

## Smart Tracks. A strategy for sustainable mobility in Naples

### Matter of Interest

The Regional Transport System (RTS) under development in Naples (Italy) is a network that will be obtained constructing an urban subway and integrating it with the existing urban, regional and national transportation lines.

Even if the comparison with the London subway (M. Binyon, 2002) sounds a paradox, the new Naples underground appears to be really innovative.

The case of the Naples RTS deserves attention for three reasons at least:

- the urban context: Naples is a problematic place where public policies face enormous obstacles; it is an European city of great complexity affected by troubles and deficiencies typical of some underdeveloped metropolis; therefore, here any project is hardest to be carried on;
- the philosophy of the RTS project: it is based on the construction of a brand new subway but it largely relies on the reuse and upgrade of existing railways; the connection and the integration of the old and the new tracks will shape a network that did not exist before and will enhance the capacity and the efficiency of the regional railway system;
- the complementary objective of the project and the way of pursuing it: the construction of the transportation network is taken as an opportunity for improving the quality and safety of places; the stations (either newly built or refurbished) are conceived like poles of urban regeneration and this task is largely committed to contemporary art.

The way this project is progressing proves that even a city affected by serious social and economic problems can build a modern transportation system if it is able to find its own way and represents an original approach to urban mobility based on the “smart use” of existing resources. It is definitely a case of sustainable development.

### The Urban Context

Founded by the Greeks in the 6<sup>th</sup> Century BC, former Roman resort town and Capital city of the Reign of South Italy until mid 19<sup>th</sup> Century, Naples is today the third biggest city in Italy after Rome and Milan and the core of a dense metropolis: more than 1 million people live in the Commune, with a density of 8,296 inhabitants per km<sup>2</sup> (Milan: 7,137, Rome: 2,115; Bertuccio, 2008); about 4 millions live within a radius of 50 km from the city centre, with a density of 1.900 inhabitants per km<sup>2</sup> (Milan: 911, Rome 161; Cascetta, 2007) and peaks of more than 17.000 inhabitants per km<sup>2</sup> in some suburban towns.

A city of paradox, Naples seems to confirm the worst prejudices against it, yet is always able to surprise positively. It is really as chaotic and sometime frantic, as reputed to be; nevertheless, it is one of the major ports of the Mediterranean and a centre of business, trade and industry of international level. It is a place of striking contrasts: heritage is exceptional for quantity and quality but scarcely enjoyable and its state of maintenance is often miserable; city life is joyous and friendly but large zones are decayed and unsafe; culture, research and education boast long traditions and exceptional achievements but the young talents are often compelled to leave the city for lack of job opportunities; an incredible variety of material and immaterial goods is produced inside the metropolitan area, yet economic indicators (like GDP and rate of employment) are constantly under the EU average.

For more than one century social, economic and historic studies have been analyzing the contradictions of Naples and have found explanations, but solutions are far to come. The political life continues to be confused and the public services largely inefficient; this make harder to tackle any matters, primarily to fight the *camorra*, the powerful criminal organization that has bases scattered in the city hinterland, is able to enter deceitfully in any local business and to act internationally.

Italy looks at Naples like at one of the national problems, not only for the size of the city and for its regional influence, but because it seems to reflect and amplify critical situations that occur in other parts of the Country – mainly, but not only, in the South.

Someone says frustration and self complain hinder from finding ways out: the complexity of the problems and the tendency to seek for responsibilities outside restrain creativity and provoke paralysis. It is a matter of fact that new ideas and new projects keep on sprouting out in Naples but there is the feeling that any good initiative is doomed by failure. On the contrary, Naples RTS is proving to be not only a singular case of success, but the demonstration that even in such a difficult context there are ways for solving problems and achieving results; as far as this project develops, an optimistic mood can grow about the capacity of the city to keep the pace with modernization.

### **The Beginnings. Railways in Naples**

UE programs encourage sustainable development. Considering that, whichever technology is adopted, moving by car produces three times more carbon oxide per passenger than moving by train and aiming to get UE funds for improving the local transportation system, in the late 1990s the Commune of Naples adopted a policy of mobility based on the development of tracks. At the same time, the Region Campania<sup>1</sup>, where Naples is located, decided to carry out a programme for the development of a regional railway system pivoted on the main city.

Inefficient and expensive transportation is generally reputed to be a major problem of cities, while making traffic fluid is expected to enhance economic competitiveness.

In Naples, traffic is very bad, a problem particularly hard to solve and a major disturbance of the city life.

First of all, the urban road network is inadequate: the national motorways and the modern bypasses pour flows of cars into old streets which had been designed with grandeur – but in the age of carriages.

Second: traffic is wild. The saying that the Neapolitan people are intolerant of rules could be eventually proved false, like any commonplace but it sounds absolutely true when they drive a car or – worst – ride a motorbike; traffic in Naples is a real nightmare for visitors and hampers its citizens to make reliable estimates of the time needed for reaching a destination.

Third: pollution caused by traffic is particularly heavy and tops the EU standards. Poor people either buy second-hand cars or do not dismiss their old ones: the average age of cars in Naples is higher and carbon emissions too. In 2007<sup>2</sup> more than 44% of the cars circulating in Naples were not catalyzed; 30% of the cars were Euro Zero and only about 15% Euro 4: definitely the worst performance of an Italian city (Bertuccio, 2008).

Twenty years ago, new motorway trunks were considered the right solution for quickening metropolitan mobility, but the projects had to stop where reaching the city centre: if car is taken as the fundamental mode of transportation, little can be made in a very dense urban fabric with a deficient road system, so attempt at improving inner urban traffic seemed to have no chance. Yet Naples had two points of strength: railways and multimodality; someone began to reflect on this.

The 7km track from the city to the royal palace of Portici, the first Italian railway built in 1839, was little more than a gracious facility for the King and the Court amusements; yet the foundation of the Pietrarsa locomotives factory, in 1840, boosted the construction of railways and established a tradition that still goes on. After the unification of Italy, two long distance lines were laid out from Rome to Naples and several local lines were built to connect the old capital city of the South with many smaller ones which are located in a radius of less than 100 km, being central Campania one of the more populated area of the Country. An underground railway that crosses the city centre was inaugurated in 1925 as the “first Italian subway”. As a result, Naples has the highest rate of railways among the Italian metropolitan areas: 180.9m per km<sup>2</sup> (Cascetta, 2007).

Funiculars (i.e. cable railways) play an important role in the urban mobility. At the end of the 19<sup>th</sup> Century, the possibility of connecting the city centre with the middle class neighbourhood of Vomero, newly built on the hills, was a matter of study for the engineers; the first vertical system of transportation was inaugurated in 1889; three others followed (the last one in 1931); all have been recently modernized and are fully operative.

Another peculiarity of Naples is the role of the maritime transportation in the metropolitan mobility: hydrofoils and ferries operate regular trips which connect central Naples with the islands of Ischia, Procida and Capri and with the resort cities of the coast and serve not only seasonal tourism but also a great number of commuters.

In the 1960s, mass car mobility boomed in Naples like in the other Italian cities. Urban traffic did not miss completely its multimodal style (actually, trams were replaced by buses) but buses and railways began to lose passengers; in 1996 private cars were used for more than 60% of the transfers (see table 1 and 2). It is not therefore surprising that one out of three citizens is unsatisfied of the public transportation, considering that the bus average speed in Naples is 12km/h (Legambiente, 2009; Vitolo, 2009).

The decision of the City to improve public transportation by train had a sense; but it would have not been effective without matching a similar and concurrent decision by the Regional Government.

### **Concentrating on Transportation. The Planning Frame**

The programme for the development of the RTS that the Region and the City are carrying on is based on the connection and integration of the existing public transportation lines; the reuse of the old tracks and the reorganization and strengthening of the node of Naples are fundamental operations of this programme.

Central Naples is crucial to give continuity to the network and to integrate the different modalities of transport. The new underground will link the airport terminal, the maritime terminals, the head stations of the local and national trains, the funiculars; a new track will connect the Central Railways Station with the High Speed Trains Station, located at Afragola, a town of the hinterland which is 10 km far from the city centre.

The development of the Naples RTS is closely related to the development of the national High Speed/High Capacity Trains Network: if new railways are built, old trunks can be dismissed and are disposable for local transportations.

The Italian High Speed Network has a backbone represented by the line Milan-Bologna-Rome-Naples. The Region Campania made deals with the National Government for accelerating the completion of the stretches that go through its territory and, at the same time, designed the new regional transportation network as a system strictly connected and integrated with the national railways, in order to permit effective interchanges among the different levels and modes of transportation.

Regional transport policies concern also the ports, the airports and the motorways but railways have been privileged. Urban public transport is another priority. Passengers' transportation in Naples is just at the crossing point of these priorities.

To be carried out, the project of the RTS needed a planning frame. The National Legislative Decree 422/1997 empowers the Regions on transportation policies; with the Regional Law 3/2002, Campania has disciplined the activities of planning and managing the local railways. In the past decade, the City of Naples and the Regional Government provided a series of acts and plans dealing with transportation:

- the *Municipal Transportation Plan* (1997) designed the railway network of the City and established a transportation policy based on the principle of integration among old and new lines;
- the *Primary Roads Network Plan* of Naples (2000) completed the design and detailed some critical aspects concerning functionality and environmental impacts;
- the *One Hundred Stations Plan* (2003) was dedicated to the stations, conceived either as interchange nodes and as new urban polarities;
- the *Project of Regional Railway System* (2000) and the *Guidelines for the Design and the Construction of the Stations* (2006) are the Regional acts that state the general rules for the construction of the whole system, inside and outside of the City.

These documents reflect the principle of sustainability that inspires the *Guidelines for the Regional Plan*. The priority assigned to railways makes regional planning consistent with the EU policies for the sustainable development, and particularly with the ones that concern the reduction of carbon emission and low consumption transportation; at the national level,

regional planning is consistent with the General Transportation Plan, which promotes railways in order to reduce the negative environmental impacts caused by the higher carbon emissions of other transportation modalities.

Giving railways priority produces another important effect. Railways in Italy are owned by public agencies; the choice of concentrating on railways for modernizing the transportation system of Naples and Campania means that the public actor can gain more capacity to govern – not only the flows of traffic, but also the processes of land use and soil valorisation, which are strictly conditioned by accessibility (Discepolo, 2001).

As a matter of fact, the improvement of the capacity and efficiency of the passengers and goods transportation is a part of a strategy deliberately followed by the Regional Government (Cascetta, 2008). This strategy considers accessibility fundamental for the economic development of the Region and is primarily aimed to integrate the local systems with the national networks.

### **The Project**

The Naples RTS is the biggest public work presently under progress in Italy after the High Speed Railways Network.

The project under implementation considers a scenario of fifteen years (2001-2015) and a total forecast investment of 22 billions €; the forecasted cost of the project itself is about 8 millions € (Cascetta, 2007).

Some data may help in understanding the actual size of the work (base of comparison: situation at the year 2000):

- 170km of new railways (+14%);
- 127 new stations (+37%);
- from 2 to 10 metropolitan rail lines;
- from 62 to 78 km of subway (+47%);
- from 5 to 36 interchange nodes;
- from 25% to 70% of the population served in the Naples metropolitan area;
- from 1,900 to 4,350 hectares the territory served;
- forecast of the population served in the metropolitan area: +36%;
- forecast of the railways users: +38%.

The expected reduction of the CO produced per year is 6,000 tons, 11% of the present overall emissions.

Moreover, the Region is buying more than 1,500 new Euro 5 buses to be leased to the concessionaires of the public bus lines. A further strong reduction of the carbon emissions is expected.

When the project is completed, Naples will have one of the more developed and dense railway networks of the world; it is estimated that 700.000 persons will live inside a radius of 500 m from a station. The expected effects are a better accessibility of the more remote metropolitan areas, a less congested centre, more opportunity of re-qualification for the dismissed areas, a reinforcement of the smaller towns that will enhance the polycentric structure of the metropolis.

The great number of intermodal nodes and the possibility of reaching a destination in more than one way are features of the project related to the care in connecting the core centre (historic Naples and the business district) with the suburbs and the intermediate polarities of the metropolis.

The implementation of the project of a regional Network, consisting of physical interventions, is seconded by correlated transportation policies; e.g. the creation of metropolitan and regional tickets zones. In the year 2000, it was possible to travel with a single ticket inside an area that included Naples and 43 other Communes, with a total population of 2.3 millions; since the year 2003, the single ticket has been including Naples and other 550 Communes, with a population of 5.63 millions.

In conclusion, the RTS is quite a big project, hard to be carried on for any city; apparently impossible for a city that has Naples' problems. A key issue was to find an affordable and suitably sized operator able to implement the project and carry on the works.

At the year 2000, there were in Campania about 1200 km of railways, carrying a traffic of about 18 millions trains per km per year. Railways are operated by RFI s.p.a., the Italian national Company, and by 4 local public companies<sup>3</sup>. With so many actors on stage, mostly qualified in operating existing rails and not in building new ones, initiatives were hard to be fostered and carried on; indeed the only work completed since World War 2 had been a 4km track of urban railway (the line number 1 of the Subway).

To get a well-founded capacity of action, a sole operator seemed more effective; given the complexity of the project, that operator had better concentrate exclusively on it.

The EAV (Ente Autonomo Volturno) was a public company constituted in 1904 for building reservoirs and supplying Naples with electricity. In the year 2000 EAV still existed but did not have much more to do; by mean of a regional law (Lr 8/2001), it was transformed into an holding company of transportation entirely owned by the Region and it was provided with shares of the local railways Companies and other agencies of the transportation sector. A useless public structure was so converted into an agency that has demonstrated to be efficient.

Last but not least, any project of a great work has a father and needs a general manager, able to conceive a comprehensive vision, to maintain a clear idea about the objectives and to assume decisions as the project goes on. The Regional Councillor for Transportation is Ennio Cascetta, a Professor of Theory of the Transportation Systems at the University Federico II of Naples, who can be considered the “thinking mind “ that is behind the new transportation policy.

### **The Subway. Accessibility and Art for a Better Urban Quality**

The new Naples Subway is only one of the elements of the RTS; nevertheless, it holds a special place, for some reasons:

- it is necessary to the functioning of the network, because it forms a link that connects the passengers' port, the airport, the central national railway station, the head stations of the regional railways and the inner city lines (funiculars, other underground tracks);
- it makes easily accessible the most relevant points of interest of the city – the business district, the headquarters of the public administrations, the universities, the historic centre etc. – and permits to move quickly from one to another;
- its capacity of attraction is crucial in convincing people that they should leave their cars and use public transport;

A lot of care has been reserved to the last point. The attraction of a subway does not only depend on functionality and comfort; aesthetics plays also a role and the sense of safety is fundamental as well. A beautiful city deserves a beautiful underground; vice versa, a beautiful underground can give more character to the urban spaces (Paris is the typical example).

In the context of the RTS project, great care has been reserved to the design of the subway stations and their surroundings; this design is based on the will to go beyond the idea that a station should satisfy only the requirements of functionality and easy mobility, irrespective of the identity of the place.

The Regional *Guidelines for the Design and the Construction of the Stations* define the “station system” not only as the node necessary for easing the interchange among the different mode of transportation, but also specify the interventions required for connecting the stations with the urban fabric and the criterions for design of the new stations and for refurbishing existing ones.

The *Guidelines* establish the basic requirements of the stations – new or renewed:

- *accessibility*: from the external public spaces but also in terms of facility of orientation inside and effectiveness of the directions and signage;
- *unity*: deriving from functionality and from capacity to be adherent to the characters of the place;
- *integrability*: to be pursued making each function clear, with a special care to the condition of the natural and artificial lightening;

- *attractiveness*: it is the result of the “transformation of the stations from places of passage into places of contemplation”; the station is also an “open museum” that has an educational purpose and the capacity to increase the quality of life.

In order to stress the relation between the stations and their urban context and to state the uniqueness of each station, the City administration decided to commit the project to architects and artist of international reputation<sup>4</sup>.

The Transportation Plan has consequently become an exceptional opportunity for urban qualification with interventions which involve the historic centre, the central poles of interest, the outer neighbourhoods, the zones of urban transformation, beginning with the new organization of the pedestrian accessibility to the central station and the projects for covering the sunken railways and obtaining new urban specs (as in the case of the terminal station of the Vesuvius Rails, which connects Naples with all the towns built at the foot of the volcano). Definitively, the station is no longer a “non-place”. In order to attract people and enhance popularity of the public transports, the stations of the new subway are designed as places either for movement and for appreciating art<sup>5</sup>; they aim to be the “monuments” of contemporary Naples. These “Art Stations” are a permanent exhibit of works of art in a public space, a museum of contemporary art that any citizen can daily enjoy and that turns places of movement into places of contemplation.

Some stations are dedicated to the work of contemporary artists; others to the exhibition of archaeological finds. The soil of Naples is a deposit of remains of every age and any excavation brings some surprise (e.g., the Greek-Roman port, with remains of ships, has been discovered in the site selected for one of the new subway station); such occurrence usually slows down the work and makes costs grow, but can be seen also as an opportunity for the project of the new stations.

Designed by famous architects and embellished with the works of well-known artists, the new stations stand in locations eventually renewed and qualified. The intention is to make any station the beginning of a process of embellishment and rehabilitation that can involve large urban areas: a major challenge to win for Naples.

The revival of the public investments in high quality design is another special character of the RTS and a key for the success of the entire project.

### **Present Results**

At the moment, about half of the new line of the subway is on function and 14 new stations have been opened. The works are going on, even if slacken by the study of the archaeological remains found during the excavations. The refurbishment of the Station of Montesanto, one of the crucial nodes of the metropolitan network, has been completed and the High Speed Train Station of Afragola is under construction.

The integration of the fares and the creation of an inclusive ticket has already produced important results: according to some studies, the passengers transported per day in the urban area of Naples have been 747,000 in the year 2000 and 1,151,119 in the year 2006 (Cascetta, 2007); in the same period, according to the National Survey Institute, the average grow of the number of public transportation users was 7% in Italy as a whole, 31% in Naples (Turrini).

People seem to appreciate the new stations. They are matter of interest for the tourists, who can enjoy them while moving more easily in a “difficult” city. But the citizens get more profit, began to appreciate urban transportations and are eventually changing their relation with the public facilities on the whole. Public spaces in Naples appear often untidy and its citizens are blamed for being careless of what is a common property even if they risk to pay a fine; yet the new subway stations are clean and ordered – a result in itself and also a demonstration that quality and good examples are more convincing then repression and can change a general aptitude.

The first results are encouraging and a sense of proud is growing – an effect of paramount importance for a city which needs a lot of optimism to tackle its old problems

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Table 1 <b>Naples' citizens mobility per transportation modality</b> Survey Istat 2001 (Italian National Survey Institute)					
Railways	Bus	Company / school bus	Private car	Motorcycle	On foot
6.9%	16.2%	3.0%	48.6%	6.9%	18.4%

Table 2 <b>Private vs Public Transportation in the Commune of Naples at morning rush hours</b> (from Cascetta, 2007)					
year	1996*	2001*	2002**	2003**	2005**
<b>private</b>	61%	49%	48%	46%	42,5%
<b>public</b>	39%	51%	52%	54%	57,5%

\*Transportation plan of the Commune of Naples, 1997  
 \*\*Survey University of Naples Federico II, 2005



Figure1 – The Station of the interchange node of Montesanto



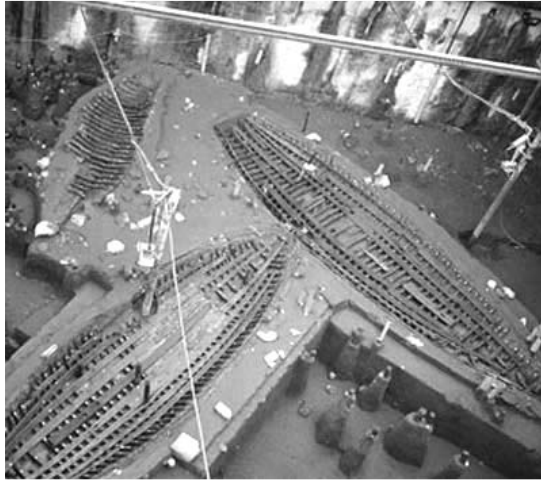


Figure 2, left – Archaeological findings during the excavations for the Subway.  
Figure 3, right – The Art Stations. A work by M. Pistoletto



Figure 4 – The Metropolitan railways and their connections with the Regional Network.



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<sup>1</sup> The management of the EU programs is commonly committed to the Regions; in Italy, Regions also have authority on land planning: they lay out land plans and issue laws on the matter.

<sup>2</sup> Data Italian Automobile Club.

<sup>3</sup> Metrocampania NordEst s.r.l., Circumvesuviana s.r.l., SEPSA s.p.a., Metronapoli s.p.a.

<sup>4</sup> The general consultant for architecture is Benedetto Gravagnuolo, professor of History of Architecture and former Dean of the Faculty of Architecture of the University "Federico II" of Naples;

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the subway and urban railways stations have been designed by Silvio d'Ascia, Gae Aulenti, Mario Botta, Sergio Cappelli, Peter Eisenman, Massimiliano Fuksas, , Anish Kapoor Futue Systems, Hans Kollhoff, Vittorio Magnano Lampugnani, Francesco e Alessandro Mendini, Nicola Pagliara, Dominique Perrault, Boris Podrecca, Karim Rashid, Richard Rogers, Uberto Siola, Alvaro Siza Vieira, Eduardo Souto de Moura, Oscar Tusquets Blanca, Benedetta Tagliabue; Zaha Hadid designed the High-Speed Trains Station.

<sup>5</sup> The general consultant for art is Achille Bonito Oliva, professor of Contemporary Art at La Sapienza University in Rome. In the station opened until now, the works of more then 70 artists have been placed; among them Lucio Del Pezzo, Mimmo Paladino, Mimmo Jodice, Michel Pistoletto, Sol Lewitt, Gabriele Basilico, Mario Merz.