

The context and development of operational management

Operations in Italy

In Italy, the network managed by ATM guarantees a comprehensive coverage of the territory of the city of Milan and of the municipalities of the urban area.

The Milan metro network consists of four lines with a total extension of about 97 km and 113 stations.

Line	Route	Year	Length	Stations
M1	Sesto 1 Maggio FS  Rho Fieramilano / Bisceglie	1964	26.70 km	38
M2	P.za Abbiategrasso Chiesa Rossa / Assago Milanofiori Forum  Cologno Nord / Gessate	1969	39.88 km	35
M3	San Donato  Comasina	1990	17.31 km	21
M5	Bignami Parco Nord  San Siro Stadio	2013	12.88 km	19
TOTAL			96.77 km	113

The current configuration of the surface net is articulated as follows:

Type	Number Lines	Note
Bus network	81 city 53 suburbans 27 provincial	Included local radiobus services (operating in 15 local areas) and 3 lines for the replacement night service of the metro
Tram network	17 city 2 inter-city	One metro line is currently suspended and replaced by buses
Trolley bus network	4 city	

During 2021, the most significant operational management interventions referred to transportation service improvements and improvements provided for by the "Milan Pact for the School," which was established between the Prefecture of Milan and the Municipality of Milan and shared by transport operators, all social partners, public institutions, trade, companies, and professional orders. The agreement had two objectives: to implement the Covid legislation and to meet the specific needs of schools in preparation for the reopening of education in attendance in January 2021.

The "Milan Pact for the School," based on a study by the Milan Polytechnic, called for the reorganization of morning movements from 7 a.m. to 10 a.m. by diversifying the time of entry in secondary schools of second degree, opening up of commercial activities and offices to avoid crowding public transportation, avoiding the need to take off, and ensuring safer travel.

The reinforcement, always carried out in compliance with the capacity filling limits of the means that were gradually defined by the governmental authority, has been carried out by increasing the service on the main lines of mobility, especially school mobility, thanks also to the temporary subcontracting to private operators of some races or entire secondary lines of the urban and suburban network. To ensure the upgrading of the fleet, ATM has made available the whole fleet, also using the vehicles it had in plan to replace and using, as already pointed out, also many private and tourist buses of other companies.

Starting in January 2021, the upgrading of the transport service has resulted in 1.200 more runs on the whole network, 100 shuttle buses to connect 30 schools in Milan and the first of the most popular hinterland with some metro stations, 180 new races on 18 high-traffic urban and suburban lines, 160 more races on major power lines distributed throughout the day. In the subway ATM has programmed 8

more trains in peak hours, which have led to the maximum number of allowed runs in accordance with the existing constraints in terms of fleet, personnel and technical capacity of the security systems.

The adaptation of the services to the school needs also required a complex and demanding coordination action with the various institutes, aimed at guaranteeing the transport offer during the start/end times of the lesson, divided appropriately according to the criterion of the stagger in at least two bands (before 8 and after 9:30) in order to avoid phenomena of assemblage at the entrance/exit of the schools and to eliminate the peak band in which the most significant flows are already concentrated.

In order to limit access and, where necessary, to limit access to the most crowded stations of the network, the automatic passenger counting system has been activated by the subway, which temporarily blocks the turnstiles; voice announcements inform passengers of the situation and invite them to wait in line for access to the gates while respecting their distance between persons. On the surface, in case of reaching the maximum capacity of the vehicle, the vehicle traveled with the message “complete” on the external display and the driver did not make the following stops except to let the passengers get off.

The messages of the communication campaigns, spread through all the channels of which ATM has, invited the passengers who had the possibility to travel after 9.30 in the morning. Through its social channels and site, ATM also released a travel rule guide and a digital student “Vademecum” “Come with us” that it sent to school executives and relaunched with a QR code campaign on board connecting shuttles.

The daily cleaning of all contact surfaces on trains, buses, trams and trolleybuses, all stations and subway docks has been guaranteed by 400 employees; the day-long sanitation operations of all vehicles with special atomizers were further intensified and were used at the end of each run mainly on trains and buses. Hand sanitizing gel dispensers have also been installed on the subway docks, which have been added to those already present on the most popular surface lines, in all stations of the metro network and in ATM Points.

In April, ATM further enhances the surface service, compared to what has already been done since January, to cope with the increase in passengers as 70% of high school students return to their classes in attendance and with the resumption of various activities planned for the regions located in the so-called yellow zone. The increase in frequencies extended throughout the day provided for a further 20 shuttle buses serving 32 institutes, a further 30 vehicles on the surface force lines.

In June, the maximum capacity of the vehicles allowed in the white areas increased from 50% to 80%. On board the cars are removed the stickers from the seats being these returned to be all usable; inside the stations remain the routes guided by appropriate signs for the entrance and exit.

From September 13, at the same time as the start of the school activities, the “Milan School Pact” was renewed in accordance with the maximum 80% filling limit. ATM puts 200 more cars on the surface lines every day, with 120 shuttles to connect 32 institutes among the most frequented and some subway stations, for a total of 25.000 runs; by metro with 8 trains in addition it carries out 2.400 runs in total every day. At the most frequent stops of the network and at the interchange nodes, 380 passengers are active to direct the flow of customers and to provide them with information and 130 controllers operating in the stations, at the surface stops, on board the vehicles and shall ensure in particular that the mask is worn.

ATM carries out new communication campaigns dedicated to the travel rules, to the new timetables of the city, to inform of the daily sanitation of trains and surface means and of the plan of upgrading the

service; it broadcasts messages through all the communication channels it has and publishes on www.atm.it a guide and a school “Vademecum” “Come with me” for students with all travel rules to use public transport safely.

On December 6, 2021, *Green Pass's obligation to access public transport* enters into force; for the control of compliance with this measure, anti-Covid agents of the order forces, accompanied by ATM personnel, carry out random checks at the stations and at the surface stops. The mask on board the cars and waiting in the stations and stops is still mandatory. ATM informs passengers about the anti-contact arrangements through the communication channels available to them.

In 2021 work was continued on the improvement of the tunnel between Lambrate and Piola stations on the M2 metro line, in particular surface work was completed at the end of 2021, while tunnel work is expected to be completed in the first half of 2022.

As part of the interventions on installations and infrastructures aimed at overcoming architectural barriers, ATM has carried out the program to improve the accessibility of stations on the M1 and M2 metro lines. In 2021 all the 14 planned escalators were installed, of which the last one in San Babila, now waiting for the commissioning. In addition, extraordinary maintenance work on was completed in 2021 no.42 escalators of the M3 metro line and 2 more escalators of the M2 metro line and 3 escalators of the M1 metro line have been added. During 2021, the replacement program for 68 mountain lifts was completed with the installation of the last 3 installations at the Rovereto station of the M1 metro line, and the operation started in 2019. Finally, on the request of the Municipality of Milan and among the projects aimed at overcoming the architectural barriers, the works of modernization of the external section of the M2 subway line (Cascina Gobba-Gessate) continue for a total of 6 stations, of which 3 provide for complete restyling.

The urban tram network, as part of its work for the Municipality of Milan, continued the renewal and technological updating of the infrastructure, including the application of a remote monitoring system on exchanges and switches and a preventive maintenance program, to reduce noise emissions and reduce wear. The construction sites involved in these interventions were: piazzale Cimitero Monumental, via Faruffini - Piazzale Brescia, via Fabio Filzi, viale Corsica, via Procaccini. The renovation of some “Forza” tram lines to make the service faster was completed in 2021. These interventions have adjusted the stops to improve passenger accessibility.

As regards the work on the premises, the work on the adaptation of the fire-fighting systems at the Molise, Leoncavallo and Ticinese warehouses continued in 2021; In addition, the Sarca warehouse has been renovated to accommodate the staff that will be transferred from the Zara Depot.

The internalization of the maintenance activities of the new trains continues; in June 2021 the first 30 “Leonardo” model trains, which ended the full service period, were added to the 46 “Menegino” model trains. It should be noted that this internalization phase has determined a new way of managing maintenance and engineering processes, given the different technology of the new trains compared to the previous ones whose technology dates back to the years ‘60. During this phase, third-party activities on patented technologies and structural interventions on the cashier are responsible, with no particular returns of experience for the company's core business.

As part of the “Full Electric” renewal plan, the program for the introduction of electric buses into the service continued. During 2021, the 45, 54, 84, 88, 42 car lines, 51, 60, 81, 82, 86 have been fully operated by electric buses, therefore it has been necessary to adapt the operating plan to make it

consistent with the specific requirements of such vehicles, the productivity of which is dependent on the capacity of the batteries or the possibility of having charging points.

The first Linate-Dateo section of the M4 metro line is expected to open in the last quarter of 2022. During 2021, the first three trains were tested at the ministerial level and were ready to begin pre-operation. Additionally, staff training activities for maintenance processes and the development of logistics equipment for the supply of spare materials for the M4 metro trains continued. ATM has already taken over the first functional section Linate-Forlanini FS, ensuring the so-called minimum maintenance pending the start of business.

Urban Forestation initiatives

ATM, under the “Full Electric” plan, in addition to the conversion of the entire diesel fleet, foresees the conversion of the deposits and the construction of four new spaces completely automated and with advanced technologies. In this area, particular importance will be given to the area above, which will be exploited as a place of foresting and exploitation of the green for the benefit of the district and of citizenship.

In particular, within *the Sustainable Development goal 11 – Sustainable Cities and Communities, and 13 – Climate action* ATM is advancing the “green deposits” project whereby old deposits will be converted to accommodate the new buses and columns needed to refill them. They also have a plan of exploitation for the planting of green. The revamping of spaces provides for the use of NBS (Natural based Solutions) instruments, which, in addition to being solutions that help reduce CO₂, can also be an element of modernization of sustainable mobility and of the integration of the city fabric.

In this regard, ATM planted 330 forest trees in the San Donato warehouse in December 2021, with the contribution of the company employees, directly involved in the forest work.

Moreover, a green wall is being realized in Giambellino’s warehouse, a work of 350 square meters that is part of the European Horizon 2020 project within the clever Cities Plan and that has seen the participation and contribution of the local community and the Polytechnic of Milan.

These initiatives are important in the area of CO₂ compensation; in fact, each tree absorbs between 10 and 20 kg of CO₂ per year and 1 square meter of green wall absorbs 2,3 kg of CO₂ from the air and produces 1,7 kg of oxygen. Between autumn 2021 and spring 2022, ATM, through its compensation works, will have contributed to the absorption of more than 4 tons of CO₂, this only for the first year. The project is carried out with the partnership of:

- The Municipality of Milan, both as a 100% shareholder of ATM, and as an entity that allows to converge the local, national and international contributions allocated for the realization of works necessary for its completion;
- Politecnico di Milano; Bocconi University and Bologna University, which are involved in the drafting of studies and projects of economic feasibility and study of the absorption of CO₂ and polluting particles through the use of plants
- ForestaMi, the foundation of the Municipality of Milan, which has been the objective of planting 3 million trees in the Metropolitan City, With which ATM has activated a protocol of understanding with which it makes available its own areas inside the deposits to be exploited with works dedicated to the green.

Operations abroad - Copenhagen

In Denmark, the Copenhagen metro network, managed by the subsidiary Metro Service A/S, consists of four lines with a total extension of approximately 38.7 km and 61 stations. The M4 metro line is currently operative with 8 stations out of 13 stations.

Line	Route	Year	Length	Stations
M1	Vanløse ⇄ Vestamager	2008	21 km	15
M2	Vanløse ⇄ Lufthavnen			16
M3	København H ⇄ Enghave Plads	2019	15.5 km	17
M4	OrientKaj ⇄ København H	2020	2.2 km	13*
TOTALE			38,7 km	61
* 8 station operating and 5 still under construction				

In 2021, 73.6 million users were transported compared to 63.7 million in 2020, with a 15.7% increase in circus. The results of the management of the M1, M2 and M3 metro lines of the Copenhagen metro were of major importance. *Service availability* was 99.5% with a frequency of one train every 104 seconds at peak times for the M1 and M2 metro lines and 99.1% for the M3 metro line with a frequency of one train every 93 seconds between Østerport and La Copenhagen Central Station.

During 2021, the Company Metro Service A/S continued the investment program in the improvement of ERP systems, while in 2021 it will continue the program of investments in actions aimed at further reducing carbon dioxide emissions also through the replacement of the remaining fleet of fuel-powered service cars fossils with electric vehicles. In addition, the investment program provides for significant interventions on digitization, development and implementation of a DWH related to the analysis of costs related to operational activities.