DEVELOPING WHAT STILL UNDERDEVELOPED:  
THE REVITALIZATION OF THE TRANSPORTATION SYSTEM IN ROME

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ABSTRACT:

Developing what still underdeveloped: the revitalization of the transportation system in Rome  
In spite of its fame and aura, the city of Rome resisted mobility adaptations and measures which its growth required. Without comprehensive transportation policies, the city went through a period of deteriorating transportation conditions. This trend had negative impacts on the city quality of life, resulting thus, in many contrasts: a socially and economically developed metropolitan area, with an underdeveloped transit supply and consequently car-dependent mobility habits among the citizens. Hence, a revision of the current transportation policy was needed. Accordingly, both long-term and short-term solutions have been planned. For the former, the so-called “iron therapy” has been designed, i.e. the improvement of rail modes. For the latter, a number of measures have been already implemented (also thanks to a synergy of intents between the Municipality and the European Commission), according to two keywords: “disincentives to use private cars” and “incentives to attract passengers to transit”. The paper deals with the methodological approach, the measures and their implementation process, along with the consolidated outcomes.

RESUME

Développer ce qui est encore à développer: l’amélioration du système de transport à Rome  
Malgré son charme, la ville de Rome résiste toujours à s’adapter à des mesures de mobilité, nécessaires par sa croissance urbaine. Sans une politique des transports globale, les conditions des transport ont subi une dégradation remarquable dans le temps, avec des impacts négatifs sur la qualité de la vie urbaine: une ville très développée économiquement et socialement avec une offre de transport insuffisante et, de conséquence, une usage massive de la voiture particulière. Pourtant, une révision de la politique de transport est nécessaire soit à travers des solutions à court terme, soit à travers des solutions à long terme. Pour les premiers, le “traitement du fer” (l’amélioration des modes ferroviaires) a été mise en place. Pour les deuxièmes, plusieurs mesures ont été déjà appliqués (aussi grâce aux efforts communes de la Mairie et de la Commission Européenne), selon deux stratégies: “limiter l’utilisation de la voiture particulière” et “favoriser les transport en commun”. L’article concerne l’approche méthodologique, les mesures et leur mise en place, avec la présentation des résultats.
DEVELOPING WHAT STILL UNDERDEVELOPED: THE REVITALIZATION OF THE TRANSPORTATION SYSTEM IN ROME

TRAFFIC AND TRANSPORTATION CONDITIONS IN ROME UNTIL THE 1990S
Prior to the 1990s, the city of Rome resisted mobility adaptations and measures which its growth required. Among the local administrators there was a strong belief that significant changes and innovations could not be easily introduced.
The historical city center, with its maze of narrow streets and archaeological ruins scattered across the whole urban areas, seemed to be, for a long time, the main barrier against a comprehensive set of transportation policies; indeed, the city form laid out more than 2,000 years ago seemed to prevent decision makers from adapting infrastructures and land use to transit operations. The fundamental cause of these conditions was a lack of a clear vision for the future of the city’s transportation and its positive and negative impacts on the city’s quality of life, economic efficiency and environmental quality. Needless to say, no actions meant a continuous increase in the use of private vehicles (cars, motorcycles, mopeds) that contributed to the deteriorating conditions for other modes, from transit to pedestrians. As a result, congestion on many streets, no parking regulations, no policies for the large number of scooters and motorcycles causing safety hazards, noise and pollution, sidewalks poorly designed and maintained (when not blocked by parked cars) and a general modest transit supply became chronic problems.

MAJOR EVENTS INFLUENCING TRANSPORTATION POLICY INNOVATIONS
During the 1990s, these problems of traffic congestion, pollution and deterioration of livability began to exert political pressure for a more positive approach to traffic control, improved transit services and the need to attract tourists by a pedestrian-oriented environment. Three events were main drivers in such process, i.e.: the 2000 Jubilee, the issue of national laws to improve transit systems in cities, some interventions to handle emergency situations.
A first challenge to solve some mobility problems occurred during the 2000 Jubilee. The redesign of some areas around the main churches and their pedestrianization had to be planned to accommodate 30 million pilgrims, along with the management of tourist buses. For the latter task, three basic rules were established: a) the city center became a “no-coaches zone”, b) arrivals and accesses to the city had to be booked by a telematic system called SCOOP; c) coaches had to check-in at some parking areas in the outskirts, allowing application of access charges. All measures proved to be effective, hence virtually nothing of what was implemented has been removed afterwards; in particular SCOOP evolved and is now part of a bigger ITS which manages the whole urban traffic flow, operated by the municipality.
Changes introduced for the 2000 Jubilee represented effective mobility solutions, but they solved only partly the city’s fundamental problems of car-dependency. To approach these problems in a holistic way, specific regulatory supports were needed. During the 1990s several national laws were adopted on this purpose. The first one was the 1992 Law on “Urban Traffic Plan – UTP” which mandates that municipalities with more than 30,000 inhabitants must implement local traffic plans. UTPs focus mainly on traffic issues such as the revision of the road classification according to users priorities (assuming pedestrians as the main users) and location (local, district, inter-districts, etc.), the development of new infrastructures according to sustainability criteria, safety regulations, etc. They do not directly deal with transit, but they can indirectly stimulate its use because they discourage the use of private cars since they make municipalities responsible to enforce such measures as pricing, pay-for-parking, limited traffic zones, etc.
Moreover, since 2000 the Italian government began to introduce legislation and mobility plans especially aimed at increasing efficiency of transportation systems (intermodal coordination, promotion of low-floor and “clean vehicles,” etc.).

The most important tool has been the 2000 Law “Urban Mobility Plan – UMP” which provides government grants for municipalities with more than 100,000 inhabitants which, by the local UMP, would like to improve the use of transit thanks, in general, to the increase of travel volume. UMP measures are manifold: transit supply organization (new lines, modes, operations, etc.), provision of intermodal parking facilities, increased use of ITS and other new technologies, promotion of “niche” measures as car pooling, car sharing and jitneys, purchase of “clean” vehicles to conversion of old-generation bus fleets into more sustainable ones.

Some of the above-mentioned laws that led to transportation innovations were issued not by the Ministry of Transportation but by authorities regulating environmental conditions. Indeed, environmental concerns were the main reason for policies aimed at reducing both pollution and not-renewable energy consumption at national level. They led to a series of national laws to renew the private car fleet, providing special discounts on the purchase of new cars, equipped with cleaner engines in change of the discarding of the old ones.

These so-called “auto-wreckage” acts went in hand with another major set of laws to control traffic-related pollution levels in the cities, both in terms of emissions and concentrations. This regulatory process, started in 1983, set limits for production of the main pollutants which have been progressively reduced, whereas the definition of “alert”, when such limits are exceeded, was broadened. In case of “alert situation,” i.e. three days in a row exceeding pollutants rates, municipalities can enforce “emergency” measures and even stop the private car traffic. Among these, the most enforced is the “Weather Traffic Banning”, i.e. the occasional traffic prohibition, normally due to long-lasting good weather conditions that amplify traffic-related pollution effects. In such cases traffic is blocked by an order issued by the Municipalities and advertised by media, until good air conditions are restored. Even though this was considered an “emergency” measure, as years passed by, many municipalities kept using it as a deterrence, in spite of the modest benefits it can achieve. In Rome, for instance, the mildest version is regularly implemented, the so-called “Alternate plates”: on Thursdays afternoon, from January to March, cars with plates with alternatively odd or even last number can circulate, only; a real reduction of circulating vehicles is achieved only during the last Thursday of implementation (about in average -10% circulating vehicles/h, in comparison to others Thursdays) (/I). The increased supply of transit, which is regularly operated on alternate plates Thursdays, is not enough to discourage citizens, who prefer to look for a compliant car rather than to use transit.

When emergencies become frequent, restrictions increase. To improve air quality, administrators were, hence, compelled to think not only in terms of periods but also in terms of areas of restrictions. The progressive enforcement of access restrictions in historical centers, first, then to their surroundings is another measure to face emergencies. In Rome, access restrictions to polluting vehicles is now extended across an area of 155 km², in which about half of all the pollutant emissions occur.

THE NEED TO CHANGE INTERMODAL BALANCE

However, development of traditional mass transit, namely metro, light rail or even upgrading of bus networks has lagged behind these innovations. This explains why citizens are still car-dependent and why the emergency measures are still practiced.

Indeed, at the beginning of the 2000’s and in spite of all the efforts above described, there were just two underground lines (barely a 37 km network) and a large bus network, which was not able to meet Roman citizens’ demand in a satisfactory way; no wonder, hence, that in the last few years citizens have become more and more addicted to private vehicles. According to Rome Municipality data, the 2002 modal split in the metropolitan area was as follows: 20% collective transport, 48% private cars, 11% two wheelers and 21% pedestrians and others. The total number of circulating
vehicles in the 44 km² wide city area, with the exception of about 2,000 public buses circulating daily, was about 2,470,429; they were mainly private cars (1,853,546 vehicles) and two wheelers (514,766 mopeds and motorcycles) (1). In addition, many private cars were old (average age: 8 years) and inefficient. This had major impact on pollution, particularly in the city center where pollution jeopardizes citizens’ health as well as the conservation of historical landmarks and, more generally, the city’s appearance. The above-mentioned facts become more striking when considered in the context of the overall motorized vehicle ownership rate. In Rome this rate, including two wheelers, was one of the highest in Europe, with an index of around 830 (no. of vehicles/no. of inhabitants x 1,000); this index increased by 11% between 1989 and 1995 largely as a result of a sudden rise after the “auto-wreckage” acts enforcement. It is noteworthy that such a high car “density” went hand in hand with high values for two wheeled vehicles; the two-wheel index rose from 191% in 1999 to 198% in 2000 and the two-wheels ownership rate was about 1 two-wheel vehicle every 5 inhabitants.

Engine emissions data in the city area are based on several indicators: CO, VOC, NOx, small particulates (PM10 and TSP) and benzene. All these pollutants have slightly decreased at the beginning of the 2000s, in keeping with the national trend, partially as a result of the previously implemented spot measures and also thanks to the “auto-wreckage” acts. Among all the parameters taken into consideration, particulates raised major concern. Indeed the PM10 value was very high, often close to the alert level (50 µg/m³) and above national quality standard (40 µg/m³). It was also over the European standard (20 µg/m³). The reasons for such bad performance can be linked to weather conditions and traffic; Rome has long winters with few rainy days and not much wind, so pollution levels remain high. But needless to say most of the problems just mentioned are real the causes of such poor air quality, namely the chronic traffic congestion.

This trend had negative impacts on the city quality of life, resulting thus, in many contrasts: a socially and economically developed metropolitan area, with an underdeveloped transit supply and consequently car-dependent citizens; a mobility demand growing day by day met by not eco-friendly transit options; land use policies dedicated just to solve housing problems (paying special attention to realtors rather than to citizens) in the outskirts, with no links to transportation plans; lack of awareness of the consequences such city pattern can lead to, in terms of pollution and everyday mobility management; the need to manage, at the same time, current emergency situations and future plans.

MEASURES TO IMPROVE SUSTAINABILITY

Such a situation called for a revision of the transportation policy aimed at achieving a more balanced intermodal system. A good opportunity came from the cooperation between Rome Municipality and the European Commission, thanks to the MIRACLES - Multi Initiatives for Rationalised Accessibility and Clean Liveable EnvironmentS demonstration project. MIRACLES enabled Rome to apply a set of 16 integrated measures, based on disincentives to use private cars, along with some incentives to use transit. The “philosophy” behind the choice of the interventions was to apply both major and “niche” measures (a selection is synthesized in Table 1), consistent with the complexity of the urban environment they had to deal with, according to a “push and pull” approach.

A good example can be considered the extended implementation of access restrictions, regarded as the “push” part (i.e. as a pressure to change driver behavior), and pedestrianization as the “pull” part to encourage use of green travel modes. Both proved to be the most effective measures, according to the positive results achieved so far in terms of benefits on the urban environment and livability. Actually, access restriction itself can be considered as a policy, since it unites several sub-measures: Access Control System (ACS), i.e. a set of "Electronic Gates" around the historical centre to limit private vehicles access to central areas, creating a Limited Traffic Zone - LTZ; pedestrianization of some historical areas (the largest of them is the so-called Tridente area, near the Spanish Steps); free access to such areas for “clean” vehicles only; increased and improved transit services.
<table>
<thead>
<tr>
<th>Main measures</th>
<th>Most relevant impacts on:</th>
<th>Transport</th>
<th>Society</th>
<th>Environment</th>
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</thead>
<tbody>
<tr>
<td><strong>Collective</strong>&lt;br&gt;<strong>Mobility</strong>&lt;br&gt;<strong>management</strong></td>
<td>Occupancy rate about 15% (baseline 20%)</td>
<td>Participants increased from 2,391 units in 2002 to 41,805 in 2005</td>
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<tr>
<td><strong>Car pooling</strong></td>
<td>Occupancy rate of the vehicles: 75%</td>
<td>Car-poolers addressed during the trial; have been 1,160</td>
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<td><strong>Car sharing</strong></td>
<td>A good index of awareness (14%) was surveyed, along with a positive perception of the scheme and the value of the “satisfaction level” indicator was quite high (7.6 points, on Likert scale 1-10)</td>
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<tr>
<td><strong>Clean transit fleet</strong></td>
<td>About 670,000 journeys</td>
<td>- Public awareness of the need to use clean transit increased from 55% to 78%, and satisfaction increased from 1.6 to 3.9 (1-5 Likert scale)</td>
<td></td>
<td>- Reduced average age of buses (6 years old in 2000 vs 12 years old in 2008) - Achieving zero-emission standards requirements</td>
</tr>
<tr>
<td><strong>Access restrictions</strong></td>
<td>- Reduced traffic by 20% during the whole restriction period and by 15% on the morning peak hour (8:30-9:30)</td>
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<td><strong>Optimization of the ACCESS Control System</strong></td>
<td>- 35% of offenders - Increasing municipality incomes</td>
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<td>- CO emissions values reduced by about 76%, particulates and CO656 emissions values, reduced by about 38%</td>
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<tr>
<td><strong>Pedestrian areas</strong></td>
<td>- 20% increase of pedestrian areas</td>
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<td>- No variation on awareness level</td>
</tr>
<tr>
<td><strong>Permits for central areas only for clean vehicles</strong></td>
<td>- Reducing access permits by 4%</td>
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<tr>
<td><strong>Pay-for-parking</strong></td>
<td>- On-street pay-for-parking increased from 52,000 to 74,727 units. - The number of pay-for-parking spaces related to P&amp;R facilities also increased by about 50% up to 12,250 units</td>
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TABLE 1 Main measures and impacts on transport, society and environment

**Environmental Aspects**

The most important outcomes from the surveys run after four years of the access restriction implementation was an appreciable reduction in air pollution. A comparison between the 2001 and 2004 mean values showed that CO concentrations were reduced by 21%, PM10 by 11% and benzene by 37% (Figure 1).

Authorized central area access solely for clean private vehicles and buses can be considered the main contributing factor. In some cases it was possible to use the collected data to analyze not only general trends, but also selected spot conditions. On-site measurements of concentrations recorded that the ex-post measured values of benzene concentrations at the main pedestrianized area, i.e. the Tridente, were the lowest surveyed in the central area (4.1 microg/m² at the Tridente vs. 5.2 microg/m² in the whole area), exceeding any expectation. This result was due to the virtually total removal of private traffic from the area during most daily hours.

Regarding emissions, the ex-post values showed a substantial reduction. CO emissions values were reduced by about 76%, during both peak and off-peak periods. Also in this case, besides a general renewal of the private car fleet (as an effect of the “auto-wreckage” act), Access Restrictions and limitations in the use of the most polluting cars, along with the new electric buses, appeared to be the main reasons for this improvement. For particulates and benzene emissions values, the reduction was about 38%. Results concerning noise levels in the access restricted areas were satisfactory as well.

In general, 2 dB(A) reductions were easily achieved. According to some on-the-spot surveys, once the access restriction was operative, a 8-9 dB(A) reduction in noise pollution was recorded on
streets with no commercial activities, whereas in zones with facilities such as restaurants or clubs, a minor reduction was recorded, i.e. about 3-4 dB(A).

For what concerns transit, the old generation of buses (Euro 0 standard) were not only high-polluting, but also noisy. Therefore, another important improvement concerned the noise reduction. To assess the benefits arising from the implementation of the new vehicles namely trolleybuses (further in-depth described), a survey monitored traffic noise before and after the implementation of trolleybuses, comparing the noise of a passing Euro 0 bus with one produced by a trolleybus. Even though the “white noise” was very high, passing of a Euro 0 bus increased such noise by about 10 dB(A). On the contrary, a trolleybus only increased it by about 5 dB(A) (2).

Traffic Conditions
A comparison between 2002 and 2005 modal split values showed a change of trend in favor of walking and transit (3). Access restrictions and pedestrianization were the main drivers of this trend. For instance, the implementation of the full scale Access Control System applied in the Central Limited Traffic Zone, resulted in a 10% decrease in daytime traffic; such value turned into a 20% decrease in traffic during the restriction period, a 15% decrease in the morning peak hour (8h30-9h30), a 10% increase of two-wheel vehicles and a 6% increase of public transport.

Modal split in the central area has been considered a basic indicator of change for public transport. Although this number has increased by only 1%, it is significant that quality of service has increased noticeably. Five new lines of electric transit have been opened: one trolleybus line carries 32,000 and four lines of electric minibuses carry about 10,000 passengers/day, exceeding the original target of carrying 200,000 passengers/month by non-polluting electric transit in the sensitive central area. These lines represent an increase of electric transit network from 27 to 52 km, with decrease of travel times by 50%, thanks to the new separated lanes for trolleybuses. The upgrading of the pedestrianized areas was another relevant task. From a qualitative point of view, the creation of an actual pedestrian network in the city centre allows citizens and tourists to walk safely and enjoy an exclusive pedestrianized environment of about 365,000 m². Moreover, local administrators felt increased parking supply around the central area was decisive to foster actions such as access restriction and pedestrianization. In quantitative terms, from 2002 to 2006, the capacity of paid parking facilities rose from 52,000 to 78,727 spaces. The number of spaces in Park-and-Ride facilities at metro and bus terminal stations was also increased by about 50% (4).

TRANSIT IMPROVEMENTS AND TRANSIT USE INCENTIVES
Incentives to use transit were planned in synergy with auto use restrictions, and as measures aimed at raising people’s awareness towards more sustainable mobility patterns. However, neither improved environmental conditions nor innovations in transit technology, such as minibuses or ITS
applications, were considered as sufficient motivations to have many people switch from cars to transit. Administrators therefore started implementing complex programs such as transit specially dedicated plans as more effective processes aimed at promoting public transportation to become the main modal option for travel in the city.

*Policies Favoring Transit*

Policies favoring transit benefited from the upgrading of the Master Plan, the enforcement of the UTP and of a law providing special funding for the city, as the nation’s capital. The basic strategy for increasing the role of transit has been the “iron therapy” strategy: the city needs more rails rather than rubber-tired modes. This strategy consists of two major efforts: building of radial lines from outskirts to the centre, operated by regional railways, and the increase of the tramway supply in central areas and its consequent integration with trolleybuses and electric minibuses. The goals were clear: the former was aimed at providing a reliable option for commuters, the latter was targeted to create higher capacity and higher speed modes to serve the entire central city area, which presently has inadequate coverage. The implementation of such basic requirements should achieve to two major goals: the completion of the railway ring around the city and the enlargement of the metro network (the line B extension and the building of new C and D metro lines).

The “iron therapy” is still at the beginning, mostly because of financing problems. Initial funding was underestimated in comparison to the real requirements. Currently about 100 million Euros per year is funding requested to complete the lines designed as a short-term plan. This plan did not prevent administrators from applying more short-term and long-term solutions consistent with the natural development of the city.

*Short-term Solutions*

Regulatory measures are sometimes the quickest interventions and fare integration was an example, aimed at meeting citizens requirements as well as complying with requirements of a 1997 national decree. Other measures, as the upgrade of the ITS supporting transit, by introducing real-time information displays at bus stops or on-board videos, can be fast measures, useful to increase transit attractiveness among the citizens, but can not be sufficient when the main goal is to improve the city quality of life; hence more resolving measures are needed, as the introduction of environmentally-friendly vehicles. Indeed, responding to the demands for increased livability in central areas, planners of the local bus company (ATAC) decided to “rejuvenate” the bus fleet with average age of 12 years, giving special consideration of environmental impacts. Three types of actions were used:

- Increase the fleet of electric minibuses
- Renew the traditional (endothermic) buses
- Introduce 30 bimodal trolleybuses (Figure 2)

The electric minibus fleet was increased, but it continues to serve special center city services with small passenger volumes making short trips in central city. Replacing old buses with new ones was a major effort: 1,107 vehicles were substituted by new Euro III-compliant vehicles in less than three years. The third action is particularly interesting because it involved new type of vehicle, upgrading of its right-of-way and giving it a status of semirapid transit line. The new Trolleybus line 90 was designed in 2002 as an upgrading of a regular bus line to provide higher capacity and reliability along a radial corridor connecting city outskirts to the city center. Higher operating speed and hence reduced travel times were other expected results. The 11.4 km long line has 33 stops. Most of the line is on a separated lane, shared with other bus lines. It operates 217 trips/day and serves a peak demand of 2,700 pass/h.

Heritage preservation compelled the bimodal choice. Starting from the main railway station, Termini, the line runs for 1.6 km in a historic environment using batteries to avoid overhead wires due to visual concerns in the vicinity of landmarks. Once on its reserved lanes, trolleybuses
automatically raise their poles and continue quiet travel with excellent dynamic performance. Thus, trolleybuses which were abandoned in Rome during the 1960s, have made a successful comeback.

![Trolleybus and Electric Minibus](image)

**FIGURE 2 Bimodal Trolleybus (left) and Electric Minibus (right)**

**Long-Term Solutions**
As mentioned above, transit in Rome relies mostly on buses. They serve a 2,200 km network which covers the city and has average stop spacings of 600 m. The rail network, consisting of two metro and 6 tramway lines, has a length of only 65.7 km. Although this short network carries very high volume of passengers (daily ridership on metro lines A and B is respectively 302,400 and 180,000 passengers), its coverage of the city is much lower than in most European cities.
So far the trend has been just to add more bus lines, but not to improve transit system’s performance. The UTP and the new Master Plan foresee revisions of networks which will expand the rail network and convert many bus lines into feeders to rail transit. This network restructuring will require not only considerable construction of rail lines, but also regulatory and organizational changes among different transit operating agencies.
Three types of projects, consistent with the “Iron therapy”, are foreseen; according to UTP and the Master Plan, key actions are:
- Expansion of the regional railway network (Ferrovia Metropolitana - FM) and its better integration with the national railways as well as with the city’s Metro
- Enlargement of the metro network
- New semirapid transit lines on separated rights-of-way in major corridors.

**Development of the Regional Rail Network**
Presently there are eight FM lines (also called FRs, as in Figure 3), connecting the city to the main airport, industrial areas and satellite towns. This network will be extended from the current 430 km and 106 stations, to a 470 km and 133 stations network. The extra 40 km will consist of the completion of the railway ring around Rome (4 km), a bypass that will improve south-westbound connections (26 km), and quadrupling of tracks on a link of the FM4 (9.5 km). The main goal of these extensions is to improve commuting travel to the city. With exception of the completion of the railway ring, which will become the “urban leg” of the regional railway, these extensions will improve the city’s accessibility.

**Metro Extension and New Lines**
Plans for Metro extensions are very ambitious since besides the two current lines (Line A, 18.4 km long with 27 stations and Line B, 18.6 km long with 22 stations), a 12-km branch to line B is now under construction. Further, two new lines, C and D, will be built. Once the upgrading process will be over, the metro network will be 128 km long, with 156 stations (with average spacing 820m).
Line C is the most important project: this 39-km long line will link north-western to south-eastern districts, crossing the historical centre and passing under the Tiber. Its estimated cost is about 3.5 billion Euros. Trains will be driverless, ATC-operated, thus allowing economical operation at short
headways at all hours; travel speed will be 35 km/h and with 3-min. headways, the line will offer 24,000 spaces/hour. The 30 stations will be fully accessible, and 4 of them will have transfers with other metro lines.

![FIGURE 3 Metropolitan Rail Network (Present and Planned Lines)](image)

About 3,500 parking places will be provided at four main stations. The construction started in the spring of 2007 and are expected to be completed by 2015. Line C is expected to create a “network effect” with the other metro lines and hence increase the choice of this mode not only to access the center of Rome from its outskirts, but also to serve large volumes of trips in central areas. Line D, still in its feasibility phase, will be shorter (19 km and 24 stations) and generally go through central city parallel to line B to the north of it.

**Development of semirapid (medium-capacity) transit lines and integration of the traditional network**

Supplementing the planned expanded network of regional rail and metro lines, the Master Plan foresees 15 new semirapid transit lines with a total length of about 200 km. These lines are planned to have right-of-way (ROW) category B, i.e., curbed medians or separated lanes along existing corridors. Utilizing light rail, trolleybus or bus transit modes, these lines will go through intersections, usually with preferential treatments, so that they will have considerably greater operating speeds and reliability than the traditional bus lines in mixed traffic. Two types of these semirapid transit lines are planned by their functional alignment. So-called T-lines will be lines tangential to central areas serving close-in suburbs. The other group will be so-called I-lines, connecting the outskirts to the closest metro stations and/or business and commercial facilities. Consistent with the Master Plan principles, both I and T lines will have transfer stations with other lines and some major stations will have park-and-ride facilities. Decision-makers are still examining optimal modes for each of these new lines among the three candidates – tramway/LRT, trolleybus (conventional or bimodal) and bus (conventional or BRT). It is likely that each one of these modes will be introduced on some of the planned lines.

**TRANSPORTATION GOALS AND POLICIES FOR THE CITY**

Improvements in mobility are crucial for the future of Rome. Indeed, although its population is not increasing, lifestyles are changing. The central area is largely immutable in form and land use, and yet it must be adapted to new functions, social patterns and cultural habits. Housing and transit are the “backbones” of such transformation, particularly the latter. The changes described above, are the first step of a process aimed at revising governance trends. Regulatory tools, currently in force,
have already set some directions according to a vision called “Strategic Integrated Design”, where greater attention is given to the integration between mobility patterns and land use. Intermodal integration has a special significance for Rome, since it adapts private and public modes to an urban environment which was not planned for cars. In the past, planners and administrators considered this as a limitation, but now decision-makers feel it as an advantage, in light of the sustainability and livability requirements they have to meet.

Planning principles, as reported in the Master Plan, in which a mixed land use pattern is forecast, are consistent with the urban form: a polycentric city with mix of activities (residential, business, tourism, etc.). This means that, on the one hand, transit must be improved, and, on the other, only limited road infrastructure should be constructed so that massive use of cars is prevented. Consequently the Master Plan forbids building in areas not served by rail transit. Hence, the real challenge is to reassess the role of transit. The “iron therapy” is very appropriate because increased supply of high-performance rail transit in the city is essential.

A logical approach in further transportation improvements is to consider central areas as a laboratory where both major and various new measures are to be applied, while the suburbs should be progressively converted into “tamed traffic” zones. The central areas are eligible for improvements of both rail and rubber-tired transit. The historical city is also the right place to increase electric minibus services and new types of services such as car sharing and jitneys.

Another possibility is to reintroduce the tramway lines to replace the present major bus lines and convert lighter ones into feeders, as in the 1960s, when the tramway network served the whole central areas along the main corridors.

CONCLUSIONS
The policies and numerous measures recently introduced in Rome are aimed at strengthening regulations (air pollution, parking, driving), organizational changes and increasing investments in new infrastructure to achieve long-term improvements in the quality of transportation services (by all modes, including pedestrians), efficiency and attractiveness of transit and drastic reductions in negative environmental impacts to increase city’s livability and sustainability. Among the implemented measures, the city center access restriction can be considered a good practice, in which limits and control policies can achieve positive outcomes. Turning congested areas into safe, clean environments can hence be considered as the good facet of restriction policies, whereas bans for cars are experienced just as constraints. Moreover, the Rome experience showed that pedestrianization can be considered as the “premium” part of the whole access restriction scheme, but to “gain” it, a strong political will, both in terms of planning activities and making unpopular choices, is required when the goals are to improve sustainability and standard of living.

Even though such significant results have been achieved, more efforts are expected to continue in order to achieve both short-term results and long-term goals discussed above.

References