliance with the latest technical standards worldwide: traction in alternative current, recuperative brake, air conditioned in driving cabins, intercommunication between metro cars, communication system between driver, passengers and operator, local doors opening system to enter the cars.

In June 2008, it was supplied the last metro train from a total of 26 new metro trains type BM21 (Bombardier), an improved version of BM2 metro train. These trains were included within the scope of supply of the contract for the acquisition of 20 new metro trains, subsequently supplemented with 6 additional metro trains. Some of these metro trains are in operation on Metro Lines 1 + 3, replacing some of the old rolling stock fleet.

The remaining metro trains type BM21 supplemented the rolling stock fleet on Metro Line 2 with a view to decrease the involved headway.

Subsequently, in 2014, according to the commissioning schedule, 16 metro trains type BM2 were gradually replaced by the 16 new metro trains generation type BM3 (CAF). The 16 metro trains, type BM2, were relocated for being operated on Metro Lines 1+3.

In 2016, after the procurement and commissioning the second lot of 8 metro trains type BM3 (CAF), the other rolling stock fleet type BM2/BM21 were gradually transferred for being operated on Metro Lines 1+3, except for the 2 BM21 metro trains which remained into operation on Metro Line 2 in order to meet the timetables used on this line.

Compared with the old rolling stock fleet, from the technological perspective, BM2/BM21 have improved characteristics, such as:

- high reliability;
- savings in energy consumption up to 25%;
- reduced maintenance costs;
- increased safety and comfort level for the 1.200 passengers of one metro train;
- the communication between the 6 metro cars is performed via intercommunication corridors (gangway);
- highly improved doors locking systems, as they are equipped with sensors to detect obstacles;
- the metro train can be operated by a single driver;
- latest protection systems: automatic train protection (ATP) and automatic train operation (ATO);
- forced ventilation in passengers' compartment;
- the level of noise is much reduced, compared with the old IVA metro trains' level of noise.



## Technical characteristics of the new metro trains generation type BM2 and BM21 (configuration of 6 metro cars)

Length of unit over couplers	112.610 mm
Maximum width	3.100 mm
Axle load	max. 14 tons
Maximum height from NSS (over the roof)	3.460 mm
Floor height from NSS	1.120 mm
Gauge	1.432 mm
Tare Weight	173,5 t
Seating capacity	216
Standing capacity (4 passengers/m <sup>2</sup> )	984
Total capacity – standing seats (8 passengers/ m <sup>2</sup> )	1.968
Supply voltage	750 Vcc 3rd rail in traffic and pantograph in depots
Traction motor rating	16 asynchronous motors 125 kW each
Maximum acceleration	1,25 m/s <sup>2</sup>
Service deceleration	1,2 m/s <sup>2</sup>
Emergency deceleration	1,3 m/s <sup>2</sup>
Braking system	Microprocessor controlled, tread brakes
Propulsion system	IGBT converters, One inverter for 2 parallel traction motors, MITRAC control system, 3-phase asynchronous motors,
Auxiliary systems	2 static converters with battery charger, 400 V AC 50 Hz and 110 V DC, 2 compressors, piston type
Maximum speed	80 km/h





### 5.2.2.3. BM3 (CAF) METRO TRAINS OF NEW GENERATION

In order to improve the traffic safety and passengers' comfort conditions, the new BM3 metro train is characterised by the here below elements (in addition to BM2/BM21 metro trains):

- improved passengers handrail system;
- outer speakers for travel information;
- the train direction displayed on the train's side;
- visual warning for doors closing on the train's outer side;
- special area for bicycles;
- special area for wheelchairs;
- yellow press buttons for local doors opening with Braille text;
- additional number of seats (6 per train);
- improved design of passengers' seats;
- fluorescent strip at access doors' sill;
- improved passengers' access in the metro train by reducing the distance between the car's floor and the platform;
- improved access through gangways by mounting an additional step plate (with skid-proof strip) and divided into 3 parts the first step plate above the bridge slide assembly;
- improved interior design, the indoor displays for passengers' information being hidden inside a fake ceiling, located behind a semi-mirrored glass;
- facile access to the devices destined for passengers' egress emergency, being mounted at the level of panel surface (on the left post of the door) and at a lower height to become accessible also for small and medium height passengers;

- improved climate in cars and adding inclinable windows in the upper part of the windows (for an additional ventilation, besides the forced ventilation of the room for passengers).

From the technological point of view, the new metro train is characterized by the following:

- a Wi-Fi metro network to notify the failures and submit information for metro trains maintenance;
- disk brake mounted on axle, instead of shoe brake mounted on the wheels' rolling surface;
- the anti-climbers and impact deformation elements are to be mounted on the end trailer in order to take over the shocks in case of frontal collision, without affecting the bodyshell for relative speeds below 25 km/h;
- running lights with longer operating Xenon bulbs, instead of Halogen bulbs;
- improved Human Machine Interface (HMI) for the train's driver, via a Touch-Screen monitor;
- driver's seat with headrest;
- special place for driver's bag (under the driving panel);
- modified internal and foreign train design;
- ATC on-board system (automatic train control) mounted in the driver's cabin locker;
- anti-vandalism protection foils of the indoor windows.

In order to improve the safety into operation and the passengers' comfort, the new metro trains had been equipped with automatic train protection and automatic train operation systems (ATP and ATO), compatible with the current new generation infrastructure systems, currently into operation at Metrorex.

## Technical characteristics of the new metro train generation type BM3 (CAF) (configuration of 6 cars)

Length over couplers	113.610 mm
Maximum width	3.200 mm
Axle load	max. 14 tons
Maximum height from NSS (over the roof)	3.550 mm;
Floor height from NSS	1.130 mm;
Gauge	1.432 mm;
Tare weight	172,5 tons
Seating capacity	222
Standing capacity: 4 passengers/m <sup>2</sup>	978
Total capacity – standing seats (8 passengers/m <sup>2</sup> )	1.956
Supply voltage	750 Vcc șina a III-a în linie curentă și pantograf pe liniile tehnice
Traction motor rating	16 motoare asincrone a 145 kW fiecare
Maximum acceleration	1,25 m/s <sup>2</sup>
Service deceleration	1,24 m/s <sup>2</sup>
Emergency deceleration	1,6 m/s <sup>2</sup>
Braking system	Microprocessor controlled, disk brakes for service braking, electro-magnetic shoe for emergency / safety braking
Propulsion system	IGBT converters, One inverter for 2 parallel traction motors, MITRAC control system, 3-phase asynchronous motors
Auxiliary systems	2 static converters with battery charger, 400 V AC 50 Hz and 110 V DC, 2 compressors, piston type
Maximum speed	80 km/h





#### 5.2.2.4. PROCUREMENT OF NEW METRO TRAINS GENERATION

I. The commissioning of Metro Line 5 is one of the main objectives for the Bucharest metro development and modernisation. That is why, this objective was included in the Management Plan of Metrorex for 2013 – 2017, and also in the Sustainable Urban Mobility Plan 2016 – 2030 for Bucharest – Ilfov Region and in the Bucharest Metro Development Strategy 2016 – 2030.

Given the fact that Metro Line 5 is opened for service, in stages, as of 2020, in order to unify the rolling stock fleet to be operated on the entire line, over a period of ten years, from 2020 to 2030, it is necessary to be purchased a single type of train. Here, there will be included the rolling stock fleet associated to the first two sections of Metro Line 5, namely Râul Doamnei - Eroilor (including Valea Ialomiței) and Eroilor – Iancului.

In order to provide the transport capacity of the first two sections of Metro Line 5: Section Râul Doamnei - Eroilor (including Valea Ialomiței) and Section Eroilor – Piața Iancului, in order to ensure the safety and comfort conditions, it was launched and completed an open bid for procurement of new metro trains.

The contract was signed on December 2, 2020 with the successful bidder, Alstom Transport – France (subcontractor Alstom Transport S.A.) having as scope of supply:

- Goods: 13 new metro trains: simulator for training of operating personnel; equipment, devices and special tools for trains maintenance & repair, other fittings/accessories, in compliance with the bidding documents;
- Services and accessories: transport, insurance, commissioning, AFER technical agreement, technical assistance during the defect liability period, training of the operation personnel, train operation and use of software applications.

To enable the possibility to opt for supplementing the purchased quantity, either for equipping the second section of Metro Line 5 (after the construction works shall be completed), or in any other circumstance when an additional need shall arise (for instance, to decrease the

headway), in the contract there is stipulated a revision clause related to the quantity of goods to be supplied which can be used within maximum 84 months from the date of signature, in the sense of extending its scope with maximum 17 metro trains. The total contract duration is of 118 months.

The guarantee period of these metro trains is 48 months, but for a period of 10 years, the supplier shall remain responsible for remedying potential hidden defects.

In order to improve the safety traffic conditions and passengers' comfort, the new metro train, which is referred to as BM4, shall be equipped with some new features compared to the existing Metrorex new generation metro trains fleet, such as:

- enhanced audio and visual warning, both for passengers' doors closing and opening;
- forced ventilation installation of the car, also enabling the possibility of cooling the introduced air;
- presentation on LCD displays of the dynamic map of the train route;
- display of trains direction in all cars and also on their side;
- lighting in the cars with LED lamps;
- recording option closed circuit television and transmission of images from the car at the driver's cabin;
- surveillance cameras of the outside of the train by the driver;
- increased number of intercom and duplex communication devices to improve the passenger-driver communication in case of emergency;
- anti-graffiti film to protect the indoor and outdoor windows of the train;
- automatic train protection and automatic train operation systems, compatible with the existing infrastructure systems on Metro Line 5 (CBTC type – communications-based train control);

In 2022, the manufacturer had prepared the descriptive technical specifications of the train components consisting the basis of the technical design and commenced the inspection activities for validating the proposed technical solutions.

II. For the commissioning of Metro Line 6: Gara de Nord – 1 Mai – Otopeni, the Bucharest Metro Development Strategy 2016 – 2030 stipulates the procurement of new metro trains. In this context, it has been prepared the bidding documents for the procurement of 12 new metro trains and the procurement procedure shall be launched in correlation with the execution of metro infrastructure and installation necessary for the operation activity.

III. In order to provide an urban public transport service by metro at international standards of safety, quality and comfort, to ensure proper operating conditions, so that on each metro line to run a sufficient number of trains of the same type to cover transport and maintenance needs, and to ensure interoperability between Metro Lines (1 - 3 and 2 - 4 - 6), it was proposed the procurement of new metro rolling stock manufactured in compliance with the specific standards laid down by the European Union, i.e. new metro trains equipped with on-board equipment for the CBTC (communication-based train control) system. The necessary number of metro trains shall result from the analysis to be made by Metrorex, in

cooperation with the EIB-PASSA and JASPERS technical experts within the project advisory support service agreement signed between the Ministry of Investment and European Projects and the European Commission.

### 5.2.3. TIMETABLES

The following aspects were considered when using the timetables in 2022:

- the number of transported passengers on the metro network, on specific time slots/stations and metro lines;
- providing the best headway within certain hourly slots when increased passengers' flows are recorded (hereinafter referred to as "peak hours");
- reduced level of maintenance services provided by the maintenance supplier during 11.07.2022 – 21.12.2022





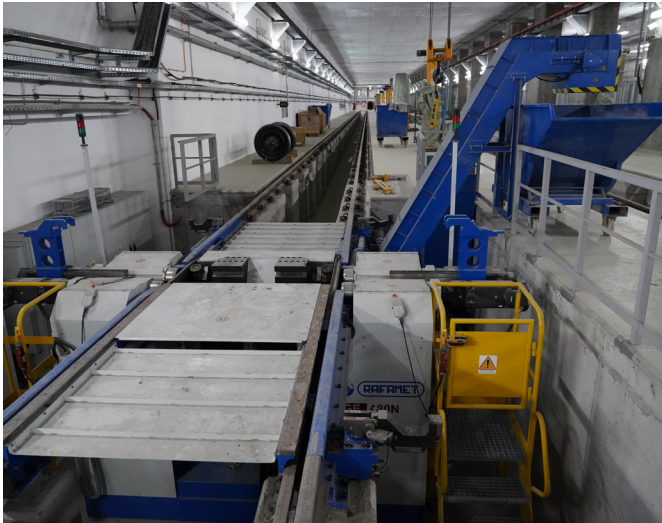
**In this context, the here below operating timetables were used:**

• for business days (Monday – Friday):

No.	Metro Line	Timetable	Applicable period	Headway
1.	Metro Line 1 Republica – Dristor 2	A 1344	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022;	Peak hours: 7' Off peak hours: 8'-12'
		A 1346	03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 7' Off peak hours: 8'-12'
	Metro Line 1 Republica – Pantelimon	A 1344	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022;	Peak hours: 18' Off peak hours: 20'
		A 1346	03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 18' Off peak hours: 20'
	Metro Line 3 Anghel Saligny – Preciziei	A 1344	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022;	Peak hours: 7' Off peak hours: 8'-12'
		A 1346	03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 7' Off peak hours: 8'-12'
2.	Metro Line 2 Berceni – Pipera	A 250	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022; 03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 4' Off peak hours: 5'-12'
3.	Metro Line 4 Gara de Nord 2 – Străulești	A413	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022; 03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 7' Off peak hours: 9'- 12'
4.	Magistrala 5 Eroilor 2 – Romancierilor	A501	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022; 03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 6' Off peak hours: 9'- 10'
	Metro Line 5 Romancierilor – Râul Doamnei, Romancierilor – Valea Ialomiței	A501	03÷07, 10÷14, 17÷21, 25÷28, 31.01.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28.02.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷31.03.2022; 01, 04÷08, 11÷15, 18÷21, 26÷29.04.2022; 02÷06, 09÷13, 16÷20, 23÷27, 30÷31.05.2022; 02÷03, 06÷10, 14÷17, 20÷24, 27÷30.06.2022; 01, 04÷08, 11÷15, 18÷22, 25÷29.07.2022; 01÷05, 08÷12, 16÷19, 22÷26, 29÷31.08.2022; 01÷02, 05÷09, 12÷16, 19÷23, 26÷30.09.2022; 03÷07, 10÷14, 17÷21, 24÷28, 31.10.2022; 01÷04, 07÷11, 14÷18, 21÷25, 28÷29.11.2022; 05÷09, 12÷16, 19÷23, 27÷30.12.2022;	Peak hours: 12' Off peak hours: 18' – 20'

• for statutory days (Saturday - Sunday and public holidays)

No.	Metro Line	Timetable	Applicable period	Headway
1.	<b>Metro Line 1 Republica – Dristor 2</b>	<b>C 1336</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 10' Off peak hours: 11' - 12'
	<b>Metro Line 1 Republica – Pantelimon</b>	<b>C 1336</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 20' Off peak hours: 20'
	<b>Metro Line 3 Anghel Saligny – Preciziei</b>	<b>C 1336</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 10' Off peak hours: 11' - 12'
2.	<b>Metro Line 2 Berceni – Pipera</b>	<b>C 215</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 10' Off peak hours: 9' – 12'
3.	<b>Metro Line 4 Gara de Nord 2 – Străulești</b>	<b>C 414</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 10' Off peak hours: 10' - 12"
4.	<b>Metro Line 5 Eroilor 2 – Râul Doamnei – Valea Ialomiței</b>	<b>C 501</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 9' Off peak hours: 9'
	<b>Metro Line 5 Romancierilor – Râul Doamnei; Romancierilor - Valea Ialomiței</b>	<b>C 501</b>	01÷02, 08÷09, 15÷16, 22÷24, 29÷30.01.2022; 05÷06, 12÷13, 19÷20, 26÷27.02.2022; 05÷06, 12÷13, 19÷20, 26÷27.03.2022; 02÷03, 09÷10, 16÷17, 22÷25, 30.04.2022; 01, 07÷08, 14÷15, 21÷22, 28÷29.05.2022; 01, 04÷05, 11÷13, 18÷19, 25÷26.06.2022; 02÷03, 09÷10, 16÷17, 23÷24, 30÷31.07.2022; 06÷07, 13÷15, 20÷21, 27÷28.08.2022; 03÷04, 10÷11, 17÷18, 24÷25.09.2022; 01÷02, 08÷09, 15÷16, 22÷23, 29÷30.10.2022; 05÷06, 12÷13, 19÷20, 26÷27, 30.11.2022; 01÷04, 10÷11, 17÷18, 24÷26, 31.12.2022;	Peak hours: 18' Off peak hours: 18'



In 2022, the passengers transport service has been achieved at a rate of 97,14%, by means of 540.211 total planned runs, being registered:

- 524.779 operated runs;
- 16.041 cancelled runs, out of which 14.274 runs had been cancelled due to „other causes“ (suicide attempt, graffiti dyeing, major passengers flow, headway adjustment, reduced level of maintenance services);
- 436 irregular runs, out of which 97 runs due to „other causes“ (suicide, graffiti dyeing, major passengers flow, headway adjustment).

For 2023, our company intends to attract a greater number of passengers by adjusting the operating schedules in order to provide a proper transport capacity, to satisfy the transport demand, and meet the best comfort and safety conditions.

#### 5.2.4. ROLLING STOCK FLEET MAINTENANCE

In order to provide the urban public transport services, in compliance with the provisions of the Transport Services Contract concluded between Metrorex S.A, as Operator, and the Ministry of Transport and Infrastructure, as Contracting Authority, as per the national and European enforceable law, Metrorex S.A used in operation (commercial service + supporting activities) 15 IVA metro trains (90 cars), 44 new BM metro trains (264 cars), 23 new CAF metro trains (138 cars), 6 Diesel Hydraulic locomotives (LDH), 5 railway inspection trolleys, 11 cars for administrative use, out of which 2 cars for rapid interventions. The outsourcing of the rolling stock maintenance service had been made as a component of the company's reorganization, restructuring, and upgrading strategy issued in 2002. The outsourcing was enforced as an organizational measure within the frame of the development strategy for the metro operating activity and counted on a positive result in respect of increasing the technical and technological performances.

The first step within the outsourcing activity was the signature with ALSTOM Transport S.A. of the contract related to the "Maintenance of railway rolling stock operating in tunnels", for a period of 15 years, starting from

July 1st, 2004. In 2011, by renegotiation, this contract had been subsequently extended until December 31, 2019 (Contract no. 91/20.11.2003).

Since the validity of the contract for "Maintenance of the railway rolling stock operating in tunnels" was about to expire on 31.12.2019, in 2018, there were purchased professional consulting services (by the signature on 12.12.2018 of a services contract between Metrorex S.A and the Joint Venture SYSTRA S.A. - METROUL S.A) with a view to conclude a maintenance services contract under which Metrorex S.A. could obtain high quality services, in advantageous conditions. The selected consultant professional services involve the assistance of Metrorex S.A. during the entire period starting with the procurement process preparation, by a competitive procedure, until its completion, resulting in the signature of a new rolling stock fleet maintenance contract by Metrorex S.A.

Due to legislative changes regarding the administration of public property, incurred in 2019 by the issuance of the Government Decision no. 57/2019 concerning the Administrative Code [(regulatory document which do not contain provisions by which the public property having special destination for the maintenance activity (land, buildings, access routes) belonging to Metrorex S.A. to be used by the services provider], it was necessary for Metrorex S.A to make arrangements towards various public authorities for their support in order to solve this matter resulting in delays in launching the competitive procurement procedure of the maintenance services.

As the period until the expiry of the Contract no. 91/20.11.2003 did not allowed the launching of a competitive procurement procedure of the maintenance services, in order to ensure the continuity of these services, it was applied a procurement procedure foreseen as exception by the relevant applicable law and, consequently, it was organized a negotiation procedure with no prior invitation to a competitive bidding procedure.

Considering the quality of the maintenance services performed within the Contract no.91/20.11.2003, Metrorex S.A. sent the invitation to this bidding procedure to the same services maintenance provider.

The procedure was completed at the end of 2019, by the signature of a new maintenance services contract for metro trains and railway vehicles used on the metro infrastructure for one year (01.01.2020 – 31.12.2020), this being the second step within the outsourcing activity of the maintenance activity by Metrorex S.A.

In 2020, it was launched the procurement procedure of the services related to Maintenance of railway rolling stock operating in tunnels for a period of 15 years.

Since until the expiry date of the maintenance services contract concluded for year 2020, the competitive bidding procedure could not had been completed, in order to be provided the ongoing maintenance services, a new contract was signed with the same services provider

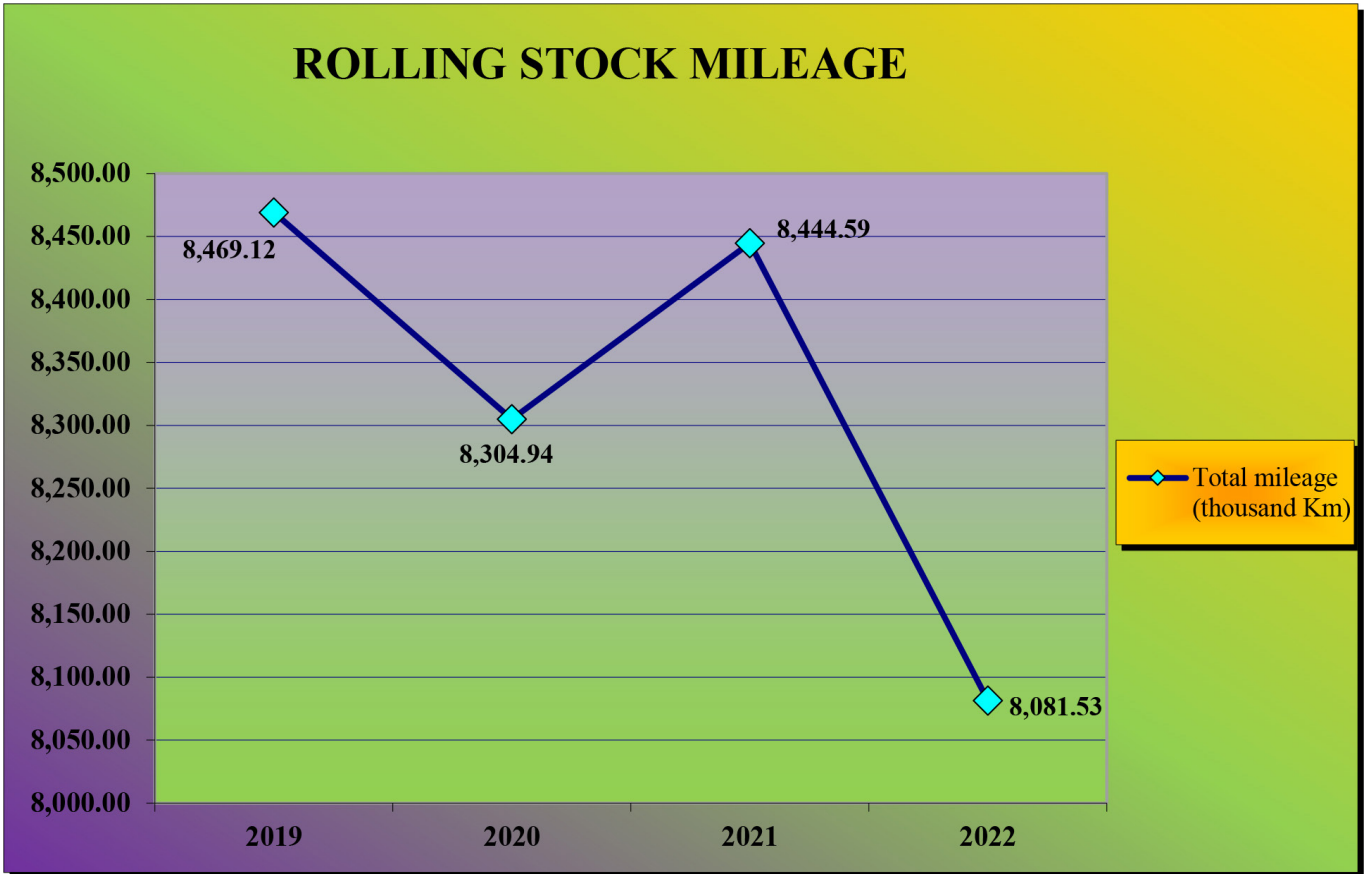
for an indicative one-year period of time, containing a clause for a potential extension up to six months, and mentioning that in case the competitive bidding is to be completed, the contract shall provide a termination clause and coming into force of the new maintenance services contract. This had been considered as the third step within the outsourcing activity by Metrorex S.A.

In 2021, all legal steps were taken and completed the procurement procedure of the services related to Maintenance of specific metro and railway rolling stock for a period of 15 years, so that, at the end of 2021, a new services contract was concluded, this representing the fourth outsourcing action of the maintenance activity by Metrorex. The new services contract effectively came into force on January 1st, 2022.



### 5.2.5. ROLLING STOCK MILEAGE

Year	2019	2020	2021	2022
Rolling stock mileage (thousand Km)	8.469,12	8.302,80	8.446,04	8.081,53

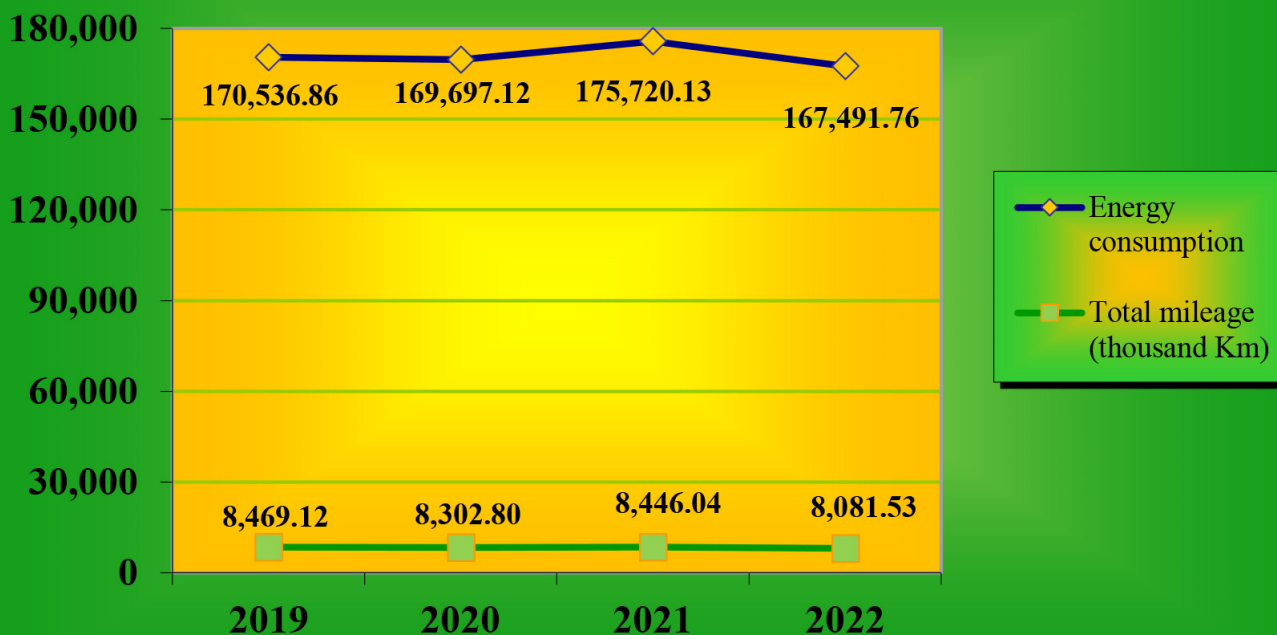


## 5.2.6. ENERGY CONSUMPTION

The energy consumption development within 2019 - 2022 is shown below:

Indicator	Year (MWh)			
	2019	2020	2021	2022
Energy consumption, of which:	170.536,86	169.697,12	175.720,13	167.491,76
- for traction	91.449,94	90.438,72	91.668,66	88.447,95
- for installation	79.086,92	79.258,40	84.051,47	79.043,81

### MILEAGE DEVELOPMENT - km - AND ENERGY CONSUMPTION DURING 2019 - 2022



Compared to 2021, the energy consumption decreased in 2022 due to reduced number of km ran in 2022 compared with 2021, subsequent to operating a reduced number of metro trains due to diminished level of maintenance services during 11.07.2022 – 21.12.2022.



### 5.3. ACTIVITY RELATED TO INFORMATICS SYSTEM IN 2022

In 2022, the IT staff enabled the interface with the maintenance services provider for any issue reported within the Integrated Informatics System operation, in order to adapt and develop the solution, in compliance with the legal amendments and the requirements of the internal users.

During 2022, the volume of information to be processed increased and diversified, thus the number of users logged into the Information System increased, new

reports and applications were modified and developed, both by own staff and by the external consultant.

Also, the HELPDESK division followed up the requests issued by Metrorex pay desks and provided technical support for the fare collection system and ticket sales application.

Another activity within the IT area of expertise carried out in 2022 was the one related to network and computer management, and the use of "Hardware infrastructure securing and optimisation" system of Metrorex data network.

The screenshot displays the Metrorex Portal interface. At the top, there is a navigation bar with tabs for 'Top Management', 'Metrorex.ro', 'Dispecerat Central', 'Suita E-Business', 'Planificare Raportare', 'Management documente', 'iLearning', 'HELP\_DESK', 'Interfețe Externe', and 'Dezvoltari'. Below this, a search bar and a 'Deconectare' button are visible. The main content area is titled 'Managementul documentelor -OCS' and contains several panels:

- Legături (Links):** A list of quick links for 'orcladmin', 'E-mail' (2 messages), 'Voicemail' (0 messages), 'Calendar' (0 invitations), 'Activități' (0 activities), and 'Spații de lucru' (workspaces).
- Dosare (Cases):** A table showing recent files, with one entry for 'metrorex' modified on 12.12.2013 09:33.
- Calendar:** A view for the date 13 mai 2015, showing a schedule for 'Rezervare' (reservations) from 08:00 to 13:00.
- Expeditor (Sender):** A table with columns for 'Expeditor', 'Subiect', and 'Data', currently showing no messages.
- Registru- INTRARI-IESIRI (Attendance Register):** A section for tracking employee arrivals and departures.

The servers, routers, and switches of Metrorex administrative network had been permanently monitored, by analysis of logs, verification of operating parameters and flagged any kind of malfunctions, being taken all necessary steps for intervention in due course. There had been made the network configurations/reconfigurations and the equipment had been maintained into operation in order to keep these services secure for Metrorex users.

As for the protection against cyber and virus attacks, there were purchased services to updating the virus signatures during 2022, configured the IT equipment connected in the network for being protected by the procured antivirus (Bitdefender) and there were taken the necessary steps to intervene in due course and solve the incurred problems. Also, for protection against cyber-attacks, annual update services were purchased from the manufacturer of the security barriers used to protect the email server, the web server, and the internal network connection to the Internet.

It was maintained the "METROREX SITE" application which can be visited at the web page www.metrorex.ro. This site is currently shown in FTP dynamic version and the passengers may find in real time the information with regard the routes of all metro lines, including the connections with the ground transport system (STB) in each station.

The current structure of Metrorex website was set according to the standard format for publishing the information of public interest, in compliance with Law no. 544/2011 and the Memorandum issued by the Ministry for Public Consultation and Social Dialogue, further approved by the Government Decision issued on March 2nd, 2016.

There had been monitored the updating information and useful messages on sites in html format (press releases, information related to procurement, investment, reports upon the payments enforced by Minister Orders or Government Decision, activities concerning the future metro network development, information on employment, notifications upon intended expropriations on the route for Metro Line 6).

Also, there were performed site maintenance operations and regular back-ups on the backup servers and updated the site backup versions.

Due to budgetary constraints, no IT systems modernisation or optimisation projects were carried out in 2022. The involved activities were limited to maintaining the existing systems and networks within the normal operation parameters.





# COMMERCIAL ACTIVITY

## CHAPTER 6.

### 6.1. DEVELOPMENT OF TRANSPORTED PASSENGERS

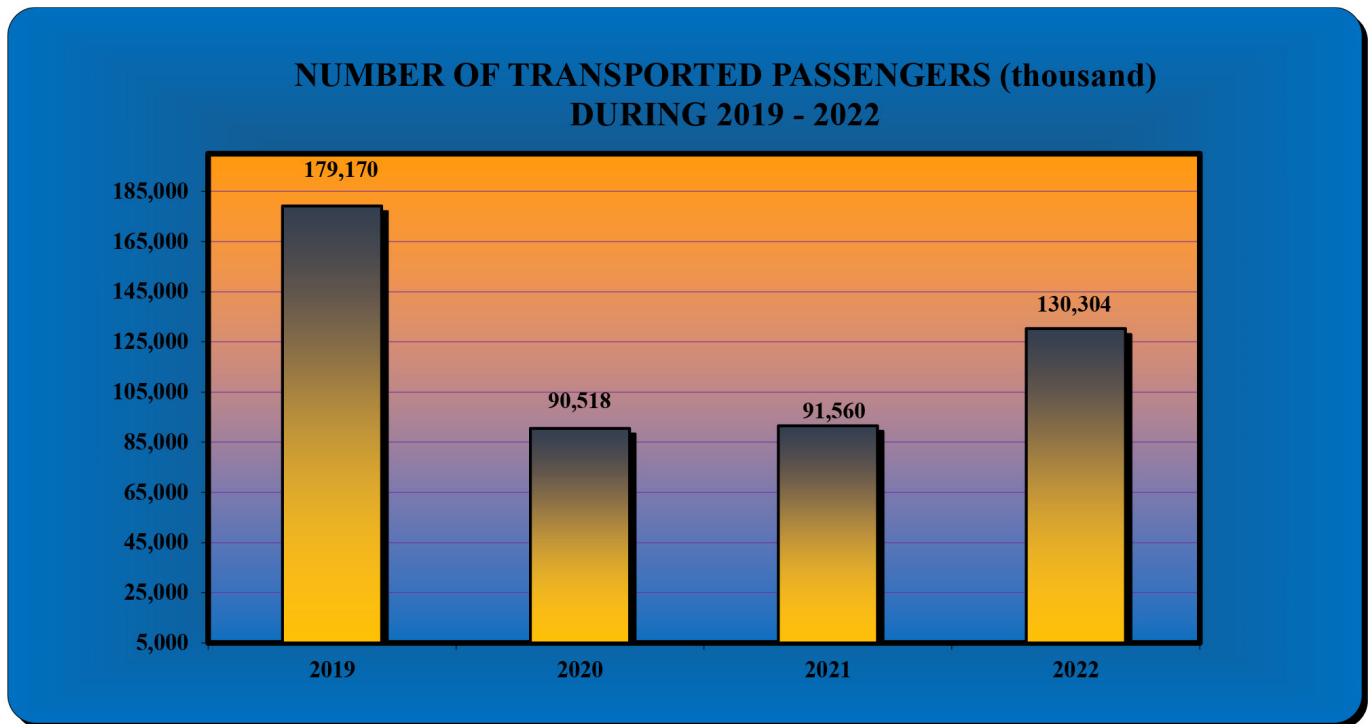
Although it covers only 4% of the Bucharest entire public transport network, the metro supplies a higher transport capacity due to its comfort, regularity and safety traffic conditions and provides the transport for about 20% of the total passengers using the Bucharest urban public transportation.

In 2022, the number of transported passengers increased compared with the previous year. Still, this number remain low compared with the period prior pandemics, and thus, around 400.000 passengers/day being transported, on average.

In normal circumstances, the Bucharest metro carries, on average, around 500.000 passengers/day, and over 15 million passengers/month.

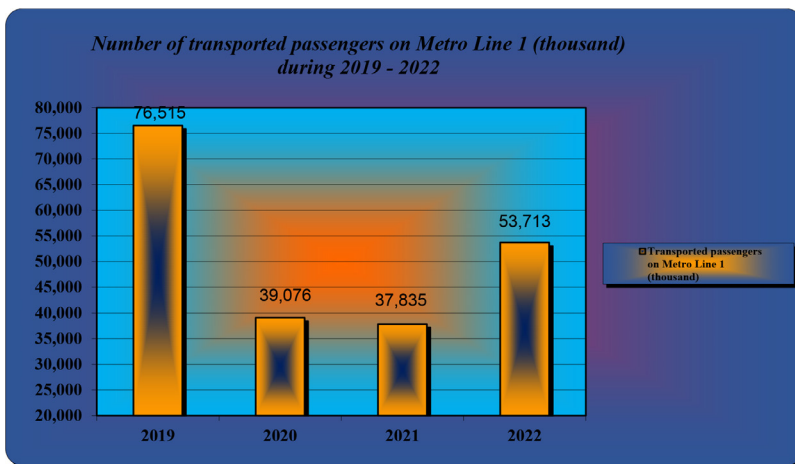
The number of transported passengers' development within the last four years is shown below:

	Year (Thousand passengers)			
	2019	2020	2021	2022
Transported passengers	179.170	90.518	91.560	130.304

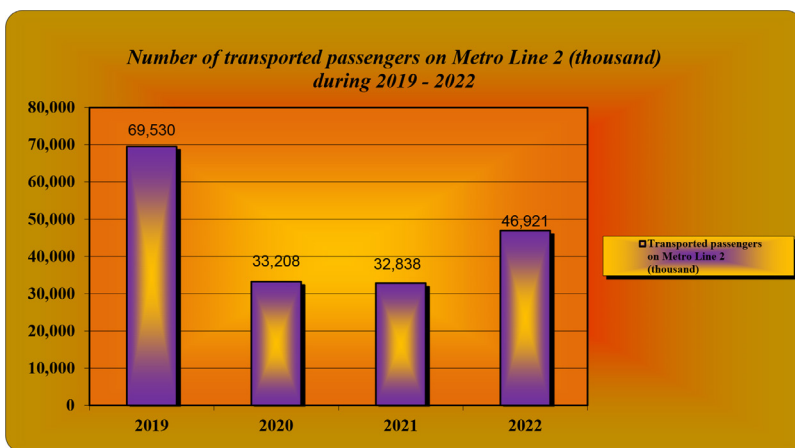


The dynamic of the transported passengers within the last four years, on each of the four metro lines, is shown below:

Year	Thousand passengers					
	Total transported passengers	Transported passengers on Metro Line 1	Transported passengers on Metro Line 2	Transported passengers on Metro Line 3	Transported passengers on Metro Line 4	Transported passengers on Metro Line 5
2019	179.170	76.515	69.530	26.949	6.176	
2020	90.518	39.076	33.208	14.509	2.955	770
2021	91.560	37.835	32.838	14.419	3.144	3.324
2022	130.304	53.713	46.921	19.283	4.664	5.723

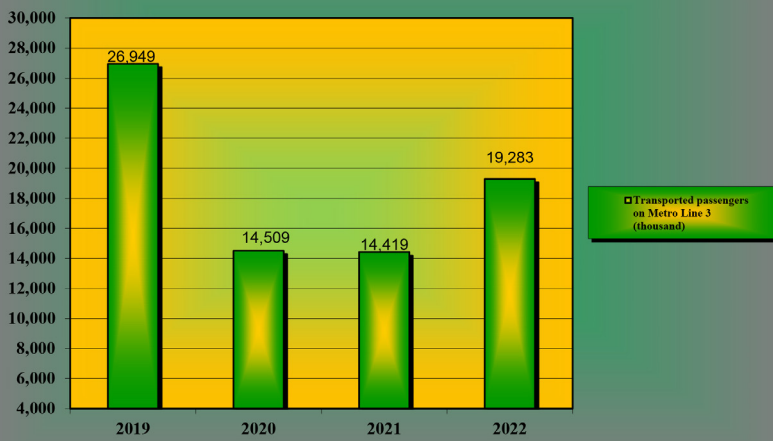


**Number of transported passengers on Metro Line 1 (thousands) during 2019 - 2022**



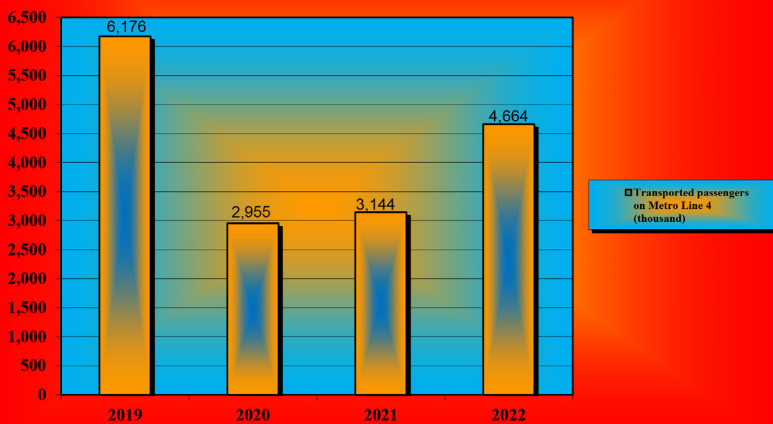
**Number of transported passengers on Metro Line 2 (thousands) during 2019 - 2022**

Number of transported passengers on Metro Line 3 (thousand) during 2019 - 2022



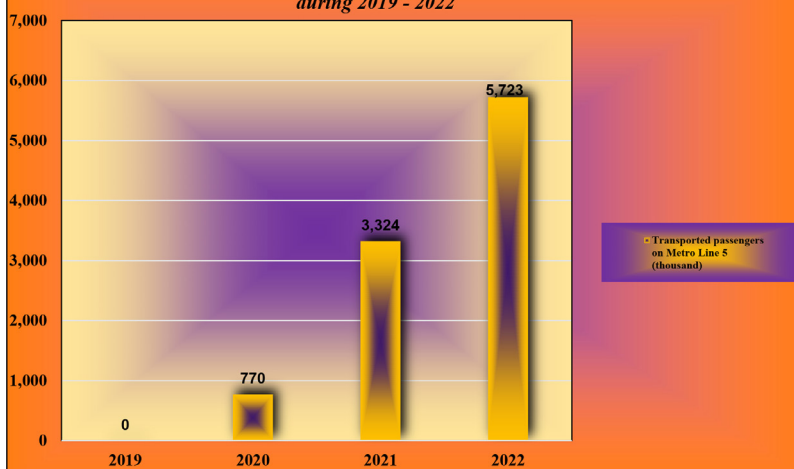
Number of transported passengers on Metro Line 3 (thousands) during 2019 - 2022

Number of transported passengers on Metro Line 4 (thousand) during 2019 - 2022



Number of transported passengers on Metro Line 4 (thousands) during 2019 - 2022

Number of transported passengers on Metro Line 5 (thousand) during 2019 - 2022



Number of transported passengers on Metro Line 5 (thousands) during 2019 - 2022

## 6.2. TRIP TITLES

- one trip
- two trips
- 50% discounted two trips for students
- ten trips
- 50% discounted ten trips for students
- 24 hours pass/daily pass
- 72 hours pass
- weekly pass (7 days) with unlimited trips
- 50% discounted weekly pass (7 days) with unlimited trips for students
- monthly pass with unlimited trips:
  - fully paid
  - 50% discount (students and blood donors)
  - 100% discount (pupils, orphan students)
- 6 months pass
- annual pass
- pass for passengers under the protection of special laws: war veterans, Revolution heroes
- AVC magnetic ticket
- Contactless PayPass Bank card
- Common trip title METROREX – STB:
  - 1 metropolitan and metro trip valid 120 minutes
  - 2 metropolitan and metro trips valid 120 minutes

- 10 metropolitan and metro trips valid 120 minutes
- 24 hours metropolitan and metro pass
- 72 hours metropolitan and metro pass
- 7 days metropolitan and metro pass
- 1 month metropolitan and metro pass
- 6 months metropolitan and metro pass
- 12 months metropolitan and metro pass
- Common trip title METROREX – Railway (M-R)
  - 1 month M-R integrated metropolitan pass
  - months M-R integrated metropolitan pass
  - 12 months M-R integrated metropolitan pass
- Common trip title METROREX –STB - Railway (M-S-R)
  - 24 hours M-S-R tourist card
  - 75 hours M-S-R tourist card
  - 1 month M-S-R integrated metropolitan pass
  - 6 months M-S-R integrated metropolitan pass

## TRIP TITLES USED WITHIN THE BUCHAREST METRO NETWORK



10 trips

Daily pass



AVC magnetic ticket

## Common ticket METROREX – STB and METROREX – STB - RAILWAY



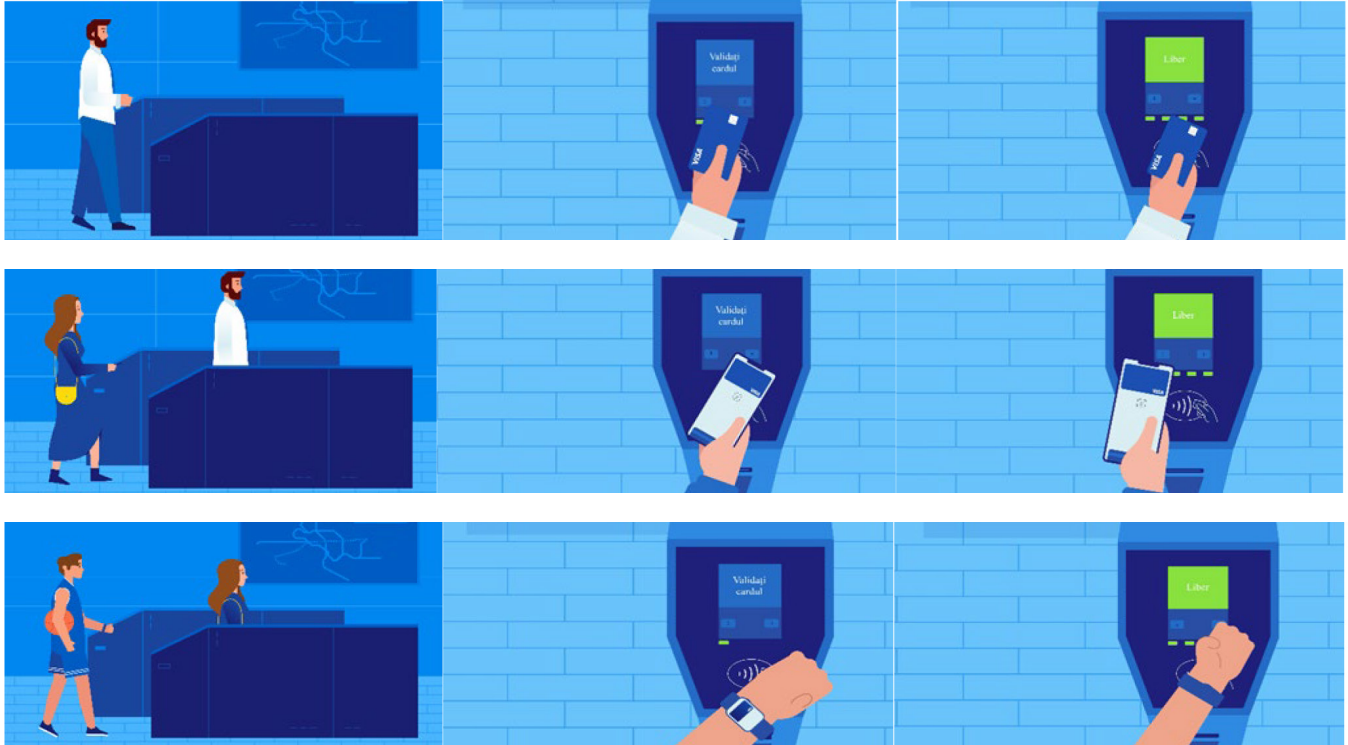


# New Tickets Design -2022-

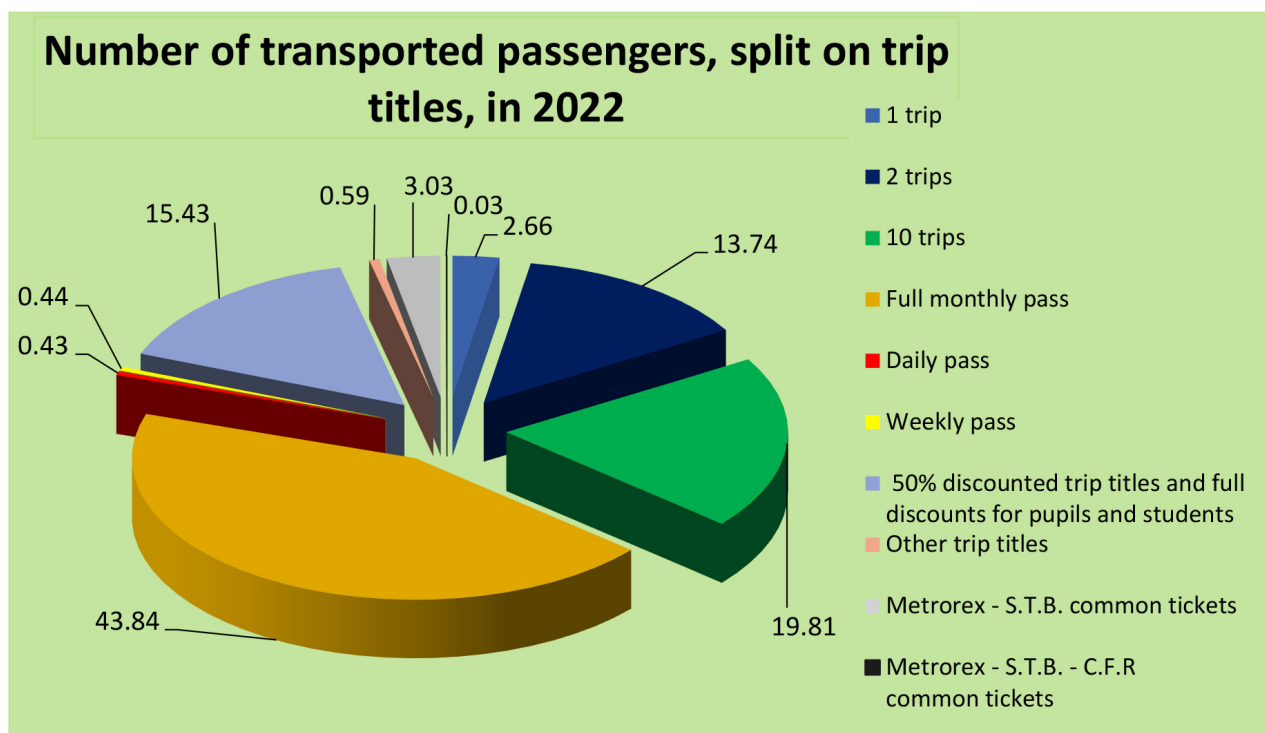


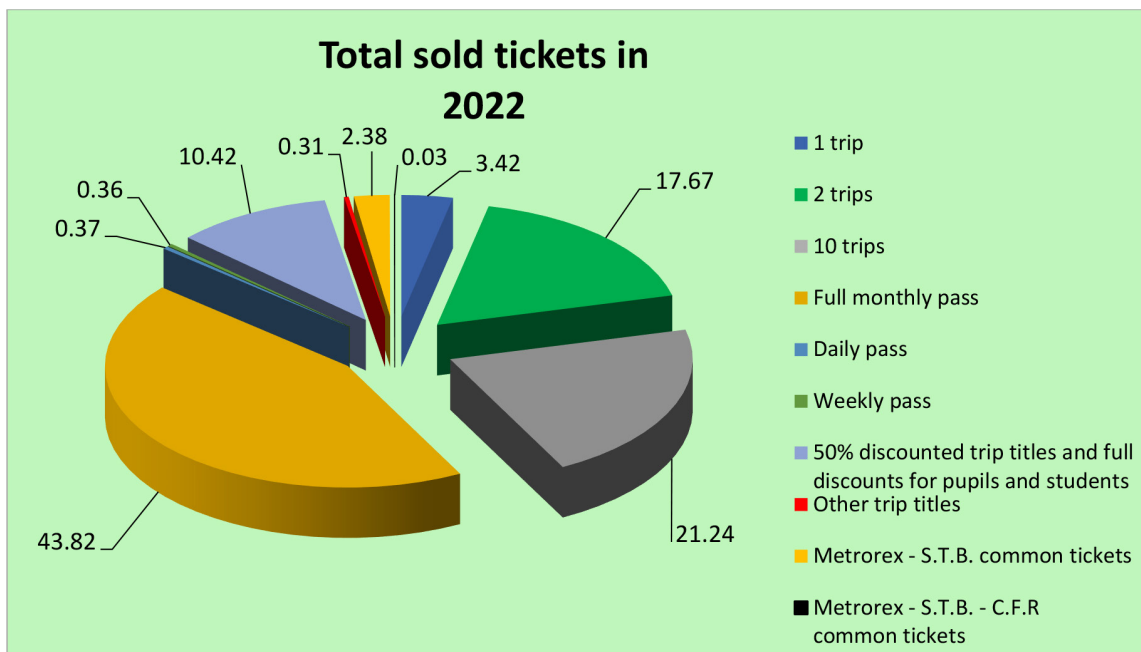
## Implementation of new payment modalities for Metrorex S.A. trip titles

In 2022, there were installed contactless terminals at the automatic vending machines in all metro stations located on Metro Lines 1, 2, 3 and 5, so that the passengers to be able to pay using the bank card, smartphone or smartwatch when purchasing trip titles. The payment with smart devices directly at the access gates (smartwatch and smartphone) had also been implemented, in order to facilitate the entrance into the metro by simply bringing these devices close to the contactless sign.

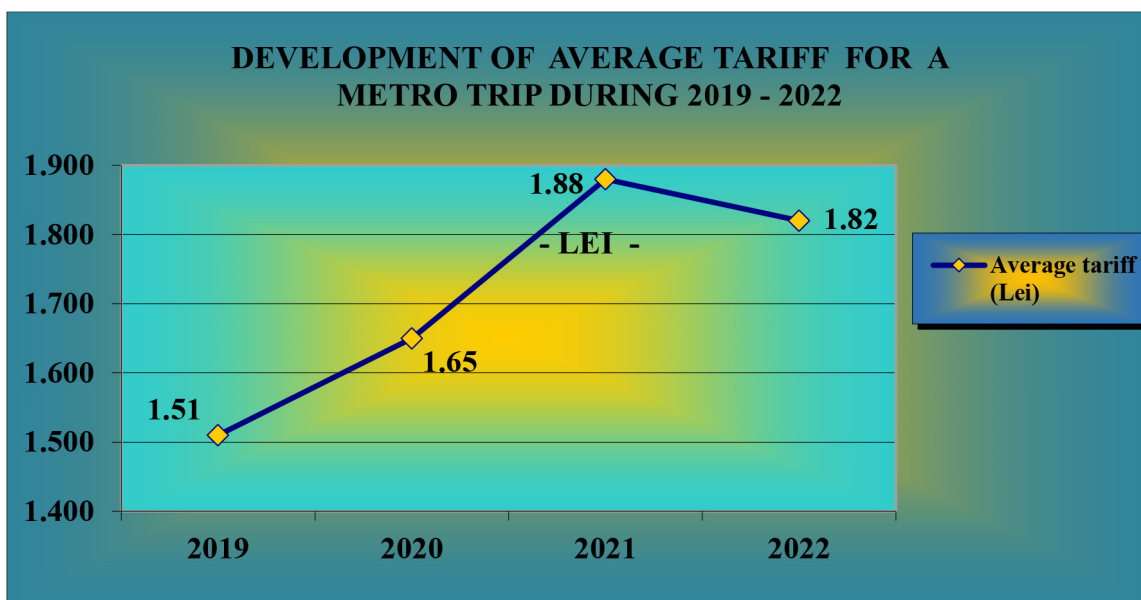


In 2022, the diagram of total sold tickets is shown below:





### 6.3. THE DEVELOPMENT OF AVERAGE TARIFF FOR A METRO TRIP



In order to meet the passengers' needs, as of February 2022, there were introduced new STB – Metrorex – Railway integrated metropolitan trip titles were introduced. The trip titles 24 hours and 72 hours tourist cards enable as many transfers in the metro network, on any type of ground vehicle in Bucharest – Ilfov region and railway (on the route from Gara de Nord to Henri Coandă Airport) during the hourly validity range

No.	Surface (S)/Metro(M)/Railway (R)* Product name	Integrated tariff - Lei -
1	Integrated metropolitan pass/24 hours	20
2	Integrated metropolitan pass /72 hours	40
3	Integrated metropolitan pass /1 month S/M/R	210
4	Metropolitan pass M-R/1 month	140
5	Integrated metropolitan pass /6 months	1.100
6	Metropolitan pass M-R/6 months	800
7	Integrated metropolitan pass /12 months	2.000
8	Metropolitan pass M-R/12 months	1.400

## Cultural projects which increased Metrorex S.A. corporate image

### Painted advertisement

The first ever painted commercial at the metro has been made for Netflix (the Stranger Things series). After the project completion, the wall was repaired and painted again in compliance with the guidelines provided by Metrorex staff in charge with the station's maintenance activity.



### M City

As part of the M City project, the Bucharest passengers had the great pleasure to discover the reinterpreted travel by metro, as depicted by Romanian artists, in murals of the metro stations.



### Art Safari – World Health Day

The "Art Safari" cultural partnership was designed to promote national values and culture through the works of the best known 100 Romanian masters of art, a project meant to raise awareness and educate the passengers.

On the occasion of the International Health Awareness Day, Metrorex – in partnership with Art Safari – placed in Eroilor 1 metro station the sculpture of the Romanian artist Costin Ioniță named "Tribute to medical doctors fighting against SARS-CoV-2 virus". In the context of the last two years when SARS-CoV-2 virus has put an enormous pressure on the entire medical system, the work signed by Costin Ioniță humbly brought out into high relief the heroism and tireless work of the medical staff, in a tribute to all. Nevertheless, Metrorex continued to promote the culture in the Bucharest metro stations.





## Ambassadors at the Metro Musical Theatre – June 1st

On the occasion of the "International Children's Day", right in the heart of the city, at Unirii 1 metro station, it has been organised an event inviting to smiles and laughters. The passengers could stop and listen to the famous songs of Liliana Ștefan or took pictures with the most beloved characters of the "Music Box – The Adventures of the Magic Hat" show.



## Did you know...?

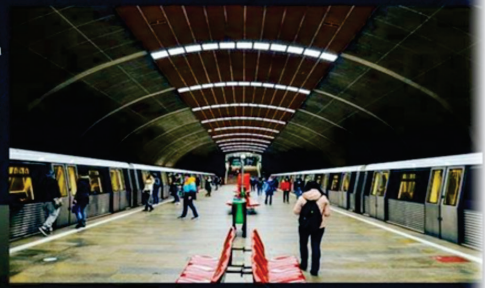
The Project "Did you know ...?" was a sequel of the cultural campaigns, through which, by means of information panels located in metro stations, the travel was transformed from a simple journey from A to B into an experience itself, showing undiscovered information about the Bucharest metro?

## Știați că ...?

Stația de metrou Titan a fost dată în folosință în anul 1985. Designul acesteia, cu o boltă mare și fără vreun stâlp de susținere intermediar, a făcut ca stația Titan să devină cel mai interesant punct al metroului bucureștean.

Pentru realizarea stației de metrou Titan a fost nevoie de înghețarea solului, operațiune realizată cu ajutorul unei impresionante instalații cu amoniac. Metoda înghețării solului nu se mai aplicase nicăieri în România până la acel moment.

Stația de metrou Titan face parte din al doilea tronson (Mihai Bravu - Republică) al primei magistrale a metroului bucureștean (M1), dată în folosință în anul 1981.



## Santa Claus's metro train

As it has already become a tradition, during winter holidays, Metrorex decorated a Bombardier metro train with Christmas messages and images. The train operated all December on Metro Lines 1 and 3. As a premiere, in 2022, the passengers travelling by Santa Claus's metro train were in for an unexpected surprise.





**On the seats in the train,** the passengers discovered handwritten letters with a message intended to touch their hearts:

*“Dear beautiful soul,  
The winter season is more than material things.  
It is about heartfelt presents, such an honest smile, a compliment, a small gesture of kindness, unconditional love which could bring true happiness in everyone’s soul. Give from your heart!”*



**“Promote the literature”** in the metro trains, project in partnership with Embassy of Spain in Romania. Stickers with texts belonging to famous, classical, and contemporary writers were placed in a Bombardier metro train operated on Metro Lines 1 and 3.



**“No queues at the counter” Pilot project**

The Bucharest District 4 had begun the implementation of “No queues at the counter” project, meeting the requests of the citizens willing to have access to fast and modern services. Thus, by installing automated payment stations and self-pay devices in public areas with heavy traffic, the tax payer was given the opportunity to have a rapid and secure access to detailed information upon the payment obligations, facilitating the possibility to pay all taxes and fees due to local budget, in strict compliance with the enforceable regulations on fiscal secret.

Consequently, the Bucharest District 4 installed these self-pay facilities in the following metro stations located on the administrative territory of district 4: Dimitrie Leonida, Apărătorii Patriei, Piața Sudului, Constantin Brâncoveanu, Eroii Revoluției, Tineretului, Piața Unirii, Timpuri Noi, without disrupting the passengers’ flow or blocking the access routes.

# INVESTMENT ACTIVITY IN 2022

## CHAPTER 7.

### INVESTMENT PROGRAM ACHIEVEMENT

The investment program in 2022 was prepared based upon the Bucharest metro network development, upgrading and modernisation strategy, structured on the following main directions:

1. On-going activities with a view to complete the investment works under various stages of preparation and/or execution;
2. Preparations to initiate new investment objectives for the Bucharest metro network extension and modernisation.

In 2022, the approved funds for the investment activity were of 593.091 thousand Lei, in total, structured as here below:

#### **TOTAL, of which: 593.091 thousand Lei**

- Title 51 - Transfers to finance the metro investment projects: 149.606 thousand lei from which achieved : 32.400 mii lei  
- the outstanding balance will be reported in the program of 2023
- Title 58 - Projects financed under non-reimbursable funds within the financing programme 2014 - 2020: 443.485 thousand Lei  
from which achieved: 404.738 thousand Lei

#### **The approved funds for capital expenditures in 2022 were used for the here below mentioned investment objectives:**

##### **• Metro Line 4. Section Gara de Nord – Gara Progresu**

In 2022, there were continued the necessary arrangements for the implementation of the project related to construction works of Metro Line 4: Lac Străulești – Gara Progresu, section Gara de Nord – Gara Progresu, by preparation of the documentations for Urban Zonal Plans (PUZ) of Bucharest city and Ilfov County. After the General Council of Bucharest city and the Regional Council of Ilfov county issue the decision to approve the above mentioned Urban Zonal Plans, a Notification will be submitted to the National Agency for Environment Protection, representing

the screening stage upon the intention to develop the investment, in order to obtain the legal guidance and to make all necessary arrangements for the issuance of the Environmental Permit. After the Environmental Permit is to be obtained, the investment objective shall be promoted for approval by Government Decision.

##### **• Metro Line 5. Drumul Taberei – Universitate – Pantelimon**

The technical and economic indicators of this investment objective were reapproved by Government Decision no. 347 dated June 3rd, 2019, published in the Official Journal of Romania no. 453/05.06.2019. This decision enforced upon the merger of the two sections of Metro Line 5, Drumul Taberei – Universitate and Universitate – Pantelimon, respectively.

- **Section I:** Râul Doamnei - Eroilor, including Valea lalomiței Station, Depot and connecting gallery  
Project cost: Lei 3.223 million  
Main indicators: 10 stations, 1 depot and associated tunnels of 6,871 km total length.

In 2022, there were continued the civil engineering works which could not had been accepted, namely the works associated to entrances A-A1-B1-B of Parc Drumul Taberei metro station, entrance B of Academia Militară metro station, platform extension of Eroilor 1 metro station, by reconfiguration of Line 4 and mounting 9 escalators and one indoor elevator, and Valea lalomiței Depot, respectively.

Also, there were continued the works related to the second stage of the safety and automation system, in parallel with the preparation of the technical design of the new rolling stock to operate on Metro Line 5.

##### **- Section II:** Eroilor - Iancului:

In 2022, it continued the activity related to preparation of the deliverables within the “Services Contract for designing and technical assistance for Metro Line 5 (Drumul Taberei – Pantelimon), Section Eroilor (PS Operă) – Piața Iancului” signed with the Joint Venture 3TI Progetti Italia - Ingegneria Integrata SpA & SWS Engineering SpA & Coding SRL & METRANS Engineering SRL.



• **Metro Line 6: Bucharest International Airport Rail Access Link**

In 2022, it was signed the design and build contract for Lot 1.1. between 1 Mai and Tokyo metro stations and carried out certain designing services.

Also, the procurement procedure associated to designing services and civil engineering works for Lot 1.2 between Tokyo and Otopeni Airport metro stations was launched.

The arrangements to promote for approval, by Government Decision, the revised Annex 2 of Government Decision no. 496/2017 upon the land expropriation for public utility work had been completed.

Therefore, by Government Decision no. 906/13.07.2022, the amount secured as fair compensation upon the land expropriation for public utility work on the national interest corridor for Metro Line 6 was supplemented in 2022.

• **Improvement of metro urban public transport services on Metro Line 2 Berceni – Pipera:**

The procurement procedure of the sectorial contract having as subject matter “Consulting services, technical assistance and works supervision” for the implementation of the project associated to Improvement of metro urban public transport services on Metro Line 2 Berceni – Pipera was completed by the signature of the Report of procedure and the services contract will be signed.

In 2020, the procurement procedure of the sectorial contract having as subject matter Improvement of metro urban public transport services on Metro Line 2 Berceni – Pipera. Replacement of rolling track and installation on inter-stations was cancelled, as the manufacturer of the safety traffic and automation system in use on Metro Line 2 refused cooperation and further development of this system.

Therefore, subsequent the clarification discussions with the representatives of the Ministry of Transport and Infrastructure and JASPERS with regard the safety traffic and automation system to be used on Metro Line 2, as the awarding documents shall accordingly be modified, the here below approach was considered:

- Rolling track and installation: to be executed in compliance with the original documentation, by relaunching the tender, without the safety traffic and automation system.

- Safety traffic and automation system: shall be the scope of a new investment project, and also of a new procurement procedure, apart from the one related to rolling track.

The co-opted experts submitted the terms of reference for the rolling track rehabilitation, subsequently reviewed by detailing the rolling track possession time slots, so that the contractor to be able to perform the works included in the awarding documents, and the impact of works upon the normal operation schedule to be minimized.

The final form of the bidding documents, updated feasibility study (DALI) and General estimate

shall be agreed within the meetings of the technical and economic councils of Metrorex S.A. and the Ministry of Transport and Infrastructure and the Interministerial Committee in order to promote for approval the new investment objective by Government Decision.

After taking all these steps, it shall be resumed the procurement procedure related to the awarding of the sectorial contract having as subject matter Improvement of metro urban public transport services on Metro Line 2 Berceni – Pipera. Replacement of rolling track and installation on inter-stations.

• **Project to make accessible the metro stations in service for visually impaired passengers**

The project is intended to improve the accessibility of the metro stations for the visually impaired passengers and consists of installation of special stainless-steel strips directly applied on the existing flooring in the metro stations and Braille information panels.

The investment objective was approved by Order of Minister of Transport no. 1717/02.11.2018. The project is financed under EU non-reimbursable funds, as per the Finance Contract in amount of Lei 24.128.276,69 signed within the Large Infrastructure Operational Program LIOP 2014 – 2020.

In 2022, out of 63 metro stations in total, there were executed accessibility works in 14 metro stations, as follows: on Metro Line 1 (Piața Victoriei 2, Gara de Nord 1, Basarab 1, Piața lanului and Obor), Metro Line 3 (Preciziei, Gorjului, 1 Decembrie 1918, Nicolae Teclu and Anghel Saligny) and Metro Line 4 (Gara de Nord 2, Basarab 2, Grivița and 1 Mai).

• **Execution of a metro station at ground level between Berceni metro station and the Ring Road – Tudor Arghezi metro station**

On September 12, 2019, Metrorex has signed a Protocol of association with Bucharest District 4 city hall in order to carry out a public procurement procedure for the “Execution of a metro station at ground level between Berceni metro station and the Ring Road” (design, execution, and consulting & supervision services during construction, publicity etc.).

For the execution of this work, on 01.10.2020, Bucharest District 4 has signed a contract with the Joint Venture SOMET SA – TIAB SA – UTI GRUP S.A – CONSTRUCȚII ERBAȘU S.A.

In this regard, a Finance Contract in amount of Lei 258.464.409,03 was signed within the Large Infrastructure Operational Program LIOP 2014 – 2020. The works related to erecting an inter-station to connect the existing Berceni metro station with the new designed station (Tudor Arghezi) were completed on 04.11.2022.

Consequently, at the end of 2022, the related technological tests commenced in order to prepare the acceptance on works completion and verification of the necessary conditions for the metro station, Tudor Arghezi, to be opened for service.

## **BUCHAREST METRO NETWORK EXTENSION AND MODERNISATION**

In 2022, there were carried out the works associated to the following projects:

### **I. Metro Line 5:**

- a. Section I - Râul Doamnei - Eroilor, including Valea Ialomiței Station, Depot and connecting gallery:
  - monitoring the remaining works to be completed, such as entrances at Parc Drumul Taberei and Academia Militară metro stations, and reconfiguration of Line 4 to extend the platform of Eroilor 1 metro station;
- b. Section II. Eroilor – Piața Iancului (6 stations; 5,4 km)
  - performing the design activities and preparation of necessary documentations to launch the procurement procedures for civil engineering works.

### **II. Metro Line 6. 1 Mai – Otopeni. Bucharest International Airport Rail Access Link**

- a. Southern Section between 1 Mai and Tokyo metro stations:
  - on 08.03.2022, the sectorial contract no. 32 having as subject matter Bucharest International Airport Rail Access Link (Metro Line 6. 1 Mai – Otopeni). Design and build of Lot 1.1.: 1 Mai – Tokyo was signed with the Joint Venture Alsim Alarko Sanayi Tesisleri ve Ticaret A.S. – Makyol Insaat Sanayi Turizm ve Ticaret A.S.
  - the contractor commenced the designing activities right after receiving the Inception Order.
- b. Northern Section between Tokyo and Otopeni Airport metro stations:
  - it continued the evaluation of bids submitted within the procurement procedure having as subject matter Bucharest International Airport Rail Access Link (Metro Line 6. 1 Mai – Otopeni). Design and build of Lot 1.2: Tokyo – Otopeni Airport.

### **III. Metro Line 4 - Section Gara de Nord – Gara Progresu:**

- Subsequent to the preparation of the Feasibility Study associated to construction of Metro Line 4: Lac Străulești – Gara Progresu, Section Gara de Nord – Gara Progresu, there were made the necessary arrangements with a view to:
- obtain the Zonal Urban Plan for the land located in Jilava village, Ilfov county;
  - issue the Screening stage Decision no. 3/20.04.2022 upon the Strategic Environmental Assessment;
  - initiate the preparation of the bidding documents for design and works execution with the support of EIB – PASSA experts.

### **IV. Ongoing projects jointly implemented with Bucharest local authorities:**

- On September 12, 2019, Metrorex has signed a Protocol of association with Bucharest District 4 city hall in order to carry out a public procurement procedure for the “Execution of a metro station at ground level between Berceni metro station and the Ring Road” (design, execution, and consulting & supervision services during construction, publicity etc.).

For the execution of this work, on 01.10.2020, Bucharest District 4 has signed a contract with the Joint Venture SOMET SA – TIAB SA – UTI GRUP S.A – CONSTRUCȚII ERBAȘU S.A.

In this regard, a Finance Contract in amount of Lei 258.464.409,03 was signed within the Large Infrastructure Operational Program LIOP 2014 – 2020. The works related to erecting an inter-station to connect the existing metro station (Berceni) with the new designed station (Tudor Arghezi) were completed on 04.11.2022.

At the end of 2022, the related technological tests commenced in order to prepare the acceptance on works completion and verification of the necessary conditions for the metro station, Tudor Arghezi, to be opened for service.

- Also, in 2022, Protocols of Association were signed between the Ministry of Transport and Infrastructure – Bucharest District 4 city hall – Metrorex, and between the Ministry of Transport and Infrastructure – Bucharest District 6 city hall – Metrorex in order to be carried out certain urban rehabilitation projects of areas nearby the metro stations on the administrative territory of District 4/ District 6, by providing new access routes, underground connection corridors, modernisation and/or rehabilitation /reconfiguration of interior and exterior areas of the metro stations or other necessary interventions, as may result from technical documentation, in order to increase the safety level for all participants to transport by metro and pedestrian and vehicles traffic in adjacent areas.

## V. Projects to be implemented as of 2023

<b>Modernisation of installation in operation on Bucharest metro network.</b> Replacement of rolling track and tunnel installation on Metro Line 2. Berceni - Pipera - 18 km	
Project cost:	Lei 675 million
Actions to be undertaken:	- initiation of the preparatory arrangements to follow the necessary steps in order to set up the investment objective, including the approval of the technical and economic indicators; - preparation of bidding documents; - signature of consulting and supervision services contract - resume the procurement procedure associated to replacement of rolling track and tunnel installation.
<b>Metro Line 4 – Section Gara de Nord – Gara Progresu</b> (13 stations +1 existing; 11,94 km, 1 depot, 15 metro trains)	
Project cost:	Lei 11.059 million
Actions to be undertaken:	- subsequent to issuance by General Council of Bucharest City and Ilfov County Council Decisions to approve the related project Zonal Urban Plans (PUZ) and after the Environmental Permit is obtained, the project shall be promoted for approval by Government Decision; - preparation of bidding documents for launching the procurement procedures.
<b>Metro Line 5. Drumul Taberei – Pantelimon. Section II: Eroilor – Piața Iancului</b> (6 stations; 5,4 km)	
Project cost:	Lei 2.924 million
Actions to be undertaken:	- continue the designing activity and preparation of bidding documents for launching the procurement procedure related to civil engineering works; - preparation of documents to consist the basis of the financing application of this objective under EU non-reimbursable funds.

<b>Procurement of new rolling stock</b>	
Project cost:	Lei 490,5 million
Actions to be undertaken:	- supply and commissioning in stages of the new metro trains for Metro Line 5.

<b>Metro Line 6. Bucharest International Airport Rail Access Link Project</b> (12 stations, 14,2 km, 12 metro trains)	
Project cost:	Lei 6.433 million, in compliance with the Order of minister of transport, infrastructure and communication no. 995/19.05.2020.
Actions to be undertaken:	- completion of land expropriation activities; - commencement of civil engineering works for Lot 1.1. (1 Mai – Tokyo); - signature of design and build contract for Lot 1.2. (Tokyo – Otopeni Airport); - launching the procurement procedures to be organized for awarding the services/works/goods contracts.

<b>Improvement of accessibility into the metro stations for visually impaired passengers</b>	
Project cost:	Lei 24 million
Actions to be undertaken:	- works completion and acceptance on works completion.

<b>Integration of Metro Line 4 control access system with Metro Lines 1, 2, 3 and Connection Link</b>	
Project cost:	Lei 35 million
Actions to be undertaken:	- completion of the procurement procedure having as scope designing and technical assistance services for preparation of the feasibility study and signature of services contract.



### 8.1. SHARE CAPITAL

The share capital increased from Lei 20.177.587,50 to Lei 470.177.587,50 by raising the number of nominal shares of Lei 2,5/share, from 8.071.035 shares to 188.071.035 shares, further the allocation from the state budget of Lei 55.000.000, in compliance with the Government Emergency Decision no. 47/29.10.2015 regarding the budget adjustment in 2015, Lei 55.000.000, in compliance with the Government Emergency Ordinance no. 86/23.11.2016 regarding the state budget adjustment in 2016; Lei 190.000.000, in compliance with the provisions of art. 37, para. (1) of the State Budget Law no. 50/2019 and Lei 150.000.000, in compliance with the provisions of art. 14, para. (2) and (3) of the Government Emergency Decision no. 19/18.08.2022 regarding the budget adjustment in 2022.

The Ministry of Transport and Infrastructure is the sole shareholder with a shareholding of 100%.

### 8.2. REVENUE DEVELOPMENT

The revenues of METROREX S.A. have the following sources:

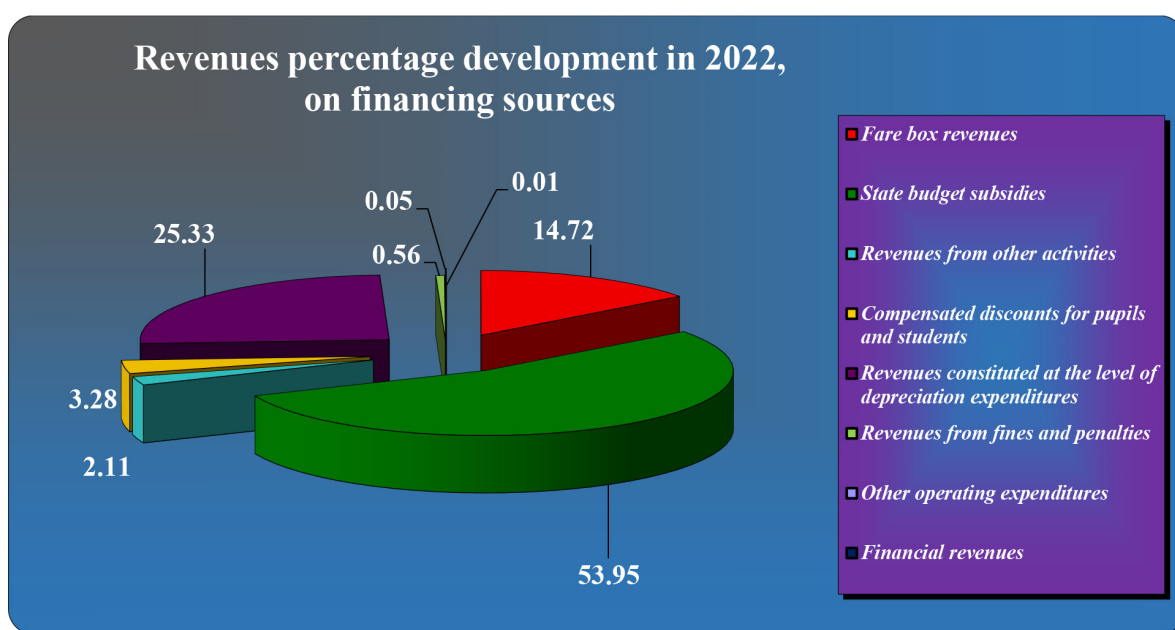
- Fare box revenues (passengers transport by metro)
- Revenues from state budget subsidies for operating activity for net turnover

- Revenues from other activities, of which:
  - Revenues from other commercial activities [revenues from royalties and rental, revenues from reinvoiced utility contracts, revenues from operation of state public property assets (fibre optics and telecommunication equipment)];
  - Other operating revenues, out of which:
    - Revenues from operating subsidies (compensation of discounts for pupils and students, full discount for Revolution heroes and war veterans);
    - Revenues constituted at the level of expenditures with depreciation of commissioned investment objectives having as financing sources budget allocations, loans guaranteed by the state or non-reimbursable funds; considering the modification of accountancy, there were included the revenues from sales of assets and other capital transactions associated to investment objectives costs about to be commissioned and included in the public patrimony, according to Decision of the Court of Accounts
    - Revenues from subsidies for investment registered in the public patrimony of the state;
    - Revenues from fines and penalties;
    - Other operating revenues (recovery, manufacture, assets selling);
    - Revenues associated to ongoing cost production.
- Financial revenues

The revenues pattern during 2019 – 2022 is shown in the table below:

Indicators	- Thousand Lei -			
	2019	2020	2021	2022
0	1	2	3	4
<b>I. Total revenues (1+2), of which:</b>	<b>921.466,65</b>	<b>1.049.949,46</b>	<b>2.017.556,17</b>	<b>1.616.393,19</b>
<b>1. Total revenues from operation (a+b+c+d), of which:</b>	<b>920.763,94</b>	<b>1.049.825,97</b>	<b>2.017.473,06</b>	<b>1.616.262,91</b>
a) Fare box revenues	270.197,37	149.060,88	171.930,71	237.875,52
b) Revenues from operating subsidies, as per the turnover	457.500,00	683.000,00	818.000,00	871.999,00
c) Revenues from other commercial activities [revenues from royalties and rental, revenues from invoiced utility contracts, revenues from operation of state public property assets (fibre optics and telecommunication equipment)]	29.251,61	22.801,46	23.419,54	34.037,62
d) Revenues from other sources, total of which:	163.814,97	194.963,63	1.004.122,80	472.350,77
- Revenues from operating subsidies associated to other incomes (compensation of discounts for pupils and students; full compensation for Revolution heroes and war veterans)	33.282,04	18.634,00	29.311,07	53.087,89
- Revenues from investments subsidies, constituted at the level of expenditures with depreciation for those investment objectives having as financing source budgetary allocations or loans guaranteed by the state, as per the Minister of Public Finances Order no. 1802/2014 and Law no. 259/2007 to modify and amend the Accounting Law no. 82/1991	127.017,69	168.091,82	973.505,36	409.422,39
- Revenues from fines and penalties	2.811,25	7.391,63	333,67	8.979,42
- Other operating revenues (recovery, manufacture, assets selling-off)	738,92	846,18	972,83	861,49
- Revenues associated to on-going production cost	-34,92	0	0	-0,41
<b>2. Financial revenues</b>	<b>702,71</b>	<b>123,49</b>	<b>83,11</b>	<b>130,28</b>

Revenues percentage development in 2022, on financing sources





### 8.3. EXPENDITURE DEVELOPMENT

The expenditures pattern is the following:

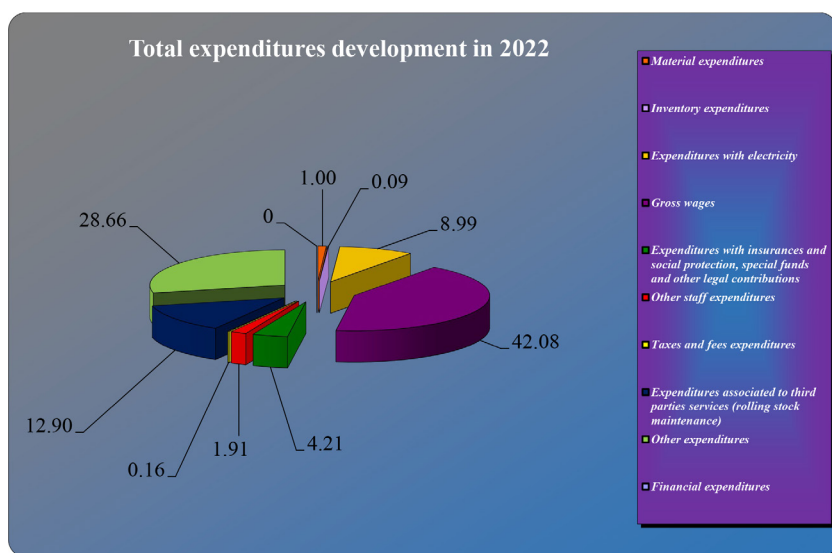
- Material expenditures, of which:
  - Spares expenditures
  - Fuel expenditures
- Inventory expenditures
- Power supply, heating, and water expenditures
- Staff expenditures, of which:
  - Gross wages
  - Expenditures related to insurances and social protection,

special funds and other legal obligations

- Other staff expenditures (lunch tickets, social and cultural expenses, other related expenses as per the Collective Labour Contract)
- Taxes and fees expenditures
- Expenditures related to the third-party services, of which:
  - Rolling stock repairs, as per the maintenance services contract
- Other expenditures, of which:
  - Depreciation
- Financial expenditures.

The expenditures pattern during 2019-2022 is shown below:

Indicatori	- Thousand Lei -			
	2019	2020	2021	2022
0	1	2	3	4
<b>I.Total expenditures and funds usage (I+II), of which:</b>	<b>1.252.750,54</b>	<b>1.261.524,60</b>	<b>2.306.578,67</b>	<b>1.613.881,68</b>
<b>I. Total expenditures (1+2), of which:</b>	<b>1.252.401,91</b>	<b>1.261.356,74</b>	<b>2.306.516,25</b>	<b>1.613.865,31</b>
a) Material expenditures, of which:	17.066,15	14.851,22	10.895,98	16.149,37
- spares expenditures	4.497,40	4.439,49	2.670,92	5.876,88
- fuel expenditures	451,11	357,87	327,44	365,22
b) Inventory expenditures	1.541,22	3.287,42	2.382,61	1.487,82
c) Power supply, heating and water expenditures	68.783,36	74.983,60	85.058,21	145.095,24
d) Staff expenditures, of which:	550.950,51	687.874,15	786.674,13	777.908,14
- Gross wages	473.491,52	598.110,56	690.957,84	679.177,21
- Expenditures related to insurances and social protection, special funds and other legal obligations	47.233,88	59.737,44	69.355,52	67.914,73
- Other staff expenditures (lunch tickets, social and cultural expenses, other related expenses as per the Collective Labour Contract)	30.225,11	30.026,15	26.360,77	30.816,21
e) Taxes and fees expenditures	728,98	724,85	2.546,35	2.556,98
f) cheltuieli cu prestațiile la terți, din care:	202.879,47	235.441,25	248.287,42	208.191,68
- Expenditures related to the third-party services, from which:	155.509,17	175.714,55	184.872,40	141.200,55
g) Other expenditures, of which:	410.452,22	244.194,24	1.170.671,55	462.476,07
- depreciation	140.248,09	141.322,51	184.164,88	192.335,95
<b>2. Financial expenditures</b>	<b>348,62</b>	<b>167,86</b>	<b>62,42</b>	<b>16,37</b>



#### 8.4. REVENUES AND EXPENDITURES BUDGET

In order to substantiate the revenues and expenditures budget for 2022, the provisions of art. 21 on Public Finance Law no. 500/2002, with subsequent modifications and amendments, were considered, retaining 10% of the subsidy level allocated to Metrorex according to State Budget Law applicable in 2022 no. 317/2021 (in amount of 81.800,00 thousand Lei), so that in the revenues and expenditures budget for 2022, approved by Government Decision no. 410/25.03.2022, the substantiated subsidy was of 736.200,00 thousand Lei representing around 64% of the necessary funds, which resulted in an unbalanced revenues and expenditures budget for 2022, and a negative result (loss) in amount of -418.354,94 thousand Lei.

Considering the provisions of Government Ordinance no. 19/2022 allocating the 10% retained subsidy in Q3 and Q4 2022, as well as the notifications of the Financial Directorate within the Ministry of Transport and Infrastructure no. 3186/33818/01.09.2022, registered to Metrorex with Ref. no. M.01/12500/01.09.2022 and no. 3147/33134/01.09.2022, registered to Metrorex with Ref. no. M.01/12512/01.09.2022, indicating the allocation of budgetary credit lines, as approved by State Budget Law for 2022 no. 317/2021 and by Government Ordinance no. 19/2022 upon state budget adjustment in 2022, stating that the amount secured at chapter 40.05 "Subsidies for transport by metro" in amount of 963.504,00 thousand Lei, it was ensured the amount of 91.505,00 thousand Lei to be

paid for the services performed in 2017, according to Civil Court Resolution no. 1108/2022, issued for the case file no. 6250/2/2020, the subsidy for transport by metro secured within the revenues and expenditures budget adjusted for 2022, and further approved by Government Decision no. 1274/19.10.2022, was of 871.999,00 thousand Lei (963.504,00 thousand Lei – 91.505,00 thousand Lei). The revenues and expenditures budget of Metrorex, adjusted in 2022, has been unbalanced, having as result a negative balance (loss) in amount of 100.588,77 thousand Lei.

Also, the Government Emergency Ordinance no. 160/2022 upon state budget adjustment in 2022 had no changes at chapter 40.05 "Subsidies for transport by metro".

In 2022, the total revenues were of 1.616.393,19 thousand Lei, of which the turnover 1.143.912,14 Lei, resulting in a performance of 66,42% compared with the foreseen budget for that period.

The total registered expenditures were of Lei 1.613.881,68, achieved at a rate of 63,68% compared with the foreseen budget for that period.

The fare box subsidy allocated to Metrorex in 2022 was of 871.999,00 thousand Lei, representing 54,03% of the total expenditures associated to public social transport service by metro for passengers under safety and comfort conditions.

As per the annual financial statements, the result of 2022 financial exercise was positive and represented a profit in amount of 2.511,52 thousand Lei.

#### 8.5. ARREARS AND ACCOUNTS RECEIVABLE DEVELOPMENT

The arrears registered on December 31, 2022 were of 34.451,00 thousand Lei. The development of arrears over the last four years is shown below:

	- thousand Lei -			
Year	2019	2020	2021	2022
Arrears	77.654,66	0	149.864,31	34.451,00

**The total accounts receivable at the end of 2022 were of 48.423,81 thousand Lei.**

The accounts receivable on December 31, 2022 were of 10.751,50 thousand Lei representing 9.897,94 thousand Lei - accounts receivable to be recovered from the state

budget and 853,56 thousand Lei - accounts receivable to be recovered from business clients from private sector which were fulfilled at a rate of 52,96% compared with the foreseen budget for that period.

	- thousand Lei -			
Year	2019	2020	2021	2022
Arrears	3.662,67	32.649,53	20.443,54	10.751,50

The company has registered adjustments for depreciation of accounts receivables in amount of 31.551,19 thousand Lei.

## 8.6. INDEPENDENT AUDIT REPORT UPON THE FINANCIAL STATUS

### Opinion of the Independent auditor

1. There had been audited the financial statements of Metrorex S.A., which comprised the statement of balance sheet as of December 31, 2022, the statement of profit and loss and other comprehensive income, the statement of changes in equity and the cash flow statement for the financial year ended at that date and a summary of significant accounting policies and the notes to the financial statements.

2. The individual financial statement on December 31, 2022 are identified below:

- Net assets: Lei (467.657.726)
- Net result for the period: Lei 2.511.515

3. The individual financial statements fairly presented, in all material aspects, the financial position of Metrorex S.A. as of December 31, 2022, as well as the financial performance and treasury cash flows for the financial exercise ended at that date, in compliance with the Order of the Minister of Public Finance no. 2844/2016 for the approval of accounting regulations in line with the International Financial Reporting Standards enacted by the European Union, with subsequent modifications and amendments.

### Basis for qualified opinion

As of December 31, 2022, Non-current assets in progress of the Company were 3.053.848.810 lei (31 December 2021: 3.447.216.402 lei). These also include completed investments actually put into operation, but for which the procedures for delivery to the public patrimony or registration as fixed assets in the own patrimony have not been completed. To finance these investments, Metrorex S.A. received governmental

investment subsidies and non-repayable loans in the form of investment subsidies, recognized in the statement of financial position as deferred income (account 475 – Subsidies for investment). In general, as the Company's assets for which non-repayable financing has been received are depreciated, amounts equal to the recorded depreciation expense are transferred to income.

As of December 31, 2022, the corresponding expenses / revenues were not recorded for these non-current assets. Also, the investments of the nature of the public patrimony actually put into operation were not removed from the Company's accounting records and the subsidies related to them were not diminished. During the audit we were unable to determine any adjustments in the financial statements as of December 31, 2022 related to non-current assets, non-current assets in progress, investment subsidies and operating expenses/ income, as a result of the issues described above.

The independent audit had been conducted in accordance with International Standards on Auditing (ISA), EU Regulation no. 537 of the Parliament and of the European Council and Law no. 162/2017.

### Emphasis of matter

The independent auditor considered relevant the here below mentioned aspects:

The company has launched a range of ongoing investment objectives, currently under various stages of execution. Some of these values are projects and feasibility studies for which no funds have been allocated to continue the works. The company analyses the possibility and opportunity of completing the involved investment objectives, as well as any potential capitalization, if they are no longer useful for the company. The effects of any decision to cease (abandon) these investment objectives were not quantified at the financial statements' issuing date.

During 2017-2018, METROREX has promoted and approved at the level of the Ministry of Transport the „Bucharest metro development strategy, 2016 – 2030“. The main goal of the metro infrastructure development strategy is to increase the attractiveness of the metro transport services in Bucharest city, by the identification of a balance between the metro infrastructure development projects and the projects for modernisation and maintenance of the existing infrastructure.

At strategic level, the main goal of the metro infrastructure development correlates with the strategic objectives of the Bucharest urban public transport system development, as follows:

- Increased economic efficiency by efficient allocation of the limited resources;
- Improved urban transport system accessibility;
- Reduced road congestion and, also reduced delays and travel time;
- Increased road safety by decreasing the human losses and the number of accidents;
- Reduced impact of urban mobility upon the environment.

The metro infrastructure development strategy intends to identify a balance between the transport users' prospect and requirements and the promise of the public transport operator – METROREX S.A, by reaching the here below objectives:

- Increased level of metro services quality;
- Adjustment of the transport offer by metro to the urban mobility needs;
- Metro network development in correlation with the mobility needs and the other transportation means;
- Increased safety for the metro transport users;
- Optimisation of the operation activity at METROREX level;
- Efficient management of human resources;
- Adjustment of the IT systems to the new technologies and their integration to metropolitan level;
- Improvement of communication processes both within the organisation and with the metro transport services users.

By excellence, the metro transport is environmentally friendly, significantly reducing the impact of urban mobility upon the environment. Therefore, at strategic level, the environmental objective is of particular importance for the metro infrastructure development strategy. For this purpose, at the level of the metro infrastructure development strategy, the following specific objectives are envisaged to be met:

- Increased level of metro transport services quality. This objective shall lead to increase of the metro network attractiveness and, consequently, to redistribution of

transport demand from the other polluting transportation means towards metro system – sustainable and non-polluting public transportation;

- Adjustment of the transport offer by metro to the urban mobility needs. This objective shall consolidate the transport demand and, subsequently, the considerable positive effects upon the environment;

- Metro network development in correlation with the mobility needs and the other transportation means. This objective shall enable the efficient management of the effects upon environment during the project's implementation period, by the proposed goals, and shall also encourage the selection of certain models of modal split targeted to metro transport (as non-polluting means of transportation).

The long-term metro transport strategy places in the forefront the citizen and his need for safety, a clean and healthy environment, while considering the economic requirements that such a transport service must meet.

The client is in the centre of the Bucharest metro network development strategy. His increasing expectations to urban public transport, alongside with the rapid technological development, lead to the need of continuous adjustment of the modality in which the metro transport service is provided. In the course of time, the metro transport offer has been continuously adapting, starting from focusing on the possibilities of integrating the metro transport services into the urban public transport offer at the city level, to the accessibility of public rooms and, also to a strong focus upon the improvement of transport conditions and ensuring the client satisfaction.

The investment implementation schedule included in the Development Strategy is correlated with the financing opportunities under non-reimbursable funding (Large Infrastructure Operational Programme), with the Urban General Strategy promoted by the Sustainable Urban Mobility Plan for Bucharest – Ilfov, as well as with the future opportunities for financing and implementation of the development plan.

The metro development and modernisation, in compliance with the schedule foreseen in the “Bucharest metro development strategy, 2016 – 2030”, represents an objective of major importance having a significant impact upon the safety and comfort of the urban transport services for passengers, with major implications upon the environment protection and an improved contribution to a better picture of Bucharest city, compared with the capitals of other European countries and from around the world.

## 9.1. INVESTMENT PROGRAMS

The Bucharest Metro Development Strategy was issued starting from the identification of certain modalities to increase the contribution of the metro transportation to the Bucharest public transport modernisation. The main objectives for the investment development, on short, medium, and long term are shown below:

### 1. Metro Line 5: Drumul Taberei – Pantelimon

The indicators of Metro Line 5. Râul Doamnei - Pantelimon investment objective are shown below:

- Total cost:	Euro 2.021 million + VAT
- Total length:	16,2 km
- Total number of metro stations:	22
- Depots:	2

**Thus, according to SUMP Bucharest – Ilfov phasing, the commissioning is scheduled to take place as follows:**

- Secțiunea Râul Doamnei - Eroilor - commissioned in 2020
- Secțiunea Eroilor - Piața lancului
- Secțiunea Piața lancului - Pantelimon

### 2. Metro Line 6. Bucharest International Airport Rail Access Link Project

The indicators of Bucharest International Airport Rail Access Link Project (Metro Line 6. 1 Mai – Otopeni) are shown below:

- Estimated cost:	Euro 1.347 million + VAT
- Execution period:	4 years from the commencement of works
- Total length:	14,2 km
- Total number of metro stations:	12
- Number of metro trains:	12

### 3. Metro Line 4. Lac Străulești - Gara de Nord - Gara Progresu

The indicators of the investment objective Gara de Nord – Gara Progresu are shown below:

- Estimated cost:	Euro 1.347 million + VAT
- Execution period:	4 years from the commencement of works
- Total length:	14,2 km
- Total number of metro stations:	12
- Number of metro trains:	12

### 4. Metro Line 7. Voluntari – Bragadiru:

- Estimated cost:	Euro 2.470 million + VAT
- Execution period:	Subject to the Feasibility Study provisions and financing
- Estimated total length:	26 km
- Estimated number of metro stations:	27
- Depots:	2

### 5. Stations rehabilitation on Metro Line 2. Berceni – Pipera

### 6. Safety traffic system (Interlocking), including public address system on Metro Line 2. Berceni – Pipera

### 7. Procurement of new rolling stock, including on-board interlocking equipment – 50 metro trains;

### 8. Integration of Metro Line 4 control access system with Metro Lines 1, 2, 3 and Connection Link;

### 9. Extensions to the current metro network:

- Extension M1 - Păcii - Linia de Centură Vest - this section shall connect Metro Line 1 (M1) with the Bucharest railway ring, at West;
- Extension M2 - Pipera - Petricani - this section shall connect Metro Line 2 (M2) with the railway ring;
- Extension M2 - Berceni - Linia de Centură Sud - this section shall connect Metro Line 2 (M2) with the Bucharest railway ring, at South;
- Extension M4 - Străulești - Mogoșoaia - this section shall connect Metro Line 4 (M4) with the railway ring at Mogoșoaia.

In addition to the above major objectives, Metrorex S.A. intends to continue the modernisation works of the current metro stations and installation, to improve the metro stations accessibility for visually impaired passengers, to develop other extensions to the metro lines into service, to increase the number of stations on the current operating metro lines, and to improve the transport conditions on Metro Lines 1, 2 and 3.

## 9.2. INVESTMENT PROGRAM DEVELOPMENT

Development status of investment projects carried out by Metrorex S.A on 31.12.2022, as per the budget modifications to apply certain budgetary measures approved by the Ministry of Finance

- thousand Lei -						
No.	Name of investment objective		Total program 2022 / achieved 2022	out of which:		
				State budget (Title 51.02.34)	State budget (Title 58)	Own sources
<b>GRAND TOTAL, of which:</b>						
	P - Program:	P	678.866,00	149.606,00	443.485,00*	85.775,00
	A - Achieved:	R	440.266,20	32.399,36	404.738,16	3.128,68
	% - percentage of achievement:	%	64,85%	21,65%	91,26%	3,64%
A.	Ongoing works, of which:	P	598.124,00	149.606,00	443.485,00*	5.033,00
		R	437.419,03	32.399,36	404.738,16	281,51
		%	73,13%	21,65%	91,26%	5,59%
1	Metro Line 4 - extensions	P	2.532,00	1.032,00	0	1.500,00
		R	71,56	0	0	71,56
		%	2,82%	0	0	4,77%
2	Metro Line 5, Drumul Taberei - Pantelimon	P	89.458,00	13.941,00	74.017,00*	1.500,00
		R	48.958,59	0	48.764,68	193,91
		%	54,72%	0	65,88%	12,92%
3	Modernisation of installation on Metro Lines 1, 2, 3 and Connection Link	P	1.000,00	0	0	1.000,00
		R	15,60	0	0	15,60
		%	1,56%	0	0	1,56%
4	Bucharest International Airport Rail Access Link Project	P	496.964,00	134.633,00	361.331,00*	1.000,00
		R	380.499,92	32.399,36	348.100,12	0,44
		%	76,56%	24,06%	96,33%	0,04%
5	Project to improve the accessibility in the metro stations in service for visually impaired passengers	P	8.170,00	0	8.137,00*	33,00
		R	7.873,36	0	7.873,36	0
		%	96,36%	0	96,75%	0
B.	Other investment expenditures TOTAL, of which:	P	80.742,00	0	0	80.742,00
		R	2.847,17	0	0	2.847,17
		%	3,52%	0	0	3,52%
a	Independent logistics	P	73.084,00	0	0	73.084,00
		R	2.847,17	0	0	2.847,17
		%	3,89%	0	0	3,89%
b	Expenditures for preparation of pre-feasibility / feasibility / other studies associated to the investment objectives	P	7.061,00	0	0	7.061,00
		R	0	0	0	0
		%	0	0	0	0
c	Expenditures with expertise, designing services, technical assistance, trial runs, tests etc.	P	597,00	0	0	597,00
		R	0	0	0	0
		%	0	0	0	0

### Note:

\*The figures for chapter 58 in the above table comply with the last budget adjustments applicable in 2022 notified to Metrorex by letters Ref. No. 4013/42351/28.10.2022 of the Financial Directorate within the Ministry for Transport and Infrastructure, in correlation with letter Ref. No. 48722/08.12.2022 issued by the General Directorate European Programs for Transport within the Ministry for Transport and Infrastructure.