

Urban Center - CENTRAL EXHIBITION

3 – BOLOGNA, A CHANGING CITY

Bologna Municipality is developing its **Municipal Structural Plan** (Piano Strutturale Comunale - PSC), the structural urban planning tool defined by regional bylaws.

It is valid for the mid-long term (around fifteen years) and lays down the general aims that are then interpreted by the Municipal Operative Plan (Piano Operativo Comunale - POC), which however has a term of five years.

On the basis of a politically defined social, economic and environmental strategy, the PSC formulates structural urban aims for the form and development of the city that protects its physical, environmental and cultural integrity.

The **City Forum** has been set up by Bologna Municipality, as an additional participatory tool for the process of drawing up the PSC by working together on the contents.

It is made up of representatives of the institutions and civil society, with links throughout the area.

As part of the forum, participatory town planning workshops have been set up for the design of the shared measures at district (and/or neighbourhood) level.

<http://psc.comune.bologna.it>

140.9 sq. km urban area

375,000 population

81,000 students registered at the University of Bologna

41,000 university students domiciled in Bologna from outside the city

37,720 businesses

2.3% unemployment rate

4 – CHANGES IN THE POPULATION

The most recent data highlight the establishment of a **new demographic cycle** that involves Bologna and can also be seen throughout the Province and the Emilia-Romagna region. The variable, characterising this new phase, is the extraordinary growth in migration from other areas in Italy and abroad. This has rapidly changed the image (that had been the norm for around twenty-five years) of an area distinguished by a falling birth rate, an aging population and a drop in the number of inhabitants.

The rapid change in the demographic aspect of the city has had profound repercussions on its social and economic fabric. Compared with ten years ago, Bologna has **more children, more old people and more immigrants** (from other countries as well as from the south of Italy and its island). **The overall population of the Bologna Provincial area has begun to increase** even if the values differ widely from municipality to municipality.

Coming up with explanations for the demographic composition of the population also means reasoning over the economic and social evolution of the area: this awareness will help in evaluating some tendencies correctly and benefiting from them in the process of defining local policies.

Progressive increase in the birth rate

In Bologna, **deaths are still more numerous than births**, but in the last few years the gap has narrowed due to a **steady increase in the birth rate**.

3,044 children were born in 2004 (181 more than the year before - an increase of 6.3%); of these new-born babies, 407 were to parents both of whom are foreigners (13.4% of the total), while almost 200 were births to mixed couples (133 where the father is Italian and the wife a foreigner and 65 to a foreign father and Italian mother).

Such a high number of births had not been recorded in the city since 1977 and the contribution of foreign immigrations is evident. Almost one child in five in fact has at least one parent of a nationality that is not Italian.

The attitude of couples formed by young Italian nationals from Bologna is also steadily changing. Compared with the past, these are showing a greater propensity to have children, even if it is later on in life (an average age of thirty-six for the father and almost thirty-three for the mother when the child is born).

Increase in average life expectancy

Numbers of elderly residents continue to increase (especially those over seventy-nine years old) thanks to greater life expectancy, which has reached seventy-eight for men and eighty-three for women.

According to some estimates, in 2018 the number of old people resident in the province of Bologna will probably have an overall increase of between 27,500 and 36,000 people compared with 2003.

The territories most affected by this **phenomenon of aging** will be the municipalities in the greater Bologna area as well as those making up the rest of the Province. Bologna, now characterised by considerable aging of the residents could, on the other hand, experience slight reductions or levelling off of the population over 64 years of age.

This process, whereby there is an increase in the number of people over seventy-nine in the province, will probably also continue in the city of Bologna itself (with variations of between 6,300 and 9,000 units).

Intense migration with a strong foreign component

In 2004 more than 14,500 people came to live in Bologna, while more than 12,000 moved out of the city. Migration determines a **very high social turnover of the population**: residents in the city since birth total 36% of the population and in many areas the residents who have been there for less than ten years are more than 20%.

While Bologna loses inhabitants to the municipalities in its province, migration from the south of Italy and its islands has begun again with force and the number of immigrants from foreign countries remains high. The foreign population resident in Bologna reached nearly 25,400 people in 2004 and now represents nearly 7% of the overall population. It is a very young population with a large presence of **Asian, African and European nationals** with a **slightly higher number of females**.

Changes in the family

There has been a **considerable overall increase** in nuclear families (+ 1.6% in 2004 for a total of 190,000 units) and a **far-reaching transformation in their type**: more, ever smaller, families (up to one or two members only). The slight increase in families with single parents (mostly the mother) living with children. In relative terms the number of families has grown much faster than the population.

There seem to be many more single residents in Bologna, with a net majority of females: in 2001 42,000 "single" people were women against 25,000 men. A large number of people are over sixty-four years old. Also accommodation requirements (evolution of the total accommodation pool and the ways in which it is used) are profoundly influenced by these changes in the family.

Resident population and the overall population

In the Municipality of Bologna, the resident population has stabilised over the last few years to between **370,000 and 375,000**, thus the long downward trend of the inhabitants that started in 1973 has come to an end. If one considers in addition that the population of the city on a non occasional basis (in particular the almost 40,000 students who come in to the city) and the more than 100,000 people who flock to Bologna each day to study, work or who come on business or else are here as tourists, Bologna exceeds the **500,000 mark** (rising to 650,000 if the population in the municipalities of the greater Bologna area are also taken into account).

Future estimates tell us that if Bologna is still be able to attract migrants in significant numbers, the resident population in 2018 will vary between the 2003 figure (almost **2,000 inhabitants** more as a conservative estimate) and a significant increase (over **13,500 residents** more in the most dramatic of cases).

5 – THE TOTAL HOUSING POOL – RECENT DEVELOPMENTS

The analysis of trends in the local housing pool highlights a number of links between the trends in housing, how it is used, and the demographic changes in the population and families.

One fact is that **the overall number of houses is increasing, the number of owner occupied flats is increasing and the number of rented flats is falling**.

The average surface area available is also increasing, as is the number of rooms per head, partly as a result of smaller families.

Most of the housing in Bologna is in a **good or excellent state of repair**.

Housing

The 2001 census showed that there are almost **445,700 houses** in the province of Bologna, with an increase of 38,000 houses compared with 1991 (+9,1%). This increase in the amount of accommodation has been smaller in Bologna itself, with a calculation of almost **194,900 units** (over 4,500 more than in 1991, a 2.4% increase).

The 2001 census, for the first time, also gives the number of buildings for residential use in which these housing units are situated. In the province of Bologna, the buildings for residential use in 2001 totalled almost **113,000** with an average of four units per building. In Bologna itself, there were on the other hand some **20,500** buildings with a considerably higher number of units per building compared with the provincial average (9.5).

Owner occupied buildings as opposed to rented accommodation

Housing in Bologna consists mainly of flats occupied by families legally resident in the city.

The houses and flats occupied by persons resident in Bologna in 2001 totalled almost 173,400 with an increase of 4,800 units (+2,8%) more than 1991.

In Bologna in 2001, **the number of houses occupied by their owners reached 65% of the total** and today an even higher value can be estimated because many other householders have decided to buy their homes over the last few years. So, if it is considered that in 1971 the number of homes owned by their occupiers was still a distinct minority (33% of the total), in just thirty years the number of families owning their homes has doubled and has become the clear majority.

Size of the homes: available area and number of rooms

In Bologna in 2001 the average surface area of occupied housing was approximately **85 square metres** (approx. **93 square metres** in the Province of Bologna) and the average number of rooms in each home was **3.68 (3.91** in the entire province).

Compared with 1991, the average surface area of the housing units has risen slightly (on average almost two metres more) and the average surface area available to each occupant has grown still further as a result of the simultaneous reduction in the average family size.

In Bologna in 2001 each resident had over 40 square metres of living area available, with an increase of almost five square metres over ten years previously. The trend over the long term is even more astonishing as it rose from 26 square meters per person in 1971, to 31 in 1981 and 35 in 1991.

Housing not occupied by resident families

In Bologna housing not occupied by residents in 2001 totalled **around 21,500**, a slight fall compared to ten years before.

Of course, in Bologna most of these homes (roughly two thirds, around **14,500 units overall**) meet the living requirements of the numerous non-residents present, particularly university students from other areas. The remaining (about **7,000 flats**) are unused for various reasons (unrented, or kept free for use by the owner, flats waiting to be sold, flats in a very bad state of repair etc.).

In Bologna therefore, about 7% of its total housing pool is lived in by the non-permanent population, and another 3-4% is completely unused.

State of repair of the buildings

In Bologna, more than 4,600 buildings for residential use (22.4% of the total) were built before 1919, while those completed between 1919 and 1945 account for some 4,800 (23.6% of the total). **The greatest number of buildings was built between 1946 and 1971** (more than 9,000) and, from 1972 onwards, building in the city has slowed considerably (fewer than 2,000 buildings put up in the last thirty years).

In 85% of cases the buildings surveyed were judged to be in a good or excellent state of repair.

6 – CHANGES IN THE SOCIO-ECONOMIC SYSTEM

Over the last few years there has been a considerable slowing down of the national economy, which has not however had too much of a negative effect on Bologna's employment market. **Employment continues to grow** and the large immigrant population is playing an ever-greater role in local employment.

The pro capite GDP in Bologna is still among the highest in Italy, thanks not least to a **solid, active productive fabric**, and an ever-growing tertiary sector.

Employment

Despite the slowing of the economy in recent years, **employment in Bologna continues to rise** albeit it at lower rates than the regional average, highlighting a tendential shortage of job opportunities.

The unemployment rate is stable (2.37% in 2003); this situation is basically similar to that of the entire Region (3.04%) and the area of North East Italy (3.26%).

The immigrant population is an increasingly important player in filling the jobs available.

Income

In 2002, the pro capite GDP of Bologna was Euro 26,860, a figure that places the provincial area in third place nationally, with 31% growth since 1995. The provincial areas located in the centre of the Emilia region represent the fulcrum of the regional economic system. Wealth and economic well being are in fact rooted in a **solid, active productive fabric**. In industry, including services, the Province of Bologna in particular has 20% of the area's businesses, local production units and relative workers.

Structure of the local economy

An analysis of added value by field of activity confirms the **growing move towards the tertiary sector by Bologna's production system**, a process that is a typical feature in areas of particular economic development. As a matter of fact more than 68% of added value is produced in the tertiary sector, an amount higher than the regional average and just under the national figure.

According to the figures from the eighth ISTAT census, of the 58,025 businesses in the Bologna area, 75% are service companies. If trade shows a decline common with almost all the provincial environments with the exception of Rimini, businesses in other service industries has grown at a rate of over 45% in Bologna. The increase in industries is decidedly lower, at a rate of just over 3.1%. On the contrary, other provinces of the region have recorded considerable growth in the field.

The field of knowledge

The Bologna area boasts a **University** of national and European renown. The student body of over 100,000, and the 15,000 freshmen starting each year, can choose from a wide range of faculties and courses in Bologna (and its decentralised centres). In addition to these there are some 14 research centres that make Bologna a leading scientific concentration in Italy.

The **Bologna Trade Fair**, in addition to the undoubted direct and indirect impact it has on the local and regional economic system is an important venue for the exchange of knowledge and professional expertise. In 2004 there were 28 trade fairs with 22,000 exhibitors and over 1,300,000 visitors.

One of the provincial area's most striking features lies in the field of **healthcare**. Patient treatment services and medical research have reached such a level of excellence as to increase the appeal of the facilities in the province, considerably. In the last few years more than 183,000 patients have been through Bologna's hospitals, some 10% of whom come from other provinces in the Emilia-Romagna region, almost 20% from other Italian regions and 1% from abroad.

Accessibility of the area and transport infrastructures

The **G. Marconi Airport** is the main gateway to the metropolitan area for foreign tourists and business travellers. The considerable increase in passenger traffic and, to a lesser degree, goods traffic recorded in the last few years makes Bologna one of the main airports of regional importance in a European context.

Bologna railway station will undergo radical restructuring and enlargement, bearing in mind that once work on the high speed line and the metropolitan railway network has been completed, approximately 180,000 passengers a day will pass through it.

As for goods transport, the Bologna **Interport** is the main interchange. It handles some 3.8 million tons of goods a year, of which 1.5 million is transported by rail. The current surface area of around 2 million square meters is to be expanded by a further 2.7 square metres.

Other provincially important logistic platforms are the goods centre (**Centro Merci**) in Imola, the **Centergross** wholesale centre and the **Centro Agroalimentare** agriculture and food products centre.

7 – BOLOGNA'S VALUES

Values are elements that make a city attractive, pleasant to live in and interesting.

Bologna has many values. The **old city centre** has first place of course, but the historical fabric of Bologna's outskirts is also important. Some districts that grew up in the 1960s and 1970s are almost small towns in their own right, places where people feel at home, and that provide the city with a sort of **emotional map of the city**.

The city's **urban renewal** policies are centred on these values so as to promote them and to give them space to develop in some of the more difficult contexts.

The old town and historical settlement patterns

Bologna's old town is the most representative part of the city.

Over the last few decades, since the 1969 Urban Masterplan, and its conservation policies, which no longer regarded single buildings, but the overall conservation of the historic area, the centre of Bologna has undergone wide-ranging urban renewal and restoration schemes aimed primarily at the conservation of its historical buildings. As the old town does not have great potential for actual physical transformation, the areas along the alleys skirting the centre play an important functional role.

A very topical theme is that of the quality of public spaces in the city centre, partly concerning the matter of traffic control and the promotion of cycling and walking as alternatives to vehicular transport. In fact, apart from a few main roads built at the beginning of the twentieth century, most of the roads in the centre were not conceived for motorised vehicles.

Since the 1985 Urban Masterplan (Piano Regolatore Generale – PRG), conservation policies also cover the city's historical outskirts and to a certain extent the rest of the municipal area.

Leading on from regional bylaws, the most recent urban planning instrument provides for the extension of cultural heritage conservation to the entire city.

Focal points and places of identity

The presence of places that are meaningful for the inhabitants in each "neighbourhood" (section of a district) is an important factor for urban quality. The recognition of one's own district as an area imbued with character and history, and full of focal points, contributes greatly to the sense of belonging and thereby creates the prerequisites for a better use of public spaces.

By consulting the local inhabitants directly, the neighbourhood meeting points were identified, focal points and landmarks, i.e. places which define the neighbourhood and with which the local community tends to identify.

Bologna is full of these identifying places (not necessarily accessible) in particular in the city centre but in many other areas as well, such as Bolognina, the historic centre of Borgo Panigale and the Savena district. On the other hand, places where people can meet are few and far between in areas that have been developed more recently: Casteldebole, the Via Larga area and some more remote districts, including Birra, Noce, Pescarola, Dozza and Croce del Biacco.

Other areas, such as the Saragozza and Santo Stefano districts, while boasting fewer meeting places, are nonetheless rich in identity and history.

Urban quality perceived by the local residents

The view of the local residents is fundamental for assessing the data provided by surveys and to understand what priorities they attribute to city life.

The perception of quality of life by residents in the outskirts is fundamental in order to assess the values that are attributed to this residential context. The results of a social survey carried out in the outskirts of the city (in particular in the Bolognina and San Donato areas) on a sample of more than six hundred families show that among the elements determining quality of life the following are deemed particularly important:

- living in a safe, secure area;
- good public transport links;
- nearness of the services;
- living in a quiet area;
- low cost of housing and/or living in one's own house.

Another important factor is that the inhabitants say they are on the whole satisfied with where they are living, even if a number of difficulties were detected linked to the urban environment, safety and cleanliness.

The good state of repair of the buildings in the city

The result of an analysis of the building work carried out in Bologna between 1992 and 2004 shows that most restoration was carried out on the oldest buildings.

The intervention covered the whole city more or less equally: degradation does not concern the urban area overall, but only individual, localised areas. In other words there are not any residential sections of the city that are perceived as totally run down and in need of urban renewal.

This phenomenon could be linked to the fact that the city centre and closest outskirts appeal particularly to newcomers to the city (Italian and foreign immigrants, university students etc.), although the quality and age of the buildings do present difficulties.

This has meant a market also for those flats and houses that do not meet the standards currently applied to new buildings but meet other requirements (proximity to services, to public transport etc.).

Promotion of neighbourhood trade

The spread of local shops adds to the richness and vitality of urban areas. The recent development of shopping centres, supermarkets, hypermarkets and other large stores has led to tough competition. Due to this, the Municipality of Bologna has approved various projects in recent years in order to improve trade and these have met with positive results.

In the last five years, the number of shops in Bologna has remained stable with a total of 6,694 units. While non-food stores have increased in number, food shops have closed (in particular neighbourhood groceries) and so have medium to small non-food outlets.

41.3% of Bologna's shops are located in the city centre, almost all of them being local shops mainly of the non-food type. The average density of food shops is 407 m² per 1,000 inhabitants, rising to 603 m² per 1,000 inhabitants in the old town centre and at a level of 374 m² per 1,000 inhabitants in the outskirts.

The average density of non-food stores, 1,240 m² per 1000 inhabitants, rises to as much as 3,132 in the old city centre and falls to 928 in the outskirts.

8 – WHAT DOES THE CITY HAVE TO OFFER US: PUBLIC FACILITIES

The contribution of urban planning to the relaunch of local welfare as a way to speed up city development is fundamental, in particular when it is necessary to equip the city with new facilities and, even more, when these must be planned among existing buildings.

In this way, the need to develop a system of public facilities emerged, and a specific section of the Municipal Structural Plan was drawn up. The map shows the full picture of the facilities and public spaces available and it contains some of the main linking and integration elements.

9 - <http://sit.comune.bologna.it>

GIS - Geographic Information System (SIT - Sistema Informativo Territoriale)

Bologna Municipality's GIS department has been in charge of designing methods for the digital management of the area since 1996 and it co-ordinates development in relation to the territorial analysis needs of users both within and outside the local administration (planners, technical instructors, designers etc.).

Tasks include the creation, management and constant updating of mapping and of geographical reference points as well as the diffusion of data related to the territory, to planning and to the social, economic and environmental situation.

The purpose of GIS is to integrate the department's, often quite diverse, IT systems, relating them to common reference aspects, to enable the exchange, comparison and assessment of data, using a territorial approach.

Access to the GIS databases is possible from about a thousand workstations located in various council offices.

Since 1998, the department has provided innovative territory-based web services to citizens and professionals and has carried out training schemes for council staff, local actors and students.

Available on the web:

- ◆ Consultation and print out of digital maps, ortho-photo, the Urban Masterplan (PRG) and rules and regulations.
- ◆ Comparative consultation of the map and historical photo files.
- ◆ Virtual flight in a 3D model of the city.
- ◆ Place names.
- ◆ Topography and geodetic network.

10 - QUALITY OF THE URBAN ENVIRONMENT

For many years, Bologna Municipality has been involved in environmentally sustainable territorial planning. The opportunities offered by the regional law, and the Report on the State of the Environment (RSA), basis of the Local Agenda 21 process, formed a basis for the implementation of the knowledge base of the Municipal Structural Plan (PSC).

The environmental knowledge base is therefore shared between the Structural Plan and the Local Agenda 21 process and is organised into the following themes:

- **Physical and environmental conditions** (studies and analyses undertaken for **surface and underground water, soil and subsoil**);
- **Quality of the urban environment** (in which the status and critical themes of **air, noise, energy and greenhouse effect, waste and electromagnetism** are highlighted).

Air

Bologna Municipality is at the centre of a vast metropolitan area called, for the purposes of the assessment of air quality, the **Bologna Agglomerate**. As with many other Italian municipalities, the agglomerate faces the problem of emissions due to intense traffic and, to a lesser extent, heating systems and production activities. The data resulting from a period of monitoring, seen in the light of European standards recently introduced in Italy, highlights a **widespread critical problem** extending beyond the municipal boundaries.

The critical pollutants widespread in the Bologna area are:

- **PM10 (powders with aerodynamic diameters less than 10 µ)**
- **NO₂/NO_x (nitrogen dioxides and oxides)**
- **O₃ (ozone)**
- **C₆H₆ (benzene)**

The widespread critical levels must be confronted on a large-scale, through measures aimed at the reduction of overall emissions. The local critical situation regarding benzene, particularly in the city centre can be confronted with local traffic regulations.

Noise

Bologna Municipality has always been sensitive to problems of noise and has had a **traffic noise** monitoring network since 1995.

Furthermore, since 1992 there has been a central control unit for monitoring **airport noise** and since the year 2000, in cooperation with ARPA (the regional agency for environment and prevention), there has been a system measuring **railway noise** in order to identify the most critical areas.

In 1999, a **Plan for Acoustic Pollution Abatement** was approved from which the "Acoustic Criticalities Map" was developed. Critical areas were identified and intervention planned to improve situations where there is the problem of noise. These mainly include: the by-pass and motorway, the inner-city ring road, the old town centre, main roads and linking routes (Viale Vighi-Cavina), railway lines, the airport.

Waste

Thanks mainly to the increase in **differentiated waste collection**, the amount of non-differentiated waste disposed of fell from 167,000 tons in the year 2000 to 148,000 tons in 2003.

The need for urban renewal in particularly prestigious points of the old town centre led to the creation of **underground ecological islands** in 1995 for the collection of rubbish in the city. The familiar roadside rubbish containers were substituted by underground bins with a capacity of roughly thirty-five traditional containers, with a vastly improved visual impact.

Energy and the greenhouse effect

Energy consumption in the city of Bologna is on the increase with critical consequences for the **emissions that pollute and contribute to climate change**. The strategy aimed at reducing consumption included in the Municipal Energy Plan has been implemented partly through the opening of an **information point** for citizens (the "Energy and Environment" showroom), which **promotes rational energy use**. The urban **distance-heating** network, which gives the opportunity to exploit the combined production of electricity and heat (**cogeneration**), has also been extended.

Regarding activities measures aimed at energy saving, 1999 saw the end of the experimental phase involving **eco-building** solutions. The results are now available to the urban planners.

The "Metropolitan Boiler System Service" (SMIT - Servizio Metropolitan Impianti Termici) was established in 2003 to make **monitoring and safety procedures** for boiler systems easier. The service will contribute to the updating of the Municipal Energy Plan through the creation of a database, which will help integration between **territorial planning and planning for energy consumption**.

Electromagnetism

High frequency

There were 312 authorised **mobile telephone structures** in the city of Bologna at the end of 2004, 284 of them active.

The number of applications for new fixed installations for cellular telephony was low for 2005.

Bologna Municipality received around 200 applications for authorisations for existing **radio and television structures**, while applications for the authorisation of new structures were few and only for new relay stations.

Low frequency

Electricity distribution and transmission structures are among the sources that generate low frequency electro-magnetic fields. There were 110.8 km of high voltage (HV) power lines and 920 km of medium voltage (MV) power lines in the municipal area at September 2004. The percentage of MV lines underground is very high (89% of the total).

11 - GREEN AREAS

In Bologna's varied and complex landscape several factors that mark the city's identity more profoundly are immediately evident: the old town centre, the range of hills (accounting for 28% of the municipal area), the Reno and Savena rivers and the open countryside on the plain.

This considerable diversity in the territory, whose overall surface is 14,087 hectares, is matched by a notable wealth of natural, semi-natural and man-made environments, equally worthy of interest in terms of territorial management and planning policies directed at guaranteeing, as required, protection, improvement and restoration.

Public green spaces in Bologna now include **more than 750 areas**, covering a **total of over 1,000 hectares**. Actual parks and public gardens total around 250 (600 hectares) added to which are the green areas created alongside roads (160 hectares), sports centres (110 hectares), green areas linked to schools, green areas around public buildings and many smaller areas as well (totalling 180 hectares). It is an asset of considerable size if placed in comparison with many other Italian cities. Nonetheless, it provides too few top quality areas and responds only partially to the many requirements of the inhabitants in terms of the quality of green spaces and how they are laid out.

12 – GREEN AREAS IN BOLOGNA AND BORDERING MUNICIPALITIES

Plans to consolidate and increase Bologna's green areas must necessarily take into account the wider territorial context. This means considering the ten municipalities bordering on the city and, to a lesser extent, other municipalities that border on them, with the aim of integrating the layout of Bologna's green spaces with those that exist, or are under development, in the neighbouring territories.

Among the various themes that have emerged, the contribution that Bologna can make to a wider project of protecting, enhancing and using the **Reno river** stands out. This initially involves the municipalities of Calderara di Reno, Casalecchio di Reno and Sasso Marconi, but could also extend to the municipalities located on the banks of the river from the mountain to the plain, at a later date.

Also the area around the banks of the **Savena** could provide a good opportunity for a project at supra municipal level, as the footpath along the banks in Bologna could be continued through the territories of San Lazzaro and Castenaso.

As for the **hills** above Bologna, a good policy appears to be to increase links with the adjacent river environments of the Reno and the Savena, the areas protected by the Gessi Bolognesi and Calanchi dell'Abbadessa Regional Park and those belonging to the planned Nature Reserve at Contrafforte Pliocenico.

The theme of safeguarding and enhancing the **countryside around the urban area** promotes the opportunity to create new and effective connections between the areas of greatest natural beauty in the Bologna area and the surrounding open spaces.

A further idea being developed, which could be an excellent opportunity for co-operation between Bologna and the neighbouring municipalities, is to promote the wonderful **system of old canals** that flow through Bologna, in particular the two most important artificial waterways: the Reno canal and the Navile canal.

13 – MOBILITY AND INFRASTRUCTURE SYSTEM

14 – THE SUSTAINABLE MOBILITY PROGRAMME

The areas of intervention in the short/mid term: mobility with low environmental impact

The **Programme for Air Quality and Sustainable Mobility in Bologna** is an instrument for tackling the emergency situation regarding traffic and atmospheric pollution in the Bologna urban area. It includes a series of integrated actions aimed at promoting mobility systems with a **low environmental impact** and reducing the emission of fine particles.

The strategies introduced aim to reduce the need to use private transport by improving the public transport system and other forms of mobility that feature low environmental impact and zero emissions.

Pedestrian areas and areas used by weaker members of the community

There has been a steady introduction, through urban regeneration programmes, of pedestrian zones in areas with the problem of excessive levels of traffic noise. The aim is to improve conditions and the **quality of life** in the old town centre, showing artistic heritage and monuments at their best, as well as improving conditions in some of the suburbs that are suffocated by the traffic.

The need to enhance pedestrian routes is linked to the strategy of reducing the use of private vehicles in favour of other, lower impact, means of transport, which involve walking at least for part of the journey, at the beginning or the end.

These improvements must include aspects specifically aimed at greater safety and accessibility for weaker users. For this reason the themes of **pedestrian crossings** and **secure home-school routes** (or other places where people get together) have been identified as particularly significant.

The aim is to promote low-speed use of the city, by creating specific areas and introducing pedestrian-friendly bylaws for traffic and thereby reducing the number of accidents involving pedestrians.

Cycling and walking in the city

The promotion of the use of the **bicycle as an alternative** to motor vehicles is one of the most significant commitments for long-lasting, sustainable development, contributing to the reduction of polluting exhaust gases in the atmosphere and relieving the congestion of urban traffic.

To encourage the inhabitants of Bologna to use their cars less, it is essential to create a continuative cycle network that is safe and easily identifiable as well as being integrated with other forms of mobility.

Mobility management and the new ECO tickets

Home-to-work journeys, while accounting for less than 50% of total journeys, do have a definite impact on the build up of traffic at rush hours.

To reduce the environmental impact caused by traffic, mobility strategies are being introduced for the employees of medium to large companies and schools with the aim of favouring the use of public transport and bicycles.

The policy for employees' home-work journeys is drawn up by each company's mobility manager with the aim of reducing the use of private vehicles and organising timetables better. Policies approved by Bologna Municipality in 2003 concern around 30,000 employees.

The new **Ecoticket and Ecodays** bus tickets are intended for those who do not use public transport every day, for motorists on days when traffic restrictions linked to car registration numbers prevent half the population from driving in the city and for cyclists and motorcyclists in the case of bad weather. Both the new tickets are flexible and offer great advantages with a considerable reduction in price for the occasional user: with the Ecoticket the price of a journey is € 0.60 and when Ecodays is used for four trips a day the price is € 0.45.

Bus lines with low environmental impact

The steady updating of the bus fleet with ever more environmentally-friendly vehicles comes under the municipal strategy proposal, and involves, in particular, the urban areas of greatest historical, architectural and environmental prestige such as Bologna's old town centre.

Since the late Eighties there has been a steady reduction in the number of buses running on diesel. At the same time, the local public transport company ATC's fleet of vehicles has been gradually renewed, introducing electric vehicles and vehicles running on methane. As a result, a number of lines crossing the old town centre have become completely environmentally friendly.

The trolley bus network at present involves lines 32, 33 and 13 covering a total distance of 42.6 km in both directions.

Bus lines using only electrically powered vehicles: shuttle A.

Bus lines using only hybrid vehicles: shuttle B.

Bus lines using only vehicles powered by methane: 30, 17, 18, 25, 10.

Bus lines using only vehicles powered by diesel with CRT: 28, 29.

Car sharing

Car sharing is a service where **use of a vehicle is shared**.

At present there are eleven reserved parking points for the service, and the fleet counts twenty environmentally friendly cars of different kinds (9 Smarts, 2 Puntos, 2 Stilos, 3 Doblò bipowers, 4 Multipla bipowers), plus Bologna Municipality's 10 Fiat Pandas running on methane.

In the face of the introduction of a new system of access restrictions, the service will be perfected with a view to integrating car sharing with the local transport system.

There is a dual aim: reducing pollution emitted and freeing up public space, as well as developing a service conceived for short, frequent trips as a form of public transport for individual use.

15 – THE SUSTAINABLE MOBILITY PROGRAMME

Areas of intervention for the short/mid term: new technologies to support mobility

As laid out in the Programme for Air Quality and Sustainable Mobility in Bologna, the use of new technologies for mobility is fundamental. The aim is to ensure compliance with the measures adopted, while at the same time helping to create a new way of thinking and new behaviour patterns among the inhabitants regarding the way they get around the city.

The Programme includes various kinds of intervention, to be brought in alongside the complete activation of SIRIO, the system of **remote monitoring of accesses** to the restricted traffic area (ZTL). The aim is to promote the reorganisation of mobility in the direction of the city centre and to define a different use of the city.

SIRIO

Sirio is the system whereby **access** to the restricted traffic area (ZTL) in the centre of Bologna is **monitored remotely**: it reads vehicle licence plates, runs them through the database of authorised vehicles and produces fines for those who enter the area without authorisation.

With this system, access to particularly sensitive areas from the point of view of monuments and the road system can be limited in the attempt to make public transport more efficient.

The aim is to reduce the number of non-authorised vehicles in the centre (by an estimated 20-30%) by means of better management of permits and a closer check on vehicles with permits not linked to their number plate.

Sirio began operating on February 28 2005 at the entrances to via Santo Stefano, via San Vitale and via Alessandrini. In the summer of 2005, Sirio also began operating at all the other entrances: via Marconi, via Riva di Reno, via San Felice, via Sant'Isaia, via Tagliapietre and via XII Giugno.

RITA

The RITA programme (Integrated Remote Access Monitoring Network) covers the installation of CCTV cameras for the **electronic surveillance** of some routes of particular importance for public transport.

The activation of the RITA program aims to:

- Increase the efficiency of public transport (increased speed and regularity of the service) by reducing non-authorised transport in lanes reserved for public transport, particularly on main routes (entering and leaving the restricted traffic area ZTL);
- Stop unauthorised driving through the old town centre on the so-called "T", comprising Via Indipendenza, Via Rizzoli, Via Ugo Bassi). This will involve an estimated 25-30% of cars and a greater proportion of motorbikes, on the basis of results registered in the lanes that are already monitored remotely.

The correct functioning of the reserved lanes leads to benefits from the point of view of both speed and safety by dividing the traffic up into its different components.

Bus priority at traffic lights

The **on-going modification of the system of traffic lights** and the implementation of strategies giving priority to public transport, are facilitated by the local public transport (ATC)'s Remote Bus Monitoring centre. This structure uses a GPS localisation system to follow the buses' progress, transmitting the co-ordinates to the traffic light centre. The traffic light centre, in turn, adjusts traffic light sequences so that the public transport vehicle is given priority and can reduce any delays accumulated.

The eight lines for which this traffic light preference system is active at present are on the primary network (lines 11, 13, 14, 19, 20, 21, 25, 27).

Main objectives: increasing the efficiency of local public transport through improved regularity of the service (i.e. respect for the timetable) and avoiding vehicles on the same line forming a queue behind one another.

Directions to car parks and the CISIUM Centre

Bologna's telematic mobility facilities include:

- a **road information** system through variable message panels (VMS)
- a system **directing cars to car parks** that receives data regarding the situation at the car parks and transmits it to the direction signs with a variable message system at the side of the road.

CISIUM (the Centre for Supervision and Integration of Urban Mobility Information) is responsible for collecting and processing information on the **state of mobility** in the metropolitan area (in real time) and summarising recurrent scenarios in order to:

- provide an up-to-date overview of the metropolitan mobility situation making it possible to take adequate action;
- help the user make decisions regarding a journey by presenting the various options;
- direct those already on the road in private vehicles, towards the least congested route;
- regulate traffic lights to help ease congestion in the most critical areas.

To communicate the information, variable message panels, radio broadcasts, Internet and text messages to mobile phones will be used.

STARS Programme

The **STARS Programme** (Sanzionamento Transiti Abusivi Rosso Semaforico or Traffic Light Abuse Fines Programme) has been implemented with the aim of making the road user aware of **safety** issues and to check that the monitoring and fine systems are working properly.

During the initial experimental stage, the crossroads monitored are located as follows:

- Malvasia, Saffi, Vittorio Veneto;
- Emilia Levante, Po, Dozza, Lenin.

The programme's offence detection system will be extended to other junctions and crossroads and it will be made automatic, becoming more efficient.

The Metropolitan Railway Service (Servizio Ferroviario Metropolitan - SFM) is a public transport system on rails designed to serve the main routes between the city and the province by means of five railway lines terminating at Bologna's central railway station.

The service is being increased in order to make it more efficient thanks to the introduction of new stations, the modernisation of the infrastructure and a greater frequency of trains.

Since the perception of transport efficiency largely depends on total travel time (from leaving home to arriving at work or place of study), all the stations and stops, both the new and old modernised ones, will have:

- Plenty of convenient points of access to make coming from the surrounding areas easier;
- Space for the tram and bus stops, car, moped and bicycle parking and easy access for pedestrians;
- Direct, convenient and safe pedestrian routes.

Please refer to the diagram on the panels prepared by the Bologna Provincial Administration, to see the complete SFM network.

17 - <http://sit.comune.bologna.it>

Bologna in 3D

The three-dimensional modelling of the buildings gives a highly realistic view of the city and urban landscape and makes it possible to explore the city dynamically, a true flight simulation.

Using digital maps that give the dimensions of the buildings and with the aid of specialised tools, the buildings have been modelled three-dimensionally and the orthophoto technique has been used to "dress" the shapes.

The model can be explored through the Internet using functions typical of flight simulators; thanks to the wealth of substrate information – more than 50,000 objects – it provides a highly realistic view of the city and urban landscape.

It also allows for two-dimensional border enlargement of traditional tourist maps and exploration of the city in a highly dynamic way, moving freely to find information in a realistic flight over the city.

The consultation system, designed for the web, can be integrated with specifications about the various items, external links and more detailed information about the main monuments and places of interest. One idea is to plan a series of virtual guided tours around the city and the Internet.

18 – HIGH SPEED RAIL LINES

19 – THE BOLOGNA RAIL HUB

Bologna is the most important rail hub for passenger and goods trains between the north and south of the country.

Work on the new high-speed line will allow the Bologna hub to be reorganised and improved, enabling the development of the Regional Rail Service (Servizio Ferroviario Regionale - SFR) and the Metropolitan Rail Service (Servizio Ferroviario Metropolitan - SFM).

The volume of trains passing through the hub could be more than doubled. To optimise the management of all the hub's rail traffic, a Command and Monitoring System (SCC) will also be set up, using the latest technologies. Bologna will thus be in a position to restructure and develop its entire rail link system.

The line

The new high-speed line crosses Bologna from south to west on a route 60% of which runs underground. The total length through the city is 17.7 km.

From the Savena-San Ruffillo district the line arrives at the new high-speed train station. From here it continues towards Milan and comes out onto the surface again at Prati di Caprara. After crossing the Reno the line runs alongside the current Bologna-Milan railway line as far as the Lavino river. It then joins the new high-speed line at Anzola Emilia.

When it is completed, the new high-speed line will make it possible to reach Milan from Bologna in an hour (as opposed to the present hour and 45 minutes) and to connect Bologna and Florence in 30 minutes (as opposed to the current 59 minutes).

The main works

The project includes the digging of eight artificial tunnels, the use of two natural tunnels, two large chambers, two viaducts and two bridges.

Among the main works:

- The **double tunnel** between San Ruffillo and the central station, some 6 km in length. To dig these, very large machines, known as "mechanical mole-hole tunnelers" (over one hundred meters in length) have been used. These machines, also called shielded mechanical diggers, allow for 10-15 metres progress a day compared with the mere 2-3 metres progress made using normal digging techniques.
- **Two new bridges**, already built crossing the Reno river, positioned alongside the railway bridge of the existing Milan-Bologna line. The first bridge, to the north of the existing one, will carry one of the two tracks of the new high-speed line (the other will use the existing bridge). The second will use twin tracks to make the link to Bologna Station on the Porrettana (Bologna-Pistoia) line.
- **Interlinks**. The high-speed line is connected to the existing line by two interlinks. The San Ruffillo interlink consists of two tunnels in the municipal areas of Pianoro and San Lazzaro di Savena. The Lavino interlink is in the municipal area of Anzola and consists of two branches connecting the new high-speed line with the peripheral Bologna line and the existing line. A further two interlinks are planned within the hub near the locomotive depot (between the Maggiore hospital and Via Agucchi): one with the Padua-Venice line and one with the Verona line.

The technical characteristics of the hub

Length	17.7 km
km above ground	5.9
km viaduct	1.6
km in man-made tunnel	1.8
km in natural tunnel	7.7
Average speed	160 km/h
Minimum radius of bend	475 m.
Maximum radius of bend	11,400 m.
Power	3k V d.c.

The Metropolitan Rail Service

When the high-speed line is built in Bologna, the existing lines will be completely given over to regional, local and goods transportation. The Metropolitan Railway Service (SFM), an extensive network stretching over the entire metropolitan area, designed in particular for commuters within Bologna and between the city and the province, will be developed. There are eight rail lines which converge on Bologna Central Station from all directions. In addition to national and regional trains, it will be possible for metropolitan trains to circulate and provide 50,000 seats a day as opposed to the current 5,000. The Italian Railway Network company (Rete Ferroviaria Italiana - RFI) plans to build 13 new stops, nine of which will be in the urban area. The service will become more frequent, providing trains every fifteen to thirty minutes in a radius of 30 km around Bologna, starting from the Central Station.

The new underground station

The new underground station for the new high-speed lines, some 23 m below the surface, is for medium to long distance trains. Situated in the area occupied by the last five tracks of Bologna's central station on the via Carracci side, a large new underground area some 650 m long and over 40 m wide, spread over three storeys, will be built. The tracks will be on the lowest level, with passenger services on the middle level (15 m below the surface) while the nearest level to the surface (7 m underground) will be reserved for road traffic and will give access to the station's carparks and those in the Salesiani area.

20 – BY-PASS & MOTORWAY

Noise reduction intervention concerning the whole urban section of Bologna's motorway and by-pass is planned in the near future. A new tollbooth exit will be built to serve the trade fair district, the by-pass slip roads will be improved and a so-called "third dynamic lane" will be built.

The noise reduction intervention will bring the entire urban section of the by-pass and motorway in line with current standards. A soundproofed tunnel will be built in the San Donnino residential area of the San Donato district, and soundproof barriers will be put up at all points passing residential areas.

Planned intervention on the roads includes:

- The rationalisation of the by-pass slip roads that connect with the city road system at critical points:
 - Airport
 - Lame
 - Corticella
 - Trade fair district-Viale Europa

- Roveri
- Massarenti (San Vitale-Mazzini)
- San Lazzaro.

- The construction of a new "Trade Fair District" exit with toll booth to ensure better accessibility to the trade fair district and a consequent lower flow of traffic on the by-pass when a trade fair is on.
- Widening of the motorway to make an emergency lane, the so-called "third dynamic lane", to be used temporarily under particularly heavy traffic conditions (rush hours, trade fairs, mass exodus for the holidays); under normal conditions the motorway will operate with two lanes plus an emergency lane.

Use of the third dynamic lane will be managed by efficient information systems, in particular:

- Variable message panels, clearly visible to road-users at entry points, displaying information regarding the state of lane use (both motorway and by-pass).
- Variable message panels before all by-pass access roads, with information on the general road conditions.
- A highly automated monitoring system using CCTV cameras and sensors to check traffic flow conditions and enable real time traffic management (including emergency situations).
- Adaptable passages in the traffic divide between the motorway and the by-pass, that can be opened rapidly to ensure aid gets through as efficiently as possible in the case of accidents where traffic has come to a standstill.

21_22 – METRO TRAMWAY

A **rapid network for mass transport** using railways and metro tramways is necessary in order to achieve two main objectives.

- To allow the Bologna area to grow in competitive terms in the economic field.
- To allow Bologna to grow as a place of excellence: regarding territorial development, quality of life, and services to the population.

It is a logical integration between the different forms of public transport to make the mass transport system more efficient and effective, so as to increase the use of public transport and reduce pollution from exhaust emissions.

Line 1 of the metro tramway links the trade fair district to Bologna's central railway station, the old town centre, Maggiore hospital, and Borgo Panigale district. The line covers a distance of 11.3 km, of which 5.4 km is underground, 5.5 km is on the surface, and 0.4 km is on linking ramps.

A further link is planned from Prati di Caprara-Lazzaretto stretching for some 1.5 km.

Characteristics of the line:

- Capacity: 6,600–7,200 passengers/hour in each direction
- Speed: 23–28 km/h
- Frequency during the rush hour:
 - 1 train every 2 minutes in the central stretch
 - 1 train every 4-6 minutes in the Maggiore hospital–Borgo Panigale stretch

Characteristics of the vehicles:

- Capacity: 220 to 240 passengers
- Length: approx. 33 m
- Average width: 2.3 to 2.65 m

Complementary road system improvements:

- Link between Via Prati di Caprara and Via Triumvirato.
- Improvement of the south-west road link between the Romagnoli roundabout and the Granatieri di Sardegna roundabout.

23_33 – HOW WE LIVE THE CITY: THE DISTRICTS AND NEIGHBOURHOODS

The "How we live the city" map contains an interpretation of the district area. Its aim is to highlight the positive and critical factors that must be understood in order to work positively towards urban quality. Shown on the map are focal points and values, critical issues and problems, requirements and needs, resulting from opinions collected from different points of view. The map in fact is the summary of an

extended discussion carried out with the districts, during which local inhabitants and institutions had various opportunities to understand, verify and add to the content.

- Each district's positive elements should be brought out: places of identity, focal points, streets with lively pedestrian traffic, were identified in a study carried out by Bologna Municipality, then enriched and developed with the suggestions of the local inhabitants.
- The places and elements of value: preliminary studies for the Municipal Structural Plan listed buildings bound by the Cultural Heritage Code, buildings indicated in reports on green spaces, parks and public gardens of particular beauty, tree-lined avenues.
- Problematic elements can limit urban quality although, in some situations, can be turned into opportunities for change and positive transformation. The Municipality and districts have identified the areas and disused buildings that can be recovered, the barriers dividing parts of the city (railways, rivers and heavily trafficked roads), busy areas where heavy traffic interferes with pedestrian use and so on.
- Requirements, projects and specific requests have been outlined by the districts themselves.

24 – BORGO PANIGALE DISTRICT

Borgo Panigale is an outlying district brimming with history and identity. Separated from the centre of the city by the large infrastructures that are its boundaries (motorway, highway, railway, the airport, the Reno river) it is, in itself, complete and self-contained and provides a variety of services that are not always to be found on the outskirts of towns.

The Via Emilia main road has dictated the district's development, and the various neighbourhoods are distributed along it: Borgo Panigale, Birra and Casteldebole, Lavino.

There is also a large high quality agricultural area south of the Via Emilia, large parts of which are owned by the Municipality, and the disused Vocational Training Centre building. Villa Pallavicini, a meeting place, land mark and integration centre for the area, is also here. With its impressive driveway it stands out in the agricultural landscape.

With the exception of the Bacchelli Centre, the focal points and main landmarks are located in the oldest part of Borgo Panigale, although the modern district of Casteldebole has neighbourhood shops, a new railway station and the Reno river nearby, which are all attractive aspects with development potential.

26 – NAVILE DISTRICT

The Navile district, one of the city's largest, is greatly affected by the thorough urban transformation planned.

Various local communities with their own history and identity, as well as a high degree of participation and involvement, are grouped here.

Bolognina, Lame, including Pescarola, and Corticella are the three old districts which make up the Navile district today, together with two more recent centres: Noce and Dozza. These two are not very well connected to the rest of the area and show signs of being isolated, with little access to public services. Pescarola, Noce and the southern part of Corticella lack a central focal point and landmarks.

27 – PORTO DISTRICT

The Porto district is not a particularly large area, but it is very built up. It consists of the Marconi and Saffi areas, and its boundaries are marked by substantial barriers that, especially to the north, condition and limit interaction with other parts of the city. One important topic, or problem, is the railway station and the conditions of degradation and safety connected with it.

The district's central focal point is the former cattle market, which now serves a variety of functions. The central area of the district has a less well-defined identity, although it does include the important resource of the former tobacco factory, which is undergoing a process of urban renewal.

28 – RENO DISTRICT

The Reno district is made up of two well-defined areas: Santa Viola and Barca.

The right bank of the Reno river forms a border to the west and gives the area its identity. Another notable, and also problematic, element of the area is the south-west highway that separates the area, crossing it from north to south (thereby isolating one built up section near the Reno canal) and from east to west dividing the two areas.

Barca is an important central focal point, with good integration between the facilities present (some of the best in the urban environment) and the Via Emilia that, while suffering from the problem of traffic, plays a central role for the Santa Viola area.

29 – SAN DONATO DISTRICT

The San Donato district consists of a substantial area of agricultural land (the prestigious north-eastern agricultural wedge) and a built up, largely residential area (with a high incidence of public housing). It is also home to two important functional structures, the trade fair and CAAB, the central fruit and vegetable wholesale market (Centro Agroalimentare di Bologna).

The district consists of three areas, San Donato, San Donnino and Pilastro. Most of the mobility in the district is centred on Via San Donato which, consequentially, suffers from the large amount of local traffic and traffic passing through.

The failed integration of immigrants, the strong sense of isolation (even abandonment), and the presence of public buildings that are often in a bad state of disrepair, are all aspects that call out for considerable attention. A strategy must be brought in to emphasise the positive elements while dealing with social tensions and difficulties.

The central focal points and landmarks are mostly where lively social activities take place (the centre of the district, the Casalone events centre, various meeting places in the Pilastro area).

30 – SANTO STEFANO DISTRICT

The Santo Stefano district consists of the Murri, Colli and Galvani areas: it covers a very wide, diversified area that extends from the city centre to the outskirts (it grew under the 1889 town plan) and the hill area (that it shares with the Saragozza and Savena districts).

The Murri and Galvani areas are characterised by a lot of upmarket residential building and two extensive green areas that are among the largest in the urban area (Giardini Margherita and Lunetta Gamberini public gardens). Another noteworthy characteristic is the importance to the district of the hilly landscape that is a feature of all its built up area in the south.

31 – SAN VITALE DISTRICT

The San Vitale district consists of various areas, the morphology and urban structure of which differ considerably, and which are separated by infrastructures that make mobility between districts difficult. The areas are: Innerio, Cirenaica, Mazzini together with the area of Via Scandellara, the recently urbanised areas of Via Larga and Croce del Biacco.

There are marked differences between the centre on the one hand, and the zone to the east of the S. Orsola hospital on the other. The former, while suffering from a lack of green areas and a high density of residential buildings has, like the Cirenaica area, a precise identity. The latter area, though, is gradually losing its identity through the steady modifications being made to the building fabric, caused in part by the barriers that obstruct mobility, and causing what is no doubt one of the district's main problems.

32 – SARAGOZZA DISTRICT

The district consists of the Malpighi area in the centre of the city, and the Costa Saragozza area.

Among the features of the district is its upmarket housing in the first ring of suburbs with its leafy avenues.

The district's hilly landscape and a number of its more evident features are of considerable importance, such as the Basilica of San Luca and its porticoed approach route, which have deep significance for the area.

In Saragozza the hills, thanks to the series of parks (particularly Villa Spada), are closely tied to the residential urban fabric.

33 – SAVENA DISTRICT

The Savena district consists of two areas that are quite different from each other socially and morphologically, Mazzini and San Ruffillo.

The Mazzini area, which has grown around the Via Emilia road, with the "Fossolo" expansion projects, has plenty of green areas and adequate services and facilities. The San Ruffillo area is split in two by the Bologna/Florence railway line, and suffers greatly from southbound traffic along Via Toscana. The area stretches as far as the Savena river and beyond the bridge, which often appears to residents as the boundary with the Municipality of Pianoro, although the border is actually further south.

SUSTAINABILITY

What is HERA doing for a better future?

"We do not inherit the Earth from our Ancestors, we borrow it from our Children" (old African saying)

The first definition in order of time of **sustainable development** was in the Brundtland report of 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

For Hera, each production process for the purpose of supplying a service must **create value** for the client without neglecting the environmental, social and economic impact.

Constantly investing in processes which make use of **renewable resources** and which encourage **recycling** and **disposal with the least possible impact on the environment**, is therefore one of the foundations of the strategic plan of the Hera Group.

Being socially responsible means operating so that the three aspects of sustainable development are taken into consideration:

- **economic responsibility**: working so that the company choices not only increase the value of the industry in the short term, but are able to guarantee business continuity in the long term through application of an advanced model of corporate governance. Basically, the economic dimension concerns the capacity to generate income, profit and work; economic equilibrium in the industrial management of the services supplied by the Hera Group is an essential objective of sustainable development;
- **social responsibility**: promoting ethical behaviour in business and reconciling the legitimate expectations of the various parties involved in respect of common shared values. Social responsibility, intended as the possibility of guaranteeing conditions of wellbeing and opportunities for growth evenly distributed throughout the area, as well as respecting human and labour rights, is directly rooted within the daily activity of a group like Hera which provides essential public services;
- **environmental responsibility**: managing to produce while reducing the direct and indirect environmental impact of its production, in order to defend the natural environment for the benefit of future generations. Basically, the environmental dimension of sustainable development is to be understood as the ability to maintain the level of quality and reproducibility of the natural resources; this means it is necessary to operate with respect to the different environmental features of the area, such as taking water where this will have less impact on the environment (subsidence) and thus allow the water table to re-establish itself.

Each year the Hera group draws up and publishes the Sustainability Balance Sheet, which provides a means for accounting for, monitoring and publicising the responsible management process for sustainable development.

ECONOMIC RESPONSIBILITY. Economic objectives which are responsible in the long term.

A company pursues economic responsibility if it operates in an economically responsible way in the long term. Hera pursues this objective of sustainability and thus intends to operate so that the business choices increase the value of the company and are able to guarantee the future – in other words the stability – of the company itself. The services provided must therefore respect economic principles, as in any other industrial process. But the company's capacity to produce wealth is no less important than its capacity to redistribute it to all the subjects concerned. The Group's firm establishment in the local area means that the whole area served received derived benefits of about 840 million euros in 2004 due to the group's work. For the area of Bologna alone the economic spin-off is estimated to be 30% of the total amount.

SOCIAL RESPONSIBILITY. The social context as objective.

The Hera Group is part of a social context made up of different parties - employees, shareholders, sponsors, institutions and customers - each bringing along their own interests with respect to the company itself.

It is essential for us to aim towards objectives of social responsibility, adopting a behaviour towards these different interlocutors which is responsible in the long term.

As regards **employees**, the group focuses on staff policies, the composition of a workforce structured in an equal way and with respect for equal opportunities, with ongoing training and development opportunities (a total of more than 22,000 hours in 2004 in Hera Bologna alone), and incentivisation, and complying with stringent safety and health standards.

Towards **shareholders** and **sponsors**, Hera maintains positive, ongoing relations, offering guarantees and transparent handling of their investment.

Towards **suppliers**, Hera adopts principles of correctness, equity and impartiality in order to obtain goods and services which meet the technical, professional and environmental requirements.

The formation of the Group also required a different approach to the market of reference, which has now been liberalised in some of the sectors of activity.

Attention is thus focussed on the service provided to the **customer** and customer satisfaction, a factor of primary importance for achieving the company's objectives. Communication with customers is designed to be simple, clear and transparent with a view to providing constant and accurate information.

Hera co-operates fully with the institutions of local government and with the regulatory bodies of the services. Participation in research and development projects together with public authorities and the University is of major importance.

ENVIRONMENTAL RESPONSIBILITY. Working to protect the environment.

Natural resources are not infinite. They must be used carefully so that they will also be available for the future. For Hera this means cutting down to the minimum the environmental impacts deriving from the production processes necessary for making water and gas available for everyday use and for handling the waste each of us produces.

Our attention is thus focussed on the emissions into the atmosphere produced by the plants, vehicle noise, and the least possible dispersion of gas and water in the networks. It is also focussed on environmental education, which is fundamental for a future increase in separate waste to reduce the amount of refuse taken to the waste disposal units or incinerated so that water and energy saving become more widely practised.

We are increasingly making use of low pollutant-emission technologies such as co-generation, methane-fuelled vehicles, complex systems and filters for the treatment of fumes from heating plants and solid waste conversion plants.

Refuse collection with methane-fuelled vehicles.

In 2003 Hera sent 11 methane-fuelled waste compaction and collection vehicles into operation in Bologna. With these vehicles, the levels of emission into the atmosphere and noise have been reduced considerably with respect to the diesel-fuelled vehicles they replaced. In 2004 they were used to collect about 18% of the urban waste disposed of in skips by the people of Bologna.

Leakage in the water pipe network.

At the beginning of 2004 the operation to reduce the network pressure of most of the area in the Municipality of Bologna was concluded. The overall data available highlight a decrease - of about 50% - in the total number of leaking pipes in the summer of 2004 with respect to the same period in 2003.

District heating.

More than 30,000 inhabitants of Bologna and Casalecchio benefit from the advantages offered by district heating as regards safety and continuity of the service, while contributing to improving the quality of the air we breathe. It is estimated that for a block of 25 flats, the use of district heating instead of independent gas boilers considerably reduces the installed power (from over 700 to less than 300 kW), as well as methane consumption (a few thousand cubic metres), and leads to a lower emission level into the atmosphere.

Separate collection and waste recovery.

For the whole of 2004, the area served by Hera Bologna s.r.l covered 23 Municipalities in the Province of Bologna.

The Hera group handles waste with particular emphasis given to the environmental impact of its operations. In 2004, treated and recovered waste amounted to more than 60% of the waste handled, a figure 50% higher than the average proportion achieved by waste collection operators on a national scale. The waste disposal unit at Galliera and the incineration plant at Frullo comply with ISO 14001 and ISO 9001 standards, in confirmation of their successful management and low environmental impact. In

addition, the waste disposal unit at Baricella conforms to the standards of EMAS, the European Union's authoritative environmental certification, which will also be applied to the two new plants at Galliera and Frullo.

Protection of the environment and the population.

Technologically re-conditioned and restructured, the waste heat exploitation plant at Frullo is located in a densely populated area affected by numerous sources of atmospheric pollution.

For this reason a monitoring campaign which is a research project in itself has been started up. 5 central units will monitor air quality (presence of fine dusts and polycyclic aromatic hydrocarbons), innovative bio-toxicological tests will be done on collected samples of solid particulate, epidemiological surveys will be done on causes of death, with research also extending to data on reproduction.

12 sampling stations will investigate any traces of heavy metals and microelements in the water-soil-plant system.

PROVINCE OF BOLOGNA

THE SIZE OF THE METROPOLITAN AREA

945,000 – population of the Province of Bologna

1,000,000 - forecast of the population in 2011

60 - municipalities

228 - built-up areas

190 - industrial areas

3,700 km² - surface area of the province

210 km² - urban area

62 km² - area used by industry

METROPOLITAN DEVELOPMENT STRATEGIES

The Province Co-ordinated Territorial Programme – PTCP (Piano Territoriale di Coordinamento Provinciale)

On March 30, 2004 the Provincial Council approved the new PTCP, the Territorial Programme co-ordinated at provincial level. This programme plans the future of the Bologna provincial area, reorganising the structure of new housing and settlements in line with large-scale mobility projects, and aiming to improve social and economic conditions whilst making the most of the environmental resources.

The PTCP opposes dispersive construction throughout the provincial area and promotes urban renewal in Bologna itself. It covers a new integrated public transport network and the reorganisation of private vehicle use. It also promotes the Bologna area on the international scene, concentrating on the aspects attaining standards of excellence, as well as the protection and promotion of nature and the landscape.

Consolidating the city network

The Metropolitan Railway Service (Servizio Ferroviario Metropolitan - SFM) will be the integrated provincial public transport system by 2008. It will have 5 lines, 8 routes and 86 stops, 16 of which will be in the Bologna municipal area.

Urban development policies concerning residential areas will be put into practice mainly near the SFM stops and where all main public and private facilities and services are available. In this way, a metropolitan network will be consolidated, countering the negative effects of the disordered sprawl of settlements over the territory.

Reorganising industry

Roads are among the infrastructures that influence industry in the Bologna provincial area. But also the disorganised growth of settlements over the area also influences the development of industry. To govern these phenomena, the PTCP will examine the 190 industrial areas in the province and select 14, taking into account their position in relation to the motorway's northern loop, as most suitable for sustaining future development.

The strategic decisions of the PTCP will ensure greater efficiency in the plain area where three quarters of the provincial population live and 80% of Bolognese businesses are based.

Promoting nature and the landscape

In the unified strategy of safeguarding natural resources and landscapes, the PTCP ensures compatibility between the policies introduced and intervention promoted by the various bodies that have responsibilities concerning the environment. In particular, the PTCP deals with matters regarding the water cycle, atmospheric, electromagnetic and acoustic pollution, energy consumption, waste collection and disposal as well as the conservation and restoration of historical and natural heritage. The PTCP also defines a wide mesh of "ecological networks" and connections between natural and semi-natural spaces featuring great biodiversity.

THE METROPOLITAN RAILWAY SERVICE (SFM)

The strengthening of the public rail transport network – in particular the Metropolitan Railway Service (SFM) – is one of the pillars on which the territorial development proposed by the new PTCP rests. The SFM consists of 8 rail routes, 5 of which being circular lines passing through Bologna's central station. Underpinning the project is the reorganisation of the metropolitan rail transport system through regular services based on a new system of stations along the existing railway lines. In 2008, when it is fully functioning, the SFM will have 86 stops, 16 of which will be in the Bologna municipal area. Trains will run every quarter of an hour, more frequently during the rush hour and on the more popular lines.

Links between the railway network and towns and villages are considered of vital importance in planning the various stops. At provincial level, the PTCP notes the greater potential for development in the places served by the SFM. At local level the importance given to integration between the SFM and other systems of public and private mobility shifts the attention towards enhancing their role in the territorial and urban context.

- 8 - routes of the Metropolitan Railway Service (SFM)
- 350 km - length of the network, 280 km of which is in the provincial area
- 86 - total stops, 16 of which are in the Bologna municipal area
- 22 - new stops, 8 of which are in the Bologna municipal area
- 3.5 km - the average distance between stops
- 160,000 - potential users a day

THE NORTHERN LOOP

The planned motorway section covers about 40 km, in a semi-circular shape on the northern plain. This area stretches from Lavino di Mezzo, a subdistrict of Anzola Emilia, in the west, and Ponte Rizzoli, a subdistrict of Ozzano Emilia in the east. The current route of the motorway, will be demoted and will reinforce the by-pass, serving the central urban areas and the functional structures located along its route (airport, trade fair, wholesale fruit and vegetable market - CAAB). The new section of motorway will serve the main logistical concentrations directly (Interport, the Centergross wholesale centre) and the inter-municipal industrial areas, which are expected to grow through use by a larger number of goods haulers. In order to reduce the impact – noise, air pollution and changes to the landscape - whilst protecting both the inhabitants and the territory affected by the motorway, the plan includes an environment project. This will involve the development of a wooded belt 120 m wide, planted specifically to be in keeping with land use in the area. There will also be other environmental measures covering a distance of up to a kilometre on each side of the new section of motorway.

- 40 km - length of the new Northern Loop
- 21 - large areas served by the motorway – bypass system
- 10% - less of the network congested than at present
- 120 m - width of the green belt involved in the environmental project
- 990 million euro - the overall cost

PARTNERS OF THE eBO COMMITTEE

FONDAZIONE CASSA DI RISPARMIO IN BOLOGNA

Actions, ideas and values which leave their mark.

The Fondazione Cassa di Risparmio in Bologna has always been a point of reference for the city, the surrounding area and its inhabitants.

The work it does to support the institutions, the authorities and the private associations of public utility and voluntary groups is an integral part of the process of development of the community and the historical, cultural and production identity of Bologna.

THE FOUNDATION'S MAIN AREAS OF ACTIVITY

Art and interventions connected with art.

The initiatives within this sector include the restoration and enhancement of monuments and the architectural and artistic heritage; promotion of exhibitions, mainly housed in the headquarters of the Foundation's Collections or in Palazzo Saraceni; support for artistic projects linked to music, dance and the expressive arts in general; museum initiatives focussing on the distinctive features of the local area.

Cultural assets and activities.

These initiatives include support of events promoted by local institutions, particularly those for young people, avant-garde and experimental theatre productions, projects promoting the use of Bolognese dialect; support for editorial initiatives of major cultural value.

Education and training, scientific and technological research.

All educational and training stages are supported in the activities of the Fondazione Cassa di Risparmio in Bologna, ranging from primary and secondary education through to university and postgraduate training which opens the doors to the world of employment.

Voluntary work, philanthropy and charity.

The Foundation promotes a number of initiatives in the social sector. In particular it provides major support for national and local Associations and Charities in the sector of voluntary work.

Public health, preventive and rehabilitative medicine.

Interventions in this sector are designed to integrate the health and welfare system of the Province of Bologna, contributing to an improvement in patients' quality of life and investing in the technological and practical improvement of structures and services, the purchase of increasingly advanced clinical and diagnostic equipment and the promotion of medical research.

HERA

1. Presentation. HERA IS A COMPANY PROVIDING CITIZENS WITH PUBLIC SERVICES.

What is Hera? Hera is the second largest multi-service group in Italy and the outcome of the first major operation aggregating companies involved with public services in Emilia-Romagna.

What does Hera do? With its 5,000 employees, Hera operates in the energy, water and environment sector to serve about 2,200,000 people in the provinces of Bologna, Ravenna, Rimini, Forlì-Cesena, and - as from January 2005 - Ferrara.

Hera has been quoted on the stock exchange since 26th June 2003.

The business and organisational model of the Hera Group is highly innovative. It was the first proper "Public Services Industry" to be set up in Italy.

ENERGY

Gas: distribution and sale of natural gas and LPG.

Electricity: distribution and sale.

District heating: the cleanest and most efficient system for heating interiors and producing hot water.

Geothermal power: an "Integrated Energy System" which makes use of renewable energy sources (**Geothermal power**) and sources of heat recovery (heat produced by waste incineration), together with a traditional system of heat production which makes use of fossil fuels (methane gas) to cover "peaks" in heat demands whenever necessary.

INTEGRATED WATER CYCLE

Catchment: collecting waters from the environment for human, domestic and industrial consumption.

Drinking water treatment: process to make water taken from the environment drinkable.

Distribution: of drinking water to consumers by means of a system of tanks and piping.

Collection: through the sewerage network, the waters collected through the waste pipes are conveyed via pumping stations to water purification plants.

Purification and return: used to clean the water after domestic and industrial use, the water purification process is fundamental for protecting the natural environment since the purified water is sent back into the environment and returns to circulate in rivers and seas, etc.

ENVIRONMENT

Environmental operational services: waste collection, street cleaning and washing.

Waste treatment: recycling and disposal.

2. The principles: **FIRST PEOPLE, THEN ACTION.**

Gas, water, electricity and environmental services are all indispensable for families and for Hera this responsibility means **quality** first of all. A fundamental basis for quality is a continuous and constant focus on **innovation**, which allows renewable resources to be used by means of increasingly developed, efficient and sustainable processes.

Innovation guarantees the supply to the citizen of increasingly practical and extensive services for a better quality of life.

Responding rapidly to customers' needs and queries: **dynamism** is a crucial factor for Hera. The extensive and systematic structure chosen by the Hera Group is in fact designed to bring the company close enough to its local area to listen to customers' demands and thus respond more rapidly.

Open and transparent **communication** is fundamental for Hera.

Informing clients about the services and making them more aware about the environment and the right way to achieve "a more aware consumption of Hera's services" is essential for our Group. It is only in this way that we can all play a leading part in improving the area where we live, placing **people first, then action**.

3. Key figures. **THE NUMBERS WHICH DESCRIBE HERA.**

1,912,000,000 > m³ of gas distributed

1,639,000,000 > production value in euros

206,000,000 > m³ of water sold

30,000,000 > km travelled by our vehicles each year

2,700,000 > tons of waste treated

2,200,000 > population served

451,000 > tons of waste treated in the waste incineration plants

20,700 > km of aqueducts

9,870 > km of gas pipes

5,000 > people on the Hera staff

2,286 > GWh of electricity sold

154 > partner municipalities

30 > % of the total waste is separate waste

13 > companies belonging to the Hera Group

1 single mission

AEROPORTO G. MARCONI DI BOLOGNA

As one of the first in Bologna to tackle the problem of airport impact towards the end of the 1980s, convinced as we were that protection of the environment is an essential pre-condition for development, we have accepted the challenge for sustainable development.

Sustainable development.

- What is at stake for the area.
- The advantages of development.
- Employment and wealth can double every 10 years: each million passengers generate about 4,000 jobs.
- Better environmental conditions: creation of resources and know-how to be dedicated to the environment.
- The costs of "non-development": loss of competitiveness and growth, fewer jobs, worse environmental conditions (lack of resources and know-how).
- How to reach our airport's objective of sustainable development ... right back at the beginning of the 1990s we decided on a balanced approach: economic, social and environmental development.

Method recognised today on an international level, by the ICAO and by the European Union.

Balanced approach: the main stages.

Noise abatement with the most effective combination of:

- technological development (motorisation-aerodynamics): March 2002 - in progress;
- flight procedures (initial climb and exit taxiways, preferential departure routes): contraventions report in operation;
- airport infrastructures (taxiway for runway 30 with holding bay: as from January 2000; extension of runway and rapid exit taxiway: 2nd July 2004);
- noise monitoring (integrated radar tracking): since November 2002;
- sound-absorption barriers (noise generated at ground level): in progress, completion date July 2005;
- ISO 14001 certification: issued 25th March 2005;
- building planning (acoustic zoning): approved January 2003;
- environmental communication: permanent.

Bologna's airport today: managing development.

Services objective:

- traffic capacity: satisfying demands for transportation;
- quality of services: connections, efficiency, punctuality;
- services for the public: Retail, Help Phone, Children's Club, Touch routes, Airport Events (as part of ISO 9001-certified quality system);

Safety objective:

- safety: safety of airport and infrastructure operations, SMS implementation;
- security: protection from unauthorised interference.

Environment protection objective:

- integration with the local area with a view to sustainable development.

For several years now the most modern and complete system of airport noise monitoring integrated with radar tracking has been in operation at the Airport of Bologna. Co-financed by SAB and Aeroporto di Bologna, this system is managed by SAB and monitored by ARPA, in compliance with current regulations.

East (city) side take-off procedures and anti-noise optimisation lanes. It should be noted that the noise abatement procedure also allows for a reduction in flight times, cutting down fuel consumption and emissions into the atmosphere, thus optimising all environmental requirements.

[captions: green = ideal performance, yellow = caution zone, red = contravention].

Following contravention reports, many aircraft have altered their take-off to comply with noise abatement procedures.

[caption: The extension of the runway has allowed for an average noise reduction of 2 decibels].

Environmental management system certification ISO 14001.

In 2005 the managing company of Bologna's G. Marconi Airport obtained Certification as required by the international standards UNI-EN-ISO 14001/1996.

With this environmental certification, the external standards authorities Cermet and Tuv Italia certified SAB's long commitment to the protection of the environment and the sustainable development of its activities and infrastructures on the basis of special inspections.

SAB, one of the few Airport Management companies in Italy to have the prestige of this official recognition, will continue its complex processes of airport management with a view to constantly improving its environmental performance and working towards environmentally sustainable development.

Objectives for further improvement in air transport.

- Noise: reduce noise affecting the area by 50% by 2020;
- Air quality (local): reduce emissions of NOx by 80% by 2020;
- Global climate change: reduce consumptions and subsequent emissions:
 - 6-12% by 2020: modernisation of the air traffic control system
 - from 4.5 to 4 litres/100 pax/km by 2008: motorisations
 - 50% overall reduction of CO2 emissions and consumption by 2020.

The benefits of air transport.

The air transport industry generates more than 28 million direct and indirect jobs world-wide, as well as a further significant percentage of induced employment. It transports more than 1.8 billion pax/year. It directly generates more than 4.5% of the world's GNP, reaching 10% if we include that generated by the tourist market.

ARCHAEOLOGY AND THE G. MARCONI AIRPORT

It is with great satisfaction that the G. Marconi Airport presents the results of its co-operation with the Archaeological Heritage Department of Emilia-Romagna and "La Fenice Archeologia e Restauro".

Triggered by the archaeological findings which emerged following works for excavation and extension of the runway and connected operations, the co-operation followed the operative line of "preventive archaeological protection", avoiding inconvenience as far as possible and limiting the suspension of works.

On the occasion of the reopening of eBO, the G. Marconi Airport would like to thank those who took part in the initiative presented here:

Scientific Direction: Archaeological Heritage Department of Emilia-Romagna (Luigi Malnati, Caterina Cornelio Cassai).

Excavation and research: La Fenice Archeologia e Restauro S.r.l.

Ideas for exhibition and illustrative panels: Archaeological Heritage Department of Emilia-Romagna (Caterina Cornelio Cassai); La Fenice Archeologia e Restauro S. r. l. (Claudio Negrelli, Laura Pini).

Reconstruction models: La Fenice Archeologia e Restauro S. r. l. (Davide Longhi, Maurizio Molinari).

INTERCONTINENTAL BOLOGNA

350 metres make all the difference. With Bologna Airport's new runway, you may fly across the ocean to reach the North American Coast, the Caribbean, South Africa and the Indian Ocean. Bologna and Emilia-Romagna are now connected directly without stopovers with a number of scheduled intercontinental flights going all over the world.

This is a strategic choice in order to meet the demands of the residents and companies of the region who require an efficient and modern network of communication, able to follow market developments and comply with local demands for internationalisation.

In terms of safety, operating capacity and noise levels, the advantages are:

- long-range flights of up to 5,000 sea miles;
- noise abatement;
- optimisation of the airport's operational services.

New York – Cancun – Capo Verde – Havana - La Romana – Mombasa – Zanzibar – Bangkok

FONDAZIONE DEL MONTE DI BOLOGNA E RAVENNA

The Fondazione del Monte di Bologna e Ravenna was founded in 1991 following the merging of the Banca del Monte di Bologna e Ravenna with the Cassa di Risparmio di Modena. It is the ideal continuation of the ancient *Monte di Pietà di Bologna*, set up by the Franciscan monk Michele Carcano and authorised by city government on April 22nd 1473.

The Foundation pursues aims of social solidarity, contributes to the protection and development of the artistic and cultural heritage and supports scientific research by defining independent programmes and projects of intervention in the provinces of Bologna and Ravenna, to be accomplished independently or together with other public or private organisations.

The Foundation also organises its own cultural initiatives such as the publication of books, mainly on local history, cycles of conferences and cultural performances, as well as the restoration of major city monuments. The Foundation houses the activities of the *Centro Studi sui Monti di Pietà e sul credito solidaristico* (for studies about ancient Monti di Pietà and solidarity credit) and the *Laboratorio sulla storia dei centri storici urbani* (Research Workshop on Old Town Centres).

Seat: Palazzo Paltroni, via delle Donzelle 2, Bologna - telephone: 051 2962511

Webster: <http://www.fondazionedelmonte.it>

e-mail: info@fondazionedelmonte.it

CAPTIONS FOR PHOTOGRAPHS

- Palazzo Paltroni (16th century) in Via delle Donzelle, new seat of the Fondazione del Monte.
- Interior of the Oratory of San Filippo Neri (18th century) where the cultural activities of the Fondazione are held.
- Guido Reni, *Arianna*, restored and offered to be exposed at the National Picture Gallery of Bologna.

The city restored

CAPTIONS FOR PHOTOGRAPHS

- 1997. Restoration and re-location of the fresco *La parabola del banchetto alle nozze di Cana* by Bartolomeo Cesi (16th century) in the refectory of San Giovanni in Monte, now Aula "Giorgio Prodi" of the University of Bologna.
- 1997-2000. Restoration of the paintings and the sculptures by Alfonso Lombardi housed in the Oratory of Santa Maria della Vita and of the paintings of the adjacent Sanctuary (17th-18th centuries).

- 1998-99. Restoration of the *Polittico* by Paolo Veneziano (about 1340) and its re-location in the church of San Giacomo Maggiore.
- 1998-2001. Restoration of the *Rocchetta* of the Torre degli Asinelli (15th century), the Torre Garisenda (12th century) and re-location of the seventeenth-century statue of San Petronio by G. Brunelli.
- 1999. Restoration of the façade with terracotta portal of the church of Corpus Domini.
- 1999-2000. Restoration of the façades of Palazzo d'Accursio overlooking Piazza Maggiore and Via Ugo Bassi.
- 2001. Restoration and lighting of the Voltone del Podestà.
- 2002. Restoration and lighting of the entrance archway to the Sanctuary of the Beata Vergine del Baraccano (1491) in Via Santo Stefano, and the former Church of the *Conservatorio delle Putte*, now the local district meeting room of the Quartiere Santo Stefano.
- 2002-2003. Restoration of the seventeenth-century Portico dei Mendicanti in Via Albertoni.
- 2003-2004. Complete restoration of the interiors of the church of San Vincenzo at the Eremo di Ronzano and recovery of the surviving Renaissance frescoes (15th – 16th century).
- 2003-2004. Restoration of the Ponte Nuovo bridge known as the "Ponte della Bionda" (17th century), on the Navile canal in Via dei Terraioli.
- 2003. Complete restoration of the interiors of the Church of SS. Gregorio e Siro (16th – 17th century).
- 2004-2007. Complete restoration of the frescoes and interiors of the Church of San Giacomo Maggiore (15th and 17th century).

Social initiatives and scientific research

Assistance to elderly people

In January 2000 was activated the *Progetto Anziani*, an experimental programme providing house assistance to elderly people who are not self-sufficient. It is financed by Fondazione del Monte and it has the dual aim of restoring dignity to the elderly by allowing them to remain in their own homes and relieving their families from having to provide help for twenty-four hours a day. The programme provides between 4 and 24 hours of assistance per day at extremely low cost for the family giving a more competitive and efficient service than public one. In March 2005 there were 736 elderly people involved in the programme. The average amount of daily assistance provided per patient was 6 hours and 42 minutes and the average monthly cost was 1,264 euros, 947 euros of which to be paid by the Foundation and 316 by the families themselves.

On January 2006 the Foundation could provide a new operating intervention plan for the assistance to elderly people.

Other initiatives in the social sector

The Foundation supports important interventions in the social sector, through its contribution to the setting up of:

- The new Oncological Sciences Institute established by ANT – Italy's National Cancer Association.
- Multipurpose Day Centre for family support belonging to the Fondazione Santa Clelia Barbieri in Vidiciatico.
- Reception centre at the parish church of San Giovanni Battista di Calamosco.
- Clinic at the "Hospice Mariateresa Chiantore Seràgnoli" providing hospitalisation and treatment for terminally-ill and progressive patients.
- Residential facilities at "Casa Maria Domenica Mantovani" for treating psychological and social disorders run by the Cooperativa Sociale Nazzareno.

Scientific Research

The Foundation has always supported scientific research projects intended to community well-being as, for example, the three-year research project promoted by Hospital S.Orsola-Malpighi for the development of molecular imaging. With the contribution of the Foundation has been possible to purchase the first PET Scanner in Italy, an innovative instrumentation for cancer early diagnosis. The contribution to the University of Bologna Operative Units of Gastroenterology, Internal medicine Service for Metabolism and Infectious Diseases will support a project for both primary and secondary prevention, and care, of digestive system cancers. The study will allow some effective preventive measures as well as the development of a culture towards a disease and its treatment.

The Hematology Institute "L. e A. Seràgnoli", that was already supported by the Foundation in the past, will receive a contribution for the project of research about "Genetic Alterations in leukaemia and their impact on prognosis and therapy", dedicated to the development of new diagnostic strategies and biotechnological platforms for diagnosis in cancers and hemopaties-leukaemia.

The Centre for the study of Coma, that has already received an important contribution to purchase its equipments, will receive new funds for the research about "Severe Brain Injury (Vegetative State and Minimally Conscious State). From Awakening functional exploration to the facilitation of Consciousness" that will be realized at "Luca De Nigris Awakening Home" in Bologna.

1.

The public transport company ATC S.p.A. serves the towns of Bologna, Imola, Castel San Pietro Terme and Porretta Terme as well as providing a suburban and out-of-town service throughout the province. The company is owned in part by the Bologna Municipality and in part by the Bologna Provincial Administration. Over the last few years the management of public transport has been integrated with complementary services and activities for transportation, including management of street parking and structured car park facilities, traffic and parking control, mobility management and car sharing, educational activities with schools, new services and systems of information. In these last years ATC has made a major commitment to the environment, with the gradual renewal of the fleet and the inclusion of vehicles with very low environmental impact such as electrically-powered buses, hybrid and methane-fuelled vehicles and trolley buses. Due to the quality of the service, customer orientation and the initiatives of promotion and loyalty incentivitation, ATC has an expanding clientele with more than 31,000 annual season-ticket holders in 2004.

THE ATC TRANSPORT SERVICE

The area covered by ATC extends for about 3,700 sq. km, with more than 180 bus routes including city, suburban and out-of-town bus services. One of the firm's priorities is guaranteeing a regular and punctual service - in 2003 99.8% of the services ran as normal and 77.6% of buses were no more than 5 minutes off the scheduled times.

CAR SHARING (IO GUIDO – CARATC)

The Car Sharing project involves a group of people using a fleet of cars. The Ministry for the Environment and Bologna Municipality have promoted this initiative and provided the necessary financial resources, commissioning ATC to manage the service.

LOYALTY INCENTIVATION FOR THE CLIENTELE

For several years ATC has had a special policy for loyalty incentivitation of the clientele based on defining special fares for different customer targets and dedicated promotional initiatives. More specifically, past and present customers of personal annual season tickets benefit from a range of discounts and special terms including insurance against mugging, discounted holidays, pension funds, concerts, gadgets and prizes, etc. This has led to a huge increase in sales, thus making direct marketing initiatives possible (mailing, telephone sales etc.) which are highly effective and target-based. ATC has eight transportation centres (ATCITTA) and more than 1,200 sales points in Bologna and the surrounding province.

2004 DATA

Area covered: 3,700 sq.km.

km of routes available:	37,135,245
including	
city service:	19,240,546
suburban service:	6,696,431
out-of-town service:	10,930,192
other services:	268,076

Rental: 104,430

Residents in the area served by ATC: 941,500

Extension of the network:	3,976 km
including	
city	565
out-of-town	3,411

Number of bus routes	188
including	
city	53
suburban	18
out-of-town	120

Number of vehicles	1004
including	
trolley buses	54
electric buses	38
Passengers carried	107,100,000
No. employees	1,771
No. headquarters and depots	6
Radio-linked buses with switchboard	1,004
routed buses in city service	502
PARKING	
Car spaces handled	31,516
Parking meters	558
Supervised car parks (Tanari, Prati di Caprara, Foscolo, Marco Polo, ex-Stiassi)	5

2. ATC FOR THE ENVIRONMENT

ATC is aware of its responsibility in protecting the environment and deals with the aspects and problems connected with the safeguarding of the area from a global and dynamic viewpoint by means of a special management system certified according to UNI EN ISO 14001 standards. Its efforts are directed towards making the circulation of its vehicles compatible with respect for the urban environment. The road tram project is also designed to contribute further to creating a public transport system with low environmental impact, based on electric vehicles and methane-fuelled and hybrid vehicles. With the introduction of this type of vehicle and a careful and constant maintenance of the entire fleet, the overall reduction of pollutants emitted by ATC vehicles was about 40% between 1998 and 2003. During 2004 1,360,540 vehicle-kilometres were travelled by methane-fuelled vehicles, 1,596,725 vehicle-kilometres by electric vehicles (trolley bus, electric, hybrid with traction unit), and 650,166 vehicle-kilometres by hybrid diesel electric vehicles. With respect to 1998, the pollutants emitted by the ATC fleet were reduced by about 25% overall, and about 40% as regards the city fleet. Eco-friendly vehicles are expected to make up 48% of the entire ATC fleet by the end of 2005.

EMISSIONS TABLE UPDATED TO 2004

MAJOR PROJECTS

Methane-fuelled buses: there is a constant increase in the number of these in the ATC fleet. In 2004 a filling station was set up inside one of the company depots and works have begun on the construction of a second plant. By the end of 2005 the ATC fleet will have 100 methane-fuelled buses.

Hybrid electric/diesel vehicles: these are buses driven by an electric engine powered by an endothermic generator fitted on board. The number of 9 and 10-metre vehicles used for the city services has increased, particularly in the old city centre. By the end of 2005 the ATC fleet will have 39 hybrid buses.

Alternative/ecological fuels: experimental tests have been underway for several years with the co-operation of a number of local authorities in order to study the use of alternative fuels (water-diesel fuel emulsions, biodiesel, ultra low sulphur diesel).

CRT (Continuous Regeneration Trap) Filters: this is a technical solution which "filters" and limits pollutant emissions. CRT requires low sulphur diesel, which ATC is already using, even before the deadlines set by European legislation. By the end of 2005 there will be 176 buses with this filter.

Noise and vibration reduction: because the fleet is constantly being renewed, there has been a gradual and significant reduction in the average noise level of the vehicles. A methane-fuelled vehicle, for example, has a noise level which is about 6.5 decibels (dB(A)) below that of a traditionally-fuelled bus. Similar amounts of reduction in the average noise level have also been reached by the hybrid vehicles coming into service over the last few years. The best results in terms of reduction of noise emission (up to 20 decibels less than a diesel-fuelled bus) have been achieved since trolley buses were introduced. Their noise level is mainly due to the inevitable noise caused by the movement of the vehicle and the rolling of the tyres on the rough roads.

A further positive result will be reached when the new road tram comes into service. The special technical measures adopted guarantee very high levels of noise abatement as well as reduction in vibrations.

3. TECHNOLOGIES

Competition and the constant search for efficiency and quality has meant that the company has focussed on the strategic choice of technological innovation, aimed at support systems, operation, management, supply and control of the public transport service, as well as communication and information for the clientele.

Emphasis is placed on research, design and implementation of instruments to support, improve and optimise the activities by automating procedures, creating new methods of providing the service, and including new systems of control or value-added management.

Bus routing: the system uses GPS to keep track on the locations of the vehicles of the fleet so that signals can be sent in real time when the vehicle passes a particular stop. In this way the central operating unit is able to monitor the state of the service constantly and intervene in real time if necessary. The system also enables information to be provided as regards the times of waiting and the service itself at the stops equipped with variable message panels within the city limits of Bologna.

Hellobus: the GPS bus routing system makes it possible to find out immediately from a mobile phone or landline exactly when the bus passes any of the bus stops in Bologna (more than 1,000) even at different times and places. After entering the code of the required stop, as given on the special red sticker, the user's mobile phone will receive the required information directly from the system within a few seconds. An average of more than 2,500 messages are sent each month.

Variable message panels: again thanks to the bus routing system, which locates the position of the buses in service, the times of the next few buses are displayed in real time at about 150 different city stops.

Ticket dispensers: these have been installed on the entire fleet serving Bologna and Imola, as well as on the local FBV trains. They issue tickets valid for an hour from the time of issue and are used by more than 400,000 passengers each month. There are also 29 fixed ticket dispensers located around Bologna and its province, as well as 20 at the FBV stations. These latter are able on request to issue various types of ticket for use on the public transport service.

WOB (Welcome on board): ATC has installed 240 innovative audio-video devices on board its vehicles, designed specially for the bus, to provide service information such as the next stop and ATC initiatives, as well as news in real time, music videos, advertisements and items of interest. (*)

SMS NEWS: annual ATC season-ticket holders have the option of receiving text messages with updates on the services, promotional offers and information about ATC routes, particularly route changes, street demonstrations, strikes, special offers etc.. SMS news is sent in real time to all season-ticket holders who give ATC their mobile phone number. More than 18,000 people did this at the start of 2005 and more than 210,000 messages have been sent.

AUTOMATIC BUS LANE MONITORING SYSTEMS

The use of special bus lanes is important for setting up efficient traffic control plans. Lanes reserved for buses only make public transport rapid and effective and thus attract more customers, reducing the amount of private traffic at the same time. Unauthorised vehicles must be prevented from using the bus lanes, yet a 24-hour surveillance of all the bus lanes by special staff would be too costly. It is therefore necessary to have an instrument which is both flexible and efficient to identify vehicles and provide notification of this type of traffic offence.

For this purpose ATC has set up a lane control system with the aid of technologically approved infrastructures whose use is already in line with official standards. It should be pointed out that these systems also become a deterrent, with the objective of keeping the special bus lanes as free as possible in order to optimise and thus increase public transport.

4. TRAMS ON TRAMLINES IN BOLOGNA

Between October 1880 – when the first horse-drawn city tram route was inaugurated – and 1963, Bologna had a system of trams running on tramlines which underwent various developments over the years. The original aim of the system was to serve the city by guaranteeing passengers the maximum possible comfort with the technology of the time. At the beginning of the century (1904) the (*) city tram lines were electrified. In 1924 the city tram service was municipalised and expanded with the renewal and modernisation of systems and vehicles. In the years which followed, the Bolognese tram network extended practically throughout the old city centre. (*) After the second world war (*) the tram network no longer (*) responded to the needs of the people, weakened as it was by wartime damage and by the wear caused by an increase of the service during the war. Because of the high cost of modernisation and its inability to meet the new needs of the city, the tram network was gradually replaced by buses and trolley buses as from 1955. The last tram in Bologna did its last journey in 1963.

CAPTIONS FOR PHOTOGRAPHS:
PHOTOGRAPH 1

(*) The first horse-drawn city tram line was inaugurated in October 1880. This type of vehicle was intended for an elite clientele, guaranteeing the greatest possible comfort for the time.

PHOTOGRAPH 3

In 1924 the tram service was municipalised. By now the tram had become a means of mass transportation.

PHOTOGRAPH 5

After 1958, trams were gradually replaced by buses and trolley buses because of the high cost of modernisation and the fact that they no longer responded to the new requirements of the city.

5. TRAMS IN BOLOGNA

The various stages of Bologna's road tram project.

2000

October: project sent to the Ministry of Transport and Navigation, Headquarters of the Traffic Control Authority (MCTC).

2001

January: procedure for Environmental Impact Assessment begins.

February: CIPE deliberation of authorisation for the project no. 15/01 dated 01/02/2001.

April: project authorised by the Ministry of Transport and Navigation

May: CIPE deliberation of authorisation for the project no. 76/01 dated 03/05/2001.

June: Programme Agreement procedure started.

2002

September: conclusion of procedure for Environmental Impact.

December: publication of tender notice and start of pre-qualification stage for the competitors.

2003

April: conclusion of pre-qualification stage for the competitors and call for tenders.

June: approval and conclusion of the Programme Agreement.

August: presentation of the bids.

2004

February: allocation of the tender and signing of the contract.

December: consignment of works. Start of the executive planning and alterations.

Environmental Impact Study.

The road tram project involves a system of transportation which also improves the quality of the areas affected. The building of the infrastructures needed for the tram will in fact be backed up by actions aimed at rationalising the city's public transport network, improving its efficiency and quality also in terms of environment and urban furnishing.

Besides the lack of pollutant gases, the use of road trams also means a great reduction in the noise level both inside and outside the vehicles. This service will be high-frequency and to maintain the planned frequencies the trams will have reserved or protected lanes where possible, also using special traffic lights to give precedence to public transport at crossroads. The reserved tram lane may be raised with respect to the level of the road.

The tram stops, whose layout has been studied in detail, will be distributed in the best possible way throughout the area, respecting existing positions and creating hubs with Bologna's central railway station, the Metropolitan Railway Service and the car parks of San Lazzaro and the Manifattura Tabacchi. In the city centre, the stops will be constructed on a level with the pavement – with a small ramp for the disabled – while in the suburbs they will be raised with a "safety" pavement.

Work on the road tram infrastructures is planned so that streets will not have to be closed for long.

6. AN INNOVATIVE SOLUTION

Road trams in Bologna: a joint project.

As from 2000, Bologna Municipality, Bologna Provincial Administration, San Lazzaro di Savena Municipality and ATC have been promoting the project for a new system of public transport to serve the city and the surrounding areas. The aims of this project are:

- to guarantee a public transport service which is efficient, regular and comfortable, provides a practical alternative to the private car and is integrated with the other public transport systems;
- to contribute to the urban development of the areas affected by the passage of the new vehicle.

The technical solution.

The tram project has materialised in the shape of a system of transportation based on an electrical vehicle with a high transport capacity which runs on rubber tyres instead of iron tracks like traditional trams. In addition, thanks to an assisted driving system, this vehicle can operate both in its own lane

with guided driving and on ordinary roads just like a traditional trolley bus, with the added value that it can also be driven manually for short stretches off the electricity network since it has energy storage units.

Design and comfort.

The new trams will be highly distinctive with clean, aerodynamic lines, silent operation, large windows, doors at road level and precise alignment with the tram stops (even the disabled will be able to enter without assistance) which will also make access easier for children and elderly people. Maximum comfort will be guaranteed by silent operation, air conditioning, suspension systems, seating, improved lighting and a smoother journey thanks to electronic driving control.

An environment-friendly vehicle.

Over the last few years, ATC has concentrated on making its fleet operate with full respect for the urban environment. The road tram project is another contribution to setting up a public transport system with low environmental impact, based on electric, methane-fuelled and hybrid vehicles.

11. THE BOLOGNA – VIGNOLA RAILWAY (FBV)

On October 28th 1938 “the first train set off from Casalecchio at 3.30 p.m. amidst cheers and applause from the festive crowd”, in the words of a local report of the time. After an interruption of thirty-five years, the Suburbana Bologna-Vignola started up again on September 15th 2003, with a train connecting Bazzano with Bologna’s Central Railway Station for the first time to become an integral part of the Metropolitan Railway Service. On September 19th 2004 the extension of the line between Bologna and Vignola was inaugurated, thus completing the whole line. Linking up with Bologna’s Central Railway Station, the FBV provides another response to the needs for transportation of residents living between the city and Bazzano and, though beset by numerous difficulties, has finally achieved the goal of a number of authorities and companies - ATC, the Regional Council of Emilia-Romagna, Bologna Provincial Administration, Bologna Municipality, the Municipalities of Casalecchio di Reno, Zola Predosa, Crespellano, Bazzano, Savignano sul Panaro and Vignola, as well as the Suburbana FBV company which runs the service.

The new line.

The new high-speed link between Bologna’s Central Railway Station and the area to the west of the city is a better and cheaper alternative to the car for all those who wish or need to reach the city quickly and safely. The line measures 33 kilometres, with 17 stops of which 7 are completely new, with a total journey time of just over 50 minutes.

The Bologna-Vignola line starts from Bologna Central Station, stops at Borgo Panigale and Casteldebole, passing through Casalecchio (from where the old railway line started) and runs alongside the main road to Bazzano, via Ceretolo, the Casalecchio Sports Stadium, Riale, Pilastrino, Zola Predosa and other stops as far as Crespellano, Bazzano, Savignano sul Panaro and Vignola (the latter two in the Modena area). Having now been in operation for 18 months, the restored FBV has been considerably successful, even carrying an average of 2,600 passengers on week days (with peaks often exceeding 3,000). Surveys have shown that 36% of these passengers have chosen to make use of the new opportunity offered by the train instead of their private car - a “mode shift” which is a sign of truly remarkable success for local rail transport.

Currently served by diesel trains, in a few months’ time the line will have air-conditioned electric trains with access for the differently able.

In the future, in accordance with the available financial resources, the service is to be expanded, particularly at peak times initially, in order to satisfy the growing demands of the clientele.

FS – FERROVIE DELLO STATO

To improve transportation around Bologna, Ferrovie dello Stato, the Italian Railways company, have set up four major projects:

- high-speed to bring the cities of Italy closer
- a new station for the new high-speed trains
- a new metropolitan railway service and new city stops
- new technologies for safety on the railways

Together we get the whole country moving

Ferrovie dello Stato, with 102,000 employees, 16,000 kilometres of railway lines, 9,200 trains in operation every day, 63,000 vehicles making up the fleet, are a modern, efficient, strong, authoritative and competitive company in Italy today. With an investment of 10,000 million euros in 2005, Ferrovie dello Stato are also the country’s largest investor.

The Group is highly integrated, consisting of a strategic holding company for co-ordination and control and a number of highly independent operational firms.

The companies in the FS Group – 36 in all – respect the logic of role specialisation.

The main companies are RFI, responsible for the infrastructure, and Trenitalia which guarantees the transport services.

The other companies include TAV, constructing the High-Speed project; Italferr, the Group's engineering firm; Ferservizi, providing services common to the firms of the Group; Ferrovie Real Estate, which manages and exploits the railway assets; Grandi Stazioni, which manages, improves and enhances Italy's main railway stations; Centostazioni, operating with similar purposes in 103 stations in the larger towns; Sogin, which operates in the specific sector of public road transport and manages the replacement and integrative transport services for Trenitalia.

In 2005 Ferrovie dello Stato celebrated their hundredth anniversary.

RFI

RFI, Rete Ferroviaria Italiana, is the infrastructure firm of the FS Group which has the task of designing, constructing, putting into operation and managing the national railway infrastructure; guaranteeing train circulation safety on the entire network; guaranteeing that it is kept running efficiently; and developing systems and materials technology.

RFI has been assigned total control of the capital of TAV, the firm commissioned to construct the high-speed line system.

RFI has an equal share (50/50) with its French counterpart RFF in the capital of LTF, the mixed firm commissioned to develop the projects and supervise the construction of the mountain passage on the new high speed/high capacity Turin-Lyon line.

Directly and through dedicated companies, RFI is involved in an extensive programme of renovation of existing stations and in constructing new ones, which become part of the urban fabric with the creations of leading contemporary architects.

TAV – Treno Alta Velocità SpA

RFI set up this company to design and construct more than 900 km of new high-speed lines between Turin and Padua, Milan and Naples, and Genoa and the Po Valley network.

The activities of TAV are integrated within RFI's programmes to expand the infrastructures on the main lines and the metropolitan hubs with the extension of high-speed lines between Italy and the rest of Europe. TAV's specific role is to organise and co-ordinate the work of firms or consortiums of firms involved in the completion of operations.

TAV operates according to fundamental principles of socio-environmental policy: transparency; agreements with the institutions and attention to local communities; environmental sustainability of the project throughout its lifecycle; protection of the cultural and archaeological assets; increasing the value of interventions to reduce the impacts; health and safety of the workers on the sites; quality and safety of the infrastructure; competitiveness of the railway system to rebalance the transport system; constant improvement of performances in terms of health, safety and reduction of impacts.

The Bologna Hub

The route

The city section of the high-speed line crosses Bologna from south to west, running underground for 60% of the way. The overall length of the city section is 17.8 km. From the Savena-San Ruffillo district the line reaches the new station for high-speed trains. From here it continues towards Milan, appearing over ground at Prati di Caprara. After crossing the river Reno, the route runs alongside the existing Bologna-Milan line as far as the Lavino stream, where it joins the new high-speed line in the area of Anzola Emilia.

The main works

The project involves the construction of 8 artificial tunnels, 2 natural tunnels, 2 large chambers, 2 viaducts and 2 bridges.

Among the main works:

- The 6-kilometre **double tunnel** between San Ruffillo and the Central Railway Station. To build this, two "mechanical moles" of considerable dimensions (about 20 metres long) will be used. These machines, also known as mechanical shield bores, allow progress of 10-15 metres per day to be made instead of the usual 2-3 metres with traditional excavation methods.
- **Two new bridges** to cross the river Reno, located next to the present railway bridge of the existing Milan-Bologna line. The first bridge, north of the existing one, will house one of the two tracks of the new high-speed line (the other will join the existing bridge). The second bridge, already built, today provides double track connection between Bologna's central station and the Bologna-Pistoia line (the "Porrettana").
- **Interconnections.** The high-speed line is connected to the existing line by means of two interconnections. The San Ruffillo interconnection consists of two tunnels located within the council

boundaries of Pianoro and San Lazzaro di Savena; that of Lavino is located entirely within the municipality of Anzola and is made up of two branches linking the new high-speed line to the encircling "Linea di Cintura" and the existing line. Within the hub, close to the Locomotive Depot (between the Maggiore hospital and Via Agucchi), a further two interconnections are planned - one with the Padua-Venice line and one with the line for Verona.

Expanding the Bologna hub

The expansion and re-organisation of the railway hub of Bologna, made possible by the construction of the new high-speed lines, will enable development of the Regional Railway Service (SFR) and the Metropolitan Railway Service (SFM). Within the hub, the number of trains running may be more than doubled. To optimise management of all railway traffic of the hub, an advanced technology Command and Control System (SCC) will be set up. Bologna will thus be able to re-organise and develop the entire system of railway connections.

The Metropolitan Railway Service

With the building of the high-speed line in the city, existing lines will be given over entirely to regional and local transport and freight. The Metropolitan Railway Service (SFM) will be developed, becoming a huge network of tracks extending throughout the metropolitan area and designed in particular for commuting within Bologna and between the city and its province. The eight railway lines which converge towards Bologna's Central Railway Station from all directions may also be used for special trains - as well as national and regional trains - offering 50,000 seats/day compared with 5,000 seats at present. The project includes the construction of 13 new stops, 9 of which will be within the city. At peak times, trains will run every 15/30 minutes within a range of about 30 km around Bologna, starting from the Central Station. The planned construction of Line 1 of the metro from the Fiera District to Staveco will further expand the capacity of the entire system of rail transport.

The new metropolitan railway stop inside the railway station and the terminuses of the new tramway (running east-west) in Piazza XX Settembre will help to make the Central Railway Station the main hub of interchange in the metropolitan area of Bologna.

The Milan-Bologna line

The line extends for 182 km, from Melegnano (south of the bridge over the river Lambro) to Lavino (west of the Lavino stream) across the Po Valley. To avoid taking away any more of the farmland in the Po Valley and to reduce the amount of space occupied by new infrastructures, the route chosen for the passage of the high-speed line runs parallel to the A1 motorway where possible - about 130 km, or parallel to the existing railway - about 10 km. Deviations to the route were made only where the shape of the land was such that construction next to the motorway or existing railway was not practical, for example at the crossing of the river Po, at junctions and service stations on the motorway and where there were particularly complex situations in built-up areas, industrial areas and existing infrastructures such as those in the Modena area. The project includes a stop for passenger trains along the high-speed line within the council boundaries of Reggio Emilia.

The existing railway will be integrated structurally by means of **eight interconnections** situated at: **Melegnano**, two at **Piacenza (west and east)**, one at **Fidenza**, one at **Parma**, two at **Modena (west and east)** and one at **Lavino**. Besides being necessary for the railway halt and deviation of high-speed passenger trains onto the existing line, the interconnections perform a strategic role in the expansion of freight transport.

The Bologna-Florence line

The new line, linking the new underground stations of Bologna and Florence, extends for about 80 km overall. From the station of Bologna, the stretch begins 4.884 km away where the existing line interconnects at San Ruffillo and terminates km 83,366 away at the station of Castello, where the interconnection will be made with the existing surface railway leading to Florence's S.M. Novella station. The route consists of a series of tunnels varying in length between 528 metres and 16.752 km, interspersed with brief stretches in the open constructed with bridges, viaducts, raised tracks and embankments.

The open stretches are mainly very short, except for where the line crosses the Mugello basin. In this stretch, measuring about 5 km, the route runs across the valley of the river Sieve and over the Faenza-Florence railway and the main road SS Traversa del Mugello. Here there is one of the two communication points built to deviate trains onto adjacent tracks in case of necessity. The other communication point, on the Bologna side, is planned at km 20.500. Another distinctive feature of the line is the "Posto di Movimento" located at S. Pellegrino for rescue operations, storage and maintenance of trains.

The existing railway will be integrated structurally by means of the **interconnection of San Ruffillo**. This will allow goods trains to be directed towards the Interporto freight district of Bologna-San Donato and onto the railway links for Milan, Verona-Brennero, Padua-Tarvisio-Villa Opicina and Ancona-Bari-Brindisi.

The Rome-Naples line

The line begins immediately after the Tor Sapienza district, involved in the works for expanding the Rome railway hub, close to the main ring road (Grande Raccordo Anulare) flanking the A24 Rome-L'Aquila motorway. After a bend the route continues parallel to the Fiano-San Cesareo motorway link road. It then crosses the Colli Albani area and follows the course of the rivers Sacco and Liri before crossing the river Gari. From here it runs along the valley bottom close to the Rome-Naples motorway to limit impact on the environment as far as possible. The line runs slightly uphill, passing through the hilly area of Monte Lungo, in the province of Caserta, with a series of tunnels. With a slight descent, it then crosses the plain of Volturno, reaching the north-eastern suburb of Naples at the station of Naples Afragola, almost on the same level. From here it joins the railway hub of Naples to run into Naples Central station.

The existing Rome-Cassino-Naples railway will be integrated structurally by means of **three interconnections** located at **Frosinone North** and **Cassino South**, to allow access for freight and passenger trains to the high-speed line, and at **Caserta**, to guarantee local users a high performance and capacity service which also includes connection with the Adriatic coast and the south of Italy. As from 2005, the interconnection with the existing Rome-Naples line via Formia will enable high-speed trains to reach Naples Central station along the last 20 kilometres – to be completed in 2008 – of the existing Rome-Formia-Naples line.

For the first time in Europe, the European Railway Management System (ERTMS) will be used on the high-speed Rome-Naples line. This is the new system of command, control and spacing of trains set up at European level to guarantee smooth international railway operations. ERTMS uses the GSM Railway system with which trackside signals – under the supervision of the engine driver – are received directly by the in-cab equipment and converted into circulation, spacing and braking instructions. The system has a central piece of equipment (Radio Block Centre) which transmits constantly via radio to each train the speed to be respected both according to the speed of the train and the limits set by the route or any temporary hold-ups. At the same time the train signals its position to the central switchboard.

The Turin-Milan line

The new line, about 125 km long, starts at the station of Turin Stura and terminates just before the station of Milan Certosa. The route runs very close to the south of the A4 Turin-Milan motorway as far as Sedriano. From here the line crosses the A4 and runs alongside it to the north for about 3 km to Rho. The line then turns off towards the north-east, leaving the motorway behind and after a wide curve towards the south-east, joins the existing Turin-Milan railway to enter the Milan hub.

The mainly flat area over which it passes means that there is much interference with existing roadways, leading to the demolition and rebuilding of almost all the present works crossing the motorway (overpasses, exit lanes etc). The route runs overland for most of its extension. The layout of the area is such that the new line may be built without particular difficulty, with the route exploiting the flatness of the land and flanking of the motorway to keep environmental impact to a minimum without taking any more land away.

The decision to build the new line within a corridor which already houses much infrastructure has meant that many works have had to be done in the numerous places where the new line meets the road and motorway network as well as adaptation to the water system. The works will contribute to the expansion and improvement of the infrastructural elements of a highly productive area of the country. The works planned affect the road network (motorway exit lanes, overpasses, toll booths, services areas), the water system (construction of underground water piping, optimisation of water pipe network) and the improvement of the strip of land used for the route (reduction of environmental impact, extension of viaducts where the routes cross the rivers to prevent obstruction of rivers in flood, construction of roads for civil defence etc.).

The existing railway will be integrated structurally by means of **five interconnections**: two terminal ones at **Settimo Torinese** and at **Milan Certosa** and three intermediate ones at **Santhià (Vercelli west)**, **Novara west** and **Novara east**. The interconnections are used to direct passenger trains along the original lines and freight trains on other routes.

Safety and technologies

Railway traffic safety is guaranteed by the consistent and rational development of the safety systems trackside and trainside and by the operating regulations to be respected by staff. According to data processed by CER, the Italian railways are the safest in Europe. The 16,000 kilometres of railway network, with different infrastructural and technological characteristics, on which more than 9200 trains run every day, are all equipped with safety systems appropriate for traffic characteristics and for the maximum speeds the trains can reach. The main innovative systems of management and control of infrastructure and circulation are SCC, ERTMS/ETCS, SCMT and GSM-R.

SCMT

SCMT, the Train Speed Control System, ensures that at each moment the train speed does not exceed the speed set by the system's safety settings. If the limits set by the system are not respected, the SCMT

causes the train to brake automatically. Installation of SCMT began in 2003 and by 2004 about 3000 kilometres of railway line had been equipped with this system. The objective is to cover about 10,500 kilometres of the busiest network by the end of 2007.

SCC

SCC, the Command and Control System, is the railways' most advanced system of integrated circulation management. Through SCC, the traffic is managed with electronic and computer technology handling components and equipment of a variety of electromechanical and computerised technology, by means of a single central switchboard which operates over an area stretching over hundreds of kilometres with a high density of both goods trains and passenger trains, as well as trains running at high speeds. The SCC will also be installed on the High Speed/High Capacity lines.

ACC

ACC, Computerised Central Apparatus, exploits the potential offered by electronics to give operators better operational effectiveness in normal running situations and in the management of critical situations.

GSM-R

The GSM-R system is used to support circulation management for communications between trackside staff and train staff. This will be the system of communication used for the new systems of signalling which involve in-cab radio transmission of information (ETCS/ERTMS), both on existing lines and on the new High Speed/High Capacity lines.

ERTMS/ETCS

ERTMS/ETCS controls train spacing on the special High Speed/High Capacity lines; in-cab signalling and checking that engine drivers' operations have been done correctly will be controlled by ERTMS/ETCS-Level 2.

BACC

BACC, Coded Current Automatic Block, was the first system installed on the railway network to send all the information required for safe train operation directly on board: the relative in-cab apparatus (in-cab signal repetition - RSC) detects and shows the engine driver the appearance of the light signals on the line by decodifying the current from the trackside subsystem.

SSC

The Operation Support System (SSC) is an advanced safety system for the engine driver. The system requires recognition by the engine driver of the appearance of the signal encountered by pushing the relative button on the special pushbutton pad in the driver's cabin. If the information transmitted by the transponder does not coincide with the operations of the driver, the system activates the train braking system. The same happens when the train is not stopped at a red signal or when the speed is not reduced when the system receives information requiring speed reduction.

On a national level, there will be about 6000 kilometres of commercial track equipped with the SSC by RFI, as well as more than 10,500 kilometres where the Train Speed Control System (SCMT) will be installed.