Foreword

The Metro has entered in the consciousness of the people of Bucharest for a long time now. For many of us, the absence of metro would be unimaginable. The Metro is one of the core operators of the public transport network of Bucharest City, which on the course of its history, 34 years, has transported over 5 billion passengers. We take great pride in the fact that Bucharest was among the first 60 cities of the world who had introduced an underground transport system.

Metro infrastructure development is an essential policy in reducing the overcrowded road traffic, accidents, noise, pollution and energy consumption. And the intense involvement of the authorities with regard to the optimization of this type of public transport and promoting it is shown by the constant support given for the development of new metro lines.

For the first time in the history of the company, Metrorex was included among the beneficiaries of the Sectoral Operational Program – „Transport“ and has accessed non-reimbursable European funds for the investment projects. The approved projects are over 400 million Euros, and our proposed objective is to access funds in amount of 1,3 billion Euros from the European Commission by the end of 2015.

2013 has been the base year for the execution of tunnels with special equipment TBM – Tunnel Boring Machine for the execution of Metro Line 5. The new Metro Line will offer a high capacity, fast and direct way of transport between the west area of Bucharest - Drumul Taberei neighborhood – the city’s down town and the east area –Pantelimon neighborhood. It will be the main solution for increasing the degree of mobility and also of the weight of the environmental friendly public transport to the demise of private road transport. At the end of 2013 the first tunnel between Orizont and Favorite has been bored, with a length of 341 m. The advance rate, on average, was of 16,23 meters per day, but an execution speed record also has been registered of 39 m in a single day.

Currently, the four existent metro lines assure the daily transport of over 600,000 passengers almost in every area of the city. Bucharest metro is maintaining its market value, the number of passengers which travel by metro represent aprox. 20% of the total number of people using public transport, though the length of the metro network is about 4% of the total length of the public transport network of Bucharest city. Within the hierarchy of the European countries the Romanian metro is placed among the first half of the classification with a certain tendency of climbing the chart.

We adapt rapidly to the requirements of the market which are constantly changing. Innovative spirit, team work and the respect given to social values are challenges which we strive to imprint permanently. The reply to the transport demand is prompt and based on competence, professionalism and the experience of the specialist team of the company. With the support given and through the work of over 4,200 employees, Metrorex turns with each day projects in material facts. By the end of 2017 we will have one of the most modern metro networks in Europe and even in the world.

We are responsible toward the community and in this regard we are permanently developing programs for environmental protection, thus complying with the national and international environmental policies. Metro station accessibility for people with disabilities is assured by Metrorex as part of its operational and development strategy which is permanently monitored and future developments are taken into consideration.

Day by day the metro travels the Bucharest underground, transporting people with their mundane preoccupations to their destinations. For the trust which you have in our services we thank the people of Bucharest and we assure them that all our employees will make permanent efforts to continue to offer the best quality services which adds value to this important public space which is - Bucharest Metro.

Aurel Radu,

GENERAL DIRECTOR OF METROREX
### TABLE OF CONTENTS

1. **Chapter 1.** Background

2. **Chapter 2.** Bucharest metro network

3. **Chapter 3.** Calendar of events in 2013
   - 3.1. Modernisations, upgrading
   - 3.2. Traffic and rolling stock fleet improvement
   - 3.3. Trip and access conditions improvement
   - 3.4. International events participation (Congresses, Conferences, Exhibitions etc.)
   - 3.5. Communication and public relations

4. **Chapter 4.** Organization and personnel development

5. **Chapter 5.** Operation activity
   - 5.1. Infrastructure
     - 5.1.1. Stations and inter-stations
     - 5.1.2. Installations
     - 5.1.3. Installations maintenance activity
     - 5.1.4. Rolling track
     - 5.1.5. Lines, Tunnels and Special Constructions maintenance activity
     - 5.1.6. Labour conditions improvement
   - 5.2. Rolling stock
     - 5.2.1. Rolling stock fleet - structure
     - 5.2.2. Metro trains constructive characteristics
     - 5.2.3. Timetables
     - 5.2.4. Rolling stock fleet maintenance
     - 5.2.5. Rolling stock mileage
     - 5.2.6. Electric power consumption

6. **Chapter 6.** Commercial activity
   - 6.1. Development of transported passengers
   - 6.2. Trip titles
   - 6.3. Development of the average tariff levied for a metro trip

7. **Chapter 7.** Investments activity in 2013

8. **Chapter 8.** Financial data
   - 8.1. Revenues development
   - 8.2. Expenditures development

9. **Chapter 9.** Bucharest metro global development and modernisation strategy
   - 9.1. Organization system improvement
   - 9.2. Institutional measures
   - 9.3. Investments programs

**Annex**
TABLE OF CONTENTS

**Chapter 1. Background** ................................................. 4

**Chapter 2. Bucharest metro network** ............... 5

**Chapter 3. Calendar of events in 2013** .......... 7
   3.1. Modernisations, upgrading ................................. 7
   3.2. Traffic and rolling stock fleet improvement .......................... 7
   3.3. Trip and access conditions improvement .......................... 7
   3.4. International events participation (Congresses, Conferences, Exhibitions etc.) .......................... 7
   3.5. Communication and public relations .................................. 7

**Chapter 4. Organization and personnel development** ................................................. 9

**Chapter 5. Operation activity** ....................... 10
   5.1. Infrastructure ......................................................... 10
      5.1.1. Stations and inter-stations .......................... 10
      5.1.2. Installations .................................................... 11
      5.1.3. Installations maintenance activity .......................... 13
      5.1.4. Rolling track .................................................... 13
      5.1.5. Lines, Tunnels and Special Constructions maintenance activity ............................................. 13
      5.1.6. Labour conditions improvement .......................... 13
   5.2. Rolling stock ......................................................... 14
      5.2.1. Rolling stock fleet - structure .......................... 14

   5.2.2. Metro trains constructive characteristics .......................... 15
   5.2.3. Timetables ......................................................... 19
   5.2.4. Rolling stock fleet maintenance .......................... 20
   5.2.5. Rolling stock mileage ............................................ 20
   5.2.6. Electric power consumption ............................................ 21

**Chapter 6. Commercial activity** ...................... 22
   6.1. Development of transported passengers .......................... 22
   6.2. Trip titles ......................................................... 24
   6.3. Development of the average tariff levied for a metro trip ............................................. 25

**Chapter 7. Investments activity in 2013** .......... 26

**Chapter 8. Financial data** ................................. 28
   8.1. Revenues development ............................................. 28
   8.2. Expenditures development ............................................. 30

**Chapter 9. Bucharest metro global development and modernisation strategy** ............................................. 32
   9.1. Organization system improvement .......................... 32
   9.2. Institutional measures ............................................. 32
   9.3. Investments programs ............................................. 33

**Annex** ................................................................. 35
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 Transports and Infrastructure having as scope of activity “the passengers transport with 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.

For these services, METROREX receives money transfers from the state budget to cover the differences between its own revenues resulted from the passengers transport activity and the total expenses, as subsidy to the related fare trip.

The infrastructure and technological installation operation, maintenance and repair are performed by the existing personnel of 4,224 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.

Starting with July 1st, 2004, further the contract signature in November 2003, and approved by the Government Decision no. 47/22.01.2004, the rolling stock maintenance and repair activity was taken over by S.C. Transport ALSTOM S.A for a period of 15 years.

On July 1st, 2011, there were commissioned two new transport capacities on Metro Line IV, section from 1 Mai to Parc Bazilescu of 2.3 km length, double track, and two new stations were added: Jiului and Parc Bazilescu.

Built, equipped and put into operation in stages, on certain extensions, starting with 1979, the metro network is currently integrating 69.20 km double track, structured on 4 metro lines, 51 metro stations and 4 depots.

The metro transport system is continuously monitored and coordinated by a Central Traffic Control, which subordinates some other six branch dispatching centres: lines, tunnels, stations, passengers’ information, 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.
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The operating metro network is structured as follows:

<table>
<thead>
<tr>
<th>Metro Line/Extension</th>
<th>Route</th>
<th>Km</th>
<th>Stations</th>
<th>Commissioned</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metro Line I</strong></td>
<td>PANTELIMON - REPUBLICA- EROILOR - GARA DE NORD – DRISTOR 2</td>
<td>31.01</td>
<td>21</td>
<td>In stages 1979 - 1990</td>
</tr>
<tr>
<td>Extension</td>
<td>Petrache Poenaru - Timpuri Noi</td>
<td>8.63</td>
<td>6</td>
<td>November 1979</td>
</tr>
<tr>
<td>Extension</td>
<td>Timpuri Noi - Republica</td>
<td>10.10</td>
<td>6</td>
<td>December 1981</td>
</tr>
<tr>
<td>Extension</td>
<td>Petrache Poenaru - Crângași</td>
<td>0.97</td>
<td>1</td>
<td>December 1984</td>
</tr>
<tr>
<td>Extension</td>
<td>Crângași - Gara de Nord</td>
<td>2.83</td>
<td>2</td>
<td>December 1987</td>
</tr>
<tr>
<td>Extension</td>
<td>Gara de Nord - Dristor 2</td>
<td>7.8</td>
<td>6</td>
<td>December 1989</td>
</tr>
<tr>
<td>Extension</td>
<td>Republica - Pantelimon</td>
<td>0.68</td>
<td>1</td>
<td>January 1990</td>
</tr>
<tr>
<td><strong>Metro line II</strong></td>
<td>BERCENI - PIPERA</td>
<td>18.68</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td>Berceni - Piața Unirii 2</td>
<td>9.96</td>
<td>8</td>
<td>January 1986</td>
</tr>
<tr>
<td>Extension</td>
<td>Piața Unirii 2 - Pipera</td>
<td>8.72</td>
<td>6</td>
<td>October 1987</td>
</tr>
<tr>
<td><strong>Metro Line III</strong></td>
<td>ANGHEL SALIGNY - N. GRIGORESCU - EROILOR - PRECIZIEI</td>
<td>22.2</td>
<td>15</td>
<td>(7 common stations with Metro Line I)</td>
</tr>
<tr>
<td>Extension</td>
<td>N. Grigorescu - Eroilor</td>
<td>8.67</td>
<td>5</td>
<td>August 1983</td>
</tr>
<tr>
<td>Extension</td>
<td>Eroilor - Preciziei</td>
<td>8.83</td>
<td>5</td>
<td>November 1999</td>
</tr>
<tr>
<td></td>
<td>Stația Gorjului - Nava 2</td>
<td></td>
<td></td>
<td>July 1996</td>
</tr>
<tr>
<td></td>
<td>- Nava 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td>N. Grigorescu 2 - Anghel Saligny</td>
<td>4.7</td>
<td>4</td>
<td>November 2008</td>
</tr>
<tr>
<td><strong>Metro Line IV</strong></td>
<td>LAC STRĂULEȘTI - GARA DE NORD - GARA PROGRESU</td>
<td>5.54</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td>Gara de Nord - 1 Mai</td>
<td>3.24</td>
<td>4</td>
<td>March 2000</td>
</tr>
<tr>
<td>Extension</td>
<td>1 Mai - Parc Bazilescu</td>
<td>2.3</td>
<td>2</td>
<td>July 2011</td>
</tr>
</tbody>
</table>
Chapter 3. Calendar of events in 2013

3.1. Modernisations, upgrading

In compliance with the medium term modernisation and development strategy of Bucharest metro, in 2013, there were performed various actions related to the metro network extension and also continued the modernisation and technological upgrading works of the hereinafter fixed infrastructure installation, as here below:

- The project “Facilities for disabled persons, elevators & platforms” was completed by mounting of 81 elevators and 3 inclined platforms in the metro stations commissioned prior 2008. In the metro network currently operates 93 elevators (40 with electric drive and 53 with hydraulic drive) and 3 inclined platforms.
- Under the same project, it was also completed the endowment of each elevator with phone system and video camera.
- The control access and automatic fare collection installations extension was completed, by mounting and integrating specific access gates for passengers using the wheelchair.
- During 2013, at the BOMBARDIER Transportation RCS – Italy manufacturer’s premises in Rome, it was completed the acceptance of 16 onboard ATC sets, all these activities being undergone within the frame of the activity related to „quantitative and qualitative acceptance of the onboard equipments to manufacturer premises”.

3.2. Traffic and rolling stock fleet improvement

Together with the maintenance services supplier (ALSTOM Transport S.A.), continued the rolling stock fleet modernisation project for the old metro trains type Astra ARAD. Therefore, six metro trains were modernised, so that at the end of 2013, 13 modernised metro trains were put into service. The modernisation program will also continue in 2014, and the 15 metro trains, in total, will be modernised.

Also, at their expense, S.C. ALSTOM Transport S.A. undertook to purchase and install reversible windows for the new rolling stock fleet (BM2 and BM21 metro trains). The reversible windows had been mounted on 18 BM2 and 26 BM21 metro trains, the process now being completed.

It was modernized the Diesel-Hydraulic Engine no. 345 of 450 HP equipped with Caterpillar drive within the capital repair (RK). This modernization process was made under a common project S.C. REMARUL 16 FEBRUARIE S.A. – S.C. ALSTOM Transport S.A. – S.C. SOFTRONIC S.A.

For the Diesel-Hydraulic Engines no. 001, 002, 364 and 367 of 450 HP, the capital repair (RK) had been undertaken by S.C. Service FAUR S.A. Bucharest. Currently, the Diesel-Hydraulic Engine no. 345 of 450 HP is under the general repair procedure at S.C. Service FAUR S.A. Bucharest.

The whole fleet of box cars on two axles type Ks (11 units) were repaired and this process included capital repairs for 9 cars and periodic repairs with modernisation for the two intervention cars.

There were also completed the modernisation works of the washing station in Ciurel Depot and rehabilitation of the access road into the underground revisions hall in Berceni Depot.

In 2013, in compliance with the provisions of the Transport Minister Order no. 1.193/2004, S.C.METROREX S.A. registered the following rolling stock fleet: 18 BM2 metro trains, 26 BM21 metro trains, 33 modernised IVA cars, all Ks platform cars on two axles used into operation (9 box cars + intervention cars ) and 5 Diesel-Hydraulic Engines (no. 001; no.002; no.345; no.364; no.367). There were submitted the registration files for Diesel-Hydraulic Engines no. 367 and 002. In 2014, there will be registered the last 12 modernised IVA cars type 2, out of the 45 cars planned in total.

3.3 Trip and access conditions improvement

A new method of payment to buy the metro tickets, via text message, was introduced. Their validation and control of access in the metro were possible using Data-over-Voice technology.

3.4. International events participation

(Conferences, Exhibitions etc.)

Since 1994, S.C. METROREX S.A. is a full member of the International Association of Public Transport (I.U.T.P.) (during 2003 – 2006, it provided the Vice-presidency of the European Integration Committee). This membership entitles S.C. Metrorex S.A to attend the congresses, conferences and other similar events organized by U.I.T.P.

Other events to which the representatives of S.C. METROREX S.A. attended in 2013:

- **Abroad trips:**
  - During the reporting period, based upon the supplying contracts and received invitations, the staff of S.C. Metrorex S.A attended to both international events: the 60th UITP World Congress and “Mobility and City Transport”, events dedicated to transport technology and also type tests for BM3 metro trains components, inspections of the BM3 production line, acceptance of ATC onboard equipment, theoretical and practical training courses destined to BM3 trains drivers, preliminary acceptances of the first four BM3 metro trains and involved sets of onboard ATC equipments, acceptance of Vignol rail track, technical visit to assess the suppliers and products for Astra, IVA metro trains.

- **Domestic trips:**
  - During the reporting period, the Metrorex staff attended both to training and/or technical inspections activities, and also participated to urban public transport events.

3.5 Communication and public relations

The activity of communication and public relations of Metrorex has been developed according to the law regarding the free access to the information of public interest, no. 344/2001, according to government decisions, orders of the minister of transport, decisions of the general director. The General Director’s Cabinet has ensured the free access to the
information of public interest – to the strategies and projects of the company, through specific actions (press releases, press news, direct correspondence, book releases, interviews, press conferences, campaigns, events, distribution of materials of public interest).

We have monitored the news flow of the press agencies, radio and TV broadcasts - for specific aspects mentioning Metrorex; we have optimized our company's internet pages, in collaboration with other involved departments.

We have ensured the external information of different partners, and also the cooperation with other organizational structures, for the fulfillment of responsibilities regarding public information and decisional transparency: subway passengers, mass-media, banks and insurance companies (World Bank and The European Investment Bank as a community of investors), groups focused on special interests (Japan's Government), legislative bodies, authorities, ministers' governance, the academic community, unions, the international carriers' community (UITP).

Our company has received and resolved a number of 86 press requirements. The provided information has appeared in written and audio – visual press with a great impact upon the company's image due to the responses' transparency and promptitude. Furthermore, the administration of Metrorex has informed the public opinion about the activity of the company by means of press interviews granted to prestigious Romanian and foreign publications.

Metrorex has answered in 2013 to a number of 910 requests of information of public interest, and on the company's webpage, there has been posted, with the compliance of the Ministry of Transport, press releases and press notifications. The company has initiated, organized and developed 73 social, cultural and educational partnerships, well reflected in mass-media (3 press agencies, 7 TV stations, 2 radio stations and over 50 online news websites, forum websites and personal blogs). The average answer time for the requests was of 8 days. After monitoring the impact of the communication activity on subway passengers, we have ascertained the growing satisfaction of our clients towards the company's performance, and the 89 letters of content addressed to Metrorex regarding the prompt and aptly given answers, are seen as a proof of the satisfaction of our clients towards the company's performance.

The control body ASFR-ISF has observed the conformity of the dealing procedures with the politics and objectives of the society which is targeted towards the satisfaction of the client.

We assure the subway passengers that Metrorex was, is and will be a loyal partner that will define the public transportation through rapidity, comfort, safety and a sustained effort to adapt to the challenges of the future.
Chapter 4. Organization and personnel development

The organizational structures comply 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, 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 2013 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 number of personnel at the end of 2013 was of 4.224 employees.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>4.110</td>
</tr>
<tr>
<td>2011</td>
<td>4.117</td>
</tr>
<tr>
<td>2012</td>
<td>4.158</td>
</tr>
<tr>
<td>2013</td>
<td>4.120</td>
</tr>
</tbody>
</table>
Chapter 5. Operation activity

5.1. Infrastructure

5.1.1. Stations and inter-stations

When the site was chosen, there were taken into account the total number of urban conditions: the concentration of passengers’ flows, the peculiarity of public utilities of each area, as well as the real possibilities of execution, avoiding within the construction a major impact on ground traffic.

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 and 5 m).

The rolling track levels are located at 12,00 m depth, on average, and may vary between 7,80 m and 19,60 m.

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 5,00 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 also with ceramic plywood, decorative mortars, enamelled sheet metal elements (alphatron), 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.

Since these suspended ceilings are quite old, the company initiated and promoted a modernisation program of these systems in all metro stations.

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. Installations

The normal and uninterrupted operation of the existing installation in the metro network provides 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);
- installations of passengers' dynamic information (info-kiosks, displays with information for passengers, S.O.S balises);
- installations for continuous surveillance and limiting to non dangerous values the electrical voltages of touch and step in the embarking areas;
- installations for warning, signalling and monitoring of fires & intrusions;
- installations 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;
- it was tested the access control system and trip fare payment using mobile phone;
- it was extended the access control system and trip fare payment using contactless bank cards.

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 has to be circulated on a station – inter-station assembly is of about 300,000 m³/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 +27ºC.

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 extinction installations

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 firefighting equipments.

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 installations

Every station was equipped with a technical 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;  
- fire 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 facilitate 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 both for traction and the entire operation activity of metro.

The necessary power supply is provided by the national energetic system, by feeders of 20 and/or (10) kV voltage.

This installation was conceived taking into account the system’s generally continuity condition, the traffic’s stopping 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 is 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 the Control Traffic Centre, which takes over all these functions on the entire metro network and provides the here below endowments for every line:

- a synoptic panel with automatic display of the operational diagram and a control desk;  
- telemechanics equipment and communication lines for information taking over and automatic transmittal 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 energetic traffic centre.

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, Westrace type, 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 trains, send the speed codes from the rolling track (rail) to the onboard 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 telemehanics 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 auto-stop installation (INDUSI) and speed continuous control installation by repeating the signals on board (for 8M metro trains), surveillance mechanism (surveillance foot board);  
- installation for automatic train operation, including the traffic telemehanics installation, vehicle identification and automatic display installation in the dispatching centre of the train number (AVI), destination and the trains’ routes;  
- installation for automatic train operation incorporating the optimised train control by process computers, automatic stopping at platforms and, finally, trains speed continuous control (automatic pilot);  
- automatic train control system (ATC) including the automatic protection subsystem (ATP) – monitors the trains, send the speed codes from the rolling track (rail) to the onboard 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.
5.1.2.7. Telecommunications

The system provides rapid and safe communications channels, according to the specific operating requirements. It includes:

- 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 on 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;
- transmissions are provided on assigned local frequencies;
- in parallel with the radio-communications system, to manage the traffic, it also operates the underground – ground communication system for emergency situations (this system provides the interconnection with entitled authorities such as the Emergency Situations Inspectorate, S.C. Metrorex S.A management, police station etc.).

The system contains a transmitter/receiver station in the central traffic centre, fixed transmitter/receiver stations in metro stations and depots and onboard transmitter/receiver stations.

The personnel performing works in tunnels can also use the system when the metro trains are not into operation or during traffic hours, if the case is strongly justified.

5.1.3. Installations 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 equipments users' guide.

In 2013, the installations divisions performed 100% the planned services activities and maintained the installations into normal and safety operation conditions at the technical designed parameters.

5.1.3.2 Failures

Within the analyzed period, 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 installation 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 of the intervention periods of time.

5.1.4. Rolling track

For the first metro line “Petrache Poenaru – Timpuri Noi”, the rolling track was performed using the classical solution: rail type 49, with K type clip, on wooden sleepers, sited on gravel sand bed of 25 cm thickness and a 10 mm binder substratum.

Based on the studies performed for the following metro lines, it was generalized the concrete sleeper (biblock) sited on concrete bed.

There are used flexible pin changes with 100, 190 and 300m rays, as track devices.

In order to increase the comfort and reduce the vibrations of metro lines operation, it was necessary to replace the initial resilient fastening system with a new one.

5.1.5. Lines, Tunnels and Special Constructions maintenance activity

For the rolling track, tunnels and suspended ceilings there were performed and are still performed 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: 73,229 constructive km on Metro Lines 1 and 3, and 50,222 constructive km on Metro Lines 2 and 4;
- Rolling track recurrent maintenance: 22,574 km on Metro Lines 1 and 3, and 17,954 km on Metro Lines 2 and 4;
- Switches recurrent maintenance: 48/ 2 / 2 – Metro Lines 1 and 3, and 1/-1 – Metro Lines 2 and 4;
- Tunnel and gallery maintenance: 81,413 km on Metro Lines 1 and 3, and 53,301 km on Metro Lines 2 and 4;
- Verify the rails, on each current line, and switch machines using the fault detector: 1,281,228 km on Metro Lines 1 and 3, and 689,672 km on Metro Lines 2 and 4;
- Metro stations suspended ceilings and ditches maintenance: 87,200 m² on Metro Lines 1 and 3, 43,652 m² on Metro Lines 2 and 4;

5.1.6. Labour conditions improvement

In 2013, there were performed the following activities for labour conditions improvement, both in the technical rooms of the metro stations and depots:

- infiltrations cut off;
- simple and washable paintings;
- paintings on wooden and metal surfaces;
- floor cloths layout, PVC carpet, crockery & tiles mounting;
- rooms subdivisions using plasterboard;
- sanitation works;
- furniture manufacture (office cupboards, desks, tables, chairs, hangers, flooring etc.);
- metallic grates, doors and outdoor windows manufacture.
5.2. Rolling stock

5.2.1. Rolling stock fleet - structure

The structure of the rolling stock fleet during 2010 – 2013 is as follows:

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory rolling stock fleet, from which:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) IVA (old) metro cars, manufactured by Astra Arad, Romania</td>
<td>288</td>
<td>286</td>
<td>280</td>
<td>226</td>
</tr>
<tr>
<td>b) BM 2 and BM21 new metro trains generation</td>
<td>264</td>
<td>264</td>
<td>264</td>
<td>264</td>
</tr>
<tr>
<td><strong>Operating rolling stock fleet, from which:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) IVA (old) metro cars, manufactured by Astra Arad, Romania</td>
<td>84</td>
<td>76</td>
<td>79</td>
<td>90</td>
</tr>
<tr>
<td>b) BM 2 and BM21 new metro trains generation</td>
<td>228</td>
<td>228</td>
<td>228</td>
<td>234</td>
</tr>
<tr>
<td><strong>Total operating rolling stock fleet, from which:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) IVA (old) metro cars, manufactured by Astra Arad, Romania</td>
<td>82</td>
<td>76</td>
<td>78</td>
<td>84</td>
</tr>
<tr>
<td>b) BM 2 and BM21 new metro trains generation</td>
<td>216</td>
<td>228</td>
<td>228</td>
<td>228</td>
</tr>
</tbody>
</table>

The rolling stock fleet structure in 2013 is shown below:
5.2.2. Metro trains constructive characteristics

The existing rolling stock fleet consists both of electric metro trains manufactured by “Întreprinderea de Vagoane Arad” (IVA), configured in 2 metro cars units, and new Bombardier Transportation Sweden type BM2 and BM21 metro trains, configured in 6 permanently coupled metro cars.

5.2.2.1 IVA metro trains of old generation

| Technical characteristics of the IVA type metro unit, manufactured by Astra Arad, Romania, (configuration of 2 metro cars) |
|---|---|
| Length of unit over couplers | 2x19,000 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 | 2x36 tons |
| Seating capacity | 34 |
| Standing capacity for 4 passengers/m² | 166 |
| Standing capacity for 8 passengers/m² | 264 |
| Supply voltage | 750 Vcc (-30%, +20%) |
| Traction power | 4x215 kW |

Driving with starting series – parallel controller and braking with auto-compensatory separate excitation

- Control voltage: 110 Vcc ± 20% şi 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 carbody 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, Metorex and the metro trains' maintenance supplier (ALSTOM Transport) initiated during 2011 a major process for modernisation of 90 cars – 15 IVA metro trains.

Therefore, until the end of 2013, there were finalized the modernisation works for 78 cars – 13 metro trains. This process will continue and is scheduled to be completed in 2014.

**5.2.2.2 BM2/BM21 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 car etc.

In June 2008, it was supplied the last metro train from a total of 26 new metro trains type BM21 (Bombardier). 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. 22 of these metro trains are in operation on Metro Line 1 + 3, replacing a part of the old rolling stock fleet.

The rest of 4 metro trains type BM21 supplemented the rolling stock fleet on Metro Line 2 with a view to decrease the involved headway.

From the technological point of view, the new BM21 metro train is characterized by the following:

- high reliability;
- decreasing the energy consumption up to 25%;
- decreased 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 metro trains' level of noise.
5.2.2.3 Procurement of new generation metro trains

Since the number of transported passengers is increasing, Metrorex initiated in 2011 an open bidding procedure for the procurement of 16 new metro trains (96 cars), in order to satisfy the transport demand on Metro Lines 1, 2 and 3, to improve the transport conditions and to replace the old IVA rolling stock fleet. The bidding procedure having as scope the „procurement and commissioning of 16 new metro trains” was successfully completed by signature of a commercial contract with the rolling stock supplier Construcciones y Auxiliar de Ferrocarriles (CAF) – S.A – Spain.

In order to improve the traffic safety and passengers’ comfort conditions, the new metro train is characterised by the here below elements:

- 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 the 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

<table>
<thead>
<tr>
<th>Technical characteristics of the new metro trains generation type BM2 and BM21 (configuration of 6 metro cars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of unit over couplers</td>
</tr>
<tr>
<td>Maximum width</td>
</tr>
<tr>
<td>Axle load</td>
</tr>
<tr>
<td>Maximum height from NSS (over the roof)</td>
</tr>
<tr>
<td>Floor height from NSS</td>
</tr>
<tr>
<td>Gauge</td>
</tr>
<tr>
<td>Tare Weight</td>
</tr>
<tr>
<td>Seating capacity</td>
</tr>
<tr>
<td>Standing capacity (4 passengers/m²)</td>
</tr>
<tr>
<td>Total capacity – standing seats (8 passengers/ m²)</td>
</tr>
<tr>
<td>Supply voltage</td>
</tr>
<tr>
<td>Traction motor rating</td>
</tr>
<tr>
<td>Maximum acceleration</td>
</tr>
<tr>
<td>Service deceleration</td>
</tr>
<tr>
<td>Emergency deceleration</td>
</tr>
<tr>
<td>Braking system</td>
</tr>
</tbody>
</table>
| 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 |
### Technical characteristics of the new metro train generation type CAF (configuration of 6 cars)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length over couplers</td>
<td>113,610 mm</td>
</tr>
<tr>
<td>Maximum width</td>
<td>3,200 mm</td>
</tr>
<tr>
<td>Axle load</td>
<td>max. 14 tone</td>
</tr>
<tr>
<td>Maximum height from NSS (over the roof)</td>
<td>3,550 mm</td>
</tr>
<tr>
<td>Floor height from NSS</td>
<td>1,130 mm</td>
</tr>
<tr>
<td>Gauge</td>
<td>1,432 mm</td>
</tr>
<tr>
<td>Tare weight</td>
<td>172,5 tons</td>
</tr>
<tr>
<td>Seating capacity</td>
<td>222</td>
</tr>
<tr>
<td>Standing capacity (4 passengers/m²)</td>
<td>978</td>
</tr>
<tr>
<td>Total capacity – standing seats (8 passengers/ m²)</td>
<td>1,956</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>750 Vcc 3&quot; rail in traffic and pantograph in depots</td>
</tr>
<tr>
<td>Traction motor rating</td>
<td>16 asynchronous motors of 145 kW each</td>
</tr>
<tr>
<td>Maximum acceleration</td>
<td>1,25 m/s²</td>
</tr>
<tr>
<td>Service deceleration</td>
<td>1,24 m/s²</td>
</tr>
<tr>
<td>Emergency deceleration</td>
<td>1,6 m/s²</td>
</tr>
<tr>
<td>Braking system</td>
<td>Microprocessor controlled, disk brakes for service braking, electro-magnetic shoe for emergency/safety braking</td>
</tr>
<tr>
<td>Propulsion system</td>
<td>IGBT converters One inverter for 2 parallel traction motors MITRAC control system 3-phase asynchronous motors</td>
</tr>
<tr>
<td>Auxiliary systems</td>
<td>2 static converters with battery charger 400 V AC 50 Hz and 110 V DC; 2 compressors, piston type</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>80 km/h</td>
</tr>
</tbody>
</table>
medium height passengers;
- improved climate in cars and adding openable 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 WiFi 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 carbody 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 external train design;
- ATC onboard system (automatic train control) mounted in the driver’s cabin locker;
- anti-vandalism protection foils on the exterior windows.

The contract will be carried out during 2011 – 2014 and the metro trains are about to be put into service starting with the second half of 2013. By this procurement, Metrorex will finalize an important stage of the Bucharest metro modernisation project, providing 60 new metro trains of new generation for the passengers’ public urban transportation system.

In order to increase the safety into operation and the passengers’ comfort, the new metro trains will be equipped with automatic train protection and operation systems (ATP and ATO), compatible with the current new generation infrastructure systems, now into operation at Metrorex.

To provide the technical compatibility and fully operation, these systems were procured by Metrorex within 2011 from Bombardier Transportation – Rail Control Systems Divisions, further to a procurement procedure by direct negotiation, with no prior notice.

5.2.3. Timetables

The following aspects were taken into account when using the timetables in 2013:
- the increased number of transported passengers on the metro network;
- providing the best headway within certain hourly headways when increased passengers flows are recorded (named “peak hour headways”);
- the rolling stock fleet (IVA and BM), technically and safety traffic made available by the maintenance supplier, ALSTOM Transport S.A for the commercial service within the frame of the maintenance services contract;
- timetables complying with the IMF requirements (efficient and optimised costs);
- the existing operating personnel (driver and supporting driver of railway engine & metro) medically and psychologically available.

Therefore, the here below timetables were used:

<table>
<thead>
<tr>
<th>No.</th>
<th>Metro Line</th>
<th>Timetable</th>
<th>Applicable period</th>
<th>Metro trains headway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metro Line 1 Pantelimon-Republica</td>
<td>A1340 01.01-01.07.2013</td>
<td>16 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1341 01.07-01.09.2013</td>
<td>16 – 18 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1340 01.09-31.12.2013</td>
<td>16 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metro Line 1 Republica-Dristor 2</td>
<td>A1340 01.01-01.07.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1341 01.07-01.09.2013</td>
<td>-off peak hours = 8-9 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1340 01.09-31.12.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metro Line 3 Anghel Saligny-Preciziei</td>
<td>A1340 01.01-01.07.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1341 01.07-01.09.2013</td>
<td>-off peak hours = 8-9 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1340 01.09-31.12.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The common section of Metro Lines 1 and 3, Nicolae Grigorescu-Eroilor</td>
<td>A1340 01.01-01.07.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1341 01.07-01.09.2013</td>
<td>-off peak hours = 8-9 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1340 01.09-31.12.2013</td>
<td>-peak hours = 7 min.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Metro Line 2 Berceni-Pipera</td>
<td>A249 01.01-31.12.2013</td>
<td>-peak hours = 3 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A250 01.07-01.09.2013</td>
<td>-off peak hours = 6-10 min.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Metro Line 4 Gara de Nord-Parc Bazilescu</td>
<td>C407 01.01-31.12.2013</td>
<td>-peak hours = 8 min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A250 01.07-01.09.2013</td>
<td>-off peak hours = 9-10 min.</td>
<td></td>
</tr>
</tbody>
</table>
b) for statutory days (including Saturdays, Sundays and legal holidays)

<table>
<thead>
<tr>
<th>No.</th>
<th>Metro Line</th>
<th>Timetable</th>
<th>Applicable period</th>
<th>Metro trains headway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metro Line 1 Pantelimon-Republica</td>
<td>C1334</td>
<td>01.01-31.12.2013</td>
<td>20 min.</td>
</tr>
<tr>
<td>1</td>
<td>Metro Line 1 Republica-Dristor 2</td>
<td>C1334</td>
<td>01.01-31.12.2013</td>
<td>-peak hours = 8 min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-off peak hours = 9+10 min.</td>
</tr>
<tr>
<td>1</td>
<td>Metro Line 3 Anghel Saligny-Preciziei</td>
<td>C1334</td>
<td>01.01-31.12.2013</td>
<td>-peak hours = 8 min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-off peak hours = 9+10 min.</td>
</tr>
</tbody>
</table>

The common section of Metro Lines 1 and 3 Nicolae Grigorescu-Eroilor: C1334 01.01-31.12.2013 - peak hours = 4 min. - off peak hours = 4+5 min.

2 | Metro Line 2 Berceni-Pipera | C212 | 01.01-06.04.2013 | -peak hours = 7 min. |
2 |                         | C213 | 06.04-31.12.2013 | -off peak hours = 8+10 min. |

3 | Metro Line 4 Gara de Nord-Parc Bazilescu | C407 | 01.01-31.12.2013 | -peak hours = 8 min. |
3 |                         |      |                   | -off peak hours = 9+10 min. |

For 2014, we propose to attract a greater number of passengers by adapting the timetables in order to provide an adequate transport capacity, in compliance with the demand, and best comfort and safety conditions.

5.2.4. Rolling stock fleet maintenance

The patrimony assets of S.C. METROREX S.A. consist of 38 IVA metro trains (226 cars), 44 BM new metro trains (264 new cars), 8 Diesel Hydraulic locomotives, 4 railway inspection trolleys, 11 cars for internal use, out of which 2 cars for rapid interventions. In 2002, Metrorex issued a strategy for the company’s reorganization, restructuring and upgrading, an important component of this strategy being the outsourcing of some services and activities.

One of the outsourced activities was the rolling stock maintenance, finalized by the signature with S.C. 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 1st of July 2004.

The outsourcing was imposed 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.

5.2.5. Rolling stock mileage

![Rolling stock mileage graph]

<table>
<thead>
<tr>
<th>Year</th>
<th>Rolling stock mileage (thousand Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>8.169,2</td>
</tr>
<tr>
<td>2011</td>
<td>8.387,05</td>
</tr>
<tr>
<td>2012</td>
<td>8.612,67</td>
</tr>
<tr>
<td>2013</td>
<td>8.362,24</td>
</tr>
</tbody>
</table>
5.2.6. Energy consumption

The energy consumption development within 2010 - 2013 is shown below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity, from which: (MW/h):</th>
<th>for traction (MW/h):</th>
<th>for installations (MW/h):</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>174.790,59</td>
<td>97.882,73</td>
<td>76.907,86</td>
</tr>
<tr>
<td>2011</td>
<td>169.939,87</td>
<td>95.726,33</td>
<td>74.213,54</td>
</tr>
<tr>
<td>2012</td>
<td>174.153,40</td>
<td>96.384,44</td>
<td>77.768,96</td>
</tr>
<tr>
<td>2013</td>
<td>168.397,36</td>
<td>94.042,01</td>
<td>74.355,35</td>
</tr>
</tbody>
</table>

Compared with 2012, the electric power consumption decreased in 2013 with around 3.42%, due to metro trains timetables adjustments, by decreasing the headway during peak hours and subsequent increasing the headway during off peak hours.
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.

The Bucharest metro is currently transporting over 600,000 passengers/business day, on average, and over 15 million passengers/month.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Transported passengers (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>174,670</td>
</tr>
<tr>
<td>2011</td>
<td>170,525</td>
</tr>
<tr>
<td>2012</td>
<td>172,555</td>
</tr>
<tr>
<td>2013</td>
<td>169,779</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Total transported passengers</th>
<th>Transported passengers on Metro Line 1</th>
<th>Transported passengers on Metro Line 2</th>
<th>Transported passengers on Metro Line 3</th>
<th>Transported passengers on Metro Line 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>174,670</td>
<td>86,144</td>
<td>62,448</td>
<td>21,576</td>
<td>4,502</td>
</tr>
<tr>
<td>2011</td>
<td>170,525</td>
<td>82,643</td>
<td>60,897</td>
<td>22,000</td>
<td>4,985</td>
</tr>
<tr>
<td>2012</td>
<td>172,555</td>
<td>82,188</td>
<td>61,222</td>
<td>23,606</td>
<td>5,539</td>
</tr>
<tr>
<td>2013</td>
<td>169,779</td>
<td>77,973</td>
<td>62,061</td>
<td>24,036</td>
<td>5,709</td>
</tr>
</tbody>
</table>
6.1 Development of transported passengers

Although it covers only 4% of the Bucharest 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.

The Bucharest metro is currently transporting over 600,000 passengers/business day, on average, and over 15 million passengers/month.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Transported Passengers (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>174,670</td>
</tr>
<tr>
<td>2011</td>
<td>170,525</td>
</tr>
<tr>
<td>2012</td>
<td>172,555</td>
</tr>
<tr>
<td>2013</td>
<td>169,779</td>
</tr>
</tbody>
</table>

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

- **Transported passengers on Metro Line 1**: 86,144, 82,643, 82,188, 77,973
- **Transported passengers on Metro Line 2**: 62,448, 60,897, 61,222, 62,061
- **Transported passengers on Metro Line 3**: 21,576, 22,000, 23,606, 24,036
- **Transported passengers on Metro Line 4**: 4,502, 4,985, 5,539, 5,709
6.2. Trip titles

- two trips ticket
- ten trips ticket
- daily pass
- monthly pass with unlimited trips:
  - fully paid
  - 50% discounted (pupils and students)
- monthly pass with limited trips (62 trips):
  - fully paid
  - 50% discounted (pupils and students)
- weekly pass (7 days) with unlimited trips
- pass for passengers under the protection of special laws:
  - with disabilities

TRIP TITLES USED WITHIN THE BUCHAREST METRO NETWORK

Starting with the second semester of 2011, there were commissioned 37 automatic vending machines (AVC). The passengers were given the possibility to buy trip titles using coins, bank notes or bank card. For 2013, the diagram of total sold tickets is shown below:

Number of transported passengers split on trip titles, in 2013

- 2 trips
- 10 trips
- Full monthly pass
- Monthly pass (62 trips)
- Daily pass
- 50% discounted pass for pupils and students (unlimited trips)
- 50% discounted pass for pupils and students (62 trips)
- Weekly pass
- Government decision no. 448/2006
- Common ticket Metrex-RATB

---

<table>
<thead>
<tr>
<th>Trip Title</th>
<th>No. of Tickets Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 trips</td>
<td>0.57</td>
</tr>
<tr>
<td>10 trips</td>
<td>15.93</td>
</tr>
<tr>
<td>Daily pass</td>
<td>10.65</td>
</tr>
<tr>
<td>Weekly pass</td>
<td>13.48</td>
</tr>
<tr>
<td>Monthly pass</td>
<td>26.36</td>
</tr>
<tr>
<td>AVC</td>
<td>3.23</td>
</tr>
<tr>
<td>Total</td>
<td>55.35</td>
</tr>
</tbody>
</table>
Starting with August 6th, 2012, the metro trip fares were adjusted according to the Order no. 1.269/02.08.2012 issued by the Minister of Transports:

- 2 trips ticket ........................................... 4 lei
- 10 trips ticket ........................................... 15 lei
- Daily pass .................................................. 6 lei
- Monthly pass with unlimited trips:
  - fully paid ............................................. 60 lei
  - 50% discounted (pupils and students) ....... 30 lei
- Monthly pass with limited trips (62 trips):
  - fully paid ............................................. 50 lei
  - 50% discounted (pupils and students) ....... 25 lei
- Weekly pass (7 days) with unlimited trips ...... 20 lei
- METROREX ticket activated as RATB ACTIV card, out of which:
  - monthly pass with unlimited trips .......... 60 lei
  - monthly pass with limited trips (62 trips) ... 50 lei
  - weekly pass ........................................... 20 lei
  - electronic wallet (can be charged with any amount) and rated with ....................... 2 lei/trip

Further the agreement signed between Metrorex and the Bucharest Municipality in October 2012, starting with November 3rd, 2012, there were introduced the here below trip titles:

1. Single ticket valid 60 minutes from the first validation, both to Metrorex and RATB, with unlimited validations during the validity period of 60 minutes .......................... 5 lei (2 lei at Metrorex).
2. Multiple 10 trips single ticket valid 60 minutes with unlimited validations, both to Metrorex and RATB, during the validity period of 60 minutes .......................... 30 lei (15 lei at Metrorex).
3. Single daily pass with unlimited validations both to RATB and Metrorex, valid 24 hours starting with the first validation ....................... 16 lei (6 lei at Metrorex).

The annual average tariff for a metro trip is the result of dividing the revenues obtained from the passengers transport activity and the number of transported passengers.

To adopt a more flexible tariff policy complying with the transport demand and offer, it was issued a new decision enabling the metro trip fares adjustments over the inflation index ceiling.

Consequently, the Romanian Government approved the Emergency Decision no.57/16.06.2011 to recall some items included in the annex to the Government Decision no. 36/2001, enabling the adjustments of the metro fares over the inflation index ceiling.

The passengers were given the possibility to buy trip titles were commissioned 37 automatic vending machines (AVC).
Chapter 7. Investments activity in 2013

The investment program in 2013 was prepared based upon the Bucharest metro network development, upgrading and modernisation strategy, structured on the following main directions:

1. Ongoing activities with a view to complete the related investment works under different stages of designing and/or execution;
2. Preparations to initiate new investments objectives for the Bucharest metro network extension and modernisation.

The approved funds for the investment activity in 2013, as per the Budget Law no. 5/2013 were at the beginning of the year of 266.037 thousand Lei in total, structured as here below:

- Budget allocation 266.037 thousand Lei
  - Investments of state owned companies 61.000 thousand lei
  - Expenditures related to reimbursable programs 205.037 thousand lei

In compliance with the budget adjustments enacted by the Government Decision no. 17/2013 and Government Decision no. 99/2013, the investments budget of Metrorex, as approved at the end of year, became:

- Budget allocation 820.127 thousand lei
  - Investments of state owned companies 54.868 thousand lei
  - Expenditures related to reimbursable programs 211.259 thousand lei
  - Transfers to finance the environment projects 294.000 thousand lei
  - Projects financed under non-reimbursable funds 260.000 thousand lei

The approved amounts for capital expenditures for 2013 were used for the here below investments objectives:

**Metro Line 4: Section Gara de Nord – Parc Bazilescu - Lac Străulești and Section from Gara de Nord to Gara Progresu**

**Section Parc Bazilescu - Lac Străulești**

On July 14th, 2012, it was signed with the Joint Venture consisting of ASTALDI SpA – S.C. SOMET S.A. – S.C. TIAB S.A. – S.C. UTI CONSTRUCTION & FACILITY MANAGEMENT S.A the civil works contract: “Metro Line 4, Section 2. Parc Bazilescu – Lac Străulești. Construction works for tunnel, gallery, stations, depot, multimodal terminal and related installations with a view to be commissioned”. There were performed civil engineering works related to the structure of Străulești Depot and launched the works for the new stations.

There were prepared the documents to obtain EU financing under Sectoral Operational Program – Transports 2007-2013. These are currently analyzed by JASPERS.

**Section Gara de Nord – Gara Progresu**

For the execution of Metro Line 4: Lac Străulești – Gara Progresu, section Gara de Nord - Gara Progresu:

There is under preparation the technical documentation and the bidding documents to launch the bidding procedure for Pre-feasibility and Feasibility Studies;

The action related to the feasibility study preparation was proposed and approved on the list of objectives about to be financed under the Swiss – Romanian Cooperation Programme granted by the Swiss Confederation;

It was approved the Final project Proposal to be financed under the Framework Agreement signed between the Government of Romania and the Swiss Confederation for „Pre-Feasibility Study (PFS) and Feasibility Study (FS) for construction of Metro Line 4: Lac Străulești – Gara Progresu, extension Gara de Nord – Gara Progresu”.

Further the audit mission of the Swiss Federal Audit Office which took place in Bucharest, on September 6th, 2012, it was agreed the extension of the Project scope by including three additional activities:

- **multimodal motion study** focusing on the surface motion impacts of the planned Metro Line 4 extension;
- **security study** related to the potential increase of traffic on Metro Line 4;
- **institutional partnership** between S.C. Metrorex S.A and Swiss public transportation companies.

The Swiss Contribution to this project was approved for CHF 8.5 million, out of the total cost of CHF 10 million (no
It was signed the Project Agreement was signed between the Ministry of Public Finance, as National Coordination Unit (NCO), the Ministry of Regional Development and Public Administration, as Intermediate Body (IB) and the State Secretariat for Economic Affairs of the Swiss Confederation (SECO).

⇒ Metro Line 5
   Section I Drumul Taberei – Universitate (14 stations, 9 km)
   Section II Universitate - Pantelimon (13 stations + 1 depot, 8 km)

On November 12, 2009, between Romania, represented by the Ministry of Public Finance, as Borrower and the European Investment Bank, it was signed the Finance Contract for Bucharest Metro Modernisation IV Project, Metro Line 5: Drumul Taberei – Pantelimon, section Drumul Taberei – Universitate and procurement of 37 new metro trains, in total amount of Euro 883 million (no VAT included), out of which Euro 395 million EIB loan.

In 2013, continued the execution works related to moulded walls, excavations, soil consolidation, water removal with pumps from excavation, public networks declination, stations structure of resistance (bars, ceilings, walls, foundation rafts) for all 10 metro stations, including Valea lăcătului depot and were launched the tunnel boring machines (TBM), the tunnels being already executed between Academia Militară and Orizont.

On December 14, 2011, between Romania, represented by the Ministry of Public Finance, as Borrower and the European Investment Bank, it was signed the Finance Contract for Bucharest Metro Modernisation V Project, Metro Line 5: Drumul Taberei – Pantelimon, section Universitate – Pantelimon and procurement of 30 new metro trains, in total amount of Euro 968 million (no VAT included), out of which Euro 465 million EIB loan.

The activities related to Feasibility Study review and technical-financial indicators updating were completed in 2013. Some of the agreements necessary to fulfil the objective were obtained. This action is to be completed in the first semester of 2014.

Also, in 2014 there will be undertaken the procedures so that the new technical and financial indicators to be approved by Government Decision.

The documents related to preliminary technical designs review and procurement documents for civil engineering structure works were completed.

This Project is included in the Loan agreement signed with the Japan International Cooperation Agency providing the co-financing of this metro line.

⇒ Installations modernisation on current metro lines:
   All works related to modernisation of sub-stations and low voltage installations on Metro Lines 1 and 3 were completed.

⇒ Procurement of new metro trains
   There were continued the consulting services for the procurement of 37 new metro trains to be operated on Metro Line 5 and replace the old rolling stock fleet.

   It was paid the first instalment of the advance payment for the procurement of the new metro trains and related onboard equipment.

   The first new metro train was supplied in December 2013.

⇒ Facilities for the passengers with disabilities
   There were continued the mounting works of elevators (outdoor and indoor) in the existing metro stations to facilitate the access of passengers with disabilities in the metro network, and during 2014, the last elevator in the contract will to be mounted in Tineretului metro station.

   In order to secure the necessary funds to achieve on time the investments projects included in the Strategy of Metrorex, there were undertaken arrangements so that Metrorex to be included on the list of potential beneficiaries of the Main Infrastructure - Operational Programme 2014 – 2020, in order to facilitate the use European Structural Funds (this measure is about to be implemented and is subject to the decision of the Ministry of Transports, Ministry of Public Finances and other bodies).
Chapter 8. Financial data in 2013

8.1 Revenues development

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

- Fare box revenues (passengers transport);
- Revenues from state budget subsidies for operating activity for turnover, total subsidies for passengers’ transport with metro, out of which:
  - Current operation activity;
  - Rolling stock maintenance, as per the contract concluded with ALSTOM;
  - Rolling stock maintenance (payments made in the current year for services performed within the previous year), as per the contract concluded with ALSTOM;
- Revenues from other activities, out of which:
  - Revenues from commercial activities, association contracts, room or land rentals, advertisement etc.
  - Revenues from other sources, out of which:
    - Revenues from operating subsidies (50% discounts granted to pupils and students, 100% discount granted to Revolution heroes and war veterans);
    - Revenues from investments subsidies, constituted at the level of depreciation expenditures for those investments objectives having as financing source budgetary allocations or loans guaranteed by the state, as per the Minister’s of Public Finances Order no. 3.055/2009 and Law no. 259/2007 that modifies and amends the Accounting Law no. 82/1991;
    - Financial revenues;
    - Allocated amounts from the estate budget, including loans guaranteed by the government and reimbursed from budget allocations.

Revenues percentage development in 2013, on financing sources

<table>
<thead>
<tr>
<th>Source</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenues and financial sources (I+II)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total revenues (I+II), from which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total revenues from operation (I+II), from which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Fare box revenues</td>
<td>552,904.49</td>
<td>549,781.08</td>
<td>548,379.53</td>
<td>117,712.20</td>
</tr>
<tr>
<td>b) Revenues from operating subsidies</td>
<td>349,293.00</td>
<td>225,615.75</td>
<td>123,677.25</td>
<td>42,534.00</td>
</tr>
<tr>
<td>b1) Current operation activity</td>
<td>22,639.58</td>
<td>22,639.58</td>
<td>22,639.58</td>
<td>22,639.58</td>
</tr>
<tr>
<td>b2) Rolling stock maintenance contract concluded with ALSTOM (current year)</td>
<td>1,523,61</td>
<td>2,288,44</td>
<td>2,288,44</td>
<td>2,288,44</td>
</tr>
<tr>
<td>b3) Rolling stock maintenance contract concluded with ALSTOM (payments made in the current year for services performed within the previous year)</td>
<td>28,557.96</td>
<td>28,557.96</td>
<td>28,557.96</td>
<td>28,557.96</td>
</tr>
<tr>
<td>c) Other revenues from operation</td>
<td>22,639.58</td>
<td>22,639.58</td>
<td>22,639.58</td>
<td>22,639.58</td>
</tr>
<tr>
<td>- Revenues from commercial activities, association contracts, room or land rentals, advertisement etc.</td>
<td>26,874.69</td>
<td>33,842.30</td>
<td>33,842.30</td>
<td>33,842.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The revenues development

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

- Fare box revenues (passengers transport);
- Revenues from state budget subsidies for operating activity for turnover, total subsidies for passengers’ transport with metro, out of which:
  - Current operation activity;
  - Rolling stock maintenance, as per the contract concluded with ALSTOM;
  - Rolling stock maintenance (payments made in the current year for services performed within the previous year), as per the contract concluded with ALSTOM;
- Revenues from other activities, out of which:
  - Revenues from commercial activities, association contracts, room or land rentals, advertisement etc.;
- Revenues from other sources, out of which:
  - Revenues from operating subsidies (50% discounts granted to pupils and students, 100% discount granted to Revolution heroes and war veterans);
  - Revenues from investments subsidies, constituted at the level of expenditures with depreciation for those investments objectives having as financing source budgetary allocations or loans guaranteed by the state, as per the Minister’s of Public Finances Order no. 3.055/2009 and Law no. 259/2007 that modifies and amends the Accounting Law no. 82/1991;
  - Financial revenues;
  - Allocated amounts from the estate budget, including loans guaranteed by the government and reimbursed from budget allocations.

Revenue percentage development in 2013, on financing sources:

<table>
<thead>
<tr>
<th>Activity</th>
<th>2010 (Thousand lei)</th>
<th>2011 (Thousand lei)</th>
<th>2012 (Thousand lei)</th>
<th>2013 (Thousand lei)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenues and financial sources (I+II), from which:</td>
<td>552.904,49</td>
<td>577.192,79</td>
<td>613.926,70</td>
<td>604.935,18</td>
</tr>
<tr>
<td>I. Total revenues (1+2), from which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Total revenues from operation (a+b+c+d), from which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Fare box revenues</td>
<td>117.712,20</td>
<td>125.189,38</td>
<td>154.613,96</td>
<td>171.569,91</td>
</tr>
<tr>
<td>b) Revenues from operating subsidies, as per the turnover (b1 + b2), from which:</td>
<td>349.293,00</td>
<td>358.999,96</td>
<td>349.000,00</td>
<td>328.138,00</td>
</tr>
<tr>
<td>b1) current operation activity</td>
<td>225.615,75</td>
<td>213.236,49</td>
<td>206.353,61</td>
<td>235.579,36</td>
</tr>
<tr>
<td>b2) rolling stock maintenance contract concluded with ALSTOM (current year)</td>
<td>123.677,25</td>
<td>145.763,47</td>
<td>142.646,39</td>
<td>92.558,64</td>
</tr>
<tr>
<td>b3) rolling stock maintenance contract concluded with ALSTOM (payments made in the current year for services performed within the previous year)</td>
<td>42.534,00</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>c) Other revenues from operation, from which:</td>
<td>22.639,58</td>
<td>28.557,96</td>
<td>33.842,30</td>
<td>26.874,69</td>
</tr>
<tr>
<td>- Revenues from commercial activities, association contracts, room or land rentals, advertisement etc.</td>
<td>22.639,58</td>
<td>28.557,96</td>
<td>33.842,30</td>
<td>26.874,69</td>
</tr>
<tr>
<td>d) Total revenues from other sources, from which:</td>
<td>58.734,75</td>
<td>62.157,05</td>
<td>74.946,83</td>
<td>77.461,66</td>
</tr>
<tr>
<td>- Revenues from operating subsidies (50% discounts granted to pupils and students, 100% discount granted to Revolution heroes and war veterans)</td>
<td>5.001,00</td>
<td>10.002,83</td>
<td>21.089,91</td>
<td>27.337,78</td>
</tr>
<tr>
<td>- Revenues from investments subsidies, constituted at the level of expenditures with depreciation for those investments objectives having as financing source budgetary allocations or loans guaranteed by the state, as per the Minister’s of Public Finances Order no. 3.055/2009 and Law no. 259/2007 to modify and amend the Accounting Law no. 82/1991</td>
<td>53.733,75</td>
<td>52.154,22</td>
<td>52.798,30</td>
<td>49.862,08</td>
</tr>
<tr>
<td>- Revenues from fines and penalties</td>
<td>—</td>
<td>—</td>
<td>1.058,62</td>
<td>261,80</td>
</tr>
<tr>
<td>2. Financial revenues</td>
<td>1.401,55</td>
<td>2.288,44</td>
<td>1.523,61</td>
<td>890,92</td>
</tr>
<tr>
<td>II. Subsidies for loans reimbursement</td>
<td>3.123,41</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
8.2 Expenditures development

The expenditures pattern is the following:

- Material expenditures;
- Expenditures with power supply, heating and water;
- Expenditures with personnel, out of which:
  - Gross wages;
  - Other staff expenditures.
- Expenditures related to the third parties services, out of which:
  - Rolling stock repairs, as per the maintenance services contract signed with Alstom;
- Other expenditures (depreciation, social-cultural, protocol etc.);
- Financial expenditures.

The expenditures pattern during 2010 - 2013 is shown below:

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2010 (Thousand lei)</th>
<th>2011 (Thousand lei)</th>
<th>2012 (Thousand lei)</th>
<th>2013 (Thousand lei)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total expenditures and funds usage (I+II), from which:</td>
<td>603.444,66</td>
<td>577.192,79</td>
<td>656.228,77</td>
<td>669.394,18</td>
</tr>
<tr>
<td>I. Total expenditures (1+2), from which:</td>
<td>600.321,25</td>
<td>577.192,79</td>
<td>656.228,77</td>
<td>669.394,18</td>
</tr>
<tr>
<td>1. Operation expenditures, from which:</td>
<td>599.146,00</td>
<td>572.551,41</td>
<td>644.266,45</td>
<td>651.787,40</td>
</tr>
<tr>
<td>a) Material expenditures</td>
<td>9.987,40</td>
<td>9.698,03</td>
<td>8.668,94</td>
<td>8.455,80</td>
</tr>
<tr>
<td>b) Expenditures with power supply, heating and water</td>
<td>47.480,34</td>
<td>50.026,07</td>
<td>65.266,93</td>
<td>61.883,07</td>
</tr>
<tr>
<td>c) Expenditures with the personnel:</td>
<td>257.872,24</td>
<td>267.143,54</td>
<td>280.959,83</td>
<td>278.343,90</td>
</tr>
<tr>
<td>- gross wages</td>
<td>188.327,28</td>
<td>195.054,96</td>
<td>204.213,50</td>
<td>202.489,61</td>
</tr>
<tr>
<td>- other staff expenditures</td>
<td>69.544,96</td>
<td>72.088,58</td>
<td>76.746,33</td>
<td>75.854,29</td>
</tr>
<tr>
<td>d) Expenditures related to the third parties services, from which:</td>
<td>217.872,42</td>
<td>180.331,41</td>
<td>194.008,33</td>
<td>201.567,07</td>
</tr>
<tr>
<td>- Rolling stock repairs, according to maintenance contract signed with ALSTOM</td>
<td>185.575,67</td>
<td>145.958,63</td>
<td>155.043,36</td>
<td>145.557,36</td>
</tr>
<tr>
<td>e) Other expenditures (depreciation, social-cultural, protocol)</td>
<td>65.352,36</td>
<td>65.352,36</td>
<td>95.362,42</td>
<td>106.804,15</td>
</tr>
<tr>
<td>2. Financial expenditures</td>
<td>1.175,25</td>
<td>4.641,38</td>
<td>11.962,32</td>
<td>12.340,19</td>
</tr>
<tr>
<td>II. Funds used for loans reimbursement</td>
<td>3.123,41</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
The financial year result for 2013, calculated as the difference between total revenues and total expenditures, is negative, representing a loss of around 64.459 thousand lei, motivated by the fact that the revenues of the company have not been achieved at the level foreseen in the revenues and expenditures budget of the company, as approved in 2013, due to non-approval of tariff adjustment proposals made by Metrorex starting with May 1st, 2013 (although Metrorex had made several tariff adjustment proposals since April 2013 to be applied on May 1st, 2013; these tariff adjustment proposals continued in June and proposed to be applied starting with the next month, July, in September and proposed to be applied starting with September 21st 2013, or September 28th 2013 and also in October, proposed to be further applied from November 2013, these proposals came to nothing), proposal consisting the basis of a sound and balanced budget of revenues and expenditures, but also to decreased subsidy for the transport services with metro subsequent to budget adjustment (Government Decision no. 99/30.10.2013) with around 21 million Lei (from 349 million Lei to 328 million Lei), and also as a result of the reassessment of the fixed assets of Metrorex, part of the patrimony, which led to increased depreciation expenses.
Chapter 9. Bucharest metro global development and modernization strategy


To issue the metro development and modernization strategy, it was initiated from the identification of certain modalities to increase the metro transport system contribution in Bucharest taking into account the expenditures diminishing and the performances increasing within the involved public transport specific conditions.

The transports strategy envisages the public transport prioritization, simultaneously with its development and modernisation components.

Therefore, the strategy to be followed for Bucharest metro network modernisation and development envisage the here below main directions:

- Improvement of the organizational system;
- Enacting of certain institutional measures with a view to co-ordinate the underground and ground public transport under all aspects;
- Development of certain investments programs to allow the Bucharest metro network development and modernisation.

9.1. Organization system improvement

Improvement of the entire organizational system, especially by:

- Increasing the underground public transport attractiveness;
- Quality increasing and underground public transport services diversification;
- Maintenance services improvement.

9.2. Institutional measures

The Bucharest metro global development, modernization and reliability strategy is based upon organizational measures at the company’s level and measures adopted at governmental level.

One of the most important institutional measures seeks to better co-ordinate the public transport in Bucharest and the contiguous areas.

Under these circumstances, by the Government Ordinance no. 21/31.08.2011, it was created and established the Bucharest Metropolitan Transport Authority, ordinance subsequently approved by Law no. 8/06.01.2012. The Government Decision no. 1.204/06.12.2011 approved the rules of organization and operation of the Bucharest Metropolitan Transport Authority so that to co-ordinate all aspects of the urban ground and underground public transport in Bucharest and contiguous area.

The advantages of establishing and operating such a decisional body are multiple and are mainly referred to:

- Co-ordination of development programs and providing the involved complementarities of the urban and sub-urban transport systems;
- Allocation of public funds for investments in order to avoid parallel operation at an unsatisfactory productivity level of all different transport modes and/or services for transport;
- Fare collection integration and attractive tariff policy application with a view to increase the public transport efficiency;
- Coherent administration of the existing endowments based upon an integrated transport master plan including the transport offer in line with the passengers transport demand (proper routes, common stations, and easy links to reach all the city’s main interest points).

The International Bank for Reconstruction and Development (I.B.R.D.) financed the Transport Restructuring Project consisting of the herein below components:

- Component A – Roads Sub-sector
- Component B – Railway Sub-sector
- Component C – Urban transport Sub-sector, consisting of the following sub-components:

Technical assistance related to the establishment of the Bucharest Metropolitan Transport Authority

Until 31st December 2007 there were finalized and
submitted the Reports related to the functions and geographic coverage, funding and governance the Authority, as well as the organization and personnel structure. A study tour was conducted at the Metropolitan Transport Authorities in Barcelona (Spain) and Lyon (France). The Government Decision draft was finalized in November 2008 and subsequently submitted to the Ministry of Transports for being signed and promoted. Public consultations are currently ongoing; therefore, within the second half of 2011, the Romanian Government will approve a decision to regulate the establishment and entering into force the Bucharest Metropolitan Transport Authority. By Law no. 8/2012 it was established the Bucharest Metropolitan Transport Authority, but there is under preparation a new government decision, so that the Bucharest Metropolitan Transport Authority to be subsequently modified and adjusted to the real conditions of urban public transport in Bucharest – Ilfov area.

- **Technical assistance for short term measures to improve efficiency and effectiveness of Metrorex**

  This project was completed in the second semester of 2007 when the Consultant submitted the Final Report. A series of recommendations were included in the Global Development Strategy of Metrorex.

- **Technical Assistance for the Extension of Metrorex Services within a Metropolitan Bucharest Public Transport Strategy and Investment Program**

  The Project was financed by the World Bank and completed in July 2009. Due to all hereinabove and correlated with the attention granted to the local public transport by all factors involved both at local and governmental level, it is appreciated that in the future the results will appear, too. Therefore, there will be met requirements to increase the public transport efficiency, by metro, tram, trolley or bus and to improve the quality standard for the passengers’ service.

**9.3. Investment programs**

The Bucharest metro global development and modernisation 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, on short, medium and long term are structured, as detailed below:

- **Metro network development**
  1. **Metro Line 5: Drumul Taberei – Pantelimon**
     - **Section 1 - Drumul Taberei – Universitate**
     - Estimated commissioning for the section from Drumul Taberei to Haşdeu: 2016
     - Total length: 9,035 Km / Number of stations: 14
     - Estimated cost: Euro 623,5 million + VAT
     - This metro line will serve Drumul Taberei district which is defective on public transport services. The number of people is of 300,000 inhabitants and the buses, trolleybuses and tramway networks do not cover the traffic demand at peak hours.

   - **Section 2 - Universitate – Pantelimon**
     - Estimated commissioning for the section from Haşdeu to Iancului (Traian): 2020
     - Estimated commissioning for the section from Iancului (Traian) to Pantelimon: 2018
     - Total length: 8,074 Km / Number of stations: 13
     - Estimated cost: Euro 828,33 million + VAT
     - It will provide the connection between Pantelimon district which is of over 250,000 inhabitants, the downtown and the south-western of Bucharest, Drumul Taberei district.

  2. **Metro Line 6. Bucharest International Airport Rail Access Link Project**
     - Execution period: 7 years; Estimated commissioning: 2020
     - Total length: 14 Km / Number of stations: 12 (according to the Ministry of Transports agreement)
     - Estimated cost: Euro 1,055,00 million + VAT
     - It will provide the connection of the metro network with the Bucharest International Airport. This metro line will serve important areas of interest such exhibitions, business centres, leisure & supermarkets, residential real estates that create a corridor between the downtown of Bucharest and the Airports surrounding the city, revitalizing the activities and stimulating development of the north and residential areas between Baneasa and Otopeni. By the construction of this metro line, it will be created a rapid railway link between other two, vital for the economy, transport modes: railway and air flight. By the extension of the Metro Line 4, from Gara de Nord to Gara Progresu, it will be created the biggest and the most important metro line on the city’s north to south diameter, in order to make the connection between the two main airports: Bucharest International Airport and Băneasa Airport with Băneasa, Basarab, Gara de Nord and Gara Progresu railway stations, and subsequently, the interconnection with the ground transportation.
3. Metro Line 4: Lac Străuleşti – Gara de Nord - Gara Progresu

Section from Laminorului to Lac Străuleşti
Estimated commissioning: 2015
Total length: 2.10 Km / Number of stations: 2, including depot
Estimated cost: Euro 150 million + VAT
The line represents an extension of Line 4, added with a view to facilitate the connection with the National Road DN1A, in an area where it will be possible to be located a Park & Ride.

Section from Gara de Nord to Gara Progresu
Execution period: Subject to financing
Total length: 15 Km / Number of stations: 20
Estimated cost: Euro 1.008 million + VAT
Radial metro line that will connect two of the main railway stations: Gara de Nord and Gara Progresu with the Bucharest International airports: Otopeni and Băneasa, which will provide the connection with all existing metro lines in operation and future metro lines.

4. Metro Line 7: Voluntari – Bragadiru
Execution period: Subject to financing
Total length: around 25 Km / Number of stations: 30; depot-1
This metro line will be executed in order to increase the passengers' mobility, currently using the SW – NE route. It will interconnect two of the most crowded and populated districts, crossing the downtown. The metro line will be in the service of the south-western Bucharest residential districts and the markets on the ring road Alexandriei, as well as for Rahova and Ferentari districts, connecting the downtown with the north-south, Colentina – Voluntari. This metro line is scheduled to be executed under Public Private Partnership (PPP).

Modernisation of the existing installation on metro lines in service by:

- Modernisation of obsolete fixed installation on the existing metro network whose life span was reached:
  - Ventilation installations, correlated with the involved electric installations. In stages, within 3 years from the financing source providing;
  - Sanitary installations. In stages, within 3 years from the financing source providing;
  - Telecoms installation. In stages, within 2 years from the financing source providing;
  - Rolling track modernisation by extension of the resilient fastening system. In stages, within 2 years from the financing source providing;

- Metro stations modernisation:
  - Replacing the suspended ceilings. In stages, within 2 years from the financing source providing;
  - Construction of sanitary rooms destined to passengers. In stages, within 2 years from the financing source providing;
  - New finishing in the metro stations. In stages, within 2 years from the financing source providing;
  - Extension of the signalling and dynamic information system for passengers on the entire currently operating metro network. In stages, within 2 years from the financing source providing.

Rolling stock procurement
Within the strategy of S.C. Metrorex S.A is included the policy of providing the necessary rolling stock for operation, by replacing the old rolling stock fleet type IVA and subsequent procurement of new rolling stock for the envisaged new metro lines.

The following criteria were taken into consideration:

- Increasing of metro attractiveness by:
  - Improving the amenities conditions for passengers and increasing the safety operation by purchasing metro trains of latest generation in order to replace the obsolete fleet;
  - Decreasing the headways between trains, once the transport demand will increase, and purchasing additional rolling stock;
  - Decreasing the operating expenditures percentage, optimising the energy consumption and the expenditures to purchase new rolling stock having improved technical and energetic parameters, more reliable in order to replace the obsolete rolling stock.

- Providing rolling stock for the new metro lines or for the extension of the existing ones correlated with the needs to cover the transport demand under safety traffic conditions.

- Considering the procurement of 37 metro trains of 6 cars each to replace the operating rolling stock fleet on Metro Line 3 (16 metro trains) and providing the transport capacity on Section 1 of Metro Line 5: Drumul Taberei – Universitate (21 metro trains).
### Investment program development

**Development status of investment projects carried out by S.C Metrorex S.A on 31.12.2013**

P-program, A-achieved, % - percentage achievement rate

<table>
<thead>
<tr>
<th>No.</th>
<th>Investment objective</th>
<th>Total achievements 31.12.2013</th>
<th>State budget (Title 51.02.34)</th>
<th>State budget (Title 56)</th>
<th>State budget (Title 55)</th>
<th>Title 65 (non-reimbursable funds)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GRAND TOTAL, from which: P</td>
<td>820.127,00</td>
<td>294.000,00</td>
<td>260.000,00</td>
<td>54.868,00</td>
<td>101.612,00</td>
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<td></td>
<td>A</td>
<td>616.982,49</td>
<td>165.416,39</td>
<td>186.506,26</td>
<td>54.860,03</td>
<td>101.524,07</td>
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<td>75,23%</td>
<td>56,20%</td>
<td>71,73%</td>
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<td>99,11%</td>
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<td>A.</td>
<td><strong>On going works, from which:</strong></td>
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</tr>
<tr>
<td>1</td>
<td>Metro Line 4</td>
<td>195.626,00</td>
<td>134.000,00</td>
<td>10.000,00</td>
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<td>140.188,22</td>
<td>88.562,50</td>
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</tr>
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<td></td>
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<td>71,66%</td>
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<td>99,99%</td>
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<tr>
<td>2</td>
<td>Metro Line 5, Section Universitate - Drumul Taberei</td>
<td>318.867,00</td>
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<td>170.000,00</td>
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<td>18.779,00</td>
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<tr>
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<td>254.431,26</td>
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<td>18.778,60</td>
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<td>79,79%</td>
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<td>100,00%</td>
</tr>
<tr>
<td>3</td>
<td>Metro Line 2 Modernisation of electrical installations on Metro Lines 1, 2, 3 and connection link</td>
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<td>3.242,00</td>
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<td>99,95%</td>
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<tr>
<td>4</td>
<td>Facilities for passengers with disabilities</td>
<td>20.341,00</td>
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<td>0</td>
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</tr>
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<td></td>
<td></td>
<td>20.340,06</td>
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<td>0</td>
<td>100,00%</td>
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<tr>
<td>5</td>
<td><strong>Bucharest International Airport Rail Access Link Project</strong></td>
<td>98.446,00</td>
<td>52.500,00</td>
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<td>36.925,00</td>
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<td>6.256,08</td>
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<td>36.864,09</td>
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<td>52,40%</td>
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<td>0</td>
<td>99,99%</td>
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</tr>
<tr>
<td>6</td>
<td><strong>Metro Line 5, Section Universitate - Pantelimon</strong></td>
<td>138.571,00</td>
<td>3.500,00</td>
<td>80.000,00</td>
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<td>30.008,00</td>
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<td>99,99%</td>
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</tr>
<tr>
<td>B.</td>
<td><strong>Other investment expenditures TOTAL, from which:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>15.900,00</td>
<td>16.235,00</td>
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<tr>
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<td>31.726,15</td>
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<td>0</td>
<td>15.895,80</td>
<td>15.830,35</td>
</tr>
<tr>
<td></td>
<td><strong>98,73%</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>99,97%</td>
<td>97,51%</td>
</tr>
</tbody>
</table>

**Independent facilities**

|     | 32.135,00                                                                            | 0                             | 0                              | 0                       | 15.900,00               | 16.235,00                       |
|     | 31.726,15                                                                            | 0                             | 0                              | 0                       | 15.895,80               | 15.830,35                       |
|     | **98,73%**                                                                           | 0                             | 0                              | 0                       | 99,97%                  | 97,51%                          |