2017
Management Report

July 2018

Transports
Metropolitans
de Barcelona

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1 Introduction

Transports Metropolitans de Barcelona (TMB) is the common name for the companies **Ferrocarril Metropolità de Barcelona, SA, (FMB)** and **Transports de Barcelona, SA, (TB)** that manage the Metro and Bus network on behalf of the Metropolitan Area of Barcelona. It is the largest company within the Group, Ferrocarril Metropolità de Barcelona, SA, that prepares the consolidated financial statements.

The Group also includes the companies **Projectes i Serveis de Mobilitat, SA, (PSM)** which operates the Telefèric de Montjuïc, **Transports Metropolitans de Barcelona, SL**, which manages fare products through the e-commerce platform Barcelona Smart Moving and other transport services and the **associated company consolidated through the equity method, Transports Ciutat Comtal, SA.**

TMB also has the **TMB Foundation**, which takes care of TMB's historical heritage and promotes public transport values through social and cultural activities.

The companies FMB and TB provide service in Barcelona and its metropolitan area covered by the Integrated Fare System (STI) of the metropolitan region of Barcelona, and they do so in a completely coordinated way which on a business level is achieved by sharing corporate and management structures.

Ferrocarril Metropolità de Barcelona, SA, is the company responsible for producing the annual consolidated accounts, for the following reasons:
—The Group's transport strategy is structured around Ferrocarril Metropolità de Barcelona, SA.
—The business activity of Transports de Barcelona, SA, is complementary to that of Ferrocarril Metropolità de Barcelona, SA.
—As a result of the previous points, Ferrocarril Metropolità de Barcelona, SA, heads up the Group's transport policy.

Furthermore, this is reinforced in terms of passengers carried, volume of business and the value of its fixed assets.

As the main public transport operator for Barcelona, and as part of the daily life of thousands of citizens, TMB provides two regular transport networks (surface transport by bus and underground transport by metro) as well as various leisure transport options in order to:
—Meet mobility needs and make journeys for the general public quicker and more convenient for reasons of work, shopping, leisure, etc.
—Provide a public service that is accessible to everybody.
—Improve the quality of life in the metropolitan area of Barcelona, cutting the journey times down between its various cities and towns.

Governing bodies

In the case of Transports de Barcelona, SA, and Ferrocarril Metropolità de Barcelona, SA, the administrative and representative body of the company is the Board of Directors of each of these companies, which is the highest decision-making body.

The appointment of members to the Board of Directors of Transports de Barcelona, SA, and of Ferrocarril Metropolità de Barcelona, SA, is done by the Metropolitan Council of the Metropolitan Area of Barcelona, constituted as a general shareholders meeting of each of the companies. Currently, the chair, vice chair, chief executive officer and six of the board members serve on both boards.

In the case of Projectes i Serveis de Mobilitat, SA, and Transports Metropolitans de Barcelona, SL, the governing body consists of a sole administrator, the chief executive officer, common to the companies Ferrocarril Metropolità de Barcelona, SA, and Transports de Barcelona, SA.

In the case of the TMB Foundation (Transports Metropolitans de Barcelona), the last change to the Board of Trustees was made on 22 June 2016.

Management bodies

Upon being constituted, the boards of directors of Transports de Barcelona, SA, and Ferrocarril Metropolità de Barcelona, SA, nominated a chief executive officer delegated with the responsibilities and powers to take charge of the day-to-day administration of the companies.

The integrated management of the different services provided under the Transports Metropolitans de Barcelona (TMB) umbrella has enabled common management structures over the course of its history. That way, the various activities carried out at the heart of TMB are, whenever possible, managed in a common way across all of the companies making up TMB. The group has two management bodies:
—The **Executive Committee,** which is TMB's highest executive management body, composed of seven senior managers from TMB, one of which is the chief executive officer who acts as its chair.
—The **Management Board,** composed of the chair of TMB, the General Manager of the Metropolitan Area of Barcelona (AMB), the director of AMB Mobility and Transports, the Executive Committee plus various senior managers from TMB.<1>

Mission, vision and values

The **mission of TMB** is:

To provide a public transport network:
—that contributes to the improvement of public mobility and to the sustainable development of the metropolitan area,
—guarantees the best customer service,
—develops policies aligned with social responsibility,
—within a framework of economic viability and efficiency.

The **vision of TMB** is:

To be a point of reference throughout Europe as a competitive public transport and mobility company:
—for its contribution to improving mobility in the Metropolitan Area, urban sustainability and the environment;
—for the technical quality provided and the quality perceived by the general public;
—for the efficiency of its processes and optimisation of resources;
—for the efficient use of technology as a lever for improving service levels and efficiency;
—for the excellence of its workers;
—for its commitment to society and the general public;
—for its international presence.

TMB's values are:
—Commitment and a vocation for public services.
—Excellent service, efficient management.
—Socially responsible behaviour.
—Openness to innovation.
— "Win-win" relationships.
—Recognition and fairness.
—Teamwork and team spirit.
—Integrity and honesty.
—Commitment to personal and professional growth.
—Respect.

Summary of the management report of Projectes i Serveis de Mobilitat, SA

The Telefèric de Montjuïc cable car completed its tenth full year of operation in 2017 after it was totally renovated in 2007. It is equipped with 55 fully glazed cabins, each with a capacity of eight people all of which are adapted for passengers with reduced mobility. Using three stations (Parc de Montjuïc, Mirador and the Castle of Montjuïc), the cable car can carry over 2,000 people per hour in each direction, a figure that can be varied according to demand. It operates all year round between 10:00 and 21:00 (during peak months), except during the period needed for compulsory maintenance which, in 2017, was between 30 January and 19 February.

Insofar as improvements in managing sales of the various types of ticket, 2017 saw the consolidation of digitalisation as a means of reading discounted and special offer tickets

Tickets can also be purchased through the cable car's own website www.telefericdemontjuic.cat, which also gives information about the service, places of interest for tourists and a photo gallery. There is also the website www.barcelonasmartmoving.com, a platform in six languages that promotes leisure transport options in Barcelona.

Commercially speaking, promotional activities are continuing in collaboration with other operators and through new intermediaries.

During 2017, a project was put out to tender and awarded to prolong the useful life of the cable car's 55 SIGMA GD8 cabins, in order to guarantee keeping it fully operational.

The maintenance work due to be carried out on the cabins includes checking their general condition, a systematic change of all worn out elements and an aesthetic refurbishment to any elements showing signs of general wear and tear. The project will begin after the annual closure for maintenance in 2018.

Also during the year, a tender was issued for updating and implementing new control equipment for the cable car, work that will be carried out in 2018. It involves technicians from the manufacturer installing and implementing an electrically operated remote assistance system for the cabin (*hot line*) so that they can analyse any breakdowns that occur. This way, a rapid response is guaranteed and the time it takes to resolve the issue is shortened. At the same time, the tender incorporates the renovation of material with state-of-the-art equipment to operate the main display of the installation at each of the three stations.

2 Business development statement

Demand for Bus services

One of the most noteworthy facts to emerge from 2017 was the growth in passenger numbers that had occurred across all the means of transport provided by Transports Metropolitans de Barcelona (TMB). Specifically, 592.45 million passengers were carried, representing 15.16 millions more than in 2016. This figure is a record figure for passengers carried on TMB networks.

For the means of transport operated by Transports de Barcelona, SA, there was an increase of 6.25 million users (+3.2%), and the total reached was 202.05 million passengers, the highest in recent years.

Passengers carried by Transports de Barcelona (in millions)

	2017	2016	Difference	%
Bus network	196.97	190.10	6.87	3.6
Bus Turístic	4.94	5.55	-0.61	-10.9
Tramvia Blau	0.14	0.15	-0.01	-8.6
Total Transports de Barcelona	**202.05**	**195.80**	**6.25**	**3.2**

As can be seen in table, the passenger increase for Transports de Barcelona was concentrated on the regular bus network, where there was an increase of 6.87 million ticket validations reaching 196.97 million passengers. The increase in passengers carried can be attributed to a number of factors among which the most notable are:

—**An improvement in economic activity in the country,** that has had an impact on the labour market.

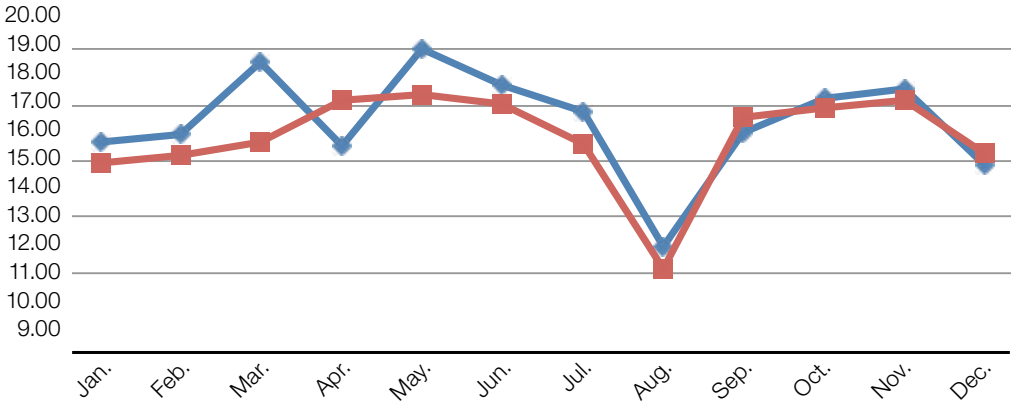
—**An improvement in the number of bus services:** on 18 September 2016 the Bus del Barri (neighbourhood bus) was reintroduced on Sundays and public holidays, a service that had been withdrawn in 2012. Another factor was the consolidation of the New Bus Network, whose routes have maintained an upward trend in attracting passengers. On 13 November 2017 the New Bus Network was expanded with the incorporation of four new routes (V5, V29, V31 and D40). The Reinforcement Plan for routes running along the beach in the summer of 2017 should also be noted as well as the Bus Quality Improvement Plan introduced in the third quarter which will mean there will be 43 more buses on the streets between 2017 and 2018 (22 buses in 2017).

—Measures taken to improve service quality such as **renewing vehicles**, technological innovations and improvements to user information services.

Regarding Leisure Transport, what stands out is the decrease in passengers carried on the Bus Turístic and Tramvia Blau, possibly affected by the impact on tourism of the terrorist attack in the Ramblas in Barcelona on 17 August 2017 and the political situation during the last quarter of the year. Furthermore, the Tramvia Blau was taken out of service for several weekends in order to carry out renovation work on the high voltage electrical substation.

The chart below shows the progress of monthly passenger figures on the regular bus network over the last two years. The annual increase in passengers occurred in both semesters, but was higher in the first six months of the year (4.9%) than in the second (1.9%).

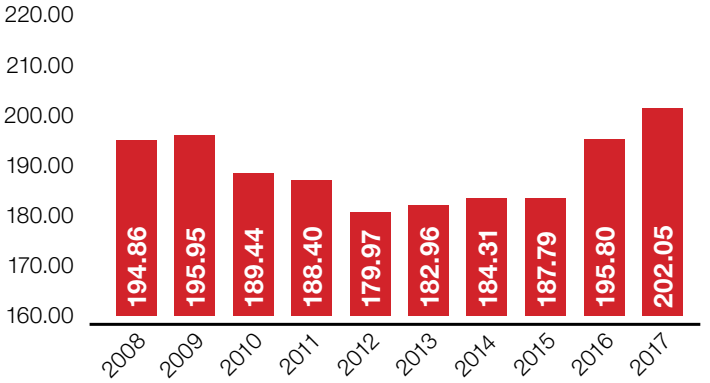
Monthly progress of passengers on the bus network (millions of ticket validations)



	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2017	15,68	15,97	18,56	15,51	19,03	17,75	16,80	11,91	16,02	17,28	17,63	14,84
2016	14,95	15,17	15,71	17,20	17,36	17,05	15,58	11,13	16,55	16,93	17,18	15,29

The following chart shows changes in demand over the last 10 years for Transports de Barcelona services.

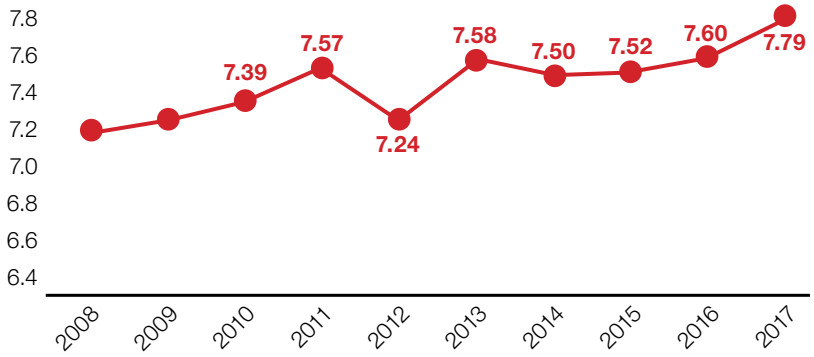
Progress of bus network passenger numbers (including leisure transport services)
(Millions of passengers)



Two distinct periods can be identified:
—In the period 2008-2012 there was a drop in demand due to the extension of the metro network and the impact of the recession.
—From 2013 onwards, coinciding with the introduction of the New Bus Network in October 2012, the Quality Improvement Plans of 2015 and 2017 and an improvement in economic activity, passenger carrying figures grew in each consecutive year until the maximum figure of the series was achieved in 2017.

Finally, in addition to the growth produced in passenger numbers, it should be noted that in the 2017 study of the index of customer satisfaction, the average score awarded to the TMB bus service reached 7.79 points out of 10, the highest figure of the last 10 years. The decline in 2012 was due to strikes and service stoppages that affected passenger perception of the service.

Bus service - progress of overall satisfaction scores



Demand for Metro services

The most important fact to come out of 2017 was the growth in the number of passengers carried on TMB transport services. Specifically, 592.45 million users used TMB Metro, Bus and Leisure Transport services, an increase of 15.16 million passengers (+2.6%).

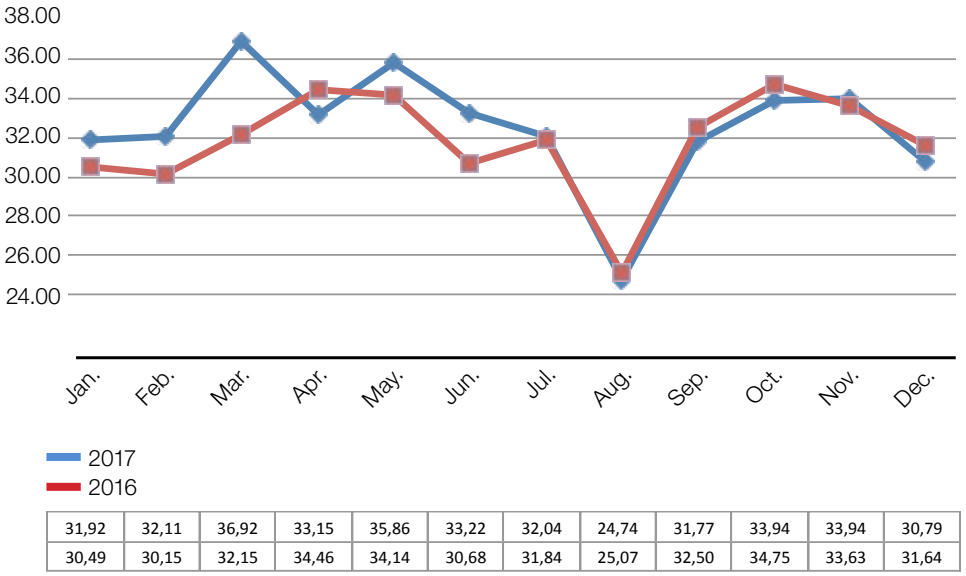
In the specific case of the Metro, last year beat their historical record by reaching 390.4 million annual ticket validations, which is 8.9 million more than in 2016, representing an increase of 2.3%. It is worth noting that this figure would have been higher had it not been for 12 days of partial stoppages due to labour disputes and two days of a general strike on 3 October and 8 November 2017.

Passengers carried on the Ferrocarril Metropolità de Barcelona (in millions)

Line	2017	2016	Difference	% Diff.
L1	104.304	101.735	2.568	2.52%
L2	42.045	40.509	1.536	3.79%
L3	79.613	80.776	-1.163	-1.44%
L4	53.937	53.054	0.883	1.66%
L5	90.877	88.531	2.346	2.65%
L9 Nord/L10	8.757	8.261	0.495	6.00%
L9 Sud:	8.913	6.889	2.024	29.38%
L11	1.260	1.163	0.097	8.38%
Funicular	0.690	0.566	0.124	21.86%
Total	**390.396**	**381.486**	**8.910**	**2.34%**

As can be seen in the graph, this growth in passengers carried were concentrated exclusively in the first half of the year.

Progress of monthly passenger numbers on the Metro network
(millions of ticket validations)

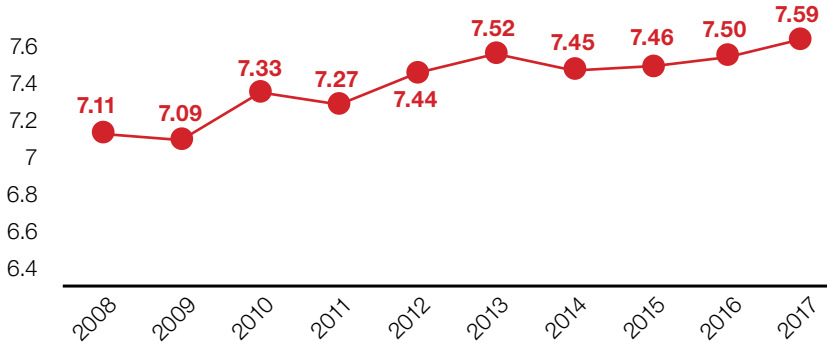


31,92	32,11	36,92	33,15	35,86	33,22	32,04	24,74	31,77	33,94	33,94	30,79
30,49	30,15	32,15	34,46	34,14	30,68	31,84	25,07	32,50	34,75	33,63	31,64

The main reasons behind the increase in passengers carried were:
—Continued growth in the Catalan and Spanish economies which was also reflected by an improvement in the labour market. Over the last three years, 1.5 million job positions have been created throughout the whole of Spain, which is half of the jobs lost during the crisis.
—The increase in the number of tourists and visitors coming to Barcelona. Tourism to Barcelona grew by 3.2% between January and November 2017 compared to the same period last year, despite the effects of the terrorist attack on the Ramblas in the city in August and the political situation that arose in the last quarter of the year.
—Increased service offering: the new section of Line 9 Sud between Zona Universitària and Aeroport T1 came into service on 12 February 2016. Additionally, the service on some metro lines was reinforced in 2017 to cope with increased demand.
—Investments and improvements carried out to continue giving a quality service adapted to customer needs.

In 2017, apart from setting a new record for passengers carried on the Metro, the annual study of the customer satisfaction index achieved an average score of 7.59 points out of 10 points, on a par with the best scores from previous years.

Metro service - progress of overall satisfaction scores

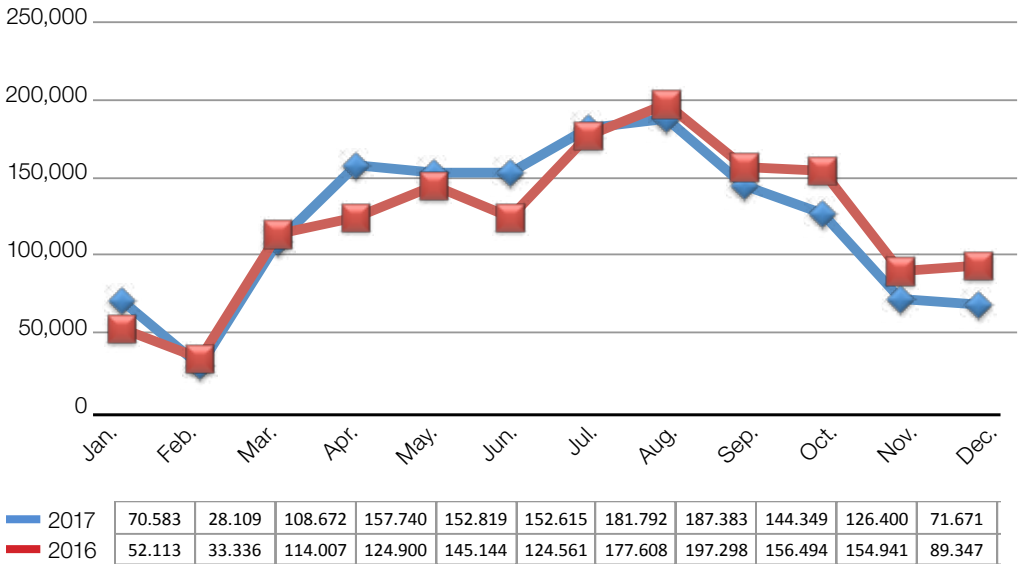


Demand for the Telefèric de Montjuïc.

The Telefèric de Montjuïc cable car carried 1.45 million passengers, a figure that is 0.9% lower than 2016, which was a record year for users. However, the way passenger numbers have evolved reflects two distinct trends over the course of the year. While in the first six month period there was a growth of over 76,000 passengers (+12.9%), this positive trend fell away in the second semester when passenger figures dropped by almost 90,000 (–10.3%). This drop in demand during the second semester could also possibly be due to the effects of the terrorist attack in the Ramblas on 17 August and the political situation in the months leading up to the end of the year.

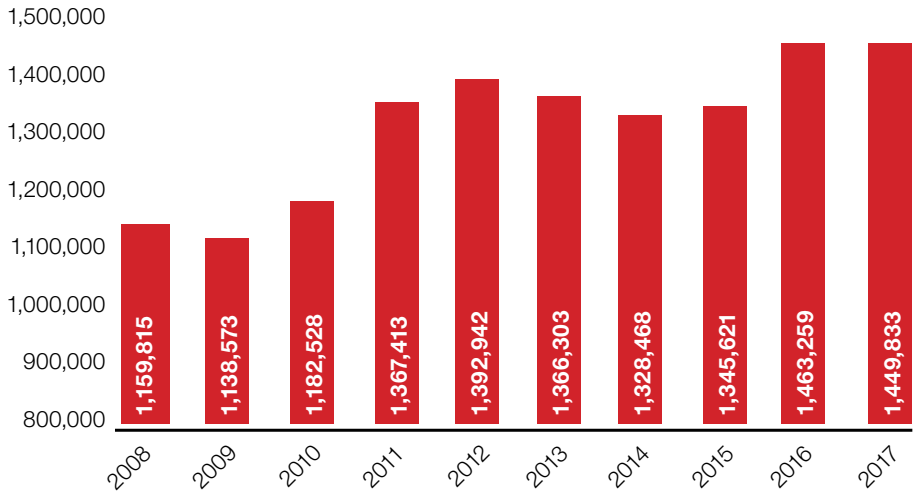
	2017	2016	Diff.	%
Passengers 1st semester	670,538	594,061	76,477	12.9%
Passengers 2nd semester	779,295	869,198	-89,903	-10.3%
Total	**1,449,833**	**1,463,259**	**-13,426**	**-0.9%**

Telefèric de Montjuïc - monthly progress of passenger figures



The chart shows how demand for the Telefèric de Montjuïc has evolved over the period 2008-2017, highlighting the high numbers of journeys taken in each of the last two years, both exceeding 1.4 million passengers.

Telefèric de Montjuïc - progress of passenger figures



Passengers carried

From the point of view of demand, the most notable factor of 2017 was the significant increase in passengers produced by the ATM integrated fare system (31 million passengers), something that paved the way for achieving a historical record number of 985.6 million passengers.

The transport networks operated by Transports Metropolitans de Barcelona (TMB) achieved passenger carrying figures of 592.45 million, exceeding the 2016 figure by 15.2 million. This represented a 2.6% increase over the previous year. Furthermore, the 2017 passenger figures were a new historical record for the number of TMB users, beating the previous maximum by 15.1 million, being the 577.4 million passengers carried in 2011.

It is worth pointing out that the 2017 figure would have been even higher if there had not been 12 days of disruption to metro services and two days of general strike in Catalonia (3 October and 8 November).

Passengers carried by TMB

(Figures in millions)	2017	2016	Diff.	%
Ferrocarril Metropolità de Barcelona, SA	**390.40**	**381.49**	**8.91**	**2.3**
Bus network	196.97	190.10	6.87	3.6
Bus Turístic	4.94	5.55	-0.61	-10.9
Tramvia Blau	0.14	0.15	-0.01	-8.6
Total Transports de Barcelona	**202.05**	**195.80**	**6.25**	**3.2**
Total TMB	**592.45**	**577.28**	**15.16**	**2.6**

This increase in passengers carried by TMB was generated exclusively on the regular bus network, where passenger numbers increased by 6.9 million (+3.6%), and on the Metro network, with 8.9 million users more than the previous year (+2.3%), where the number of passenger achieved for 2017 was also a historical maximum.

Conversely, there was a drop in the number of passengers on Leisure Transport, possibly due to the effects of the terrorist attack in the Ramblas of Barcelona on 17 August and the political situation during the last quarter of the year. Furthermore, the Tramvia Blau was taken out of service for several weekends in order to carry out renovation work on the high voltage electrical substation.

The increase in passengers carried on the Bus and Metro networks can be attributed to various factors, notable among which are:

—**An improvement in the country's economic activity,** which also had an effect on the labour market and general mobility.

—**An improvement in bus services:** the expansion and consolidation of the New Bus Network, the Reinforcement Plan for beachside routes in the summer of 2017 and the implementation, in the last quarter of the year, of a Bus Quality Improvement Plan for 2017-2019.

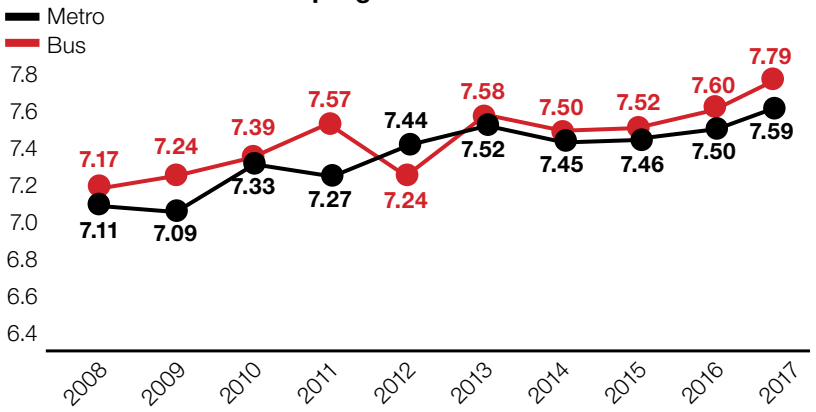
—**Increase in the Metro service:** the new section of Line 9 Sud went into service on 12 February 2016 between the stations of Zona Universitària and Aeroport T1. Additionally, the service on some metro lines was reinforced in 2017 to cope with increased demand.

—**The increase in the number of tourists and visitors,** especially during the first half of the year, who also used the bus and metro networks to get around the city. According to data from the City Council, tourism into Barcelona increased by 3.2% between January and November 2017, despite being affected from August onwards as a result of the terrorist attack in the Ramblas.

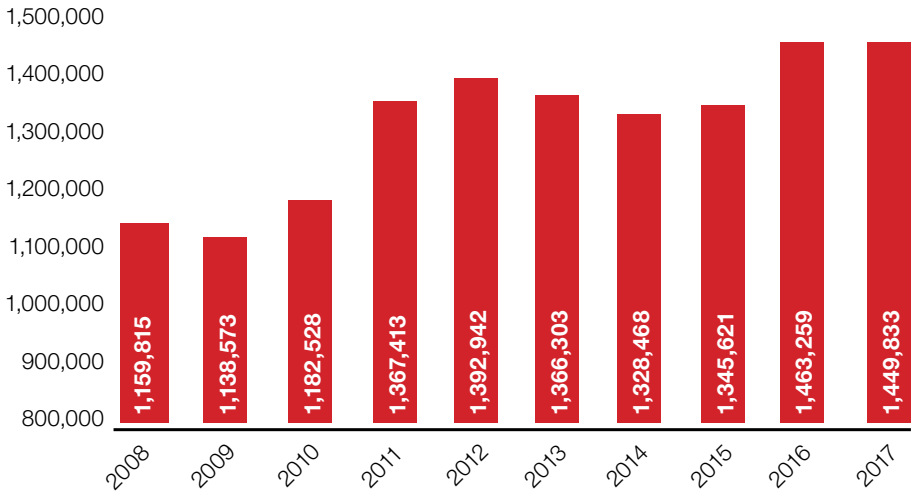
—**Measures taken and increased investments made in the quality of the service,** such as renovating the bus fleet, refurbishing stations, technological innovations and improvements to passenger information systems, to name but a few.

One of the results of these actions is the positive assessment of services given by TMB users. The average score obtained from customer satisfaction surveys in 2017 achieved a record high for both networks. The Bus service scored 7.79 and the Metro 7.59 on a scale of 0-10 points.

Bus and Metro service - progress of overall satisfaction scores



Telefèric de Montjuïc - progress of passenger figures



Bus service offering

–Places-km provided

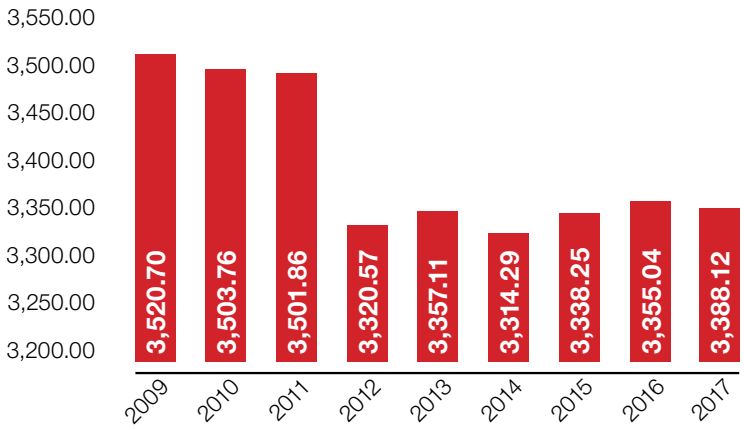
With regard to service offering, the main developments over the year were as follows:
—The introduction of four new routes on the New Bus Network on 13 November 2017: one diagonal route, D40 and three vertical ones (V5, V29 and V31). These latest ones bring the number of routes operating on the new network up to twenty.
—Two new neighbourhood routes were also introduced on 13 November: numbers 136 and 191, reinforcing connections between the Sant Martí district and the Hospital del Mar, and between the Congrés i els Indians district and the Hospital de Sant Pau, respectively.
—On 2 October, as part of the TMB Plan to adjust the bus network service offering to the increase in passenger numbers, 22 vehicles were incorporated on a permanent basis as a first phase for boosting services on work days. The second phase of this Improvement Plan will be introduced in the autumn of 2018 and will include the introduction of 21 additional buses.
—In the summer of 2017, additional bus services were introduced to boost capacity on the routes that attract more passengers during holiday periods, making journeys to the beaches less crowded and providing a better service in the city centre.

Taken together, these measures meant that the bus service offering reached 3,388 million places-km, which is a 1% increase on the previous year. It should also be remembered that bus services this year were affected by certain events and public demonstrations that took place in the city on several different days.

Progress of places-km provided by TB (in millions)

	2017	2016	Difference	%
Places-km provided	3,388.12	3,355.04	33.08	0.99

Progress of places-km provided by TB
(million places-km)



As the chart shows, over recent years the availability of bus services has been adapted to demand, especially with the introduction of metro line L9 Nord/L10 and the extension of lines L2, L3 and L5 in 2009 and 2010. The fall in 2012 was due to the days lost to strikes that year, along with the implementation of a service rationalisation plan to better cover the needs of genuine demand and to save resources due to the lack of finance for the transport system

- Usable vehicle-km operated

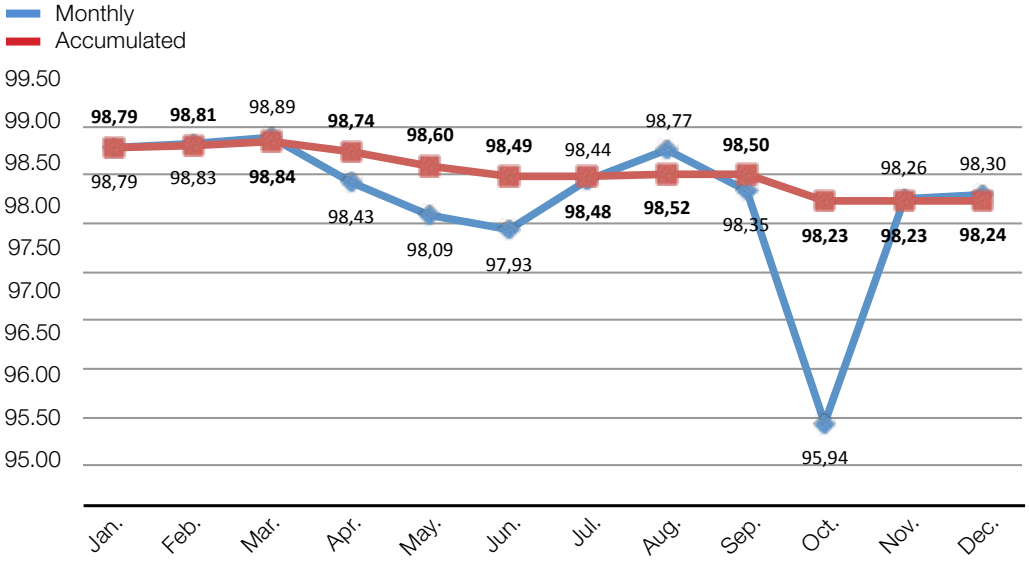
In 2017, 40.59 million usable kilometres were operated, a very similar figure to the previous year. The fact that the percentage increase in usable vehicle-km continues to be less that the places-km provided is due to the fact that, over the course of the year, the proportion of kilometres operated has increased due to the fleet having a greater capacity.

Usable vehicle-km operated (in thousands)

	2017	2016	Diff.	%
Usable vehicle-km operated	40,585.07	40,555.40	29.67	0.07

The average fulfilment of scheduled services (usable vehicle-km operated as a percentage of the total scheduled) for the year was 98.24%, a very similar figure to that of the previous year (98.27%). The fall in the month of October is basically due to the general strike that took place on 3 October 2017.

% fulfilment of services in 2017



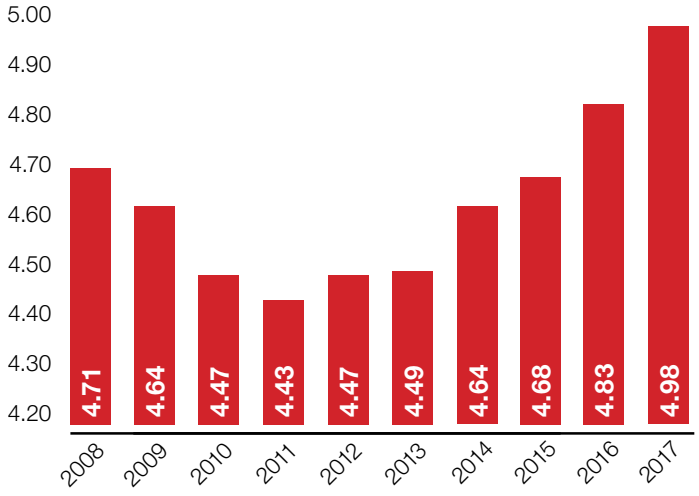
—Number of passengers per vehicle-km in operation

The ratio of passengers carried per vehicle-km in operation grew by 3.1% reaching a figure of 4.83 passengers per vehicle-km in operation, due to an increase in demand (4.3%) that exceeded the service provision of vehicle-km covered in operation (1.1%).

	2017	2016	Diff.	%
Passengers	202.05	195.80	6.25	3.2
Usable vehicle-km	40.59	40.56	0.03	0.1
Total passengers per usable vehicle-km	**4.98**	**4.83**	**0.15**	**3.1**

As the graph demonstrates, the ratio of passengers per vehicle-km in operation on the bus network decreased each year until 2011, when it reached a minimum of 4.43 passengers per km in operation. From that year onwards, as a result of actions taken in respect of the service provision, this trend was changed and began to increase each year until reaching its highest level for the last financial year.

Progress of passengers per usable vehicle-km for TB



To cope with this increase in demand and improve standards of comfort within the vehicle, this year a Bus Quality Improvement Plan was designed that consisted of putting 43 more buses into circulation on work days. The first phase of the plan was implemented on 2 October with 22 more vehicles in circulation and the other 21 will be put into service in the autumn of 2018.

—Other service quality indicators

The service provision study provides assessments of various qualitative aspects of the bus service. Average scores for 2017 (on a scale of 0 to 10) for fulfilment of service, cleanliness, conservation, information and customer services were as follows:

2017	Score
Passengers travelling in vehicles that are adequately maintained	9.02
Passengers waiting at bus stops that are adequately maintained	6.19
Total comfort: Maintenance	**7.93**
Passengers travelling in vehicles that are sufficiently clean	6.55
Passengers waiting at bus stops that are sufficiently clean	8.68
Total comfort: Cleanliness	**7.26**
Fulfilment of service	9.87
Overall competence	**9.87**
Journey with adequate information on the vehicles	9.90
Journey with adequate information at the stops	9.89
Total information	**9.89**
Passengers that receive appropriate service	9.89
Passengers that receive correct responses	10.00
Passengers travelling with appropriately dressed staff	10.00
Passengers travelling with adequate driving conditions	9.98
Average response time	10.00
Responses within a deadline	9.26
Total customer service	**9.91**
Average response time 11.22 days	

Note: The average response time was 11.22 days (the target is 28 days or less) with 92.6% of queries answered within the deadline
.

Service offering on the Metro

–Places-km provided

The service offering of the Metro service in 2017 was affected by various key factors. One was that 2017 was **the first full year of operation of Line 9 Sud** (it opened on 12 February 2016) and, additionally, there was a labour dispute that resulted in **12 days of service stoppages during** the first seven months of the year, along with **two days of a general strike** in Catalonia (3 October and 8 November).

Due to the increase in demand at peak times on work days that developed from the beginning of the year, some lines reached saturation point. Thus, for example, at peak times Lines 1 and 5 had an average occupation of over 100% and Line 5 reached 130% occupation on some journey sectors. This congestion at peak times, especially on these two lines, led to the design of a short- to medium-term plan to improve transport capacity on the network between 2017 and 2021 and, at the same time, prepare the network for possible transport restrictions in Barcelona in order to combat episodes of environmental pollution.

The Service Offering Plan designed in 2017 consisted of:
—Reinforcing the service for peak times on work days on L1 and L5, getting as many as 30 trains circulating by the end of the year (at intervals of 3'20") on L1 and 32 trains (at intervals of 2'49") on Line 5.
—Reinforcing Line 4 during the months of July and August to cope with the increase in the number of journeys to the beach areas.
—Reinforcing both peak and off-peak times on Line 2 due to an increase in ticket validations.
—Reinforcing peak time trains on Friday afternoons on Line 3.

The first phase on the plan was implemented on 13 June and the second phase on 11 December. These measures increased the total number of trains at peak times by seven: four on Line 1, one on Line 2 and two more trains on Line 5.

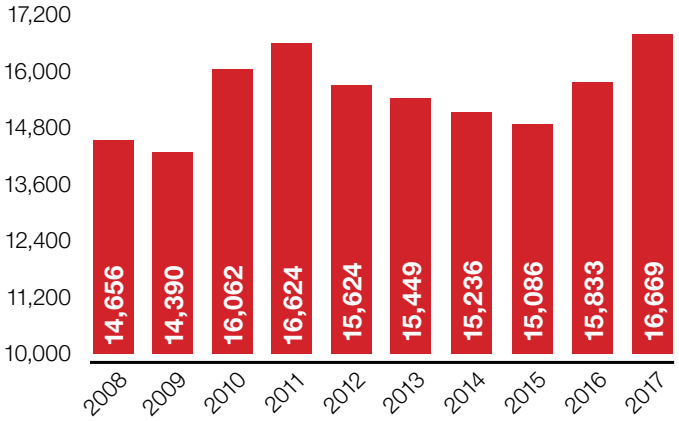
Places-km provided (in millions)

Line	2017	2016	Difference	%
L1	3,427.69	3,232.30	195.39	6.04
L2	1,902.85	1,791.86	110.99	6.19
L3	2,540.00	2,465.76	74.24	3.01
L4	2,238.95	2,134.94	104.01	4.87
L5	2,955.34	2,841.61	113.73	4.00
L9 Nord/10	1,487.13	1,448.88	38.25	2.64
L9 Sud:	2,044.11	1,846.66	197.45	10.69
L11	72.72	71.27	1.45	2.03
Total	**16,668.78**	**15,833.29**	**835.49**	**5.28**

The implementation of the 2017 Service Provision Improvement Plan and the fact that Line 9 Sud operated for a full year explain the increase of 5.3% in the places-km provided compared with the previous year.

By observing how the provision of services has evolved over the last 10 years, two distinct periods can be identified. There was a significant increase in service provision up to 2011, due to the growth of the network with the introduction into service of L9 Nord/ L10, the extensions of Lines 2, 3 and 5 and improvements in service frequencies. This trend changed from 2012 onwards due to a cost rationalisation plan. Finally, an increase in service can be observed in 2016 (as a result of the opening of L9 Sud), until reaching, in 2017, the provision of 16,669 million places-km, which represents a ten-year high.

Progress of places-km provided
(in millions)



- Usable vehicle-km operated

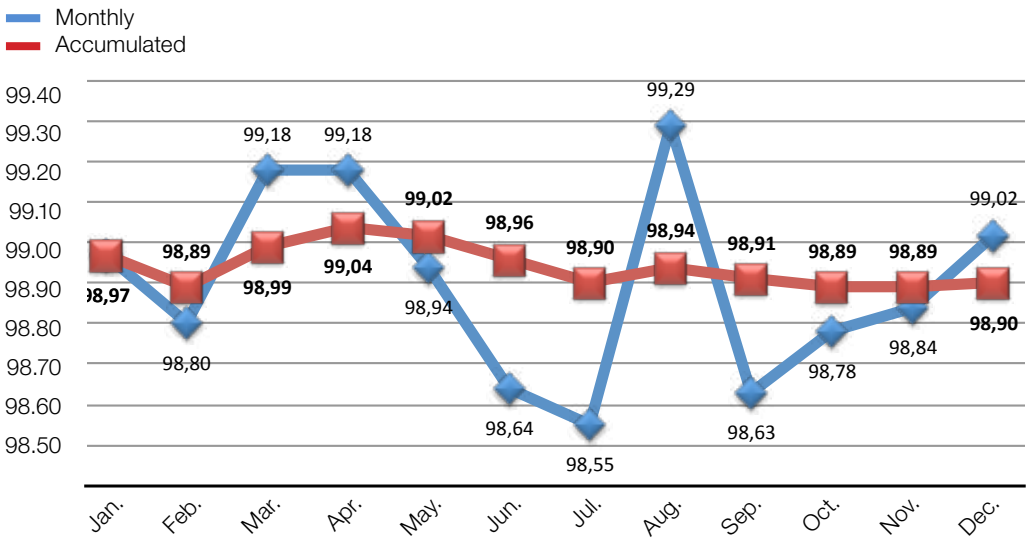
The same reasons noted for figures of the places-km provided also explains the increase in the number of usable vehicle-km operated in 2017. Specifically, 90.2 million usable vehicle-km were operated, a figure that represents a 5.2% increase over the previous year.

Usable vehicle-km operated (in thousands)

Line	2017	2016	Difference	%
L1	17,134.63	16,165.68	968.95	5.99
L2	10,421.17	9,813.21	607.96	6.20
L3	15,423.37	14,972.96	450.41	3.01
L4	12,692.99	12,118.01	574.98	4.74
L5	16,027.06	15,410.09	616.96	4.00
L9 Nord/L10	7,626.29	7,430.15	196.14	2.64
L9 Sud	10,482.61	9,470.07	1,012.54	10.69
L11	410.85	402.57	8.28	2.06
Total	**90,218.96**	**85,782.74**	**4,436.22**	**5.17**

In terms of fulfilling the services scheduled (usable vehicle-km operated as a percentage of the total scheduled) the average for the year was 98.90%, an improvement on the index for the previous year.

% fulfilment of service targets in 2017



–Number of passengers per usable vehicle-km

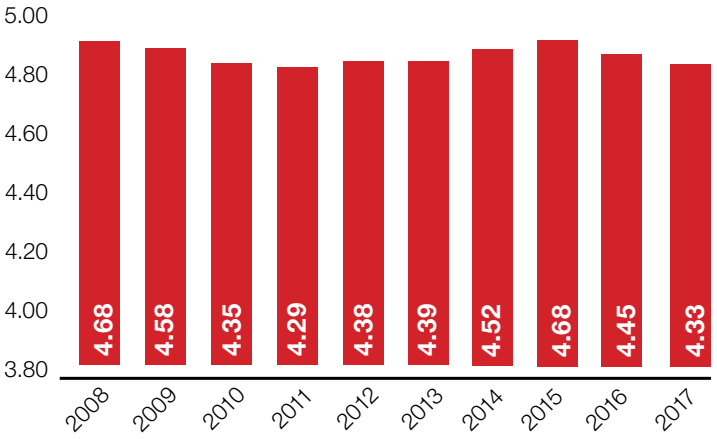
The increase in the service offering in 2017 led to a decrease in the ratio of passengers to usable vehicle-km of 2.7%, as the figure went from 4.45 to 4.33 passengers per usable vehicle-km. While the number of passengers grew by 2.3%, the usable vehicle-km operated grew by 5.2%.

Passengers per usable vehicle-km in operation

Line	2017	2016	%
L1	6.09	6.29	-3.27%
L2	4.03	4.13	-2.26%
L3	5.16	5.39	-4.32%
L4	4.25	4.38	-2.94%
L5	5.67	5.74	-1.30%
L9 Nord/L10	1.15	1.11	3.27%
L11	3.07	2.89	6.20%
L9 Sud	0.85	0.73	16.88%
Total	**4.33**	**4.45**	**-2.70%**

The chart below shows that this ratio declined from 2008 to its lowest value in 2011, coinciding with the extension of the metro network and the opening of L9/10. Later on, with the implementation of the Service Offering Rationalisation Plan that began in 2012, the indicator rose every year reaching its maximum level in 2015, after which it went down again once the new L9 Sud became operational and the 2017 Service Offering Improvement Plan was implemented.

Progress of passengers per usable vehicle-km



–Provision of trains in service in winter during peak hours (work days)

The number of trains in service during the morning peak hours on a work day in winter (including the Montjuïc Funicular) was 150 by the end of the year, an increase of seven units compared to the previous year. By line, the increases were as follows: four trains on Line 1; one train on Line 2 and two trains on Line 5. This increase in the number of trains in circulation is a result of the implementation of the previously mentioned Service Offering Improvement Plan.

Trains at peak times (work days)

Line	2017	2016	2015	2014	2013
L1	30	26	26	26	26
L2	20	19	19	19	19
L3	26	26	26	26	26
L4	19	19	19	19	19
L5	32	30	30	30	30
L9 Nord	6	6	6	6	6
L9 Sud	9	9			
L10	4	4	4	4	4
L11	2	2	2	2	2
Funicular	2	2	2	2	2
Total	**150**	**143**	**134**	**134**	**134**

–Commercial speed

The chart below shows the commercial speed on each metro line during peak hours on a work day in winter.

Commercial speed (km/h)

Line	2017	2016
L1	26.5	26.8
L2	27.2	25.7
L3	26.5	26.6
L4	28.4	28.4
L5	26.7	26.3
L9 Nord	30.6	29.3
L9 Sud	37.7	
L10	32.7	32.4
L11	24.0	24.0
Funicular	18.0	18.0

Over the course of the year, a project was started to implement variable circulation times on the different metro lines (this is worldwide pioneering initiative aimed at improving customer perception). The project will continue to be rolled out throughout 2018.

–Other indicators of service quality

The measurement study of service provision (MPS) provides assessments of various qualitative aspects of the metro service. Below, the average scores appear for the service in 2017 (on a scale of 0 to 10 points), with regard to accessibility, information, safety, maintenance, cleanliness and customer service.

2017		**Score**
1. Accessibility score	Customer lift availability	**7.58**
	Customer escalators available	**4.14**
	Customer ticket machines available	**6.38**
	Customer ticket barriers available	**5.12**
	TOTAL ACCESSIBILITY	**5.81**
2. Information Score:	Passengers appropriately informed about trains	**9.86**
	Passengers appropriately informed about stations	**9.97**
	TOTAL INFORMATION	**9.93**
3. Safety Score	Incidents per million ticket validations	**7.24**
	Accidents per million usable vehicle-km	**6.67**
	TOTAL SAFETY	**6.96**
4. Comfort score: maintenance	Passengers passing through stations that are adequately maintained	**8.03**
	Passengers travelling in trains that are adequately maintained	**8.28**
	TOTAL COMFORT: MAINTENANCE	**8.15**
5. Comfort score: Cleanliness	Passengers passing through stations that are sufficiently clean	**5.42**
	Passengers travelling in trains that are sufficiently clean	**4.79**
	TOTAL COMFORT: CLEANLINESS	**5.13**
5. Customer service score	Passengers that receive appropriate service	**9.76**
	Passengers travelling with appropriately dressed staff	**10.00**
	Passengers that receive correct responses	**9.83**
	Average response time	**10.00**
	Responses within a deadline	**8.36**
	TOTAL CUSTOMER SERVICE	**9.69**

Note: * The average response time was 14.24 days (the target is 28 days or less) with 83.7% answered within the deadline.

Telefèric de Montjuïc service offering

In 2017, the Telefèric de Montjuïc cable car was in service for 3,146 hours, a slightly lower figure than the previous year (-0.78%). It is during the summer months (June, July, August and September) that the number of service hours available is higher. The cable car operated 97.06% of its scheduled timetable. Service interruptions were due to external causes, mainly adverse weather conditions (2.92%), and internal technical problems (0.02%).

TMB service offering

–Usable vehicle-km

The service offering in 2017, in terms of usable vehicle-km, was 90.2 million usable vehicle-km operated on the Metro network and 40.6 million on the Bus network.

Usable vehicle-km (thousands)

	2017	2016	Difference	%
Metro	90,218.96	85,782.75	4,436.22	5.2

–Places-km provided

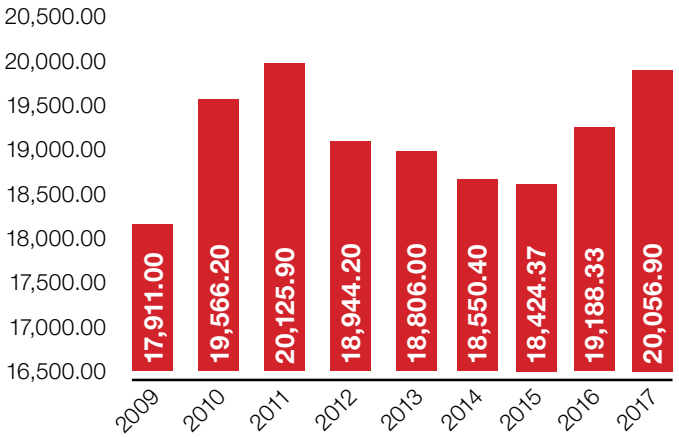
In terms of places-km provided, TMB's joint service provision increased by 4.5%, achieving a total of 20,057 million places-km between the two networks.

Places-km provided (millions)

	2017	2016	Difference	%
Metro	16,668.78	15,833.29	835.49	5.3
TB	3,388.12	3,355.04	33.08	1.0
TMB	20,056.90	19,188.33	868.57	4.5

The following chart shows changes in places-km provided on all TMB networks (excluding the Telefèric de Montjuïc cable car). There was a drop in these figures from 2011 onwards due to cost-saving measures that were introduced. As far as buses are concerned, it should be remembered that 2012 saw the launch of five phases (20 routes) of the New Bus Network aimed at rationalising the network, moving from a model based on accumulating routes to an integrated network which is more efficient, understandable and useful. The increase in places-km in 2016 and 2017 is mainly due to the opening of Line 9 Sud of the Metro, the introduction of the respective 2017 Service Offering Improvement Plans for Metro and Bus, together with the return into service of the Bus del Barri neighbourhood buses on non-workdays.

Progress of places-km offered by TMB



Developments, improvements and projects.

Ferrocarril Metropolità de Barcelona, SA

Fundamental Improvement Objectives (OMF) for the Metro 2017
Based on the strategic reflection process of the last quarter of 2016, which assessed the main changes and their impact on developing lines of strategic policy (senior management structure guidelines, customer guidelines, staff guidelines and changes in the market), it was decided to develop the following cascading objectives in 2017:
— M1: an objective related to motivation.
— M2: an objective related to improving the service offering.
— M3: an objective related to improving availability

Based on these premises, work started within the metro network on the methodology for developing strategic lines for projects called OMF (Fundamental Improvement Objectives) aimed at creating multi-disciplinary and autonomous working groups that could work throughout the year in the various different fields, identifying actions and measures that need taking to achieve effective improvement:

1. Staff motivation:
— Proximity plan (presence)
— Professional classification
— Training model

2. Improvement in service:
— Finishing off the service offering analysis (Improvement plan to absorb increased demand)
— Planning
— Time spent out of service due to external causes

3. Improvement in the availability of trains and infrastructure:
— Organisational project in the field of Rolling Stock
— Development of the 2020 Maintenance Plan

Undertaking these objectives must pave the way to achieving the strategic results defined by the four central pillars on which the way forward is based: efficiency, motivation, product and commercial.

At the same time, actions were taken in the various areas of service:
— Improved security: this also incorporates civil protection and self-protection plans, railway safety and prevention of risks in the workplace.
— Improved accessibility
— Actions in the field of maintenance and cleaning
— Preparation of the new Line 10 Sud.
— Actions to do with infrastructure, tracks, energy, the T-Mobility project, etc.
— The new collective agreement for the period 2016-2019.

–Transports de Barcelona

Projects carried out in respect of the bus network in 2017 include the following:

1. Seeking improvements in efficiency and environmental protection:
—Continuation of the ZeEus project. Support for zero emission buses.
—European project ELIPTIC for a new ultra-fast charging station for the electrification of urban transport.
—ASSURED: a new European innovation project for the fast charging of electric vehicles.
—Proposal for an electric minibus project.
—EBSF-2, designing the bus of the future.
—Project Mobileye.

2. Commitment to technology: Key technological projects under way:
—Project for Wi-Fi on board buses.
—Bus lane patrol car project.

3. Projects to coordinate fleet programming and maintenance:
—Predictive inspections, training and optimisation of preventative maintenance plans for the fleet.
—Development of a new model to analyse maintenance costs
—ROMMI technological improvement plan. Technical improvement initiatives aimed at improving maintenance.

4. Infrastructure projects.

5. Key measures in Business Operations Centres (CON).

6. Key measures in the Network Support Centre (CSX).

Progress of cost per passenger carried and per bus service hour operated

–Cost per passenger carried

As seen previously, 2017 saw a significant increase in users of the Transports de Barcelona group, which led to a 0.9% decrease in the total cost per passenger, going from 1.49 euros per passenger in 2016 to 1.48 euros per passenger last year.

Operating costs per passenger fell by 0.7% thanks to staff cutbacks, external services and variations in per passenger provisions that compensated for increased costs in other areas.

Costs per passenger carried (in euros)

Item		2017	2016	Difference in euro cents	%
Operating expenses	Supplies	0.055	0.051	0.40	7.9
	Electricity/fuel	0.095	0.094	0.09	1.0
	Staff	1.055	1.068	-1.26	-1.2
	External services	0.177	0.177	-0.08	-0.5
	Changes in provisions	-0.009	-0.009	-0.09	10.1
Total operating expenses		**1.373**	**1.382**	**-0.94**	**-0.7**
Other expenses	Taxes	0.003	0.004	-0.08	-21.0
	Net Amortisation	0.105	0.123	-1.84	-14.9
	Result of asset sales	0.000	0.002	-0.17	-105.3
	IVMDH tax refund	-0.008	-0.011	0.34	-30.9
	Pensions	0.003	0.001	0.20	137.5
Total other expenses		**0.104**	**0.120**	**-1.56**	**-13.0**
Financial expenses:	Interest paid on AEAT tax refunds	0.000	-0.002	0.17	-82.8
	Structural	0.002	-0.008	0.97	-120.7
Total financial expenses		**0.001**	**-0.010**	**1.14**	**-112.9**
Total cost per passenger		**1.478**	**1.491**	**-1.36**	**-0.9**
Passengers carried (in thousands)		202,049	195,797	6,252	3.2

Regarding the rest of the costs, the costs per passenger fell in terms of tax, net amortisation and the result of selling fixed assets. However, financial expenses per passenger increased, primarily for two reasons: lower dividends from associated companies and a reduction in refunds received from the Tax Agency due to interest charged on arrears arising from the tax on retail sales of specific hydrocarbons (IVMDH) from previous financial years.

–Total cost per hour of service

Unit cost analysis in terms of service provision (cost per hour of service) is radically different to what has been described with regard to cost per passenger. While, in 2017, there was a reduction in the cost per passenger carried of 0.9%, the total cost per hour of the bus service rose by 1.7%, reaching 77.40 euros per hour. The reason is that while the percentage increase of passengers was higher than the expenses for the financial year, the increase in service hours was lower than that of the expenses which led to increases in the cost per hour for the year.

The cost per hour of operating expenses grew by 1.9%, rising from 70.52 euros per hour to 71.89 euros per hour, as a result in increased costs across the board.

The rest of the costs per hour went down by 0.66 euros per hour overall (-10.8%) thanks to the drop in items such as tax, net amortisation and sales of fixed assets. Conversely, financial costs increased by 0.58 euros per hour compared to the previous year.

Total bus service costs per hour (in euros)

Item		2017	2016	Difference in euros	%
Operating expenses	Supplies	2.873	2.595	0.28	10.7
	Electricity/fuel	4.993	4.818	0.18	3.6
	Staff	55.262	54.492	0.77	1.4
	External services	9.249	9.053	0.20	2.2
	Changes in provisions	-0.492	-0.436	-0.06	13.0
Total operating expenses		**71.885**	**70.523**	**1.36**	**1.9**
Other expenses	Taxes	0.166	0.204	-0.04	-18.9
	Net Amortisation	5.501	6.299	-0.80	-12.7
	Result of asset sales	-0.005	0.084	-0.09	-105.5
	IVMDH tax refund	-0.394	-0.555	0.16	-29.0
	Pensions	0.182	0.075	0.11	143.7
Total other expenses		**5.450**	**6.107**	**-0.66**	**-10.8**
Financial expenses:	Interest paid on AEAT tax refunds	-0.019	-0.106	0.09	-82.4
	Structural	0.087	-0.409	0.50	-121.2
Total financial expenses		**0.068**	**-0.515**	**0.58**	**-113.2**
Total cost per hour		**77.403**	**76.115**	**1.29**	**1.7**
Total bus service hours (in thousands)		3,858	3,837	21	0.6

Progress of costs per passenger carried and per total vehicle-km operated on the Metro

–Cost per passenger carried

Despite the increase in metro users in 2017, the total cost per passenger carried was 2.7% higher than the previous year, reaching 0.86 euros per passenger. This increase happened because the percentage increase in costs over the financial year exceeded that of passengers carried. The rise in costs was mainly due to the increase of the service offering (the start of the Service Offering Plan and a complete year in operation of Line 9 Sud).

Operating costs per passenger also rose by 2.3% more than the previous year, standing at 0.72 euros per passenger. Except for the cost per passenger of energy and variations in provisions, all other cost items increased, especially for external services and staff. The decrease in energy costs is explained by lower electricity consumption and a lower price per kWh compared with the previous year. Meanwhile, as will be explained later in this report, work continued on implementing measures to save energy consumption on the network and within metro premises.

With regard to other costs, an increase in the cost per passenger of financial expenses is particularly notable.

Costs per passenger carried (in euros)

Item		2017	2016	Difference in euro cents	%
Operating expenses	Supplies	0.025	0.021	0.36	16.9
	Electricity/fuel	0.064	0.070	-0.62	-8.9
	Staff	0.444	0.439	0.55	1.3
	External services	0.193	0.176	1.69	9.6
	Changes in provisions	0.002	0.005	-0.31	-60.5
Total operating expenses excluding train leasing and L9/L10 charges		**0.728**	**0.711**	**1.67**	**2.3**
Other expenses	Taxes	0.001	0.000	0.03	65.5
	Net Amortisation	0.076	0.080	-0.32	-4.1
	Result of sales of fixed assets	-0.001	-0.001	-0.05	88.5
	Pensions	0.000	0.001	-0.03	-44.1
Total other expenses		**0.076**	**0.080**	**-0.37**	**-4.7**
Financial expenses:		**0.053**	**0.043**	**0.96**	**22.4**
Total cost per passenger		**0.857**	**0.834**	**2.25**	**2.7**
Passengers carried (in thousands)		390,396	381,486	8,910	2.3

Note: Train leasing and charges for L9 Nord/10 and L9 Sud are not included.

–Total cost per vehicle-km

Contrary to what happened with the cost per passenger in 2017, when the total costs of FMB are related to the total number of vehicle-km operated, the unit cost comes out lower than the previous year. Thus, the total cost per vehicle-km operated (excluding train leasing and charges for L9 Nord/L10 and Line 9 Sud) decreased by 0.3%, going down to 3.63 euros per km in 2017. The explanation is that, unlike what happened in the case of demand, the total number of vehicle-km operated grew at a higher percentage than that of costs, as a consequence of the implementation of the first phase of the Service Offering Improvement Plan and also the fact that Line 9 Sud operated for a full year for the first time in 2017.

Operating costs per vehicle-km covered totalled 3.09 euros per km, a decrease of 0.6% compared to the previous financial year. This reduction is due to the decrease in the cost per km of energy, staff and variations in provisions. On the other hand, when you add in the costs per kilometre of all the other items, the reduction in the total cost per km is less, due to the increase in financial expenses during 2017.

Total cost per vehicle-km operated (in euros)

Item		2017	2016	Difference in euro cents	%
Operating expenses	Supplies	0.105	0.092	1.25	13.6
	Electricity/fuel	0.270	0.305	-3.51	-11.5
	Staff	1.885	1.917	-3.17	-1.7
	External services	0.819	0.769	4.94	6.4
	Changes in provisions	0.009	0.022	-1.37	-61.6
Total operating expenses excluding train leasing and L9/L10 charges		**3.087**	**3.106**	**-1.86**	**-0.6**
Other expenses	Taxes	0.003	0.002	0.12	60.8
	Net Amortisation	0.324	0.347	-2.37	-6.8
	Result of sales of fixed assets	-0.004	-0.002	-0.20	83.1
	Pensions	0.002	0.003	-0.14	-45.7
Total other expenses		**0.324**	**0.350**	**-2.59**	**-7.4**
Financial expenses		0.223	0.187	3.54	18.9
Total cost per hour		**3.634**	**3.643**	**-0.91**	**-0.3**
Total bus service hours (in thousands)		92,030	87,346	4,684	5.4

Note: Train leasing and charges for L9 Nord/10 and L9 Sud are not included.

Progress of Bus revenues

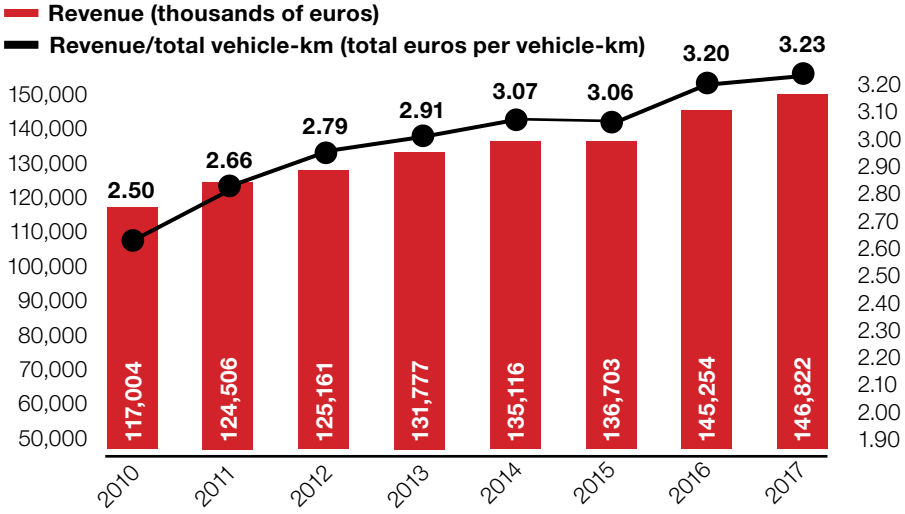
Despite freezing fares in 2017, there was an increase in revenue of 1.57 million euros (+1.1%) over the previous year. This is explained by the increase in passenger numbers over the course of the year.

Revenue per total vehicle-km covered (euros)

	2017	2016	% Diff.
Revenue (thousands of euros)	146,822	145,254	1.08
Total vehicle-km operated (thousands)	45,478	45,407	0.16
Revenue/total vehicle-km	**3.228**	**3.199**	**0.92**

The indicator linking sales revenue to service provision, the revenue per total vehicle-km operated, grew by 0.9%, reaching a total of 3.23 euros per total vehicle-km

Progress of income through revenue



Looking at how revenue has evolved over recent years, what stands out is the continuous growth in ticket sales every year since 2010. With regard to revenue per total vehicle-km, this has also increased every year (except 2015) before reaching its maximum level in 2017, the last financial year.

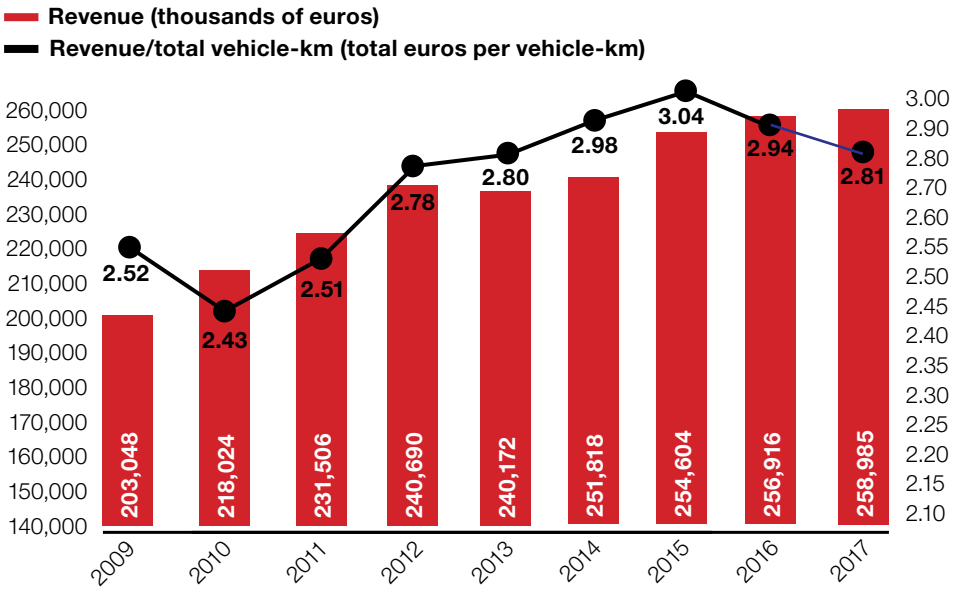
Progress of Metro revenues

Although public transport fares were frozen in 2017, income from Metro tickets and passes (before applying overrides and discounts) grew by 2.07 million euros, an increase of 0.81%. The reason is the increase in passenger carrying over the last financial year. On the other hand the ratio of revenue to total vehicle-km decreased for the second year running and last year it reduced by -4.3% compared to the previous year, declining to 2.81 euros per total vehicle-km. The decrease is due to a greater percentage increase in the number of kilometres operated (5.36%) compared to the increase in revenue (0.81%).

Revenue per total vehicle-km covered (euros)

	2017	2016	% diff.
Revenue (thousands of euros)	258,985	256,916	0.81%
Total vehicle-km operated (thousands)	92,030	87,346	5.36%
Revenue/total vehicle-km	**2.81**	**2.94**	**-4.33%**

Progress of income through revenue



The chart shows that revenues from ticket sales have increased every year, reaching nearly 259 million euros in 2017. Since 2009, these revenues have increased by 55.9 million euros, a cumulative increase of 27.5% over the whole period.

With regard to the ratio of revenue per vehicle-km operated, this experienced annual growth from 2011 until reaching its maximum in 2015. In 2017 it decreased for the aforementioned reasons.

Progress of rolling stock and fuel consumption

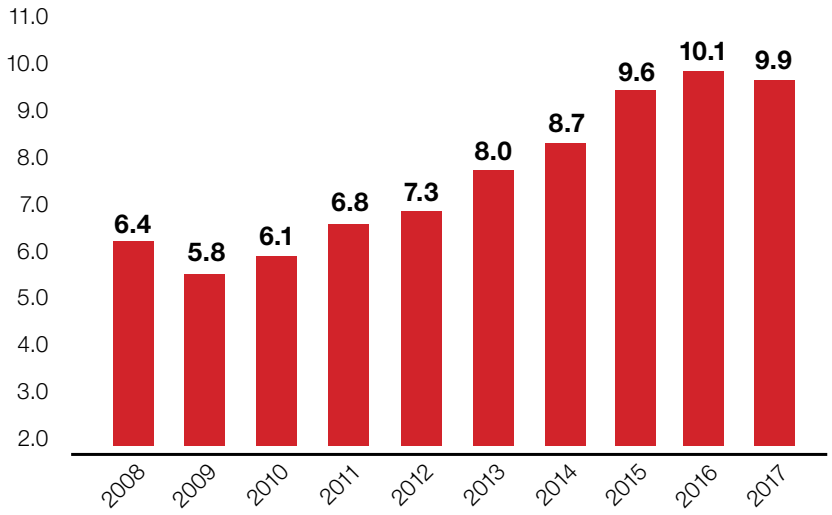
–Composition and average age of the fleet

The operational stock of buses as at 31 December 2017 consisted of 1,085 vehicles, comprising the following models: 601 standard buses, 327 articulated buses, 25 medium-sized buses, 52 mini-buses, 3 bi-articulated buses and 77 double decker buses (for the Bus Turístic).

With the incorporation over the year of new vehicles to replace older units (as part of the 2017 Fleet Renovation Plan which will be described later on), the average age of the operational stock of buses has reduced. As of 31 December 2017, the average age of the fleet was 9.93 years.

Over the last decade, a progressive ageing of the fleet can be noted from 2009, coinciding with the onset of the economic crisis and the consequent introduction of cost-saving plans that also impacted on the investment policy for renewing buses. Although the current fleet is older the 10 years ago, this trend will change over the coming financial years thanks to an increase in investments dedicated to renewing the oldest stock. Thus, for example, it is forecast that 127 new buses will be acquired in 2018 at a cost of around 42.4 million euros.

Average age of the bus fleet (years)



–Fleet reliability

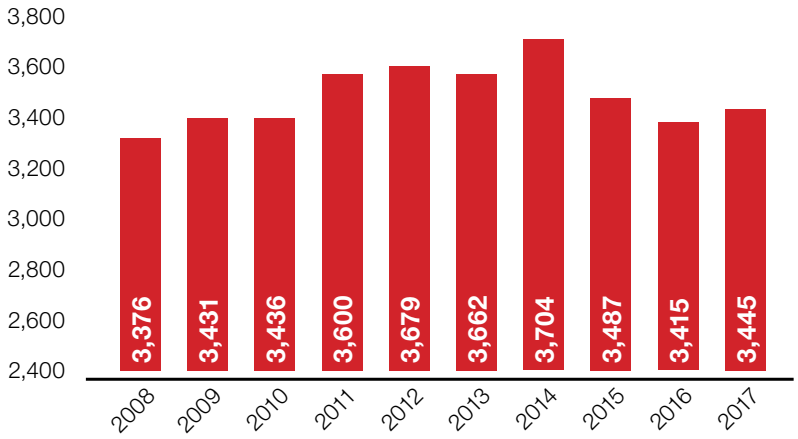
The indicator that measures fleet reliability (average number of kilometres operated without breakdowns) has grown after two consecutive years of continued decline. It improved by 0.9% in 2017 reaching 3,445 km operated without a breakdown. The improvement in the indicator is due to a drop of 0.7% in the number of breakdowns compared to the previous year. The 2017 figure is very close to the objective set of 3,451 km without a breakdown.

Average km operated without breakdowns

	2017	2016	diff.	%
Average km without breakdowns	3,445	3,415	30	0.9

The chart shows how fleet reliability has evolved over the last 10 years. After several years in which the indicator grew, from 2015 onwards it began to fall, coinciding with a slowdown in the pace of fleet renovation. However, with the increase in investments dedicated to renewing the fleet over the coming financial years, the indicator is predicted to rise again in the coming years, something that will also improve levels of customer comfort. There was an improvement in the reliability of the fleet in 2017 compared with the previous year.

Progress of kilometres covered without breakdowns

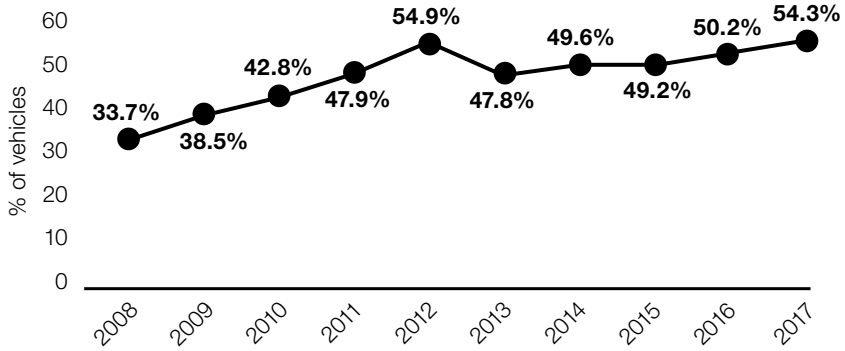


–Fuel consumption

Caring for the environment has been part of TMB's approach to its business for many years, positioning Barcelona as a leading city for research and innovation in respect of zero emissions urban transport. Since 2012, buses in Barcelona have been at the forefront of Europe in terms of low levels of gas emissions and particles that are harmful to people's health (thanks to the use of compressed natural gas and the mass installation of anti-pollution filters). Moreover, the intention is to limit the emission of gases that contribute to global warming through the purchase of hybrid vehicles and the gradual electrification of the fleet.

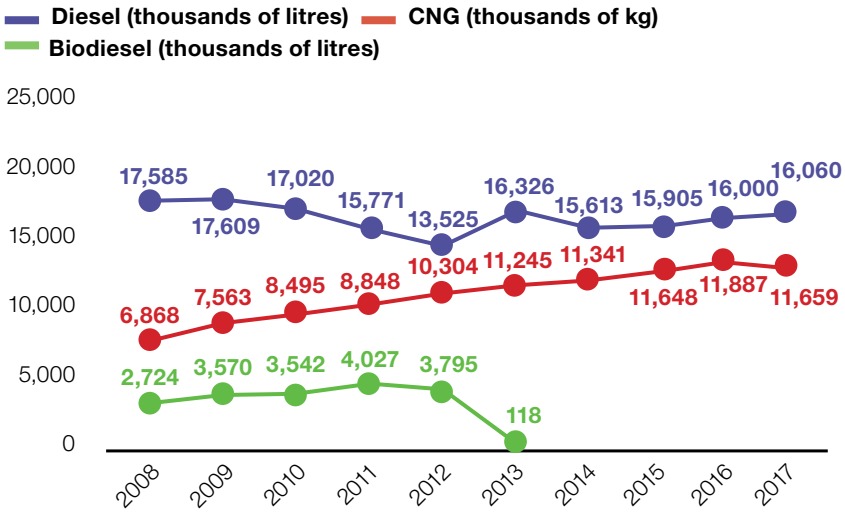
The graph shows that, over recent years, TMB has progressively increased its fleet of more environmentally friendly vehicles (including CNG, biodiesel, hybrid and electric vehicles). While in 2008 only 33.7% of buses were powered by more eco-friendly fuels (CNG and biodiesel), last year 54.3% of the fleet was made up of environmentally more sustainable buses (hybrids, CNG powered and purely electric) thanks to the introduction of more hybrid and CNG vehicles. The dip in 2013 occurred because biodiesel was no longer used as fuel, mainly due to the withdrawal of the government subsidy it benefited from. That, combined with the higher consumption level of vehicles powered by that fuel compared to those that run on diesel, made it less efficient.

% of vehicles powered by CNG, hybrid and electricity



Note: includes vehicles powered by biodiesel up to 2012.

Fleet consumption by types of fuel



The consumption of different types of fuel in 2017 was as follows:

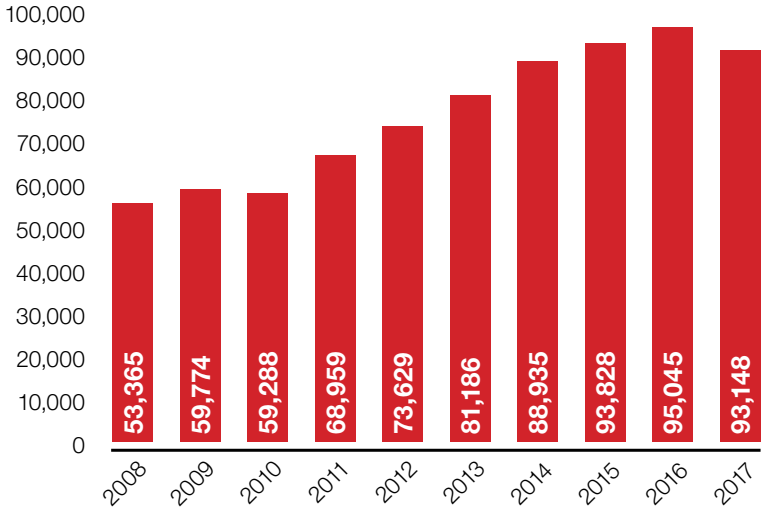
1. Diesel consumption: the diesel-powered bus fleet consumed a total of 16.06 million litres, a very similar figure to the previous year (+0.4%). This small increase is due to a 2.2% increase in the number of kilometres operated by buses with diesel engines plus the hybrids that operate with diesel; specifically the addition to the fleet, since 2016, of 40 articulated diesel hybrid vehicles. Meanwhile, the consumption of diesel per 100 km travelled went down by 1.8%, reducing to 57.95 litres for every 100 km travelled, thanks to the higher proportion of hybrid vehicles in 2017. Specifically, the number of kilometres operated by the hybrid fleet grew by 25.4% compared to the previous year, and they consume less than those vehicles powered exclusively by diesel.

2. Natural gas consumption: CNG-powered vehicles within the fleet consumed a total of 11.66 million kg which is 1.9% less than the previous year. This reduction was due to the lower number of kilometres covered by CNG buses in 2017 (2.9% less than the previous year). On average, the fleet powered by natural gas consumed 65.94 kg for every 100 km travelled, a slightly higher figure than the previous year (65.27 kg per 100 km).

Operational reliability of the Metro

The average number of kilometres travelled without a breakdown is the indicator that measures the operational reliability of the train fleet. In 2017, after a series of financial years of growth, reaching its highest level in 2016, there was a decline to 93,148 km without breakdown, a similar figure to that of 2015. Despite this reduction, it should be noted that this reliability indicator has improved by 75% over the last ten years.

Progress of reliability for the train fleet
(vehicle-km without breakdowns)



Traction energy consumption

The electrical power consumed by the train fleet in service in 2017 (excluding L9 Nord/L10 and L9 Sud) was 173.26 million kWh, an increase of 13.2 million kWh compared to the previous year. This increase was due to the increase in the offer of total vehicle-km operated on conventional lines as discussed earlier. On the other hand, the average consumption was 235.5 kWh per 100 total vehicle-km operated, a figure that is 3.4% higher than the previous year, due to the notable increase in passenger numbers throughout 2017 (more crowded trains carrying more weight).

Meanwhile, the consumption allocated to stations, buildings and premises reduced by 1.2% compared to the previous year, with a total of 82.3 million kWh in 2017. Work has been done in recent years to apply measures that make energy consumption more efficient and to save on energy costs.

Developments, improvements and projects. Bus

–Research into improving efficiency and improving the environment:

—Work continues on the ZeEUS Project. promoting zero emission buses

Work continues on the ZeEUS project, that was due to come to an end in April 2017 but which has been extended for a year up until 30 April 2018.

The articulated Solaris Urbino buses, the first 100% electric 18 metre-long buses in the country, are continuing their test period but are already in service on route H16. Thus, the city is continuing its trials of zero emission buses as part of the ZeEUS project which started in 2014 with two standard cars and two electric articulated buses (from 2016). The project consists of a series of intensive trials on new generation plug-in electric and hybrid buses carried out in ten different cities aimed at giving a decisive boost to research and innovation in clean technologies applied to urban transport. TMB is heading up the trials in Barcelona in association with the manufacturers Irizar and Solaris and the energy company Endesa, and with the collaboration of Enide, the Polytechnic University of Catalonia, Idiada and the technological business group GMV.

As a result of this project, Transports de Barcelona is committed to electric mobility using the opportunity charging option (rapid streetside charging). That is why seven 18 metre-long articulated electric vehicles have been purchased in line with this strategy (four Irizar and three Solaris).

It is expected that all of these buses will be delivered by June and that they will go into service in September 2018. Therefore, half of the vehicles operating route H16 will be electric. Over the coming financial years, the purchase of these type of vehicles will continue so that the whole fleet becomes electric powered.

—European project ELIPTIC for a new ultra-fast charging station for the electrification of urban transport.

The objective of the ELIPTIC (Electrification of Public Transport in Cities) project is to save money and energy by using existing electric public transport systems (e.g. metro, tram and trolleybus) to benefit other modes of transport as a means of increasing capacity and reducing emissions. Thus, for example, electric buses and cars could take advantage of the energy generated by train convoys braking to make the recharging processes more efficient.

There are currently 20 user groups working on what are known as business cases or experimental operations of different types in 11 European cities: Barcelona, Bremen, Leipzig, Eberswalde, Oberhausen (Germany), Brussels (Belgium), Lanciano (Italy), London (Great Britain), Szeged (Hungary), Gdynia and Warsaw (Poland).

In Barcelona, the challenge is to build a recharging station for electric buses using energy produced by the Metro network, specifically Line

4. The chosen location is Avinguda d'Eduard Maristany, close to the Diagonal Besòs campus at the end of route H16, as it complements the charging station constructed by Endesa in Carrer del Cisell at the route's other terminus stop as part of another European project called ZeEUS. The new charging station is currently under construction.

At the same time, seven stations are being constructed at the Triangle bus depot where, overnight, the seven vehicles contracted to operate the same route are charged. In this case, the energy will be provided from the Metro depot located beneath the bus depot. Thus, progress is being made towards the complete electrification of bus route H16. Progress on the project continued throughout the year and a number of meeting were held known as *Partner Meetings* (Warsaw, Oberhausen and Barcelona). It is an interesting forum in which different specialist operators, constructors and engineers can exchange knowledge. The culmination of this was the particularly successful organisation of the *Partner Meeting* in Barcelona.

— ASSURED: a new European innovation project for the rapid recharging of electric vehicles

The innovation project ASSURED (which takes its acronym from *the phrase 'fASt and Smart charging solutions for full size Urban hEavy Duty applications')* is scheduled to run between October 2017 and September 2021, with a budget of 23.64 million euros, 18.65 million of which will be provided by the EU.

Over a four-year period, 39 partners (authorities and public transport operators, bus, truck and light vehicle manufacturers, electric energy suppliers, recharging infrastructure suppliers, national and international associations, municipalities, consultancy companies and research institutes) from 12 countries will develop advanced solutions to promote zero-emission urban fleets, all coordinated by the Free University of Brussels and headed up, on behalf of electric buses, by the International Association of Public Transport (UITP).

The objectives of ASSURED can be summarised in the following points:

— Development of modular solutions for new generation high-powered chargers (up to 600 kW).
— Interoperable and scalable high-powered charging solutions.
— Development and testing of efficient wireless charging solutions up to 100 kW.
— Assessment of the cost, energy efficiency and impact on the electricity network.
— Testing the solutions that come out of ASSURED on six public transport buses, according to the TRL 7 definition *(system prototype demonstration in an operational environment)*, in cities of the European Union.

— Support for standardisation bodies (for example, CEN-CENELEC, ISO, IEC).
— Protocol for standard tests of compliance and interoperability.

As part of the project, the UITP is heading up activities connected with electric buses, specifically the tests being conducted in the different participating cities, coordination with end users and publicising the project to make effective use of the results. The six case studies or practical cases involving buses intended to validate the technologies will take place in Torí/Lió (shared between these two cities), Gothenburg (Sweden), Jaworzno (Poland), Helmond (Germany), Bayonne (France) and Castejón (Navarre, Spain).

In a later phase, other cities will carry out tests as part of this project: Osnabrück (Germany) and Barcelona will test the interoperability between buses and chargers of different brands in real time operation; Gothenburg will do the same using buses and trucks, while Eindhoven (Netherlands) will test smart charging for large volume fleets.

— Proposed electric minibus project

With reference to the call for RIS3CAT grants coordinated by ACCIO10, work continues on the design, manufacture and approval for a prototype electric minibus to provide service to the Bus del Barri neighbourhood routes. The vehicles are expected to be delivered in May 2018 and operational testing will begin to correct and validate their performance.

Tests are due to be completed by the end of 2018 and, if the anticipated results are achieved, the next minibuses could be those that use this type of engine. Idiada, Eurecat, Indcar and Millor Battery are involved as partners.

— EBSF-2, the design of the bus of the future

Collaboration continues with this research and innovation project run by the UITP. The TMB testing team is working on reducing the consumption of auxiliary energy in electric buses through a number of different technological solutions.

— Renewal of obsolete fare collection machines

There was a gradual renovation of employee fare collection machines at each CON (Business Operations Centre). The firm SCANCOIN was selected as the supplier of the new equipment. The machines will be adapted to the requirements implemented with T-Mobilitat.

– Commitment to technology: the key technological projects being carried out:

— Project for *Wi-Fi* on board the bus

The deployment of new onboard equipment (CPU30) was completed in 2017, enabling a *Wi-Fi* service to be provided during the journey as well as mobile data coverage, thus bringing internet connectivity to the bus fleet.
Extending a *Wi-Fi* service to public transport reflects the desire of Barcelona City Council to offer a free access internet network to the general public in accordance with current legislation governing the sector and the existing legal limitations, and also as a response to the new needs of citizens with regard to mobility and access to information. Thanks to this commitment, the people of Barcelona and visitors to the city have access to the largest free public *Wi-Fi* network in the country, and one of the most extensive in Europe.

— Bus lane patrol car project

The material has been purchased in order to equip a car with a licence plate recognition system and a report generator in order to pursue the bus lane patrol car project. Authorisations are currently being requested to enable it to become operational in 2018.

– Key measures in Network Support Centre.

The main projects and activities undertaken in 2017 by the various departments of the Network Support Centre (CSX) are detailed below, including both the ones they led and those they collaborated in at the development and/or implementation stage:

— Management of regulatory measures: In February the implementation was finalised of the new tool for the SAE (Operation Assistance System) operator positions of the four Business Operations Centres (CON). This application facilitates:

- — Management of regulatory measures in real time, with an impact on forecasts (they will not be produced) and on regulations (the affected shift will not be taken into account).
- — Simplification and automation of processes (hard copy notes about regulatory measures and lost journeys will disappear).

— Optimisation of the load on the SAE and the design and development of query tools for SAE maintenance: the content capture process was optimised for the onboard system which is a critical step in the process of preparing information to send to those on board. The process was optimised and integrated automatically into the preparation procedure for SAE data in such a way that the procedure for uploading data to the SAE guarantees that the information has been correctly prepared for the vehicles. In this way, the risk is eliminated of inconsistencies between the central system and the onboard equipment that would affect the correct functioning of the system. Meanwhile, a number of applications were introduced for extracting data about the position of buses in order to monitor routes and also query applications to check compliance with the timetable on the routes.

—Implementation of the Bus Security Centre: the new Bus Security Centre is integrated into the premises of the Bus Control Centre (CCB) to centralise security management and to give support and cover to local bus security centres.

—Second reorganisation of operator positions in the CCB room: a second reorganisation has been carried out in the Bus Control Centre room to create two new bus information positions. At the same time, two SAE back-up positions have been installed to be able to cover any operational need or technical breakdown. The ROMMI (technological improvement) area has been supplemented with SAE query equipment. During night-time hours, the only active area within the room is the incident area; that is why it has been adapted as a fully SAE operated location, from which any phone request can be dealt with.

—Broadcast of pre-recorded onboard audio messages: a new feature has been added to the driver information system (SIC) (desk) that gives drivers control over broadcasting various pre-recorded messages at their discretion.

—Passenger information screens: a new environment has been implemented for monitoring incidents using solar information screens managed by the manufacturer/servicing company (CAPMAR).

—Development of the geoportal: In May, version 1.13 went into operation which includes the following new features:
  — Ability to work with data in ETRS89 format in different ways: data export, clipboard, etc.
  — Ability to search by kilometre points on the tracks of the metro.

—GIS-4 (Geographic Information System): a beta phase has been implemented that tests the following areas:
  — Tests in the vicinity of interchange areas.
  — Synchronisation of GIS data with timetables.
The company's cartographic information systems have been updated with the latest developments resulting from the implementation of phase 5.1 of the New Bus Network.

—Customer information procedures: procedure P825-Management of CIB Information has been drawn up and included in the quality management system with the aim of defining the actions needed to provide information about measures that need to be communicated to bus network customers.

—Audit of the horizontal signage in interchange areas: for the purpose of guaranteeing the quality of customer information. Over the course of the year, two audits were carried out on support signage at interchange areas: horizontal signage and supporting MUPIS (urban furniture used to transmit information).

—Update of route maps: all route maps were updated so that this information could be attached to the drivers' timetable boards. As a new feature, these maps were also uploaded onto SIC so that drivers would always have updated information on route itineraries. Meanwhile, a map has been produced that shows all of the New Bus Network (NXB) routes with the details of each journey and all of the interchange areas.

—Introduction of the position of ticket validation assistant: ticket validation assistants were introduced in July, who fulfil their role in person on the bus, observing and noting down information about ticket fraud.

—Collaborative environment for the Technical Office for Traffic: development and implementation of a new collaborative environment to streamline incident management with the Technical Office for Traffic.

—Implementation of the application to manage resources on the street: this is a tool that facilitates, using localisation provided by emitters, the identification of how the different resources available on the street are distributed: information and control agents, operational controls and those in charge of operational groups on the routes.

—Projects to coordinate fleet programming and maintenance

—Predictive inspections, training and optimisation of preventative maintenance plans for the bus fleet

A total of 2,490 inspections were carried out over the year out of an initial forecast of 3,057, resulting in a compliance percentage of 81.45%.

Predictive inspections have been identified as a key process prior to undertaking the tasks laid out in the Maintenance Plan by which, apart from the tasks that need carrying out systematically (by kilometre or time), other anomalies are identified that need correcting. This permits the time spent working on vehicles to be optimised by carrying out these additional tasks during regular inspections, thereby making a significant contribution to reducing the number of incidents while improving reliability indicators.

With regard to training, eleven actions have been carried out representing a total of 54 sessions given to a total of 210 participants.

During 2017 preventative maintenance plans have been applied to SAP for new fleet acquisitions that incorporate hybrid and CNG propulsion technologies.

—Development of a new model to analyse maintenance costs

—Allocation of materials to work orders
In 2017, 68% of the cost of materials used in fleet maintenance was allocated to works orders, against an approximate forecast allocation limit to materials of 70%. These figures confirm that the processes for allocating materials to work orders are fully consolidated. The technical analysis of maintenance costs for 2017 will be issued during the first quarter of 2018.

—Allocation of time to work orders
From 13 December 2016, workers in the Rolling Stock Workshops began logging the operational time spent fulfilling maintenance orders. This second step, which is essential for knowing the costs associated with maintenance activities, will shortly make it possible to analyse them from a technical perspective aimed principally at optimising the resources employed.

In 2017, the time was notified in 79% of the cases when operations were correctly entered on work orders. However, given that work orders with operations filled in correctly amounted to 83%, the average final ratio of time notifications completed on work orders falls to 65%. Given these figures, these processes still need to improve in order to start extracting costs that are minimally representative of maintenance activity. One very positive piece of information is the good response shown by workshop staff regarding these new activity information procedures, in that of the 79% of operations entered with timings, 71% percent of the cases were entered by the Rolling Stock workers themselves using the touch screens distributed throughout the workshops, and in only 29% of cases were workshop commands executed through fixed PC terminals.

—Review and implementation of Activity Categories
The third step for getting the most out of the knowledge about resources (materials and labour) for use in maintenance activities is to identify the activity category of each work order.
In 2017 there was a review of the activity categories initially defined on SAP, which enabled the required structure for activity categories to be identified and which can be grouped into two types:

1) Type 1: activity categories that can be assigned by the SAP system itself when the work order is created (according to the type of notification that precedes it or for specific types of work order).
2) Type 2: types of activity categories that need to be selected by workshop management at the time of creating the work order as the system is unable to identify the activity automatically.

At the end of the year, the automatic designation of Type 1 activity categories was loaded onto SAP. At the same time, current settlement rules are being reviewed on SAP, in order to adapt these changes to avoid them having an impact on the data used for cost analysis from the finance and accounting perspective of TMB. Type 2 activity categories are forecast to be implemented in 2018.

—ROMMI technological improvement plan. Technical improvement projects aimed at improving maintenance.

—Improvements in the management of work orders
This project represents an important saving in terms of the time required to fill in work orders correctly in the corporate SAP environment. It consists of a unique interface that allows workshop managers to have a simplified overview of the maintenance work being carried out at any given moment, with information about the procedures performed, the staff involved and the time that has been devoted to repairs.
It also allows for the streamlined and simplified management of the various fleet status situations in order to have online knowledge about the fleet available to put into service.

—Improvements in breakdown notifications (T1-T2-T3) and the implementation of new breakdown symptom catalogues.
A new system of cataloguing and identifying breakdown symptoms was introduced in 2017 and incorporated additional information about these symptoms created in SAP by the staff of the Network Support Centre; the interface for entering existing notifications was also reviewed and updated. In the future, this will be a perfectly viable solution enabling drivers to enter breakdown symptoms using the screen of the driver information system (SIC).

—Improvements to the reclassification of notifications (T2) and the introduction of new breakdown cause catalogues (review of ABC queries)
The project began at the end of 2014 as a result of the need to adapt vehicle structures and breakdown cause catalogues to SAP according to new technological changes incorporated in the new buses (hybrid, electric and CNG). It envisages the introduction of a new cataloguing system for the causes of breakdowns in order to improve the identification of these causes when it comes to reclassifying T2 notifications. The system also includes the ability to preselect the attributability of the breakdown which can be modified by the user at the time of reclassifying the notification, the main objectives of which are the following:

— Improving quality in the analysis of results.
— Having control over attributability in cases where the anomalies are produced by defects in the vehicle or its components.
— Monitoring and updating the attributability criteria.
— Reflecting on and taking decisions about the reclassification of breakdowns and the figures involved.
— During the year, a review was carried out on the ABC queries for SAP Business Objects, and it was adapted using the new data. Thus, full advantage was taken of all of the analysis potential provided by the new system.

—Mobility: operational notifications from external companies
Over the course of the year a pilot test was run to make it possible for staff belonging to the external companies that maintain the air-conditioning equipment incorporated on buses to report on the work carried out through direct notification of their operations (using the touch screens distributed throughout the workshops) onto the work

orders. On the one hand, this allows the maintenance activities of these staff to be registered perfectly and on the other, to be able to share the information and extract the same analysis conclusions from the records.

In 2018, it is planned to extend this form of working to the rest of the companies involved in air-conditioning equipment maintenance. Meanwhile, an study is planned into the possibility of mobilising the registration of this information through the use of mobile devices.

—Development of analytical tools for ISO 50001 certification
The collaboration with the Ministry of the Environment and the Technology Department has continued in the development of indicators and graphs for monitoring, using the SAP BUSINESS tool to produce a monthly presentation (graphs and tables) of the consumption data of the fleet and the premises. Other necessary queries were also programmed into SAP BUSINESS to be able to monitor the progress of monthly energy consumption for the current financial year, the previous three years and the energy baseline.

Finally the objective was achieved of obtaining ISO 50001 certification for the Business Operations Centres of Horta and Zona Franca.

—Pilot project for dual training
The Coordination and Project Programming Unit for fleet maintenance collaborated with the Operations and Staff Management Area to develop the first pilot test for dual training, carried out at the Triangle Business Operations Centre.

The department for Technological Quality Control, Inspection and Training played an active role and, among other tasks, designed and programmed three specific training exercises focused on bus technologies, complementing the regular training courses taught in the schools that the three students who took part in the project belong to.

—Infrastructure maintenance and improvement

Over the course of 2017, a total of 5,361 management actions were carried out: 73 TB infrastructure projects, 529 supply requests, 3,799 TB infrastructure corrective actions and 960 TB infrastructure preventive actions (60 involving external providers). These initiatives amounted to 10.27 million euros (investments plus managed costs).

The most noteworthy investments were:
—Electrical recharging infrastructure for pure electric articulated Solaris buses at the Forum Diagonal terminal.
—Adaptation of coolant installation at the Horta BOC to comply with the APQ6 reference standard.
—Availability of documents and necessary requirements prior to the assessment for obtaining the certification according to ISO-14001 standard at the Horta BOC and ISO-50001 standard in the Zona Franca BOC. Start of the required interventions in the different facilities for securing both certifications.
—Implementation of the executive project and the first phase of the rolling stock workshops at Zona Franca Port.
—Implementation of the Horta depot space organisation project and transfer of the medical service to this centre.
—Implementation of a new prefabricated workshop to receive the new fleet in the Llobregat area.
—Construction of outdoor warehouses in the bus depot parking yard at Triangle Ferroviari.
—Awarding of the Zona Franca Port new depot project to the company IDOM.
—Bus recharging station at Triangle Ferroviari.

—Main actions in business operations centres (BOC).

—**HORTA BOC**
Throughout 2017, the following projects, among others, were carried out or are in the process of being implemented at the Horta BOC:
— Improvement plan regarding the regularity of the V21 line.
— To decrease the number of accidents per million kilometres, several trainings/observations were carried out.
— To improve customers' perception of the cleanliness of the buses, priority was placed on cleaning windshields (due to acids) and floors.
— Consolidation of the improvement of the warehouse model and standardisation of tasks performed.
— Securing ISO 14001 (environmental) certification and ISO 50001 (energy) certification.
— Implementation of organisational reflection of BOC offices.

—**Ponent BOC:**
Over the course of the year, the following projects, among others, were carried out or are in the process of being implemented at the Ponent BOC:
— The access control project was implemented with the aim of guaranteeing the security of the BOC and improving the operational capacity of internal fleet movements.
— The "5S" project was continued:An exhaustive review of the system was carried out to revitalise the certifications obtained. For this reason, external audits were conducted, work plans were identified, corrective actions were taken and improvements resulting from the work carried out during this time were implemented.
— *Counterst* pilot test:6 vehicles from the BOC are equipped with passenger counter systems made by the company Counterst.

These systems allow for identifying the number of passengers that get on and off at a specific stop, in addition to recording vehicle occupation rates.

— **Triangle BOC**

Over the course of the year, the following projects, among others, were carried out or are in the process of being implemented at the Triangle BOC:

— Continuation of the implementation of the "5S" philosophy in workshop facilities.
— Accident Prevention Programme (APP) observations: a centre agent was assigned part time with the aim of improving driving level observations within the APP.
— Electric vehicles:2 electric articulated vehicles were put into service on the H16 route, with a high-speed recharging station on the street and overnight recharging at the BOC.
— Training of 171 drivers in the driving and use of articulated electric vehicles.
— Change of WiFi systems at depots. The initiative was implemented with success during the final quarter of 2017.

— **Zona Franca I BOC**

During the year, the following projects, among others, were carried out or are in the process of being implemented at Zona Franca I BOC:

— Review and updating of operation procedures common to all the BOCs.
— Implementation of the new failure reclassification process and the 2017 certification, in addition to defining objectives and indicators.
— Service launch project:started in 2017, and continuing in 2018, clear processes aimed at efficiency in the service launch were reviewed and updated (vehicle failure information, incidents during the launch, management of vehicles in the yard, internal workshop processes).
— Accessibility project:a cross-functional group consisting of centre personnel was developed in an attempt to reduce the number of incidents involving people with reduced mobility.
— Start of work projects in the workshop facilities at Zona Franca Port, which will serve as the new Zona Franca depot.

Subway innovations, improvements and projects

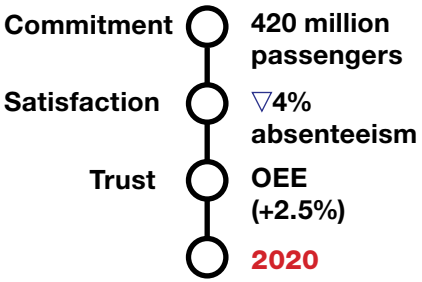
This is the third year since the 2015-2020 subway network strategic management plan was implemented. The plan outlined two main objectives: changing the culture of the organisation (DARWIN Project) and defining where we want to go from here (RUMB Project).

We have a clear vision of what we want to be: **a mobility leader in Catalonia and a reference in terms of customer satisfaction, providing added value technological services that allow for increasing the number of fares with the aim of achieving financial equilibrium.**

To achieve this objective, a series of features were deployed to gain market share from private vehicles:
—**We're reliable:** you can plan your travel time and we won't let you down.
—**We're fast:** with us you don't have to worry about traffic and we get there quicker.
—**You can stay connected:** Forget about being behind the wheel and check your *smartphone* as much and as often as you like.
—**Save time:** Make good use of your time while you ride.

To confirm that the objectives of the strategic plan were being met, a series of key reference indicators were defined:

Strategic milestones 2020



Also included were strategic lines that needed to be developed to achieve targets set:

ASPIRATIONAL:
Leaders in quality, service, image and safety

Commercial

1. Increase our knowledge of customers and their mobility patterns

2. Develop initiatives to capture new customers, particularly through increasing the added-value service offer

Efficiency

3. Develop an efficiency improvement policy through the OEE.

4. Develop an organisational model

Motivation

5. Cultivate people and organisation in an effective communication environment.

Product

6. Design solutions to adapt supply to demand

—Subway Major Improvement Objectives (MIO)

Starting with the strategic reflection process in the last quarter of 2016, in which the main changes and their impact on the development of strategic lines (higher-order guidelines, customer recommendations, employee recommendations and market changes) were evaluated, it was determined that the cascading targets that needed to be developed in 2017 were:

M1: objective related to **motivation**
M2:objective related to improving the **offer**
M3:objective related to **availability**

On this basis, work is underway within the subway network on the methodology for developing strategic lines on MIO (Major Improvement Objectives) projects. With the creation of multidisciplinary work groups, the goal is to work over the course of the year in different areas to identify specific actions and measures that lead to effective improvement:

1.Employee motivation
- — Proximity plan (presence).
- — Job classification.
- — Training model.

2.Improvement of the service
- — Completion of offer analysis.
- — Planning
- — Downtime due to external causes.

3.Improving the availability of trains and infrastructure:
- — Organisation project in the area of rolling stock.
- — Maintenance development 2020

Pursuing these objectives will allow for obtaining the strategic results defined on the basis of the four major blocs that indicate the path that should be followed: efficiency, motivation, product and commercial.

— **Employee motivation**

The objective of the motivation action is to achieve an organisational transformation within the company that will allow for better adaptation to the external environment and will meet customers' expectations regarding products and services. This transformation should increase the motivation and commitment of employees in keeping with the mission, values and policies of the company. To attain these milestones, we focused on three major areas: proximity plan, job classification and training model.

— *Proximity plan*
The goal of the proximity plan is to increase employees' motivation and commitment by overseeing the proximity of managers and directors to their teams: The milestones defined within this project were:
— The operating definition of motivation, proximity and employee leadership model.
— Defining specific "proximity" actions.
— Review of the IESC (Internal Employee Satisfaction Index) for operations and design of the new IESC for the maintenance and projects areas.
— Implementation model for proximity initiatives.

First, the concept of motivation and proximity at the operational level was defined in order to identify which behaviours or indications contribute, and which ones do not, to increasing the motivation of employees and which communication and leadership styles generate and facilitate the perception of proximity towards employees.

An inventory of actions that need to be taken was drawn up, in addition to the objective that must be met in each of these and the form of application.We worked intensively with the Intervention group on a range of activities including interrelation with other operators, employing group techniques to improve cohesion, cooperation and development of skills and group participation in activities that form part of the TMB Educa programme.
The IESC operating questionnaire was also reviewed. The group and elements of an IESC for the maintenance area were identified. The goal was to use the questionnaire in future surveys. Also, the questionnaire was used for the first time in the Intervention area.

Within this course of action, a general proximity action model was defined. This model was prepared following the RASCI methodology (responsibility assignment matrix).

In the area of personnel management and administration, a series of actions was carried out that can be summarised as follows:
— 794 contracts were entered into and processed. Of these, 208 were indefinite (direct, part time or full time, or novations) arising for the most part from incorporation commitments and working day extensions reflected in the new collective bargaining agreement); 515 were part time to cover structural customer service agents while on vacation (recycling plus provision of services during the summer); 45 were relief contracts and 26 were partial retirement contracts for employees of the subway management network.
— In relation to partial retirement, recovery periods were managed for the annual work percentage of 201 partially retired employees assigned to subway business areas. It is worth noting that the recovery modality for 25% of "continuous" annual work, and not by years, was implemented at the end of the year to be carried out in 2018.
— Following the practice begun in 2015, absentee data by area were distributed monthly, and a new system for grouping information prepared at the end of 2016 was implemented. Despite the work carried out in recent years to improve the indicator, the results are still far from expected.

Regarding the efforts made on the basis of employee requests and actions deriving from their activities, the following stand out:
— Granting and adjustment to the working time reductions that company employees requested. As of 31 December 2017, a total of 373 people have been granted working time reductions throughout the subway management network. Worth noting are the changes brought about by the new collective bargaining agreement regarding new reduced working time modalities, which led to a very notable increase in requests during the last quarter of the year.
— 41 cases of maternity leave, 79 paternity leaves and 49 breastfeeding breaks (cumulative and daily) were processed. Moreover, application of the 6,400 requests for leave, for different reasons, was supervised, and leave was granted to the 2,096 subway management network employees who requested it.
— Regarding clothing, the annual distribution of summer clothing was managed for the entire Operations area. Maintenance attire is expected to be distributed in January 2018 (adpating it to high-visibility requirements).

— Job classification
The basic job classification improvement objective aims at defining and implementing a methodology, procedures and information and communication channels within the area of job classification that contribute to making the process more transparent, systematic and rigorous, in a way that increases the perception of fairness. Defined milestones were:
— Defining the method for preparing a description of the position.
— Designing a job creation, review and elimination procedure.
— Defining a communication and information model.

In the methodology section, a dossier was prepared defining key concepts related to job classification and determining the main contents of a job description.

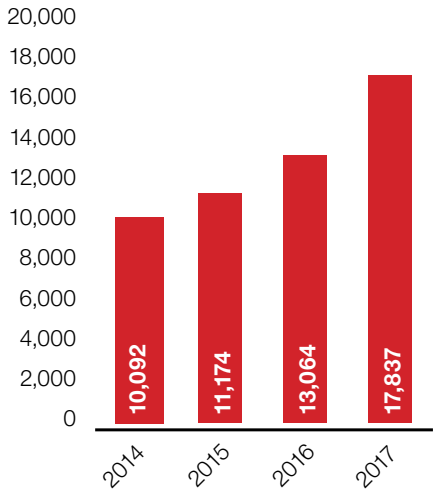
Three procedures were defined that should be applied in cases where a new job (function) is created, functional content is reviewed and a job position is eliminated.

Finally, an information and communication model was defined for employees and managers regarding job classification.
Over the course of 2017, a review - and updating if necessary - was carried out at TMB of jobs assigned to the managers and technicians group.Within this scenario, all of these functions were assessed.

— Training model:
The objective of the training model focused on the review and adaptation of the model and training plans to continuous improvement in a way that contributes to the professional development of employees according to organisational process requirements. The work lines undertaken in this project were:
— Identification of competence profiles in the training area for subway network functions. The training programmes were updated for the most numerous job vacancies in Operations and in the personnel Management and Administration unit.
— In keeping with the systemisation of the training method, the training manual was revised to ensure a universal and general system, in pedagogical terms, with which any trainer can comply.
— Regarding the identification and inventory of new technological resources for teaching support and training management, the report prepared in 2016 by Seguridad Ferroviaria concerning four new training techniques was updated.
— The adaptation of training procedures processes begun in 2015 was continued.
— Within a multidisciplinary team that includes the participation of the training team, an "OEE-Training" indicator was defined that provides information about the impact of the training. The indicator consists of several sub-indicators:costs, performance of the plan and satisfaction and assessment of participants and trainers.Its implementation is contingent on being able to secure the provision of certain information.

In parallel, a training plan was defined for the subway network management area with the aim of meeting the objective that each employee receive training during approximately 5% of his or her working day, and according to the requirement profile specific to his or her duties and competence profile. The 2017 training plan included 800 training actions and 200,000 class hours aimed at achieving this objective.

Participants



In recent years, more effort has been made in this area to achieve the 5% objective.

Training of external partners also continued; 378 external partners received security training.

Over the course of the year, the project aimed at the development of the organization and people was promoted. As a result, new acquisition and competence reinforcement actions directed at the group that participated in the project were carried out.
Also worth noting are the 793 assessment evaluations and analysis of the results obtained and of the individual areas of development of the evaluated employees.

Finally, during 2017, a total of nine cooperation agreements were formalised with academic training centres for internships within the subway management network.

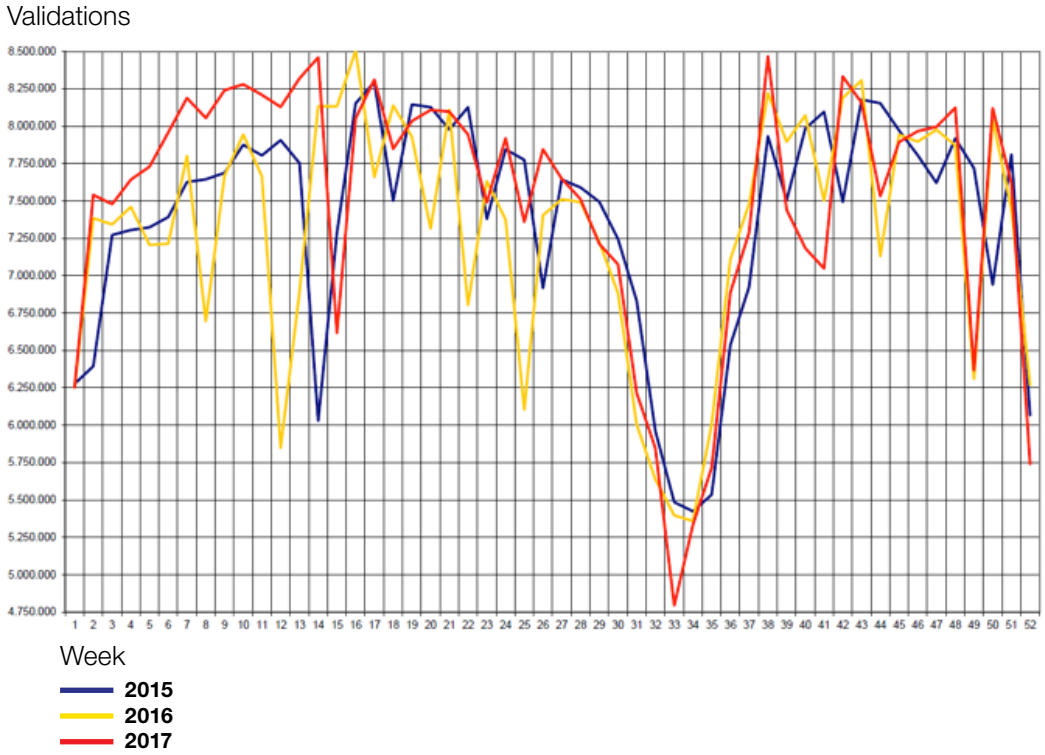
— Improving the service

— Analysis of the offer

Throughout the year, an analysis was made of the the current status of the subway network, both regarding current users and in terms of predicting the evolution of demand.This allowed for:
— Defining short-term offer plans to relieve some of the busiest lines and ensure a better travel experience and medium-term plans to increase the number of users.
— Defining action plans and investment scenarios that allow for handling future demand challenges.
— Contributing to decreasing currently existing unacceptable levels of pollution within the metropolitan area.
— Facilitating the change of the mobility model, encouraging the transfer from private to public transportation.

The Barcelona Metropolitan Region ended 2016 with nearly 955 million passengers, which represented a new historic high. Over the short and medium term it seems logical that this demand will reach nearly 1 billion passengers. These assumptions are reinforced by the 390 million validations at the close of 2017, a 2.3% increase compared to the previous year.

Subway validations per week



To this growth forecast needs to be added the saturation and overuse of the network in some of the time slots. Specifically, the current situation of the system is one of undeniable congestion at rush hour, with unacceptable use levels on the L1 and L5 lines.

To confront the current situation and future demand expectations, it was necessary to come up with a supply plan.The plan seeks to be able to absorb an average demand increase of between 15 and 20% over a three-year period. To be able to do this, a three-phase plan was defined with an annual average increase in demand of 12%, reaching 20% during rush hour.

The main considerations that the plan takes into account are:
—A significant increase in passengers in 2017 throughout the entire system, and on the subway in particular, as the leader in metropolitan mobility.
—Saturation of the current network at rush hour.
—Need to increase public transport capacity to handle social demands, including, among others, the metropolitan environmental situation.
—Obvious signs of trains S300/4000 (18+24 trains) entering the final stage of their useful life.
—Delay in implementing actions that will enable increasing the subway network capacity, mainly the central section of the L9, which will provide the system with a redistribution effect.
This supply plan is reflected in the company's 2018-2021 Plan, which was prepared in 2017.

This Plan is related directly to investor needs amounting to a total of 196 million euros that will be financed within the framework of the 2018-2021 programme contract. These are considered essential for performing major maintenance work. The figure entails a yearly average of 48.7 million euros of activations for the period 2018-2021.

Simultaneously, over the course of the year, we worked in coordination with the Catalan regional government to make the necessary investments for the 2018-2023 period. This task was completed on 26 October 2017, with the announcement of the subway network modernisation and improvement plan, for which the Department of Territory and Sustainability of the Catalan regional government is responsible, for the period 2018-2023. It includes actions coordinated with TMB amounting to 248 million euros.

But we must not lose sight of the fact that we find ourselves in a shifting and increasingly demanding environment. Therefore, to achieve these goals, we need to constantly reinvent ourselves and design new ways of operating and working, ones that are more efficient and which provide higher added value service to our customers. Along these lines, during 2017, a series of projects were implemented. Noteworthy among them are:
—Line demand:since 2016 we have been working on the train occupancy level project. Based on measurements obtained from the secondary suspension of the new series of trains, we are now able to know the weight that the train is carrying and, consequently, its occupancy level.In 2017, we went one step further with the integration of data to be able to visualise them in real time. This has allowed for more in-depth knowledge of demand behaviour and, therefore, implementing a supply improvement offer which, in its initial phase, involved making an adjustment between supply and demand. For 2018, this will enable us to introduce a pilot test to improve passenger

distribution on platforms, through passenger information regarding the occupancy level of each car.
—Re-routing and modelling the demand:the level of use of each line is different. For this reason, a project is being developed that will allow us to reroute a certain number of passengers between lines so that they can enjoy a comfortable ride with the similar amount of travel time. To do this, we need to know passengers' origin-destination information. To this end, in 2017, we began collaborating with the Israeli software company Moovit Inc. The customer showcase and the services they offer could facilitate obtaining this information and modelling the demand in great detail. In 2018, we expect to continue advancing in this line of action to standardise the distribution of travellers on the lines and alleviate the busiest sections of line.
—Doors that close vertically:in 2017, a cooperation agreement was reached with a conglomerate of South Korean technology companies and institutions to conduct a pilot test on the functioning of vertical platform doors.
—This initiative continues in 2018 with the preparation and defining of new modes of operation that will contribute to the efficient implementation of the announced plans.

— Planning
The review of current planning processes continues with the aim of optimising the results obtained in the provision of the service. Among the processes being reviewed, the following are of particular note:

1.Designing the offer:based on a study of travel times, for lines 1, 2 and 5 a theoretical adjustment of the timetable was applied to make it more responsive to actual operating needs. The concept of variable return time was also applied.
2.Optimisation of employees' daily activities: simulations were carried out to improve productivity and achieve better alternation-equivalence, according to the conditions and rules scheduled for the planning system.
3. Vehicle timetables:study methodology to compare the theoretical timetable with the real timetable and preparation of indicators that measure timetable quality.
4.Preparation of the functional document of the assignment tool (software) and computer development, with the functionalities described in the study mentioned in the previous point. Using this programme, services were assigned for 5 work shifts for 2018. Vacations in 2018 and mini sessions were also assigned.

— Downtime due to external causes
Since 2012, a committee has existed which analyses what leads to downtime due to external causes with the aim of reducing them. Considering downtime as a whole, external causes have increased significantly, nearly tripling other causes. To reduce them, we defined and implemented a series of actions over the course of the year organised along the following lines of action:
– Data analysis and improving the recording process of incidents due to external causes, preparation of a "hot points" map.
– Review of procedures/operations including ones involving people on the tracks and indisposed customers, since these cause the most incidents.

– Communication campaigns:a proposal was made for a campaign aimed at indisposed customers and people on the tracks. Work was done on preparing videos for the different supports.
– Specific actions to deal with downtimes caused by people on the tracks; installation of CAT0 (electronic cylinder) systems at "vandal trespassing hot points" on the network.
– Specific actions to reduce downtime caused by indisposed customers inside the train:steps were taken to improve temperature comfort control inside trains.
– Teams specialising in helping indisposed customers at subway network "hot points" submitting proposals for improving the medical emergencies system (MES).
– Information/training/recycling actions for subway employees.
In 2018, we will continue with the implementation of campaign proposals and actions outlined in 2017.

— **Improving availability on trains and infrastructure**

— *Organisational project in the area of rolling stock*
The objectives of this project were:
— Analysing the different versions of the proposal with the aim of improving the "Analysis of the offer" and adapting the maintenance of rolling stock to new requirements.
— Identifying the causes of unavailability and proposing solutions.
— Analysing maintenance processes and assessing the necessary resources
— Analysing support processes:planning and control, logistics, systems, engineering.
— Identifying improvement opportunities and outlining an action and investment plan.

Strategic lines proposed were:maximum availability, improving the quality of the service, maintaining high reliability, increasing quality, more technical maintenance and organisational motivation.

Steps were taken to develop methods adapted to the new agreement and the versions of phases II and III of the supply plan. Definition of three scenarios:possible, intermediate and disruptive.

Several analyses were carried out over the course of the year:
– Analysis of the infrastructure of the Santa Eulàlia and Sant Genís workshops to detect capacity issues and functional limitations.
– Analysis of indicators. Indicators offer highly different values depending on the series of train. This affects the delivery of trains per line. An adequate availability indicator and subsequent analysis of immobilisation causes are lacking.
– Analysis of current subcontracting policy:it was agreed to internalise teams and maintain current shared maintenance on the L2, L5 and L9 Sud lines.
– Analysis of preventive maintenance. This led to the conclusion that it will be necessary to standardise processes and operating times.
– Technological solutions are being anlaysed to increase predictive maintenance based on the condition of the equipment.The main project is telemonitoring of trains. The Engineering team needs strengthening.
– Analysis of electronic maintenance equipment:centres by series in depot and centralisation in Sagrera of certain maintenance equipment.
– Analysis of office tools used: it was detected that the current SAP tool is not very user friendly and has functional limitations. In addition, a new mobility system was proposed to better manage maintenance.
– Analysis of the availability of trains to achieve the different offer scenarios proposed, focusing both on the phase II scenario and phase III scenario of the improvement plan. Analysis of the investments needed to resolve space limitation issues and, at the same time, determine the size of the direct and indirect workforce.
– Analysis of the proposals made in the area of employee motivation, proposing measures based on the improvement of workstations, participation, communication, flexibility, versatility, and horizontal and vertical integration.

Alongside this analysis, work was done on an unrestricted disruptive scenario for a long-term vision. The notion of a new workshop network and organisational restructuring was proposed.

—Maintenance development

In 2016, the Maintenance 2020 stategic objective was drafted with the aim of identifying the best way to perform subway maintenance in light of the scenario expected for 2020 and the steps to take to get there. The conclusions reached included the definition and justification of 150 different types of actions that needed to be carried out over the short and medium term.
The goal for 2017 is to continue in this manner so that in 2020 the maintenance and project organisation will be able to:
—Respond to new challenges related to the increase in the offer and maximum availability of equipment.
—Provide optimal performance and maintain the facilities in a good state of repair, with costs adjusted, addressing the ageing and obsolescence of facilities.
—Improve internal maintenance management with the aim of increasing efficiency.
—Consolidate knowledge about the facilities within the organisation.
Of the 150 actions, the 97 that could be implemented in 2017 were identified and approved. They were grouped, according to their similarity to each other, in several milestones:

1.Coordination of activities

The following actions were completed:
—Creation of a compatible work table and calendar in all the units to avoid overlapping and to improve the scheduling of night work in tunnels.
—Proposals were made to gradually improve the scheduling of work planned in stations, moving from monthly scheduling to weekly scheduling, building up to the maximum number of systems per day.
—The methodology was defined for carrying out the technical analysis of internal incidents in the area and its repositories.
—Section-to-section collaborations and activities where sections work jointly were identified, defining and implementing improvements.

2.Implementation of 2017 actions in relation to remote maintenance and measurements from the train.

20 actions were completed and 12 more were undertaken over the longer term. To sum up, the work carried out was the following:
—An optical sensor developed jointly by TMB and *Thinking Forward* was incorporated in the 99 drive switchers on the main tracks to take mechanical measurements The action was also carried out on switches affected by summer shortages in the Fondo and Vall d'Hebron stations.
—Work was done on remote monitoring of Bombardier L1/L3 and Dimetronic L2/L5 track circuits using the device developed by *Thinking Forward* and TMB.
—Supervision for loss of field beacon readings of ATP/ATO and Cesares.Analysis from the train.Different alternatives were evaluated and sample records were obtained.
—Siemens is developing a digital service platform for maintenance management that seeks to integrate maintenance tools in a single platform and enable data mining and record analysis algorithms. Permanent connection to the support tool was established to test it.
—Work was done towards having a remote connection in the computers at 29 substations in order to monitor them from the subway control centre and the maintenance bases.
—The computers at 3 of the distribution centres on the conventional network were monitored in order to have all the information from the maintenance station and high-voltage electricity supply meters.

—Supervision of track lubrication:a study was conducted to improve static track lubrication equipment and update them with the possibilities of remote monitoring. The conclusion is the creation of an installation prototype for 2018 and the replacement of equipment as soon as they gradually approach the end of their useful life.
—Supervision of changes: we developed a product with *Thinking Forward* to measure the openings of sprat points, adaptable to all track widths. In December, a prototype was installed at switch 3 of the Hospital Bellvitge station.
—Work has been progressing on a prototype which, on board the train, sonically monitors the track continuously and independently. Verification of its functioning is expected in 2018.
—Review of current remote control alerts of the validation and sales system, updating codes, associating alerts with equipment correctly and modifying remote control visualisations with the aim of streamlining the allocation of breakdowns.
—Requirements that need to be included in a new fixed installation remote control were compiled.
—Remote measuring of bridges:the majority of TMB bridges are more than 40 years old and knowledge of their actual condition is complicated, given the difficult of carrying out a static load test. For this reason, a study was conducted to evaluate the viability of carrying out dynamic tests and analysing the structures of the bridges through vibrations. The work concluded that, by analysing the frequency of the vibration when trains pass, structural deviations or defects that could appear over the course of their useful life can be determined. Details were specified for measuring the Diagonal L5/FGC bridge in 2018.
—For remote monitoring of wheel tread control through vibrations, a prototype was designed, using the *Thinking Forward platform,* that integrates the current system in a way that allows for seeing the vibrations produced by the trains and critical points on the tracks through a web tool that can be accessed from the different maintenance workshops. Its launch is set for 2018.

3.Implementation of 2017 actions regarding improving SAP notifications and stations *Checklist*.

8 actions were completed in this area. Work was done on 10 more in the long term.To summarise, the tasks carried out were:
—Station categorisation:The A, B, C indicator at each location of stairs, elevators, toll stations and distributor stations was uploaded to SAP according to the classification of the station so that all these locations and their equipment would have the same category as the station.Thus, when defining the desired resolution times of these three categories, the locations and equipment will already have inherited the information automatically.
—The use of subway control centre catalogues in several facilities was analysed and fields were implemented in SAP that allow for identifying the person who detects the incident.Instructions were defined for attaching files in the SAP PM environment. Tests were also conducted for completing notifications from an *app*.A pilot test will be conducted in 2018.
—A tool was developed for reporting the*checklists* that operating personnel prepare in station facilities. This tool is integrated into SAP as notifications. Standard transactions can be used. Over the course of this year, the tool was developed and then tested and validated on Line 3.

—To improve monitoring the condition of the buildings, both regarding incidents and preventive maintenance work, two separate lists (notifications and orders) were created to obtain, in a simple way, information about the desired building.

4. Detailed outline of the organisational model and its implementation

9 actions were completed. In short, the work involved the development in detail of the organisation required for 2020. In additon, specific tasks were performed to define the jobs of accessibility technicians in the subway control centre. Steps were taken to internalise 5 actions in the maintenance area: air conditioning in technical rooms, L9 ventilation, LP compartmentalisation doors, L9 Sud central control station and level one fire prevention. They were included in the collective bargaining agreement.

5. Definitive proposal for primary and secondary maintenance bases

The goal was to develop in detail the base creation proposal, worked on in 2016. The idea was to adapt the analysis to the offer plans described above, analysing the economic costs and required spaces. This led to changes in the initial proposal, with a new primary base and another secondary base in the different options studied.

6. Practical resolution of the simultaneous occurrence of activities

Progress was made on resolving different cases, and measures outlined over the course of the year for drafting bidding documents were included. Also, certain activities such as maintenance of compartmentalisation doors were internalised.

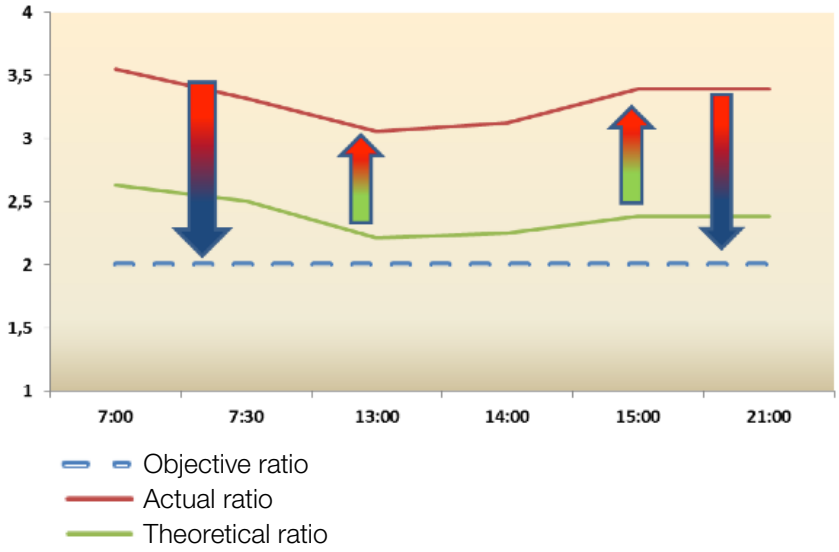
7.New remote control infrastructure

A multidisciplinary work team documented the basis of the new remote control system for fixed installations that will need to be implemented, both on the L9/L10 and conventional lines, to replace the current ones. This is necessary to resolve the issues of technical and functional obsolescence of these lines, as well as to address, with a degree of certainty, the needs arising from the new 2020 operation and maintenance models. During 2018, Ifercat will prepare the bid documents for the project and the work for the new L9/L20 remote control on the basis of these documents.

—Security actions

a) Security actions
—Evolution of station ratios that each security team must monitor

Ratio:stations/security team



–Theoretical ratio: Stations/Security team.
–Actual ratio: Stations/Security team (security team events, operations, accompaniments).
–Objective ratio: medium-term ratio (2 stations/security team).

In addition to consolidating the increases in security services begun at the end of 2015, and at the beginning and during the summer of 2016, in 2017, security resources were increased to reduce the number of stations that each security team must monitor and reduce the response time to incidents. It was determined that the subway is the busiest from 7:00 to 22:00. The actual objective ratio over the short term for each security team was established in 2 stations, with an additional budget for covering the security teams required for events (trade fairs, holidays), operations and accompaniments, mainly to avoid reducing the ratio of previous years.

The selection of the ratio, along with the coverage of other static, semi-static and mobile services, allowed for establishing the security resource needs that, together with annual economic capacity, have determined the services that need to be included in the new security contract for the next 4 years. To guarantee the optimal value between economic capacity and security resources, the contract concluded at the beginning of fourth quarter 2017 was extended to the second quarter of 2018.

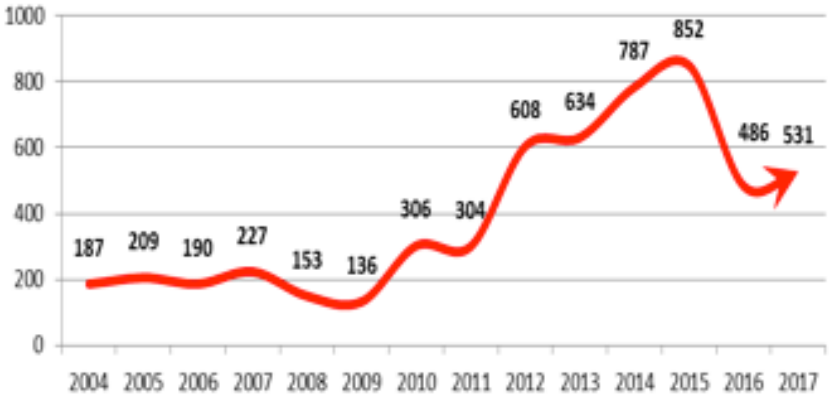
In the area of self-protection, and continuing the work carried out in 2016, training in self-protection measures to avoid attacks on new employees hired during the summer and refresher sessions for already trained employees were encouraged.

Over the course of the year, progress was made on remote control door opening in the stations. While in 2016 15.7% of the stations were opened by remote control security from the Centre for Security and Civil Protection, in 2017 this figure increased to 29%. Moreover, the

allocation of Security Base stations, where security personnel have been present since the beginning of the service, was strengthened.

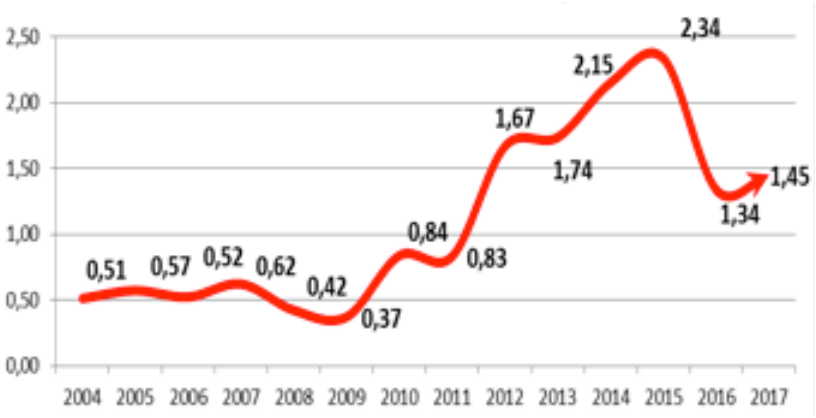
—Graffiti:
During 2017, graffiti activity on trains increased, breaking the trend begun the previous year.

Number of acts of vandalism for 2014-2017



2017 ended with 1.45 graffiti actions per day (1.41 in 363 days not including general strikes). On general strike days, there were 18 incidents, or 9 per day, much higher than the average for the rest of the days of the year.

No. of acts of vandalism on trains/daily



The main reasons are:
– Vandalism during general strikes: also affecting private security personnel, without the possibility of increasing security resources and with lower minimum services, which results in more parked trains throughout the day (well above the normal rate).
– Restrictions on the boarding of private security personnel:the tests conducted on the L9 Sud, which do not allow for the presence of security guards inside trains that run during the updating of the train operation system.
– Change in the *modus operandi* of graffiti artists:increase in acts of vandalism directed at trains in service at any station on the network, which prevents the continuity of the service, or which occur a few minutes before the service begins, at 5:00 in the morning.

In 2017, there was a 7.87% decrease in the total number of security incidents, mainly in the form of thefts (47.04% increase), and a 6.96% increase in pickpocket warnings. Regarding the handing in of objects, there was a 17.86% increase compared to the previous year.

	2013	2014	2015	2016	2017
Security incidents	43,326	47,118	52,537	45,134	48,688

Alerts of people sleeping increased by 2.29%. They ocurred mainly as a result of internal campaigns by our employees consisting of issuing an alert if they observe people sleeping in the subway to be able to attend to them as quickly as possible.

Restraining order judgements directed at pickpockets remained in place. Perpetrators were notified as a necessary action to prevent convicted pickpockets from committing new infractions in the subway.

—Actions in the area of civil protection/self-protection plans

This year, progress was made on the most recent improvement proposals introduced by the General Directorate for Civil Protection regarding updating the self-protection plan submitted in 2017. Delivery of the adapted version is expected in the first quarter of 2018, while its approval is anticipated over the course of the year. We also continued to work diligently on updating the emergency documents at the stations.

During the year, actions were carried in relation to:
– Security of infrastructure elements (elevators, stairs, emergency doors, tunnel signals, improved visibility of SOS posts on platforms - 100 units-).
– Actions related to accessibility, evacuation, access control and fire prevention plans.
– Implementation continued of the employee crisis intervention project (for employees who witness a human collision with a train) in cooperation with the Barcelona Trauma, Crisis and Conflict Unit (UTCCB) of the Autonomous University of Barcelona (UAB). Work also moved forward on the implementation of psychological first-aid training for the leadership management structure - Subway Control Centre and Centre for Security and Civil Protection (CSPC).
– The legally required emergency drills were conducted on regular lines and automatic lines. A drill involving coordination and communication in case of an evacuation incident involving a suspicious package in two linked stations, Fondo (Zona Nord), and Zona Universitaria (Zona Sud), was also conducted. This allowed for testing the section 1 system and the automatic line system in section 4 as well as conventional line protocols.

—Intervention actions:

In 2017, the Intervention Department continued with the work started the previous year:
On one hand, it addressed fraud more directly, attacking hot points. The cause-effect relationship is a higher number of targeted fines at critical points. In parallel, this also led to a significant increase in the removal of cloned cards.
– On the other hand, intervention in all stations in the network created an image effect that contributes to raising users' awareness, in addition to preventing fraud and ensuring compliance with railway law and FMB, S.A. general use regulations and conditions.

We also worked in close collaboration with executive management for innovation, technology and internal business areas to develop several software versions that resulted in, among other things, significant improvements in the detection of fraud and, more specifically, locating cloned cards. Progress was made on proposals to reduce this type of fraud, including more thorough control of reels and changes to automatic ticket dispensers that allow for easier identification of these types of cards.

b) Railway safety

A total of 55 technical notes, including new ones and revisions, such as one related to L10 SUD protocols, were issued. They assessed and, if necessary, authorised railway system changes related to equipment, software, functionalities, instructions and modifications in rolling stock. In addition, a review was carried out of the condition of the railway auxiliary vehicles (18 assessed) that took part in maintenance work and projects within the network.

Monthly monitoring of the railway safety management indicator (SMI) continued. The final result of the SMI of the network (26.26) is less than in 2016 (26.32), with a positive trend of 4%. The improved result is due, in particular, to the SMI results on automatic lines (8.18), which improved on those of the previous year (12.54).Additionally, the SMI results on conventional lines (29.53) remained essentially the same as the 2016 values (29.56).

The safety management system check, a fundamental aspect in ensuring ongoing improvement in operating safety, continued. Work was developed on a change in train operator certification regulations and adapting other documents to current standards, such as operational safety indicators and the FMB risk map. We also worked with the executive management for innovation and technology on updating technological systems and resources in order to improve productivity, workstation ergonomics and the tools that technicians have at their disposal.

The main investments to enhance safety involving signs and remote monitoring in the subway control centre were:
– Implementing, in sign spots on the L1 and L3 lines, phase I of a new functionality to prevent trains from running red lights at M+25 in parking areas at final stations, depots and workshops. .
– Implementing a two-way track with signs and ATP (Automatic Train Protection) between Horta and Vall d'Hebron stations on the L5 line to allow trains to travel in both directions on each track.
– Adapt and reprogramme the ATO (Automatic Train Operation) radio system frequencies on the L1 and L3 lines to the new frequencies indicated by the Directorate General of Telecommunications.
– Installing file records on hard drives automatically, for subsequent reproduction, in the traffic remote control, eliminating the video tape system.
– Implementing rules for trains in the second loop in case of partial service in the traffic regulation system on conventional lines.Until now, only part of the line could be regulated in case of partial service. As a result of this improvement, both areas where trains run are now regulated.

c) Occupational Risk Prevention (ORP)

Throughout the year, progress was made on the ORP master plan for the subway network. Its first strategic objective is certification of the system and reducing accident rates (frequency rate) as well as strict monitoring of the actions reflected in the annual prevention management plan. Work done along these lines included:

— Planning and monitoring of preventive activity.
  – Keeping risk assessments updated.
  – Identifying critical activities and assessing specific operational risks. .Checking the condition of signs systems in work centres and ensuring that facilities are properly allocated and signposted.
  – Establishing criteria for the periodic monitoring of hygienic, ergonomic and psycho-social risks.
  – Revising the Personal Protective Equipment catalogue (IPC), including the proposal of new explanatory paragraphs in the risk assessments.
  – Carrying out security inspections at work centres and verifying that the facilities are clean and orderly.
  – Making sure that all chemical products have a safety data sheet (SDS) or that one is available at the points where they are used.
  – Updating and keeping an inventory of machines and work equipment and checking their valid certification status.
  – Carrying out periodic documented verifications of safety conditions under the provisions of RD 1215/97, especially after performing maintenance and modification tasks and transfers of machines or facilities.
— Implementation of ORP guidelines and procedures:updating and disseminating the document "Minimum health and safety conditions within the FMB network".

— Protective equipment:
  – Guaranteeing the use of the delivery record and making PPE available to employees required to have them in their risk assessments.
  – Reminder campaign regarding mandatory use of safety footwear in the facilities or during activities in which this is required.

— Information and communication: disseminate risk assessments, safety instructions and information about work centre self-protection plans via the Intranet. Improve communication in ORB.

— Business Activities Coordination (BAC):
  – Establishing the registration process for the transfer of machinery and work equipment.
  – Checking, maintaining and completing the content of the CONTROLAR application library.

— Construction work safety and health:assessing maintenance operation risks that could be involved in construction work.

— Emergencies and self-protection:
  – Reviewing and updating the different self-protection plans for work centres and the network.Conducting emergency drills.
  – Maintaining first aid kits by replacing materials that have been used.

— Monitoring individual health:maintaining the 98% rate for conducting mandatory medical exams.
— Particularly susceptible persons:improve the management and adaptation of particularly susceptible workers to minimise the personnel and organisational impact.
— Maternity protection:update maternity and breastfeeding protection procedure 656 according to the results of the collective bargaining agreement.
— Accidents at work:report all events that cause personal injury and investigate them.
— The second strategic objective according to the ORB master plan is to certify the ORP management system. Work done along these lines included:
— Management system manual:prepare and make the manual available to the organisation.Design it according to the future ISO 45001 certification.
— Operational control:Draft ORB management guidelines.Risk Assessment, Training, Business Coordination Activities, Machinery, Self-Protection Plans, PPE.
— Audit:conduct audits in the legally established times and forms as well as regular internal inspections.

Simultaneously, investments were made to improve ORB safety. Noteworthy for their size and amount are station adaptation and shunting siding projects according to the risk assessments. Serious situations detected were fast-tracked while mild and moderate situations form part of a five-year project aimed at eliminating them.

—Accessibility improvement actions

A new escalator was installed at the Barceloneta (L4) access. The escalator at the Fondo (L1) station, Mossen Cinto Verdaguer access, was replaced by a new, shorter one. This allowed us to remove the stone stairs at the upper entrance, thereby improving access to the station.
The following stations are in the project level stage:
– Interchanges at Plaça de Sants (L1/L5), Espanya (L1/L3), Urquinaona (L1/L4), Maragall (L4/L5) and Verdaguer (L4/L5).
– Clot (L1), Vallcarca (L3) and Ciutadella - Vila Olímpica (L4) stations.

The Jaume I (L4) station is in the construction phase. The worked is expected to be completed by the end of 2019.

Adaptation to people with reduced mobility needs for 2017 is summarised in the following table:

	L1	L2	L3	L4	L5	L9/L10 Nord	L9 Sud	L11	Total
Total number of stations on the line	30	18	26	22	26	12	15	5	**154**
Number of already adapted stations	26	18	24	17	23	12	15	5	**140**
Number of stations under construction				1					**1**
Number of stations in the project design phase	4		2	4	3				**13**

In 2017, there was one station in the construction phase (Jaume I) and 13 in the project design phase.

—Maintenance and cleaning actions

The bidding process for the new cleaning contract began this year. The contract entered into effect 01/06/2017, under the conditions established in the agreement between companies and unions regarding the gradual adaptation of the conditions of the application agreement to railway collective bargaining agreement for the validity period of the current contract until 01/01/2020.

—Improvements in cleaning

Cleaning objectives centred around maintaining the qualitative results obtained. In this regard, a plan was implemented to enhance the image of the stations and trains, during the period from October to December 2017. It consisted in carrying out the following actions:
– Increase of two people per line for Saturday night *non- stop* service. Cleaning reinforcement and problem resolution.
– Machine cleaning of station platform floors.One cleaning machine per line.
– Cleaning of spots in stations where, as a result of filtrations, there is an accumulation of dirt.
Mechanised cleaning of escalator steps in stations. Polishing of station floors.
– Complete cleaning of the interior of all trains in the network.Quick wash of train exteriors.
– Support for machine-washing of depots and in-depth cleaning of stations and depots.
– Cleaning of high areas (> 3 metres) and station ceilings.

The improvements foreseen in the facilities cleaning action plans were:
– Overhauling the treatment plant at the Triangle Ferroviari and Can Boixeres washing facilities.
– Improvement in the parts cleaning system at Sagrera.
– Overhauling of the overhead power line at the Can Zam washing station.

Furthermore, in 2017, measures were introduced that will be implemented in 2018. These include the complete remodeling of the Sant Genís washing plant and the tender for the facility that washes trains as they pass in the Hospital Bellvitge separator.

—Improvements in image and signposting directed at the general public

Obsolescent network access signs were renovated and new permanent signs were developed for inside the tunnel. All network maps in the stations were updated while the location and new signs for crowds in the Urquinaona station were digitalised.

Signs indicating the danger of getting one's hand caught in elevators and the replacement of all platform thermometers due to the obsolescence of current ones are being prepared. They will be implemented in 2018.

—Anti-vandalism measures

The objectives over the course of the year in this area focused on:
– Making equipment more flexible based on the new incident protection system. This allowed for new planning actions and timetables according to the level and type of vandalism incident.
– Maintaining response times during emergencies and cleaning of graffiti, video surveillance cameras and adjustment of response times in non-emergency situations.
– Continuous monitoring of the degree of impairment due to vandalism and setting resolution priorities.
– Implementing an action policy to achieve objectives set regarding cycles, emergency requirements, general protection criteria and materials and products that need to be used.

In 2017, the amount of wall graffiti increased by 7% on trains but the m2 cleaned decreased by 4%, in large part thanks to the joint work with the Security Department aimed at implementing further deterrent actions such as:
– Improving technical security systems in the facilities.
– Checking access controls at centres with higher rates of vandalism.
– Continuous monitoring at hot points; establishing a map indicating the areas most attacked and with the most incidents on the network; and carrying out specific security operations.
– Coordinating security forces for prevention and action.
– Allocation of resources during weekends to remove and clean graffiti on trains.

The main figures to which we refer in regard to anti-vandalism actions in 2017 pertain to cleaning the exterior of trains on 1,318 cars tagged with graffiti. This required us to clean more than 34,378 metres of graffiti painted on the outside of trains. Anti-graffiti maintenance teams removed more than 5,719 tags from train interiors and cleaned a total of 9,353 metres of the interior of trains. In stations, 28,233 *tags* and small graffiti images were removed while 71,858 metres were cleaned.
Regarding *anti-scratching* maintenance and stainless steel elements:
– A total of 11,107 metres^2 of anti-vandalism laminated material was replaced inside trains.
– A total of 6,710 metres^2 of protected glass elements were replaced in stations. Meanwhile, a total of 403 metres ^{2} of stainless steel were sanitised, 58 metres^2 of glass in trains and stations were polished and 72 metres^2 received shadow treatment.

To improve their image, the recovery of 1,800 m^2 of stainless steel elements was begun in stations.

—Other improvement actions

—Actions to maintain infrastructure quality

Regarding stations and offices, the most important actions were:restoration work in the stations Passeig de Gràcia (L3), Paral·lel (L2-L3), Besòs Mar (L4) and the platforms at Universitat (L1) and Fondo (L1). Work continued on legalisation of the facilities and remodelling part of the Santa Eulàlia building while construction work on extending the access to the Barceloneta station was completed.

Other important actions were the signposting and painting of all the rolling stock workshops (according to railway safety and ORB criteria) and the installation of new railings and access stairs to ventilation shafts (according to ORB criteria). The cleaning tunnel at Sant Genís is currently being modified to allow trains to move from the switching zone from north to south. Projects were drafted to heighten the platforms at Lesseps (L3) and Plaça de Sants (L1).

A number of repair actions were carried out in stations, workshops, bridges and tunnels. During the year, after inspecting all the stations, tunnels and bridges, the 4 substations that are isolated were inspected and a contract for inspecting the workshops and depots was signed. After this, all of the subway infrastructure will have been inspected.

—Actions to maintain track quality

Over the course of the year, the most important actions carried out to improve the tracks were:

– Renovation of railway devices at the Vall d'Hebron station (L3) with service interruption during the month of August: 1 turnout and 2 crossovers.
– Renovation of Stedef tracks at between Vallarca - Penitents stations and part of the tracks between the Vall d'Hebron - Montbau (L3) stations, with service interruption during the month of August: 2,375 metres of track.
– Renovation of tracks between Trinitat Vella and Fondo (L1), with service interruption during the month of August: 2,900 metres of track and 1 crossover.
– Renovation of tracks between Barceloneta and Ciutadella (L4) without any service interruption: 2,000 metres of track and 1 crossover.
– Renovation of Stedef tracks on the L1 between Baró de Viver - Santa Coloma and Rambla Just Oliveres - Can Serra: 370 metres.
– Renovation of drainage system on the L1 between Bellvitge and Can Serra: 960 metres.
– Improvement of drainage system on the L2 in 750 metres of tunnel track in concrete to prevent the current blockage and flooding that they cause, along the section between Verneda and Pep Ventura stations.
– Implementation of buffers for railway auxiliary vehicles in the track maintenance depots.
– Consolidation of the tracks between Sagrada Família and Bac de Roda de L2. Renovation of 750 curved segments.
– Instalation of anti-graffiti panels in two stations on shunting siding at Zona Universitària (L3).

– Installation of anti-vibration fasteners and renovation of ballasts on 450 metres of track between Lluchmajor and Via Júlia.

—Actions to maintain the quality of high-voltage electricity

Regarding catenary, the replacement of the catenary bars along the section between Hospital Clínic and Sagrada Família (L5) was completed and the isolator switches at Passeig de Gràcia and Bogatell (L4) were replaced.
Regarding substations, the 6kV cable along the Paralel - Drassanes section of track on the L3 line and that of Poble Nou - La Pau on the L4 line were replaced. There are some sections where the internal network cabling is becoming obsolete due to new station operation requirements, the result of the increase in consumption. Furthermore, work was completed on the comprehensive renovation of the Tramvia Blau substation and the installation of the energy recovery system for train braking in the Canyelles substation.

Collaboration continued on the project to supply electricity at electronic bus recharging points; more specifically, recharge point work is underway at the Avinguda Eduard Maristany stop (opportunity charging) on the H16 line and on power supply at recharging points in the Triangle Ferroviari depot.

—Energy efficiency and operational actions

In the area, the following series of actions is noteworthy:
– The project to reconfigure ATO curves on the L1 and L3 lines was started.
– The project to install two energy recovery systems for traction when braking was also begun.
– Projects were undertaken involving renovation work and improving the lighting in 4 workshops in the network, where the latest generation LEDs will be used.
– Work continued on the plan to gradually renovate station lighting. LED tubes were installed using corrective maintenance lighting while remodelled stations were equipped with LED lighting.
– A network of electric chargers for the van auxiliary fleet was installed in 9 work centres within the network.
In regard to operating efficiency, the project was begun to renovate access doors to the station at 84 priority access points; new doors with marking integrated into the remote control system will be installed to allow for remote opening and closing.

—Actions regarding the Montjuïc funicular

During 2017, the Montjuïc funicular carried out a series of actions aimed primarily at continuing the service in good time, under the following premises: compliance with cable transport regulations, operational safety and renovation due to obsolescence. The solicitation document was drawn up for competitive bidding on the major overhaul (phase 2) planned for November 2018. It will include an overall review of the machine room, the route, the tensioning system and the installation of access doors to station platforms.

The builder of the facilities carried out corrective activities regarding non-conformities and warranty processes as part of phase 1 of the major overhaul. As a result of the replacement of the tractor cable, part of a warranty process, the annual mandatory review of the facilities, originally planned for January 2018, was pushed forward to November 2017.

The energy transformation centre of the funicular was renovated, a new control was installed and new safety measures were implemented. An inspection of the condition of the walls along its route was conducted to determine which corrective actions are needed to integrate them jointly into phase 2 of the major overhaul.
Work was begun on designing a remodelling project for two stations (Parc de Montjuïc and Paral·lel). A construction project was drafted to adapt the funicular to fire prevention regulations.

— T-Mobility Project

Development of the T-Mobility project within the company continues with the aim of having the system up and running at the beginning of 2019. The main actions taken this year were:
– Functional groups: submission of functional documents defined by TMB in May, which resulted in technical requirements that are currently still in the validation phase.
– Technical groups:work was performed in stations within the network to prepare the equipment and facilities for the massive deployment of the technical solution.
– Within the T-Mobility map of groups, Group 11 - Putting into Service and Management of Change, which will be responsible for coordinating all the necessary tasks to get the system up and running, got the green light to move forward in this direction. In 2017, we worked very actively on employee training plans and timetables as well as on coordinating the different elements involved, keeping in mind the operating restrictions and higher volume of trainings that will exist next year.

The dates of the different pilot tests, the scope of the test, the functional checks of the system and the communication plan for our teams will be some of the noteworthy milestones in 2018 under this group's responsibility.

Management of bus quality and the environmental

—Quality management

Throughout 2017, the Quality Department continued working primarily on the development of the implemented quality management model. The main objective of the model is to achieve a management model based on processes in accordance with the ISO 9001 model. This will ensure that the organisation is oriented at all times towards satisfying the needs of customers, according to the UNE 13816 model, which sets corporate quality policy at TMB.

In relation to corporate matters, the project to adapt current ISO 9001:2008 certifications to the new requirements of the new version of the ISO 9001:2015 standard was submitted to the executive board for approval.

Internal/external audits were conducted of the certified units of TMB customer service points, the training unit and the customer complaint, claim and suggestions management unit. Also, employees in the area of subway operations (customer service agents) and buses (drivers) received quality training, in addition to all new incorporations through internal promotions (bus technicians, subway operating technicians) in the ISO/UNE certified units.New training manuals more suitable to the current reality at the TMB were prepared.

A map was developed of level 1 processes in the area of human resources, an essential element for the future ISO 9001 certification of the corporate process for the management of human resources at TMB.

Also, work was carried out in coordination with the units involved to define the functionalities of a new corporate application that allows for managing customer complaints, claims, suggestions and non-conformities more efficiently. In relation to the defining of these functionalities, the appropriate training was imparted to the certified units to address the main changes implemented.

In the area of bus operations, and in close cooperation with area management, the list of bus services based on Standard 93.200 was defined and published on the TMB web page.

At the same time, all the accompaniment/consulting tasks in this area related to maintaining the existing certifications (ISO 9001 and UNE 13816) were carried out.
1. Internal audits of all the units
(in the BOCs and in the network support centre).
2. An external audit (successfully completed).
3.Resolution of non-conformities detected in the audits.
4.Joint monitoring between the quality units and bus operations of all the aspects related to maintaining the certification.

—Environmental sustainability

Processing and maintenance of environmental licenses and authorisations

This refers to all administrative and technical paperwork that the law stipulates must be submitted to the different environmental offices (Barcelona metropolitan area, city hall and the regional autonomous government). The Environmental Department centralises the processing and maintenance of the licenses and authorisations in all TB work centres: Campa de Zona Franca Port and the 4 BOCs (Zona Franca, Ponent, Triangle Ferroviari and Horta).

Maintenance of TB documents entails initial processing and regular renewal according to the following outline:

Communication	Subject	Who it is directed at	Renewal period	Affected centres	Comments
Waste minimization study	Waste	Catalan Waste Agency	4 years	4	All that exceed 10 tons of waste/year
Preliminary Soil Report	Soil	Catalan Waste Agency	6 years	4	All centres that according to RD 9/2005 are considered potentially contaminating activities.
Discharge permit or declaration of responsibility	Water	Activities regulated by the city council	5 or 8 years	4	All the workshops that consume more than 6,000 m^3 of water
Emission register books	Emissions	Environmental Quality Management	**	4	All the workshops with points of air emissions

**When changes occur.

In 2017, the Triangle BOC waste minimisation study was submitted and the Horta and Zona Franca 1 BOC minimization studies were updated.

In regard to emissions registry books, the points of air emissions were identified and the registry books of the Zona Franca 1 and Horta BOC were released.

In 2017, an application for the renewal of discharge permits for the Zona Franca 1 BOC was submitted and approval by the Barcelona metropolitan area (AMB) was granted.At the same time, a renewal application was submitted for the Horta BOC. A response is still pending.

Regarding soil reports, the reports for the Horta and Zona Franca 1 BOCs were submitted to the Catalan Waste Agency.Completion/ renewal of the legal formalities of the Triangle BOC is expected in 2018.

—Environmental and energy management system according to ISO 14001/50001 standards

Over the course of the year, further progress was made in the implementation process of the environmental and energy management system at TB. In May, an internal audit of the Horta and Zona Franca 1 BOC was conducted; the external audit was conducted in June. Both were successfully completed, resulting in the securing of ISO 14001 and ISO 50001 certification for both BOCs.
Securing ISO 14001 and ISO 50001 certifications for the Triangle BOC is expected in June 2019.The Ponent BOC cannot be certified because it is not possible to obtain the environmental permit; nevertheless, the environmental and energy management system will be implemented just like the rest of the centres.

—Selective collection and green points

This year, the specifications were drawn up to hold the new tender for comprehensive waste management at TMB. Several important steps were taken to start this process. The awarding of the contract and initiation of the service are expected in 2018.
A service for renting and reusing cloths at all TMB centres was contracted to minimize waste: contaminated absorbent material, code CER 150202.This measure was defined in the waste studies submitted in 2016 and 2017 to the Catalan Waste Agency.The roll out of the service is expected for the 1st quarter of 2018.

—Map of bus network emissions

In 2014, the method for calculating emissions of the bus fleet was agreed with the Directorate-General for Environmental Quality, and the guide for calculating the PM and NOx emissions of the fleet was published.The emissions maps were completed for the European 3iBS project (intelligent, innovative, integrated Bus Systems project): maps of consumption and emissions for the years 2012, 2014 and 2017 to quantify the reductions in air emissions achieved with the incorporation of the new fleet and the configuration of the new network. Network emissions maps allow for the visual presentation of the contribution that the new fleet and the new bus network are making to improving present and future air quality in the metropolitan area:
– 2011-2014:857 kg reduction in daily NOx emissions.
– 2011-2017:1,091 kg reduction of daily NOx emissions.
Currently, the programme to make the fleet more "green" by reducing air emissions continues. Work progressed on designing a programme of energy management system targets according to the ISO 50001

standard for Horta and Zona Franca 1 as a pilot site for reducing energy consumption and air emissions at TB.

—**Set of indicators of the environmental behaviour of TMB according to ISO 14001/50000 standards.**
In 2016, work was done on the construction and implementation of the environmental scorecard at TMB with which environmental behaviour can be monitored through the following indicators:

Indicator name	Indicator description
Energy consumption	Energy consumption per km, per total passengers, per m^2/month
Emissions generated	CO_2 emissions, NOx and PM generated per km, per total passengers, per m^2/month
Improvement in air quality/ Savings in emissions	Savings in polluting emissions (NOx and PM) generated by the transport of passengers
Making the fleet greener/ Technology	Total no. of vehicles by technology (Euro I, II, III, Euro I-III with SCRT, IV, V, VEM filters, hybrids, electric) per total number of vehicles
Making the fleet greener/Energy sources	Total no. of vehicles by types of fuel or energy source (diesel, natural gas, diesel hybrid, compressed natural gas hybrid, electricity) per total number of vehicles
Waste generation	Tons of waste by total types generated and by classification/month
Water consumption	m^3 of total water consumed (network + facilities)/month
Consumption of materials	Tons, kg or UN of total materials consumed (network + facilities)/month

Milestones achieved in 2017, in relation to the design, construction and implementation of the scorecard:
– Presentation of the bus scorecard to the executive board.
– Design, construction and implementation of the executive summary of the scorecard (monthly summary of the situation status of all the indicators.
– Inclusion of FMB energy and water consumption data in the scorecard .

—Implementation of environmental criteria in the purchase of products and services

In the last year, the P716 design and acquisition of TMB products and services procedure was implemented. The environmental officer at the TMB was included in the contracting committee to supervise contracts that are worth more or are equal to 250,000 euros with environmental consequences and, in this way, to be able to include environmental criteria in the contract specifications.

This year, environmental criteria were included in the acquisition of the following services: renting and reuse of cloths, ventilation maintenance on the L9 Nord, L9 Sud and L10 lines, low voltage energy supply, cleaning machines and maintenance of thermal facilities and production of hot water for sanitary use in subway network workshops and buildings.

Management of metro quality and the environment

—Quality management

Within the metro:

—Maintenance and projects area:
The Quality Department, in cooperation with the maintenance and projects area, was responsible for the monitoring of ISO 9001 certification in the area's management model. To achieve this objective, steps were taken in different areas in 2017:
1.Internal audits by the Quality Department of all the management and projects areas.
2. An external audit (successfully completed).
3.Resolution of non-conformities detected in the audits.
4.Joint monitoring between the Quality units and the management and projects area of all aspects related to maintenance of the certification.

—Subway operations:
In the area of subway operations, and in close cooperation with subway management and the representatives of its steering committee, the first review was carried out of the subway list of services in accordance with standard 93200. At the same time, all the accompaniment/consulting tasks in the area of subway operations related to maintenance of the existing certifications (ISO 9001 and UNE 13816) were carried out.

—People and the metro
In 2017, work continued on defining the processes and related documents for all the activities developed in this area. This is a two-year project, which means that in 2017, the work started the previous year was continued.

In November, an internal audit, based on the requirements defined in standard ISO 9001, was conducted. Non-conformities detected in the first quarter of 2018 will be resolved.
All the work performed this last year was carried out jointly and in coordination with area personnel.

—Environmental sustainability

—Processing and maintenance of environmental licenses and authorisations

This refers to all administrative and technical paperwork that the law stipulates must be submitted to the different environmental offices (AMB, city council and the regional autonomous government). The Environmental Department centralises the processing and maintenance of permits and authorisations to all subway work centres.

Maintenance of subway case files entails the initial processing and regular renewal of the following:

Communication	Subject	Who it is directed at	Renewal period	Affected centres	Comments
Activities – Environmental license or communication	Activity	Activities regulated by the city council	6 years	9	Affecting repair workshops
Waste minimization study	Waste	Catalan Waste Agency	4 years	11	All that exceed 10 tons of waste/year
Preliminary Soil Report	Soil	Catalan Waste Agency	6 years	10	All centres that according to RD 9/2005 are considered potentially contaminating activities.
Discharge permit or declaration of responsibility	Water	Activities regulated by the city council	5 or 8 years	11	All workshops that consume more than 6,000 m3 of water
Emission register books	Emissions	Environmental Quality Management	**	11	All the workshops with points of air emissions

**When changes occur.

Regarding the processing of subway workshop activity permits, Can Boixeres, Santa Eulàlia, Sant Genís, Sagrera, Vilapicina, Roquetes and Triangle began the license process along with the already initiated activity. For these centres it was necessary to agree on a corrective measures programme with the fire department, which entails the related investment schedule and calendar.After the centre has been adapted, an environmental control body is hired to carry out the initial control and issue a report which, if favourable, entails the securing of the definitive permit. The process was begun in 2006, and has been completed in Vilapicina, Roquetes, Sagrera and Sant Genís.

In 2017, the Can Boixeres master plan was drawn up.In December, the bidding process began for the work, the completion of which is expected in January 2019. After that, focus will be placed on the Santa Eulàlia and Triangle centres, where the investment schedule for the master plan and execution of the works will be developed.

Simultaneously, every six years, from the date of the securing of the initial license, regular control will be necessary.Control of the environmental part of Sant Genís, Roquetes and Vilapicina is expected to be carried out over the course of 2018. It was necessary to request an extension of the deadlines.

For the ZAL, the process with the autonomous regional government infrastructure area was begun with the aim of the latter's delivering the workshop to us with the license. The part related to fires was completed (with a favourable report). The initial inspection of the environmental part will be conducted in July 2018.

Regarding discharge permits, the ones for Can Boixeres, Roquetes, Sagrera, Triangle de Metro, Vilapicina, ZAL, Sant Genís, Santa Eulàlia and the Metro network are valid.During 2017, ZAL's initial application for discharge authorisation was submitted while renewal of the discharge authorisation for Sant Genís was requested. Arrangements were also made for streamlining the renewal of the discharge permit for Santa Eulàlia. At the beginning of 2018, TMB was granted the corresponding discharge authorisations by the AMB for the three centres.
We have been working on compiling all the documents needed to request discharge authorisation for Hospital Bellvitge and Can Zam. We expect to submit the applications for discharge authorisation in the first quarter of 2018.

Regarding waste minimisation studies, in 2017, the studies for Can Boixeres, Can Zam, Sagrera and Santa Eulàlia were submitted to the Catalan Waste Agency. In 2018, the minimisation study for Triangle de Metro will be submitted.

Regarding soil situation reports, reports for Sant Genís and Vilapicina were submitted to the Catalan Waste Agency. Later, the reports for XAL, Can Boixeres, Santa Eulàlia, Triangle de Metro, Can Zam, Hospital Bellvitge and Sagrera will be submitted.

Regarding emissions registry books, in 2017 the points of air emissions of the Roquetes, Sant Genís and Vilapicina centres were identified and then classified according to CAPCA (Catalogue of Potentially Air Polluting Activities). Subsequently, it will be necessary to identify the points of air emissions at ZAL, Can Boixeres, Triangle de Metro, Sagrera, Santa Eulalia, Can Zam, Hospital Bellvitge, Boixeres Guadalupe, Mercat Nou and Tramvia Blau.

— **Environmental and energy management system**

The Environmental Department designed the document management system for TMB as a whole to comply with the legal requirements of ISO standards 14001 and 50001.

For the subway, this would entail making use of the management system design, replicating the model already implemented at TB and adapting it to subway characteristics and ways of working.

In 2017, the executive board approved the implementation of the following environmental and energy management system calendar for the subway:

— **2017:**
– Definition of the environmental and energy management system work team.
– Training the team in ISO14001 + ISO50001.
– Loading of energy and water consumption data.

— **2018:**
– Diagnosis ISO140001 + ISO50001 (+assessment need of the ISO 50001).
– Definition of the scope of the pilot test.

— **2019:** review, adaptation and implementation of environmental and energy management system procedures.

— **2020:** certification of the pilot test.

— **2021:** preparation (integration) of the environmental and energy management system for subway network management.

— **2022:** certification of subway network management.

In 2017, the environmental and energy management system work team was defined and trained in ISO 14001 and 50001. Similarly, the energy and water consumption data corresponding to the FMB was uploaded to the environmental scorecard.

— **Metro network emissions map**

In 2015, the new subway air quality sample campaign, in connection with the LIFE13 ENV/ES/000263 project, entitled *"Implementing methodologies and practices to reduce air pollution of the subway environment"* was launched.The project will last for three and a half years.

In 2015, the final measurement campaigns related to the project were carried out and the scientific reports and articles were prepared. In addition, actions are underway for the dissemination and communication of the results.

Bus studies

—Market knowledge studies

Market knowledge can be divided along two major lines of activity:regular and occasional studies. The first group includes all the research carried out on a regular basis and which has been going on for several years. In financial terms, they take up the bulk of the department's budget. Regarding the second line, it consists of all studies in response to specific requests or that, despite occuring with a degree of regularity, are not considered to have regular status yet.

1.Regular studies
Within regular studies, the 3 most notable cases that, considered as a whole, represent 90% of the departmental budget are:
- Bus and subway customer perception study (CPS).
- Bus and subway fraud study.
- Measuring bus and subway provision of service (MPS).

In addition to these, within the bloc of regular studies carried out in 2017, the following should be mentioned: investigation of complaints, claims and suggestions; several internal customer and bus customer satisfaction studies.

2.Occasional studies
Aming the occasional studies carried out during the year, the following stand out:

—Fraud analysis and control
Over the course of the year, we continued to work on the Bus fraud map project, which will help determine the best work areas for bus intervention units.

Monthly monitoring of the management process for fraud sanctions also continued. It includes the main areas of interest: interventions, penalties, charge according to type and channel, collection, allegations and transfer of case files to the administration.

—additional income and own tickets
Support was given to several initiatives aimed at optimising our own certification policy:study of the rates that need to be considered for financial year 2018 for Hola BCN! tickets and for Barcelona Bus Turístic, as well as a detailed study of the format and rates of a joint business venture with Aerobús (the contract was signed in 2017). A *Big Data*) project related to the Hola BCN! certification for 2017 was also developed.

Supported was provided to several e-commerce web optimisation projectswww.barcelonasmartmoving.com

—Digital analysis, SEO and SEM, and marketing
In the area of digital analysis, tasks were completed related to consulting and implementation of <1>Google Analytics<3> for TMB web and applications.
Within SEM (*Search Engine Marketing*), the Market Knowledge Department is now internalising all online advertising through *Google Adwords.* Within SEO (*Search Engine Optimization*), the department is now the unit responsible for the organic positioning of TMB web pages.

As part of the Marketing Plan, technical support was provided to several initiatives while projects related to the customer database for which it is responsible were activated.

—Network planning projects and studies

In the area of Network Planning, progress was made on several studies and projects:

—Mobility information project with RFID technology:
—The system with RFID technology for the acquisition of origin-destination data on the bus was completed with the addition of two more devices. The system was adjusted and small changes were made depending on the intended operational use of the devices.

During 2017, more new equipment was received. We now have a total of eight devices. Taking advantage of their arrival, improvements were made in the new equipment we already had, such as, for example, the elimination of mistakes in the software of the equipment and improvements in the data exploitation system.

Improvement actions were carried out in old equipment, such as updating batteries, renovating all the bases that support RFID equipment and renovating the anchoring of the equipment to the bases.

In the final campaign of the year, four pieces of new equipment and two old ones were used intensively with satisfactory results. The old machines will be used until it is no longer possible to continue repairing them, as they are technically obsolete and replacement parts are no longer available.

In 2018, maintenance of the equipment is expected to continue while new equipment will be received to move forward with the technology renovation undertaken this year.

—New Barcelona bus network and modelling:

In 2017, work was done on defining phase 5 of the new bus network involving various modelling scenarios of the future network and keeping in mind the Barcelona city council project in connection with the tram networks along Avinguda Diagonal. To prepare reports about the new bus network, the available modelling tools *(TransCad* and Aisum) were used, in addition to other applications developed directly by the Planning Department.

Simultaneously, requests to modify the new bus network lines already in service such as the H16, which on 13 November changed its route from Calle Sepúlveda to Calle Manso, were analysed.

In the deployment of the new bus network, an additional subphase is expected to be implemented in June 2018 (Phase 5.2A) with three new lines (V9, V33 and D50) and a final subphase in November 2018 (phase 5.2B) with 5 new lines (V1, V19, V23, V25 and H2).

A study was begun of the weekend bus network after phase 5 of the new bus network was implemented.

Last year, the modelling of the final phases was carried out for the new bus network, phase 5.1 and the complete final phase. To do this, the standard TransCAD environment simulation tool was used. The results assess the line load and the impact on passengers of transfers and time variation on foot and overall travel.

—Study and design of special services

During 2017, a series of special services were studied and designed that involve different events within TMB such as: Fira de Barcelona trade fair, activities on Montjuïc, concerts, city events.

—Proposal for improving bus access service to Parc Güell:

The problem caused by the high demand on regular lines (lines 24 and 92) and tourist lines (Bus Turístic) that serve Parc Güell led to an analysis of the various possible scenarios in an attempt to adequately satisfy the mobility needs of both residents and tourists.

—Analysis of transfers to the bus network before implementation of phase 5.1 of the new bus network.

In 2017, phase 5.1 of the new bus network entered into operation. The same as with the previous phases, an analysis was carried out of transfers before the implementation of this new phase to be able to compare it with the forecasts and the realities of phase 5.1 after it is established.

—Bus demand information:

This year, Big Data infrastructure was launched in which processes of interest to the TMB are being implemented.

Network Planning has offered its support in implementing a calculus whose goal is geo-referencing the use of transport documents on board the bus and obtaining the demand volume per stop.
Support is being provided to validating the technologies being assesed to obtain information about bus demand, both increases and

decreases and the evaluation of the different systems for obtaining origin and destination matrices automatically, through different detection technologies (WiFi, Bluetooth, physical characterisation of the user).

This validation process will continue in 2018 depending on the different technologies used.

—Mobility study with mobile technology applications
At the end of the year and continuing in 2018, the assessment of obtaining mobility data about the subway and the bus began with the use of the Moovit mobile telephone application. A pilot test was requested for the L9 Sud line and for the V15 bus line to be able analyse the results that the system obtains and compare them with the results that are currently available. It is in the analysis process.

In 2018, a similar analysis is expected to be carried out based on data that Google could provide regarding the mobility of mobile telephone users and other solution proposals based on *WiFi* and*Bluetooth* technology.

—Study of bus, subway and other interchanges:
The study offers a brief description of the main transport interchanges to which the TMB bus and subway service network provide service. It includes the Barcelona airport, the port, the regional railway network, the Catalan railway network, the tram, medium- and long-distance bus stations and Exprés.cat intercity bus network stations.

Later, the functioning of TMB interchages will be studied in more depth:
- **Subway Network:**the transfer time in subway correspondence stations between all the lines that offer service is specified. Stations where the line change is quickest and the stations where it is slowest are identified. Data are also provided on the transfer flows in each of these stations.
- **Bus Network:**interchange areas serving new bus network lines and transfer flows between these lines are identified. The field of analysis is then extended to all bus network lines.
Bus and subway network: transfer data between bus networks and subway networks were analysed to be able identify which bus lines and subway stations record the most interchanges between these two networks.

Finally, a series of conclusions are given that ought to be taken into consideration when designing the interchanges, based on the data analysis carried out.

—Functional definition of T-Mobility fare system.
During the year, the functional definition was developed for the different aspects of the functioning of the future fare system associated with the implementation of T-Mobility. Aspects such as system settings, managing exchanges and the design of tickets and supports were addressed.

Next year, several tasks are foreseen involving tests and validation of the implementation of the functional designs prepared, in addition to validation of the fare systems training plans and manuals.

— *Other bus studies*
  — Analysis of passenger fares on the 80, 81, 82 and 83 bus lines.
  — Assessment study of the bus counting system
  — Analysis of claims on the bus
  — Origin/destination surveys on several bus lines
  — Studies of various bus lines (24, D50, 57, 63, 91, 115, 110).

Subway studies

—Occasional studies

Among the occasional studies carried out this year, the following are noteworthy:

Validation and sale:
We continued to support projects that required help in relation to determing the size of the validation system and sales for new lobbies and the remodelling of already existing ones within the subway network. Specifically, the measurements associated with the T-Mobility project were reviewed.
Analysis and control of fraud:

At the beginning of 2017, a new plan for the security guard system located in the lobbies of subway network stations was prepared to discourage fraudulent travellers.
Work continued on assessment of PAR door fraud counters, which allow for having continuous measurement of the percentage of fraud within the suhway network on a weekly and monthly basis.

—Network planning projects and studies

In the area of network planning, the main projects and studies worked on this year are indicated below:
Modelling of the L10 subway line:

During 2017, a request was submitted to Barcelona Regional to carry out an updated study of socioeconomic data ("Technical assistance at Barcelona Regional for updating the infornation based on the TMB demand simulation model), as the previous one was ten years old. The idea is to use it in a new assessment of the line 10 Sud section of track, adding the experience of the operation of the other, already introduced sections of the L9 as well as other demand studies.

With these new data, an assessment was made of the L10 Sud section to Passeig De La Zona Franca, that is, the Provencana, Ildefons, Fonería and Foc Cisell stations.

—Information regarding passenger loads on trains:
As a result of the project started two years ago, which is still being developed in conjunction with subway, subway rolling stock and technical area management, in 2017 the data collected and processed were validated. The system for uploading data on trains on lines 1 and 5 was used as a real test of the preciseness of the measure, comparing it with the actual counts in all the doors of a car and in the connection passageway with the rest of the train while the train collected data automatically. After this information was processed, it was compared with the manual collection. The rate of coincidence is high, which proves that the measurement is of high quality. The margin of error obtained with a single test is between 4 and 8%, which is an

excellent result keeping in mind that only one test of two round trips a day on each line was conducted.
Analysis of subway station demand according to socioeconomic data:

The objective of the study was to identify and quantify the explanatory variables of subway station demand based on socioeconomic data from the area of influence within its environment.

The subway station demand relationship model and the socioeconomic data were developed with the TransCAD computer programme. The socioeconomic data that were used are the result of the commission "Technical assistance in Barcelona Regional for updating the information based on the TMB mobility demand simulation model" for 2017.Finally, the data included in the model were: group, workstation, tourist accommodation vacancies, tourist visits to points of interest, number of hospital beds and demand.

The relationship between demand and socioeconomic variables was developed with a multiple linear regression of where a final explanatory equation of subway station demand was obtained.

—Microsimulation of pedestrian flows:
This year, work continued on pedestrian microsimulation with LEGION, a software that simulates pedestrian flow movements, complementing the different modelling work being carried out. This modelling work entailed, in addition to an intense learning process, multiple simulations in this area. In 2017, this consisted in the assessment with microsimulation of the side platform evacuation process at Montigala station on the L1 line.

—Other subway studies:
— Distribution studies by subway lines of passenger flow in the lobbies of connecting stations. Continuing the work begun in 2016 on the L9 Sud line, this year, progress was made on the rest of the lobbies in connecting stations.
— Launchers for subway interruptions on the following lines: L1 (Torras i Bages-Fondo), L3 (Vall d'Hebron - Canyelles) and L3 (Lesseps - Vall d'Hebron).

Bus administration and finances

—Pension compensation service and insurance

Article 25 of the 2015-2019 collective bargaining agreement states that on 01/01/2017, the participants of the collective B Pension Employment Plan of Transports de Barcelona no longer are included in this plan and their benefits will be covered by Transports de Barcelona, S. A., through an insurance policy outside of the Plan.During 2017, the work procedures were defined for making this new policy operational.

The rest of the activities of the Insurance Unit maintained a level similar to that of the previous year. The total number of incidents in 2017 was 2,088, which represents an average of 1.84 per vehicle (only incidents with an economic impact).

Regarding the Pension Plan Unit, operational coordination functions continued while support was provided to the Control Committee and the initiative was taken to mediate between this body and the rest of the bodies involved (managing, actuaries, external consultants and different departments of the sponsoring company).

The 2017 Spanish Budget Act has returned to preventing ordinary contributions due to retirement. This led to reissuing the agreements adopted in previous years (2012-2016), which has allowed for maintaining the contributions as defined in the Plan.
The Control Committee reviewed the investment policy with the aim of achieving the profitability needed to maintain the current technical rate of interest. Under the assumption of maintaining a conservative investment profile, and keeping in mind that the profitability of fixed income is practically non-existent, a highly more diversified investment mandate was approved to respond to current needs.

Since June, an analysis has been underway that will allow for identifying and quantifying the risks to which the Plan is exposed (financial, actuarial and coverage), and the definition of possible alternative scenarios.

—Logistics, sales, collection and general services

— *T-Mobility Project*
In 2017, as part of the T-Mobility project, the functional work groups defined in the project governance model, consisting of ATM, AMB, FGC and TMB co-managers, with the participation of transport operators, the administrations, SocMobilitat and the assistance of a consultant from Pricewaterhouse, prepared a complete catalogue of functional documents was prepared that will serve as a basis for the developments needed to implement T-Mobility.

More specifically, the participation of the Sales Logistics and Collection service focused on the following 3 groups: Group 1 - Fare management, Group 2 - Marketing and Group 6 - Management of the Public-Private Collaboration Agreement with Societat Catalana per a la Mobilitat.

– **Group 1:** Fare management
The objective is to define and validate the implementation of the fare management tools of all transport documents.Work was done on preparing 29 work documents in this area.

– **Group 2:** Marketing
The objective is to define and validate the implementation of tools for manufacturing, distribution, logistics management and marketing of all transport supports/documents.Work was done on preparing 15 work documents in this area.

– **Group 1 + Group 2 + Group 3**
After preparing this set of documents, it was detected that there are certain subjects that need to be addressed simultaneously by Groups 1, 2 and 3. It was thus decided to prepare a single document of each subject that reflects the functional needs of the three groups. Consequently, 3 additional documents were prepared: "*Hardware* functionalities that must be offered at customer service points" (Doc 94); "Matters forwarded to the legal group by groups 1, 2 and 3" (Doc 95) and, lastly, the "Synthesis of the billing model" (Doc 96).

After these documents were completed, we began working with SocMobilitat on defining the functional requirements that technicians must use to prepare specifications and functionalities and the corresponding software development.

Simultaneously, each functional group prepared a timetable for its group, which later was incorporated into the overall schedule for the project.

– **Group 6:** Management of Public-Private Collaboration Agreement
Management of the Public-Private Collaboration Agreement with Societat Catalana per a la Mobilitat.The contract monitoring report was prepared on a monthly basis.

Progress was made on a simulation tool that includes all the financial impact of the T-Mobility project. This includes everything contained in the agreement, as well as other aspects outside the contract but within the project.

A proposal was also drawn up for the new Metropolitan Transportation Authority (ATM) Income Distribution Chamber, which was transferred to group 1 for its supervision.

—Implementation of a new ticketing application:

During 2017, in cooperation with the Technology Department, work was carried out on implementing a new ticketing information system adapted to the new T-Mobility needs. It was expected that the transfer of the different modules of the current ticketing application to the new one would be carried out gradually and through complete sales channels.

Throughout the year, the following sales channels were transferred: Tramvia Blau, sales on the bus through a control panel and sales on the bus through an automatic onboard ticket machine. For technical reasons, the migration of the following sales channels was pushed back to the begninning of 2018:subway automatic ticket machines, bus network automatic ticket machines and sales at TMB points.

We are still working on completing the migration of a series of current ticketing application modules unrelated to the sales channels but essential to other functions associated with the service:the distribution module for revenue collection; cash management associated with automatic and reverse charge machines; scheduling of collection services and change tools for automatic machines in the subway network and the reporting module. All will be migrated during 2018.

—Phase two of the project for the generation and control of simplified invoices for direct ticket sales from all TMB sales channels:

As part of phase two of this project, a series of actions was carried out:
– Together with the Metropolitan Transport Authority (ATM) and Metro de Madrid, a meeting was held with the Spanish Tax Authority (AEAT). It was agreed that companies in the public transport sector could send a monthly report of all simplified invoices issued, instead of sending a detailed report of each one, which was what was initially intended.
– An agreement was signed with the ATM and another with the AMB authorising TMB to issue simplified and complete invoices on their behalf and with the tax identification number of each, associated with sales of integrated and T-4 tickets, respectively, through any sales channels.
– The issuing of simplified invoices through the Teleférico sales channels was implemented while the implementation in the rest of the channels in the *backoffice*was postponed for technical reasons until the beginning of 2018. However, all the functional specifications for doing so were prepared.

—Second renovation of bus reverse charge machines:
Continuing a project started in 2016, during 2017, in cooperaton with the bus business area and the technology area, part of the reverse charge machine pool installed in TB depots was updated due to obsolete hardware and software.

Of the 13 reverse charge machines distributed in 5 depots, 4 units were replaced as part of phase one in early 2017 and 4 as part of phase 2 at the end of 2017.For the rest of the old machines, it will be determined if they need to be replaced or removed, depending on how single ticket sales on board the bus progresses. In all likelihood, they will decrease notably in the coming years due to the implementation of the T-Mobility project (appearance of new digital sales channels, bank card payments).

—Changes in the management of existing sales channels:
– Due to technological developments:
Sales channel for Barcelona Bus Turístic (BBT) tickets, in addition to renovating the entire PDA pool (now obsolete). The new equipment has enabled obtaining information about on-line sales. As a result, the workflow associated with sales information with the old equipment was eliminated, thereby avoiding possibles losses of information and subsequent recovery of this information.

At the same time, the PDAs, which, despite being the property of TB, Turisme de Barcelona installed in most of the offices for selling BBT tickets, was replaced with new equipment called VirtualPOS (a virtual TPV). This allowed for having on-line sales information and eliminating most of the pre-cut tickets supplied to Turisme de Barcelona for sale in some offices. In addition, the new equipment also allows for the simultaneous sale of other TMB products, such as Teleférico products, through direct ticket sales or the issuing of vouchers.

An agreement was reached with the two major issuers of TMB product vouchers: Turisme de Barcelona and City Sightseeing (CSS) so that the vouchers that are issued have bar codes provided by TMB, which allows for controlling them automatically when they are exchanged.
– For organisational reasons:
Starting in October 2017, the sales logistics and collections area absorbed all pre-cut ticket sales to distributors and massive sales to companies and administrations, leaving sales to individual customers to TMB points.

Simultaneously, we collaborated on the preparation of the functional requirements for the implementation of the new ticket sales application for TMB points, in response to current needs (VirtualPOS), similar to the one used for the Teleférico.

—New sales channels:

Following the business policy of the last few years, work continued on opening new sales channels, entailing in some cases the adaptation of the department's information system and in all cases additional control work. The main sales channels are:
– New external sales channels for issuing TMB product vouchers such as Extrapolitan.
– The opening of TUSGSAL and MONH as a sales channel for selling T-Escolar cards, the result of an agreement signed with the AMB.
– The agreement signed with the AMB for the sale by TMB of Aerobús tickets and vice versa.

—Project for controlling access to the Zona Franca II building:

In the area of general services, based on the request by TMB management and in cooperation with the subway Safety and Civil Protection Unit, a project was started for the installation of an access control to the Zona Franca II building.

It is a safety measure that will allow for, among other things: preventing unauthorised personnel from entering the building and knowing, at all times, every person that is inside the building.
During 2017, the technical solution was validated. The order was processed and we are waiting for the offers. The installation of the access control is expected to take place in 2018.

Also this year, as part of the ongoing comprehensive security improvement process, a scanner was installed in the reception area of the building to control the parcels of external personnel.

—Payroll, Social Security and salaries of personnel outside the agreement

In addition to ordinary functions, during the year there were several matters of particular importance:

—The consolidation of the new interface system with Social Security:
Over the course of the year, the new relationship process and forms regarding Social Security were internalised and consolidated, in the two-fold manner implemented the previous year: on the one hand, management of benefits through the direct settlement system for making payments, as a result of the Cret@ project; and, on the other, management in the areas of affiliation, contributions, maternities and paternities in the new procedures and telematic tools required by the Social Security Fund.

—Consolidation of payroll processing in the current month:
Moreover, in close connetion with Social Security needs, the integration and consolidation of the new tools and processes required for the execution of 2 monthly payroll processes, or 3 in case of coincidence with extra payment periods, was also necessary for adapting to the processing of payroll in the "current month".

—Implementation in 2017 of the 2015-2019 collective bargaining agreement:
Salary plans with the increases envisaged in the agreement for 2017 were prepared and implemented. Adaptation to the limitations of the Spanish Budget Act involved a complex implementation process during the year, with a series of payment processes, adjustments and advances to payroll accounts.

—Integration of personnel outside the agreement into the agreement: In January 2017, the first phase was set into motion of voluntary integration into the salary negotiaton agreement of personnel from groups G4 and G5 from outside the agreement attached to bus network management.

—Supplies, logistics and hiring

During the financial year, a system for classifying own providers of buses was launched.The tool allows the company to pre-categorise potential participants in tenders. In this way, when TMB's approval bodies authorise the start of the process, a bid can be directly requested from the companies that are part of the system, given that the period for the public tender has been formally and previously complied with through this system.

With this new scenario, purchase processes of the bus fleet can be sped up, with 6-8 week reductions.

—Financial services

—Immediate supply of information regarding value added tax (IIS-VAT):

Transports de Barcelona, S. A. was included in the group of large companies subject to the application of a new VAT management system based on IIS (Immediate Information Supply VAT)

During the first part of the year, a training effort was undertaken to learn the basic characteristics of the new regulation. Also provided was specific training in the regulation and its application in corporate information systems. Given its newness, and the fact that the regulation has not been widely developed, the Spanish Tax Authority (AEAT) was slow in answering questions and the lack of experience in the market, it was difficult to find consultants that could answer the many questions that arose. To respond to the questions that continually came up, joint work was carried out with the external auditor and the tax advisor, as well as consulting with the Directorate General for Taxation.

With the entry into force on 1 July of the regulation and the summer ahead, an additional effort was made to roll it out also in August.

In the second half of the year, the regulation enabled reporting about invoices issued and received with a transition period of 8 business days, and up to 4 days as of 1 January 2018.
This process also meant a change and adaptation for the rest of the areas in the company. After being informed, they had to speed up their invoice procedures.

Milestones reached in this area:
1. Obtaining authorisation from AEAT for TB to prepare monthly summary notes regarding own tickets sold.

2. Agreements with ATM and AMB to issue invoices in their name (with either ATM or AMB's tax ID) of their tickets with their tax ID, sold through different TB channels.

3. Issued invoices: the XML file has been parameterised to send on a daily basis to AEAT the accounting records of the invoices issued on its own behalf by TB, and also of the invoices issued on behalf of a third party (ATM, AMB).

4. Incoming invoices: the XML file has been parameterised to send on a daily basis to AEAT the accounting records of the invoices received by TB.

5. Issued invoices for exchanges: a database was created to generate issued invoices for exchanges and the XML file was parameterised to send these types of invoices on a daily basis to AEAT.

6. Invoices for ticket sales commissions: a database was created to generate invoices on behalf of a third party for ticket sales commissions. These are incoming invoices that TB issues on behalf of a third party that receives a commission for selling tickets to end customers.
7. Resolving different errors arising from data mining and that need to be treated manually before sending to AEAT.

8. Studying how to document and send information about batches of simplified invoices when this information is available.

—Initial SAP Hana and SAP S4 Finance training:

In June 2017, a new SAP Hana operating system was implemented that has allowed for optimising the performance of the accounting and logistics operation in SAP. In addition, for the sake of the implementation of specific modules of the new SAP S4, several meetings were held at the end of the year with an external consulting firm to start learning about the new system, which will entail improvements in the use of tools for finance accounting, third parties, analytical cost accounting and accrual accounting. Several meetings were also held to see if the new tool would be adequate for the company's cash flow and if it would improve the features of the current application.

To simplify the future implementation of the analytical and cost accounting modules, work was done for Transports de Barcelona to identify the aspects that can be improved and those that must be maintained in order to know the busness lines of the company, and which have no direct output with the current analytical information systems. These aspects were worked on with Central Bus Services, Management Control and Technology.

Work on implementation of the S4 modules is expected to begin in the second half of 2018.

—Building of a corporate repository of power and water supplies:

Until now, the accounting of statistical measurements for consumption of power and water supplies, calculated using accounting analysis, has been done manually.

This project is still ongoing. In cooperation with the IT department and integrated into the BLAULABS platform, it has become the focal point of the following guidelines:
- Management of power supplies and water: billed amounts and consumption, consumption analysis by use, average price analysis, simulation of future evolution of energy performance, projected accounting calculation, and additional comparative analysis.
- Strategic programme for the improvement of energy efficiency which in the future will foster the environmental scorecard of the group's companies and facilitate improvements in environmental management.
- Comply with the mandatory energy audit the company is subject to, according to the Official State Gazette, RD 56/2016.
- Mediate a link to contribute to a green and circular economy for the regeneration and optimisation of energy and water uses.

In addition, to foster consumption on environmental scorecards, a consumption allocation diagram from geographic centres to cost centres was prepared throughout the year. A sharing model was also designed to automatise the accounting of statistical measurements linked to energy consumption, from one origin measurement and cost centre to several destination cost centres and other measurements, by means of several calculus algorithims.

A pilot test with natural gas supply was left to a consulting firm.

—Preparation for the bidding for the inventory update:

During the last part of the year, everything was prepared for the 2018 bidding for FMB, as well as for the 2019 bidding for the rest of companies in the group: TB, PSM and TMB, S. L.

The procedures for fixed assets put in place in tax year 2009 have allowed for the improvement of the regular update of fixed capital. However, because of the large amount of investments made in recent years, it is difficult to control given the lack of human resources available. An inventory update needs to be carried out, in addition to a new procedure that requires all the departments to communicate the acquisition, retirement and transfer of assets.

Thus, it will be possible to: update in real time the investments undertaken by the companies, review the adapting of fixed assets procedures to the real situation of the companies and convey a true picture of asset inventory.

—Signing of financial leasing under conditions of financial caution:

Given the TB classification by the General Intervention Board of the State Administration (IGAE) as a public administration, several transactions were signed with financial institutions at below-market conditions with conditions obtained from the Official State Gazette. This has decreased the number of financial institutions willing to provide financing at very competitive prices.

Metro Administration and Finance

—Pensions and insurance compensation service

This year, the Insurance Unit started up the telematic remittance to the insurance company of reports on incidents of minor injuryto Metro users.
Remaining incidents have maintained a similar level to the previous year. There were 6,119 incident reports received regarding the Metro in 2017 of which 1,620 were processed with the insurance company.

—Payrolls, Social Security and staff remunerations outside the agreement.

Apart from ordinary functions, the miscellaneous matters have had particular significance, such as:

—Application of the 2016-2019 collective Agreement:
During the first half of the year, collaboration continued in the negotiation phase of the agreement, with the contribution and assessment of proposals. Once the 2016-2019 collective agreement was signed, it was prepared and applied to payrolls on a retroactive basis, salary tables of 2016-2017, with wage increases and forecast advance payments.

—Financial service

—Immediate supply of information on value added tax (Internal Revenue Service-VAT)

Ferrocarril Metropolità de Barcelona, SA entered the group of major companies, subject to the application of the new VAT management system, based on the Immediate Supply of Information on VAT).
This process has meant changing and adapting the remaining areas of the company, which having been informed, have had to speed up new procedures when processing invoices.

The goals achieved in this field were:
1. Authorization from the AEAT (Spanish Tax Agency) to FMB, in order to make monthly summary entries on the transport tickets sold.

2. Agreements with the ATM and the AMB to be able to issue invoices in their name (with the ATM or the AMB Tax Number) of their transport tickets with their Tax Number, sold through different channels of FMB.

3. Invoices issued: The XML file has been parametrized for the FMB to remit to the AEAT the accounting records in their own name, and also invoices issued in the name of third parties (ATM, AMB). This should be done on a daily basis.

4. Invoices received: the XML file has been parametrized for the FMB to remit to the AEAT the accounting records received. This should be done on a daily basis.

5. Exchange invoices issued: A database has been created in order to generate exchange invoices issued. The XML file has been parametrized in order to remit this type of invoice to the AEAT, which should be done on a daily basis.

6. Invoices of commissions for the sale of tickets: a database has been created to generate invoices in the name of third parties, for commissions for the sale of transport tickets. These are invoices received that FMB issues in the name of third parties, which charge a commission for the sale of transport tickets to end customers.

7. Resolve different errors that arise from the extraction of data, and which has to be processed manually, before sending to the AEAT.

8. Study how to document and send information of the series of simplified invoices, once this information is available.

—Initial training on SAP Hana and SAP S4 Finances:
Finally, at the beginning of the year, the application of rents of commercial premises was updated.

Personnel management of the Bus service

—Bus Labour Relations and Legal Department

—Works committees

Last year, negotiations were held with the Work Council, through various work committees (Joint, Permanent, Operations, Rolling Stock and Workshops, Administration, etc.).
As a step prior to the judiciary, in the Joint Committee, its position was discussed regarding various conflicts proposed.

In the Operations, Rolling Stock and Workshops, Administration and Permanent committees of the Work Council, the main agreements reached regarding work organization were:
– In applying the collective Agreement 2015-2019, the approval of selection regulations to formalize allocation enquiries to groups which did not have regulations. Also the management of general selection of Rolling Stock operators.
– Approval of work schedules applicable to 2017 of all groups attached to these work commissions.
– Agreements referring to holidays for the different work groups.
—Labour Relations and Legal Department

Activity concerning administrative and legal proceedings was as follows:

	TB
Individual claims	112
Industrial disputes	18
Workplace inspections	15
Strike calls	4
Strikes (days called)	30
Strikes (days held)	1

The collective conflicts lodged against the company, were the following:
– Collective conflict for the bonus on official holidays, lodged by the CGT union.
– Collective conflict lodged by the CGT union, disputing article 1 of the collective Agreement in force.
– Collective conflict lodged by the ACTUB union, regarding bonuses for achieving objectives, corresponding to 2015.
– Collective conflict, lodged by the*Compromiso Obrero union,* regarding breaks between working days of Rolling Stock operators.

Regarding disciplinary measures, the number clarifications reported have increased slightly. On the other hand, the number of disciplinary reports have dropped in comparison to the previous year.

There was a one-day general strike (03/10/2017), called by the CGT, COS and Intersindical Alternativa de Catalunya unions, in view of the political situation of Catalonia regarding the referendum held on 1 October. However, on 8 November, another general strike was called by a minority union, which did not affect the Bus service.

The number of trade unions has been maintained in the company in 2017. 8 present in the Council (ACAT, ACTUB, CCOO, CGT, COS, SIT, UGT, USOC), 4 non-present (BS, CNT, CO and PSA), although the latter two unions formed part of the USOC candidacy for the 2014 Work Council elections.

—Planning, management and development of staff

—Contracts

In order to cover different needs, both in provision (the summer improvement Plan, the improvement plan with 22 vehicles more in the fourth quarter, the different special shuttle service to maintain the Funicular and the Metro and FGC in the summer), along with continuity in the application of the collective Agreement 2015-2019 concerning partial retirement, 55 contracts were signed during the year, including:

a) Partial retirements:following regulatory changes, which put back partial retirement rights to the age of 61 years and 5 months, a total of 58 employees took partial retirement in 2017. b) Relief staff:
b) Replacements: 58 temporary contracts were converted to permanent contracts (temporary or contracts for a specific work or service).
c) Disabilities: Contracts to cater for the readmission of company staff where full permanent disability has been recognised, making it impossible for them to carry out their usual work. The allocation of new jobs is made according to the vacancies available and the compatibility of the work with the disability recognised. 7 recruitments have been made this year.
d) Temporary staff: the contracts of weekend staff were extended until they can be converted into relief contracts, when other staff take partial retirement, under the legal requirements established.

e) Temporary newly recruited staff: 185 new recruitment contracts have been formalized, for both part-time and full-time staff. This is in order to meet the needs of summer improvement Plans, Metro and FGC shuttle services, and the increased provision corresponding to the improvement Plan of 22 coaches in the fourth quarter.
f) For the start-up of the provision improvement Plan 92 temporary contracts have been changed to permanent contracts, 8 of which are Rolling Operators and 84 are drivers.

—Absence from work

The established protocols have continued to be worked on, to monitor cases of possible abuse or fraud. The main actions have included individual monitoring to ensure the good use of temporary disability leave, along with the reinforcement of the management system of temporary disability, in conjunction with the Labour Health Unit.
This system optimizes doctors' home visits to patients to assess the reasons for them taking sick leave. CON managements play an active part in this process.

—IT systems

Improvement and reinforcement of the monthly analysis model has continued, prior to processing in payrolls, particularly regarding: changes in paid break periods, overtime, calculation management, bonuses for versatility and productivity, permanent and variable night shift, leave, work calendars of different groups, balance of break periods through model change and timetable rules of other groups.

—Development

The Unit's work in this field focused on a number of areas:.

— Training plan: in collaboration with the Department of Training, the updating process of the Biannual Training Plan 2017/2018 has been coordinated, with all needs detected for 2018.
— 2017 will close with a bonus of 100% (over 540,000 €).
— The most important training during the year, either because of volume, innovation or significance, included the following: certificate of professional competence (CAP), line participation sessions, driving of electric and hybrid vehicles, and CNG buses, new drivers, leadership, teamwork and communication.
— Training has been planned and carried out for the incorporation of new drivers, new operations managers and Rolling Stock operators (structure or reinforcement for the summer).
— a new Manual for Drivers was prepared including key information on all the company divisions and departments.
— Plan of action to reduce traffic accidents: a total of 15 courses of observers and driving analysis have been done, with the participation of 54 operation managers and central agents.
— Individual training leave: 9 applications have been processed.
— Others

This year, 7,504 passes have been processed, because of renewal or deterioration. Equipment has been provided to all Rolling Stock workers. The uniforms of new drivers and operators have been prepared for the summer campaigns and provision or structure improvement plans.

Personnel management of the corporate Bus service

—Technical Secretariat

The Technical Secretariat has continued working on all matters requiring a high level of coordination between services. The most significant actions were the preparation and monitoring of budgets of the Area and also of staff of functional Areas (in collaboration with the Personnel Management of functional areas), plus back-up in information systems to different services of the area.

In the organization of job classification, the most significant actions of the year are detailed below:

—Updating of the description of workplaces
In TB, the analysis, review and updating or validation was done (by direct managers) of functional contents and naming of all descriptions of workplaces of the Bus Network Management. This was also done for different workplaces of remaining executive managements and of the Network, occupied by TB employees, either within the "Euro" agreement or "outside the TB agreement", together with ex-outside the agreement (managers of the operational group of lines, and remaining employees, who were included in the agreement, in a new group created, the G11).

This meant mobilizing information corresponding to over 290 workplaces, affecting over 370 employees. It also involved formalizing the creation of a reduced format of each description. This helps to standardise inserted contents, highlighting sections on the purposes and main tasks of the workplace.

—Personnel assessment committees within the agreement.
The normal, regular activity of the workplace assessment committee within the agreement has been maintained in this field. It was fully reactivated a few years ago, with a mixed, joint representation of the company Management and of workers.
The exceptional, high volume of activity carried out by this committee in 2016, has led to a considerable decrease in 2017 in the number of actions undertaken. This was because the organization structure and workplaces with functional contents, had been correctly updated and adapted.

—Professional classification committees of the TB "Euro" group
The professional Classification Committee of workplaces allocated to the "Euro" group has been reactivated this year. The agreements taken at the initial meetings have meant the inventory, analysis, assessment and resolution of over 45 cases (TMB), both in past issues of the "Euro" group, and also extended to people, who in recent years have been incorporated in the agreement, although they initially occupied places that were "outside the agreement".

—HAY Group assessment committees
From the diversity of workplaces analysed and assessed, and regardless of whether they had been assessed previously following the TEA or ICSA format and methodology (because they have always belonged to the group inside the agreement), it has been sought to assess them with HAY methodology (until now only used for workplaces "outside the agreement"). The aim was to classify all of them (inside and outside the agreement), under the same methodology. This would lead to an easier identification and global classification.

—*Organization Charts*
Maintenance and updating of organization charts has been completed, which are published in Intranet.

—*Projects and work groups*
Support and technical backup was given to all organization changes or functional adjustments throughout the year. This has had an impact on the functional contents of descriptions of workplaces or dependencies and organizational allocations. The most significant organizational changes affecting TB personnel, were the Executive Marketing Management and the Executive Management of Innovation, Technology and International Business.

There has once again been active participation in all projects and work groups that have been created in different Network and Executive managements.

—**Personnel management of functional areas.**

Efforts have been continued to retain staff, efficiently managing the coverage of vacancies. Work corresponding to the current 63 partial pensioners of TMB and their employment contracts have been managed and coordinated.

20 employment contracts have been formalized throughout the year, within functional areas.

—Personnel management services centre

—Development and management of personnel improvement
—Training for the certificate of competence for professional drivers (CAP)

In 2017, the "interpersonal relations" session has been continued, within the CAP programme, addressed to TB drivers. The aim of the Unit was to back up trainers by providing them with tools to perfect their role, and assess them on site at the CAP sessions.

There was also participation in an internal workshop, to find new dynamics to include in CAP training, together with external training addressed to strengthening and reflecting on trainer skills as an efficient change agent. A monitoring session has been planned. All this will continue in 2018.

—Cohesion programme-project of the Central Workshop team
This programme, which started in 2016, aims to improve both leadership and cohesion of the management team of the Central Workshop Unit of the Bus Service. In 2017, people from the workshop team have been able to reinforce and manage emotional group tension, which may arise in their everyday work and apply it, by training the team in analysis and dialogue. This is to solve problems and focus on common objectives and Unity.

Individual monitoring has been done by the Human Resources department of all managers, particularly the Unit manager, programming competence training in a more individual way.

—Staff development and organization project: Talent management.

The goal is to identify the skills and promotion factors of people and have current knowledge on organization skills, the ability to anticipate decisions linked to people (retirements, changes, new projects,...) and to have an organization in constant development. To achieve this, sessions, started in 2016, continued in workshop format. Reflections were made on various challenges of the organization, to adapt objectives and commitments of each group. Rolling Stock, CON and Workshop managers participated.

An innovation has been the start-up of sessions, which consisted of preparing a joint, cross view of the objective and vision, creating synergies between Rolling Stock managers (who repair buses) and operation managers (who run buses) and technical area managers (who design the vehicles). The commitments and programmes emerging from these reflections will be worked on within the Bus Management.

— Training of the operations management Plan.

In April, a training programme was started for all the Bus operations management, in competence skills, which had not been carried out for 5 years. Training consisted of 4 sessions: leadership, communications, management of resources and management/teamwork. A new factor of the programme was the proposal to draw up a plan of action (PAI), to put into practice the knowledge learnt in training and supervised by the direct manager (the corresponding operating group line manager).

Communication assessment and facilities have been provided, along with fluency to achieve the goals proposed in the PAI. Two sessions were planned per depot, one in which information was given on the project, and another in which the direct heads were given advice on how to approach and accompany their collaborators in the PAIs. Training called "interview with collaborators" is planned for 2018, which will reinforce this concept to work on.

There were a total of 139 attendants and 90 action plans, representing 70.5% of managers. The remaining managers did not finish training, and therefore their plan of action will be postponed until they complete it. There are more sessions planned for 2018.

— "Indoor game" project for drivers

This project intends to improve awareness of personal power, to be able to learn how to achieve a satisfactory experience during work, regardless of the everyday circumstances of Bus drivers. For the company, it will improve personal implication and performance. It will also reduce stress and other psychological risks of this group, together with an improvement of absenteeism and customer satisfaction.

As this group is very large, two pilot tests were done in 2017.
- The first was held from March to April with 9 people (a representative example of the Ponent depot), which was carried out in two 8-hour sessions.
- The 2nd was held from September to October. It focused on line V7, characterised by high frequency and occupation. In this case, 16 people attended, divided into 2 groups.

The TB Management explained the challenges and efforts of the whole organization, which works to make it possible. This has contributed considerably in putting the objectives of this programme into context.

The monitoring phase is now underway of the commitments acquired, in order to assess the implementation of the programme in the remaining depots.

—Selection and promotion

In 2017, there were a total of 17 promotion and selection processes of the Bus service and 31 of corporate areas.

The main selection process of TB has been for drivers, owing to its complexity and the number of places covered. A total of 185 external people were selected, out of 1,500 applications. This process has covered the temporary summer/weekend needs, and the extension of the new network. 10 drivers of the Bus Turístic were also hired.

A significant external selection of rolling stock maintenance operators was carried out, 18 to be incorporated in the structural staff and 22 for temporary summer reinforcement in different depots. Regarding internal promotion, the operations management process results in the promotion of 18 people.

Within the Economic-financial Executive Management of corporate areas, vacancies have been covered in Financial Services, Logistics, Warehouse, Purchasing, etc., as a result of early retirements of employees. Some of these administrative positions have been temporary and have been offered in the job pool of customer service agents (coverage for maternity leave, holidays, temporary disability leave, etc.).

Processes have also be done within the Executive Marketing Management, both for office vacancies and customer service vacancies. This service has been reinforced with temporary and structural recruitments. The position of non-fare business marketing manager and Punts TMB manager should also be mentioned.

Some recruitments have also been made in the Human Resources Corporate Department, including 5 senior technicians in occupational risk prevention and two psychologists.

In the Executive Management Department of Innovation, Technology and International Business, a selection process for a telecommunications technician and an operator of the technological support centres was carried out. The Legal Advisory Department was reinforced with an administrative processing and monitoring technician of legal services.

Throughout 2017, the selected candidates were monitored and accompanied before completing the trial period. A reception group for people recruited the previous year was also set-up. Support was also given to the selection of students doing work experience.

— **Training:**

The following table shows the most significant ratios in 2017 of training activity (the majority were training actions within the training Plan), both in technical training and cross-training (languages, office automation, etc.).

TB	**2013**	**2014**	**2015**	**2016**	**2017**
Courses [1]	692	477	611	602	769 [2]
Number attending [3]	3,325	1,949	1,841	2,287	2,180 [4]
Number participating [5]	6,259	3,492	3,915	4,212	5,064 [6]
Training hours [7]	12,225	5,334	6,919	6,820	9,886 [10]
Hours per attendant [8]	71,690	49,196	51,609	54,258	74,306 [9]
Ratios					
Number participating/ course	9.04	7.32	6.41	7.00	6.59
Hours per employee [11]	11.45	14.09	13.18	12.88	14.67
% of personnel trained	85.57	50.62	47.10	58.13	54.20

The notes are explained below:
1. Number of sessions held during the year. If a course is held 5 times, it is recorded as 5 courses.
2. Includes courses provided for Bus Network Management plus corporate courses with at least one participant from DXBus.
3. Attendants are the number of people receiving training, bearing in mind that a person who has, for example, attended three courses will only be recorded once..
4. Includes attendants at courses provided for DXBus plus those attending corporate training courses..
5. Participants are the number of people receiving training, bearing in mind that a person who has, for example, attended three courses will be recorded three times..
6. Includes participants of DXBus plus those attending corporate training courses..
7. Training hours are those of the trainer, calculated by training completed..
8. Attendance hours are the number of hours of the course multiplied by the number of people attending..
9. Includes hours of DXBus plus corporate training hours.
10. Includes corporate training hours provided for DXBus network employees in which at least one Bus employee has participated.
11. The standardised average workforce in 2017 was 4,022.3 employees and the number attending was 2,180.
12. . The number of hours attended divided by the number of participants.

The ratio of participation per course is practically maintained in the last two years (people in the classroom per each training action and the percentage of staff trained).

The following events are highlighted of the training activity over the year, regarding technical training of the Bus Network Management.
—Continuous Training of the Professional Competence Course (CAP) has formed an important part of the training plan as regards volume of hours/participant. This year, the second 2015-2020 cycle has been continued, with updated contents and new dynamics. 35 "Continuous Courses of CAP" have been given over the year, with a total of 629 employees trained (representing 22,015 hours/participant), with a maximum of 20 participants per group. All employees participating have received their time and method card. Efforts were also made to improve the knowledge of CAP trainers, including training on "Accident drill with multiple victims", "Trainer as an agent of change" and "Integrated Fare System".

—Following the same model as previous years, a total of 240 candidates received training for new drivers, who eventually joined the organization. This has meant a total of 21,360 hours.

—26 new Rolling Stock operators have also received training.

—The promotion of 18 new operations managers should be underlined, which has meant 3,375 hours.

—Work has continued on the Rolling Stock training models, owing to the good results and use made. This year has been particularly beneficial owing to the inclusion of the annual training schedule.

—The "Line Participation Training Sessions" have reached around 500 drivers, which means 3,500 hours.

—In Rolling Stock, the efforts made to train 126 authorized expert technicians in different models of electrical and hybrid vehicles should be mentioned. This training was to enable their accreditation as qualified workers by the management of the four CONs.

Training actions have been done in corporate managements, regarding new technologies, tools and systems, along with training linked to implemented technology projects and upgrades, regarding projects and legislative developments.

Cross training has continued in the Organization Development Centre (CDO). Both face-to-face and *e-learning* language training has also continued for the staff that require languages for their assigned tasks. Face-to-face and e-learning training has continued in office automation on different Office 2010 programmes and features of *Click&Decide* Deployment has continued of specific training in occupational risk prevention and training in welcoming staff to their new workplace. Training has also be given to adapt to the new version of standard ISO 9001, version 2015, and other cross training in the LOPD (data protection), application of complaints and claims, management of fraud and other corporate applications.

Finally, the global satisfaction index of attendants regarding the Bus Network Management courses achieved 3.58 over 4, which is higher than last year.

As in previous years, efforts were made to optimise resources, ensuring that investment in training is recovered through the Social Security contributions given by FUNDAE *Fundación Estatal para la Formación en el Empleo* (State Foundation for Training at Work), up to 100% of the TMB Grup fee

—Competence management systems, projects and innovation

In 2017, the number of assessments has maintained a similar level to the previous year. 284 people were assessed in the Bus network and 15 in functional areas.

A joint work group was created with intermediary managers of the Bus operation and system users, to analyse the situation of the implementation of this tool, and to make improvement proposals, some of which were applicable immediately and others to be considered in future developments.

Work from the Centre of People's Management Services and the Technical Secretariat was also managed from the Unit, coordinated with the Labour Health Safety and Welfare Service, with the support and expert assessment of the Environmental Management and Quality Service. This was to achieve a new version of the ISO 9000 certification of 2015, consisting of identifying the map of first level processes of the area.

—Health, safety and welfare

—Prevention of injuries due to work accidents and occupational diseases

The development of the Prevention Plan has continued this year. The following actions are highlighted:

		2017
New job risk assessments	New workplaces	**20**
	New work centres	**1**
	Review and updating of workplaces	**66**
	Review and updating of Work Centres	**5**
Assessments of specific risks	Safety reports	**26**
	Industrial hygiene reports	**21**
	Ergonomics Reports	**13**
Safety inspections of work centres and installations		**20**
Emergency and self-protection plan of work centres	Preparation of new self-protection and emergency plans (PAU) and emergency dossiers	**-**
	Updating of PAU documents and emergency dossiers	**2**
	Partial emergency drills	**2**
Review of work processes and instructions		**4**
Documentation management for coordinating business activities (CAE)	Total companies managed in 2017	**304**
	Total active companies in the system	**510**
	Allocation of risk level based on order type	**60**
	Notification of start of external activities	**135**
	Total incidents	**350**

459 actions have been carried out for the maintenance of the safety certification of machines and work equipment.
As part of the health monitoring programme, 1,821 planned and 501 unplanned medical examinations were performed, along with 345 ordinary actions and 5 specialized actions investigating work accidents.

The Health and Safety Committee has continued its usual tasks throughout the year: 11 ordinary meetings, 5 extraordinary meetings and 12 joint visits to work centres.

Finally, as part of the management of the occupational risk prevention system (ORP):

— 8 work meetings of the ORP monitoring group.
— Updating of the matrix of functions (workplaces, risk assessments and training).
— Analysis of the main processes within the scope of ORP. Preparation of the map of processes and the main flow charts (risk assessment, self-protection plans, machines and equipment, training in ORP, investigation of accidents).
— Updating of the ORP training catalogue: review of contents of all ORP training action cards.
— Preparation of a proposal for a new management model of ORP training.
— Monitoring of the new action protocol in cases of aggression from external violence.

Finally, the purchase of a new information system, called Prevenweb.

—Health and social assistance

The most significant data of the year are summarized below:

Work accidents	Injuries without sick leave owing to work accidents	**77**
	Injuries with sick leave owing to work accidents: of which 97.67% were minor injuries	**349**
Medical care given in response to work-related accidents:	Visits carried out	**1,873**
	Number of diagnostic tests	**287**
	Referrals to specialist doctors	**435**
	Number of surgical operations	**16**
	Number of therapy sessions	**2,001**
Medical measures to deal with temporary sick leave for non-industrial illnesses:	Medical visits carried out	**5,036**
	Number of diagnostic tests	**34**
	Referrals to specialist doctors	**17**
	Number of surgical operations	**0**
	Number of therapy sessions	**16**
Weight loss programme		**14**
Programme to help employees give up smoking		**9**
Social work:	Personalized attention	**479**
	Care programme for conditions involving dependency	**16**
	Follow-up of previous years	**105**
	New ongoing intervention cases	**37**
Social care fund (FAS):	Beneficiaries:	**86**
	Applications received	**37**

— **Promotion of health and prevention of common diseases:**

Various programmes have been carried out: mental health, cardiovascular risk prevention, colon and prostate cancer prevention. A total of 259 employees received flu vaccinations under the flu prevention programme while 22 employees were vaccinated against tetanus and diphtheria.
On the occasion of World Health Day and work safety, exhibitions were held, with material loaned from the Spanish Association Against Cancer (AECC), at different work centres, to raise awareness among employees on the prevention of colon and skin cancer and smoking.

Two conferences were also carried out in collaboration with the AECC, entitled "Psychosocial aspects of cancer" (April and October).

The health and safety manual for bus drivers was updated and digitalized. This manual is used as teaching material in CAP training planned for this group.

An agreement was signed with an important sports entity (DIR), with special terms to promote sport among employees.

— **Occupational welfare**

This year work has continued on developing different actions in participation systems, including.

— Development of the work "Improvement strategy of the maintenance of systems deployed in the TB bus fleet".
— 8 work groups were formed, with a total of 43 employees.

Integration policies:

— Links with the company (silver and golden anniversaries), with the participation of 154 employees.
— Various sports, social and cultural events (TMB athletics group, Tai-chi group, Art group, Photography group, the TMB Choir and the hiking group).

Personnel management of the corporate Metro service

—Technical Secretariat

The Technical Secretariat has continued working on all matters requiring a high level of coordination between services. The most significant actions were the preparation and monitoring of budgets of the Area and also of staff of functional Areas (in collaboration with the Personnel Management of functional areas), plus back-up in information systems to different services of the area.

In the organization of job classification, the most significant actions of the year are detailed below:

—Updating of the description of workplaces
In the Metro, the analysis, review and updating or validation was done (by direct managers) of functional contents and naming of all descriptions of workplaces of the Metro Network Management (DXM). This was also done for different workplaces of remaining executive managements and of the Network, occupied by FMB employees, either within the agreement or "outside the agreement" (450 workplaces).

The extraordinary work should be highlighted, developed jointly with all directors of the DXM Maintenance Area and Projects Service, where there are the highest volume of general descriptions, and descriptions of the so-called individual "outside the agreement" descriptions. The main task was to seek, standardise and unify criteria and contents transversally to each of the description of the almost ten different services than encompass this Area.

–Professional classification committees of the Metro "Euro" group
This year, the professional Classification Committee of workplaces allocated to the Metro "Euro" group have been reactivated. The agreements taken at the initial meetings have meant the inventory, analysis, assessment and resolution of over 45 cases (TMB), both in past issues of the "Euro" group, and also extended to people, who in recent years have been incorporated in the agreement, although they initially occupied places that were "outside the agreement".

—HAY Group assessment committees
From the diversity of workplaces analysed and assessed, and regardless of whether they had been assessed previously following the TEA or ICSA format and methodology (because they have always belonged to the group inside the agreement), it has been sought to assess them with HAY methodology (until now only used for workplaces "outside the agreement"). The aim was to classify all of them (inside and outside the agreement), under the same methodology. This would lead to easier identification and global classification.

—Organization Charts
Maintenance and updating of organization charts has been completed, which are published in Intranet.

—Projects and work groups
Support and technical backup was given to all organization changes or functional adjustments throughout the year. This has had an impact on the functional contents of descriptions of workplaces or dependencies and organizational allocations. The most significant organizational changes affecting Metro personnel, apart from the events of the Metro Network Managements itself, were the Executive Marketing Management and the Executive Management of Innovation, Technology and International Business.

There has once again been active participation in all projects and work groups that have been created in different Network and Excutive managements. Significant participation was made in basic improvement objectives (OMF) of the DXM. The OMF tackled has been M.1 Motivation, linked to professional classification, in which a manual was prepared and presented, aimed at disseminating, approaching and providing a better understanding of the methodology and procedures to follow when reviewing and updating workplaces.

—Management Services Centre for people management in operational areas

—Development and management of personnel improvement
—Assistance programme to the new management:

Throughout 2017, work has been done on a plan to encourage personal and professional development of each management, in order to reinforce effective leadership and proximity, and to generate synergies and direct actions and attitudes to the objectives, strategy and values of the company. To achieve this, as a result of the training action to attendants in leadership, communication, teamwork and management of resources/decision-making, given in four 7-hour sessions, an individual monitoring action plan was prepared. These sessions are given by their managers or assigned tutors, in which the target is to provide support tools and to later value the transfer to the workplace.

From December 2016 to June 2017, a total of 82 managers participated, divided into 9 groups.

—Staff development and organization project: Talent management.

The goal is to identify the skills and promotion factors of people, with current knowledge on organization skills, the ability to anticipate decisions linked to people (retirements, changes, new projects,...) and to have an organization in constant development. To achieve this, information was prepared on the professional career participants (90 in the Metro group), as a result of past and participatory knowledge in various tools and development projects.

Work has been done on management, planning, individual interviews, by the assigned consultancy, together with the custody of information generated, in personalized report format, where the strong points and areas for improvement are described, along with a recommended professional itinerary and assessment to be developed.
A total of 162 diagnosis interviews were done, 72 of which were in 2017. Once information had been collected and analyzed, from November and December a total of 140 development interviews were done. The reports corresponding to final recipients were handed out. In 2018, the actions were started based on the recommendations (training, participating in projects, *mentoring*, experiences), which each person had received.

—Detection of competence training needs for the 2017 training Plan.

The Unit provided and proposed assessment, for the 2017 training Plan, in the detection of training needs, as a result of the qualitiative analysis of the year's action appreciation tool, together with recommendations in training, which arose from the talent management project.

As a result of the detection of needs to draw up the 2017 training Plan, 66 people of the corporate environment attended external training, in leadership, growing with the team, time management, effective presentations, and even the manager assistance programme for customer attention centre managers, with later assistance.

—Selection and promotion

During the year, a total of 38 processes have been done in the Metro and 31 in corporate areas.

International promotion and external selection processes were carried out, to cover 33 rolling stock maintenance operators. Different positions have also been offered for a senior depot technician for standard lines and automatic lines.

In Operations there have been technical operational management processes (10 positions offered internally), plus positions of operation technicians of automatic lines (16 positions), which have been covered firstly through competitive examinations, and later through external advertising. In order to cover the needs of customer attention agents (AAC) for the summer, a selection of 87 people was done for temporary work as a customer attention agent in the summer season. A total of 5,200 applications were received.

The remaning processes carried out, including internal and external selection, were to cover vacancies owing to retirement, promotions/ functional mobilities or new needs.

—Training:

The following table shows the most significant ratios in 2017 of training activities (mainly training activities within the Training Plan). These were both of a technical nature for the Metro and for functional areas.

FMB	2013	2014	2015	2016	2017
Courses (1)	2,287	3,024	2,806	3,298	3,895 (2)
Number attending (3)	3,714	3,447	3,602	3,654	3,149 (4)
Number participating (5)	13,465	11,207	12,612	14,842	19,375 (6)
Training hours (7)	19,465	19,741	31,183	18,189	22,138 (10)
Hours per attendant (8)	76,335	67,800	116,253	79,978	100,580 (9)
Ratios					
Number participating/ course	5.88	3.71	4.49	4.50	4.97
Hours per employee (12)	5.67	6.05	9.22	5.39	5.19
% of personnel trained	170.0	110.3	114.7	113.3	97.0 (11)

1. Number of sessions held during the year. For example, if a course is held times it is recorded as 5 courses.
2. Includes courses provided for Metro network management plus corporate courses with at least one participant from DXMetro.
3. Attendants are the number of people receiving training, bearing in mind that a person who has, for example, attended three courses will only be recorded once.
4. Includes attendents of DXMetro plus those attendants of corporate training courses..
5. Participants are the number of people receiving training, bearing in mind that a person who has, for example, attended three courses will be recorded three times..
6. Includes participants of DXMetro plus Metro participants of corporate training courses.
7. Training hours are those of the trainer, calculated by the training completed..
8. Attendance hours are the number of hours of the course multiplied by the number of people attending.
9. Includes hours attending courses of DXMetro plus the hours spent on corporate training courses.
10. Includes training hours provided for DXMetro plus training hours on corporate courses with at least one participant of the Metro.
11. The standardised average workforce in 2017 was 3,247.22 employees and the number attendants was 3,149.
12. . The number of hours attended divided by the number of participants.

The ratio of participation per course has beem practically maintained in the last two years (people in the classroom per each training action).

There was a significant increase in the number of participants, meaning an increase in the total hours of classes and attendance hours.

The following events are highlighted of the training activity, regarding technical training of the Metro Network Management.

—The ongoing retraining of all automatic lines operation technicians (TOLA), as indicated in the annual training Plan.
—The continuation of specific training in legal regulations for intermediary business managers of the Metro (labour regulations, LOPD data protection), etc.)
—Deployment has continued of specific training in occupational risk prevention, particularly on standard lines, the highest number being of the category (AAC/motorists).
—Training of new incorporations to different workplaces.
—The training of mass interventions of control and intervention agents.
—The retraining of the AAC summer pool, differentiated by promotions (2012-2015 job pool) The 2016 job pool has only done the updating of stations, owing to a lack of AAC trainers.
—The incorporation of summer AACs, with the difficulties for achieving driving qualifications.
—The continuation of the railway register in all renewals of the driving certification in Operations.
—Training in validation qualifications of Professional Training/ intermediate training cycles, for internal staff wishing to apply for the TOLA process, without having the required qualifications. This will be done in 2018, to coincide with the extension of the automatic line. Training has been given to corporate managements, regarding technology innovations, tools and systems, along with training linked to technology projects implemented and updates regarding legislative projects and innovations.

The Organization Development Centre (CDO) has continued to give cross training. Both face-to-face and e-learning language training has also continued for the staff that require languages for their assigned tasks. Face-to-face and e-learning training has continued in office automation on different Office 2010 programmes and features of *Click&Decide.*

Deployment has continued of specific training in occupational risk prevention and training in welcoming staff to their new workplace. Training has also be given to adapt to the new version of standard ISO 9001, version 2015, and other cross training in the LOPD (data protection), application of complaints and claims, management of fraud and other corporate applications.

Finally, the global satisfaction index of attendants regarding the Metro Network Management courses achieved 3.55 over 4, which is higher than last year.

As in previous years, efforts were made to optimise resources, ensuring that investment in training is recovered through the Social Security contributions given by FUNDAE Fundación Estatal para la Formación en el Empleo (State Foundation for Training at Work), up to 100% of the TMB Grup fee.

—Competence management systems, projects and innovation

The appreciation activity of the Action has remained quantitatively stable, with 793 assessments in the Metro Network and 15 in functional areas.

A survey has been done on the past results of action appreciation to people who have been successful in internal promotion processes, taking data from 14 coverages made in 2016. This survey has given various improvement proposals on information integration regarding compentence fields.

Work from the Centre of People's Management Services and the Technical Secretariat was also managed from the Unit, coordinated with the Labour Health Safety and Welfare Service, with the support and expert assessment of the Environmental Management and Quality Service. This was to achieve a new version of the ISO 9000 certification of 2015, consisting of identifying the map of top level processes of the area.

Participation and contribution has been made in the M1 project team of the Metro Network Management, in the chapter on motivation and the section on proximity, of which a study proposal has been made.

Personnel management - Bus

—Health, safety and welfare

—Prevention of injuries due to work accidents and occupational diseases

The development of the Prevention Plan has continued this year.
The following actions are highlighted:

		2017
Job risk assessments	New workplaces	**5**
	New work centres	**12**
	Review and updating of workplaces	**44**
	Review and updating of work centres	**34**
Specific risk assessments	Safety reports	**56**
	Industrial hygiene assessments	**35**
	Ergonomics Reports	**6**
Safety inspections of work centres and installations		**42**
Emergency plan and self-protection	New emergency plans	**20**
	Updating of PAU documents and emergency dossiers	**12**
	Partial emergency drills	**4**
Review of work processes and instructions		**49**
Documentation management for coordinating business activities (CAE)	Total companies managed in 2016	**304**
	Total active companies in the system	**510**
	Allocation of risk level based on order type	**60**
	Notification of start of external activities	**135**
	Total incidents	**350**

15 meetings have been held with licensees to coordinate activities with the L9/10 Nord and Sud and 20 actions within the management of works and activities on new infrastructures of L9/10 Sud.

421 actions have been carried out for the maintenance of the safety certification of machines and work equipment.
As part of the health monitoring programme, 1,583 planned and 619 unplanned medical examinations were performed, along with 272 ordinary actions and 5 specialized actions investigating work accidents.

The Health and Safety Committee has continued its usual tasks throughout the year: 11 ordinary meetings, 11 monitoring meetings of ongoing issues and 51 joint visits to work centres.

Finally, as part of the management of the occupational risk prevention system (ORP):
— 60 work meetings of ORP monitoring groups.
— Updating a a matrix of functions (workplaces, risk assessments and training).
— Analysis of the main process in ORP Preparation of the map of processes and the main flow charts (risk assessment, self-protection plans, machines and equipment, training in ORP, investigation of accidents).
— Undating of the ORP training catalogue review of contents of all ORP training action cards.
— Preparation of a proposal for a new ORP training management model. Review of the pregnancy and breasfeeding procedure according to agreements of the FMB collective Agreement.
— Updating of the minimum specifications on safety and health of the Metro Network installations. Dissemination of the 2017 version of the document.
— Legal audit of ORP

Finally, the purchase of a new information system, called Prevenweb.

—Occupational welfare

This year work has continued on developing different actions in participation systems, including.
— *Team of analysis and optimization (TAO):* creation of 9 analysis and optimization teams in automatic lies, with the participation of 24 people.
—Implementation of the 5S methodology (sort, straighten, shine, standardise, and sustain) and system maintenance audits in the following work centres:
- — Workbenches of depots of the Sant Genís and Roquetes workshops.
- — Individual protection equipment area of the Sant Genís workshop and the Bellvitge track workshop.
- — Shelving of the Roquetes electronic workshop and the Bellvitge track workshop.
- — The spare parts area of the Can Zam warehouse.
- — The dynamometers area of the Can Zam and Santa Eulàlia workshops.

—16 work groups with the participation of 76 employees.

Integration policies:
— Links with the company (silver and golden anniversaries), with the participation of 94 employees.
—Various sports, social and cultural events (TMB athletics group, Tai-chi group, Art group, Photography group, the TMB Choir and the hiking group).

—Promotion of health and prevention of common diseases:

Various programmes have been carried out: Mental health, cardiovascular risk prevention, colon and prostate cancer prevention. A total of 92 employees received flu vaccinations under the flu prevention programme while 49 employees were vaccinated against tetanus and diphtheria.

On the occasion of World Health Day and work safety, exhibitions were held, with material loaned from the Spanish Association Against Cancer (AECC), at different work centres, to raise awareness among employees on the prevention of colon and skin cancer and smoking.

Two conferences were also carried out in collaboration with the AECC, entitled "Psychosocial aspects of cancer" (April and October).
An agreement was signed with an important sports entity (DIR), with special terms to promote sport among employees.

—Health and social assistance

The most significant data of the year are summarized below:

		2017
Work-related accidents:	Injuries which do not lead to time off work:	**86**
	Injuries which do lead to time off work: of which 98.3% were minor injuries	**273**
Medical attention actions for workplace contingencies:	Visits carried out	**1,549**
	Number of diagnostic tests	**233**
	Referrals to specialist doctors	**240**
	Number of surgical operations	**9**
	Number of therapy sessions	**1,439**
Medical measures to deal with temporary sick leave for non-industrial illnesses:	Medical visits carried out	**4,613**
	Number of diagnostic tests	**14**
	Referrals to specialist doctors	**10**
	Number of surgical operations	**0**
	Number of therapy sessions	**16**
Weight loss programme		**7**
Programme to help employees give up smoking		**9**
Social work:	Personalized attention	**456**
	Care programme for conditions involving dependency	**19**
	Follow-up of previous year interventions	**102**
	New ongoing intervention cases	**32**
Social care fund (FAS):	Beneficiaries:	**108**
	Applications received	**250**

Innovation and technology

—Sale and validation systems

In sales and validation systems, during 2017 technological assistance has been done, enabling the implementation of the Hola BCN! ticket by hours, and integrated tickets regarding environmental management, such as T-verda and the ticket for pollution incidents. Functional improvements have been implemented in the Punts TMB sale terminals.

The development of the TMBCommerce system has continued. This system aims to replace the ticketing system for the Bus and Metro, and prepare for the integration of T-Mobility. The most important goal this year was the development of the invoicing module to end customers.

—Digital environments

Regarding customer attention and information (IAC), projects started in 2013 were continued, to cover the development of public needs through new digital channels.

In 2017, the personalization project of the website and *App* channels was carried out. This consists of accessing these two channels, in order to personalize user experience through digital channels, both in information and services.

The development project of new web portals of Leisure Transport has also been carried out: Barcelona Bus Turístic, Montjuïc Cable Car and Catalunya Bus Turístic. The phases completed were conceptualization, interaction design, visual design, layout, development, implementation of infrastructure and the creation and insertion of contents. Publication is planned for January 2018.

Securisation of the API and TMBApp: securisation was implemented (updates, adjustments and changes in the systems required to achieve a high level of security) of the services in the API (application programming interface) of TMB, with the Open ID Connect standard. This guarantees a safe use of the services, the identification of the user (authentication) and management of the authorization. One of the most significant cases was the new version of TMBApp, through which it is possible to safely access both social network users (*Google*, *Facebook*) and users registered in JoTMBé. This is in line with the new requirements of the European General Data Protection Regulations (GDPR), to protect the personal data of our users and customers.

Development portal – API Open Data: in 2017, adaptations have been made to services of the application programming interface (API), in order to be published in the environment of (*Open Data*), following the standards and good practices when publishing REST services (*Representational State Transfer*). At the start of 2018, the project will be completed with the publication of a new portal for developers. This will enable TMB services to be used and integrated in third party applications or systems, in a controlled way (with authorization) and with information on their use.

—IT systems

The following technological and organization projects are highlighted within the global scope of TMB:

—*Migration of SAP systems to SAP HANA:* the migration project of corporate SAP R/3 systems to SAP HANA was completed. This technological development marked by the manufacturer, means a major change in current architecture. The potential of this new environment will open up to new features in TMB information systems processes.

The installation was completed of the specific infrastructure for SAP HANA, and it was modelled as a platform service designed to give support to all SAP systems of the company. The majority of systems were migrated to this new platform throughout the year, making use, as far as possible, of everything to upgrade the version.

—*Location of people:* the development of the new location of people system of the Bus (outdoor) was carried out, which was implemented at the end of 2016. This system is to be able to incorporate all metro location technologies (SPA, Wi-fi, Tetra, Beacons, etc.), and for it to be the basic central platform of people location systems of the Bus and Metro (indoor).

—*Advanced big data analysis:* during the year, three projects have been implemented within the scope of advanced analysis: 1) Validations for Bus stops. 2) Adaptation measure of bus drivers to the regulation orders of the operations assistant system (OAS). 3) Analysis of the Hola BCN! ticket. The definition and contracting of three projects to be developed in 2018 have also been started. 1) Analysis of the demand,

occupancy and passenger flows of the Bus network. 2) Analysis of the demand, occupancy and passenger flows of the Metro network. 3) Phase 2 of the analysis of the Hola BCN! ticket.

—Adaptation of financial modules: the following ERP economic, financial and logistics projects have been carried out:

– Migration of programming to HANA TMB data base and infrastructure: migration has been done to *Unicode*, the database and upgrading to the latest available version.

– Migration of the SAP *Real Estate* (RE) module, to meet new licensee needs. It has been passed to RE-Flexible, which has enabled new features in the Metro licensees environment.

– Implementation of the immediate information system (SII): implementation of a third party solution based on SAP, to enable the legal compliance of SII, and for document exchange (invoices issued and received) with the Tax Agency within the set deadlines.

– Issue of simplified invoices on behalf of ATM: generation from the SAP environment of simplified invoices posted in this system. The issue of simplified invoices has also been enabled, in the name of ATM, and their remittance to public administrations, through the electronic invoice and delegated digital signature platform (SERES).

—Contractor profile: legal adaptations and integration with others of the Contractor Profile: a large number of improvements have been implemented, both in the public and internal part. This facilitates communication and integration with other information systems.

—Construction of an ICA scorecard: extension of the environmental quality scorecard. Extension of new indicators of the Environment. The following have been included: emissions, Nox, waste and other environmental indicators of the fleet. This will be extended to the Metro during the coming year.

—Call statistics of corporate building: *Reporting* of call statistics in corporate buildings has been completed. Information uploading from operational telephony systems has been included.

—Digital signature: inclusion of the digital signature in fines for fraud. Implementation has been done through a device in the payment procedure of fines for fraud in Punts TMB.

—Complaints, claims and suggestions: implementation of the new (*Zendesk*) application for complaints, claims and dissatisfaction.

—Technological infrastructure

The following actions are highlighted in technological infrastructure:

Transmission Network (MPLS): in 2017 deployment of the MPLS network 2017 has continued, corresponding to Phase VI (22 stations of line L4, 17 stations of line L2 and operational). The installation of all L4 has been completed. At the same time, all services from old networks were migrated, using the improvements of the new network (security, bandwidth, maintenance).

New SAP HANA infrastructure: the new infrastructure has been started-up to migrate ERP systems based on SAP R/3 and SAP HANA software. The first environment to use it was finance and logistics.

– *Improvement of the data network of the Data Processing Centre (DPC)*: new network equipment has been installed in the DPC, for significant improvements in capacity and security, on its integration with the new transmission network based on MPLS. In order to use the new features, the equipment located in the DPC should be configured and connected. 538 servers have been connected to the new network during the first phase carried out in 2017.

– *Centralization of workplace PCs* in order to facilitate user mobility and the remote management of personal computers, the first phase has been started of a project to virtualize workplaces of certain users, in equipment located in the data processing centres (DPC). This involves the replacement of traditional computers with simpler equipment, called thin client, which connects the user only to a central server, where the Windows desktops or different applications are run.

—Innovation plan

In 2017, an innovation Plan has been defined, aimed at designing the management and deployment model of innovation open in TMB. It is based on the identification of the current situation, in order to boost and take maximum advantage of all synergies available (internal and external). Therefore, this innovation Plan puts forward the master lines to be able to start its implementation. The proposals included in the Plan will start to be gradually applied during 2018.

—T-Mobilitat project:

The main targets of the project, within the fare system of the ATM of Barcelona for January 2019, are the change of magnetic technology of validation and sales systems, to contactless technology and the improvement of transport information. In a following phase, a new far system will be defined and implemented, together with the extension of the T-Mobilitat system to the whole of Catalonia.

The main actions carried out during 2017 were:
– Closing of the contractual addenda corresponding to the reinforcement of the project (objectives and supply).
– The activation of work groups responsible for the 13 sub-projects was completed.
– Integral planning of the project.
– Complete definition of functional models (fares, marketing, customer attention and service information).
– Detailed specification of the functional requirements, according to models established.
– Progress in engineering works of different machinery and programming elements, both of central systems and field equipment.
– Progress in the definition of training plans.

The most important actions to be carried out in 2018, and which should lead to the start-up of the T-Mobilitat service in the fare system, are the following:
– Development and testing of different technological elements
– Adaptation of the project to the implementation of the fare system in 36 municipalities of the Metropolitan Area of Barcelona.
– Implementation of different systems and equipment.
– Employee training.
– Actions to manage the change for bus and metro users.
– General testing of the system and "empty running tests".
– Preparation of the start-up

—Technologies of the Bus business

One of the most important technological achievements for the Bus business, was the completion of the deployment of WFi on the entire fleet of buses. This project has also contributed technological progress for all buses, such as:
—The replacement of the main, obsolete CPU, which had come to the end of its lifespan, by a new, modern machine with more features. The power of this machine will enable improved architecture of bus systems, a vehicle locator, and it will also eliminate another additional CPU, which is obsolete.
— Improvements in bus location through the new generation of incorporated devices, with estimated navigation functions, which not only work with GPS, but also with European location systems (GALILEO) and the Russian system (GLONASS).
—The implementation of communications in 4G in all the fleet, which enables future services started-up that require bandwidth (videosurveillance onboard, telemonitoring of vehicles, upgrading of contents in real time by customer information systems, etc.).

Some of the projects that use the new features were, in fact, started in 2017. The main projects were:
—The location improvement project, where the solution has been improved, which has been checked in a validation pilot test. This has increased various current, useful location points.
—The functional evolution of the interaction system with buses (CT-BUS), in order to upload or download files, not only when buses are at the depot, but also when they are running.
Another significant aspect, from a technological viewpoint, is the support to the implementation strategy of the electric bus, basically

within the European ZeEUS project, and in three specific areas:

— The start-up of telemonitoring of the electric bus battery system. This project is also the embryo of the future monitoring system of the whole vehicle.

— The implementation of monitoring chargers on public roads, for the operation of the first line with electric buses.

— The design of intelligence layers (adaptation of chargers following the programmed service, simultaneity management, etc.).

Similarly, technological assistance has been done on the new security organization of the Bus business, with the creation of the Network Security Centre, within the Bus Control Centre, where the videosurveillance systems, access control and security systems of depots are centralized.

The work carried out on the tender and later implementation of the improved WiFi services for the Bus Turístic.

— Digital and customer technologies

The implementation of the new mobility sales system for the Barcelona Bus Turístic and the Tramvia Blau was one of actions carried out in the Leisure Transport service. This project has meant a substantial improvement to the current system, which was obsolete. The main goals achieved were:

– Substantial improvement in the sales transaction time to customers.

– Acceptance of new payment methods, through more robust and flexible technology than before.

– Availability of all data online and in real time, in order to boost sales, according to real needs.

Enabling of ticket validation on board the bus.

– Remittance and parametrization of equipment in real time, both for fares, new products and discounts, and technical settings (before this took at least a week).

– Improved reliability of the system in data flows.

The Virtual POS product *OciCommerce* was implemented in Turisme de Barcelona offices. This implementation has meant the availability of sales data of the organization in real time. This has led to substantial improvements, as previously these data were unknown until the regularisation of pre-cut tickets in stock was done at the end of the year. From an administrative viewpoint, processes have also been optimized, as the use of pre-cut tickets has practically been completely eliminated. It should be remembered that Turisme de Barcelona manages around 40% of all sales of the Bus Turístic.

In 2017, the development project of new web portals of Leisure Transport has been carried out: Barcelona Bus Turístic, Montjuïc Cable Car and Catalunya Bus Turístic. The phases completed were conceptualization, interaction design, visual design, layout, development, implementation of infrastructure and the creation and insertion of contents. Publication is planned for January 2018.

—IT systems

1. Field of Operations

—Management of lines with multiple routes: different systems have been developed throughout the year (GIS of TB, BD Trànsit, API of TMB), in order to manage lines with multiple routes, beyond commercial return routes or entry/exit of depots. This means that many problems can be tackled that have not yet been resolved: lines served by more than one CON, limited or reinforcement services during the same day, etc.

With these modifications, other systems, such as OAS or PPS can start to be applied in 2018. This will enable better service in: monitoring the fleet, time schedules of stops and supply planning.

—Improvements in the TB Control Centre Operation: optimization of incident and breakdown entries, to speed up the entry and scaling of workshops, plus improvements in locating incidents and accidents: automated entry of warehouse addresses, location on the basis of the stop, etc.

—Central OES System: Evolution and adaptation of the Central OAS system, to achieve greater dynamism, to enable better street management and to facilitate operation processes, activity indicators online. Evolution of the System continues as planned in the PDT 2015-2020 roadmap. The following projects have been carried out this year.

– Work has been done on the analysis and design to incorporate improvements in regular lines. Production is planned for 2018.
During the year, the new communications model TCP/IP of the Central OAS worked on. This is to be able to interact with buses through the new mobile 4G network. Production is planned for 2018.
The project has been implemented to manage regulatory measures in OAS in real time.
– Work has been done on the definition and contracting of the new model to manage the OAS, breakdowns and incidents of the fleet. This project intends to digitalize the whole process by integrating OAS, SAP PM AND GRCA tools. The project will be developed in 2018.
– Upgrade of the OAS: a valid version has been implemented in the development environment. It is now pending to be implemented in integration and in production.
The new model of Infotransit has been defined and contracted, which will improve information given to the customer in the area of forecasts. Production is planned for 2018.

—Service planning information systems: In 2017, test environment of the PPS module for Buses was started up in the Zona Franca CON, to give support to all service allocation processes. The test results was highly satsifactory, and a positive response has been achieved from users. The mobilization of the Bus PPS time management module should also be mentioned, which will give access to operations managements and operative group heads of lines, now coinciding with the delivery of new mobile devices.

2. Measures to improve maintenance, infrastructures and the central office

— Maintenance management of TB rolling stock: consolidation of work and time tools in the workshop, including improvements and additional validation on the use of the touchscreen, reorganization of activity classes in the workshop, and added workshop activity monitoring *reporting*. New ABC indicators of breakdowns in the fleet.

—Maintenance management of TB Telecommunications and Central Workshop: integration of systems management on board with the external GMV maintainer, for third level maintenance incidents, and second level of automatic onboard distributors of bi-articulated buses (by email and SMS). Automation of low tyre pressure.

— Management of TB infrastructures: modelling of the management of incidents of electric buses (Rolling Stock and street charging). Modelling of the installation concept, essential to define documentary management of TB infrastructures. The functional document completed and approved, will be implemented in 2018.

—Management of the Central Office: improvements in maintenance planning of the fleet, minimizing delay in charging kilometres and facilitating the management of work orders before the Technical Inspection of Vehicles (ITV).

—Technological infrastructure

The renovation of the (*WiFi*) wireless network of Horta and Triangle CON depot yards, which has been used to improve coverage. The new *WiFi* equipment has improvements in communication protocols, and enables wireless communication to be faster and more efficient.

—Innovation, research and development

The *Bridging the Interoperability Gap of the Internet of Things* (BigIoT) project proposes a technological solution for applications and Internet services of multi-standard, multi-platform and multi-domain things The collaboration of TMB consists of testing radio devices onboard buses, in order to have apparatus based on mobile telephony.

Innovation and technology in the Metro

—Technological infrastructure

The following actions are highlighted within the scope of technological infrastructure.

Low-speed converters: the converter infrastructure has been started up of Line 3 and Line 5, which solves problems of obsolescence and maintenance associated with the PDH network. All services of lines L1 and L3 have been migrated to the new network, and therefore the PDH of these lines can now be dismantled. Migration of L5 services has also be started.

—Metro business technologies

In telecommunications, projects of the technology master Plan have continued. These are targeted at eliminating the obsolescence of the most critical systems. The most important achievements have been:

– **Telephony**: replacement has started of the previous TDM telephony (*Time Division Multiplexing*) in stations for the new voice over IP system. Replacement has been fully completed in L5.

– **Public address system**: all work has been carried out on the integration between the Control Centre system and the new IP solution, to be implemented in stations. Pilot testing of this solution is planned in two stations at the beginning of 2018, to later make a mass deployment in all the network.

– **Video surveillance**: within the replacement project of old analogue systems for IP systems, in 2017 the implementation in all of Line 5 has been completed, and half of Line 1.

– **Radio communications**: the installation of the infrastructure of the new *Digital Mobile Radio* (DMR) system has been carried out in Lines 1, 3, 4, 5 and 11.

Apart from the telecommunications projects as a result of obsolescence, a tender has been done for the new video surveillance system onboard trains, which can send images from inside convoys to the Metro Control Centre. Installation will be started in 2018.

In sales and validation systems, actions have been taken to mitigate obsolescence of automatic transport ticket distribution machines (DA). Functional improvements have been made in these machines, together with Punts TMB sales terminals.

—Location systems

Regarding support services to people location systems, in the second half of the year, the integration of different location systems has been started, to provide them with geographic reference information. This has been done by creating new geographic information systems (GIS) in the TMB API, which help to locate people in the Metro. This has been integrated with different positioning technologies, based on:

– *Wi-fi* points in depots and offices (for example: The Triangle Depot and the Sagrera Offices).

– DECT antennas (wireless, digitally improved telecommunications), located on Metro platforms.

– *TAG* (tags) along the tunnel.

This service platform will gradually grow in coming years, in order to integrate all available technologies. This will mean a more accurate and improved location of people, which will give support to problems such as: panic button (in hazardous situations); service coverage (optimizing the location of resources owing to proximity of needs); calculation of *indoor* routes or guidance (accessibility, optimum routes), or loading of passengers, according to time and station.

—IT systems

1. Improvement actions for the service operation

– New communication of incidents: data processing of people who have suffered an accident on the Metro network. Definition of the new organization procedure, along with its adaptation to the Data Protection Law (LOPD). Transversal project involving Metro Operations, Insurance, Maintenance and Legal Advice.

– Development of an operational information system to enable the management and monitoring of the Safety Events managed by the Department of Metro Rail Security Management.

– Implementation of the Videoma Digital Assets tool, to manage images and videos, used by the Department of Railway Security Management.

2. Planning and allocation of the service (PPS):

Deployment has been completed of the new service allocation engine for the planning process, based on CPLEX technology (tool to solve linear optimization problems). This improves current response time and enables more optimum solutions. This improvement has enabled the later implementation of the 5 shifts that were delivered last December. A decision from the Metro is now pending for its start-up.

3. Creation and adaptations systems of infrastructures:

This year, improvement and rationalization has been done in the maintenance of Metro elements (Rolling Stock and Infrastructures) to SAP:

– Mobility applied to the management of notices in Metro Maintenance: mobilization concept test of the closing process of maintenance notices of the Metro. It will shortly be deployed to the Maintenance group of the validation and sales system and also to the low-voltage maintenance system.

– New application to control the stock of Metro warehouses: deployment of a mobile application to manage the Metro S26 sub-warehouse (inventory, creation of restocking orders, return of materials, etc.).

– New Metro work voucher circuit: implementation of a new application to manage different work vouchers, which involves the action of different departments of the Metro Maintenance and projects Area.

4. Improvements in the area of People of the Metro:

Implementation of the *Kmaleon* programme for the Legal Collaboration Consulting to monitor and manage cases.

—Technological infrastructure

Deployment has started of the wireless network in warehouses and workshops of the Metro, to give coverage to the downloading services of trains and the location of people. During the year, the infrastructure of the Triangle Railway warehouse and workshop has been installed. A pilot test has been performed in order to validate the viability of the project. Deployment has also started at La Pau.

—Innovation, research and development projects

In 2017 Ferrocarril Metropolità de Barcelona, SA was actively involved in the following projects:

—NGTC (Next Generation of Train Control)
The aim of NGTC is to develop specifications of control systems of urban trains and major railway lines, based on ETCS (*European Train Control System*), and on CBTC (*Communications Based Train Control*) systems, in order to achieve maximum synergy between both. The intention is to develop a platform based on interoperable and interchangeable standard interfaces covering the entire range of railway applications from urban lines to major railways. This project closed in July 2017.

—IT2Rail:
The*Information Technologies for Shift2Rail* (IT2Rail) project is considered by the European Union to be a *lighthouse* project. It aims to provide a new seamless travel experience, giving access to a complete multimodal travel offer which connects the first and last mile to long distance journeys. 26 European companies from urban public transport are participating, represented by TMB, VBB and the International Organization for Public Transport (UITP).

—LIFE+Improve:
The purpose is to implement methods and practices to reduce pollution underground.

—*VA*-RCM:
The purpose is to find a solution based on continuous monitoring of conditions of train doors, to detect, through mathematic algorithms, which analyse the large amount of data on door vibration and possible failures before they occur, in order to significantly improve quality and maintenance costs.

Regarding new R&D projects, TMB is participating in BiTiBi Plus (Metro-Bicyle Intermodal Integration Strategies in Europe).

International Bus business

—Development of new business and external consultancy

TMB has participated in various external projects, either alone or jointly with other engineering or consultancy companies, or with other operators, such as Moventia and Vectalia.

With Vectalia, TMB continues to run a successful urban transport network in the Perpignan area and in the city of Antibes in France. Iin 2016, an extension to the concession up to 2021 was signed (it terminated in 2019) in Perpignan. This was because the Agglomeration wishes to incorporate hybrid buses and also changes have been introduced in the design of the bus network.

A minor collaboration was done in March, with the company Talento y Empleo, S.A., to give one-off support to an internal communication plan for the EMT of Malaga. The Internal Communication team worked in Barcelona on the approach, design and monitoring of the plan. It also participated in the presentation of results in Malaga.

It also presented its interest, together with Moventia through the TCC, to operate 100 hybrid and electric buses in Pune, India. However the tender was finally not awarded to TMB.

In 2017, offers were presented for tenders of the following projects, which were not awarded:
– Tender for the revision of the mobility plan of Ulan Bator (Mongolia), together with the Ardana consultancy company of Grup-4.
– Tender for a mobility plan in Semey (Kazakhstan), together with the Ardana consultancy company of Grup-4.
– Tender for the operation of part of the bus services of the city of Arles (France), within the agreement with Vectalia for the south of France.

—Special activities
TMB ha has carried out significant commercial action in 2017, particularly in collaboration with Vectalia, receiving administrations from the south of France, such as delegations from Arles, Nimes and Nice. At the same time, actions were done with the World Bank and the Banco Interamericano de Desarrollo (BID) of Colombia.

—International Activities
There was intense activity in the international sphere in 2017, with visits by international delegations to Barcelona and the presence of TMB professionals in various international public transport organisations. This included the active participation of TMB professionals in the International Organization for Public Transport (UITP), the *Association of management companies of Urban Transport* (ATUC) and the *International Bus Benchmarking Grup* (IBBG).

International Metro business

—Development of new business and external consultancy

TMB has participated in various external projects, either alone or jointly with other engineering or consultancy companies, including AYESA, AUDING-INTRAESA and CENIT.
TMB is also participating as a partner in ENSITRANS, jointly with SENER, Lisbon Metro and the Portuguese engineering company FERCONSULT. Through this company TMB has worked since 2010 for the Oran tram service in Algeria, auditing its trams, yards and workshops. The Oran project was completed in 2016, and it now remains for Ensitrans to finish the Algiers project.

The line 1 project of the Panama Metro (MPSA) was officially completed in 2017, regarding the consortium , with the last wok finally done. The Safety project ended in May, with the implementation of a rail safety management system (SGSF), and with the assistance of an employee of Operations, who passed over to line 2 from the month of June.Work on the Panama Metro continues on line 2, on which in January 2016, auditing work was started of trains from the Alstom factory in Santa Perpètua de Mogoda (Barcelona).
Also in relation with this audit, the consortium asked TMB to take over the supervision of Yards and Workshops, particularly of equipment required and their optimum location at functional and operational level.

In 2017 the Panama Metro (MPSA) asked TMB for support in various disciplines, to consolidate the Operation and Maintenance of line 1 and to prepare for the arrival of line 2. Negotiations on technical support were carried out throughout the year, in the following areas:

1. Technical support to internationalize maintenance regarding track, communications and trains, along with support in the definition of SAP data management methods for maintenance.

2. Support to the start-up of line 2. An expatriate employee will remain in Panama until May 2019. Monitoring will be done of "empty running tests" and the final start-up, with top staff to carry out launching.

3. Regarding *Safety*, TMB was also asked for reinforcement to cover the current MPSA Safety team, which has suffered various changes, and in order to finish the running-in phase of this major project.

TMB and the Panama Metro (MPSA) have continued work in 2017 on the auditing contract of the construction and start-up of 70 new coaches for line 1 of Panama. The project is being developed correctly on time, but with a high level of minor quality incidents that are slowing it down. The contract means that the current 3-coach trains (20 trains) of line 1 will pass to 5 (40 coaches). Also 6 more trains will be purchased of 5 coaches (30 coaches).
At the start of 2017, Subterráneo de Buenos Aires (SUBTE), a public company commissioned to plan, invest and manage the Buenos Aires metro, contracted TMB. This metro has been operated for over 24 years by *Metrovías*, and now wants to call an international tender to renew the operator. SUBTE asked TMB for assistance in drawing up the specifications, and assessing the proposals presented. In 2017, a team of 6 people from TMB involved in the Metro, Management Control and International Business, developed the specifications, and it is planned to start the tender process in mid-February 2018. It is expected that in July the applications will have been received, in order to start the assessment and awarding process.

2017 began with a good start, as in January the *Transport Infrastructure Ireland* (TII) considered TMB to be the candidate selected by the *Metro Operation Advisor RFQ* of the *New Metro North* of Dublín. An new light railway line is being planned in Dublin, to connect the centre with the airport and the port city of *Swords*. Work is planned to start in 2021, and it is expected to start-up the service in 2025-2026. This is a minor collaboration, in which TMB will develop the role of benchmark Metro Assessor , to assess TII in all relevant aspects for the prior analysis phase, which is expected to be completed by the end of the year. The contract has a term of one year with the possibility of an extension. The idea is to position itself at this point, in order to continue developing this work in later phases of the project.

In September 2017, a *memorandum of understanding (MoU)* was signed with the Vienna Metro, to define the relations between both metros. The Vienna Metro is developing an extension project of its network, including a significant prolongation of Line U5, and the automatic change of line U2, plus the new section. This agreement means the collaboration of both metros in the project, operation and development with different professionals of both companies.
Also in 2017, the Granada Metro (AVANZA) contacted TMB to propose Safety technical assistance to start "empty running tests" and the start-up of a commercial service of line 1 of the Granada Metro. This collaboration was to last 5 months and was planned to be opened in July 2017. The project was carried out satisfactorily by the Barcelona Metro Rail Security team, and was finally opened on 21 September 2017.

At the start of 2017, TMB was awarded, jointly wit the Ayesa engineering company, the auditing contract of the extension of line 1 of the Lima Metro, This line was saturated, and it was decided to double the fleet of trains from 20 to 40 units, and also increase each train from 5 to 6 coaches. This meant a considerable demand of trains (economically-speaking, it is the most important part of the contract), and involved important remodelling in the workshop, some stations and also in critical systems, such as energy and signalling. The project will be completed at the beginning of 2020. TMB will do the auditing of manufacture, transfer, implementation and start-up. It also means a person will have to remain in Lima, work of International Business teams and the support of TMB Metro Rolling Stock.

As a summary, along with the aforementioned projects, the Metro of Barcelona has continued collaboration in the following projects:
– Panama Metro L2, Panama
– Zaragoza Tram, Spain
An audit of the technical studies for the electric train in Ecuador.

In addition, Metro participated in projects that it was finally not awarded, including:
– Evaluation of Alternatives and Design of the Operation Model of the first Metro line of Quito (PLMQ).
– Integral Supervision of Service Provision of Line 1 of the Mass Transport Electrical System of Lima and Callao, jointly with the Engineering Company AYESA.

—Special activities

TMB has carried out considerable commercial action in Ecuador, regarding line 1 of the Quito Metro, currently under construction. In Colombia, we are now waiting for the results of the international tender of the construction management project of the Bogotà Metro. At the same time, actions were done with the World Bank and the Banco Interamericano de Desarrollo (BID) of Colombia.

This year, the annual meeting of Alamys (*Asociación Latino Americana de Metros y Subterráneos*) was held in Barcelona.. It was a great opportunity to present the work developed by TMB in Barcelona, and a fantastic showcase to explain the international work of TMB.

—International Activities

There was intense activity in the international sphere in 2017, with visits by international delegations to Barcelona and the presence of TMB professionals in various international public transport organisations. The extension of Line 9/10 led to greater activity in this area. In fact, the director of the Strategic Projects Service of the TMB Metro Network, is president of the Observatory of Automatic Networks of the International Organization of Public Transport (UITP).
The active participation should be highlighted of TMB professionals in the activities of the International Organization of Public Transport (UITP), the Association of Urban Transport Management Companies (ATUC), the Latin American Association of Metros and Undergrounds (ALAMYS) and in the *Benchmarking* Group for Metros.

Communication, customer attention and strategic marketing

—Strategy and digital channels

In 2016, the Strategy and Digital Channels Unit was created, for the purpose of managing and coordinating digital channels, and to be the core of the digital transformation of TMB in the area of Marketing. During 2017, work was done on three lines:

— Strategic definition - digital strategy plan, to set the target regarding the website, the *apps*, social networks and future projects to be developed.

— Consolidation of TMB digital channels, as an essential tool of information and marketing for users.

— Setting up of the Unit and work dynamics with other units involved.

1.Social networks

The Contents and Social Networks Unit was created at the same time as the Strategy and Digital Channels Unit, in order to centralize strategy, policies and the coordination of digital contents and social networks in TMB

In 2017, the digital strategy Plan was completed, and with this, the TMB map of social networks, to build loyalty and increase followers. The year closed with a total community of 3 319,639 users shared between the following pages: *Twitter* (70.5%), the three pages of *Facebook* (27.4%), the two profiles of*Instagram* (1.2%) and the *YouTube* channel (0.8%).

At the same time, work was done on protocols to ensure the correct coordination between units, which provide service to social networks and mechanisms, in order to use synergies and optimally adapt contents to the provsions of each network, to boost their potential. The following actions were carried out:

—**A new TMB profile in *Instagram*,** which is the complementary network of *Facebook*, to offer visual contents and to help promote the brand and its products and services.

—**Definition of contents strategy in social networks of the Barcelona Bus Turístic**, plus boosting the profile with*engagement* goals (capacity to create solid and long-lasting relations with customers), recommendations from users and brand positioning.

—**Redefinition of social networks policies.** Definition of the map of contents published in each social network, depending on the objectives of each channel and the target public, along with the definition of the communication policy of each one.

—**Integration of *Facebook Messenger* and *Trip Advisor* to the customer attention tool,** in order to optimize resources, streamline, standardize and use synergies in responses. These are consolidated as the customer attention channels, and open up the operation model of similar future channels like *WhatsApp*.

—**Implementation of the management of comments in *app stores AppStore* and *Google Play*,** in order to have an impact on users' opinions on TMB*apps* and to solve any doubts or comments, and preserve the good product image.

—**Implementation of the management of opinions on tourist products in *TripAdvisor*** in order to have an impact in the purchasing decision of potential users.

—**Design and construction of coordination protocols** between departments, in order to ensure the correct coordination between channels and contents published.

—**Implementation and consolidation of the *community* manager for marketing and commercial channels in social networks,** as a key figure in the coordination, planning and publication of contents, and in the moderation of comments in the networks. The *community manager* is complementary to other departments, which currently operate specific profiles of *Twitter* for service information or corporate news.

—**Approval, assessment and administration of new management tools of the Hootsuite and Iconosquare channels.** Definition of roles, users and permits of use of these platforms, which facilitate the daily management of different TMB corporate and tourist social networks, and the implementation of approved proposals that do not require development on the functionality of the platform.

—**Security control of social networks through the administration of the new tool *LastPass*,** designed to safely share passwords with other users and store digital registers. Definition of users and permits of use, and the maintenance of the map of social networks, managers, tools and list of users and passwords. Periodic updating of passwords.

—**Alignment of the image of each social network with the brand strategy,** and also the definition of the structure (bio, points, sections, links, features, lists, etc.) and defined target features.

2. Web environments

The Web Environment Unit originated from the previous Digital Communication Unit, which managed the TMB website, and was the forerunner in the creation and management of social networks of the company. The Unit is fundamental to user information of public transport networks, and in Internet dissemination of corporate, commercial and service campaigns.

The TMB corporate website is the central area of the territorial website of the company and the point of access to all its digital channels. In recent years, the Unit has taken on important projects regarding the corporate website (with 1 million visits per month), and has essentially contributed to important challenges of TMB, such as universal accessibility, information transparency and marketing of tickets: in 2017, the traffic provided by the website to the TMB sales platform, represented 47.90%. TMB also recently received a recognition award for accessibility processing in the website.

The most significant actions in projects were:

—**Integration of JoTMBé in the TMB website** through a private user area and personalized service of transport information, according to user preferences. These services are omnichannel and are totally aligned with the TMB app. Further information https://www.tmb.cat/ca/jotmbe.

—**Usability of the new "Vull Anar"** in the website, aimed at improving user experience in planning travel. It will include personalization options offered by JoTMBé and will incorporate mapping features of the TMB Maps web tool, which will disappear once the project is started up during the first half of 2018.

—**New websites of the Barcelona Bus Turístic, the Montjuïc Cable Car and the Catalunya Bus Turístic:** TMB leisure transport will have new websites at the beginning of 2018, which are more attractive and visual and better positioned, as they have been designed with a prior optimization study for browsers, and a lot of effort has been made in contents. They are expected to be a good source to attract online sales.

—**Implementation of online sales of transport tickets:** this project, which is under development, was conceptualized and designed this year for implementation in the TMB website in 2018.

3. User loyalty

The TMB website has gained user loyalty of over 12 million visits, similar to the previous year, with 12.36 million sessions. The new responsive TMB website has attracted enquires from mobile devices, exceeding desktop visits, with 64% of sessions.

The three most visited contents of 2017 from the home page, have been modifications in transport as a result of the general strike in Catalonia on 3 October, the maintenance works of the metro during the summer, and the new bus routes started up in November. These topics coincide with the months of most inflow in the website, together with 17 August (terrorist attack in Les Rambles of Barcelona.

The sections and pages most visited were, in order, the "Vull anar" route planner, the section on tickets and fares, enquiries on bus routes, the metro map, bus intervals and timetable information.

The European countries from which the TMB portal was consulted were United Kingdom, France and Germany

4. *Apps*

During the year, work has been done to improve the TMB applications available to users.

—***Barcelona Bus Turístic:*** a new application has been done coinciding with the change of image of the BBT.

—***TMB App:*** with the integration of JoTMBé in the website, work has also been done on the new TMB app, aimed to speed up information access. The new TMBapp:

— It incorporates the user profile with personalization preferences, which can also be managed from the TMB website.
— It enables screens to be personalized, based on the transport preferences of users.
— It incorporates *widgets* for the mobile desktop with the most widely used features: *ibus*, “Vull anar” and service status.
— Improved accessibility, as it was constructed with iOS and Android native interface.
— It has been optimized to be faster and more reliable.
— The *TMBapp* now has around 100,000 users, bearing in mind the iOS and Android systems.

5. e-commerce

Two lines have been worked on in e-commerce.
— Maintenance and development of the current platform *Barcelona Smart Moving* (including crossed sale and discount vouchers).
— Definition of the online sales strategy for residents and design of the website and *app* for this purpose. The project is divided into two phases.

— **PHASE 1 (before T-Mobilitat).** Sale of integrated tickets through the TMB app with redemption at vending machines (planned for September 2018). In this phase, the sales processes will collect user data, so that transition to T-Mobilitat is convenient and simple.
— **PHASE 2: With the start-up of T-Mobilitat,** deployment on online selling with be complete. In this phase, the application will be adapted in order to do the sale and management linked to T-Mobilitat supports. The application will have *widgets* which will give information to users on their tickets, and will facilitate management while the website will have the same features as the app. Through the JoTMBé account, customers can use both channels to make arrangements.

6. Digital transformation

This unit is formed by project managers commissioned to define digital strategy and to transform proposals in projects and to coordinate the operation. Similarly, it participates in projects of other units related to the digital and marketing area. These projects include the following: Digital strategy Plan, the inclusion of JoTMBé in the TMB website, the new *TMBapp*, the new *app* of the Bus Turístic and the design and implementation of new websites of the Barcelona Bus Turístic, the Montjuïc Cable Car and Catalunya Bus Turístic.

Participation has also be done in other projects led by other units, such as: the TMB Marketing Plan, the definition of the “Hola BCN 3.0” Plan for visitors, and the definition of the relational marketing Plan for residents.

—Product marketing

In 2017, as a result of the marketing management Plan, the Product Marketing Unit was created. Its main functions are the preparation and implementation of marketing plans for TMB products and services. This unit is divided into two departments targeted at residents and visitors.

—Residents

The most important action was the strategic definition of the JoTMBé 2.0 product, a relational marketing programme with the following objectives:
1. Build customer loyalty
2. Attract new customer segments, which are of interest to the company.
3. Provide added value services to members of the relational marketing club.
4. Position TMB as the leading player in the city of Barcelona and its metropolitan area.

This project is divided into four plans:
1. **Segment attraction plan:** planning the actions to attract segments of most interest to the company.
2. **Loyalty plan:** a points programme is defined, which customers with the most interaction with TMB can collect, either by using services or through links with the company.
3. **Retention plan:** defined as a series of actions to avoid customers from abandoning the relational marketing plan.
4. **Recuperation plan:** defined as a series of actions to recuperate customers, who have abandoned the relational marketing plan.
5. A programme of *Partners* has also been created, in which agreements need to be reached with other companies, which can revert to benefits for members of the TMB relational marketing programme.

The following elements form part of the relational marketing programme:
—**Status of the service:** notifications on incidents occurring in the service.
—**Points programme:** more points can be accumulated with more interaction of the customer with TMB.
—**Agenda of the city:** notifications on activities carried out in the city, bearing in mind the individual preferences of each customer.
—**Commercial platform:** access to special discounts for members of the relational marketing club.
The first actions of this project are planned for the first quarter of 2018, which will be in full operation by the end of next year.

—Visitors

The most important project within this segment is the strategic definition of the "Hola BCN! 3.0" Plan. It consists of positioning TMB as a reference of tourist mobility and of increasing income from the marketing of products and services of this segment. The key factors are:

1. **Creation of an "umbrella brand"** which unites different products, which are either own products or from third parties, addressed to visitor customers.

2. **Improvement in customer experience**, giving customers either physical or digital, unique support, where all tourist mobility of the city is available.

3. **Relational marketing:** definition of a plan of contacts, providing added value to visitors and increasing the average ticket.

4. **Alliances with third parties:** different players of tourist mobility of the city are defined, with whom TMB may associate to position itself as a reference in tourist mobility.

The following projects will be developed in the first quarter of 2018: discount coupons for e-commerce, relational marketing for visitors, partnership or tour operator actions, training of customer attention agents and marketing of contents and social networks.

Other, more specific projects highlighted in 2017 are:
1. **Improvement of the Hola BCN! product:** the product has been developed from daily to hourly validation, therefore adapting to customer demands.
2. **BBT shock plan:** a shock plan was defined, to collect a series of initiatives focused on recuperating the market share which BBT had lost.
3. An **agreement has been signed with Aerobús** to jointly market Hola BCN! with these media, which will widen potential purchasers.

The challenges for 2018 are to boost and start implementing the two strategic projects of the Unit, that are the relational marketing Plan of JoTMBé 2.0 and Hola BCN! 3.0.

—Customer experience

The Customer Experience Unit was created in 2017.The main goal is to introduce customer experience in TMB, as a competitive advantage to gain the loyalty of current customers and to achieve advisors to help attract new customers. The introduction of the customer experience means a cultural change, as it puts the customer at the centre of all decisions (*Customer Centric Organization*).

This year , a study has been started on customer experience for the segment of visitors. The scope of the project has been defined in terms of:
—Fields of application Hola BCN! (until the customer has the ticket in his/her hands), BBT, the Montjuïc Cable Car and the Tramvia Blau.
—Core concepts: digital channels, intermodality, product design and *Welcoming*.
—Archetypes: tourist family, tourist couple, tourist group, local travellers and non-local travellers.

The phases of the study were:

—**Immersion:** analysis of existing TMB documentation on the visitor segment and on different tourist products/services, personal interviews with execuctives within the Executive Marketing Management, *Awakening workshop* with previously interviewed members, ethnographic observation, f*ocus groups* with people in direct contact with customers, *sprint surveys* and social *monitoring*.

—**Diagnosis:** preparation of the *Customer Journey Map* (CJM) and the*Emotional Journey Map* (EJM), inventory of moments of truth, moments of pain and critical points, diagnosis of visitor experience and the analysis of experience gaps.

—**Future model:** identification of improvement initiatives classified in *Quick wins* and pilotables (short term), desirable (medium term), aspirational (long term).

Once they have been prioritized, these initiatives will be started up during 2018.

—Advertising and brand

The following has been carried out in corporate campaigns.

—**Civic responsibility campaign "Travel with Karma":** this communicative action was carried out at the beginning of the year, with the aim of creating an allegorical character of karma, as a tool to communicate in friendly, assertive way, the awareness campaigns of civil responsibility. The campaign was done in an unusual way, with satisfactory results. A new phase is planned for next year, with new messages.

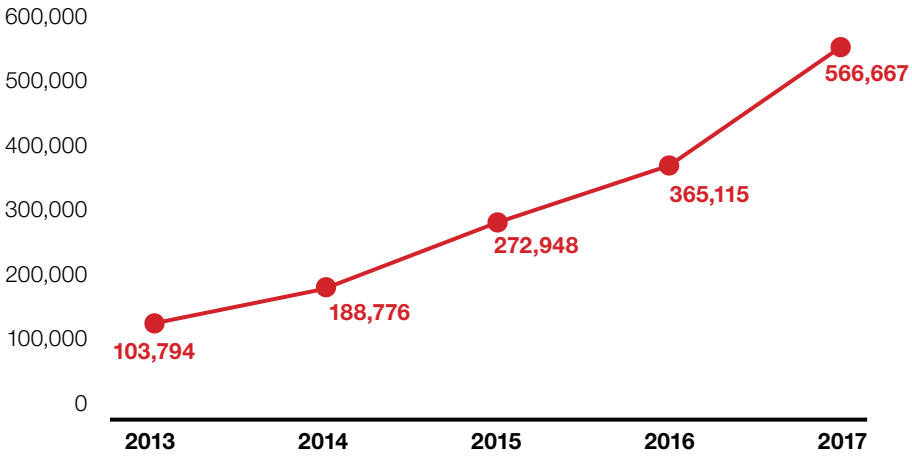
—**"Hola BCN" campaign:**the creative content of this campaign was updated to include the features of the product in the message. With this creativity, the environment of ticket vending machines (DA) was covered, of the main metro stations with greatest impact on the non-resident market, along with metro stations of the Airport.

Regarding the JoTMBé club, this year there has been an increase of over 200 registrations (55%) and there are now over half a million members.

Throughout the year, 120 competitions were done with prizes consiting of invitations or tickets to various performances
(16,000 prizes).

Coinciding with Sant Jordi day, the
11th edition of the TMB Short Story Competitions was held online, which was once again a great success. This year, there were two new categories: one linked to the 25 years since the Olympics, and another linked to a Disney film.

Number of members of the JoTMBé club



The 8th edition of Subtravelling was also held, which for the second year running, was linked to the Seoul Film Festival (SMIFF).
The database contact plan is one of the main sources to attract visits to the website, and secondly, direct visits.

Finally, this year 6 brand actions were held: Performance in the metro of the singer Muchachito; special performance of Brodas Bros and Brincadeira; conference against LGTBphobia in sport; a photography exhibition of the EFE news agency at the Diagonal interchange; Mural of Axe Colours on RagBoneMan, and the celebration of the 6th anniversary of JoTMBé with Rozalén.

—**Internal communication**

The Metro agreement was signed in 2017, after two years of negotiation and various strikes. Until its signature, Internal Communication have continued giving support to the business area in communication.

The preparation of the strategic communication and internal reputation Plan (PECRI) 2017-2021 should also be highlighted.

The internal CSR action "Tria la teva causa 2017" (Choose your charity 2017), along with the internal communication campaign that resulted, "Mou-te pels contra la violència de gènere" (Move against gender violence) were some of the highlights this year.

The following details summarise the annual activity of Internal Communication:

—**Corporate information: 84 TB notices and 132 Metro notices have been published this year.**

—**Publications:** A total of 160 articles have been written and published concerning GenTMB.

—**TMB channel and mailboxes: 53 weekly programming operations carried out.** Responses were also given to different corporate mailboxes from Internal Communication..

—The **GenTMB Club** has reached 4,025 members, with an average of almost 45 connections per user per year. The department maintained contact with various suppliers, six of whom have signed agreements with the club, either financial or for the exchange of services. As a result of these agreements, promotions and raffles have been done, aimed at increasing club members..

—**Participation campaigns**(aid to courses, sports tournaments, etc.) charity campaigns (party of the NGO Conductors Solidaris de Catalunya (Supportive Drivers of Catalonia), volunteering, Barcelona magic Line, Tria la teva causa (Choose your charity, etc), health campaigns (blook donation, addictions, etc.).

—**Communication Plan from the International Business Division:** on 30 March, the internal communication Plan was presented to the Malaga transport company (EMT), which had been drawn up by the Contalento consultancy company-

—Corporate information:

The following actions are highlighted:
—Preparation, design and contents and a TMB stand at the *Smart Mobility World Congress 2017*, dedicated to innovation in the metro and bus.
—Renovation of the *Welcome Pack* presented by TMB.
—Preparation and updating of the TMB Institutional Presentation 2017 (in three languages and accessible).
—Re-editing of the TMB institutional video, in two versions (long and short).
—Preparation of communication Plans on cuts in the Metro network and other services planned for 2017 (Funicular and Tramvia Blau). It included meetings with various councils and districts of Barcelona, affected by cuts owing to works, in order to present the communication plans of each action.
—The "Basic TMB Data 2017" documents were drawn up (in paper format and web version) and the "TMB Annual Report" (in three languages and accessible digital format).
—Support tasks and preparation of various contents, presentations and audiovisuals for topics of the Communication Area and for projects of other TMB Areas and Departments, such as the following: Communication plan of the New Bus network, presentation of the new BBT image, ALAMYS assembly and congress, "Mou-te contra la violència masclista" ("Tria la teva causa 2017"), System on Participation Systems, etc.
—The management of the TMB photographic collection should also be mentioned, this year with a Videoma of around 7,200 photos (there are around 35,000 images available from 2012 to today).
—Incorporation of 46 new videos introduced in the TMB YouTube channel.

—Press Office

Throughout the year, TMB has appeared in the media 11,805 times, 5% less than in 2016. 19.9% were in favour of the company's proposals, 23.5% against, and 56.6% can be considered neutral.

The news most appearing in the media were the strikes (3,847 news articles, 32.6% of the total), the Metro labour conflicts, and the impact of the two general strikes in the autumn. Other important news owing to the volume (794 news articles, 6.7%) refer to the Barcelona Bus Turístic, particularly the act of vandalism of one of the vehicles near Camp Nou on 27 July. This incident received wide and prolonged coverage. Other anti-social incidents appeared in the media 713 times, 6% of the total.

19.9% of the items published originated in the TMB Press Office, while 27.7% initiated jointly in the press office and other institutions or organizations. Barcelona City Council and other municipal bodies accounted for 6.6% of information items and the Government of Catalonia and its organizations accounted for 8%.Treatment by the media to 34.2% of items originating from the TMB Press Office were in favour of own objectives (4.3 percent more than in 2016).

The proactive work of the Press Offices has been focused on preparing and disseminating 216 releases and dossiers, apart from the organization of 37 meetings with the media. A total of 566 requests for information and statements were processed, as well as 282 permits for media recordings, along with other actions.

Regarding the TMB News web, which includes a virtual press room, 678 news articles were published, which have received 558,400 visits.

The management of TMB corporate profiles in social networks*Twitter* and *Facebook* involved the publication of 3,224 tweets and 1,044 posts respectively.

—Information and signage:

—Bus campaigns and actions

Various campaigns and actions were carried out throughout the year regarding the Bus:

– Updating of fares in all the Bus fleet and placing a sticker for the updating of ticket validity.
– Production and placing of copies in *Braille* inside the whole bus fleet.
– New edition of maps: NXB pocket map (November), foldable bus map (2 editions: February and November) and an office format map (November).
– New Bus Network phase 5.1 NXB: informative campaign (definition and coordination with the Council): design, production and placing of information and signage of new NXB and local lines, together with the modification of existing standard lines and NXB (notices, existing interchanges, new interchanges, stickers, codes, plans of bus shelters and street posters). Work has been done on almost 1,600 originals.
– Informative campaigns: 4-door vehicles, new ways of operating the D20 in summer, pilot test for access to scooters on the Bus and Metro, ticket vending machines of bi-articulated buses, electric vehicles on line H16 and various concerts and events (U2, Rolling Stones and ANC).
– Informative notices: modification of routes of lines 21 and V21, and of the Gran de Gràcia lines.
- Study and pilot test of a support for notices on board 3 buses.
- Study on the visual impact of the front of buses with LED lighting.
- Updating of signage for new needs or regulations: poster on the validator, rules of use, pushchairs, photoluminscent emergency notice, etc.
– Removal of previous TMB and AMB logos and placing of new logos on the whole bus fleet.
– Removal of the exterior image of NXB from 93 buses (under development).
– Implementation of WiFi signage on Buses and coding of this signage for its maintenance from the operational areas.

—Information, signage and micromarketing projects

Throughout the year work has been done on updating the TMB website, such as specifications of the service, review and correction of links and the name of accesses of all Metro stations, updating of maps of the Bus, Metro and the New Bus Network (NXB), etc.

Various projects have been started (not completed) such as the following: a study on the changeover to recycled paper, the new Metro plan, hybridisation study, Metro plan/NXB plan, the future analysis of the BCN *Contactless* campaign, new (*videowalls*) at Sagrera (Civil Protection) and Triangle, etc.

Within the actions classified as micromarketing, highlights have been the “Estrena’m Bus i Metro” (Try out the Bus and Metro) campaign, the “Estrena’m de Medi ambient i Sostenibilitat" (environment and sustainability) campaign and the ’“Espais reservats” (Reserved areas) campaign , all under development.

—Corporate design and identity

In signage, several actions have been done, such as the layout and updating of Bus and Metro plans, vehicle signs, redesign of the exterior PIM of the Metro, design of information leaflets, etc.

In corporate image, internal documents and the corporate manual have been updated, the logotype of different elements and the redesign of the Punts TMB image.

In marketing, work has included the design of elements for the Hola BCN campaign (leaflets, advertising adaptations, etc.), adaptation of all JoTMBé promotions for social networks, design of tarpaulins, roll ups and other elements for different events, and the creation and adaptation of internal campaigns (Karma, Mou-te, Christmas, etc.).

Collaboration has also been made on various internal documentation (List of Bus services, TMB welcome pack, TMB Annual Report, leaflet of Basic Data, etc.).

—Information and digital attention:

—Publication of service information on digital channels:

The coordination, management and publication of alterations is done (planned and unexpected), along with service recommendations that effect Bus or Metro services, through various digital channels: website, JoTMBé, TMBapp and TMB Maps, Twitter, MouTV and Transmet. Work is also done to identify activities of the metropolitan area and changes in the service, which should be notified to passengers.

Coordination is done of the publication of messages and graphic materials, for all digital channels, thereby guaranteeing coherence and consistency between all of them. Also the coordination and contract of information to be issued, with all operating centres (Operational Regulation Centre), Bus Information Centre and the User Information Centre.

The main actions at channel level were:

—Web TMB

– Publication of over 500 notices in the section "Status of the service", which receives over 805,000 visits, with information on changes and events in the city.
- Over 400 changes planned in Bus lines, such as diversion of lines, changes of stops and others.
Monitoring in real time and the publication of programmed information on traffic lights, on the state of traffic, which appears in the home page.
- This year, the presence of Google Maps has been consolidated,

as over 90 Google maps have been incorporated, which have led to 1.5 million more visits, apart from positioning ourselves in the browser.

—**JoTMBé:**
Over 7 million e-mails with service alerts sent to club members based on their profile and interests (segmented by line, post code, etc.). These increased by 100% over the previous year, owing to information sent on transport strikes, which have affected the service.

—*Assistance via digital channels:*

The figures for the year are summarised below:
—**Website**: Response to over 10,000 enquires made by customers through the web form, and responses to over 12,500 enquires received regarding lost property on Metro and Bus premises.
—***Backoffice***: improvement in the*Zendesk ticketing* tool, which has enabled time reduction in the management of enquiries on specialized issues (offences, JoTMBé, etc., and an increase in productivity. Other channels have also been integrated such as *Facebook Messenger* enquiries, which has reduced time in managing each enquiry, and has speeded-up registration and classification, to be able to later extract statistics and conclusions.
—**Social networks**: The @TMBinfo channel has achieved 20,000 followers in its fourth year, ending the year with 42,700 *followers*. It had an average *klout* score (tool that measures social influence through social networks) of 80, meaning 20 more than the previous year (ranging from 0 to 100 points). The higher the score, the more influence in networks.

Since March 2016, operation of the *Twitter* channel is done physically from the Metro Control Centre, and from November 2017, it is present in the Bus Control Centre. The level of *engagement* (interaction with the brand) and impressions have increased considerably, as a result of the animation of the channel, through graphic material (*gifs*, images, computer graphics and videos), owing to the alterations this year (the terrorist attack in Les Rambles, Metro strikes, demonstrations in the city), along with the use of new features and innovations, that have developed the platform itself.
In 2017, there were 12,0000 conversations with customers in the channel, meaning 23% more interactions than the previous year.

—*Operation of the MouTV channel:*

Activities of the channel are summarized below:
- Publication of planned service changes and service information in line with other channels. Apart from communication by *scroll*, informative screens on strikes, explanatory diagrams on Metro cuts, videos on the implementation of the New Bus network (with great impact, which was requested by the Barcelona City Council, for dissemination in its channels), other incidents or reminders on service timetables.
– Information in real time on events with a very high volume of passengers, such as the *Mobile World Congress (MWC)*, Metro strikes, demonstrations in the city, the terrorist attack in Les Rambles of Barcelona, la Diada (Catalan national day) and La Mercè festival.
– Operation of the channel and daily update of news, service information, corporate information and advertising of over 2,800 *players* installed in the Metro and Bus network.

– Validation and programming of over 3,000 clips on the MouTV contents manager.
– Monitoring of the state of *players* and resolution of incidents.

—Management of the Transmet Information Centre (afternoon shift):

Management of the Transmet Information Centre from 12 to 19h, focusing information on incidents in real time during this timetable, from different operators of the Metropolitan Area , in order to make radio connection with agreed channels, and updating of the online newsletter.

—Special information devices (for strikes, demonstrations, Diada, etc.)

Preparation of specific materials and extraordinary informative devices, along with the extension of usual service timetables, in order to cover events with a high number of passengers on public transport.

—In-person attention at Punts TMB

Activities of Punts TMB have been addressed to meeting the needs of the customer service, resulting from a growing demand, caused by the application of social policies to facilitate public transport. :

Improvements to the management of processes:
– Creation of fixed module management to settle travel tickets purchased at the Points.
– Readaptation of settings of the *Q-Matic* queue manager, to customer needs, regarding the volume of activity generated by the sale of social tickets, T-Mes (monthly subsidy) and T-famílies monoparentals i nombroses (single parent and large families.
– Restructure of the application in *SharePoint* for direct introduction, from various locations, of objects found in the system.
– Introduction in dataphone terminals, to improve commercial management.

Improvement of Punts TMB premises: apart from providing them with computer tools, the Universitat and Sagrera points have been refurbished. At the Diagonal Point, a new lost-property office has been incorporated.

In personal training, customized English courses have been given to agents and heads of the Points, who have also be given the efficient presentation course.

All activities of the Information Points come within procedures collected by their Quality System. This year, they have once again been certified according to the ISO 9.001 standard.

The number of calls from customers to the —*Call Centre*— and calls attended have increased. Missed calls have been reduced, and also the average time spent on each call.

Calls	**2017**	**2016**	**% Δ**
Incoming calls	76,518	70,957	7.8%
Calls attended	67,326	62,714	7.4%
Missed calls	555	1,030	-46.1%
Out-of-hour calls	5,293	4,805	10.2%
% of calls attended	95.44%	96.37%	-1.0%
Average time per call (minutes)	0:02:	0:03:	

The type of calls attended has been similar to 2016. Information calls (strikes and the implementation of phase 5.1. of the New Bus Network) have increased. QRS enquiries have reduced (more use of digital tools) and fines (drop in the number of cases opened).

Type	2017	%	2016	%
Information	34,067	50.6	28,865	46.0
Lost property	25,149	37.4	24,852	39.6
Fines	855	1.3	1,154	1.8
QRS	4,274	6.3	4,540	7.2
Others	2,971	4.4	3,303	5.3
	67,316		**62,714**	

Customer service management	2017	2016	Diff. %
Claims managed	2,133	2,481	-14.0
Statements processed	1,266	1,898	-33.3
Lost property management (items found)	29,084	24,236	20.0
Management of withdrawn travel cards	5,239	6,871	-23.8

Regarding public attention management, it can be seen in the table that the value of data has decreased in general, from the lost property management.

More use of Internet is observed from customers, in the presentation of QRS, and the number of presented allegations has fallen, because this has been done by the cases of fraud opened and by the application of clear, definite criteria in their assessment.

Finally, similar to other years, the Punts TMB have participated in different communication and advertising campaigns, promoted by TMB. Highlights have been the participation in the awards and informative management of the competitions and promotion of the JoTMBé club, the sale of tickets to Metro Historic and the management of internal promotions to TMB employees.

— **Handling complaints, claims and suggestions (QRS):**

Definition of goals for this year have been addressed to developing the following lines of work:

– Redefining the contingency Plan designed for compromising situations, and attempting not to generate a high number of cases accumulated in the process, in times of short resources.

– Implementing a new computer tool: drawing up the functional and technical specifications to acquire a tool that facilitates the management of cases in all units involved.

The quality indicators, defined by TMB, have been maintained at an acceptable level globally (average response time and the percentage of responses within the deadline). However there have been a few one-off decreases, owing to the lack of human resources. These two indicators, of which the QRS Management Unit and the Operational Areas of Bus and Metro are responsible, form part of the commitment required by the Spanish standard UNE 13816.

The number of QRS cases registered during the year has increased by 22% over 2016. This increase has been caused bassically by the service offered during the first half of the year, in order to start the 5th phase of the NBX and owing to the labour conflict in the Operational Area of the Metro.

Regarding the communication input channels, the use of digital means was consolidated over in-person means, 65% over 15%, and the register of phone communications was maintained at between 4% and 5%.

A result of this work by the team, has led to the renovation of the quality certification ISO 9001:2008, without any non-conformities in the process.

—Management of fraud and anti-social behaviour in the TMB NETWORKS

The direct line of communication between the Ombudsmen and TMB. The direct involvement of the Catalan and Barcelona ombudsmen in matters related to the handling of fraud or anti-social behaviour cases has made it possible to detect weaknesses in the service and actively improve it.

Once digitalization is implemented of all documentation related to Fraud cases, written documentation is still presented to Punts TMB. Next year, a project is planned, with the collaboration of Punts TMB, to reduce all this documentation in paper format to zero.

The first notifications to users have been updated, in a friendly, approachable way, without losing sight of the original rules for which they are issued.

A series of training sessions has been given to staff of Metro Intervention, in order to combine the work of both groups, and optimize part of the process, such as collecting data or criteria of acceptance in sending cases to the Administration. Meetings have again been held with the Head and coordinators of Metro Intervention, in order to pool procedures of each unit involved in the Fraud process, and to optimize hours spent on each part of the process.

Regarding the management of fraud cases, 24% less cases were opened than in 2016. In the Metro, they have dropped by 24.3%, while in the Bus 20.9%.

Interventions undertaken have decreased considerably. In the Metro, there have been 36.8% less interventions, which has led to a drop in the number of cases opened. Interventions in the Bus service have fallen by 24.2% compared to last year.

Collection from fraud cases has decreased over 2016, along with the number of cases paid up. The number of fraud cases referred to the Administration has increased considerably, owing to a change in acceptance criteria of the Administration compared to the previous year.

—Universal Accessibility

In 2017, because of its allocation to the Customer Area, the Universal Accessibility service has gone from management as a social policy (in the field of CSR), to a commitment of accessibility, as another principle of quality to customers with diversity. It is targeted to improving travelling conditions of everyone, regardless of their physical, sensory or communication capacities. Therefore, solutions are proposed from a perspective of "design for everyone", which represents an opportunity of improvement for all the public. This enables more operative and efficient management to be developed.

A summary of activities undertaken over the past year is given below:

—Agreement to regulate the access of scooters to public transport.

The Department of Work, Social Affairs and Families, the Barcelona city Council, the Metropolitan Area of Barcelona (AMB) and TMB organized a pilot test, through a collaboration agreement for the future safe access of scooters, for people with reduced mobility, on the main public transport of the Metropolitan Area of Barcelona.

The pilot test was developed from 26 June until the new Accessibility Code is passed. This will legally incorporate the access conditions to public transport with general effects. A commission formed by representatives of the four signatories of the agreement is monitoring the test and drawing up the conclusions. The result of the first half of the year of application is that incidents and falls have been eliminated.

—Operational code of universal accessibility

Within the new management model, it is planned to define the role, competence and actions of each service of the company related to accessibility.The aim of the operational Code is to guarantee full accessibility to the transport service, provided to users with functional diversity, in their different forms, and at the same time meeting European legal reglamentary and administrative provisions. This is to guarantee the elimination of physical barriers, communication and an approach that facilitates free circulation throughout the network.The development of the operational Code is making a description of the aspects and knowledge the whole organization should have regarding accessibility. Protocols and procedures are established to determine obligations and responsibilities shared by all teams of the TMB networks.

The project has been presented to the Executive Board and to all services involved. 14 work groups have been formed, which during the first quarter of 2018 will specify the commitment of actions to be taken in each environment.

—Audit and digital accessibility guide of the app

During the last quarter of the year, a proposal was developed for a digital accessibility guide as a design manual and development of*apps*, which the technology services are assessing. The aim is to propose an accessibility and usability design of TMB *apps*, with features and full information on TMB accessibility. The *apps* should guarantee the compliance of international guidelines and current legislation.

Various actions will be carried out in the first quarter of 2018, such as a thorough analysis of the *app*, to detect any errors in usability and accessibility, the location of the most critical points, the creation and performance of tests, to define the improvement of the tool and finally the development and implementation of proposed solutions.

—Accessibility management certification

During the last quarter of the year, the diagnosis was made of all operational and service environments of the company, with an accessibility management system, for TMB to achieve universal accessibility management certification of TMB networks, based on the AENOR standards UNE 170001-1 and UNE 170001-2.The purpose is to determine the capacity to transmit an accessible environment meeting DALCO requirements - Ambulation (horizontal and vertical mobility), Apprehension (referring to manual, visual or hearing provision), Location and Communication.

—Physical Bus accessibility commission

This is a work group formed by staff of the TMB operational area, physical disability entities and the Municipal Institute of People with Disability (IMPD). The aim is to coordinate improvement actions that help to detect and improve processes, to achieve full operation of ramps and *kneeling* in TMB vehicles, along with training and approach of drivers, to use the systems correctly.

Outings have been done with the IMPD for the Bus Stop Plan, and 4 meetings have been held to combine possible improvements. The group will continue development in 2018.

—Audit of stops and stations in Barcelona

A study carried out by the IMD, together with the Observatory of Physical Disability and technical assessment of the TMB Department of Accessibility, for the purpose of having updated and real data on accessibility at Bus stops and Metro stations of the city. All Bus stops in Barcelona have been audited, plus the Metro network (stations and elements). This has led to preparing a map of deficiencies detected, and also to bring to light the responsibility of the city council in the service proved by TMB, and which directly affects the user. In 2018, the audit and most urgent actions to be done by the City Council will be assessed.

—Training and training plan in accessibility

4 sessions were given to the Bus CAP (first aid) monitors, plus 25 sessions with a total of 325 participants of customer attention agents of the Metro.

A **corporate training plan in universal accessibility** has been done to update previous knowledge and acquire new tools to develop attention to users with functional diversity. Specific contents have been created, designed depending on the profile and type of work carried out by each group of participants. The proposal included both the technical programme part and practical activities

—Videoma organization of vídeos/photos

A profile has been defined in the Videoma programme, to organize and file the collection of images and videos referring to projects, developments, actions related to questions of accessibility of the company.

—Bus engineering/analysis of new vehicles

The Accessibility Committee has analysed certain critical elements on vehicles incorporated in 2017 (ramps, spreader bars, etc.). The department has assessed the accessible elements and has proposed improvement that can be implemented, supervising the acquisitions. The actions carried out include the design of a PRM safety side bar, to facilitate the access of scooters. An assessment has also be made on the luminosity accessible to the front information *display* of different vehicles.

—Global Accessibility Awareness Day

Collaboration agreement at the request of the UN to recognise 30 September as Global Accessibility Awareness Day.
The Mapp4all application promotes services proved by TMB to different TMB communication and information supports to the digital platform owned by it. Mapp4all will develop new *Routings* in its application

—AMB AU Grup Motor

One of the accessibility challenges in 2017 of metropolitan municipalities was the creation of an accessibility work group in public transport, called "Grup Motor". It is formed by 7 municipalities, the AMB, COCEMFE (*Spanish Confederation of People with Physical and Organic Disability*) and TMB.

It aims to draw up a participation plan to achieve full accessibility in public transport of the Area, exchange experiences and know-how, and also goals reached. TMB presented the projects, which are being carried out by the Department of Accessibility, in three group sessions. which have been developed.

—SIU improvement group

A work group formed by staff of TB Operations, visual impairment entities and the IMPD. The aim is to coordinate improvement actions that help to detect and improve processes, to reach full operation of PIU hearing accessibility systems (User Information Screens) and SIU (User Information Systems) of TB. The group monitors investments made of the collaboration agreement signed with the IMPD.

3 monitoring meetings have been held of different systems and improvements made in 2017.

—Infoaccessibility with smart tags

A signage system, with smart tags, which gives information through an *app*, with different elements of reference, to guarantee the accessible experience of customers with visual impairments. The informative content viewed by the user in the application, will later be specified, depending on corporate and user interest.

At the end of the year, the possibilities of the system were observed, which is planned for the first quarter of 2018: calibration test and pilot test and enablement before the MWC of L9 Sud, the Diagonal Punt TMB station and the Bus route H12.

—Information and signage:

—Metro campaigns and actions:

During the year, various campaigns and actions were carried out in the Metro environment:

- Study and definition of thermometers for the whole Metro network.
- Publication of the Metro guide (March, June, November and December).
- Updating of elements: Metro office plans, plans of train interiors, PIMS, Punts TMB vinyls, Metro fares and information and customer attention centres.
- Monitoring of refurbishments: Paral·lel, Passeig de Gràcia, Fondo, Universitat and Besòs Mar stations.
- Signage and information campaign: closure of the Cable Car, cuts in the Metro for planned action on L3 and L1 during the summer months, cancellation of the service on all of L9 Sud during alternate weekends.
- Definition and preparation of precaution signs in lifts of all the Metro network.
- Preparation of a proposal for prohibition and obligation signs of escalators, based on non-compliance as established by standard UNE-EN 115.
- Reformulation of platform signs on: L1 track1 and track 2, L3 track 2 and L2 track 1.

– Revision and preparation of the document, with signage considerations of the executive work Project of Foc and Foneria stations of L10 and direction bands and thermometers of L9 Sud - L10 Sud.
– Preparation of the document “Protocol for signage of Metro Network stations with works in progress and under construction", based on visits made to the site, and the study of executive projects, of both refurbishment works and new constructions.
– Production management of "Tots som Barcelona” (We are all Barcelona) posters, in solidarity with the victims of Les Rambles terrorist attack.

TMB Foundation

—Public Relations, cultural projects and protocol

In TMB Culture, a set of activities was programmed, some organized by the Foundation, and the majority in collaboration with associations and institutions of Barcelona and the Metropolitan Area. These activities are carried out on metro and bus networks. Many of the activities are financed by sponsors.

The main goals of this programme are to boost the image of TMB, provide added cultural value to public transport users and the creation of synergies with cultural entities, associations and institutions of Barcelona and its Metropolitan Area.

The main activities of the TMB Culture programme were:

Month	Activities of the TMB Culture programme	Venue
January	Special performance by Dagoll Dagom “Scaramouche”	Catalunya station
February	The Project: Guitar BCN performs on the Metro and live music concert	Exhibition at Diagonal
March	International Piano Maria Canals Festival	Diagonal station
April	Musical performance on the occasion of the Spring Festival of the Hospitalet de Llobregat Council.	Av. Carrilet and Rambla Just Oliveras stations
	Photography exhibition to celebrate 40 years of the Sports council	Corridor of the Diagonal station
May	Participation in the Nit dels Museus (Museum night)	
June	Mural painting by the artist Mari Ito	Universitat hall
	Historic bus rally	
	“Sonar baixa al metro” concert	Universitat hall
	Special event on the metro stairways: SWAB STAIRS	
	Award ceremony of the Sant Jordi competition	TMB Gaudí Area
September	Participation of TMB in the World Car-Free Days organized by the Hospitalet de Llobregat Council	
October	Silver anniversary of TMB employees	
	Presentation of the Mou-te programme 2017	Universitat station
	Awards ceremony of the Subtravelling Festival	Universitat station
November	International ELIPTIC meeting	CaixaForum
	ALAMYS Congress	Fira Gran Via Barcelona
	Participation in the Smart Mobility exhibition	Fira Gran Via Barcelona
	Presentation of the Mobileye system	Fira Gran Via Barcelona
December	International C40 Meeting	CON of Triangle Ferroviari
	Opening of the exhibition “Final de Línia”	Espai Mercè Sala
	Recognition event of FP Dual trainers	CON of Triangle Ferroviari

Own cultural projects

—**Musicians on the Metro:** in February, the aptitude tests were held of Musicians on the Metro, organized jointly with the Associació de Músics de Carrer (Amuc BCN), and with the collaboration of a jury formed by teachers of the Escola de Músics Juan Pedro Carrero (JPC), of the Ciutat Vella District.

—**Subtravelling:** This is the Fundació TMB International Festival of Short Films. Public transport is the leading actor. The eighth edition, organized by the Fundació TMB, within the TMB Culture programme, took place during the months of October and November on the MouTV screens. This year the festival consolidated the international collaboration with the Seoul Metro and its SMIFF festival. Contents are shared, which are projected on the metro screens of both cities.

Espai Mercè Sala

In 2017, 4 exhibitions were organized in the Espai Mercè Sala. Participation was also done in the Nit de Museus, organized by the Barcelona City Council:

—From 21 November 2016 to 28 April 2017: Metropolis Verda.

—From 8 May 2017 to 9 June 2017: the exhibition“Barcelona, ciutat i transport públic urbà”. (Barcelona, city and urban public transport).

—From 18 July to 26 September 2017: to commemorate 25 years from the Barcelona Olympics, the exhibition "Barcelona 92 imatges, l’obra Olímpica” (Barcelona 92 images, the Olympic work), organized by the EFE news agency and the Barcelona City Council.

—From 26 October to the beginning of February: the exhibition “Final de Línia” (End of the Line) within the Ruta DOCfield, in the framework of the Documental DOCfield Photography festival, with photos by Alessandro Vincenzi and Marc Ansaloni.

c) Organization of *benchmarking* meetings, congresses and institutional visits

During the year, the Public Relations department coordinated the organization of various international professional meetings, which took place in Barcelona, with TMB as host and organizer.
—March: meeting of the Observatory of UITP metros.
—October: participation in the *European Transport Conference*.
—November: international meeting of the ELIPTIC European project..
—November: technical sessions with the GTISET railway group.
—December: international C40 *Bus Meeting.*

30 different types of institutional visits to TMB facilities were coordinated, in collaboration with the International Business Department.
In November, and in collaboration with the *Smart Mobility* fair, the 31st congress of Alamys (Latin American Association of Metros and Undergrounds) was held.

Also in November, TMB participated in the new *Smart Mobility World Congress*, organized by the Fira de Barcelona, held in the new fair enclosure of Gran Via de la Fira, to replace the Bcnrail industry exhibition, and jointly with the seventh edition of the*Smart City Expo.*

—Corporate Social Responsibility

The following activities were carried out in 2017 regarding corporate social responsibility (CSR):

—**"Tria la teva causa i mou-te 2017".** For the seventh year running, the employees of the company chose the charity which led to the main TMB charity campaign this year - to stop violence against women. With the support and assessment of the Institut Català de la Dona (Catalan Institute of Women) and the Councillor for Feminism and LGTB of the Barcelona City Council, with the specific collaboration of Fundació SETBA and Ángel Dorao Producciones, a programme of awareness actions was designed and developed during the last quarter of the year (a flamenco performance portraying the moments of the process of violence, a photography exhibition of female victims, *Photocall* and a concert against male violence). A specific communication campaign was also successfully carried out.

—**4th edition of blood donation on the Metro.** For three consecutive days (9. 10 and 11 October, simultaneously at Universitat L2 and Diagonal L5 stations, with the collaboration of the Banc de Sang i Teixits de Catalunya (Blood and Tissue Bank of Catalonia) (BSTC), 423 donations were made. Out of these, 44% were from people who gave blood for the first time.

—**Recognition to TMB volunteers.** On the occasion of the International Volunteering Day (5 December), a meeting was held at the BSTC centre, of employees who regularly participate in cooperation and charity programmes promoted by the company.

—**Charity services of the Bus.** 38 special charity bus services have been done, with the participation of 22 voluntary drivers who have invested a total of 156 hours to benefit 1.019 people.

—**Workshops to promote autonomy of the Metro.** 8 workshops have been carried out, with the participation of 12 different voluntary guides, who have invested a total of 24 hours to benefit 114 people with disability. These beneficiaries have been able to visit the Metro facilities and learn in detail, the accessibility and safety measures available.

—**Dissemination collaboration with social entities.** 42 collaboration actions were agreed, to disseminate knowledge about initiatives, events and campaigns of 3rd sector social entities, through the provision of space and dissemination support under TMB Recommends.

—TMB Educa (TMB Educates)

TMB Educa is the educational project of TMB, through which it intends to project knowledge on the current reality of the company and mobility. Key aspects include sustainability of the transport system, the use of renewable energy, accessibility, the incorporation of new technologies in the management and improvement of transport, and the promotion of good social behaviour. The TMB Educa project works on four lines of action:

—School activities

TMB Educa offer 16 activities to schools of Barcelona and its Metropolitan area, which are adapted to different levels of education: special education, preschool, primary, secondary, six-form and university education. It has received 237 school visits during the year, with the participation of 8,810 students between different levels of education.

—Educational back-up activities to dissemination actions:

The following have been carried out over the year:
– Participation with educational activities to the session, Education for Safe Mobility (Guàrdia Urbana local police).
– Participation with educational activities in the 8th International Rally of Classic Buses.
– Presentation of educational activities to PAE (educational activities programme) of the Institut Municipal d'Educació de Barcelona (IMEB).
– Participation with educational activities at the Sant Adrià de Besòs and Horta festivals.
– Participation with educational activities in the Car-Free Day of Hospitalet de Llobregat.
– Participation in open days for children of employees and in the CON children's photographic competitions of Horta, Triangle, Ponent and Zona Franca.

—Educational activities for social interest groups.

37 actions for special interest groups, with the participation of 737 people.

Activities included the following:
– "Un Metro de tots" (Metro for All) (an activity to raise awareness on good practice and to avoid fraud).
– "TMB es mou per l'educació" (TMB moves for education) (a diversity workshop included in the Èxit 2 programme of the Barcelona education consortium).
– "I tu, com et mous?" (And how do you move?) (workshop to combat anti-social behaviour in conflictive schools)
– "TMB a prop teu" (TMB is near you) (to promote the use of the TMB website and App).
– "TMB va a l'escola" (TMB goes to school) (activity for TMB to approach primary education).
– "Ens mou la Gent Gran" (The elderly are also moving) (workshop to promote the safety of the elderly).
– "TMB obert per vacances" (TMB open for holidays) (activities addressed to NGO charities during July and August).

—Back-up activities to educational research.

Activities included the following:
– Participation in the XIX Exporecerca Jove at La Salle Campus - Universitat Ramon Llull (MAGMA), international exhibition of research work. The TMB Educa award was given to work related to mobility.
– Member of the selection jury of Barcelona Research awards (Consorci d'Educació de Barcelona - IMEB).
– Collaboration in school and university research work.
Finally, the X Training Session of monitors of the TMB Educa project, given by experts of Fundació Pere Tarrés, this year under the topic "V-R-T methods and skills of the facilitator".

TMB Educa has maintained it seal of educational quality from the Pedagogical Coordination Council. This recognition was granted by the Institute of Education Sciences (ICE) of the Universitat de Barcelona and Municipal Institute of Education of Barcelona (IMEB).

—Historic Heritage

In order to preserve the TMB historic heritage, the Foundation safeguards the preservation of historic buildings and vehicles and catalogued objects, which are tertimonies to the history of public transport in Barcelona.

On Wednesday, 4th March, the annual historic train series 300 journey took place from Sagrada Familia to La Pau of L2. This event was the opening of the commemoration of the 50th anniversary of the Transversal metro with a photographic exhibition.

On 3 and 4 June, the 8th International Rally of Classic Buses was held. It was organized by Fundació TMB, the Sagalés company and the ARCA Association.

To commemorate the 50th anniversary of the arrival of the Metro to Horta, the following events were held:
– Photography exhibition and of historic material of the Matas Ramis civic centre of Horta.
– Conferences at the Horta Library - Can Mariner and the Matas i Ramis Civic Centre.
– Installation of QR codes in the section of Sagrera - Horta stations L5, previously L2. with the history of development of each one.

On the occasion of the 30th anniversary of the Barcelona Bus Turístic, a travelling exhibition was organized of this event.

The preservation of historic vehicles of the foundation should also be highlighted. This requires ongoing maintenance work, carried out by the Bus and Metro workshops of Triangle Ferroviari.
Work is being done to market these vehicles and to increase rentals, as they have been fully repaired and serviced for maximum availability.

On 25 April, the meeting of the TMB Assessment Council of Historic Heritage took place, to define different actions planned for the year.

Finally, the Railway historic heritage group of Catalonia prepared a catalogue of historic railway material of Catalonia. It also participated in the 6th Railway Historic Heritage Day, which was celebrated on 27 September, with papers on "Tourism with historic trains".

The year's milestones for TMB

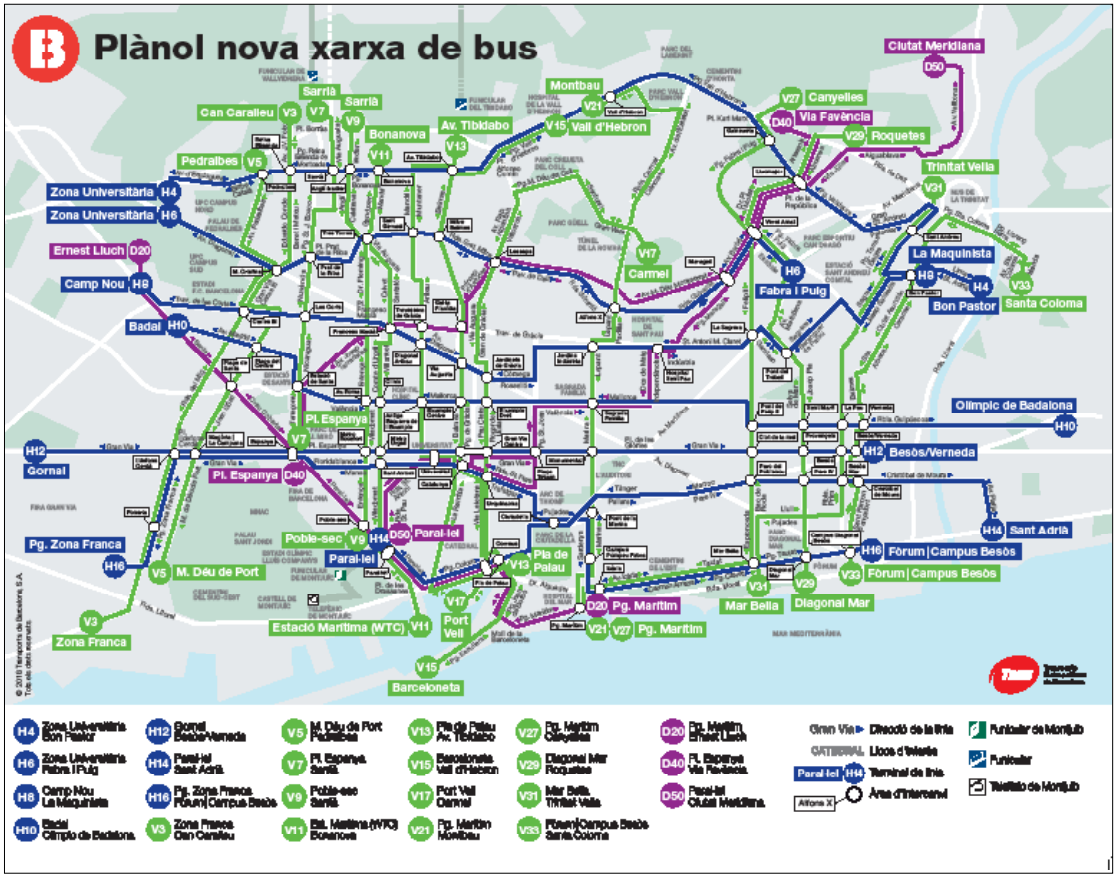
—Changes of services and supply of the bus network

—Phase 5.1 of the New Bus network

On 13 November 2017, the 5th phase of the New Bus Network (NXB) started operating with 3 new vertical lines and one diagonal line, to reach 20 lines in operation of the new network.

The new lines are:
- **D40: Plaça d'Espanya - Via Fàvència**
- **V5: Mare de Déu de Port - Pedralbes**
- **V29: Diagonal Mar - Roquetes**
- **V31: Mar Bella - Trinitat Vella**

At the points where these four routes intersect with each other and with the 16 existing routes, 18 new interchange areas have been created with a further 7 areas from previous phases undergoing modification.



The implementation of this phase also involved variations in the bus network. The route of three lines of the New Network were modified (H6. H14 and H16). Changes were also made in the itinerary of the following standard lines
—Lines 27. 42. 68 and 91 were shortened.
—Line 109 was prolonged.
—Seven lines stopped operating because they overlapped new or existing lines. These lines were: line 20, line 26, line 32, line 36, line 37, line 40 and line 57.

Once the implementation of these four high-performance lines has been finalised, (all running at intervals of 5-8 minutes during the working hours), Barcelona City Council and TMB will put the eight remaining routes into service between the spring and autumn of 2018 to complete the final design of the New Bus Network.

The information campaign, under the slogan "The bus network connects us", consisted of flags, posters at stops. leaflets, announcements in the press, advertising panels, MouTV and on the outside of buses. A monographic website, social networks and a customer service telephone 010 were also set up.Within the street communication campaign, there were over 130 people informing about the new network at bus stops, on buses and interchanges (from Monday to Saturday), to hand out leaflets and answer enquiries. A new aspect was the presence of informers at key installations of the districts, such as hospitals, first aid centres, day centres of the areas of influence of the new lines.

Finally, it should also be mentioned that TMB was finalist (among 12 candidates of the whole of Spain), of the Industrial Excellence Award 2017, given by the Celsa Group, together with the IESE business school. The jury highlighted the drive of the company to innovation, and particularly the efforts made in redesigning the bus network, which will be completed in 2018.

—*Presentation of the final design of the bus network planned for 2018.*

In 2018, it is planned to incorporate the last 8 lines to complete the implementation of the New Bus Network. These will be 6 vertical lines, 1 horizontal and 1 diagonal.

—**H2:** Avinguda d'Esplugues - Trinitat Nova.
—**V1:** Gran Via l'Hospitalet - Av. d'Esplugues.
—**V9:** Avinguda Paral·lel - Sarrià.
—**V19:** Barceloneta - Pl. Alfonso Comín.
—**V23:** Poblenou - Can Marcet.
—**V25:** Poblenou - Horta.
—**V33:** Fòrum - Santa Coloma.
—**D50: Pl. Catalunya - Ciutat Meridiana**

At the same time, and before the end of 2018, variations will be introduced in the routes of eight lines already existing in the New Bus Network. H6, H8, H10, H14, H16, V13, V15 and V17. All 28 will continue with intervals of 5-8 minutes on weekdays, priority measures and availability of user information systems.

Once this last phase is completed next year, the Barcelona bus network will be formed by a total of 97 lines of three different types: standard urban and interurban lines, district or local lines and lines of the New Bus Network.

—Standard and local lines

The final network of TMB buses will have 43 standard or complementary lines, both urban and interurban, of which 30 will maintain its current route, and 13 will be modified. Of the current routes, 13 will be replaced by lines of the new network.
Regarding the local bus service, the route of one line will be modified (line 185, which will no longer cover Sant Genís). Three new lines will be created: Line 112 (recovering part of its previous route between Sant Genís and the Horta market), line 133 (Baró de Viver - Pl. Orfila) and line 191 (Congrés - Hospital de Sant Pau), while line 192 (Hospital de Sant Pau - Poblenou) will be replaced by the V23 and the V25.

—New neighbourhood routes for Sant Martí and Congrés

Coinciding with the start-up of Phase 5.1 of the NXB, on 13 November, the commercial service was opened with two new local lines, **line 136 (Passeig Marítim – Verneda)** and **line 191 (Hospital de Sant Pau - Pl. Congrés),**. These will reinforce connections between the district of Sant Martí and Hospital del Mar, and between the district of Congrés and Els Indians and Hospital de Sant Pau, respectively.

—Start of the bus improvement plan 2017-2018

In 2016, there was a considerable increase in users of the TMB regular bus network, as a result of the recovery of economic activity. This continued into 2017, when the need was identified to reinforce the capacity of the Bus service. In order to meet the increased demand of the bus network, a new Bus Improvement Plan was identified (with the support of the ATM, the AMB and the Barcelona City Council). This involves increased resources in some standard routes and also in some routes of the New Bus Network. The Plan plans to increase the number of buses by 43 on weekdays in 2 phases (an increase of around 184,500 hours per year of service):

—**1st phase:** on 2 October 2017, 22 buses were permanently incorporated in 18 routes in order to reinforce the service on weekdays. As an example, these are some of the routes that were reinforced: H8, H10, H12, V17, V13 and V27 of the New Network, and 39, 24 and 27 of the standard routes. These 22 vehicles are used to delay the withdrawal of buses, while waiting for the incorporation of 43 new vehicles in 2018.

—**2nd phase:** it is expected to incorporate to the service the 21 remaining buses of the Plan in Autumn 2018, as required and according to demand.

The start-up of the Plan involves an investment of 16.25 million euros, with the acquisition of 33 new, standard buses and 10 articulated buses, all with diesel-electric hybrid propulsion.

The operation cost of the whole Plan will mean a net increase of needs per operation of almost 12 million euros per year in 2019. Financing of the Plan will be provided by the Contract-Programme between ATM and TMB.

—Reinforced service during the summer

The Bus service was reinforced throughout the city during the summer months (around 17,300 supplementary service hours).The aim was to increase the capacity of routes which transport more passengers during the holiday period, relieve the return journeys to and from beaches and to improve service in the centre. At the same time, the new bus network guarantees intervals of between 6 and 10 minutes on weekdays during the school holidays.

This reinforcement is financed with 1.2 million euros from tourist tax payable in tourist establishments, which for the first time, is allocated to improving the local transport network of the city.

The reinforcement started with the extension of the Bus service in April to Barceloneta, where the frequency of routes D20 and 59 was improved on Saturdays and Public Holidays. The capacity of the D20 was increased on weekdays. During the month of August, the D20 route had 24-metre bi-articulated buses, which are usually assigned to route H12, as part of the reinforcement planned for the high season of beaches, as they are suitable for high demand routes.

—Renovation plan of the bus fleet

Significant investment has been made in 2017, in order to continue working on improving and extending the environmentally clean bus fleet. Furthermore, some of the vehicles bought in 2016 have been put into service following a trial phase.

The investment made in acquiring new vehicles is the most significant of the past ten years, together with the aim of continuing this in coming years, in order to reduce investment in the medium term. This affects the provision of the service to users, as the lower frequency of breakdowns will give more reliability and hence guarantee the service programmed.

The fleet acquired in 2017 consisted of 83 new buses in different tenders, to continue renovating the fleet, plus 43 more vehicles to extend the fleet through the 2017-2018 Improvement Plan. A higher environmental quality of mobile material is also sought, as all new vehicles will be hybrid or natural gas. The majority of diesel-engine vehicles of over 14 years have been replaced. Manufacturers have delivered the majority of these vehicles in 2017, and the remainder will be received and put into service in 2018.

The first set of 54 articulated 18-metre hybrid buses have been contracted from Volvo Group España and Solaris Bus Ibérica (18 are of the Urbino series).

The second set of 14 standard, compressed natural gas (CNG) buses, are manufactured by MAN Truck & Bus Iberia. The bodywork will be from Castrosua, according to the New City model. They will be used to replace vehicles of the same type and capacity once their lifespan is over.

Seven 100% electric articulated buses have also been purchased, with a fast charging system by pantography. They will be used for the H16 route, which is currently experimenting with two vehicles of this type, with zero emission, within the framework of the European ZeEUS and ELIPTIC project.

The Barcelona Bus Turístic is also being upgraded. It is planned to incorporate 8 double-decker hybrid buses at the beginning of 2018, which will replace standard vehicles which are withdrawn owing to ageing. This is the first time that TMB has contracted double-decker hybrid buses.
The supply of the model 2.5 DD, with hybrid technology and UNVI bodywork, has been awarded to Volvo. The vehicles incorporate multi-language, audio guide systems and USB chargers in all seats.

In 2017, 43 new hybrid vehicles were also purchased, to extend the current fleet, according the the 2017-2018 Improvement Plan. 33 vehicles are standard and 10 articulated.

—Actions to improve speed and regularity of the bus network.

The Barcelona City Council passed a plan to improve the operation of ten routes of the New Bus Network, through interventions in the infrastructure, such as bus lanes, stops, signalling and traffic lights, along with redistribution and monitoring measures of space for private vehicles. The plan, as a government measure, is the result of new analysis methodology, adopted together with TMB, that can detect and prioritize the points where incidents are registered in the road network, in order to design and apply solutions, following an order of priority. The main goal is to improve the regularity of buses.

The first actions (140 interventions are planned) started on the following routes: D20. H6. H8. H10. H12. H14. V3. V7. V15 and V27. The Barcelona City Council made an investment of 261,000 euros in these interventions (which will be implemented over 2017 and 2018), to improve the interval regularity of these ten routes, which could pass from 76% to 85% on average. In August, the bus lane network was extended by 4 kilometres, 11 traffic lights were installed exclusively for buses, and 38 traffic light regulation programmes were activated.

In later phases, the operation analysis will be applied to TMB routes and will lead to new actions. These will be added to the actions, which the City Council will put into practice, on the implementation of the 12 last routes of the new network, between 2017 and 2018.

The Guàrdia Urbana local police force has also started a campaign, to guarantee that bus/taxi lanes are respected. A 100% electric TMB vehicle has also been incorporated, with automatic penalty equipment, to detect offences and deter the occupation of reserved lanes.

—New image of the Barcelona Bus Turístic

Coinciding with the renovation of the Barcelona Bus Turístic fleet, a new design of vehicles and stops has been implemented. Since the beginning of 2017, the double-decker buses have a new image, inspired in shots of some of the attractions of Barcelona: the reflection of the sun on the sea, the texture of Gaudi's mosaics, the tiles of the streets of the city, the colours of church stained-glass windows, the sensations emitted by the metal lattices of Torre Agbar, or the fish by Frank Gehry at the Vila Olímpica, for example.

This new image, which is applied both to vehicles and stops, along with all communication and promotion material, was launched the same year that the service celebrated its 30th anniversary.

—*Mobileye* Project: probe test on buses to increase road safety

In September 2017, the Barcelona City Council and TMB started a pilot test to improve road safety, based on the installation of an intelligent accident prevention system. It was installed in two TMB buses by *Mobileye*, a leading company in *Advanced Driver Assist Systems (ADAS).*

The *Mobileye Shield Plus system was installed in test mode of this new technology, in two 12 metre, hybrid buses, which were mainly used on the urban routes 6 and 34.* The artificial vision cameras located around the bodywork, permanently scan the surroundings, even the angles that are not visible to the driver through the wing mirrors. This technology can also collect information on the surroundings where the buses are driving, and identifies the areas where there are more situations of risk. With this data, the system can process them, filter them and transfer them to the Department of Mobility of the Barcelona City Council.

From the *Innovations Deserving Exploratory Analysis*, it has been seen that the buses where this system has been implemented, experienced up to 71.6% less risks of frontal collisions, 43.3% less warnings of accidents with pedestrians, cyclists and dead spots, and a potential reduction of 58.5% in claims for accidents.

Throughout 2018, TMB will incorporate *Shield Plus* technology to 22 vehicles of the network, and will equip 20 more buses with the perimeter vision system, to check how these systems could help drivers of the urban bus network.

—*Busair*: study on the quality of air of Barcelona buses

The Air Quality Research Team of IDAEA-CSIC and TMB started collaborating again, after going ahead with the Improve LIFE project, to measure and improve the quality of air in the Metro network, From the beginning of the year, a sampling and analysis programme was carried out, focused on the physiochemical and biological characterization of the air that is inhaled on buses. This is done by simultaneously measuring gases (CO_2, CO, NO_2) and inhalable particles.

It was a pioneer study, as this was the first time a study had been done on the microenvironment inside public transport buses, to adopt this integral and multidisciplinary focus, combining the measurement of pollutants, the chemical analysis of PM2.5 inorganic components, and a detailed study on bioaerosols present in the air inside buses. The Ministry of Economy and Competitiveness gave its support.

IDAEA-CSIC researchers have particular interest in the Barcelona bus system, for the following reasons: above all for the combined composition of the fleet, with modified diesel, natural gas, hybrid and electric vehicles, along with the outline of the basic orthogonal network that is being implemented. It also wanted to check the effect of the measures applied to reduce traffic emissions in Barcelona and the Metropolitan Area.

The project, which will last for three years, uses portable equipment that can measure a wide range of parameters. These also include the number and size of ultra fine particles, the concentrations of PM10, PM.5 and PM1, the chemical composition of PM2.5, black carbon, volatile organic compounds, CO, CO_2, NO_2, NH3, temperature and relative humidity and the concentrations and typology of bioaerosols.

The main purpose of the project was to achieve the largest database to date on the atmospheric conditions inside public urban buses. It was also aimed to identify the main sources of pollution and develop a protocol summarizing the best methods to maximize the quality of air for passengers.

—Change in the operation of Hola BCN! cards.

In March 2017, the Hola BCN! passes were updated, to travel on Barcelona public transport. Functioning also changed from being valid for hours from the first validation, instead of for days. In this way, tickets are now adapted to what tourists, visitors and users really need, who do not usually make their first journey early in the morning.

From 3 July 2017, the T-Dia integrated card changed to being valid for 24 hours from the first validation.

—Reinforcement of public transport in environmental incidents

After the Generalitat (Catalan Regional Government) declared an incident of pollution, on 1 December 2017, the Metropolitan Area of Barcelona (AMB) and local councils plan to activate traffic restrictions of low-carbon emission areas of the Rondes (ring roads). This means that cars will not be permitted unless they have an environment sticker from the General Board for Road Traffic.

At the same time, public transport will offer maximum operational capacity: The Metro, Bus, Tram, FGC and Suburban Trains will be increased, particularly at peak times, while the incident lasts. This will be extended from peak times to 11 am.

The aim is to replace 130,000 private vehicles, which run daily in Barcelona, that is 10% of those that normally travel, and to attract between 175,000 and 350,000 new passengers on public transport. There is also the problem for public health, with pollutants associated to traffic being generated, particularly diesel engine vehicles.

To promote this change of habits, on the days of pollution incidents, the T-Aire ticket will be sold. This is a multi-personal ticket of two integrated journeys, which can be used on the same days as the first validation. It costs 1.85 euros for a one-zone ticket (2018 rate). From 2 October, the T-Verda ticket can also be purchased. This ticket is for citizens who decide to scrap their polluting vehicle and do not purchase another one. It offers unlimited, free journeys for three years.

At the end of November, the Barcelona City Council and the Metropolitan Area of Barcelona (AMB) promoted a joint campaign, to explain to users of private vehicles and the general public, the start of operation on 1 December 2017, of the low carbon emission zone around the Rondes of Barcelona. This meant restrictions in this area of the most polluting vehicles. The campaign was implemented in different advertising supports, including TMB buses, with the slogan "Fumes are not allowed in"

—Barcelona: host to international events on public transport

From 7 to 9 March, the TMB and the International Association of Public Transport (UITP) organized a work meeting, in which the experience of automated metros in the world was reviewed, and the status of projects in preparation or in progress. The meeting held at the TMB Gaudi Area, was attended by experts from 17 countries and over 20 cities. These included Paris, Singapore, Copenhagen, Taipei, Lille, Lyon, São Paulo, Moscow, Hong Kong, Santiago de Chile, Stockholm, Milan, Istanbul, Hamburg, Marseille, Lausanne, Vienna and London. The meeting (coordinated from the Barcelona Metro) was organized by the Observatory of Automated Metros. This permanent organization of the International Association of Public Transport (UITP), is commissioned to disseminate and share current, significant know-how on lines with automated train driving.

From 4 to 6 October 2017, Barcelona hosted the 45th European Transport Conference. This was a conference of dialogue and exchanging information, in which a wide variety of topics were discussed, related to policies, research and the most efficient practices in transport. There were over 280 speakers, the majority in parallel sessions.

The conference, with the collaboration of TMB, discussed innovation topics applied to transport, such as the phenomenon of autonomous vehicles, or the concept of mobility as a service, along with economic, environmental, urban planning and infrastructure aspects. Participants at the conference were also able to make two technical visits organized by TMB, to significant points of the current transport networks: the

interchange area of Jardins de la Indústria, where routes H8 and V21 of the New Bus Network, and the metro line 9 Nord converge.

The Alaymys Ctongress, the annual meeting of the *Latin American Association of Metros and Subways,* was held at the Fira de Barcelona from 12 o 16 November. The main goal was to approach and establish the exchange of experiences, needs and projects, to improve the service in railway transport systems.

The congress focused on the role of public transport as a tool to improve the quality of life of citizens. The co-organizers were TMB, FGC, Tram and ATM.

On the last day, attendants made a technical visit to the metro line 9 Sud, including guided tours around the station and ZAL workshops.

Alamys was founded in 1986, with the aim of facilitating the exchange of experiences and technologies between Latin American countries and the Iberian peninsula, regarding urban railway transport. TMB is an active member of Alamys and of various committees and bodies.

At the same time, and on similar dates, TMB had a stand dedicated to innovation, at the new exhibition *Smart Mobility World Congress*. This exhibition is organized by the Fira de Barcelona, and was held from 14 to 16 November at the Fira Gran Via enclosure, replacing the railway industry exhibition *BcnRail*. It is held in conjunction with the sixtieth edition of*Smart City Expo*, which already had a powerful mobility tendency. It is an international summit meeting on intelligent transport, which is held every year.

The TMB exhibition area graphically displayed, in a synthetic manner, the main lines of action in innovation applied to urban transport in Barcelona, an international benchmark. Through display panels, a gigantic screen and the physical presence of a state-of-the-art electric bus, it was explained how the use of technologies and intelligent systems can achieve high-efficiency, better service and the maximum social and environmental benefit. This is the commitment to automation of the Metro, the implementation of water and energy recuperation systems, the redesign of the bus network, and the progressive incorporation of low emission electric vehicles to the fleet.

The *Smart Mobility* and *Smart City* exhibitions achieved 600 exhibitors and 17,000 visitors from all over the world. A total of 420 speakers took part in the programme of 90 technical debate tables and sessions, 80 of which were on the mobility sector.

From 6 to 8 November, Barcelona and TMB hosted a summit meeting of the European ELIPTIC project, on electric public transport. This was the sixth meeting since it started in 2015.

The *Eliptic (Electrification of Public Transport in Cities) project,* linked to the Civitas network, aims to save money and energy, by using existing electric public transport systems (such as the metro, trams and trolleybuses), to develop other modes of transport. This would increase capacity and reduce emissions. The aim is to reduce by half the use of conventional fuel vehicles in cities by 2030, and cut emissions by 60% in 2050.

TMB presented the programme to implement electric charging infrastructure of buses of route H-16, along with its outlook over the coming four years.

Finally, on 1 December, at the TMB headquarters in Triangle Ferroviari, a meeting was held to exchange experiences in innovation in overland transport. Representatives from 13 non-European cities, members of the C40 group, took part in this work meeting.

TMB Bus Managers and the Barcelona City Council presented papers on the experience in the operation of the first electric buses, and on the future of electromobility in general. Attendants then visited the electric vehicle charging installations at the Triangle depot.

The C40 is a network of major cities committed to the fight against emissions, which generate global warming and climate change. It was founded in London in 2005 and now has 90 member cities.
It should be underlined that Barcelona and 11 more major cities of the C40 international network, signed the fossil-fuel-free-streets Declaration, to speed up energy transition and slow down climate change. The cities undertook to progressively purchase zero-emission buses up to 2025, when all vehicles acquired should be in this mode.

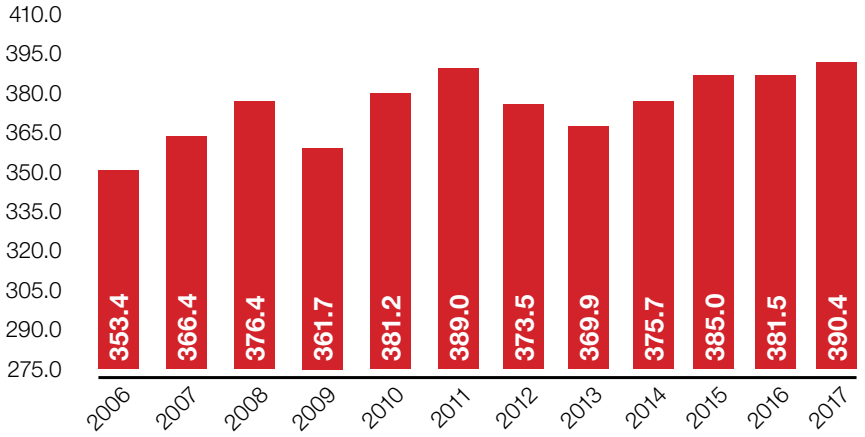
The declaration also states that some areas of cities should be considered zero-emission zones by 2030, to achiever "greener and healthier" streets. Apart from Barcelona, the declaration was signed by mayors from Paris, London, Los Angeles, Copenhagen, Vancouver, Milan, Mexico City,, Seattle, Quito, Capetown and Auckland.

—Record in the number of users transported in the Metro network

In 2017, there has been a new record in the number of passengers of the Barcelona Metro network. 390.40 million validations were recorded, exceeding the previous record in 2011, when there were 389.0 million users.

This number of passengers would have been higher, if there had not been 12 days of partial stoppages during the first six months of the year. They were caused by conflict during the Collective Agreement, along with the general strike in Catalonia on 3 October and 8 November. 2017 also had one day less (2016 was a leap year), and a higher number of public holidays.

Passengers carried on the Metro network (in millions)



—Improvement plan to absorb increased demand

Other passenger figures recorded from the start of the year, caused saturation of the network at peak times, particularly in lines L1 and L5. To cope with this situation and the anticipation in the growth of users, work was done on a Plan to guarantee that the service provided covered the demand, following the TMB quality standards.

The Plan plans to absorb an average increase of demand in peak times, of between 15% and 20% over a period of three years. To achieve this, a three-phase Plan has been defined. The first phase was implemented in 2017, in order to reduce saturation at peak times of lines 1 and 5, and to solve other problems such as access of L4 to beaches during the summer. Therefore, 7 trains have been increased at peak times on weekdays (4 more trains on L1, 1 more train on L2 and 2 more trains on L5).

The second phase will be carried out gradually during 2018, and will be fully implemented during the first quarter of 2019. It is proposed to run all trains available at peak times, which will mean forcing the system to a maximum. There will therefore be a transitional phase, when an increase of trains is planned at peak times of 8 trains, 3 of which corresponding to L1, 2 to L3, 2 to L4 and 1 train to L5.

Finally, Phase 3 of the Plan will be done gradually throughout 2019. In order to implement it, a series of actions will be necessary, including the purchase of 12 trains (purchased under leasing), plus actions in the drive system, to increase power (investment in substations for 10 million euros), to hence increase availability.During this 3rd Phase, the 12 trains purchased will be distributed as follows: 4 trains in L1, 2 trains in L3, 2 trains in L4 and 4 trains in L5. On completing the Plan, there will be 144 units running at peak times on weekdays on the 5 standard lines, 24 more than before the start of the Plan.

	Phase 0: Trains at peak times January 2017	Phase 1 : Trains at peak times December 2017	Phase II Trains at peak times January 2018	Phase III Trains at peak times December 2018
L1	26	30	33	36
L2	19	20	20	20
L3	26	26	28	30
L4	19	19	21	23
L5	30	32	33	35
Total	**120**	**127**	**135**	**144**

It is calculated that the implementation of phases 2 and 3 of the improvement plan will represent over 35 million euros by 2020, which is the first year it will be fully implemented.

This improvement plan of the Metro should be able to absorb and increase between 15 and 20% of the demand at peak times, which is forecast in the Metro network. It should also improve occupation standards of trains and cover restrictions on private transport on days of serious environmental incidents.

—Signature of the collective metro agreement for 2016-2019

In 2017, negotiations continued on the XXVI collective Agreement of the Metro, started in October 2015, which ended on 31 July with the signature of the new Agreement. 24 meetings of the negotiating table were previously held, with a breakdown in negotiations and partial shutdowns of the service on working Mondays, from 24 April to 24 July.

During this period, in which 12 shutdowns were organized, the Department of Labour, Social and Family Affairs of the Catalan Regional Government, called both parties to intercede in negotiations, and 37 mediation meetings were held. A finalist proposal was achieved, which was confirmed on 27 July at the general workers' assembly. A document ending the strike and the final text of the XXVI Collective Agreement was signed on 28 July.

On 31 July, the parties signed a final act of the agreement table, which was signed again on 15 September, with the annex of salary scales, updated with the agreed increases. On 27 September, the XXVI Collective Agreement was registered, and on 20 December, a requisition was made to clarify 3 points, in order to complete the registration process and then publish the agreement.

With the signature of the XXVI Collective Metro Agreement, an important step forward has been made in the reconciliation of family and working life of workers. The key to the reconciliation is the flexible management of work time, to enable companies to keep a balance between production and organization needs.
The text guarantees labour and organization stability of the Metro company in coming years, and good quality working conditions for staff, together with improved economic and social conditions.

The main points of the signed document are:
—**Stability:** term of the agreement to 2019.
—**Guaranteed purchasing power**, in the framework of public transport financing.
—**Improved social rights and benefits:** maintenance of partial retirement and generation of stable occupation, reconciliation measures of family and working life, dual professional training.
—**Improved working organization.**

This agreement should maintain the necessary balance to provide a quality service, and at the same time, guarantee the viability of the company. In this sense, TMB accepted the legal limit which it can reach as a public entity. It has also reached the limit in the availability of company resources.

In compliance with the agreement, a Joint Parity Commission has been formed (9 meetings held up to the end of the year), and 20 meetings have been held with different technical tables, to develop agreed aspects.

At the same time, usual management has been carried out with the Works Council, which has involved a total of 202 information requests. 143 of these correspond to the Works Council and 59 to different union sections.

—Preparation of the new line 10 Sud

One of the most important challenges in 2017, was the preparation work for the opening of L10 Sud stations. The following activities were carried out, according to the scope of application:

1. Equipment and infrastructure

– Redistribution has been made of zones and basic stations.

– In the area of movement control, Line 19 Sud has been integrated in the ATS (*Automatic Train Supervision*), which controls the movement of trains on L9 Sud. The integration process has been completed after tests were carried out on five weekends from October to December, during which this Metro line was shut down.

– With regard to energy, some work has been carried out on the L9 catenary at the ZAL workshop, owing to maintenance needs of mobile material. Work has also be done to increase staff safety in washing and blow tunnels, and on the emergency push buttons at the Can Zam Workshop. Some features have been modified in the protection booths of 30 kV rings, and improvements have been made in data extraction by the maintenance management system.

– The design has been made, and new areas have been located for the Can Tries and Gornal stations. The corresponding application has been sent to Infraestructures.cat.

2. Operation

Definition of the provision: an analysis has been carried out on the different alternatives, both for the nominal service and for important events (*Mobile World Congress*).Similarly, in order to define provision and intervals, a time estimate was made of the return trip of the line.

3. Security and movement

Adaptation tasks have been performed from the technical notes and procedures as a result of the new section. Similarly, new features have been requested, as a result of the new way of operating the south section, after the opening of L10 (operation of L9-10 Sud through Collblanc track 1, self-distinction of trains).

To avoid the presence of unwanted trespassing on the tracks, the conflictive points of the new lines have been identified, and a series of improvement proposals has been made for the area of the station / ZAL Workshop.

Siemens has started tests on the new line (at night), and "cuts" in the service have been planned for 5 weekends in L9Sud, in order to validate the operation of systems.

4. Staff

In 2017, work has been done on calculating the staff required for the new section. The new stations have been incorporated, along with the 2018 budgets, bearing in mind these data. In 2018, recruitment and training of new staff will continue, along with goals concerning the start-up of the line. Delivery of the new section to FMB is planned for 01/08/18, when empty running tests can be started, which are essential to opening L10Sud.

Cable car events of the year

—Accessibility

In previous years, the certificate of universal accessibility (UNE 170.001 standard) was obtained from the LGAI - Applus company, both for accessibility of the environment (architectural aspects) and for the accessibility management system (internal mangement). Accordingly, all cable car facilities are adapted to the needs of people with reduced mobility. enabling them total autonomy: through ramps, steps and accurate adjustment between the platforms and the cabins for people in wheelchairs; through signs and routes for people with visual impairment.

All staff of the Montjuïc cable car are trained and aware of the specific needs of people with disability, and both public service protocols and the maintenance of facilities, guarantee accessibility.

The Barcelona Municipal Institute of People with Disability and the ECOM Federation, with over 150 groups of people with disability, collaborated in the definition of accessibility features of the cable car.

—Environmental sustainability

When the environmental permit issued to the Montjuïc¯c cable car service was obtained, the criteria of the Cims town planning project for the entire Montjuïc mountain were applied, the priority being to minimise the environmental impact of the facilities.

—Others

A set of actions has been done within the economic-financial field, which have affected the company.

—Immediate supply of information on value added tax (ISI-VAT)

Projectes i Serveis de Mobilitat, SA entered the group of major companies subject to the application of ISI (Immediate Supply of Information).

During the first part of the year, training was given to disseminate the service to everyone, not only the basic features of the new regulation, but also detailed training, plus its appllication to corporate information systems. Owing to the innovation and the little development of the regulation, along with the slow resolution of doubts by the Spanish Tax Agency (AEAT) and the lack of experience on the market, it was difficult to find consultants who could provide answers to the many doubts that arose. Work was done jointly with the external auditor and tax advisor, together with consultations with the Directorate General of Taxation, to answer the many doubts that constantly arose.

With the entry into force of the regulation on 1 July and with the summer ahead, extra efforts were made to apply it also in August. During the second part of the year, the rule enabled invoices issued and received to be reported within 8 weekdays, as a transition period, until 4 days from 1 January 2018.

This process has also meant a change and adaptation of the remaining areas of the company, which having been informed of the invoices, have had to speed up processes concerning them.

Goals achieved:

1. Authorization from the AEAT (Spanish Tax Agency) for PSM, in order to make entries in the monthly summary on transport tickets sold.

2. Invoices issued: the XML file has been parameterized, in order to send the accounting records of invoices issued in its own name by PSM, every day to the AEAT, as required.

3. Invoices received: the XML file has been parameterized, in order to send the accounting records of invoices received by PSM every day to the AEAT, as required.

4. Issued exchange invoices: a database has been created to generate issued exchange invoices. The XML file has been parameterized to send this type of invoice every day to the AEAT, as required.

5. Invoices of commissions for the sale of tickets: a database has been created to generate invoices in the name of third parties, for commissions for the sale of transport tickets. These are invoices received, that PSM issues in the name of third parties, which charge a commission for the sale of transport tickets to end customers.

6. Resolve different errors that arise from the extraction of data, and which has to be processed manually, before sending to the AEAT.

7. Study how to document and send information of the series of simplified invoices, once this information is available.

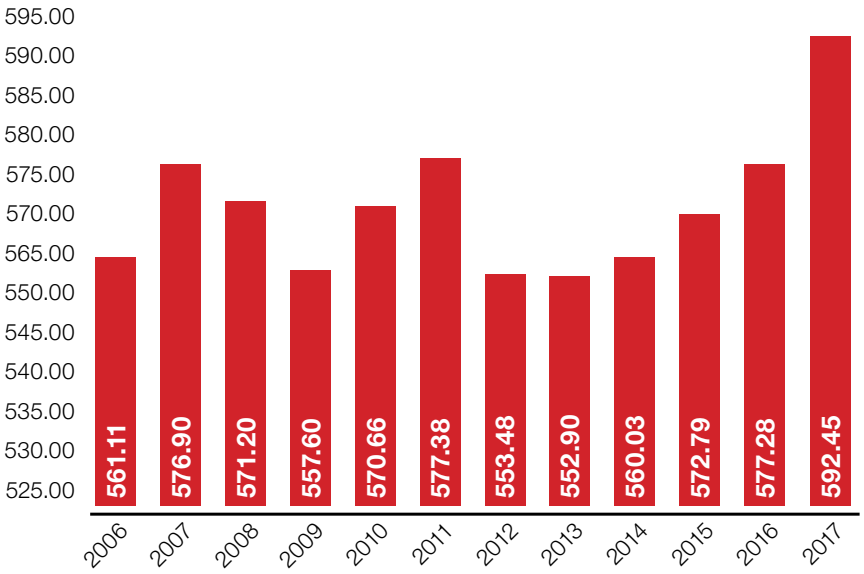
The year's milestones for TMB

—Record number of passengers transported by the TMB

In 2017, a new record was achieved in the number of passengers transported by Transports Metropolitans de Barcelona (TMB), with 592.45 million users between the Metro network, regular Bus routes, plus the Bus Turístic and Tramvia Blau. This figure has increased by 15.1 million users compared to the last record achieved in 2011.

This increased demand has occurred both in the regular bus and metro network, which has also achieved a maximum record of passengers in 2017. In total, the increase in passengers on TMB public transport was 15.2 million users more than in 2016 (+2.6%).

TMB passenger numbers (including leisure transport)



From the chart showing the demand of TMB in the last decade, a continuous increase in the number of passengers can be seen, from 2013 to the last financial year. This coincides with the reactivation of economic activities in recent years and the improved provision of TMB.

3 Exposition on the situation of the company

Main data of the Bus network

Network figures at 31 December 2017	Total
Number of routes (*):	98
Length of the network (*)	833.17
Number of stops (*):	**2,541**
with bus shelter:	1,371
with bus stop pole:	1,170
Kilometres of bus lane	191.22

(a) Excluding special Bus Turístic and Tramvia Blau services and lines 80, 81, 82 and 83 which are contracted out to Sagalés.

Fleet figures at 31 December 2017	Number of vehicles
Standard buses:	**601**
Diesel:	212
CNG:	251
Diesel and electric hybrids	123
GNC and electric hybrids	13
Electric only:	2
Articulated buses:	**327**
Diesel:	131
CNG:	127
Diesel and electric hybrids	67
Electric only:	2
Midibuses	**25**
Diesel:	24
Diesel and electric hybrids	1
Minibuses (diesel):	52
Double-decker buses (diesel):	**77**
Double-articulated buses (diesel and electric hybrids)	**3**
Total fleet	**1,085**

Fleet breakdown by fuel type:	Number of vehicles
Diesel buses:	**496**
CNG buses	**378**
Hybrid buses	**207**
Diesel and electric hybrids	194
GNC and electric hybrids	13
Electric buses	**4**
Total fleet	**1,085**

Buses adapted for people with reduced mobility (PRM)	1,085
Buses equipped with air conditioning [(a)]	1,085
Fleet required for service (weekday rush hour, winter)[(b)]	856

Notes:
(a) Difference with the total fleet corresponds to 4 shuttle buses.
(b) The difference between the total number of vehicles and the fleet necessary for the service (not
including the Bus Turístic routes) corresponds to the operative park in reserve, and the fleet
under servicing, ITV vehicle inspection, etc.

Bus lines in service at 31.12.2017

Line	Route	Distance in km (*)
6	Manuel Girona - Poblenou	8.12
7	Fòrum- Zona Universitària	10.60
11	Trinitat Vella - Roquetes	13.53
13	Mercat de Sant Antoni - Parc de Montjuïc	6.91
19	Urquinaona - Sant Genís	10.51
21	Paral·lel - El Prat	16.91
22	Pl. Catalunya - Av. Esplugues	5.46
23	Pl. Espanya - Parc Logístic	7.08
24	Paral·lel - El Carmel	8.93
27	Pl. Espanya - Roquetes	11.46
33	Zona Universitària - Verneda	10.86
34	Pg. Manuel Girona - Pl. Virrei Amat	10.54
39	Barceloneta - Horta	12.02
41	Pl. Catalunya - Pl. Francesc Macià	4.57
42	Pl. Catalunya - Santa Coloma	12.73
45	Pg. Marítim - Horta	12.00
46	Pl. Espanya - Aeroport BCN	17.85
47	Pl. Catalunya - Canyelles	9.47
50	Collblanc - Trinitat Nova	14.04
51	Pla de Palau - Ciutat Meridiana	12.03
54	Estació del Nord - Campus Nord	10.80

Line	Route	Length: in km (*)
55	Parc de Montjuïc – Pl. Catalana	10.75
59	Poblenou - Pl. Reina Maria Cristina	11.07
60	Pl. Glòries - Zona Universitària	16.85
62	Pl. Catalunya - Ciutat Meridiana	13.38
63	Pl. Universitat - Sant Joan Despí	12.43
65	Pl. Espanya - El Prat	12.52
66	Pl. Catalunya - Sarrià	7.66
67	Pl. Catalunya - Cornellà	13.13
68	Pl. Catalunya - Cornellà	13.88
70	Rambla de Badal - Bonanova	4.30
75	Les Corts - Av. Tibidabo	7.79
76	Sant Genís - Ciutat Meridiana	11.85
78	Estació de Sants - Sant Joan Despí	14.26
79	Pl. Espanya - Av. Carrilet	8.66
91	Rambla - La Bordeta	4.87
92	Gràcia - Pg. Marítim	11.30
94	Barri Almeda - Fontsanta	4.32
95	Barri Almeda - Pl. Fontsanta	5.33
96	La Sagrera - Montcada i Reixac	12.48

Bus lines in service at 31.12.2017

Line	Route	Distance in km (*)
97	Fabra i Puig - Vallbona	5.08
100	Bus Turístic South	11.95
101	Bus Turístic North	8.99
102	Pl. Eivissa - Cementiri de Collserola	10.45
103	Montcada i Reixac - Cementiri de Collserola	12.38
104	Fabra i Puig - Cementiri de Collserola	10.78
107	Interior Cementiri	4.00
109	Estació de Sants - Polígon Ind. Zona Franca	11.18
110	Av. Carrilet - Polígon Ind. Zona Franca	8.76
111	Tibidabo	3.20
113	La Mercè	3.42
114	Gràcia - Can Baró	4.40
115	La Bordeta	2.98
116	La Salut	3.63
117	Guinardó	5.06
118	Mas Guimbau	8.61
119	La Teixonera	5.20
120	El Raval	5.13
121	Poble Sec	2.63
122	Turó de la Peira	5.26
123	Bonanova Alta	3.87
124	Penitents	2.64
125	La Marina	5.01
126	Sant Andreu	5.56
127	Roquetes	5.96
128	El Rectoret	8.51
129	El Coll	2.53
130	Can Caralleu	3.68
131	El Putxet	2.50
132	Torre Llobeta - Prosperitat	3.39
136	Passeig Marítim - Verneda	7.47
143	La Pau - Sant Adrià	5.36
150	Pl. Espanya - Castell de Montjuïc	5.09
155	Can Cuiàs - Sta. M. de Montcada	10.15
157	Collblanc - Sant Joan Despí	7.52
165	Pratexprés	10.18
185	Canyelles - Sant Genís	8.34
191	Pl. Congrés - Hospital de Sant Pau	2.66
192	Hospital de Sant Pau - Poblenou	4.73

Bus lines in service at 31.12.2017

Line	Route	Distance in km (*)
194	Tramvia Blau	1.27
196	Pl. Kennedy - Bellesguard	2.12
V3	Zona Franca - Can Caralleu	8.67
H4	Zona Universitària - Bon Pastor:	14.85
V5	Mare de Déu de Port - Pedralbes	7.35
H6	Zona Universitària - Fabra i Puig	9.66
V7	Pl. Espanya - Sarrià	5.04
H8	Camp Nou - La Maquinista	12.88
H10	Badal - Olímpic de Badalona	13.16
V11	Estació Marítima (WTC) - Bonanova	6.87
H12	Gornal - Besòs Verneda	11.28
V13	Pla de Palau - Av. Tibidabo	7.52
H14	Paral·lel - Sant Adrià	10.03
V15	Barceloneta - Vall d'Hebron	10.21
H16	Passeig de la Zona Franca - Fòrum	12.10
V17	Port Vell - Carmel	8.73
D20	Pg. Marítim - Ernest Lluch	9.25
V21	Pg. Marítim - Montbau	9.45
V27	Pg. Marítim - Canyelles	11.03
V29	Diagonal Mar - Roquetes	8.82
V31	Mar Bella - Trinitat Vella	11.06
D40	Plaça d'Espanya - Via Favència	10.74

(*) Length in km corresponds to on half the sum of outward and return journeys.

Main actions of the Bus network

Throughout the year, the Technical Traffic Office has worked on the following actions in streets, owing to the redevelopment and work on infrastructures of the city of Barcelona.

—*Main provisional and final actions:*

– Line 1 and Line 3 Shuttles.
– Club Súper 3 shuttle (3 shuttles).
–FGC shuttle.
– TMB funicular shuttle.
– Shuttle for the *Mobile World Congress*.
– Cemetery campaign.
– Routes for the FADFEST project with a bus of Barcelona Bus Turístic.
– New terminus of line 126.
– Permanent change owing to major works at Prat de Llobregat: lines 21-65-165
– Works for cycle lanes in the city of Barcelona, paving and development work.
– Phase 5.1. of the New Bus Network (NXB).
– Bus lines (designs, simulations and implementation for the NXB).
– Special Line 24 bus to Carmel.
– Articulated buses of line D40.
– Electric bus terminus of line H16 on Carrer Eduard Maristany and Carrer Cisell.
– Line V21 diversion in Carrer Marina.

—Main special services:

Special service		Start date	Duration (days)
Trade fairs	Northern shuttle 1 MWC 2017	27.2.17	4
	Southern shuttle 2 MWC 2017	27.2.17	3
	INTA exhibition	21.5.17	4
	Biocultura fair	4.5.17	4
	World Routes fair	24.9.17	3
	EEE fair	1.10.17	6
Metro substitute services	Shuttle <> L1 Torras i Bages - Fondo	31.7.17	32
	Shuttle <M> L1 Torras i Bages - Trinitat Vella	31.7.17	32
	Shuttle <M> L3 Vall d'Hebron - Canyelles	29.7.17	17
	Shuttle <M> L3 Vall d'Hebron - Lesseps	22.8.17	13
	Montjuïc Funicular	30.1.17	21
	Montjuïc Funicular	15.11.17	21
Other services	Shuttle Super 3 2017 Car Park	21.10.17	2
	Shuttle Club Súper 3 2017 Pl. Espanya	21.10.17	2
	Shuttle FGC - Substitution of Funicular	31.7.17	26
	Primavera Sound 2017	1.6.17	2
	Brunch in the Park	2.7.17.	12

—Study, design and development of special services

A number of special services were studied and designed during the year for various events affecting TMB (Fira de Barcelona events, events at Montjuïc, city events such as the Mercè and Gràcia festivals, and Christmas). Special services consisted on renting rolling stock and installations for shuttles, filming and advertising sessions.

Noteworthy this year was the special programmed service during the summer months, to support various routes of the FGC during the improvement works of its facilities.

Barcelona Bus Turístic and Tramvia Blau

The **Barcelona Bus Turístic** is a joint initiative of Transports Metropolitans de Barcelona (TMB) and Turisme de Barcelona, created in 1987, to provide a regular, practical, sustainable and attractive service for people wishing to see the city at their own pace. It has an audio guide service in 16 languages, and a Turisme de Barcelona agent, to provide support to customers. It has 45 stops throughout its three routes: The Blue and Red routes operate throughout the year, and the Green route operated from 31 March to 5 November in 2017. It includes a guide of the itineraries and a discount card, which covers unique transport systems such as the Tramvía Blau, the Montjuïc cable car and the Catalunya Bus Turístic, along with museums, emblematic buildings, cultural centres and leisure in the city.

For the eleventh year, the *Barcelona Night Tour*operated from 2 June to 3 September. This route makes a tour of the most emblematic illuminated buildings of the city and the Montjuïc Magic Fountains, with great success. It runs on Fridays, Saturdays and Sundays.
Coinciding with its 30 years of service, the most outstanding event of 2017 was the modernization of the design with a new image, applied both on vehicles and stops, and all the communication and promotion material.

The renovation of the visual identity of the Barcelona Bus Turístic coincides with the upgrading of its double-decker bus fleet. This started in 2016 and continued through 2017 with the purchase of the first ten vehicles from Volvo. They were 14 metres in length, with bodywork by Sercar and had 35% more capacity on the upper deck. Their 263 kW diesel engines have maximum environmental quality of Euro 6 thermal engines. 10 new Bravo I R City vehicles have also been incorporated, 13.20 metres in length with Ayats bodywork, which have enabled the renovation of the fleet. All these buses have a USB connector in each seat to charge mobile devices.

In 2017, 8 Volvo vehicles were purchased with UNVI bodywork. These are hybrid vehicles and follow the TMB policy of being more efficient and environmental-friendly.

This year, we have also continued to widen the range of cultural and gastronomic activities, with new collaborators. Commercial actions have continued at various national and international Tourism fairs and *workshops* (WTM London, Fitur Madrid, Buy Catalunya, etc.).

Online sales, which have been operating since the end of 2015, through the *Barcelona Smart Moving* platform (www.barcelonasmartmoving.com), have become one of the sales channels with the most increase. It is a 6-language platform to promote leisure transport in Barcelona, along with the sale of other products, such as the Hola BCN! transport card.

It also has its own website (www.barcelonabusturistic.cat) and *community management* of social networks through *Facebook*, Twitter, Instagram and Tripadvisor, opting for an online channel with promotional actions, to promote Barcelona and optimize the positioning of the website on the main Internet browsers.

In 2017, improvements have been made in *Wi-fi,* which is present in all Barcelona Bus Turístic vehicles, with increased reliability and generating a more accurate database.

With regard to customer service, virtual sales points (POS) have been successfully implemented in all Turisme de Barcelona offices. They speed up the sales process with tickets on a reel, and hence a reduction in the sale of pre-cut tickets. In this sense, investments have been made in software and machinery, with the purchase of PDA devices, PINpads and printers, for increased reliability, flexibility, speed and convenience in sales processes on board buses, also including GPS and more information processing. These two actions have led to an improvement when generating updated sales reports.

An update has been made of the existing application for mobiles, and a new *app* has been created, to help users to make the most of their stay in the city. It provides access to all information on the Barcelona Bus Turístic and the most emblematic locations. It is free of charge and is available for devices with Android and iOS systems. Tickets can also be purchased through the application, which has a geolocation system. Another improvement has been the purchase of new earphones for the whole fleet, which are more comfortable and suitable for all ages. In this sense, actions are being carried out with the Fundació Rubricatus (special work centre for people with disability), to recycle earphones every day after being used by customers. This collaboration is one of the environmental management actions to be carried out, promoting circular economy practices. It reduces waste production and the need for raw materials, and helps to protect the environment. At the same time, it encourages the employability of people with disability.

On 16 October and 19 November, the high-voltage power substation of the **Tramvia Blau,** which powers the line, was renovated. This coincided with surfacing works on the upper part of Avinguda del Tibidabo, which is part of the tram line.

The existing truck with lead was also renovated, to adapt to the emissions regulations of the Barcelona City Council.
A cultural event took place from 28 October to 16 December. The Merbeyé Cocktail Bar held a photographic exhibition called "Tramvia Blau, the last survivor" by the photographer Antonia Zeni. The exhibition was a tribute to its 116 years of history, with elements that have remained intact despite the passing of time, such as wooden seats, posters or bronze door handles.

A study has been done throughout the year, concerning the integral renovation of the installation, as the Tramvía Blau facilities are now at the end of their lifespan, and the following works particularly need to be done:
—Track: There will be a high level of wear if the track is not renewed. It will also mean that control of drivers on the units will be more complicated.
—Overhead line: there is a lot of wear on this line, and preventive maintenance should be done, to guarantee the service and solve the obsolescence of material.
—Power substation:the high-voltage cells of the substation are obsolete, and spare parts are not available. If they system fails, all or part of the high voltage installation may be lost. The renovation of traction isolators and extra fast breakers is also necessary.

—Obtaining an environmental licence of the workshop: the building where the Tramvia Blau facilities are located is very old and renovation of its installation and parts is needed.

Finally, the study of the renovation project of the Tranvia Blau infrastructure was started in February 2018.

TB workforce at 31st December2017

The active workforce of Transports de Barcelona at 31st December, 2017, was 4,327. This number includes 162 partially retired employees whose jobs are linked to relief contracts.

If the annual average workforce (average staff in terms of hours employed per year) is considered, this figure was 4,022.3 employees, 87.8 more than the previous year. This increase has been mainly in drivers and is the result of the increased service provision from the start up of services on public holidays and local bus routes (in September 2016) and the Bus Quality Improvement Plan that commenced in the first quarter of 2017.

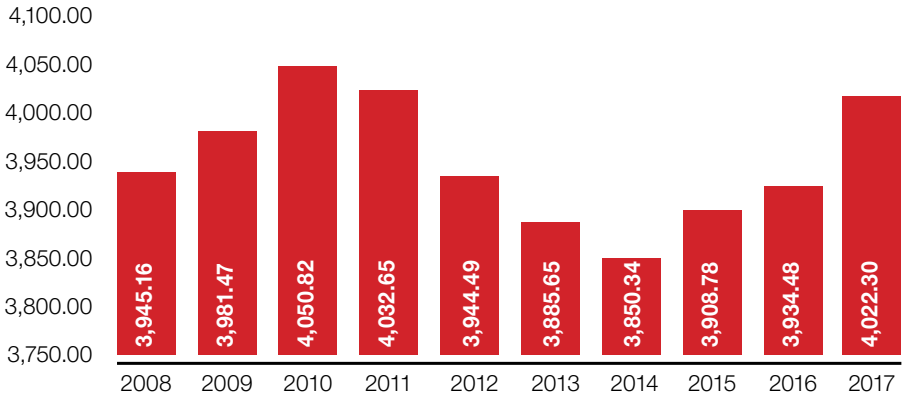
Development of the average workforce of Transports de Barcelona SA

	2017	2016	Diff.	%
Average standardized workforce (*)	4,022.30	3,934.48	87.82	2.23%

(*) Average annual workforce by hours per employee/year.

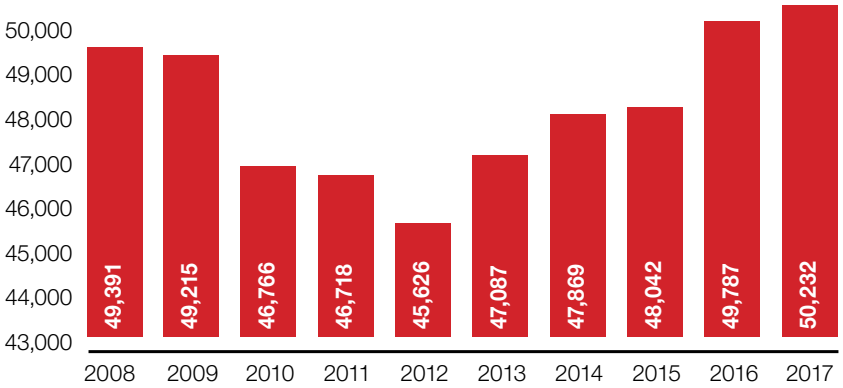
As can be seen in the chart, from 2018, the workforce has gradually been reduced, particularly from 2012. This was owing to the start-up of a Rationalization Plan, started that year. This tendency was reversed in 2015 with the implementation of the Provision Improvement Plan at the start of the year. In 2016, the workforce continued to grow with the return of the public holiday service of local lines, which had been cancelled in 2012. and the start of the Bus provision improvement Plan in autumn 2017.

Development of the TB average standardized workforce.



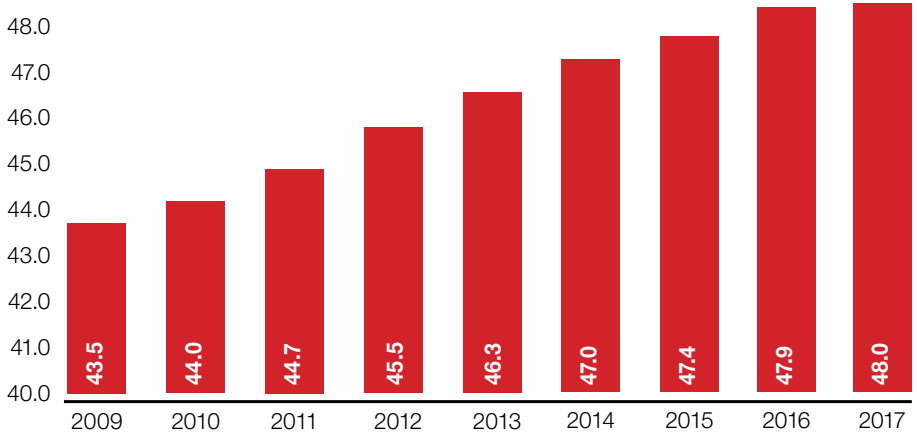
The start-up of measures to adapt the provision of the Bus service to needs of the demand, have meant improvement in recent years of the productivity rate of passengers per employee. Since 2012, this indicator has grown each year to reach 50,232 journeys per employee in 2017. These data coincide with the highest figure in the past ten years.

Change in number of passengers per TB employee



The following chart shows the breakdown of the workforce by age at 31 December 2017. The highest number of employees, 43,2% of the total workforce, is concentrated in the 41 to 50 year age bracket.

Change in average age of TB workforce

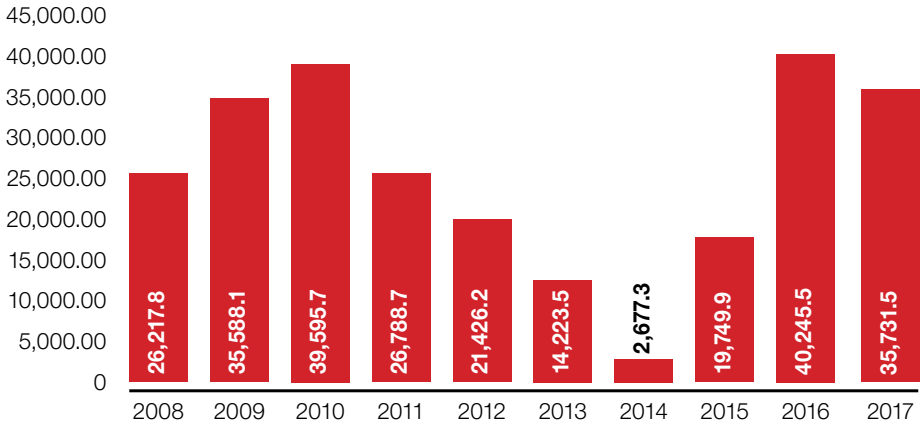


The incorporation of new employees (mainly drivers) has meant the average age of the active workforce at 31 December 2017 was 48.0 years. This figure is similar to the previous year, which was 47.9 years.

Investment in TB

In 2017. Transports de Barcelona continued investments, started the previous year, totalling 35.7 million euros. As can be seen from the chart, although investment has decreased from last year, the figure remains at the levels prior to the crisis, particularly in the renovation of the bus fleet.

Evolution of TB investments
(in thousands of euros)



Investments made during 2017 are broken down into: 2.29 million euros were invested in intangible assets, 28.15 million euros in tangible assets and a balance of 5.29 million euros in asset variations in progress.

Items	**Thousands of euros**
Intangible assets:	**2,294.6**
Industrial property rights	0.0
Computer software	2,294.6
Property, plant and equipment:	**28,148.5**
Buildings and other constructions	186.8
Machinery, equipment and tools	1,770.9
Furniture and fittings	53.1
IT equipment	507.7
Vehicles	25,284.8
Spare parts	345.2
Subtotal	**30,443.1**
Variation of assets in progress	5,288.4
Total	**35,731.5**

By volume, the most significant investment was in the following areas:
— Computer applications: corresponding to de SAP licences, systems for service planning (PPS allocation of services) and for the commercial management of Leisure Transport.
— In the section on buildings and other constructions, investments are included basically on work in the Horta and Triangle Ferroviari depots.
— Investments in machinery, installations and tooling include mainly the installation of publicc *Wi-fi* in the Bus fleet, air-conditioning and electrical installations of the CON in Zona Franca I, the new Bus cash payment machines, SAE equipment for the new 2016 and 2017 fleet and the oil and coolant installations of Horta.
— Investments made in transport elements were basically 8 double-decker buses, 44 articulated hybrid vehicles, 4 standard CNG vehicles, and electrical vehicles for maintenance.
— Spare parts for fixed assets included the acquisition of validating machines for buses.

The 5.29 million euros of fixed asset variations in progress, correspond to the balance of two accounts: 1.47 million euros advanced payments for the purchase of buses and fixed assets in progress for a total of 3.82 million euros. This last item included investments in the recharging station of electric buses at the Diagonal--Fòrum stop, investments for the repair workshop of Zona Franca Port, and the adaptation of the power substation of the Tramvia Blau.

Income statement for TB

2017 was a year with a situation of positive economic growth of both Catalan and Spanish economies, with GDP increases of over 3%. TMB has continued operating within a stable financial framework, represented by the 2014-2017 Programme Contract and the 2014-2031 Framework Plan of financial rehabilitations of the public transport system of debt refinancing, passed on 6th March 2014 by the ATM Management Board.

Regarding the Transports de Barcelona, SA service, this year saw the start-up of the first phase of the service improvement Plan, which foresees increasing the bus service on weekdays with 43 vehicles. The first phase (October 2017) reinforced the service with 22 more vehicles, and it is planned to start operating the remaining 21 vehicles in autumn 2018. Demand in 2017 has increased by 6.25 million passengers compared to the previous year. These two aspects have had an impact ob the profit and loss account, which is analysed below.

—Revenue of the year: comparison between 2017 and 2016

Revenue of the year (excluding service subsidies) has increased by 3.5 million euros (+2.4%), mainly because of the increase of 1.6 million euros in the sale of travel tickets and non-operating income, which have increased by 1.85 million euros compared to the previous year.

Detail of revenue (in thousands of euros)	(1)	(2)	Difference (1) - (2)	(%)
Sales	146,822	145,254	1,569	1.1
Commissions and rebates	-12,085	-11,232	-852	7.6
Non-operating income	8,178	6,325	1,853	29.3
Pension plan revenues	702	286	415	145.1
Special subsidies	6,731	6,222	509	8.2
Revenues before service subsidies	**150,348**	**146,855**	**3,493**	**2.4**
Service subsidies	148,262	145,171	3,092	2.1
Total Revenues	**298,611**	**292,026**	**6,585**	**2.3**

In spite of maintaining rates in 2017, sales revenues increased as a result of the growth in Bus passengers, indicated above. Commissions, discounts and rebates increased over the year by 0.85 million euros (+7.6%) .

The increase in non-operating income by 29.3% should also be underlined, particularly income from advertising.

Special subsidies have increased by 0.5 million euros, owing to the respective subsidies of the ELENA projects (*European Local Energy Assistance*) and 3iBS (*Intelligent, Innovative, Integrated Bus System*).

Finally, income from pensions, which does not affect the result of the profit and loss account, increased by 415 thousand euros over the previous year.

—Operating expenses: comparison between 2017 and 2016

Operating expenses before amortisations, grew by 7.3 million euros (+2.7%) compared to the previous year. This was mainly owing to increased expenses in supplies, staff, external services and fuel, plus the decreased tax returns from the Tax Agency, compared to 2016. This was because of the return of the cent imposed in the Tax on retail sales of certain hydrocarbons (IVMDH) from previous years.

Detail of operating expenses (in thousands of euros)	**(1)**	**(2)**	**Difference (1) - (2)**	**(%)**
Supplies	11,084	9,954	1,129	11.3
Electricity/fuel	19,263	18,485	778	4.2
Personnel	213,194	209,069	4,125	2.0
Contribution to the Supplementary Pensions System	702	286	415	145.1
Supplementary Contingency Retirement Pension System	0	0	0	
Supplementary Contingency Risk Pension System	702	286	415	145.1
External services	35,680	34,735	945	2.7
Taxes	640	784	-145	-18.4
Changes in provisions	-1,899	-1,671	-227	13.6
Results from sales of fixed assets	-18	321	-339	-105.5
Other results: Refund of IVMDH	-1,519	-2,129	610	-28.6
Total expenses before amortisation	**277,127**	**269,835**	**7,292**	**2.7**
Amortisations	27,671	29,017	-1,347	-4.6
Sub. in capital allocated to profit and loss	-6,450	-4,849	-1,601	33.0
Total Amortisation	**21,221**	**24,168**	**-2,947**	**-12.2**
Total operating expenses	**298,348**	**294,003**	**4,345**	**1.5**

Supplies have increased by 1.1 million euros (+11.3%), basically because of the increased expenses in materials for consumption and restocking.

Workforce expenses have grown according to increased staff, as a result of recruitment required to start-up the quality improvement Plan and reinforcing the service during the summer.

Fuel expenses have increased by 0.78 million euros (+4.2%), both in diesel and in natural gas, particularly as a result of increased average price per litre of diesel fuel (+2.6%) and the price per kg. of natural gas (+9.4%). In August 2016, a coverage of 20% of the consumption of diesel fuel of the fleet was contracted for 2017. This has generated an income (or a lower cost of this fuel) of 190 thousand euros.

External services increased by 0.95 million euros (+2.7%) compared to the previous year. The items that have increased the most are the following: repair and preservation of machinery and facilities and also the repair and preservation of vehicles, expenses regarding communication and information, computer work and technical assistance and studies.

Regarding the remaining items, the balance with the lowest expense of variations of provisions, has increased by 13.6%. Taxes have decreased by 145 thousand euros. Net amortisation (after subsides on capital transferred to the year) has decreased by 2.9 million euros (-12.2%) compared to the previous year, owing to the reduction in amortisation provisions and the significant increase of capital subsidies.

—Other items: comparison between 2017 and 2016

Another item that has grown considerable are financial increases, which increased by 2.24 million euros compared to the previous year. This was mainly owing to lower dividends of associated companies. Also in 2017, returns of the Tax Agency have decreased for interest on arrears from the IVMDH tax corresponding to previous years. In 2017, returns amounted to 72 thousand euros, while in 2016 they were 407 thousand euros.

Finally, although 2017 has seen an increase in revenue before service subsidies of 3.5 million euros, this is lower than the increased expenses of the year. This has meant that service subsidies required to balance the profit and loss account of the year, have increased by 3.1 million euros, that is 2.1% compared to 2016.

Profit and loss account and TB earnings (in thousands of euros)

			(1)	(2)	Difference (1) - (2)	(%)
A) CONTINUING OPERATIONS	**Revenues**	Sales	146,822	145,254	1,569	1.1
		Commissions and rebates	-12,085	-11,232	-852	7.6
		Non-operating income	8,178	6,325	1,853	29.3
		Pension plan revenues	702	286	415	145.1
		Special subsidies	6,731	6,222	509	8.2
		Service subsidies	148,262	145,171	3,092	2.1
	Total Revenues		**298,611**	**292,026**	**6,585**	**2.3**
	Operating expenses	Supplies	11,084	9,954	1,129	11.3
		Electricity/fuel	19,263	18,485	778	4.2
		Personnel	213,194	209,069	4,125	2.0
		Contribution to the Supplementary Pensions System	702	286	415	145.1
		Supplementary Contingency Retirement Pension System	0	0	0	
		Supplementary Contingency Risk Pension System	702	286	415	145.1
		External services	35,680	34,735	945	2.7
		Taxes	640	784	-145	-18.4
		Changes in provisions	-1,899	-1,671	-227	13.6
		Result of sales of fixed assets	-18	321	-339	-105.5
		Result of sales of fixed assets	-1,519	-2,129	610	-28.6
	Total expenses before amortisations		**277,127**	**269,835**	**7,292**	**2.7**
		Amortisations	27,671	29,017	-1,347	-4.6
		Sub. in capital allocated to profit and loss	-6,450	-4,849	-1,601	33.0
	Total Amortisation		21,221	24,168	-2,947	-12.2
	Total operating expenses		**298,348**	**294,003**	**4,345**	**1.5**
	Financial expenses:	Financial expenses for CP restructuring	-72	-407	335	-82.3
		Structural financial expenses (including leases)	335	-1,570	1,905	-121.3
	Total financial expenses		**263**	**-1,977**	**2,240**	**-113.3**
	Profit before tax		**0**	**0**	**0**	**0**
	Corporate income tax		0	0	0	**0**
	Profit for the year from continuing operations (after corporate income tax)		**0**	**0**	**0**	**0**
B) DISCONTINUED OPERATIONS	**Profit for the year from discontinued operations (after corporate income tax)**		**0**	**0**	**0**	**0**
PROFIT / LOSS FOR THE YEAR			**0**	**0**	**0**	**0**

TB Balance sheet at 31 December 2017

Transports de Barcelona, SA

				Diff.
ASSETS	**Non-current assets**	**289,448**	**281,624**	**7,824**
	Intangible assets	10,827	9,772	1,055
	Tangible fixed assets	226,701	219,705	6,996
	Long-term investments of the group and associated companies	5,500	5,536	-36
	Long-term financial investments	46,421	46,612	-191
	Current assets	**72,703**	**63,813**	**8,889**
	Inventory	4,608	4,207	401
	Trade debtors and other receivables	47,905	44,721	3,183
	Short-term investments of the group and associated companies	37	37	0
	Short-term financial investments	26	247	-221
	Short-term accruals	1,488	420	1,068
	Cash and cash equivalents	18,639	14,181	4,458
TOTAL ASSETS		**362,151**	**345,438**	**16,713**

Own shares

The company does not hold any own shares. No transactions with own shares were carried out during the year.

Payment terms to suppliers:

The average payment term to suppliers in 2017 was 35 days.

Recently the Company has been working to reduce payment terms to suppliers to bring the average payment period below the maximum specified in regulations on late payments.

Main data of the Metro network

The main data of the Metro network at 31 December 2017, are detailed in the following table:

Line	km(*)	Number of stations	Trains programmed at peak times	Frequency at peak times
1	20.2	30	30	3’20”
2	12.8	18	20	3’15”
3	17.8	26	26	3’21”
4	16.5	22	19	4’03”
5	18.6	26	32	2’49”
L9 Nord/L10	10.4	12	6 and 4	3’02”
L9 Sud:	19.7	15	9	7’19”
11	2.3	5	2	7’30”
Funicular	0.7	2	2	10’00”
Total network	**119.0**	**156**	**150**	

Line 11 has three trains each with two coaches and the other lines have five-coach trains. Funicular: 2 trains with 3 coaches.
The common L9 and L10 tram has an interval of 3'00"while the interval in individual trams is 6'00".

(*) New measurement criteria to adapt to international railway transport standards in measuring distance, bearing in mind the commercial service.

Of the 156 stations of the network, including the Montjuïc funicular railway, 108 are non-interchange stations, 18 allow passengers to change to one other line and 4 allow them to change to two others.

—Composition of the train fleet

Metro rolling stock (excluding Montjuïc funicular) at 31 December 2017 consisted of 168 five-coach trains and three two-coach trains. This represents a total of 846 coaches, of which 678 are engines and 168 trailers, as detailed per series in the following table:

	Engines	Trailers	Total coaches	Total trains	
2000-series	24	6	**30**	**6**	
2100-series	60	15	**75**	**15**	
3000-series	72	18	**90**	**18**	
4000-series	96	24	**120**	**24**	
5000-series	156	39	**195**	**39**	
6000-series	40	10	**50**	**10**	
9000-series	224	56	**280**	**56**	
Series 500 (*)	6	0	**6**	**3**	
Total coaches	**678**	**168**	**846**	**168**	**five-coach trains**
				3	**two-coach trains**

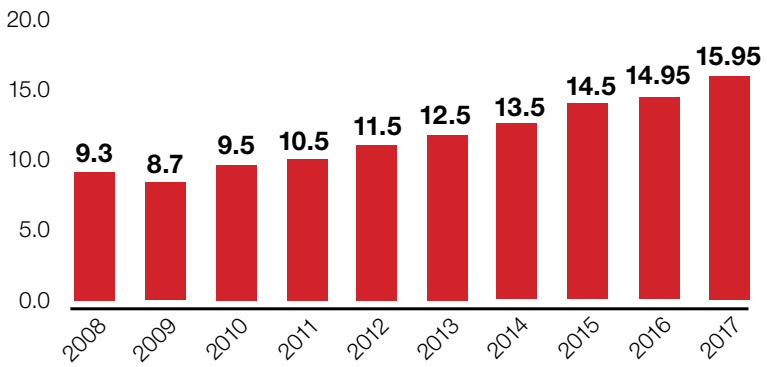
(*) 500-series trains have two coaches

The Montjuïc funicular has two units, each consisting of three coaches.

—Average age of rolling stock

The average age of the rolling stock was 15.95 years in 2017 (the lifespan of a train is around 30 to 35 years). Once a train reaches 20-25 years, it is remodelled, involving technical, aesthetic and equipment changes.

Evolution of the average age of trains (years)



The average age of the trains varies according to the line. Although the oldest units are on L1 and L3, the trains in the 4000 and 3000 series running on these lines were remodelled in previous years, which has enabled their working life to be extended.

Average train age by line (2017)

	L1	L2	L3	L4	L5	L9 Nord/ L10	L9 Sud:	L11	Total
Average age of the fleet (years)	23.4	10.6	25.0	14.8	11.5	8.6	5.6	14.0	**15.95**

Note:excluding the two trains of the Montjuïc funicular railway.

—Workforce at 31st December2017

The total active workforce of Ferrocarril Metropolità de Barcelona, SA, at 31 December 2017, was formed by 3,610 employees. This number includes 204 partially retired employees whose jobs are linked to relief contracts.

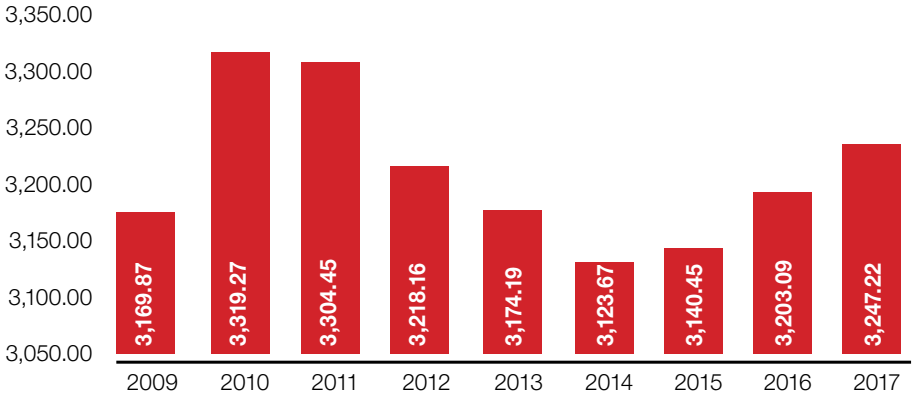
When considering the average annual standardised workforce (the workforce in terms of hours employed/year), this figure increased in 2017 by 3,247.22, with 44,13 new recruitments. This increase is mainly due to new staff recruited for the operation of standard lines (provision improvement Plan) and line 9 Sud (opened on 12 February 2016). The workforce for the maintenance of rolling stock has also increased.

Evolution of the average standadised workforce of Ferrocarril Metropolità de Barcelona, SA

	2017	2016	Diff.	%
Average standardized workforce (*)	3,247.22	3,203.09	44.13	1.38%

The average annual standardized Metro workforce decreased from 2010 until 2014. The decrease was more pronounced after 2012 as a result of the resource rationalisation plan launched that year. From 2015, the workforce started to increase again, in order to provide service to the new section of L9 Sud and to start-up the provision improvement Plan 2017.

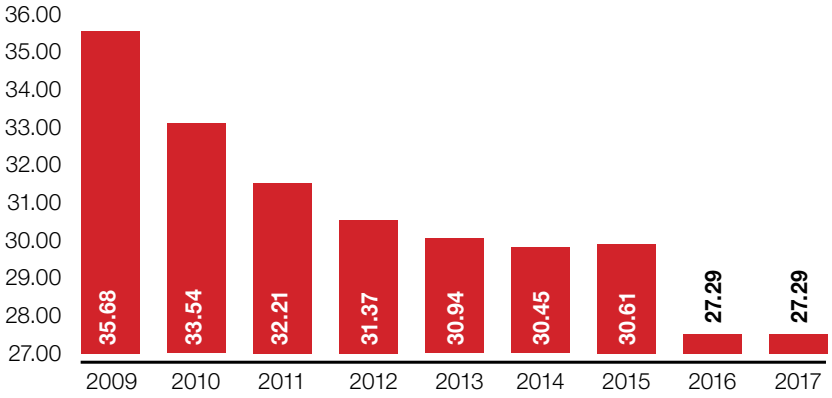
Development of the FMB average standardized workforce.



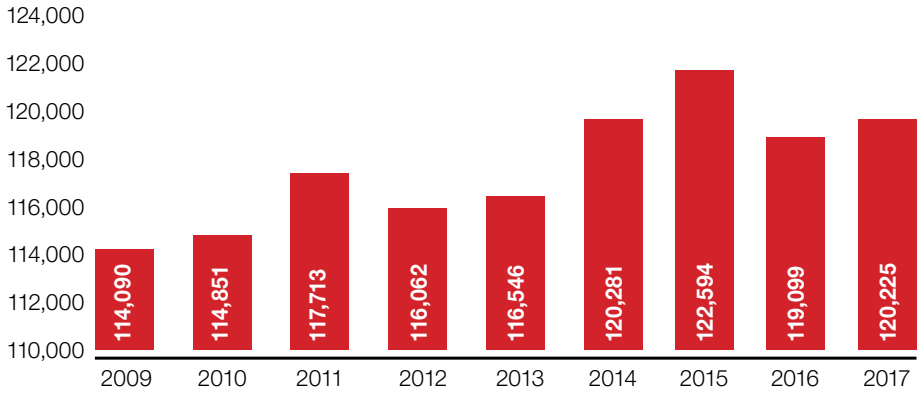
The start-up of Line 9 Sud in February 2016 meant the ratio of employees per km of network decreased considerably, down to 27.29, because the line is automatic.The figure has remained the same in 2017 as the previous year.

The number of passengers per employee ratio has improved this last year, owing to the increase in passengers. The indicator has exceeded 120 thousand passengers per employee, to the same level as 2015.

Employees per km of metro network

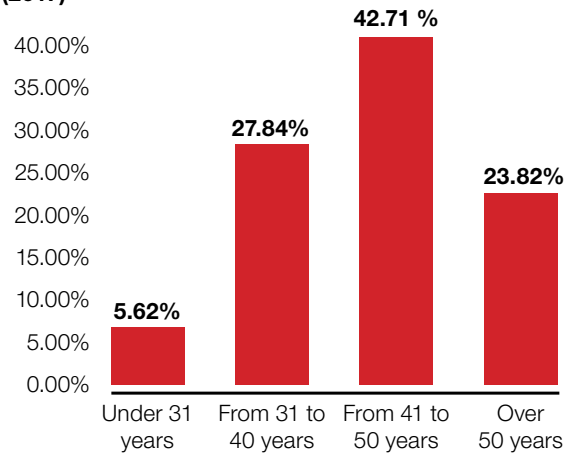


Change in no. of passengers per metro employee

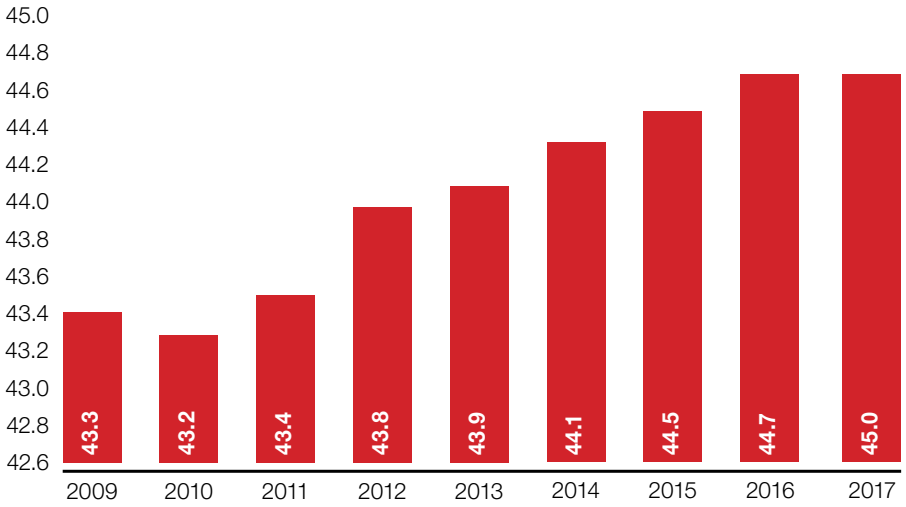


Since 2010, the average age of the company workforce has increased each year to reach 45.0 years this past year. The highest number of employees (42.7% of the workforce) is concentrated in the 41 to 50 year age bracket.

Metro workforce breakdown by age
(2017)



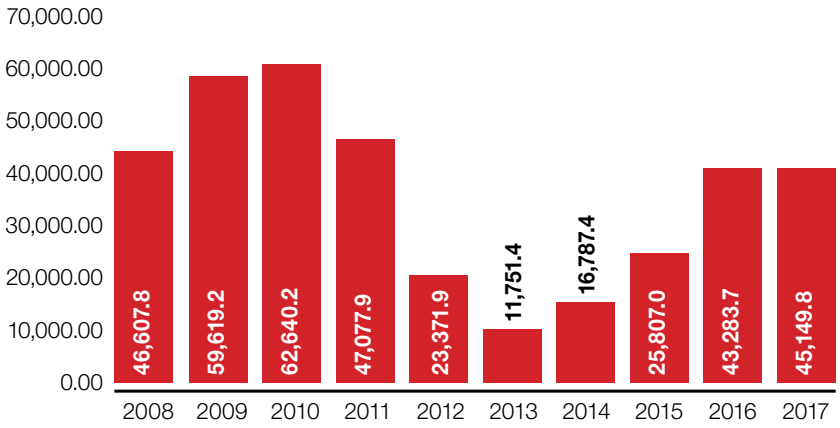
Change in the average age of the Metro workforce



— Investments

Investments of 2017 have grown for the third year running. This year they have reached 45.2 million euros (increase of 4.3% compared to 2016). Investments have now returned to levels before the crisis.

Evolution of investments at FMB
(in thousands of euros)



The following table details the investments of the year by concept:

Items	Thousands of euros
Intangible assets:	**1,951.0**
Computer software	1,951.0
Tangible fixed assets	**25,395.2**
Land and natural assets	299.1
Buildings and other constructions	17,570.4
Fixed installations	2,325.1
Machinery, equipment and tools	8.6
Sub-stations	259.6
Furniture and fittings	730.0
IT equipment	2,542.5
Vehicles	1,659.9
Spare parts	2,007.2
Subtotal	**27,346.2**
Variation of assets in progress	17,803.6
Total	**45,149.8**

As can be seen in the table above, investments of 2017 are broken down into: 1.95 million euros were in intangible assets (computer software), 27.35 million euros in tangible fixed assets and 17.80 million euros in asset variations in progress.

The most significant investments for their amount, were the following:

—Investments in intangible assets:

Investments of computer applications included SAP licences and the application for the planning and allocation of the service (PPS).

—Investments in tangible assets:

Within the section of buildings and other constructions, the most important concept is the Santa Eulàlia building (perimeter closure), plus various work on the ZAL workshop.

In the fixed installations section, the most important investments were for the refurbishment of the Besòs Mar, Paral·lel stations of L2-L3, Passeig de Gràcia of L3-L4 and Fondo L1, the restructuring of accesses and platforms, and the renovation of tracks: Lesseps - Canyelles and Trinitat Vella - Fondo.

Investments in machinery, installations and tools, the most significant concept included the electronic access control of standard lines, the elevation systems of the Hospital de Bellvitge station, the IP video surveillance system, the train engine reducer rotators and the anti-graffiti security panels of the Zona Universitària station,

In furniture and fittings, investment in the electronics workshop and equipment for information processes and computer renovation was significant.
Investments in transport elements refers mainly to improvements in the track machinery, the restructure of the series 2000 train and investments in electric maintenance vehicles.

Most of the expenditure under the spare parts heading was on parts for trains and parts for track circuits..

—Changes in assets in progress

They correspond to the balance differences of this account. They refer mainly to investments in: refurbishment in various stations, renewal of lifts, track circuits, improvements in escalator safety, migration of the public address and video surveillance system to IP, restructuring of series 2000 trains, the MPLS transmission network, the renovation of the Barceloneta-Besòs Mar section track and telecommunication projects, plus others.

—Profit and loss account

In 2017, the Catalan and Spanish economies grew by over 3%, meaning that there has been economic recuperation for the fourth year running. One aspect that should be noted is that this year, TMB operated within the stable reference framework specified in the 2014-2017 programme and the 2014-2031 framework plan for refinancing debt in the public transport system, approved on 2014 March 2014 by the ATM Board of Directors.

Regarding the Ferrocarril Metropolità de Barcelona (FMB) service, 2017 has been the first year that line 9 Sud has operated the whole year. It was opened on 12 February 2016. This year 2017, the Metro provision improvement Plan has been implemented, with an increase of 7 more trains on these lines at peak times on weekdays. As commented above, 2017 has seen the Barcelona Metro beat its record in the number of passengers. It has transported a total of 390.4 million users, meaning 8.9 million more than in 2016.

All these factors have undoubtedly had an impact on the profit and loss account of the financial year, which will be explained below.

—Revenue of the year: comparison between 2017 and 2016

Total revenues of the year, excluding service subsidies, have increased by 0.6 million euros, a slight increase (0.2%) compared to the previous year. This growth was exclusively owing to the increase in ticket sales. In spite of the price freeze, revenue increased by 2.1 million euros (+0.8%) owing to the increase in the number of passengers this year. Commissions, discounts and rebates have increased by 0.2 million euros over the previous year.

Detail of revenue (in thousands of euros)	**(1)**	**(2)**	**Difference (1) - (2)**	**(%)**
Sales	258,985	256,916	2,070	0.8
Commissions and rebates	-2,650	-2,422	-227	9.4
Other operating revenues	20,659	21,801	-1,142	-5.2
Pension plan revenues	154	269	-115	-42.8
Special subsidies	3,144	3,223	-79	-2.4
Revenues before service subsidies	**280,292**	**279,786**	**585**	**0.2**
Service subsidies	60,138	43,121	17,017	39.5
Service subsidies for train leases and L9/L10 charges	167,420	168,656	-1,235	-0.7
Total Revenues	**507,851**	**491,562**	**16,873**	**3.4**

Non-operating income has decreased by 1.14 million euros (-5.3%), owing mainly to the reduced revenue of the service from public administrations (basically revenue for the maintenance of infrastructures of L9/10 and L9 Sud), external cooperation and income from fines resulting from inspections to users travelling fraudulently.

Special subsidies have decreased by 79 thousand euros (-2.4%) mainly as a result of the reduction of the subsidy received from projects. pension revenue, which has a neutral effect on the profit and loss account, decreased by 115 thousand euros.

—Operating expenses: comparison between 2017 and 2016

Total operating expenses before amortisation increased by 12.7 million euros (2.9%) over the previous year.

Detail of operating expenses (in thousands of euros)	**(1)**	**(2)**	**Difference (1) - (2)**	**(%)**
Supplies	9,633	8,050	1,583	19.7
Electricity/fuel	24,857	26,660	-1,803	-6.8
Personnel	173,514	167,450	6,064	3.6
Contribution to the Supplementary Pensions System	154	269	-115	-42.8
Supplementary Contingency Retirement Pension System	0	0	0	
Supplementary Contingency Risk Pension System	154	269	-115	-42.8
External services	248,743	240,529	8,214	3.4
Renting of trains	73,811	75,028	-1,217	-1.6
L9 Nord/L10 and L9 Sud charges	99,580	98,302	1,278	1.3
Other external services	75,352	67,199	8,153	12.1
Taxes	280	166	115	69.4
Changes in provisions	787	1,945	-1,158	-59.6
Deterioration and results from sale of assets	-398	-206	-192	
Total expenses before amortisation	**457,570**	**444,862**	**12,708**	**2.9**
Amortisations	36,900	36,164	736	2.0
Sub. in capital allocated to profit and loss	-7,117	-5,823	-1,293	22.2
Total Amortisation	**29,784**	**30,340**	**-557**	**-1.8**
Total operating expenses	**487,353**	**475,202**	**12,151**	**2.6**

The items that have increased most were personnel expenses by 6.0 million euros (+3.6%), changes in provisions by 1.6 million euros, and external services (without charges and leasing of trains), which grew by 8.2 million euros (+12.1%),

The increase in personnel expenses is owing to the addition of staff recruited as a result of the start-up of the provision improvement Plan, and the increased wage costs from applying the new collective Agreement.

The increase in supplies has basically been owing to the increased expenses of materials for consumption and restocking.
Within External Services, the items that have experienced most growth included: expenses to repair and preserve transport elements, fixed facilities, buildings and installations and machinery, security and surveillance expenses, along with cleaning expenses of stations, buildings and trains.

One of the items that has experienced the most reduction is energy, 1.8 million euros lower (-6.8%), as a result of a reduction in the average price of kWh and regularisation from previous years of 731 thousand euros.

Variations in supplies have reduced by 1.16 million euros, and expenses for risk contingency pensions have decreased by 115 thousand euros. However, as indicated above, they do not have any effect on the results of the profit and loss account.

Net amortisation (amortisation less capital subsides transferred to the year) has decreased by 557 thousand euros, -1.8% compared to the previous year (basically owing to the growth of 1.3 million euros in capital subsidies, which offsets the increase in provisions for amortisation).

—Other items: comparison between 2017 and 2016

Financial expenses have increased by 4.1 million euros over the previous year.

Finally, the service subsidy of the year (excluding subsidies for renting trains and charges of L9 Nord/L10 and L9 Sud), needed to balance the profit and loss account, has grown by 17.0 million euros over the previous year. This has mainly been owing to an increase in workforce expenses, external services and financial expenses indicated above. However, subsidies allocated to renting trains and charges of L9 Nord/ L10 and L9 Sud) have decreased by 1.2 million euros.The main reason is that in 2017, 6.0 million euros have been applied from income of single fares and Hola BCN!, associated to the L9 Sud connection with Barcelona airport. This has reduced the subsidy needed for charges, while in 2016, this amount totalled 4.67 million euros.

Metro Profit and loss account (in thousands of euros)

			(1)	(2)	Difference (1) - (2)	(%)
A) CONTINUING OPERATIONS	**Revenues**	Sales	258,985	256,916	2,070	0.8
		Commissions and rebates	-2,650	-2,422	-227	9.4
		Non-operating income	20,659	21,801	-1,142	-5.2
		Pension plan revenues	154	269	-115	-42.8
		Special subsidies	3,144	3,223	-79	-2.4
		Service subsidies	60,138	43,121	17,017	39.5
		Subsidy for the renting service of trains and L9 >Nord/L10 and L9 Sud charges.	167,420	168,656	-1,235	-0.7
	Total Revenues		**507,851**	**491,562**	**16,288**	**3.3**
	Operating expenses	Supplies	9,633	8,050	1,583	19.7
		Electricity/fuel	24,857	26,660	-1,803	-6.8
		Personnel	173,514	167,450	6,064	3.6
		Contribution to the Supplementary Pensions System	154	269	-115	-42.8
		Supplementary Contingency Retirement Pension System	*0*	*0*	*0*	
		Supplementary Contingency Risk Pension System	*154*	*269*	*-115*	*-42.8*
		External services	248,743	240,529	8,214	3.4
		Taxes	280	166	115	69.4
		Changes in provisions	787	1,945	-1,158	-59.6
		Deterioration and results from sale of assets	-398	-206	-192	
	Total expenses before amortisation		**457,570**	**444,862**	**12,708**	**2.9**
		Amortisations	36,900	36,164	736	2.0
		Sub. in capital allocated to profit and loss	-7,117	-5,823	-1,293	22.2
	Total Amortisation		**29,784**	**30,340**	**-557**	**-1.8**
	Total operating expenses		**487,353**	**475,202**	**12,151**	**2.6**
	Financial expenses:	Financial expenses from CP restructuring	20,497	16,360	4,137	25.3
		Structural financial expenses (including leases)	0	0	0	
	Total financial expenses		**0**	**0**	**0**	
	Profit before tax		**0**	**0**	**0**	
	Corporate income tax		**0**	**0**	**0**	
	Profit for the year from continuing operations (after corporate income tax)		**0**	**0**	**0**	
B) DISCONTINUED OPERATIONS	**Profit for the year from discontinued operations (after corporate income tax)**		**0**	**0**	**0**	
PROFIT / LOSS FOR THE YEAR			**0**	**0**	**0**	

Balance sheet of the Metro at 31 December (thousands of euros)
Ferrocarril Metropolità de Barcelona, SA

				Difference
ASSETS	**Non-current assets**	**789,983**	**809,701**	**-19,718**
	Tangible assets	5,779	5,230	550
	Tangible fixed assets	311,512	303,458	8,054
	Property investments	0	0	0
	Long-term investments of the group and associated companies	5,163	5,163	0
	Long-term financial investments	467,528	495,850	-28,322
	Current assets	**109,543**	**117,220**	**-7,676**
	Inventory	5,572	5,124	448
	Trade debtors and other receivables	87,901	80,616	7,285
	Short-term investments of the group and associated companies	0	0	0
	Short-term financial investments	20	430	-410
	Short-term accruals	591	618	-27
	Cash and cash equivalents	15,460	30,432	-14,972
TOTAL ASSETS		**899,526**	**926,921**	**-27,394**
EQUITY AND LIABILITIES	**Equity**	**190,939**	**167,322**	**23,616**
	Capital and reserves:	125,121	125,121	0
	Authorised capital	*10,227*	*10,227*	*0*
	Reserves	*114,894*	*114,894*	*0*
	Profit / loss for the year	*0*	*0*	*0*
	Remeasurements	-36,860	-43,057	6,197
	Subsidies, donations and legacies received	102,677	85,258	17,419
	Non-current liabilities	**523,942**	**581,688**	**-57,746**
	Long-term debts	523,942	581,688	-57,746
	Current liabilities	**184,646**	**177,910**	**6,736**
	Short-term provisions	6,196	5,673	523
	Short-term debts	83,569	88,975	-5,406
	Trade creditors and other payables	87,547	78,324	9,223
	Short-term accruals	7,334	4,938	2,396
TOTAL NET EQUITY AND LIABILITIES		**899,526**	**926,921**	**-27,394**

Own shares

The company does not hold any own shares. No transactions with own shares were carried out during the year.

Payment terms to suppliers:

The average payment term to suppliers in 2017 was 44 days.

Recently the Company has been working to reduce payment terms to suppliers to bring the average payment period below the maximum specified in regulations on late payments.

Main data of the Montjuïc Cable Car

The main data of the Metro network at 31 December 2017, are detailed in the following table:

Length (metres):	**752**
Slopes (metres):	**84.55**
Number of supports:	**12**
Number of cabs	**55 (all glass covered)**
System capacity (people/hour):	**2,000**
Minimum distance between cabs (metres):	**48**
Speed (metres/second):	**2.5 - 5.0**
Traction (kVA):	**400**
Counterweight	**Hydraulic tension**

—**Workforce at 31st December2017**

At 31st December 2017, staff of the cable car totalled 26 people (6 head drivers and 20 auxiliary drivers), who the service to customers in different work shifts.

In 2017, the coverage process of auxiliary operators of the cable car was implemented in order to cover the needs of the summer season. 9 people were selected from the 286 candidates. These 9 people carried out training (also selective training) and finally 6 people were recruited to work the summer season.

—Investments

Investments made in the company in 2017 totalled 115.6 thousand euros.

Items	Thousands of euros
Intangible fixed assets:	**27.4**
Computer software	27.4
Tangible fixed assets	**29.4**
Buildings and other constructions	0.0
Fixed installations	0.0
Machinery, equipment and tools	29.4
Furniture and fittings	0.0
IT equipment	0.0
Vehicles	0.0
Spare parts	0.0
Total	**56.8**
Change in assets in progress	58.8
Total	**115.6**

The investment items with the highest levels were:
—Computer applications: contents management website
—Machinery, equipment and tools elevated platform of the drive station
—Change in assets in progress: basically the validation and sales system.

Profit and loss account of Projectes i Serveis de Mobilitat, SA

Total income for the year after corporation tax was 5.8 million euros of profit, an increase of 4.2% on the previous year.

This good result explains the increase in revenue of 119.7 thousand d'euros (+1.5%), along with the reduction in operating expenses plus amortisations of 101.6 thousand euros (a decrease of 3.9% compared to the previous year), and improved financial results of 142.7 thousand euros.

The increase in revenue has been the result of ticket sales, which increased by 2.1%, owing to the updating of ticket rates, as the number of passengers decreased by 0.9%. There was also a decrease of 51.2 thousand euros in non-operating income, chiefly as a result of reduced billing of external cooperation.

Operating expenses before amortisations, decreased by 3% mainly as a result of reduced supply, energy and fuel items. This reduction offsets the increase in personnel items (average increase in staff of 2.4 people), and external services. The items that most increased within external services were: computer work, technical assistance and studies, cleaning of stations and vehicles, the repair and preservation of buildings and other constructions.

Amortisations have reduced by 6.5% owing to the decrease in amortisation allowances of machinery, installations and tools, and of buildings and other constructions.

Profit and loss account of Projectes i Serveis de Mobilitat, SA

(in euros)					Difference	% Diff.
A) CONTINUING OPERATIONS	**Operating revenues:**	Sales	8,174,111.59	8,003,216.97	170,894.62	2.1
		Other operating revenues	155,359.51	206,573.19	-51,213.68	-24.8
	Total Revenues		**8,329,471.10**	**8,209,790.16**	**119,680.94**	**1.5**
	Operating expenses	Supplies	23,799.89	106,326.09	-82,526.20	-77.6
		Electricity/fuel	74,294.20	121,011.89	-46,717.69	-38.6
		Operational personnel	935,556.91	877,303.12	58,253.79	6.6
		External services	768,527.02	751,650.56	16,876.46	2.2
		Taxes	198.75	1,699.38	-1,500.63	-88.3
		Result of sales of fixed assets	-437.00	-923.70	486.70	-52.7
	Total expenses before amortisation		**1,801,939.77**	**1,857,067.34**	**-55,127.57**	**-3.0**
		Amortisations	669,917.86	716,421.94	-46,504.08	-6.5
	Total operating expenses		**2,471,857.63**	**2,573,489.28**	**-101,631.65**	**-3.9**
	Net operating income		**5,857,613.47**	**5,636,300.88**	**221,312.59**	**3.9**
		Net financial income	-99,327.61	43,357.70	-142,685.31	-329.1
	Profit and loss from continuing operations (before corporate tax)		**5,956,941.08**	**5,592,943.18**	**363,997.90**	**6.5**
	Corporate tax		157,960.97	27,440.86	130,520.11	475.6
	Profit and loss from continuing operations (after corporate tax)		**5,798,980.11**	**5,565,502.32**	**233,477.79**	**4.2**
B) DISCONTINUED OPERATIONS	**Profit and loss from discontinued operations (after corporate tax)**		**0.00**	**0.00**	**0.00**	
PROFIT / LOSS FOR THE YEAR			**5,798,980.11**	**5,565,502.32**	**233,477.79**	**4.2**

Balance sheet at 31 December of Projectes i Serveis de Mobilitat, SA

(in euros)

				Difference
ASSETS	**Non-current assets**	**9,275,020.58**	**9,829,366.14**	**-554,345.56**
	Tangible assets	244,156.83	269,625.33	-25,468.50
	Tangible fixed assets	8,740,363.24	9,269,240.30	-528,877.06
	Property investments	90,500.00	90,500.00	0.00
	Long-term investments of the group and associated companies	200,000.51	200,000.51	0.00
	Long-term financial investments			
	Current assets	**45,363,748.32**	**38,957,986.37**	**6,405,761.95**
	Inventory	5,421.78	5,559.65	-137.87
	Trade debtors and other receivables	349,813.01	140,089.87	209,723.14
	Short-term financial investments	1,876.00	50.10	1,825.90
	Short-term accruals	3,315,153.16	9,615,429.57	-6,300,276.41
	Cash and cash equivalents	41,691,484.37	29,196,857.18	12,494,627.19
TOTAL ASSETS		**54,638,768.90**	**48,787,352.51**	**5,851,416.39**
EQUITY AND LIABILITIES	**Equity**	**54,259,854.96**	**48,460,874.85**	**5,798,980.11**
	Capital and reserves:	54,259,854.96	48,460,874.85	5,798,980.11
	Authorised capital	*10,003,100.00*	*10,003,100.00*	*0.00*
	Reserves	*38,457,774.85*	*32,892,272.53*	*5,565,502.32*
	Profit / loss for the year	*5,798,980.11*	*5,565,502.32*	*233,477.79*
	Non-current liabilities	**0.00**	**0.00**	**0.00**
	Long-term debts	0.00	0.00	0.00
	Current liabilities	**378,913.94**	**326,477.66**	**52,436.28**
	Short-term debts:	32,073.79	22,343.57	9,730.22
	Debts from credit institutions	*0.00*	*0.00*	*0.00*
	Other financial liabilities	*32,073.79*	*22,343.57*	*9,730.22*
	Trade creditors and other payables	306,511.15	281,929.09	24,582.06
	Suppliers	*32,444.69*	*35,249.02*	*-2,804.33*
	Suppliers, group and associated companies	*94,486.65*	*103,422.83*	*-8,936.18*
	Miscellaneous creditors	*67,373.81*	*65,627.01*	*1,746.80*
	Personnel, salary payments pending	*20,227.48*	*20,287.93*	*-60.45*
	Other payables to public authorities	*91,978.52*	*57,342.30*	*34,636.22*
	Short-term accruals	*40,329.00*	*22,205.00*	*18,124.00*
TOTAL NET EQUITY AND LIABILITIES		**54,638,768.90**	**48,787,352.51**	**5,851,416.39**

Main data of the TMB network

—Main data of TB

Network figures at 31 December 2017	Total
Number of routes (*):	98
Length of the network (*)	833.17
Number of stops (*):	**2,541**
with bus shelter:	1,371
with bus stop pole:	1,170
Kilometres of bus lane	191.22

(*) Excluding special Bus Turístic and Tramvia Blau services and lines 80, 81, 82 and 83 which are contracted out to Sagalés.

Figures of the fleet at 31 December 2017	Number of vehicles
Standard buses:	**601**
Diesel:	212
CNG:	251
Diesel and electric hybrids	123
CNG and electric hybrids	13
Electric only:	2
Articulated buses:	**327**
Diesel:	131
CNG:	127
Diesel and electric hybrids	67
Electric only:	2
Midibuses	**25**
Diesel:	24
Diesel and electric hybrids:	1
Minibuses (diesel):	52
Double-decker buses (diesel):	**77**
Double-articulated buses (diesel and electric hybrids)	**3**
Total fleet	**1,085**

Fleet breakdown by fuel type:	Number of vehicles
Diesel buses:	**496**
CNG buses	**378**
Hybrid buses	**207**
Diesel and electric hybrids	194
CNG and electric hybrids	13
Electric buses	**4**
Total fleet	**1,085**

Buses adapted for people with reduced mobility (PRM)	1,085
Buses equipped with air conditioning [(a)]	1,085
Fleet required for service (weekday rush hour, provision of buses in winter)[(b)]	856

Notes:
(a) Difference with the total fleet corresponds to 4 shuttle buses.
(b) The difference between the total number of vehicles and the fleet necessary for the service (not including the Bus Turístic routes) corresponds to the operative park in reserve, and the fleet under servicing, ITV vehicle inspection, etc.

—TMB Workforce

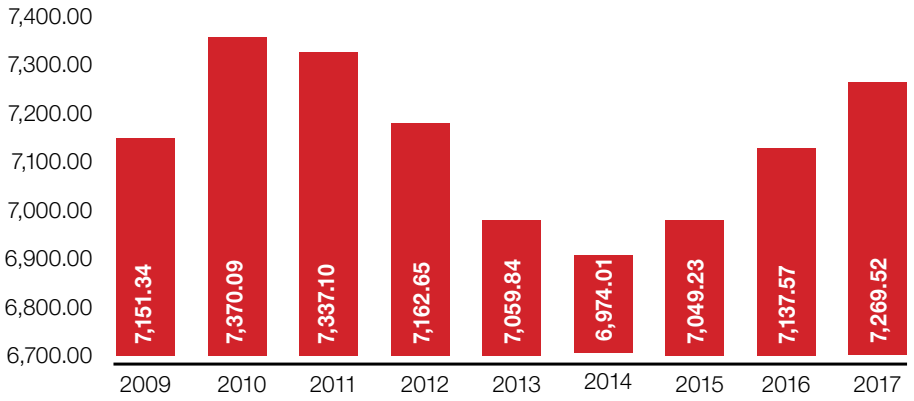
At 31 December 2017 the total active TMB workforce (excluding the company which operates the Montjuïc cable car and the company TMB, S.L.) was 7,935. The numbers include 366 partially retired employees whose jobs are linked to relief contracts.

Standardized average workforce (excluding Montjuïc cable car)

	2017	2016	Diff.	%
FMB	3,610	3,567	43	1.2%
TB	4,327	4,179	148	3.5%
TMB	**7,935**	**7,744**	**191**	**2.5%**

TMB's standardized average annual workforce in 2017 (as measured by hours per employee/year), excluding the Montjuïc cable car and TMB SL, was 7,269.5, an increase of 132 compared to the previous year. The increase in staff is the result of extensions in 2017 to the two networks explained above.

Development of the TMB average standardized workforce.
(excluding the Montjuïc cable car and TMB, SL)



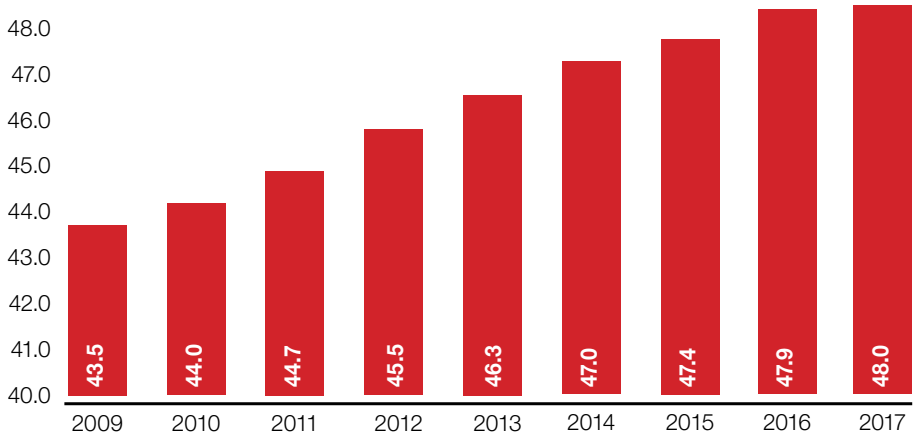
In the chart, a decrease in the workforce can be seen from 2010 to 2014. From 2015, the workforce started to grow again with the start-up of line 9 Sud of the Metro and the provision improvement plans of both networks.

FMB's standardised average workforce was 3,247.22, an average increase of 44 people compared to the previous year. This growth is mainly owing to the Metro provision improvement Plan, started in 2017, which will continue throughout 2018 and 2019.

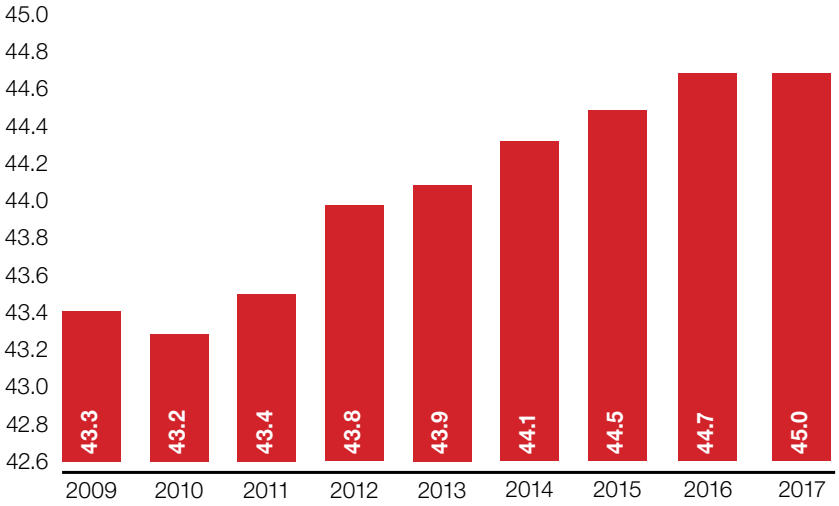
The average standardised workforce of Transports de Barcelona, is 4,022.30 employees, meaning an increase of 87.8 people. This increase has been mainly in drivers and is the result of the increased offer from actions described above.

The average age of the active FMB workforce was 45.01, while the average age of TB was 47.95 years at 31st December, 2017.

Change in average age of TB workforce



Change in the average age of the Metro workforce



—Consolidated profit and loss account of TMB

The 2017 financial year passed wiin a situation of positive economic growth of both Catalan and Spanish economies, with increases of over 3% in the GDP, in which TMB has operated within a stable financial framework. This is represented by the Programme Contract 2014-2017 and the 2014-2031 Framework Plan from financial rehabilitations of the public transport system of debt refinancing, passed on 6 March 2014 by the ATM Management Board.

2017 was the first whole year of operation of the Metro line 9 Sud, which opened on 12 February 2016. The provision improvement Plans of the Metro and Bus have been started-up this year. In the metro, this has meant 7 more trains at peak times on weekdays in some lines. On the Bus, it has meant 22 more vehicles from October on weekdays (a total reinforcement of 43 buses in 2017 and 2018).

The TMB networks have had a joint increase in demand of 15.1 million passengers over the previous year.
These events have obviously had an economic impact on the profit and loss account of the group, which will be commented below.

—Revenue of the year:

The total revenues of the TMB consolidated group (excluding service subsidies) increased by 4.4 million euros (1.0%) over 2016. The main increase was due to an increase in income from sales of 2.8 million euros (0.7%) thanks largely to the increase in TMB passenger numbers. It should be underlined that there was a price freeze on transport tickets in 2017. Non-operating income also increased by 1.2 million euros (4.4%), and special subsides by 0.43 million euros (4.6%). The increase of non-operating income is mainly due to income from advertising charges, which amply offset the decrease in other items, such as income from exterior cooperation, income from intervention/ inspection against fraud in the networks, and billing of services provided to public administrations, from infrastructure maintenance works carried out by TMB on lines 9 Nord/10 and L9 Sud.

On the other hand, service subsidies grew by 18.9 million euros (5.3%), mainly owing to increased provision as a result of the Metro and Bus improvement Plans and other actions, such as the whole year of operation of line 9 Sud and the Bus summer Plan.

—Operating expenses:

The increase in the provision of both networks also explains the increased operating expenses before amortisations, which were 20.3 million euros (+2.8%) compared to the previous year.
The items that have increased the most were: supplies, which increased by 2.7 million euros (+14.4%) basically for consumption and restocking materials; operating personnel expenses, which increased by 10.7 million euros (+2.8%), and external services, which increased by 9.5 million euros (+3.5%). Within these expenses, the items that have increased the most are the following: repair and preservation expenses of transport elements, machinery, buildings and fixed installations, security and surveillance, cleaning expenses of stations and vehicles, expenses in computer work, expenses in promotion and communications and in technical assistance and studies.

The increase in the Metro operation personnel and of Bus drivers, and the application of their respective collective Agreements, explain the increase in operating personnel expenses of 2.8%.

There was a reduction of 1.1 million euros (-2.4%) in the costs of fuel and energy compared with 2016. This decrease is basically due to the reduction of Metro electrical energy expenses from the decrease in the average kWh price and a regularization from previous years of 731 thousand euros.

Variations of provisions have reduced by 1.4 million euros and other results have decreased by 0.6 million euros.This corresponds to the return of the cent imposed in the Tax on retail sales of certain hydrocarbons (IVMDH) from previous years.

—Other expenses

Net amortisation (after capital subsidies transferred to the year) decreased by 3.5 million euros compared to the previous year (-6.4). Financial expenses increased by 4.2 million euros as a result of an increase of non-settlement of deficit in previous years.

Finally the result of the TMB consolidated group, after corporate tax was 6.5 million euros, representing a decrease of 2.26 million euros compared to the previous year.

Consolidated profit and loss account of the TMB consolidated group (in thousands of euros)

					Difference	% Diff.
A) CONTINUING OPERATIONS	**Revenues**	Sales	400,459	397,704	2,756	0.7
		Other operating revenues	27,922	26,738	1,184	4.4
		Special subsidies	9,875	9,445	430	4.6
		Service subsidies	375,821	356,948	18,873	5.3
	Total Revenues		**814,077**	**790,835**	**23,242**	**2.9**
	Operating expenses	Supplies	20,956	18,319	2,637	14.4
		Electricity/fuel	44,195	45,266	-1,072	-2.4
		Operational personnel	387,452	376,766	10,685	2.8
		Contribution to the Supplementary Pensions System	855	555	300	54.1
		Supplementary Contingency Retirement Pension System	*0*	*0*	*0*	
		Supplementary Contingency Risk Pension System	*855*	*555*	*300*	*54.1*
		Personnel in regulatory process	314	749	-435	-58.1
		External services	283,754	274,279	9,476	3.5
		Taxes	953	988	-36	-3.6
		Changes in provisions	-1,113	272	-1,385	-508.5
		Deterioration and results from sales of assets	-415	115	-530	-461.3
		Other results	-1,519	-2,129	610	-28.6
	Total expenses before amortisation		**735,431**	**715,181**	**20,250**	**2.8**
		Amortisations	65,290	65,931	-641	-1.0
		Subsidies in capital allocated to profit and loss	-13,567	-10,673	-2,894	27.1
	Total Amortisation		**51,723**	**55,258**	**-3,535**	**-6.4**
	Total operating expenses		**787,154**	**770,439**	**16,715**	**2.2**
	Financial expenses:	Financial expenses from CP restructuring	21,038	16,657	4,381	26.3
		Structural financial expenses	-376	-228	-148	64.8
	Total financial expenses		**20,662**	**16,429**	**4,233**	**25.8**
	Share for the benefit of equity-accounted companies		**522**	**435**	**88**	**20.2**
	Profit before tax		**6,783**	**4,401**	**2,382**	**54.1**
	Corporate tax		**-241**	**-124**	**-118**	**95.1**
	Profit for the year from continuing operations (after corporate tax)		**6,542**	**4,278**	**2,264**	**52.9**
B) DISCONTINUED OPERATIONS	**Profit for the year from discontinued operations (after corporate tax)**		**0**	**0**	**0**	
PROFIT / LOSS FOR THE YEAR			**6,542**	**4,278**	**2,264**	**52.9**

Note: External Services includes train lease expenses totalling 73,811 thousand euros in 2017 and 75,028 thousand euros in 2016. This amount also included 99,580 thousand euros for charges for L9 Nord/L10 and L9 Sud, and 98,302 thousand euros in 2016 for the same concept.

—Balance sheet at 31 December 2017

(in thousands of euros)				Difference
ASSETS	**Non-current assets**	**1,082,080**	**1,093,936**	**-11,856**
	Tangible assets	17,004	15,393	1,612
	Tangible fixed assets	546,962	532,436	14,526
	Property investments	0	0	0
	Long-term investments of the group and associated companies	3,963	3,441	522
	Long-term financial investments	514,150	542,666	-28,516
	Current assets	**222,427**	**214,533**	**7,894**
	Inventory	10,186	9,337	848
	Trade debtors and other receivables	130,205	119,364	10,841
	Short-term financial investments	3,363	10,293	-6,930
	Short-term accruals	2,080	1,038	1,042
	Cash and cash equivalents	76,593	74,500	2,093
TOTAL ASSETS		**1,304,507**	**1,308,469**	**-3,962**
EQUITY AND LIABILITIES	**Equity**	**404,811**	**353,258**	**51,552**
	Capital and reserves:	301,295	294,753	6,542
	Authorised capital	*18,642*	*18,642*	*0*
	Reserves	*276,112*	*271,834*	*4,278*
	Prior year losses	*0*	*0*	*0*
	Profit / loss for the year	*6,542*	*4,278*	*2,264*
	Remeasurements	-36,834	-42,841	6,007
	Subsidies, donations and legacies received	140,349	101,346	39,003
	Non-current liabilities	**654,840**	**701,838**	**-46,998**
	Long-term debts	654,840	701,838	-46,998
	Current liabilities	**244,856**	**253,372**	**-8,516**
	Short-term provisions	11,173	12,413	-1,239
	Short-term debts	106,980	125,230	-18,250
	Trade creditors and other payables	114,843	103,450	11,393
	Short-term accruals	11,859	12,281	-421
TOTAL NET EQUITY AND LIABILITIES		**1,304,507**	**1,308,469**	**-3,962**

Own shares

The company does not hold any own shares. No transactions with own shares were carried out during the year.

Payment terms to suppliers:

The average payment period to suppliers of Ferrocarril Metropolità de Barcelona, SA was 44 days in 2017, in Transports de Barcelona, SA, it was 35 dies, in Projectes i Serveis de Mobilitat, SA, it was 46 days and in TMB, SL, 35 days.

Recently the Company has been working to reduce payment periods to suppliers to bring the average payment period below the maximum specified in regulations on late payments.

4

Significant events after the close of the year

After the close of the year there were no significant events that are not included in the budget and operational plans for 2018.

However, on 28 December 2017, the Management Board of Autoritat del Transport Metropolità (ATM) passed the fare policy of the integrated system of the Metropolitan Area of Barcelona for 2018.The three associated administrative bodies of the ATM (Catalonia Regional Government, Barcelona City Council and the Metropolitan Area of Barcelona) unanimously agreed to update the fares by almost 2% (following the year-on-year increase of the CPI), after five years of price suppression. In spite of this, prices of the T-Jove or T-Mes cards did not change, nor the allowance for the unemployed.

In February 2018, the Tramvia Blau, dating back to 1901, stopped running in order to start an in-depth upgrading plan of the infrastructure, which will enable it to run in the future with complete safety. This renovation was approved by the Autoritat del Transport Metropolità, with the commitment of including funding of this action in the next 2018-2021 programme Contract.

The renovation of the historic tramvia, which will cost around 11 million euros, includes the complete renovation of tracks and catenary, the redevelopment of one of the trams, the repair of trams that usually provide service and other complementary actions. While the work is being carried out, users can use the bus route 196 (Pl. Kennedy - Bellesguard) as an alternative.

During this period, the trams will participate in cultural and historic heritage dissemination, through the TMB Educa programme, which will widen activities around the workshops and depots located in the Plaça de la Central.

Significant events after the close of the year

It should be highlighted that in January 2018, the refurbishment works of the Besòs Mar (L4), Paral·lel (L2-L3), Passeig de Gràcia (L3), Fondo and Universitat stations of L1, were completed. Service was maintained in all the stations while refurbishment was done. There were only temporary disruptions in halls and accesses, with minimum inconvenience for users.The works, with an investment of 8.5 million euros, form part of the upgrading and functionality improvement programme of old stations or those with a high level of use. The programme aims to leave them as new, apart from improving accessibility aspects.

To continue the refurbishment programme of stations for 2018, TMB has projects prepared for the Catalunya station (L1 and L3), the main halls of Sants Estació and Sagrada Familia of L5, and the secondary Lesseps station (L3), apart from the two stations of the Montjuïc funicular railway.

Significant events after the close of the year in the Cable Car

The new fares of the Montjuïc Cable Car came into force on 1 January 2018.

Following the planning done previously, the Cable Car will be closed to the public from 29 January to 18 February 2018, in order to do an annual technical service and of all its elements.

Actions of Transports Metropolitans de Barcelona:

2017 has been a year of consolidation of the company Transports Metropolitans de Barcelona, SL, since it was created in 2015. It forms part of the TMB consolidated group. The company's business activities include:

—The e-commerce platform barcelonasmartmoving.com, which is a reference in tourist mobility in Barcelona and its Metropolitan Area.
—Special, occasional services of Transports de Barcelona (TB) for businesses.

This year, sales continued a very positive development up to the third quarter of the year, when there was a global drop in tourism in the city of Barcelona, which affected e-commerce. In spite of this, there has been a global increase of 63.3%.

The main goals of the business in 2017 have been:

—*e-commerce platform*

– During the year, new products have been incorporated to the e-commerce catalogue, such as the 8 routes of the Catalunya Bus Turístic, aimed at widening the offer and increasing the average ticket of the platform.

– The tax system has changed from a commission system to the REAV system (special system for travel agencies), in order to offer a more complete, global service to customers.

– A *cross-selling* unit has been implemented to the platform in order to increase the average customer ticket, and hence increase revenue.

The main goals for 2018 are: improvement of securisation of the platform (improved security), incorporation of a new *couponing* system (offering coupons and discounts to customers to increase demands at certain times of the year), and the creation of customer link area, to obtain more information. This will enable us to offer a more global service and implement more effective marketing actions.

—**Special TB services:**

Various special services have been provided throughout the year, both on regular buses and the Bus Turístic. Income from these special services were over 105 thousand euros.

5

Outlook for the company and future projects

TMB strategic lines

As the operator of Barcelona's bus and metro networks, the aim of Transports Metropolitans de Barcelona (TMB) is to provide a quality public transport network which also contributes to the sustainable development of the Metropolitan Area of Barcelona, ensuring that customers receive the best service and implementing socially responsible policies, in a framework of viability and economic efficiency. TMB also aims to be one of Europe's leading public transport companies, underlining its international profile and competitiveness. The field of reference of TMB, will therefore depend increasingly more on the competency model resulting from the adaptation to

European regulations of passenger public transport.
The efficient use of technology has enabled us to make a qualitative leap in recent years, in improving service and efficiency, and to continue this way in the future. To ensure the success of this strategic vision, the Balanced Scorecard was implemented, which is a strategic management system which allows an overview of the entire business. This system measures business performance from four key perspectives: 1) User/public satisfaction, 2) Process performance and innovation, 3) Human resource development and growth, and 4) Financial results.

a) Outlook for users/public

The ultimate strategic goal should be customer satisfaction. In the Bus service, the implementation is planned of the last phase of reconversion of the network. This includes the start-up of new lines or other provisions, such as the continuity of the improvement Plan of the service on weekdays. Two new stations are planned to be opened in the Metro of line 10 Sud (Foneria and Foc Cisell). It is also planned to increase the service of lines L1. L3. L4 and L5 to improve provision of the busiest lines on weekdays.

b) Outlook for processes

As processes are key to obtaining the desired outcomes, this year TMB will focus its efforts on optimisation, sustainability, efficiency and quality.

TMB has also participated in the SocMobilitat Project, which aims to implement a new card, T-Mobilitat, planned for the start of 2019 in the city of Barcelona.The project will deploy Contactless technology to Transport de Catalunya, along with other services such as Transport Information Management Centre, a Customer Service Centre, along with virtual tools (web and app) to facilitate mobility of users.

c) Outlook for people

People are the drive that can achieve excellent results in other perspectives. Our strategy of this perspective includes ensuring good labour relations based on dialogue and competitiveness with a view to developing commitment and engagement. This requires a gradual shift in the culture of the company, in order to improve productivity.

d) Financial outlook

Our financial strategy is the mechanism necessary to achieve the ultimate objective of increasing user satisfaction. It is based on the following guiding principles: increasing revenues from tickets and additional items and the optimum and efficient management of resources at all levels of the organization.

—Business Plan 2018 - 2021

In 2017, work has been done on all areas of TMB to prepare the 2018-2021 Business Plan. This strategic document is the basis on which actions for the next four years are negotiated with the Autoritat del Transport Metropolità. Financial needs foreseen to carry out these actions are also calculated and included in the next Programme contract 2018-2021.

The Business Plan includes an analysis of TMB activity over recent years, from the viewpoint of supply and demand, together with a description of the macroeconomic environment foreseen during the effect of the Plan.

An innovation of the latest Business Plan was an analysis of TMB risks and contingencies for the 2018-2021 period. From this analysis, contingencies that are considered priority have been described and selected (they are considered priority because there is a greater probability that they will occur). They also have more impact on TMB action. Each of these priority contingencies have been assigned corrective action, in order to reduce or cancel effects (improvement opportunities). These actions included: Supply Plans of the Bus and Metro, the completion of the New Bus Network, extensions of the Metro network, the renovation plan of the Tramvia Blau, the new maintenance programmes of trains regarding bogie chassis, the new Zona Franca Port Bus Depot, the renovation and remodelling plan of trains, etc.

On 31 July 2017, TMB provided ATM with an estimate of requirements needed to be subsidised in the 2018-2017 period, with a view to preparing and approving the 2018-2021 Programme Contract. In the autumn, it was seen that the demand for September and October would have a significant change in tendency compared to May and June, which had been used as a basis for demand projects of the Business Plan and to calculate the needs of the 2018-2021 period. This change in tendency was probably caused by various factors, such as the terrorist attack in Les Rambles in August, and the Catalan political scenario from September-October.

On 28 December, the ATM approved the requirements foreseen for 2018 and the corresponding Programme Contract. In 2018, the goal will be to formalise a 4-year Programme Contract until 2021, which includes the 2018 financial year.
For this reason, TMB made an adjustment to the requirements foreseen for 2018, which included:

—A new calculation of revenue based on the forecast demand and average fare at the end of 2017, based on the demand data in October. An adjustment was forecast in operating expenses, based on a reduction in the Bus Turístic service of around 19,000 hours per year, owing to the reduced demand of this service in the second half of the year.

—New actions included in the Business Plan included the proposal to defer the activation of certain investments, which would enable needs to be adjusted to available resources.

With these adjustments, the total figure of requirements in 2018, adapted to the new demand, was not modified with respect to the forecast of requirements provided by TMB to the ATM on 31 July 2017, which totalled 529.2 million euros.

The new projection of TMB requirements calculated from the new figure at the end of 2017, forecasts requirements for the 2019-2021 period of 35.1 million more than those presented to the ATM in July 2017. This will have to be reviewed in 2018.The reduction in revenue as a result of the differences between forecast fares and those finally approved, should also be added to this figure.

—Outlook for 2018

The aim of TMB for 2018 will be to maintain the quality and level of service reached in recent years, in order to guarantee sustainable mobility and contribute to the integration of the territory, by using available resources in a more efficient manner.
In 2018, TMB aims to provide the current level of the Metro and Bus network, under the best conditions, and to start-up actions approved by the ATM, plus remaining actions defined in the Programme Contract.
In the TMB budget proposal for 2018, the following actions are highlighted:

1. **Bus improvement plan,** with the incorporation of 43 new buses in the network on weekdays, in two phases (the first at the start of 2017 with 22 more buses). In September 2018, there will be 21 more buses on weekdays, added to the previous phase.

2. **Bus improvement plan in the summer,** which will involve the reinforcement of Bus routes to the beaches and other routes.

3. The start-up of the Metro line 10 Sud. In 2018, the opening is planned of two new stations, Foneria and Foc Cisell, on Passeig de la Zona Franca.

4. **The Metro supply improvement plan 2017-2021,** which involves a progressive increase of the current supply of the Metro, during this period. Phase 2 of this Plan will be carried out gradually over 2018. It will consist of running all available trains at peak times, up to 135 trains in the rush hour of standard lines (it is a transitional phase, as it is practically impossible to maintain the whole fleet in service all the time).

5. **The new Metro Maintenance Plan**, regarding the chassis of series 2000. 3000 and 4000, and the changeover to a long-cycle chassis of 300,000 km.

6. **The Bus Participation Plan,** with an increased supply of 23 new more buses on weekdays in the current network. This will start in October 2018.

7. **The start of extension works of the Zona Franca depot,** owing to the future elimination of the Ponent depot, as a result of the Gran Via - Llobregat Urban Master Plan, approved on 18 April 2017.

8. **The actions required by the organization as a whole, to adapt TMB to the needs of the T-Mobilitat project,** which will mean a change in the future management of mobility.

—Investment of 248 million euros from the Department of Territory and Sustainability

The Department of Territory and Sustainability of the Catalan Regional Government will invest 248 million euros over the next six years in various improvement actions of the Metro metropolitan network, according to a communication at the end of October 2017. This plan includes works that are planned and in progress, to adapt the network for people with reduced mobility. It also includes the constructions of new stations (the network will be fully adapted by 2024), with a budget of 102.5 million euros. There will also be an extraordinary preservation programme of 143.5 million euros, to maintain the reliability of the system and to meet increased demand.

The adaptation programme for people with reduced mobility includes the adaptation of the following stations: Jaume I (L4), work in progress since June 2017, Vallcarca (L3), Ciutadella / Vila Olímpica (L4) and the interchanges of Maragall (L4, L5), Espanya (L1, L3), Clot (L1, L2) Verdaguer (L4, L5), Plaça de Sants (L1, L5) and Urquinaona (L1, L4). The plan also includes the completion of the Ernest Lluch station (L5), between Collblanc and Pubilla Cases.

The Department of Territory and Sustainability has drawn up an extraordinary maintenance programme, with a series of upgrading and improvement actions that will maintain the reliability of the system and will meet the growing demand. Actions include the following: Triangle, Paral·lel, Sagrada Família, Pg. de Gracia and Sant Genís; imrpvoement of the superstruction of track 2 (Universitat - Monumental); refurbishment of the depots and Workshops Sant Genís (L3); structural refurbishment of Baró de Viver; new depot on L1; extension of the depot on L3; manoeuvre automation L5; ventilation of Catalunya and Espanya stations; restructuring of the L4-L11 link at Trinitat Nova; new regulation and telecommand system; increased traction power supply; customer information systems and renovation of ATP signalling L4/L2.

Outlook for the company and future projects of PSM

In 2017, results of passengers of the Montjuïc Cable Car were similar to the previous year, and the increase of online sales should be highlighted.The main goal of 2018 continues to be the consolidation of good results.

6 Holdings in other companies

Holdings in other Bus companies

Transports de Barcelona, SA had the following interests in other companies at 31 December:

—A 300,506.05 euro holding in Transports Ciutat Comtal, SA, representing 33.3% of its share capital.

—A 420.71 euro holding in Promociones Bus, SA, representing 0.37% of its share capital.

—A 4,403.07 euro holding in Ensitrans, AEIE, 10% of the company's share capital.

—A 60,101.22 euro holding in Barcelona Regional, Agència Metropolitana de Desenvolupament Urbanístic i d'Infrastructures SA, representing 3.92% of its share capital.

—A 161,550 euro holding in Transports Metropolitans de Barcelona, SL, representing 50% of its share capital.

—A 5,001,550 euro holding in Projectes i Serveis de Mobilitat, SA, 50% of its share capital.

—A 58,990.78 euro holding in Societat Catalana per a la Mobilitat, SA, representing 1% of its share capital.

Holdings in other Metro companies

Ferrocarril Metropolità de Barcelona, SA had the following holdings in other companies at 31 December:

—A 4,403.07 euro holding in Ensitrans, AEIE, representing 10% of its share capital.

—A 60,101.22 euro holding in Barcelona Regional, Agència Metropolitana de Desenvolupament UrbanÃstic i d'Infraestructures SA, representing 3.92% of this company's share capital.

—A 3,005.06 euro holding in La Fundació³ per a la Motivació³ dels Recursos Humans, representing 3.85% of its share capital.

—A 2,624,400 euro holding in Tramvia Metropolità SA, representing 2.50% of its share capital.

—A 513,000 euro holding in Tramvia Metropolità del Besòs, SA, representing 2.5% of its share capital.

—A 161,550 euro holding in Transports Metropolitans de Barcelona, SL, representing 50% of its share capital.

—A 5,001,550 euro holding in Projectes i Serveis de Mobilitat, SA, representing 50% of its share capital.

—A 58,990.78 euro holding in Societat Catalana per a la Mobilitat, SA, representing 1% of its share capital.

TMB holdings in other companies

At the end of 2017 TMB France, EURL Unipersonal, formed part of the Projectes i Serveis de Mobilitat, SA group.

On 21 October 2011 the company TMB France was constituted, in which Projectes i Serveis de Mobilitat SA own 100% of the shares. The company's share capital is 500 euros. Its registered address is in Perpignan and its purpose is the management, operation and organization of a public transport service and other ways of conveying people and goods and related concessions.

On 22 December 2011 a loan was formalised between Projectes de Serveis i Mobilitat, SA as lender and TMB France as borrower for 105.000,003 euros at a euribor (3 m) rate of +3.25% for a maximum term of five years, for the purpose of participating as a minority in the operating company of the metropolitan area of Perpignan (*Corporation Française de Transports Perpignan Méditerranée)*.

At 31 December 2016, the interest pending payment was included, for a total amount of 90,050.10 euros. At 31 December 2017, the pending payment amount with interest was 91,876.00 euros. According to an agreement in December 2016, the maturity of the loan will be 22 December 2021, with a euribor (3 m) interest rate of +2.00%.

On 29 February 2014 a contract was signed between CFT Vectalia France, SAS, and Vectalia France SA, on the one hand, and TMB France on the other, under which TMB France acquired 5% of the share capital of CFT Vectalia France through the purchase of 50 shares in Vectalia France, SA.

Given the lack of importance of TMB France in the group's accounts, it was not included in the TMB Group's consolidated accounts for 2017.

Thinking Forward XXI, SL, was created on 15 December 2009, with a capital of 60,120.00 euros. On 23 December 2014. a capital increase was agreed of 9,951.00 euros plus a share premium of 190,049.00 euros. This gave a total increase of 200,000.00 euros, which was formalized in 2015. Projectes i Serveis de Mobilitat, SA, acquired a share of 7.10% in this capital increase. On 28 November 2016, there was a capital increase of 200,002.99 euros, in which Projectes i Serveis de Mobilitat, SA had a share to reach 12.50%. On 31 December 2017, the book value of the share in these company was 200,000.51 euros (the same as at 31 December 2016).

Other information of Grup Consolidat de TMB

The company does not hold any own shares. No transactions with own shares were carried out during the year.

Payment terms to suppliers: The average payment period to suppliers in 2017 was 46 days. Recently the Company has been working to reduce payment terms to suppliers to bring the average payment period below the maximum specified in regulations on late payments.

Average payment periods to suppliers:
On average in 2017, Ferrocarril Metropolità de Barcelona, SA paid supplier invoices at 44 days, Transports de Barcelona, SA paid at 35 days, Projectes i Serveis de Mobilitat, SA at 46 days and the company TMB, SL at 35 days.

Recently, all of these companies have been adapting their supplier payment periods with the objective of aligning them with an average payment time that is below the maximum permitted under default regulations.

Holdings in other companies

The consolidated Transports Metropolitans de Barcelona group holdings in other companies at 31 December were as follows:

—An 8,806.14 euro holding in Ensitrans, AEIE, representing 20% of its share capital.
—A 120,202.44 euro holding in Barcelona Regional, Agència Metropolitana de Desenvolupament UrbanÃstic i d'Infraestructures SA, representing 7.84% of this company's share capital.
—A 3,005.06 euro holding in La Fundació per a la Motivació dels Recursos Humans, representing 3.85% of its share capital.
—A 2.624.400 euro holding in Tramvia Metropolià SA, representing 2.50% of its share capital.
—A 513.000 euro holding in Tramvia Metropolità del Besòs, SA, representing 2.5% of its share capital.
—A 300,506.05 euro holding in Transports Ciutat Comtal, SA, representing 33.3% of its share capital.
—A 117,981.56 euros holding in Societat Catalana per a la Mobilitat, SA, representing 2% of its share capital
—A 420.71 euro holding in Promociones Bus, SA, representing 0.37% of its share capital.
—At the end of 2017 TMB France, EURL unipersonal, formed part of the Projectes i Serveis de Mobilitat, SA group.