

# *ANNUAL REPORT 2016*



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## *FOREWORD BY THE CEO*



As Charles Dickens wrote, “annual income twenty pounds, annual expenditure nineteen six, result happiness.” 2016 was a year full of changes, events and achievements in the life of BKV Zrt.

One of the most important events of the year both for the Company and the Municipality was that the renovation of metro line M3 combined with vehicle modernisation began. As for the achievements, the first prototype train arrived to the Kőér utca site in May, which passed the inspection required by the National Transport Authority on July 19, and on September 29 made its first run on line M3 during the night time outage.

Another significant achievement is that as part of enabling the fully automatic operation of the vehicles of metro line M4, all driver compartments were removed in 2016, and thus the driverless modern metro reached its planned condition, and passengers can now enjoy a special and exciting experience by looking through the windscreen and see the metro tunnel ahead.

We were able to significantly reduce the average age of our bus fleet by continuing the procurement programme of new and used vehicles in 2016. New models added to our fleet included Modulo M108d, Mercedes-Benz Conecto, Mercedes Citaro and Volvo 7000 buses, and at the beginning of the year a contingent of 20 Modulo C68e electric midibuses entered service.

Highlights of our 2016 results also include tram purchases as well as vehicle and infrastructural improvements: delivery of the new CAF trams was completed by the end of the year, totalling the Company’s two-year tram programme of the new, low-floor CAF trams at 47, which BKK Zrt. as the customer procured with EU funding. In parallel with that, another outstanding achievement in the infrastructural development of our tram network was the start of the interconnecting tram network in Buda on 16 January, which integrated a number of tram lines to create a transfer-free track-based network offering a faster and more convenient travel option than before.

In 2016 our Company underwent a large-volume organisational change following the Budapest General Assembly’s resolution to restructure BKV Zrt., thereby separating the suburban



train (HÉV) sector with the effective date of 7 November 2016, which continued to operate in the newly formed transportation company BHÉV Zrt.

We, of course, need to remember the business results: thanks to the debt consolidation a year before, BKV Zrt. closed the 2016 business year once again with a positive result. Due to higher revenues and a more conservative cost management, our Company realised an operating profit HUF 9,151 million higher than what was planned. We closed the 2016 year with a profit of HUF 3,799 million. In addition, BKV Zrt.’s liquidity position was stable at the end of 2016, which was primarily due to the customer’s timely provisioning of the compensations that accounted for the majority of the Company’s revenues.

As in the past, in 2016 also all the employees of BKV Zrt., the largest public transport service provider of Budapest, combined their efforts to provide the highest possible service quality to the residents and tourists of the Hungarian capital. We plan to continue this tradition in the future.

# ***PUBLIC SERVICE CONTRACT***



The Company performs the timetable-based public transportation service based on the Public Service Contract concluded by the Budapest Transport Privately Held Corporation (hereinafter: BKV Zrt.) and the Centre for Budapest Transport (hereinafter: BKK Zrt.) on 28 April 2012 and as amended later.

Within the context of the Public Service Contract, BKK Zrt. orders the timetable-based public transportation service as required for the specific sectors by stating the quantitative and qualitative requirements as well as the detailed rules pertaining to the public service, including the rules applicable to the compensation for the costs of public service.

The Parties most recently amended the Public Service Contract in November 2016, which was needed to implement resolutions no. 1529/2015. (XI.04.) and 1530/2015. (XI.04.) of the Budapest General Assembly. As a result, the number of vehicles to be procured as part of the availability scheme and the extent of the related performance to order were modified.

The client requirements for the specific timetable year and the related financing criteria are listed in the Annual Agreement incorporated in the Public Service Contract. Considering that the public service was ordered in timetable cycles (from September 1 to August 31), the evaluation and the financial settlements for the annual public service of the 2015–2016 timetable were completed in 2016.

During the preparatory works of the Annual Agreement of the 2016–2017 timetable, BKK Zrt. and BKV Zrt. agreed to switch from the timetable-based annual period to the calendar-based (business) annual period beginning 1 January 2017. Thus the next Annual Agreement was only concluded for the period between 01.09.2016 and 31.12.2016.

Rendering services in the appropriate quality is encouraged by the expectations defined by BKK Zrt. and the application of the relevant incentives/sanctions. Improved BKV Zrt. service quality is evidenced by the fact that based on the mileage index measuring compliance with performance requirements, BKV Zrt. realized significant Bonus results even with the stricter limits both during the timetable year of 2015–2016 and of Septem-

ber–December 2016. The deteriorating traffic safety situation in Budapest had a significant impact on the accident indicator of BKV Zrt. resulting in an overall Malus rating of the sector accident index for both the 2015–2016 timetable year and the period September–December 2016. However, the overall assessment of service outages and accidents concluded a Bonus rating for both periods under review.

BKV Zrt. complied with its reporting obligation pursuant to the provisions of the Public Service Contract. In the monthly, quarterly and annual reports as well as the quarterly and annual Service Reports, BKV Zrt. reported on the provisioning of the public service ordered and the related economic issues.

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# CONTROL SYSTEMS



| Datum         | R. (db) | Fajna | Tr. Atomás | Esem               | Resztelapost | Resztalapot | Ok.  |
|---------------|---------|-------|------------|--------------------|--------------|-------------|------|
| 2014. 05. 08. | 10:06   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:08   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:10   | 3     | QEE        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:14   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:14   | 4     | MZS        | 1. fázisjavító hib | Jelzés       | jött        | Jött |
| 2014. 05. 08. | 10:15   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:20   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:20   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:23   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:23   | 3     | FEK        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:25   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:30   | 3     | ECS        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:31   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:31   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:31   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:33   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:33   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:39   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |
| 2014. 05. 08. | 10:40   | 2     | DPU        | Bélepés            | Bélepés      | ment        | Jött |

### Quality control systems according to the MSZ EN ISO 9001:2009 standard

The commitment of BKV Zrt.'s management to quality is reflected by the fact that in 2016 the company successfully operated and improved its range of activities covered by quality control systems as per the ISO 9001 standard. The quality control systems concerning the energy management, education and investment processes of BKV Zrt. as well as its public transport activities carried out with buses and trolleybuses continued to operate successfully and passed supervisory audits as well.

### Environment-focused control system according to the MSZ EN ISO 14001:2005 standard

The operation of an environment-focused control system („KIR”) by BKV Zrt.— besides the functional need for an environmentally friendly operation—was also necessitated by a requirement of the financing bank connected to the purchase of ALSTOM metro cars. Continuous compliance with and development of the system requirements was indispensable for the purpose of maintaining the validity of the successful compliance certificate and ensuring the effective operation of the KIR system. At the supervisory audit implemented on 14 June 2016, after an examination of the documents, and an on-site survey of the plants, warehouses, storage facilities and the outdoor spaces, the external independent, accredited entity found the entire area of the metro vehicle depot located on Fehér út to be suitable for the further operation of KIR without limitations.

### Energy control systems according to the MSZ EN ISO 50001:2012 standard

For the purpose of compliance with the provisions of Act LVII of 2015 on Energy Efficiency and based on the decision by the Management of the BKV Zrt., an energy control system as per the MSZ EN ISO 50001:2012 standard had to be implemented and certified. Within the 5 months available under the schedule and with help from a consultant, our colleagues prepared the system documentation and, as a result, our Company launched the energy control system on 15 August 2016. After successful system certification, BKV Zrt. obtained the certificate for the energy control system as per the MSZ EN ISO 50001:2012 standard and thus complied with the legal requirements above.



# *INVESTMENTS, DEVELOPMENTS*



## Vehicle purchases, renovation and modernisation

### Bus sector

Upgrading of the bus vehicle fleet continued in 2016 to reduce average age, implement higher service level and reduce maintenance needs. Replacement of the vehicles was implemented in various arrangements in 2016 as well: exercising the options of our existing framework agreements and procurement of used buses by announcing new tenders.

#### Buses manufactured in PKD arrangement

In addition to the 18 Hungarian manufactured Module M108d buses purchased the year before, in 2016 the Company purchased and assembled another 10 units thereby increasing the number of buses of Hungarian design and assembled by the Company to 46.

#### Mercedes-Benz Conecto purchase

In addition to the basic quantity as per the 2014 contract, we exercised the first option to order 15 Mercedes Conecto buses, which arrived in mid-October of 2016 and entered scheduled bus service in November. In mid-December we ordered another 15 buses but their delivery only occurred in 2017.

#### The electric bus fleet entering service

The electric bus fleet of 20 Modulo C68e electric midibus fleet entered service in early 2016, with 5 on 30 April 2016 and another 16 gradually introduced by August. These buses ran over 460,000 km by 31 December 2016.

#### Procurement of used buses

Based on the experience with the CNG powered buses over the past years, 22 compressed natural gas powered Mercedes Citaro buses were procured and naturalised and these entered service in the South Pest region of the capital. The completely homogeneous fleet arrived to Budapest from Lund, one of the suburbs of Malmö.

The last two Mercedes Citaro buses entered service in 2016 to join the 23 units introduced in previous years, which completed the commissioning of the 25-unit fleet.

Another 12 Volvo 7000 buses purchased from Berlin also entered service to increase the fleet to 36.

At the end of the year the Company purchased the 5 Mercedes Citaro buses it had been renting for close to a year. As these buses had already been naturalised, their commissioning was purely administrative and thus they did not have to be withdrawn from service and did not create any extra expenses.

In the autumn another 4 Volvo 7000A articulated buses procured from Geneva entered service. As a result, the total count of this model reached 29. Like the other units of this model, these newly acquired buses were assigned to the Cinkota Division.

### Tramway sector

#### Procurement

Within the framework of the contract signed in December 2015, 10 TW6100 motor cars were delivered from Hannover early in the year.

The technical rescue vehicle equipped as specified with the relevant divisions of BKV built on the MAN undercarriage (“Nagysegély”) was completed in the second half of the year and commissioned before the end of the year. This modern vehicle replaced one of the Csepel rescue vehicles procured in the 1970s.

10 CAF URBOS 3 5-module and 12 URBOS 3 9-module trams were delivered and entered service in 2016. Ownership of the new trams belongs to BKK and their operation has been assigned to BKV.

#### Modernisations

8 TW6000 trams were renovated during the year with a complete overhaul of the bogies and the aesthetic modernisation of the passenger area.

The renovation of 28 Tatra T5C5 trams also involved modernisation of the powertrain. All in all 78 vehicles had been modernised since 2014. The programme is going to continue in 2017.

Modernisation of the Ganz KCsV-7 trams also continued. The scheduled 4 vehicles were completed by the end of the year. We also plan to continue this programme in the coming years.

## Suburban railway sector

### Modernisations

The components of the catenary wires such as contact wires, cables, support, tensioning and insulation elements.

The Budapest General Assembly issued a resolution to restructure BKV Zrt., based on which our Company operated the suburban train (HÉV) sector until 6 November 2016.

### Modernisation of the scheduled BKV boats

In 2012 our Company began a modernisation programme of its boats involved in public transportation. The programme's objectives included reduced travel time and increased energy efficiency with eco-friendly solutions. In 2016 our Pest-Buda boat was fitted with a new, more powerful yet eco-friendly main engine and a new powertrain as well as a bow thruster to support docking operations.



## Track reconstructions

### Budapest projects affecting the infrastructure of the tramway sector

#### Road and tramway track renovation in Görgey út in District IV

After the complete reconstruction of Görgey utca (rebuilding of the road and tramways and replacement of the towing earth cables) tram service resumed in February 2016.

#### South Buda platform buildings related to phase 1 of the Budapest tram and trolleybus vehicle development

The project affected the platforms on Alkotás, Villányi, Fehérvári and Bartók Béla streets. The implementation works also included the needed maintenance of rail and contact wire as well as earth cable installation to improve tram operational safety. Works on the signalling system were completed in Etele tér and on the cover signal and point adjustment elsewhere. The unused terminal station was demolished near Albertfalva turnout stop, the rails were rebuilt and a new turnout was constructed. The technical delivery and acceptance of the project was completed and the warranty period began. Currently tasks related to the operating permit and the full closing of the project are left to complete.

#### Track reconstructions completed as BKV's own investment

- **Renovation on the "dosator" rail of tram no. 17**  
156 m of rails were replaced, a modern track was implemented on the road connection (with two public road crossings) was rebuilt. This allows trams 17 and 19 to use it as a temporary terminal station and provides a secure connection with the track of tram no. 1.
- **Renovation on tram lines no. 19/41/47/49/56**  
In the autumn of 2015 we signed a contract for the reconstruction of the earth cable network and tramway rails in the section between Móricz Zsigmond körtér and Szent Gellért tér of Bartók Béla út. BKK could provide track obstruction required for the works in 2016, so reconstruction works began in late May 2016 with preparation works for

the replacement of the earth cable network, then from 16 June 2016 replacement of 2,232 m of rails, 6 group turnouts, 2 group junctions and 12,492 lm of earth cables were replaced. In order to reduce the wear of the small radius bends at Szent Gellért tér, rail lubricating equipment was also installed. As a result of the renovation, "slow signals" were eliminated on close to 180 rail metres. The reconstruction of the urban rail infrastructure in poor condition was especially important because since the interconnecting tram network in Buda was completed, this rail section is one of the most heavily used electric railway track previously causing a number of derailings due to heavy wear. Introduction of the CAF trams also increased the importance of raising the technical quality level of the track as this new vehicle is more sensitive to defects in track quality than other models. The reconstruction was completed in coordination with EU project KÖZOP 5.5.0-09-11-2012-0009 "Electric trolley bus development in Budapest, phase I" with the district heating pipe replacement programme of FŐTÁV and the survey of the water pipelines by Fővárosi Vízművek Zrt. The temporary permit of use was issued on 27 August 2016.

- **Renovation of the bend rail on tram line no. 51**  
Overflowed with sand, a wooden based 170 rail metre of tram line no. 51 was renovated. The straight section was constructed with new reinforced concrete track base while the bend made of cast concrete. The works also included the water drainage of the cast concrete section. An experimental plastic base was also used in the bend. To increase passenger safety, a safety fence was installed between the rails at the stop. To increase the lifespan of the rail and reduce noise, a solar-powered rail lubricating equipment was installed.
- **Napfény utca, tram line no. 3**  
The entire embedment of 260 rail metre of tram line no. 3 between the Határ út–Nagykőrösi út stop and the Napfény utca crossover was replaced. The bends here also received plastic bases, whose support is provided by a monolithic concrete solution that was

completed in the spring of 2017. To increase the lifespan of the rail and reduce noise, a solar-powered rail lubricating equipment was installed also here. The crossing at the Napfény utca public road and passenger passage received a new surface.

- **Rail replacements on the sections between Tálás utca–Arany János utca and Bercsényi utca–Hunyadi utca in Ady Endre (District XIX) on tram line no. 42**

The works included big track panel rail replacements of 1754 and 387 rail metres.

- **Bend rail replacements on the section between Hentes utca and Tagló utca in Gubacsi út (District IX) on tram line no. 51**

The works included big track panel rail replacements of 182 rail metres.

- **Replacement of 3 level crossings in District X on tram lines 28 and 37**

The works included rail replacements totalling 168 rail metres in the Maglódi út–Gitár utca crossing, the entrance at Maglódi út 12/b, and the Metalloglóbusz entrance in Sírkert utca.

- **Replacement of level crossing at Maglódi út–Akna utca on tram lines 28 and 37**

Replacement with BODAN polymer concrete covering elements at the Maglódi út–Akna utca crossing was completed in 112 rail metres. The width of the level crossing along the rail towards Éles sarok is 31 rail metres and toward Újköztemető it is 33 rail metres. This is the first level crossing on our tram lines constructed with cover panels with high load-bearing capacity. A large number of trucks use the road crossing the rail every day.

- **Renovation of 10 level crossings on tram line no. 50 in Districts XVIII and XIX**

The renovations resulted in new surfaces for every single level crossing. A total of 307 m of tram rails along with the rail connections were replaced in the level crossings.

## Other track reconstructions

- Bartók Béla út rail construction in Budapest's District XI (between Móricz Zs. körtér and Szt. Gellért tér)

- Rail reconstruction and renovation along tram line no. 24 (Visi Imre utca – Orczy tér)
- Renovation on tram lines no. 17/41/47/56 (Zsombor utca, Kondorosi level crossing)
- Renovation on tram lines no. 62/69 (Kolozsvár utca) (rail before MÁV telep)
- Renovation of the level crossing on tram lines no. 28/37 (Gitár utca, Maglódi út 12/b., Sírkert utca)
- Renovation on the line of the no. 52 tram (Vörösmarty utca)
- Renovation on tram lines no. 28/37 (level crossing at Akna utca)
- Equipment of the Vörösvár út terminal station of tram no. 17 with a call light
- Additions to the power circuits of the Bécsi út terminal station of tram no. 1
- Additions to the entry point control of the Hűvösvölgy terminal station
- Installation of a switch signalling system at the Bécsi út terminal station of tram no. 17 (next to point no. 21)
- Replacement of the traffic reporting equipment in II. János Pál pápa tér
- Replacement of the pulling magnetic interlocking equipment at Salgótarjáni utca – Hungária körút (K3424)
- Replacement of junction no. A3201 and junction turnout no. K3204 at Bosnyák tér on tram lines 3/62/62/A
- Track maintenance works at Boráros tér - Bakáts u., Kamaraerdő, at Budafok, Városház tér on tram lines no. 17/41/47, at Bécsi út on tram line no. 17, at Tordai u., 3-as Bihari út, Kozma u, Maglódi út on tram line no. 41, at Teleki tér on no. 24-28, at Éles sarok, Határ út–Jókai Mór u. 28/37, big track panel replacement on no. 52 and 42
- Replacement of railway sleepers at MÁV telep on tram line no. 62
- Replacement of semi-points at turnouts K2905, 2906, 2907, 2908, 2909 at the Bécsi út 17. terminal station of tram lines 17/19/41
- Tram lines no. 4/6: replacement of expansion

joint, rail replacement with rail cutting, replacement of level crossing, rail grinding

- Temporary panel replacement at József körút (Népszínház utca – Bérkocsis utca) and Erzsébet körút (Rákóczi út – Dohány utca) on tram lines no. 4/6
- Rail regulation at Telepes utca (at level crossing) on tram lines 3/62
- rail replacement at Boráros tér on tram line no. 2
- bend replacement at Völgy utca on tram line 61
- rail replacement in front of the Angyalföld garage on tram lines 12/14
- wooden element replacement in the turnout in front of the Angyalföld garage on tram lines 12/14
- Budagyöngye A2103 railway sleeper and embedment replacement on tram lines no. 56/61/59
- replacement of 2 semi-points + surface breaking and restoration in the K1503 turnout at the Határ út terminal station of tram lines no. 42/52
- replacement of toothed rack between Sváb-hegy and Széchenyi-hegy on tram line no. 60 (cogwheel railway)
- bridge load test at Pongrác út on tram line no. 37

The rail replacements completed made tram and public road traffic safer and faster.

We consider it as a huge achievement that rail lubricating equipment were installed to reduce rail wear and noise pollution. In 2016 a total of 21 sites were equipped with rail lubricating equipment, which reassuringly settled some of the residential complaints about noise, and resulted in positive feedback from the respective neighbourhoods.

### Renovation of the Millennium Underground line:

- At the same time with the replacement of pointers, implementation works on the safety equipment, with delivery, equipment tests and commissioning were completed.
- We completed the electric installation reno-

vation of building no. 4 and the old ticket office of the Millennium Underground rail yard.

- Outdoor light bulbs and connecting cables were replaced and the lighting of the service pit was repaired and washed (degreasing and deoiling).
- The platform lighting equipment at the station of the Millennium Underground metro line were replaced.
- We collected the expert opinions for the reconstruction of the ballast bed section of the Millennium Underground line between Hősök tere and Mexikói út.
- We provided the opinion for the implementation plans for the expansion of the emergency button system at the rail yard at Mexikói út.
- A fresh coat of paint was applied to the tunnel between Vörösmarty tér and Oktogon on the Millennium Underground line on a total wall surface of 12,000 m<sup>2</sup>.

### M2 line

- In order to create a new building in the old MTE SZ headquarters on Kossuth tér, we started the reconstruction works of the ground level hall and the traffic watch office of the metro station. Since 3 December 2016, metro trains pass Kossuth tér without stopping until the work phases are completed. We provide efficient help to successfully complete this project.
- At the M2 rail yard, we installed temporary power supply to the new gate house and then installed the final power supply.
- In the Lifting hall power supply was installed at the ATC workshop, the electric system of certain offices in the office building was rebuilt, and the lighting network for the quick response mechanical service room of the track maintenance plant was installed.
- The expert opinions for the interim designs related to the repair works of the 10 kV chain cables between the Fehér út transformer and the Pillangó u. station on the M2 line, and on-site visits by the designers and contractors were also completed. The repair works were conducted with appropriate technical supervision.

- In order to improve the operational safety of the Blaha Lujza tér station, the replacement and installation of the protection equipment of the 0.8 kV row of cells was completed.
- 70% of the windows were replaced at the track maintenance plant of the M2 rail yard, and the ramp on one side received new pavement in an area of 420 m<sup>2</sup>.
- An outside contractor was hired to grind the side wall covering at Astoria station, replace the defective tiles and grind the passenger distribution tiles.
- A number of turnout components were also replaced (semi-points, crossing mid-section, etc.).
- Prior to the installation of the “smart metering” system, Blaha Lujza tér was designated as the scene of the “Smart pilot” project. After the completion of the assessment, the consumers to be included in the programme were selected where the efficient energy management will be implemented. Implementation works are in progress.
- During the reconstruction of Széll Kálmán tér, the stairs on Várfok utca was augmented with 2 convenience elevators that we maintain.
- The infocommunication rooms of the Deák Ferenc station on metro line M2 received new lighting and mechanical installations.
- The heavy noise pollution of the CNIM type elevators at exit no. 2 of the Keleti railway station of metro line M2 were eliminated. An inspection of the stairs revealed that a crater-type wear was caused by the overturning carriages on the guide rails. We replaced the runners due to the large volume of bearing failures.

### M3 line

- On metro line M3 we renovated 10 pieces of Lorenz SEL 700-H point drive gears. In order to maintain the safety of train traffic, during this investment the point drive gear that passed the setting numbers guaranteed by the manufacturer will be able to perform a further 500,000 settings in a reliable manner.
- The entire 1,100 rail metre test track of the

M3 was renovated. As part of that renovation, we replaced 312 railway sleepers and fishplates, and heavy machine rail regulation was implemented with replacement stone base.

- The interlockings, remote controls and the functions of the AVR system were inspected, and cyclical renovation of 10 point-drive gears and 25 autostops was completed.
- At the end of the year, fire safety maintenance of 19 escalators was completed.
- The tunnel on this metro line, and especially the AVR programme carpet improved significantly in terms of cleanliness. Compared to the 2015 base year, the quantity of the oil sludge carried out of the tunnel dropped by 60%.

### Preparation works of the reconstruction of the M3 line

- In preparation for the reconstruction of the M3 line, the track of the tunnel connecting the north-south and the east-west lines, which was badly worn, was also renovated. The renovation included the following: replacement of 466.4 rail metre of rail, of which UIC 54 r. was 198.5 rail metre and 48.5 r. was 267.9 rail metre, replacement of fishplates, repair and production of Icosit cones, replacement of third rail porcelain, if needed, UIC 54 r insulated rail connection, rail regulation works. All these tasks required 62 AT weldings, of which UIC 54 r. was 18 and 48.5 r. was 44. These works were performed by an external contractor.
- We participated and provided the highest-level expert support in giving opinions with regards to the tender and implementation plans for the renovation of the infrastructure of metro line M3.
- In the first phase of the reconstruction of metro line M3, the affected premises and workshops were moved and the new sites received appropriate social facilities, workshops and temporary warehouses.
- In the turnout zones Nagyvárad tér and Lehel tér, turnout parts were replaced. (19 semi-points, 6 crossing mid-sections, 17 track rails with guide rails, 14 intermediate rails). All

these works required 143 AT weldings with the involvement of an external contractor.

- The temporary material and tools storage at Árpád híd was eliminated, the air management system at Kőbánya-Kispest gyógyszertár was reconfigured, and the ventilation at Dózsa György út was delivered.
- The dust blower at the Kőér utca rail yard received maintenance works and new bearings.
- We provided technical supervisory support for the implementation works of the BKK customer centre to be constructed at the Népliget metro station.
- We provided technical supervision for the troubleshooting of the power supply cables of the radial well system of the Népliget station. The modernisation works of the receivers are in progress.
- The simulator room to be implemented in the social facility building received a power supply cable and connections.
- Maintenance works were completed on service pit lighting equipment at track no. 13 and new lighting fixtures were installed in the vehicle storage building of the Kőér utca rail yard.
- During the renovation of metro line M3, due to the new technological equipment, the duties and numbers of the dispatchers working on the metro line as well as the technical equipment will be increased, which will require the area of the current M2 central dispatcher room in the Szabó Ervin tér headquarters. Based on the above, the dispatchers of metro line M2 had to be moved (with the exception of the Energy Dispatcher) to the dispatcher room planned for level 8 of the Kelenföld rail yard. The move will be coordinated with own resources (including the resettlement of the technological equipment), the more important preparations for which were carried out in 2016, e.g. disposition and time schedule.
- We were involved in the preparations required for the tender plans for the renovation of the Szabó Ervin tér building.
- Within the Action Plan of metro line M3, we carried out increased inspections.

## M4 line

- In parallel with the operating tasks, we performed the integrated fire safety tests required under the National Fire Protection Rules and the operating tests of the ventilation system of the battery spaces in 2016 on metro line M4.
- In 2016 we requested the Contractor to make warranty repairs of still existing implementation defects, during which we provided expert supervision.
- Warranty issues with escalators were registered in great numbers this year as well. In order to maintain uninterrupted operation, we made a number of technical modifications in agreement with the manufacturer.
- Related to maintenance tasks, we coordinated the delivery of filters to the stations and continuously improved the maintenance documentation.
- In order to meet the new operating requirements, we connected the steel structured objects to be installed to the EPH network while providing warranty services.
- Service pit lights enduring the vehicle and chassis cleaning technology were installed in the vehicle repair hall in the M4 rail yard, lighting and electrical sockets were converted in a number of office buildings, and the electrical socket network in the doctor's office was implemented.

## Infrastructure-related projects in the metro sector

- In 2016 the encryption process of the metro radio systems began, as a result of which the Motorola-made handheld and train radios were replaced with Icom units. This change affected 23 trains, i.e. 46 train radios, on the Millennium Underground line, 22 trains, i.e. 44 train radios, on the M2 line, and a total of 154 handheld radios on the Millennium Underground-M2 line, where their programming and replacement was completed.
- Article 8 of Act XLI of 2012 on Passenger Transport Services requires that camera images are

stored for 15 days; therefore, we increased the storage capacity of the video recording systems.

- The scheduled safety audit measurements of the electric equipment on metro lines Millennium Underground, M2, M3 and M4 (electric shock protection, explosion safe, high voltage equipment, lightning protection) were completed.
- The connecting tunnel of metro lines M2 and M3 was cleaned and new gutters were implemented on a 300 m section and 137 new water drainage trays were installed to prepare the connecting tunnel for the start of the reconstruction.
- 9 escalators received premium level maintenance on metro lines M2 and M3.
- Recurring oil leaks in the main engine is a known issue with the over 40-year-old escalators. As an experiment, we use the liquid grease Interflon Grease MP00 that already proved successful with power units of the metro motor cars. This method successfully eliminated oil leaks in the tested equipment. Due to positive past experience, the increase in the expected lifespan of the powertrain and the longer lubrication periods, we are going to use this solution with other power units in the future, which will result in cost reductions.
- We participated and provided expert level support in the coordination relevant to the Automated Fair Collection (AFC) project.
- Scheduled cleaning works of the water mist fire extinguishers have been completed on all metro lines.
- We completed rail grinding on extensive sections: M2 line: 7,500 rail metre, M3 line: 17,900 rail metre

### Other infrastructure-related projects

- Centralisation of the remote control of transformers using a GSM system
- addition of SMS remote diagnostics to the equipment installed at the Mexikói út terminal station of tram line no. 3
- addition of SMS remote diagnostics to the

equipment installed at the Fehérvári út terminal station of tram line no. 1

- Installation of the camera system at Margit híd (rail section of the interconnecting tram network in Buda)
- As part of implementing a metering tram, the inertia sensor-based vehicle dynamics metering system has been procured, installed and commissioned on the Ganz ICS tram to assess track conditions of rails.
- regulation of the Hosszúréti stream bed
- The public procurement process relevant to the renovation works on the expansion rail in the backyard of the Száva garage has begun.

### Other reconstructions

- **Reconstruction of the heating system at the Akácfa utca headquarters**  
Energy saving and energy efficiency are key consideration in operating our vehicles and maintaining our facilities. This is why the reconstruction of the heating system at the Akácfa utca headquarters was implemented in 2016. The project included the renovation of the boiler room and the central heating blocks: the old, outdated, low-efficiency steam boiler and the fully steam-based system were replaced with three modern condensing boilers to provide heating.
- **Recovery of the 2013 flood damage**  
Works related to the recovery of the 2013 flood damage had been finished by late March 2016. The cost of the works completed were reimbursed by the Municipality of Budapest and the Hungarian State Treasury.
- **Purchasing a used bedding replacement shovel**  
A used HSW 1 bedding replacement shovel was procured for the existing Liebherr A 900c ZW rotating excavator, allowing the muddy bedding sections of the HÉV railway network to be replaced locally with machinery.
- **Centralisation of the remote control of transformers, phase 1**  
The central control centre system (SCADA) was implemented in Vaskapu utca. The remote control of the transformers was moved

here from the Zugló and the Pálffy control centres to the standalone, new control centre system. The existing control centre in Vaskapu utca with the remote-controlled transformers will continue to operate.

- **Replacement of the 0.4 kV distributors at the Margit híd HÉV station**

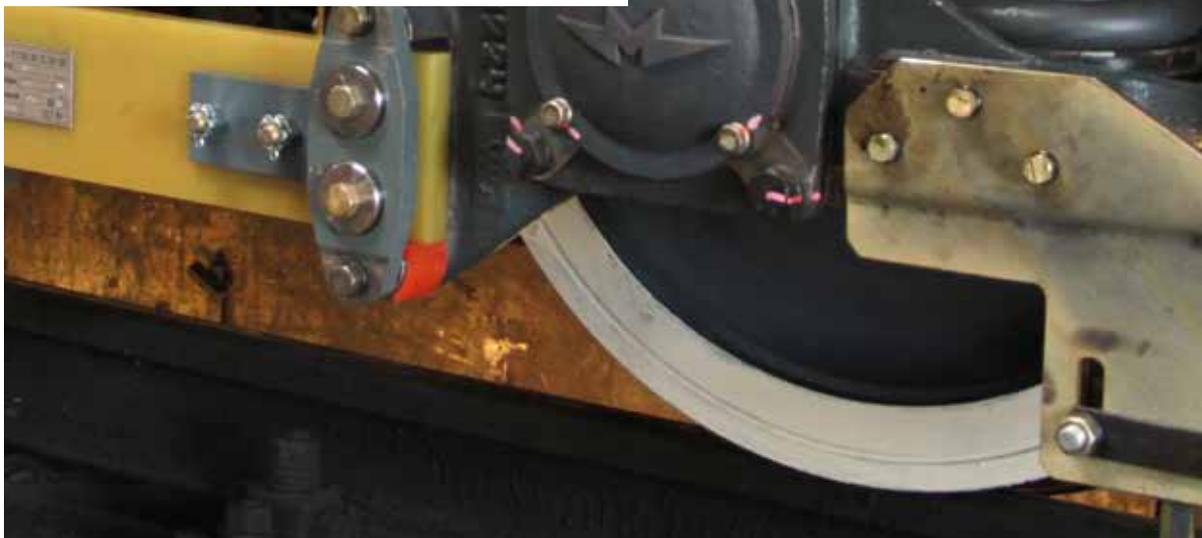
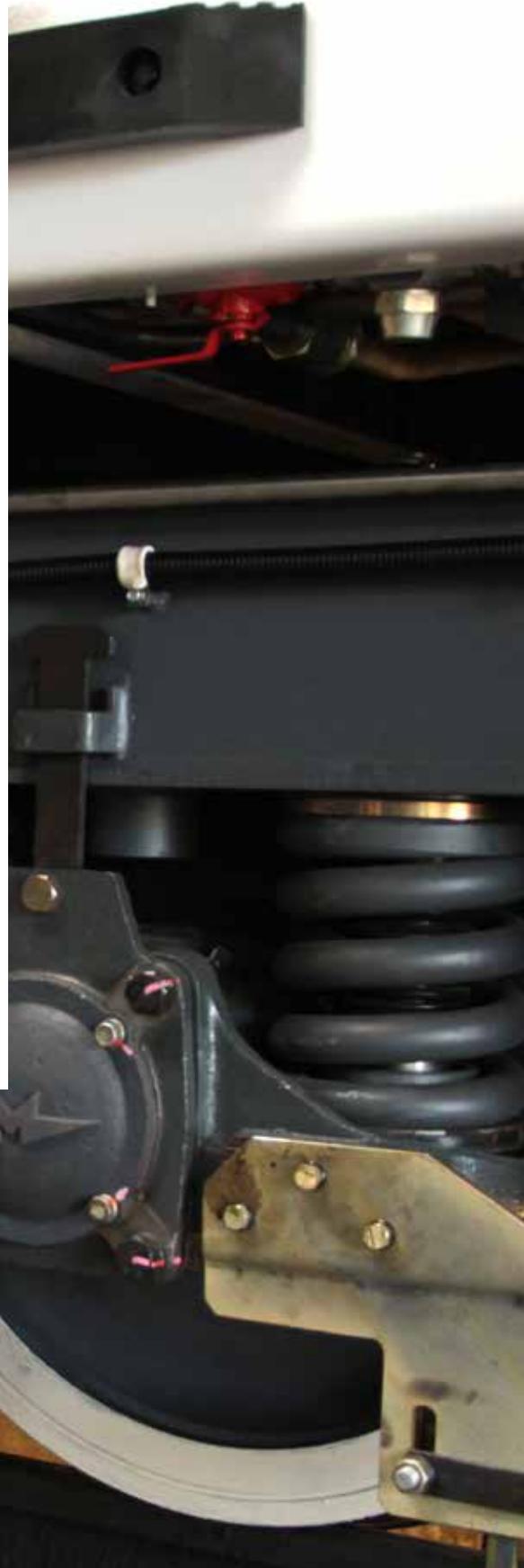
The replacement of the 0.4 kV main distributor at the Margit híd HÉV station and the power supply equipment, cabling and pipes for the consumers of the tunnel pump station was completed. In order to protect the new distributor, a waterproof inner insulation of the 0.4 kV room was needed.

- **Procurement of a digital wheel alignment equipment:**

The Kelenföld, Cinkota and Dél-Pest bus sites of BKV Zrt. each received a Welt 770 type digital wheel alignment equipment. The new machines now provide for the accurate diagnostics and setup of vehicle wheel alignments, which was indispensable in terms of traffic safety, energy use and the ideal lifespan of the tyres.

- **Procurement of 5 gasoline heat blowers:**

5 gasoline powered heavy-duty heat blowers equipped with oil tank, transport carriage, heat protection and engines with thermostat control were purchased, which are indispensable in rainy days and in freezing winter conditions to dry and unfreeze the equipment of drenched or frozen vehicles.



## Bus and Trolleybus Operations Directorate

### Changes and achievements in the vehicle portfolio

BKV Zrt. as the most significant provider of Budapest's bus traffic introduced a number of new bus models equipped with traditional diesel engines, alternative and fully electric-powered vehicles.

An assessment of fully electric-powered buses in terms of their operation, addition to the fleet and suitability had been included in the programme of BKV Zrt. With non-repayable subsidy by the Ministry for National Economy, 20 zero-emission Modulo Medio Electric C68E buses were purchased in 2015, which entered service for the first time on the 16A Buda Castle and 116 bus lines in April 2016. The bus was developed and manufactured in Hungary, and in addition to being modular, its electric powertrain represents a future trend. Since they entered service, in 2016 these vehicles spared Budapest 400 tons of CO2 emission.

The charging infrastructure needed for the operation of these vehicles had already been implemented at the Kelenföld Division. The development provided for the increased energy need of the site from the electricity company, and also the installation of the charging stations. A total of 18 charging stations (6 indoor and 12 outdoor) were installed, so the buses can be charged even during smaller maintenance and cleaning activities. We implemented the energy increase and the related network installation required for operation as well as the installation of the two container type substitution from our sources at the Kelenföld bus site.

Within the context of the master agreement concluded between BKV Zrt. and INTER TAN-KER CITY Konzorcium, 20 new articulated buses entered service using 23 portfolio vehicles. Based on the scheme, the owner and the party responsible for maintenance of the vehicles is the contractor, while BKV Zrt. is responsible for rendering the service and providing the fuel and the site. The EURO VI emission class Mercedes-Benz Conecto G buses entered service in June 2016 as scheduled on bus lines 7E, 9 and 32. Property of Ikarus Egyedi Kft., 22 Modulo M108D low-floor solo buses also entered service in the summer as part of the commitment contract.

Average age of buses and trolleybuses



Based on the favourable operating experience of the 15 solo size category Mercedes-Benz Conecto buses purchased in 2015 for the Cinkota Division, BKV Zrt. decided to call the optional quantity included in the master contract in three phases. After the first series, the bus fleet grew by 15 units in 2016Q4. Another 22 Modulo M108D buses manufactured in PKD arrangement and operated by BKV were purchased. One of the highlights of the used vehicle purchases was the purchase of 22 CNG powered Mercedes-Benz O530 buses and 5 additional diesel Citaro buses.

### New buses purchased in 2016

| Make          | Model       | Entry into service | Quantity procured |
|---------------|-------------|--------------------|-------------------|
| Modulo        | M108D (PKD) | 01-04. 2016        | 22                |
| Modulo        | M108D       | 06-09. 2016        | 22                |
| Mercedes-Benz | Conecto     | 12. 2016           | 15                |
| Mercedes-Benz | Conecto G   | 06. 2016           | 23                |
| Modulo        | C68E        | 04-05. 2016        | 20                |

### Vehicle portfolio (as of 31.12.2016)

|            | Szolo and midi | Articulated |
|------------|----------------|-------------|
| High-floor | 120            | 105         |
| Low-floor  | 442            | 261         |

### Vehicle tests

In June we had a chance to test brand new, CNG-powered Mercedes Citaro NGT buses loaned by the manufacturer in the form of an open, combined test. Our Company's experts conducted a number of measurement tests (fuel consumption, noise emission) in parallel with another loaned test bus, an Iveco Urbanway CNG, as well as a Van Hool NEW A330 and a Mercedes-Benz O530 Citaro C1 CNG-powered buses, both owned by the

Company. All this way conducted in passenger service on line 99.

In addition to the models above, we had a chance to conduct tests in passenger service with:

- a Modulo M168d low-floor city articulated bus,
- a Credo Econell City3 low-entrance city bus, and
- a VDL Citea LLE 120 low-entrance suburban bus.

To support the metro replacement activities related to the renovation of metro line M3, the Bus and Trolleybus Operations Directorate of BKV Zrt. does its best to meet expectations. In preparation for such activities, in June 2016 the Van Hool AGG 300 double articulated bus available on the second-hand market was assessed for service availability. Arrived from the Netherlands, the close to 25 m long vehicle was tested without passengers. The test revealed that even though the public road network could accommodate the vehicles on certain lines, the KÖHÉM decrees only partially adopting the international UNECE decrees, the currently effective Hungarian traffic code (KRESZ), and the Hungarian legal environment does allow the 24.785 m long vehicles to enter into service.

During vehicle tests the following technical and economic criteria are implemented:

- operational experience,
- unit maintenance costs,
- fit into the current fleet of vehicles,
- passenger-side quality, feedback,
- development routes and trends.

### Special vehicles

The classic airport Ikarus 280 bus, an exact replica of a shuttle articulated passenger bus of the national airline was rebuilt in cooperation with BKV Zrt. and Légiközlekedési Kulturális Központ Közhasznú Nonprofit Kft. (LKK). The bus was given a new life as part of the value preservation programme of BKV Zrt. and is servicing passengers during airport visits organised by LKK. The Ikarus 280 bus was renovated in the spring of 2016 by the Dél-Pest Division of the Bus and Trolleybus Operations Directorate. The bus painted in MALÉV colours is also part of the value protection programme of BKV Zrt.

The Company took over from BKV Előre SC the

Ikarus E15 bus previously providing for the transportation needs of the sports club; as a result, the Bus and Trolleybus Operations Directorate became the operator of the bus in 2016. The bus was renovated by the Kelenföld Division and in addition to providing transportation service for the Bus and Trolleybus Operations Directorate, it is also involved in the transportation of the peer directorates and organisations if the capacity of the Tourism Division proves insufficient.

### Installation of a CNG fuel station

Committed to environmental transportation and zero solid particle emission, BKV Zrt. reached a new milestone by commissioning a CNG fuel station installed at the Méta utca site of the South Pest Division, the site of the CNG powered vehicles of the Bus and Trolleybus Operations Directorate. One of the considerations in selecting the site was that in 2014 two special service bays were installed on this site to provide for the operating and maintenance tasks of CNG-powered buses, which is important both in terms of traffic safety and vehicle technology. Our Company currently has 71 CNG-powered buses, which service passengers with lower environmental and noise pollution than the diesel buses. The continuous development of the fleet and the need to optimise filling processes necessitated the installation of a second fuel station. The project was implemented in a mutually constructive cooperation between BKV Zrt. and FŐGÁZ CNG Kft. The fuel station is integrated into the existing environment of the site, and is compliant with the regulations on CNG fuel stations by implementing the public utility replacements and connections required.

### Installation of automatic fire extinguishing equipment

The Bus and Trolleybus Operations Directorate conducted a deep inspection of the low-floor vehicles bought used, after which the vehicles were converted on a case by case basis and automatic fire extinguishing equipment were installed in the engine compartment. Consequently, the installation of the standalone automatic fire extinguishing equipment in the engine compartment provided for a cost-effective and feasible risk mitigation solution for the purpose of protecting the safety of lives and property.

The cost of this automatic system is significantly lower than a full fire safety conversion, and with regular maintenance the equipment can provide protection against eventual fires for the entire lifespan of the vehicles. The water-based automatic system was installed in a total of 125 buses of the Bus and Trolleybus Operations Directorate in 2016. Since then all purchased vehicles arrive to our Company fitted with such equipment.

## Preparation for the metro replacement service during the renovation of metro line M3

### Headcount

The reconstruction works of metro line M3 scheduled for 2017Q2 will require the bus sector of BKV Zrt. to provide significant metro replacement services. 150–400 additional staff is required in the various phases of the renovation project, a part of which may be provided by encouraging part-time employment and more overtime. Considering that there is manpower shortage among HVG drivers, it is not a realistic objective to hire the required number of qualified drivers. BKV Zrt. will also consider other options to provide for the necessary manpower. In addition to hiring qualified drivers, BKV Zrt. will provide training for drivers with category C permit to obtain their category D licences. In addition, our Company joined the programme coordinated by OFA, which provides EU funding for 150 bus driver students to be employed by BKV Zrt. to obtain their category C licence.

Maintenance of the new and used vehicles procured for the metro replacement job requires an increase in the number of maintenance staff trained in the maintenance works of these modern vehicles. As a result, training for the existing blue-collar workers and hiring of employees with up-to-date professional skills will receive priority.

### Vehicles

The Bus and Trolleybus Operations Directorate will obtain new buses calling the available options of the existing master agreements and procure and naturalise used vehicles to provide for the metro replacement needs.

In parallel with the vehicle procurement efforts, in 2016 the Company began an overhaul programme and aesthetic maintenance of the 150 Volvo 7700A articulated bus fleet, as a result of which 24 vehicles were renovated in 2016. In addition, technical reactivation of another 33 Ikarus high-floor articulated buses began in late 2016 as a combined effort of BKV Zrt. employees and external partners. The programme is expected to finish by Summer 2017. The reactivation will provide for the seamless and uninterrupted vehicle service of the track obstruction tasks.

## December 1 – restructuring

In the significantly changing market and economic environment, the bus sector of BKV Zrt. made serious efforts to increase its operational efficiency and its service quality. The changes in the operating environment of the bus sector (e.g. decisions related to metro replacement) have such a heavy impact on the performance of the sector that they do not allow for planning on an optimum operating size and the implementation of the relevant measures even in the short run. All these factors justified a review of the organisational structure and internal work distribution of the Bus and Trolleybus Operations Directorate. With the organisational change effected on 1 December 2016, the objective was to implement an operating structure fitting to the current situation and position of the bus sector while maintaining the specific operating costs and without their unjustified increase.



## Railway Operation Directorate

In 2016 the Railway Operation Directorate operated the Budapest metro, the Millennium Underground, the tram, funicular and the suburban railway, and based on the Public Service Contract it maintained the vehicles and the operating infrastructure (maintenance and repair) for the purpose of continuous and safe service, and, if required, participated in the preparation of the investment projects affecting public transport.

The Budapest General Assembly issued a resolution to restructure BKV Zrt., based on which our Company operated the suburban train (HÉV) sector until 6 November 2016.

### Operational performance

- In terms of BKK, in 2016 the metro sector performed 5,164,896 thousand (active) useful place-km, which was a 0.65% increase compared to the base year. Performance level was 99.25% of the Business Plan, and 99.28% of the subsequently ordered plan.
- The ratio of service outages in the metro sector attributable to BKV was 0.17% in the 2015–2016 timetable year, which resulted in a +0.5% ranking. The same indicator was 0.44% in the partial timetable year of 09–12.2016, resulting in a 0 bonus/malus ranking.
- In addition to daily operations, the transportation service of the Millennium Underground provided special services and every service was involved in some filming production project during the year.
- Authorities requested saving 231 camera images, which was a significant extra work in addition to normal operations.
- In 81 cases we provided service trains at the request of an external party.
- With the gradual entry into service (and availability) of the CAF URBOS 3/9 tram trains, and the low weekend service rates of the Siemens Combino trams, we were able to provide all low-floor service on tram line no. 1 during the weekend. After the completion of driver training, Combino trams appeared on tram line no. 1 as well.
- To improve troubleshooting activities, in 2016 we purchased a large emergency vehicle, which replaced one of the outdated Csepel trucks that could only be operated at high costs was withdrawn from service.
- In terms of BKK, in 2016 the tram sector performed 4,113,632 thousand useful place-km, which was a 13.1% increase compared to the base year. Performance level was 102.3% of the Business Plan, and 98.35% of the subsequently ordered plan.
- In terms of mileage index in the mauls assessment, the tram sector realised 0.81% in the 2015–2016 timetable year, and 0.67% in the partial timetable year of 09–12.2016, resulting in a 0 mauls ranking in both cases. The accident index was 14.35 in the 2015–2016 timetable year and 14.05 in 2016, also resulting in a 0 rating.

### Changes and achievements in the railway vehicle portfolio

The vehicle portfolio of the railway sectors is very diverse. Our business lines operate COMBINO, CAF trams and ALSTOM metro vehicles that fully meet the requirement of our age, with high passenger comfort, with fully interconnected and wheelchair-accessible carriages with low floor and air conditioning, as well as the more aged metro, tram, funicular and Millennium Underground vehicles providing much less comfort, but guaranteeing fully adequate safety levels. Improving the technical condition and service quality of the railway vehicle portfolio was a top priority in 2016 as well.

The passenger traffic in the currently operated 34 tram routes is served by 9 different types of tram vehicles totalling 588, while the passenger traffic in the cogwheel railway, popular amongst tourists, is served by 14 funicular trains of 7 motor and 7 trailer cars. The Millennium Underground is served by 23 individually designed three-part articulated vehicles. On metro line M2 a total of 22 5-wagon ALSTOM metro trainsets; on metro line M3 222 Russian type metro trainsets past their designed service life; while on metro line M4 15 4-wagon ALSTOM metro trainsets operate.

Delivery of CAF trams was completed by the end of 2016. Responsible for the implementation of

the high-profile transportation development projects of the Municipality of Budapest, BKK Zrt. used EU funding to purchase 47 new, low-floor CAF trams in 2015–2016. Of those 10 CAF URBOS 3 5-module and 12 URBOS 3 9-module trams were delivered and entered service in 2016 based on the Operating Contract between BKK and BKV. The “short”, 5-module version is 34.1 m long with 4 double-doors on each side. The vehicle has a transport capacity of 202 passengers including 2 safety-belt equipped places for wheelchairs and 46 seats. These vehicles service tram line no. 3 and the Interconnecting tram network in Buda (lines no. 17 and 19). The “long”, 9-module version is 55.9 m long with 7 double doors on each side and with a capacity of 347 passengers. This version is currently the world’s longest, fully low-floor, single space tram. In addition to 81 seats, this tram also provides 2 places for wheelchairs. The fleet of 12 units currently transports passengers on line no. 1.

The vehicles are currently stationed in the Hungária and Száva garages. However, the full rebuilding of the Budafok garage began in May 2016 as part of the tram development project, which is scheduled to be completed by mid-2017 and is planned to serve as the main maintenance base of the CAF trams from then on.

The CAF vehicles are currently one of the most modern assets in Budapest public transportation. Their deployment in Budapest increased the level of service and its quality for passengers. The air-conditioned interior space, the huge windows, the easily passable low-floor and the modern driver compartment increases the comfort level of passengers and drivers alike. The smooth ride and the lower noise pollution has a positive impact on the environment that helps create a more viable urban environment, while the CCTV system installed on the vehicles increase passenger safety and provide invaluable help in investigating any incident.

As a result of the purchase of CAF trams, we were able to reduce the number of the oldest Ganz articulated trams, with an average age of over 44 years. 40 such vehicles were withdrawn from service, leaving only 38 Ganz articulated, ICS type vehicles in service by the year’s end, whose staggered overhaul will begin with the workforce temporarily available on metro line M3.

Renovation of the T5C5 tram vehicles coupled with the modernisation of their powertrain continued in cooperation with VJSZ Kft. from the available investment resources and our own budget, as a result of which 26 Tatra trams were completed. In addition, the overhaul and powertrain modernisation of 4 KCSV7 trams, and major repair of 8 TW6000 tram vehicles as per the vehicle maintenance schedule were completed, and the 10 used TW6100 trams purchased during the year also entered service.

The highlight of the year as far as metro vehicles was the beginning of the renovation of metro line M3 coupled with the modernisation of the vehicles servicing the line. The first prototype vehicle was delivered to the Kőér utca site of BKV Zrt. on 25 May 2016. Receiving the renovated vehicles, implementing the preparatory and test operation tasks required to obtain the regulatory permits for operation required lots of extra activities from the metro vehicle technical staff, who were able to fully perform these tasks with the optimised use of the available resources.

After the successful inspection by the National Transport Authority on 19 July 2016, on 29 September 2016 the first prototype train made its first round on metro line M3 during the night time outage. The vehicle regularly ran in the tunnel during outage periods and from 20 December 2016 on among the passenger traffic trains in 10-minute intervals.

#### Basic quantity included in the contract

- renovation and modernisation of 222 motor cars (74 front cars and 148 intermediate cars),
- renovation of the Automatic Train Operating System (ATO) for the 74 front cars,
- delivery of the special equipment for lifting and rescuing in the tunnel, maintaining and repairing vehicles,
- delivery of the starting spare parts kit and training simulator needed for maintenance and repair.
- The basic quantity may be increased with a special order for another 14 front cars and 28 intermediate cars to be modernised and renovated, renovation of 6 ATO onboard units,

and the procurement of another 10 new ATO onboard units. The increased quantity would be available upon the extension of the metro line M3.

### Key technical content of the renovation coupled with vehicle modernisation

- Installation of a new powertrain capable of recharging.
- Modern appearance of the vehicle from the outside and the interior, fan-based ventilation and monitoring and image recording system installed in the passenger area.
- Implementation spots to allow safe transportation of disabled passengers.
- Implementation of high-level fire protection, automatic fire alarm and fire extinguisher system, escape doors installed on the front end of the front cars.

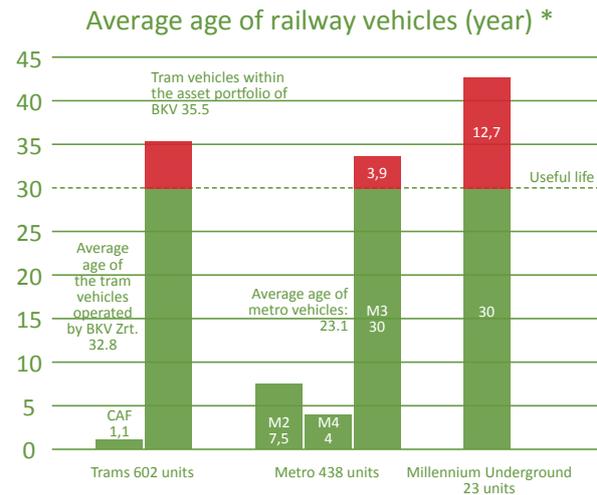
Another significant change in metro operation is that the maintenance tasks of the vehicles, as the warranty period for the Alstom vehicles ended, in 2016 were taken over from Alstom on both affected metro lines, and from then on the maintenance tasks have been performed on the Alstom vehicles by the BKV staff.

With regards to the fully automatic ride of the vehicles of metro line M4, all driver compartments were removed in 2016 and thus the driverless modern metro reached its planned condition.

With all CAF tram vehicles entering service in 2016, the ratio of air-conditioned vehicles improved considerably, reaching 14.5% in the tram sector. This ratio did not change over the reporting year in the case of metro vehicles but remained 36.9%.

The CAF fleet entering service slightly improved the technical quality of railway vehicles operated by our Company: the average age of the electric passenger transport vehicles is 32.8 years, which, despite the positive changes, still exceeds the designed service life by 2.8 years.

The average age of the metro passenger transport vehicles is 23.1 years, which, as a result of the launch of metro line M4 and the vehicle replacements on the East–West line paints a more favourable overall picture compared than the data from the previous years. Without the favourable



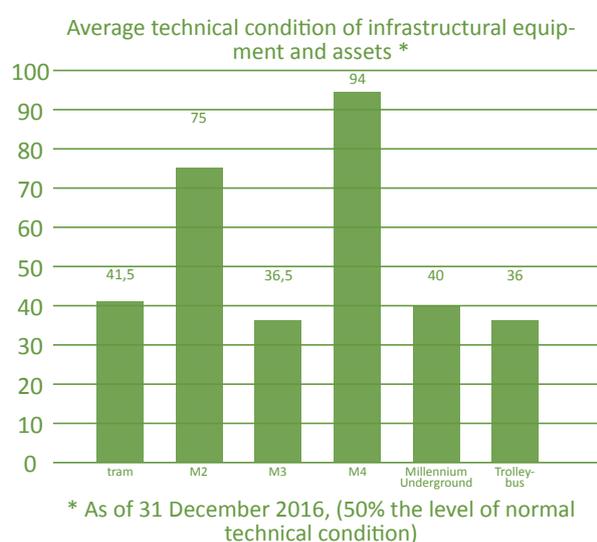
impact of the young age of the ALSTOM vehicles, the 33.9-year average age of the Russian-made vehicles (as of 31 December 2016) was above the designed service life. However, due to the renovation coupled with the modernisation of the vehicles currently in progress, a significant improvement is expected in terms of technical quality in the near future. The average age being 42.7 years, the vehicles of the Millennium Underground are way past their designed service life. Consequently, a complete renovation of 1 Millennium Underground vehicle began in 2016.

### Changes and achievements in the railway infrastructural assets

The types, numbers and conditions of the infrastructural elements within the railway sector are extremely diverse. They play an important role as railway traffic could not happen without them. In 2016 a number of renovations were carried out that helped improve the technical condition.

Based on date as of 31 December 2016, every day railway traffic occurs on a total railway network of 475.2 km, and power to the vehicles is supplied by 85 transformers. The vehicles get the electricity required for their movement via 652.5 thousand km long contact wire, and via 1,115.5 thousand km long towing cable network. Of course safe operation requires, in addition to the above listed infrastructure elements, also further assets (signalling equipment, line lighting device, engineering equipment, escalators, ventilation systems, etc.), the number of which is above several hundred thousand.

The limitations introduced due to the conditions of infrastructural equipment and assets have become permanent in several places, and they cannot be lifted by maintenance methods. Exception to this rule are metro lines M2 and M4 and the tram lines developed from EU funds. In the tram sector, as a result of the renovations carried out on tram lines no. 1 and 3 and during the implementation of the interconnecting tram network in Buda, the combined technical condition of the infrastructural equipment and tools significantly improved over the previous years and is currently at 41.5%. Similarly, the rail replacements on metro line M3 increased this indicator from 36% to 37.5%. Although the impact presented here are favourable, their value is still below the acceptable level.



One of the highlights of the year was the start of the „Interconnecting tram network in Buda” on 16 January 2016, which completed the integration of a number of tram lines. With the implementation of the network, tram lines 17, 19, 41 and 61 were extended and the new tram line no. 56 was started. With the implementation of an extensive, track-based network without changing offer a faster and more convenient travel option for passengers. As a result of the network development in Buda, Széll Kálmán tér and the related infrastructure (e.g. tram terminal station and track network) as well as the tram tunnel at Clark Ádám tér were also renovated. The opening of the latter in March 2016 marked the completion of the interconnected network.

The strategic objective of the reconstruction of metro line M3 is to improve the competitiveness

of metro M3 as part of the track-based public transportation, more specifically the rapid railway network over individual means of transportation. The starting date of the renovation of metro line M3 is delayed compared to the date planned; therefore, in order to maintain reliable operations of the line, an Action Plan was prepared. The Action Plan includes instructions and provisions relevant to the infrastructure and vehicle maintenance, as well as measures taken to ensure uninterrupted transportation of passengers.

### Employment and trainings

- In order to avoid service outages on the Millennium Underground line due to heavy shortage of drivers, a number of trainings were launched for drivers and even trainer courses were held to accelerate drive trainings.
- With no onboard vehicle supervision on line M4 as per the final permit for use, the tasks of the station dispatchers were expanded to include those of drivers. The headcount of the operational execution service was adjusted to the needs of the final operation by retraining of the drivers and station dispatchers within the framework of the Job Retention Programme.
- Related to the renovation project of the trains on metro line M3, in 2016 a preliminary training programme was prepared for the renovated 81.2K vehicle type, based on which professional training was provided for the drivers, vehicle operating staff and the test run drivers, also participating in the commissioning of the prototype.
- We kept the annual 2x12 hours of practical and theoretical training programme for technical duty to expand their knowledge with regards to the new, modern equipment installed. In addition, as part of the first aid training, staff members learned how to use a defibrillator and also participated in conflict management trainings. In cases related to safety, the technical duty officers can act and site representatives based on their qualifications.
- In cooperation with the Budapest Engineering Training Centre, we organised an Escalator inspector (OKJ 62 521 02) professional training as part of our adult training prog-

ramme. No training has been available for escalator inspectors providing technical and security oversight of escalators since 2006. In cooperation with the Escalator Service and the Company's Training Department, we were able to start the training with our own instructors and course materials.

- Building engineering service is provided 24/7 on our metro lines, and a troubleshooting task force was also created with a company car provided for their needs.
- Due to the shortage of public road railway drivers, we started six basic tram driver trainings in 2016. In order to shorten the training period, the employment system of trainees was restructured and a new incentive system was introduced to railway professional instructors.
- Related to the launch of the interconnecting tram network in Buda and in line with the expectations of the client organisation relevant to the provisioning of vehicles, vehicle type and line knowledge trainings were provided continuously during the year.
- After the preparatory works were completed, the authority approved the signalling and operational instructions no. F.1.–F.2. for public road railways, then preparation of the relevant employees for the exam and the regulatory exams on the differences began.

#### Working conditions, social and infrastructural developments

- The old cashier's offices at the stations of the Millennium Underground were converted to locker rooms and employee waiting rooms.
- The service building at the M2 rail yard underwent full renovation, which significantly improved the working conditions of the traffic control employees working there.
- Power supply to the 150 hand dryers installed at metro lines and rail yards was implemented.
- The electric installation network was implemented at the Lehel tér engineering locker room of metro line M3.
- A new locker room, employee waiting room and workshops were implemented at the Nyugati pu. station and on Fehér út; locker

rooms and social facilities were installed at the Astoria station, and new office rooms were created at the Keleti pu. station.

- The medical centre at the central office building at M4 Jár mútelep was opened in September 2016.

#### Other tasks

- Within the context of delivery of civil defence equipment, we delivered 385 large and heavy PV boxes from storage H 310 to metro line M2. This required the loading, movement and unloading of trains.
- In preparation for the modern diagnostics of the electric infrastructure, we converted an ICS tram to perform track and contact wire inspections. As a start, the vehicle can perform dynamic load-based track diagnostic procedures, and the first test measurements were completed in November and December.
- The rail grinding equipment purchased by BKV Zrt. entered regular service in 2016. This machine helped grind 134,000 metres of rail, which can significantly extend the service life of rails and rail network and can ensure operational safety and increased passenger comfort.
- In addition to performing the scheduled electrical safety inspections on metro lines (shock protection and explosion safe equipment, lightning protection), 51 safety audit measurements were completed during the year as per requests.
- During the year we performed premium level maintenance on 9 escalators on metro lines M2 and M3. At the end of the year, fire safety maintenance of 19 escalators was completed on metro line M3.

#### Incident

The incident that drew the most attention in 2016 was related to the metro sector. In the morning of 5 December 2016, as a result of a rear overriding incident, a metro train ran into a stationary metro train on the left side track at the Pillangó utca station on metro line M2. Investigation of the circumstances and the causes began immediately. Due to the 30 km/h speed limit and the controlled

manual driving operating mode ordered for the surface section on metro line M2, travel time increased and throughput decreased on the line. The operative timetables compliant with the changed parameters were introduced shortly after the incident and then optimised in a number of steps. The circumstances of the accident are still being investigated but the incident did reinforce the existing management effort to maintain and improve operating and traffic safety is the top priority of the Company as the operator.

### Recognitions

Our Company successfully entered the competition for the Werner von Siemens Efficient Award with the energy efficient metro operation implemented on lines M2 and M4. Consequently, our Company won the title Energy Efficient Company 2016 in the Energy Efficiency Excellence Tender of the Virtual Power Plant Programme for the energy savings reported on metro line M2.

**VIRTUÁLIS ERŐMŰ PROGRAM**  
200MW-os erőmű kiváltása igazolt megtakarításokkal 2020-ig

**Virtuális Erőmű Program**

**Energiahatékony Mentor Vállalat**  
Kiemelt mentor vállalatunk: AUDI HUNGARIA MOTOR KFT.

**Energiahatékony Vállalat**

**Energiatudatos Vállalat**

**Egyéni Díjak**  
Energetikai szakemberek számára

[www.virtualiseromu.hu](http://www.virtualiseromu.hu)  
[www.facebook.com/energiagatekonysag](https://www.facebook.com/energiagatekonysag)

# ***METRO LINE M4***



The construction works of the new two-level road junction in Budaörsi út, to facilitate and increase intermodality, and also the construction of the parking lots connected to the Kelenföld terminal station of the new metro line, were completed also on the fourth location.

After close to 10 years of preparation, professional consultation, planning and plot title negotiations, constructions at the M1M7 junction began between the Budaörsi út–Balatoni út underpass and Pannonhalmi út in August 2014 by Swietelsky Magyarország Kft., the bidder winning the public procurement tender with the lowest bid. Construction works continued into the following years and financing was provided jointly by KÖZOP and IKOP.

Upon the KÖZOP closing, an audit was completed on the budget of the entire M4 project as well as the expected amount of the risks provisions planned in 2012 with due consideration to the closed lawsuits. The audit concluded that HUF 26.6 billion was saved, which allowed the financing budget with the calculated state provisions to be lowered with a government decision in the amount of HUF 21 billion.

Within the context of the KÖZOP closing, all submitted settlements had been approved

## ACTIVATION

By 31 December 2016, the full documentation of all the assets to be handed over to the Municipality had been finalised in the amount of HUF 42.8 billion, which was approved by the Budapest General Assembly on 7 December 2016.

## Construction of the M1M7 junction

Connecting metro M4 to the joint introductory section of motorways M1 and M7 on Budaörsi út, the implementation works related to the M4 metro project that included the new, underground U-turn tunnel, safe level crossings, wheelchair accessible pedestrian and bicycle underpass and noise protection wall were finished. Primarily funded by the European Union, the HUF 7.2 billion project was opened by Mayor of Budapest István Tarlós on 18 April 2016. In compliance with the permit to enter into service, a 6-month traffic audit report was submitted to the Government

Office of the Municipality of Budapest in November 2016.

## INTERIOR CONSTRUCTION WORKS

The interior construction, i.e. the establishment of wall surfaces, lighting and ornamental lighting, smokeless staircases, escalators, elevators, station furniture, floor surfacing, station water mist fire extinguishers, water supply and main ventilation systems, and the installation of the balustrades for the passenger information system was completed back in 2014 in the entire line. In 2016, the interior construction company carried out only the required repairs under the guarantee in the individual locations.

Warranty reports are investigated and, if they are in fact warranty-related, are repaired on a continuous basis, the results of which are regularly checked at the site visits by the representatives of the Operator, DBR, the Engineer and the Contractor.

## SYSTEMS, ELECTRICITY SUPPLY, CARRIAGES

Acknowledged by the Certifier, the Framework Agreement concluded by DBR Metró Projekt Igazgatóság and Siemens M4 Konzorcium on 16 November 2016, arranged for the implementation of the tasks left open. Number of closed issues based on the list of defects (version no. 14): 16, number of open issues: 14. The defects listed in the open issues can be repaired with multiple software upgrades. According to the framework agreement, all software upgrades required for metro line M4 will be uploaded by 26 June 2017, at which time the list of defects can be closed.

## RELATED INVESTMENTS

As part of providing for 1,500 P+R parking lots in the Grant Agreement, as committed in the project's grant agreement, in the vicinity of the Kelenföld railway station three accessible parking lots were opened for the drivers already in 2015, two on the Etele tér side and one on the Órmező side, with a total of 953 parking spaces and 70 bicycle stands. With a capacity of 500 parking spaces including 10 wheelchair accessible slots, the fourth parking lot with the parking road net-

work and the underground entrance structure was completed by late 2016 in place of the Kelenföld railway station's eight unused MÁV rails. The commissioning procedure of the P+R parking with regards to the road, sidewalk, parking lot and the related entrance structures was closed on 23 December 2016, and the authority has issued the permit to enter into service. The Government Office of the Municipality (District I office) issued its pending decision on 30 December 2016.

The two phased projects were listed in the annex to Government Decree 1844/2015 (XI.24.) as projects eligible for IKOP funding. The two IKOP bids were submitted on 22 December 2015. After approvals, the two Grant Agreements were signed on 3 May 2016. The full funding of the M1-M7 IKOP project has been called in the amount of HUF 1.68 billion; the P+R project had HUF 810 eligible grant, and the remaining amount will be allocated in 2017.

## BUDGET

Based on the proposal by NFM, the Government declared in its Decree 1444/2016. (VIII.17.) that the amount of the state financing between 1 August 2012 to the completion of the project may not exceed HUF 56 billion. The new budget is included in Amendment no. 4 of the Standard Grant Agreement prepared in 2016 and signed on 10 April 2017.

The budget of the phased project components only include the eligible expenditure from KÖZOP and IKOP funding, whereas eligible expenditure from state funding is a part of the large project. As a result, the budget for the M4 large project was HUF 406.4 billion, the EU budget for the M1-M7 junction was HUF 10 billion and the P+R small project had a budget of HUF 3.5 billion.

By 31 December 2016, we had paid a total of HUF 370.9 billion for the entire metro project (of which HUF 3.1 billion was the repayment of the performance guarantee withdrawn as per the Co-02 contract, but this was available at DBR).

## SUPPORT FROM THE EUROPEAN UNION

Within the context of the KÖZOP closing, all submitted settlements had been approved by 30 June 2016, and a KÖZOP provision of HUF 199.34 billion was approved for the large project. The two phased projects separated from the large project had been rearranged, and approval was given in the amounts of HUF 8.2 billion for the M1-M7 project and HUF 2 billion for the P+R project. The 5-year holding period for the two phased projects started on 24 November 2016 and for the large project on 12 April 2017.

# ACCIDENT INDICATORS



The accident record of the Company was favourable in 2016 compared to the average of the previous three years. The total number of accidents at the company decreased by 5%, amongst them those attributable to the company by 9%, while personal injuries attributable to the company dropped by 37%.

Our company considers traffic safety as primary importance, for which purpose we focus on prevention. Among other things, we prepare training aids (e.g. driver information presenting the special characteristics of the specific lines), organise driver workshops (e.g. Transport Correction Behaviour Influence Trainings, education), a transport safety competition designed to support driver training, and the traffic technology and traffic organisation recommendations initiated based on the information available to us all serve the purpose of improving service quality and traffic environment. During the year we cooperated with the Municipal Accident Prevention Committee to organise various events in order to demonstrate mass transportation situations most dangerous for children to help improve the traffic culture of the next generation.



*SECURITY DIRECTORATE*



## Cable thefts

Combined with the HÉV cables, BKV Zrt. had a total of 1940.4 km cable sections on public property in the reporting year. There were two cases of cable thefts in 2016 compared to 17 in 2015 and 37 in 2014. Losses resulting from cable thefts were HUF 14 less than in 2015 and HUF 31 million less than in 2014. Unlike in the previous years, there was no cancellation of service due to cable theft in 2016.

## Occupational accidents

The number of occupational accident has steadily decreased over the past three years.

| Year: | A   | B  | C   | D   |
|-------|-----|----|-----|-----|
| 2014  | 338 | 8  | 280 | 626 |
| 2015  | 298 | 17 | 254 | 569 |
| 2016  | 307 | 6  | 245 | 558 |

A: Number of occupational accidents resulting in work disability (more than 3 days)  
 B: Number of occupational accidents resulting in work disability (less than 3 days)  
 C: Number of occupational accidents resulting in no work disability  
 D: Total number of occupational accidents

## Fire incidents

The number of fire incidents has steadily decreased over the past five years with a 50% drop compared to 2012 and 20% to 2015. No personal injuries were reported in relation to these fire incidents.

The amount of losses and incidents caused by fire over the past 5 years:

| year | number |
|------|--------|
| 2012 | 45     |
| 2013 | 29     |
| 2014 | 28     |
| 2015 | 27     |
| 2016 | 23     |

## Enterprise security

For the purpose of uninterrupted operation of the Company, enterprise security includes background checks of business associations with economic relations with the Company, as well as risk assessments and evaluations related to other businesses. Discovering risks and ensuring risk-free operations offers key background information to specific procurement or competitive procedures and preparation for decisions. In 2016 background checks on business partners and related risk analyses were performed in 84 cases. No risk factors were identified in 87% of the companies undergone enterprise security checks.

Various risk factors were identified in 13% of the audited companies, the elimination of which was requested by calling the attention of the relevant businesses to the issues.

## Training

### Internally organised trainings

Continuing vocational training for HR administrative employees. Total: 5 trainings / 62 people

### IT trainings:

- Office applications: 3 trainings / 22 people
- IQDoc electronic document management: 5 trainings / 45 people
- ForTe: 5 trainings / 37 people

### SAP trainings:

- CO - controlling activity: 5 trainings / 52 people
- HR - HR processes: 4 trainings / 31 people
- MM - Material management tasks: 10 trainings / 113 people
- PM - Maintenance activities: 17 trainings / 160 people
- guided individual preparation: 61 people
- SD - Sales activities: 1 training / 9 people

### BEST system training:

- BEST1 (Procurement supporting item number-based planning system): 8 trainings / 84 people
- BEST2 (Procurement process monitoring system): 6 trainings / 45 people

### Transport operating trainings:

- Category D: 9 trainings / 114 people
- Category TR: 1 training / 11 people

### Special trainings:

- GKI continuing training: 26 trainings / 477 people
- GKI basic training: 17 trainings / 32 people

132 employees with Company authorisation attended our passenger car driving technique training.

### Railway trainings:

- Number of reported basic trainings: 185 people
- Number of students in basic trainings started: 2301 people
- Number of basic exams: 3440 sessions
- Make-up exam: 56 sessions
- Retake exam 1: 207 sessions, Retake exam 2: 16 sessions
- Railway instructor training: 2 trainings / 35 people
- Railway instructor continuing training: 171 people
- Shop manager continuing training: 1 person
- Periodic exams: 623 people

### Note-taking:

- Theory and teaching methodology of railway technology
- HR administrative employees
- Training aids for CAF Urbos model training
- Health and safety (Training aid for railway instructors)
- Fire safety (Training aid for railway instructors) (Tamás Nyitrai – 45 pages)
- Database of questions for the bus and trolleybus qualification exam (1250 questions)
- Laws, regulations, internal company rules, labour law information for HR administrative employees
- Driving techniques for Alstom vehicle drivers on metro line M4; BKV Zrt's quality control system compliant with the MSZ EN ISO 9001:2015 standard
- Theory and teaching methodology of railway technology
- Human factors for students attending the railway instruction training
- The registry of instructors, examiners and methodology communicators include 613 trainers.

### Externally organised trainings

The external organisation of trainings means participation in trainings organised by educational institutions, training providers, event organisers other than the company, on the basis of preliminary planning (Education Plan).

Altogether 1,557 people participated in externally organised trainings.

- courses providing a professional qualification (trainings listed in the National Training Register and other trainings): 457 people,
- continuing training for professional trainees: 485 people,
- professional conferences: 358 people,
- targeted preparatory trainings (team-building, conflict management, professional): 103 people, executive trainings: 25 people, coaching: 1 person,
- trainings in secondary education (subject to student relation): education in preparation for the secondary school leaving exam, technician training, vocational adult training (free OKJ trainings): 29 people,
- trainings in tertiary education (subject to a student relation): 69 people,
- continuing vocational training (post-graduate trainings): 4 people,
- foreign language trainings: individual: 11 people, group: 15 people.

### Vocational training for skilled workers:

- With regards to our Company, the vocational training includes the obligation to contribute to vocational training and operating the vocational training.
- In the 2015/2016 school year we provided practical training to 331 vocational school students in 16 professions based on student contracts or cooperation agreements.

# *COMPANY RELATIONS OFFICE*



We continued the work we started last year to popularise the values represented by BKV Zrt. and represented by the Company's employees each and every day. For this reason, we employed communication channels, open days and professional events in 2016 to present BKV's interesting and exciting side or our procurements, latest developments, innovations and unique solutions to those interested and industry representatives. The events and communications activities organised in 2016 presented BKV's historical values without which BKV could not have become the most decisive service provider of municipal public transportation in Budapest, as well as those innovative developments that are indispensable to ensuring that the Company remains competitive and embraces development and change in the future as well.

It had been 120 years in 2016 that the Millennium Underground was opened to the public on 2 May 1896, the first underground railway of Continental Europe, which even Emperor Franz Joseph used on May 8 during his visit to the millennial celebrations. To commemorate this anniversary, we organised a number of events to replicate the atmosphere of the old times to create a lasting experience for passengers. In addition to the exhibition commemorating the anniversary, passengers could meet hostesses dressed in contemporary dresses, and during the weekends the no. 11 period train of the Millennium Underground called "the Old Lady" was also on display for those who wanted to have a first-hand experience of one of the most beautiful vehicles of BKV. Hardcore fans were able to ride the Old Lady at night.

We said farewell to line 86 in style as our Company provided service between Óbuda, Bogdáni út, Újbuda and Függetlenség park on January 15 with some special vehicles. From the early hours of the afternoon until the end of the business day an Ikarus 180 period bus serviced the line. The penultimate trip from Bogdáni út and the ultimate round from Függetlenség park was serviced by an Ikarus 280 bus, an iconic vehicle of line 86 for a long time.

2016 also saw the celebration of the 30th anniversary of the renovation of the Budapest Castle Hill Funicular, which we commemorated with a photo contest.

On our open days we opened sites to the public that otherwise are rarely, if ever, accessible to them.

On the International Children's Day in May we had an open day at the Szépileány garage, and in 2016 the rail yard of the Budapest cogwheel railway also opened its gates to the public. Children and parents alike were able to select from a wide variety of family and professional programmes of the full-day free event.

To commemorate the 10-year-old Combino trams, Hungária Kocsiszín was opened to the public in July and for a month, from the 10th birthday of the Combino to the 150th anniversary of the grand opening ceremony of the first horse-drawn omnibuses of Pest, tram enthusiasts had a range of events to choose from, including an open day and a vehicle parade.

We also commemorated the anniversary of the first UV tram entering service as it had been exactly 60 before that the first such vehicle rolled along the bank of the Danube on tram line 2. First in traffic after the renovation: Our Ikarus 284 bus serviced the "C" line between Deák Ferenc tér and Szentendre. BKV Zrt. renovated this model for the centennial of the Budapest bus service as this bus was the first of the Hungarian "pushers", the forerunner of today's most popular articulated bus design.

Our museums, the Szentendre Urban Public Transport Museum and the Deák tér Underground Railway Museum participated in a number of national museum and cultural programmes and events in 2016 as well.

Joining the programme of the International Tourist Guide Day, we welcomed visitors at guided exhibitions and in only four days we showed around hundreds of people at the Deák tér exhibition. On Literature Night the old cars of the underground provided a special site for the readings that lasted until midnight with hundreds in the audience. Following the tradition of the past years, we also participated at the Summering of Museums at the garden of the Hungarian National Museum. In addition to our permanent exhibitions, we also presented our temporary exhibition entitled "The 120-year-old Budapest underground" and organised workshops around the theme of the anniversary. During the Night of Museums, close to 3000 people visited our permanent and temporary exhibitions at the Underground Railway Museum. At the weekend of the Cultural Heritage Days, we focused on the monument buildings of our

museums but the Ferenc transformer station was also opened to the public.

Within the context of the Autumn Festival of Museums, we held for the seventh time the transport history quiz of the BKV museums for grade 8 pupils. The topic of the contest of over 50 teams was also related to the 120th anniversary of the opening of the Budapest underground.

In addition to our permanent exhibitions, we had a number of new temporary exhibitions awaiting visitors.

- At the fourth BAM 4 exhibition we displayed a selection of arts pieces by BKV employees. About two and a half thousand people saw the exhibition. We commemorated the 120th birthday of the Budapest Underground, the first underground railway in Continental Europe, with a photo exhibition. Close to 10,000 people wanted to see the temporary exhibition complementing the permanent exhibition.
- During the Olympics in August, the trains of metro line M4 served as a “mobile exhibition” of the successes of the BKV Előre sport club and its medal winning athletes.
- We bid farewell to the separating suburban train (HÉV) sector with a temporary exhibition at the end of the year. The exhibition of various relics, mock-ups, tickets, passenger information materials and photos was visited by about two and a half thousand people.
- In 2016 we also joined events and workshops conveying positive messages, cultural or professional values.

Our passengers could visit a number of exhibitions organised as part of the Metro Gallery where BKV was happy to be involved as a cooperating partner. As the opening of the Bartók memorial year, President of MAZSIKE Péter Kirschner, Deputy Minister of Culture Péter Hoppál and two-time Kossuth award recipient violinist Péter Komlós, the founder of the world famous Bartók Quartet launched the Alstom train also functioning as an exhibition space commemorating the 135th birthday of Béla Bartók on metro line M2. Passengers were able to attend “Hiány” (Void), a joint exhibition of Mazsike, Mazsihisz and the Holocaust Memorial Centre showcasing popular and respected

Hungarian citizens and their activities that were cast out by the Hungarian nation because of their ethnic background or political views.

BKV joined the European Mobility Week this year as well, which was again organised on Andrásy út. We continued the tradition and in 2016 we also joined Earth Day, where a total of 45 stems of lilly-of-the-valley were planted at the same time at each of our sites.

The Melody Tram entered service again. As each year before, this year also there was a huge party on the roaming music train where a band played music between the terminal stations.

And, of course, the year and the holiday season could not have been closed without BKV’s Christmas rides. This year again BKV’s Tram of Christmas Lights and Santa’s Bus was all dressed up to welcome their passengers.

In addition to presenting our rich history, the Company’s present and future also played an important role as we were happy to inform the public of our vehicle acquisitions and developments. Thanks to this year’s successful trolleybus acquisitions, we were able to gradually withdraw some 30 IKARUS 280.94 (GVM) vehicles from BKV’s portfolio to support further utilisation of the outdated GVMs. We were happy to present to the press the prototype metro train of the first six metro cars already renovated and modernised, and were also able to report that the first such M4 train had entered service where the temporary driver compartment was removed, thus offering a special view through the windscreen to the metro tunnel.

In addition to procurements, we also reported our vehicle tests: this year our passengers could meet the brand new Mercedes Citaro NGT type CNG-powered solo bus loaned by the Mercedes-Benz factory as well as a double articulated bus, the special, 24.79 m long VanHool AGG300 vehicle tested for the future development options of the vehicle fleet.

We were really happy to report our colleagues’ excellent performance: BKV employees Eszter Muli and Antal Harsányi excelled among their contestants and secured the top spot as the best of the continent at the 5th European Tram Driver Championship, where 27 tram companies from 17 countries were represented. Based on the decision of BKK customers, Judit Józsefné Harkai, a

driver for 20 years, was selected as the best trolleybus driver this year.

At Utazás 2016 in Pavilion A of HUNGEXPO, the exhibition with close to 40 years of history, Budapest was invited as the guest of honour this year. Invited by the Budapest Festival and Tourist Centre, BKV Zrt. appeared as the peer exhibitor at the Budapest booth. At the domestic workshop day of the exhibition, President and CEO of BKV Zrt. Tibor Bolla also delivered a lecture entitled Mobility in Budapest.

Although 2016 was the year of the European Soccer Championship, our Company again organised the traditional BKV Soccer Cup where many teams participated both in the spring and in the autumn.

The full administration related to the Lost and Found in Budapest public transport belongs to the competence of Company Relations Office. In 2016, Lost and Found received 15,050 items, 6,054 of them contained an ID that were sent to the authorities. Owners could pick up 2326 of these lost and found items at the customer service and 2024 on the field.



# *TOURISM REPORT*



With its continuously expanding activities since March 2013, the Tourism Division of BKV Zrt. aims at enriching the family programmes of Hungarian passengers and the sightseeing period of tourists visiting Budapest. Our main activities include the operation of the Budapest Castle Hill Funicular, the Zugliget Chair Lift, the boats on the Danube, the Little Sightseeing Tour, the period vehicles and special services.

In order to provide the highest level of service possible, in 2016 we managed to introduce some new services and develop existing ones while increasing our revenues and making profit.

### Chairlift tracks

In order to accelerate the operation of the ticket machines at the Zugliget Chair Lift, we implemented simple-to-select ticket types and group tickets to cut the time required to stand in line.

In order to increase passenger flow, student staff helps passengers in making their ticket purchases at weekends and on holidays (between March and November). The IT backend system provides accurate passenger traffic data and contributes to the later electronic ticketing.

Safe operation of the Zugliget Chair Lift requires the cable to be replaced every 10 years, which was completed in November 2016 before the planned deadline.

Clark Picnic Kft., the winner of the snack bar tender, renovated the snack bars at the lower and the upper stations to provide higher level services to passengers.

The rooftop also accommodates a Chair Lift logo made of plants.

Celebrating the 30th anniversary of its reopening, the Budapest Castle Hill Funicular was equipped with a new security camera system in 2016 to improve security at the station. In the coming years the focus will be on the improvement of passenger service.

The cooperation agreements with the hop-on hop-off companies to sell tickets to the Budapest Castle Hill Funicular continue to generate significant traffic. (Interesting film productions may further increase the multi-purpose utilisation of the funicular.)

Similarly to previous years, ticket prices of the Budapest Castle Hill Funicular and the Zugliget Chair Lift did not increase over the past years, which also contributed to increased traffic results.

Key figures:

Funicular: Revenue (net): HUF 843.3 million,  
Number of tickets sold: 770,000 (17% increase)  
Profit/loss before tax: HUF 652 million

Chair lift: Revenue (net): HUF 184.2 million,  
Number of tickets sold: 266,000 (22% increase)  
Profit/loss before tax: HUF 52.4 million

### Special service and period traffic

For the purpose of cost-effective operations, the Company sold 2 VOLVO special service tourist buses in early 2016 but expectations remained the same: economic business activity and increasing revenue per vehicle are the main goals. The expectations were met and the results improved. The revenue per vehicle increased by 13.3%. The number of service orders also changed for the better with a 7.6% increase. We were able to improve our performance towards M.B. Travel Service Kft., our key contractual partner, both on and off season.

Traditional special service activities are nicely complemented with services provided with operative and period vehicles. In terms of the operative fleet, most of the service orders are by buses and fewer by trams. A unique special service is the Budapest Castle Hill Funicular, which is an emblematic venue for film productions.

Period transport has also undergone some significant changes in 2016. Within public services, a separate group was defined for state holidays, regular weekend period rides and the recently introduced 'Hófehérke', a boat built in 1895 and servicing an increasing number of passengers on Saturdays. The expansion of the fleet both on water and on land is popular among passengers as evidenced by increasing ticket sales.

Of the old vehicles, the MÁVAG TR5 and the IK 55 were restored to their original condition but only for promotional purposes and available on contractual basis. However, the IK 260T trolleybus has already entered service and the IK 280T and the IK 284 models are expected to do the same.

In the autumn of 2015 we launched the Little Sightseeing Tour service in Városliget, the city park. Relying on the experience of the test period, we planned to renovate another 2 trains, but the plans were only partially realised. In 2016 we were only able to enter one train into service due to the poor technical conditions of the vehicles.

The special and period service activity was again successful in 2016, and we wish to continue its development in the coming years.

### Boat traffic on the Danube

To improve passenger experience, open upper decks were installed on 2 of our water buses. The newly installed upper deck offers comfortable accommodation for 35–40 passengers. In addition, the two boats were fitted with new, eco-friendly EPA TIER IV engines.

For the period the Kossuth tér metro station is closed, river crossing boat D2 services passengers between the ports at Kossuth tér and Batthyány tér. This boat service offered the fastest way to cross the river Danube. Every 15 minutes two boats started at the same time from the opposite sides of the river. As opposed to regular boat rides, this line accepted season tickets and the standard ticket used on other means of public transportation. Therefore, the service was used not only by those who wanted to cross the Danube but also those who just wanted to enjoy a boat ride. As the line began its operation during the Advent season, it was fitted with lights to be more spectacular. To increase travel experience, Wi-Fi and mulled wine were provided and on 6 December 2016 sailors were dressed as Santa Claus.

BKV Zrt. provided exclusive boat service to Sziget Festival for the first time in 2016. During the event, we had a 5-boat timetable to transport festival goers on 2 routes (from Petőfi tér and Batthyány tér, and from Jászai Mari tér) to the festival scene. We accumulated a lot of experience that we will be able to capitalise on in 2017.

We initiated the replacement of the equipment of the FUTÁR system because leaks of the low quality displays and their faulty operation caused a lot of problems. The equipment replacement began in late 2016.

We participated in the Ars Sacra event with a boat service and also in the WOMEX music festival to transport the audience. Continuing our tradition, we played an active part in the Erzsébet camp programmes organised for children from Transcarpathia.

### Boat service

BKK public service charge: HUF 431.5 million

Profit/loss before tax: HUF 43.5 million

Utilisation of our tangible assets amounted to HUF 40.6 million, which includes the lease of pontoons, ports, properties and machine tools.

# BALANCE



## BALANCE SHEET (Assets)

(million HUF)

| Serial no.          | Item name   | 31.12.2015     | 31.12.2016     |
|---------------------|---|----------------|----------------|
| <b>A.</b>           | <b>Fixed assets</b>                                       | <b>639 308</b> | <b>567 823</b> |
| <b>I.</b>           | <b>Intangible assets</b>                                  | <b>155</b>     | <b>233</b>     |
| 1.                  | Concessions, licences and similar rights                  | 155            | 233            |
| <b>II.</b>          | <b>Tangible assets</b>                                    | <b>637 685</b> | <b>566 178</b> |
| 1.                  | Land and buildings and rights to immovables               | 370 517        | 348 875        |
| 2.                  | Plant and machinery                                       | 210 034        | 202 028        |
| 3.                  | Other equipment, vehicles                                 | 1 799          | 1 489          |
| 4.                  | Investments, renovations                                  | 54 827         | 13 478         |
| 5.                  | Advance payments for investments                          | 508            | 308            |
| <b>III.</b>         | <b>Financial investments</b>                              | <b>1 468</b>   | <b>1 412</b>   |
| 1.                  | Long-term participations in affiliated undertakings       | 1 267          | 1 264          |
| 2.                  | Other long-term participations                            | 19             | 19             |
| 3.                  | Other long-term loans                                     | 182            | 129            |
| <b>B.</b>           | <b>Current assets</b>                                     | <b>32 715</b>  | <b>29 465</b>  |
| <b>I.</b>           | <b>Inventories</b>  | <b>5 807</b>   | <b>5 912</b>   |
| 1.                  | Substances  | 5 362          | 5 675          |
| 2.                  | Work in progress, intermediate and semi-finished products | 34             | 38             |
| 3.                  | Goods   | 411            | 199            |
| <b>II.</b>          | <b>Accounts receivable</b>                                | <b>14 811</b>  | <b>5 119</b>   |
| 1.                  | Trade debtors   | 320            | 359            |
| 2.                  | Receivables from affiliated undertakings                  | 9 328          | 322            |
| 3.                  | Receivables from undertakings with significant shares     | 7              | 5              |
| 4.                  | Other receivables   | 5 156          | 4 433          |
| <b>III.</b>         | <b>Securities</b>   | <b>0</b>       | <b>0</b>       |
| <b>IV.</b>          | <b>Liquid assets</b>                                      | <b>12 097</b>  | <b>18 434</b>  |
| 1.                  | Cash, cheques   | 78             | 72             |
| 2.                  | Bank deposits   | 12 019         | 18 362         |
| <b>C.</b>           | <b>Accrued income and deferred expenses</b>               | <b>580</b>     | <b>3 893</b>   |
| 1.                  | Accrued revenue   | 390            | 3 642          |
| 2.                  | Accrued expenses  | 190            | 251            |
| <b>TOTAL ASSETS</b> |   | <b>672 603</b> | <b>601 181</b> |

## BALANCE SHEET (Liabilities)

(million HUF)

| Serial no.  | Item name  | 31.12.2015     | 31.12.2016     |
|-------------|--|----------------|----------------|
| <b>D.</b>   | <b>Equity</b>                                      | <b>190 598</b> | <b>178 202</b> |
| <b>I.</b>   | <b>Subscribed capital</b>                          | <b>127 000</b> | <b>116 000</b> |
|             | of which: repurchased own share on face value      | 0              | 0              |
| <b>II.</b>  | <b>Subscribed capital unpaid (-)</b>               | <b>0</b>       | <b>0</b>       |
| <b>III.</b> | <b>Capital reserve</b>                             | <b>10 962</b>  | <b>12 870</b>  |
| <b>IV.</b>  | <b>Profit reserves</b>                             | <b>-2 881</b>  | <b>45 433</b>  |
| <b>V.</b>   | <b>Tied-up reserves</b>                            | <b>0</b>       | <b>0</b>       |
| <b>VI.</b>  | <b>Reserve</b>                                     | <b>0</b>       | <b>0</b>       |
| <b>VII.</b> | <b>Profit/loss after tax</b>                       | <b>55 517</b>  | <b>3 899</b>   |
| <b>E.</b>   | <b>Provisions</b>                                  | <b>2 404</b>   | <b>1 979</b>   |
| 1.          | Provisions for forward liabilities                 | 2 404          | 1 979          |
| <b>F.</b>   | <b>Liabilities</b>                                 | <b>69 060</b>  | <b>53 432</b>  |
| <b>I.</b>   | <b>Subordinated liabilities</b>                    | <b>0</b>       | <b>0</b>       |
| <b>II.</b>  | <b>Long-term liabilities</b>                       | <b>60</b>      | <b>0</b>       |
| 1.          | Other long-term liabilities                        | 60             | 0              |
| <b>III.</b> | <b>Short-term liabilities</b>                      | <b>69 000</b>  | <b>53 432</b>  |
| 1.          | Advance payments from customers                    | 9              | 31             |
| 2.          | Accounts payable                                   | 52 441         | 43 728         |
| 3.          | Short-term liabilities to affiliated undertakings  | 1 146          | 1 313          |
| 4.          | Short-term liabilities to independent undertakings | 504            | 179            |
| 5.          | Other short-term liabilities                       | 14 900         | 8 181          |
| <b>G.</b>   | <b>Deferred income and accrued expenses</b>        | <b>410 541</b> | <b>367 568</b> |
| 1.          | Accrued revenue                                    | 216            | 191            |
| 2.          | Deferred expenses                                  | 1 024          | 1 067          |
| 3.          | Deferred revenues                                  | 409 301        | 366 310        |
|             | <b>TOTAL LIABILITIES</b>                           | <b>672 603</b> | <b>601 181</b> |

**Profit and loss statement (with total cost method)**
**(million HUF)**

| Serial no.   | Item name   | 2015           | 2016           |
|--------------|---|----------------|----------------|
| 1.           | Net domestic sales  | 135 317        | 126 582        |
| 2.           | Net export sales revenue  | 0              | 63             |
| <b>I.</b>    | <b>Net sales revenue</b>  | <b>135 317</b> | <b>126 645</b> |
| 3.           | Changes in self- manufactured inventory                         | -7             | 4              |
| 4.           | Capitalised value of own performance                            | 2 302          | 1 369          |
| <b>II.</b>   | <b>Own performance capitalised</b>                              | <b>2 295</b>   | <b>1 373</b>   |
| <b>III.</b>  | <b>Other revenues</b>   | <b>70 021</b>  | <b>57 472</b>  |
|              | of which: reversed impairment                                   | 47             | 40             |
| 5.           | Material cost   | 34 611         | 30 747         |
| 6.           | Contracted services   | 20 326         | 21 297         |
| 7.           | Other services  | 1 196          | 1 047          |
| 8.           | Purchase value of sold products                                 | 179            | 156            |
| 9.           | Services sold (including intermediated)                         | 1 117          | 1 879          |
| <b>IV.</b>   | <b>Material type expenditures</b>                               | <b>57 429</b>  | <b>55 126</b>  |
| 10.          | Payroll   | 41 729         | 40 762         |
| 11.          | Payments to staff   | 3 063          | 3 130          |
| 12.          | Social insurance contribution                                   | 12 006         | 11 759         |
| <b>V.</b>    | <b>Staff (labour) costs</b>                                     | <b>56 798</b>  | <b>55 651</b>  |
| <b>VI.</b>   | <b>Depreciation</b>   | <b>32 152</b>  | <b>30 761</b>  |
| <b>VII.</b>  | <b>Other expenditure</b>  | <b>4 575</b>   | <b>40 153</b>  |
|              | of which: impairment  | 87             | 79             |
| <b>A</b>     | <b>OPERATING (TRADING) PROFIT OR LOSS</b>                       | <b>56 679</b>  | <b>3 799</b>   |
| 13.          | Dividends receivable (due)                                      | 10             | 11             |
|              | of which: received from affiliated undertakings                 | 0              | 0              |
| 14.          | Other interest and interest- type revenues receivable           | 22             | 140            |
|              | of which: received from affiliated undertakings                 | 1              | 1              |
| 15.          | Other revenue from financial transactions                       | 520            | 61             |
| <b>VIII.</b> | <b>Revenues from financial transactions</b>                     | <b>552</b>     | <b>212</b>     |
| 16.          | Other interest and interest-type expenses (paid)                | 1 209          | 5              |
|              | of which: transferred to affiliated undertakings                | 0              | 0              |
| 17.          | Losses on shares, securities, long-term loans and bank deposits | 0              | 3              |
| 18.          | Other expenses on financial transactions                        | 505            | 104            |
| <b>IX.</b>   | <b>Expenditure on financial transactions</b>                    | <b>1 714</b>   | <b>112</b>     |
| <b>B.</b>    | <b>PROFIT/LOSS ON FINANCIAL TRANSACTIONS</b>                    | <b>-1 162</b>  | <b>100</b>     |
| <b>C.</b>    | <b>PROFIT/LOSS BEFORE TAX</b>                                   | <b>55 517</b>  | <b>3 899</b>   |
| <b>X.</b>    | <b>Taxes payable</b>  | <b>0</b>       | <b>0</b>       |
| <b>D.</b>    | <b>PROFIT/LOSS AFTER TAX</b>                                    | <b>55 517</b>  | <b>3 899</b>   |

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