Green urban areas incorporating Sustainable Land Use

Present Situation

The distinguishing feature of Florence's particular nature derives from both its history and from the inclusion of the city's historical centre among the UNESCO heritage sites. The centre represents a one-of-a-kind social and urban accomplishment, resulting from centuries of continuous creation and includes priceless museums, churches, palaces, and properties. Hence, the challenge is maintaining a balance between tradition and development within the stratified urban context.

The new urban tools, SP (Structural Plan) and UR (Urban planning Rules), represent a complete innovation in terms of approach to planning, since they do not foresee the exclusive reuse of abandoned buildings/surfaces, but only their transformation for the city's development. The principle of planning is to rehabilitate, limiting as far as possible the consumption of new ground (so-called "zero volume") and improving the amount of the existing ecological network.

Therefore, the city is designed to contain and mitigate its pressure on the environment, also thanks to the network of green corridors (green infrastructure) identified through the compatibility of requalification and enhancement interventions, privileging the public and the private. Hence, the urban planning vision, the guidelines until 2030, are included in the SP and, in order to implement these predictions, the UR has become effective since June 2015, and six recovery interventions of the existing built heritage have been concluded, even with historic-architectural value, and another 13 strategic transformation interventions for the city are under way (the UR has a 5 year duration).

Description of the City

The city presents a very high percentage of green; almost 35% of the territory, mostly due to the presence of hills surrounding the city's densely-populated area.

The municipal territory includes a widespread green system consisting of parks, some with high historic-cultural value, and green areas, allowing almost all of the resident population to be in reach of a green space from their home at just a 300-metre distance (the guiding principle by which it should always possible to reach a green space within 10 minutes from one's home).

Fig. 1 / Green spaces

The table of the ecological network also defines the need to enhance and regenerate: the UR identifies 41 publicly owned areas for environmental requalification, with the aim of enhancing the networks' nodes.

The investment wishes to improve, enhance and mend the network rather than to retrieve additional spaces; the amount of green and its accessibility for citizens is granted, whilst the objective is to improve fruition and complexity in ecological terms, therefore allowing to accompany the requalification intervention with that of green infrastructures (i.e. a park) in what is an overall holistic view of the city.

The characteristics of Florence's built heritage do not encourage the use of green roofs or walls, except in specific cases and outside the historical centre: this means that this may be carried out in city areas besides the historical centre, or in previously authorised specific pilots. This allows the introduction of control and natural rebalancing systems of emissions and air quality, besides experimenting visual impacts sought to value the city, in wake of the largest European and international cities.

Fig. 2 / Le Murate - green walls

The UR proceeded to precise identification of the basic elements of urban ecological network: core areas, corridors, stepping stones and buffer zones and has detailed the network nodes.

Thanks to a specific "Abacus of interventions" the action measures, as well as requalification, development and realisation operational modalities of elements belonging to the intra-urban ecological network are indicated, useful during the interventions of the Municipality and of the private. By adopting these measures, the improvement of the green's eco-functions and, more in general, of the urban environment are pursued. An example of a buffer zone is the one established since 2015 for the historical centre. It covers an area of 10,480 hectares, including the hillside slopes surrounding the city on the North, South and East, and also the Northwest plain. The buffer zone is the cushion area, which surrounds the included property, whose use and development is linked to restrictions aimed at granting a greater level of protection to the property zone. The identification occurred through an innovative method, detecting 18 belvedere spots on the hills surrounding the city. Such areas represent the reference for new transformation interventions that affect the existing skyline.

The idea of developing energies capable of turning areas with under-estimated potential into attractive and interesting areas through forms of urban regeneration is inherent in the regeneration concept: the UR identifies thus 12 parts of the city for which it outlines a balance compared to the inhabitants and the public services they can enjoy (planning for a better life) and, on the basis of this, it has been possible to trace the history of a potential sustainable development, which starts from the current situation, resulting from the history of the city itself, and mindful of the equal distribution of the years of the economical boom.

The number of inhabitants varies between 4.2 and 5.4/ha for hillside areas, 10.7/ha for the part mainly devoted to agricultural crop, and varies between 35 and 95/ha for parts of the city largely occupied by housing. The population density of the UNESCO site (97/ha) is determined by the morphology of the historic fabric.

The current UR foresees the regeneration of areas, dedicating them to entertainment and leisure allocations, without areas of expansion but only through transformation of existing buildings, even through their demolition and reconstruction with a different intended purpose: two most recent examples are Ex Fiat Novoli, which provides a functional, residential, commercial, managerial, tourism and public services mix (including a park), distributed across 32 hectares, which, once completed, will be able to count on 2,900 inhabitants (estimate based on a theoretical calculation of 25 m^2 of useful gross floor area per inhabitant) with a density of about 90 inhabitants/hectare, and the Leopolda Paisiello intervention, almost exclusively residential, distributed across 6 hectares, which counts 616 inhabitants with a density of about 100 inhabitants/hectare.

Fig. 3 / The west area of the city (ex Fiat Novoli)

The regulation's focus on soil's permeability mainly led to the decrease in surface to be rebuilt in the transformation of brownfields: many of the UR's articles regulate these aspects in terms of the transformation of the built heritage, which is always at the basis of all urban planning.

Fig. 4 / Map of the population residing less than 300 metres from a green area, realised by tracing a buffer of 300 metres from the designated green. In the historical centre, 95.84% live less than 300 metres from a green area. Overall, 94.10% of the city's population lives less than 300 metres from a green area.
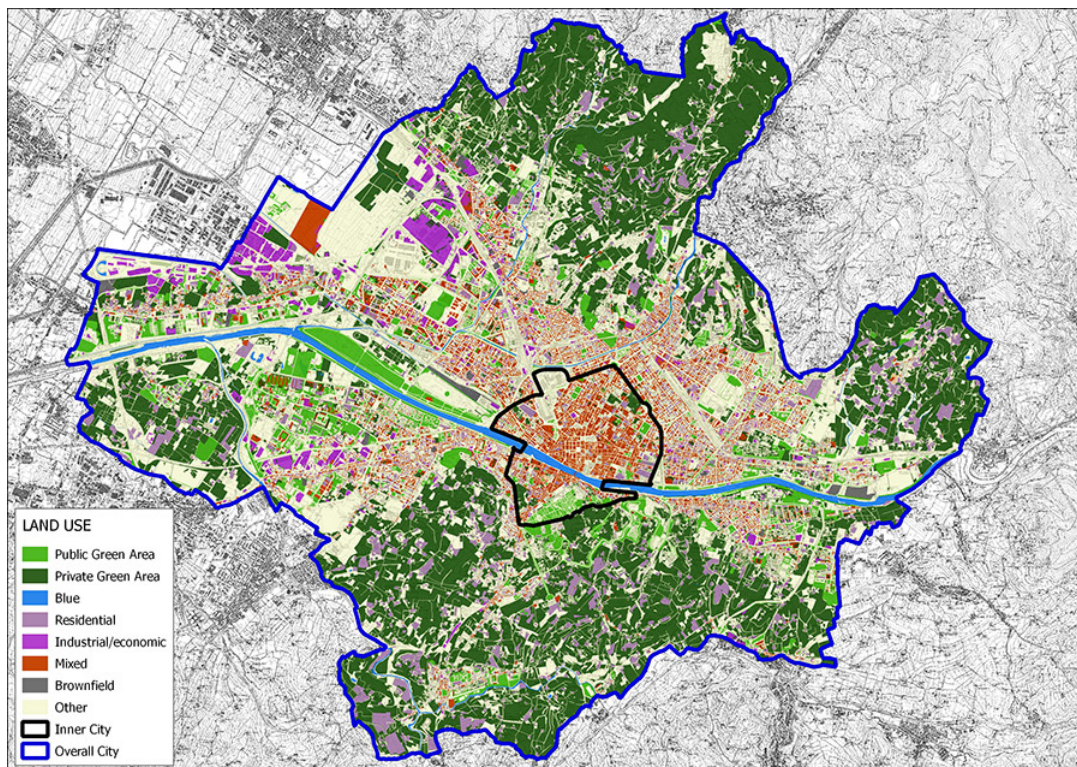

LAND USE

- Public Green Area
- Private Green Area
- Blue
- Residential
- Industrial/economic
- Mixed
- Brownfield
- Other
- Inner City
- Overall City

Fig. 5 / Land use within the city: 2016 overview map

Past Performance

In the past decade, the city has committed itself in an intense work of surveying and systemisation of data and of the existing reality for the adoption of the above-mentioned main planning and urban management tools.

For the first time, the Structural Plan granted equal importance to the system of ecological allocations as to that of mobility and collective facility systems, for the planning and management of the territory. Hence the definition and identification of ecological allocations, consisting of nodes and corridors making up the main network, formed by green elements of the urban fabric and connected to the metropolitan one.

All this has been translated into the UR, operational tool of the SP, and also represented the occasion to start reflecting on the changes that affected Florence's population structure throughout the past decade on the basis of the 2011 census data made available.

While the UR was being drafted, empty containers and brownfields were mapped as areas needing attention during the regeneration process and accomplishment of public and private actions-infrastructures-services.

The former Fiat Novoli and OGR: testimony of the abandonment of urban industrial activities, former railway freight yard, the area is regenerated foreseeing a functional mix with residential housing, activation of cultural services (New Opera House), a 10-hectare park (Novoli) and a 123,000 m^2 building, and a cultural hub project (Leopolda). Everything began from a single schematic (that even hosts a university centre), which then gave life to important public elements that characterised the transformation. In fact, through a successful functional mix of residential, commercial and managerial intended purposes, it is now a place where research for excellence translates into accomplishment (main institutions, finance institutions and the new courthouse are also based here).

The entire built area develops around a large public park, which is the real protagonist of the requalification intervention: the area has undergone a critical transformation, leading to a fast optimisation of the quality of life in the framework of the city's green policies.

Fig. 6 / Example of good practices of city regeneration: the new Opera house.

There are two aspects that always lie behind the analysis moment of renewing urban design or rehabilitation of dismissed or derelict areas: on one hand, the typical transformation from brownfield to new establishment with a different purpose, typical of the planning process and, on the other hand, the baggage of containers of historical-architectural interest of which Florence is quite rich and for which it is necessary to guide the transformation to a purpose compatible with the city and with the building's characteristics; difficult choices with difficult investments. However, the "constructional challenge" of this UNESCO site, which restricts the allowed functions for tourism and income, does not prevent the chance of finding successful examples: i.e., "Le Murate", where the public realised social housing quarters in the interest of the society, even with investments otherwise difficult to sustain, based on the use of eco-compatible construction and adaptation techniques.

Le Murate

The recovery of this former prison complex falls in a wider Public Residential Construction Program. Built in the 15th century, the Murate monastery was converted into a prison in 1832 until 1985. The complex was left abandoned for decades and became a deteriorated area of the historical centre, bordering the Santa Croce neighbourhood. The main idea was to create a multi-purpose area capable of recovering the cultural, social and productive traditional functions of a neighbourhood, together with the public residential construction function. Hence, a rehabilitation and regeneration operation was carried out and involved the entire historical centre, by giving the city access to this "island", closed and abandoned for decades.

Fig. 7 / Example of good practices of city regeneration: Le Murate, a new pedestrian street and two public squares for about 3,350 m². 73 social housing homes (from 30 to 80 m²); covered routes and arches for over 240 metres; a municipal guesthouse with 24 beds; offices for over 800 m²; art and culture workshops for 560 m²; a restaurant and café for 430 m²; a contemporary art centre for over 1,300 m²; an incubator for high-tech businesses in the cultural sector; four public multi-purpose halls for over 940 m² with audio/video equipment; 9 new elevators were added and 8 new staircases; 18 high-growing trees have been planted.

Citizens, the city and its prosperity are always at the heart of interventions: hence, the sustainable use of soil as well as economical, social and especially environmental sustainability.

This leads to choose solutions of efficiency, of sustainable materials and of short production chain during requalification, but also to forecast interconnections for sustainability: the greatest investment of the UR has been for the realisation and reconnection of spaces and public services through the creation of a cycling network, currently extending over 100 km (with a municipal investment of over 5 million euros from 2014 to 2022), whereas the creation of additional new green or service spaces for the community may also be generated by private interventions.

In fact, such interventions are foreseen also thanks to a compensation system or, in other words, the burdens to be paid by the private must contribute for regeneration/reconstruction interventions are tied to being used either directly or by the administration to rehabilitate the baseline urban context in which the regeneration/reconstruction intervention is carried out (subsidiarity), including all services and public spaces (art. 16 RU). The compensation interventions are therefore linked to the baseline context and foresee, among the various hypotheses: tree planting, flowerbeds, parks and green infrastructures on the basis of the indications that derive from the UR itself as a response to the context analysis. All of this in order to achieve a compact city: the underlying idea of "spatial efficiency", which considers a planned integration of transport infrastructures with residency and other established functions, therefore reducing travelling needs.
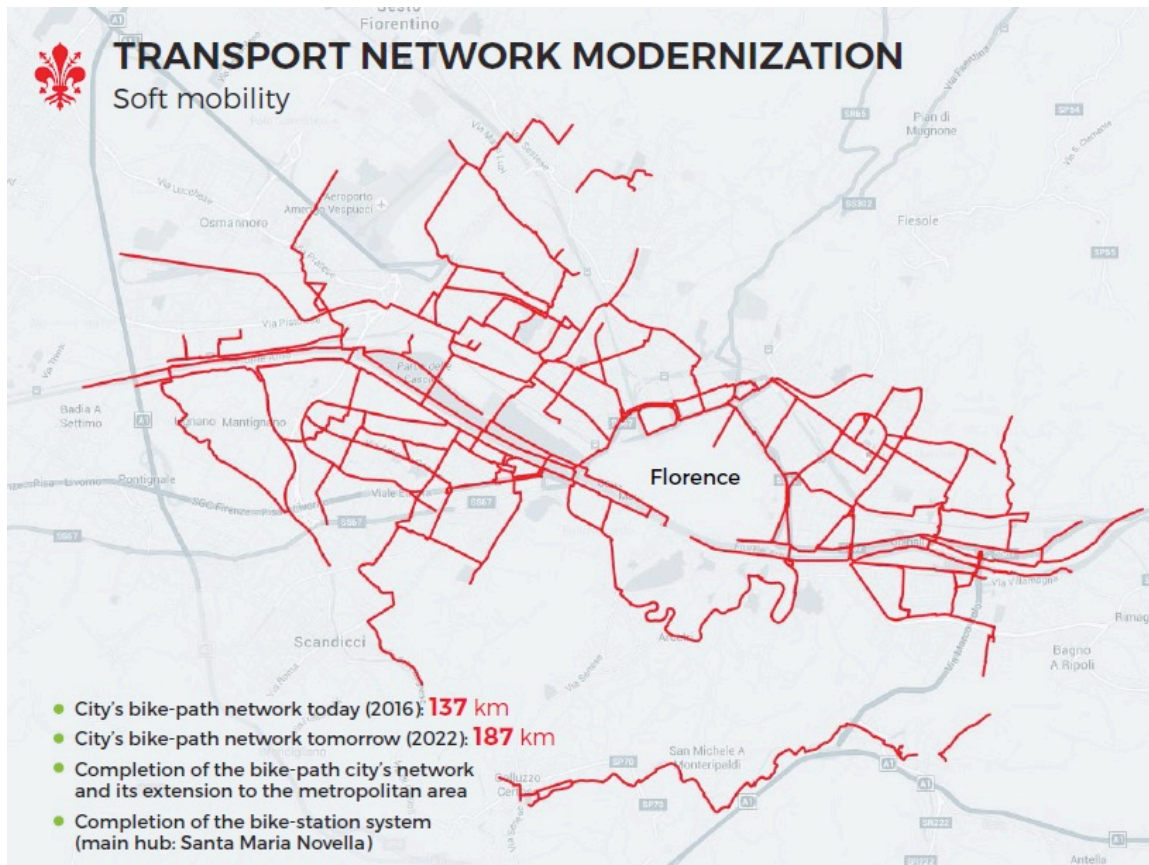
Fig. 8 / The soft mobility transport infrastructure

In this regard we must read and interpret the modernisation interventions of public transport, in which soft mobility is an important and significant part and to which new urbanism tools refer. In terms of green policy, the realisation of new buildings, albeit deriving from building substitution interventions and amplification interventions of existing buildings entailing an increase of covered surface, the maintenance of a permeability ratio of at least 25% of the property surface is guaranteed. In already urbanised areas, the satisfaction of minimal permeability requirements of soils may be ensured partially by recurring to auto-containment systems, or of temporary retention, in situations in which there are objective hindrances to the retrieval of the minimal quantities of permeable surface of interest, or if pollution risks for underground watercourses exist.

Auto-containment or temporary retention systems may be used where there is the guarantee of controlled delivery of rainwater underground, in surface watercourses or in sewers, in an amount equivalent to the non-retrieved amount of permeable surface of interest, and damages or challenges consequent to potential stagnation phenomena are not foreseeable and pollution risks for the soil or the underground do not exist.

Mitigation, compensation, and also quality: for example the Protected Natural Area of the Mensola River project, for which an important green infrastructure was approved, namely a detention basin of the river that will also become an urban park, with the double purpose of increasing liveability of

urban spaces and the system's resilience against floods: 6 million euros for an estimated extension of about 159,000 m^2.

Fig. 9 / Florence is a city characterised by the crossing of the Arno river, which, alongside the Mensola and the Mugnone, keeps the research for innovation of the city's resiliency system alive. This year marks the 50th anniversary from the Florence flood of 1966, of which the photo is about.

Future plans

Since urban planning is founded on the regeneration of areas inside the city, in some cases the objective is to retrieve new spaces serving new inhabitants, but mainly to implement the efficiency of the ecological network by improving the performances of the nodes and of the connection system inside the city and with the surrounding territory.

The municipality is equipped with a long-term programming instrument (SP), which identifies several actions to be accomplished with operational tools, which, instead, have a limited timeframe of 5 years (UR), making it possible to check that the actions carried out are functional and fulfil long-term objectives. The idea of recovering what exists, without increasing the urban sprawl: not an expansive approach, but one sought to eliminate degradation within the city through widespread interventions, mending and repairing deteriorated situations due to abandonment, proceeding with the regeneration of parts within the established city, giving life to a broad rehabilitation.

The planning objective, thought around the city's development in relation to its population and citizens, is to improve liveability by improving the fruition of zones-services-environment-green infrastructures.

The strong sharing of urban plans is one of the major indicators of results and performance:

prerogative of shared planning, both plans were subjected to moments of active public participation (i.e. town meetings for the SP) and underwent an integrated course throughout the entire period during which they were being drafted and also during their adoption and development, which not only led to identify the idea of a green and sustainable city, but also to identify those abandoned properties (public and private) destined to transformation by acknowledging the suggestions for new purposes, when possible and in line with current laws.

As a consequence, an asset needing rehabilitation of about 800,000 m^2 has been identified, with over 1.5 billion euros of potential investment and 15,000 jobs, which, even as the quickest form of updating, translates to the Invest in Florence project, which sees in the presentation of locational tenders an opportunity for a quicker rehabilitation action with a strong positive connotation, especially when these containers are large (the identified opportunities exceed 2,000 m^2).

This way the interventions also involve a natural enhancement of the green infrastructural system, of the sustainable mobility and of service infrastructures in general, which increase the attractiveness of the intervention itself and are the consequence of the Municipality of Florence's affiliation to sustainability networks, such as the Covenant of Mayors and Mayors adapt, therefore reflecting the vision of a Florence of tomorrow, an always more intelligent city, from planning to action.

Interventions such as the recovery of the Arno's riverbanks, a city symbol (connecting the city's parts through bike and pedestrian routes, or anyway of high fruition) and the implementation of the ecological network (with the consequent increase of biodiversity, mitigation of heat isles, reduction of acoustic pollution, fight against water scarcity) are the "leit motiv" underlying behind the choice of a sustainable use of soil.

The eco-city is the objective. A city tailored to the environment and to those who lives it. In other words, a city in which new constructions are not the priority, rather those constructions that respect the environment in which they are built and those that have to live it, eco-sustainable and functional, integrated in a context in which the bicycle could become the main vehicle of transport or the alternative public transport and in which the urban green extends to the point of literally crawling on skyscrapers and buildings, or at least be even more visible, of easy fruition and reachable. This includes the aforementioned soft mobility interventions, those of rehabilitation but also of safeguard and preservation (i.e. the Anpil Mensola project), including major projects such as the Cascine Masterplan or the Metropolitan Parks System.

The Cascine Masterplan

Not just an area, but a public park, with the same objective of uniting the enhancement and conservation of a historic park to a regeneration process of a multi-purposed area. The Cascine Park is the city's "historic garden": it includes beautiful spaces, where it is possible to carry out sporting

activities and organise cultural and recreational events, and also hosts important institutions and places of knowledge. A plan composed of over 30 interventions, with an overall investment estimated at 20 million euros and expected completion by 2020. The largest green lung of the city, with its over 150 hectares, it aims to be among the most renowned European river ecosystems for expansion and peculiarity, both for its location (10 minutes from the historical centre) and for its multi-faceted attractiveness.

Fig. 10 / The Cascine Park

The Metropolitan Parks System

The development of system of parks and green spaces as new important elements of the urban landscape's structure is one of the raised objectives and is involved in the context of Florence, metropolitan city, and can thus become an actual green apparatus of the city, correlated and coherent with the metropolitan parks system and with the widespread bike network in line with the idea of the greater Florence, for a unified, polycentric, green and resilient large city.
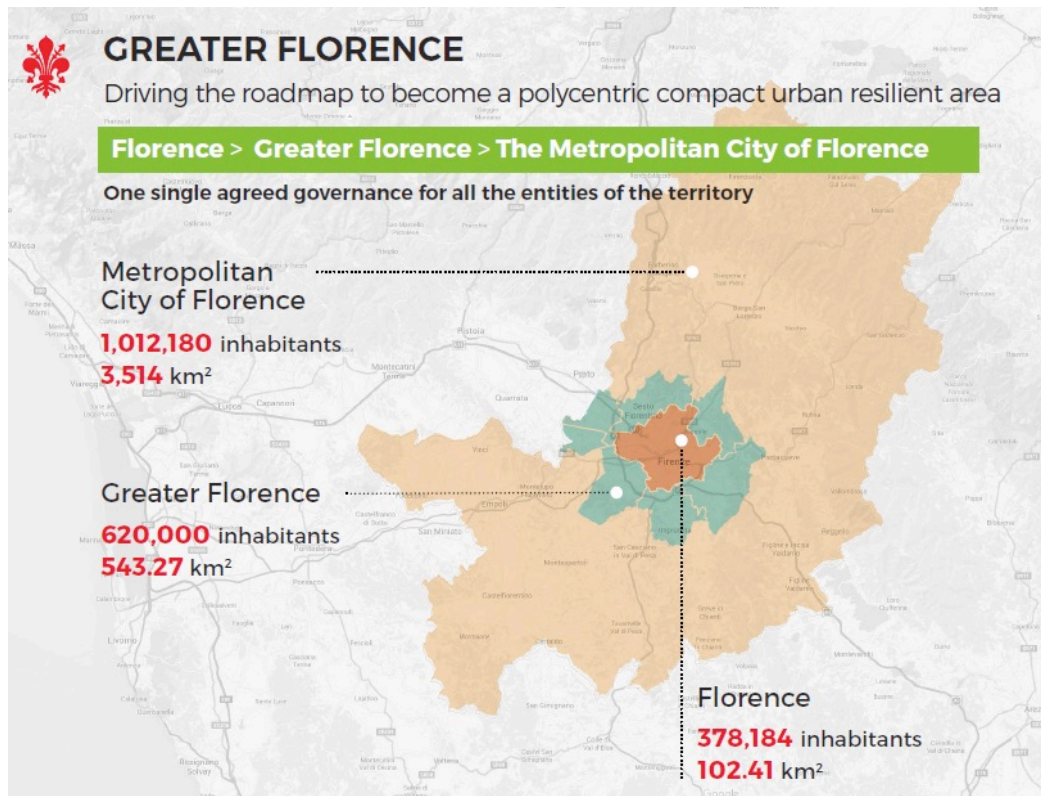
Fig. 11 / Florence metropolitan city

The operational integration of the plans is an additional operative and evaluation indicator that will help to account for the implications in terms of efficient choices of actions.

Florence has always paid attention to sustainability matters, and the choice of the so-called "zero volume plan" probably best represents the contents of actions: a plan that, as said, is the outcome of an integrated innovative vision that connects urban planning with ecological networks and supporting infrastructures.

There are different ways to join initiatives such as that of the 20-20-20 or of the roadmap to 2040: they can be transposed as a mere obligation, stressing it until social sensitivity considers it a priority, or even consider it an administrative act as many others. Or we can choose to look into its philosophy and endorse its aspects loaded with meaning. Florence has chosen the latter, because such a project gives everyone much more than the technical possibility to improve the environment, and the plans are just the result of this choice.

The underlying concept of the recent Structural Plan, to free the possibilities through physical, environmental and socio economic regeneration, proposes a series of actions sought to enhance Florence's attractiveness, open and liveable, and, among the definitions given to the city, we can now add the adjective sustainable or green, as the EEA European Energy Award attests (Luzern, 17 october 2016)

The policies for a Florence for the future spawn from the Mayoral programme of governance namely

the city of opportunities, and it develops through its plans. Ecology and sustainability are concepts that have advanced slowly and have affirmed themselves progressively with the *latu sensu* urban development. The focus on sustainability, present in the Structural Plan, has been translated into operating rules in the Urban planning Rules, but also and foremost through an awareness campaign aimed at citizens, giving basic elements of knowledge to allow more conscious decisions when buying a house, or requesting the energy efficiency class when choosing a heating/cooling system. Such choices will always be examples of eco-lifestyle, which will naturally reflect in the choices for a sustainable mobility, for a cautious use of energy (or actually, of its bad use or waste), for a healthy and conscious diet (choosing a short production chain, for example) and of a greater request for and greater attention to the green that surrounds us and on which the Administration is investing both through its own funds and with targeted European project proposals (Life+, Horizon2020). It's in this scenario, in which the principle of subsidiarity public/private finds its necessary baseline, and in which the choices for the city and the safeguard of the city's heritage and of the health of its citizens are included.

Fig. 12 / Mayoral programme of governance