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**WITHIN THE CITY:  
ONGOING EXPERIENCES IN LOCAL  
URBAN DEVELOPMENT PLANS**

**ABSTRACT:** The article presents a series of urban regeneration programmes carried out in the Lazio Region from 2011 to 2016, and financed by the resources of the cohesion policy 2007–2013. It covers: programme background, experience of the Municipality of Aprilia analysed in its most relevant details, some reflections concerning opportunities and limits of the programme, and some key elements to be developed in future research.

**KEYWORDS:** ERDF Operational Programme 2007–20013, local development, urban regeneration, smart city, capacity building.

**Preface**

The acronym PLUS stands for an Italian expression meaning a local plan for urban development. It refers to a large initiative launched by the Lazio Region in 2011 aimed at the regeneration of socioeconomic functions and tackling environmental problems at the urban level. The PLUS initiative was financed mainly under the 5th strategic priority of the ERDF Operational Programme (OP), which is the one dedicated to urban and local development.

Differently from most Italian regions, which, according to the National Strategic reference Framework 2007–2013, have included

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such a priority in their OPs since the beginning, the Lazio Region in 2006 had chosen not to include the so-called “urban axis” in the first version of its OP. Such an axis was introduced only in 2011, when a mid-term review modified significantly the original resource allocation. The revised OP was definitively approved by the European Commission in March 2012.

Officially, the review was mainly originated by the evolution of the EU and national priorities as a consequence of the international crisis; indeed, the reformulation of the programme was largely due to inadequate progress in the implementation of some measures that were putting at risk meeting of expenditure commitments.<sup>1</sup> As we will explain below in greater detail, it strongly influenced the content and the outcome of the plans.

One of the main reasons why the PLUS initiative has been so interesting can be explained by the fact that it is the first urban regeneration programme launched after more than 10 years. The last initiative of this kind dates back to the national financing programme called “Contratti di quartiere” (Neighbourhood Contracts) that the Ministry of Infrastructure and Transport launched in 1998. It consisted in a pilot programme focused on neighbourhoods representing low urban quality, which lack proper services and suffer from social problems, and its purpose was to trigger regeneration by mixing building renovation with measures to tackle unemployment and social distress. The first edition of the programme, whose initial budget amounted to 350 million euro, involved 57 municipalities and, thanks to its large success, was followed by a 2002 reissue funded with an almost 4 times bigger budget.

### **Characteristics of the PLUS programme**

The PLUS initiative can be considered an integrated investment programme, since the overall budget drew resources from different priority axes of the Regional OP: besides the 5th axis dedicated to urban development, resources were collected from the 1st and 2nd axes, respectively dedicated to the development of ICT in the public administration and to energy efficiency. Further resources derived from the regional budget.

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<sup>1</sup> [http://porfesr.lazio.it/PORFESR/galleria\\_allegati/porfesr/Motivi\\_Effetti\\_Revisione\\_POR.pdf](http://porfesr.lazio.it/PORFESR/galleria_allegati/porfesr/Motivi_Effetti_Revisione_POR.pdf)

The PLUS initiative was launched in July 2011 and, as already experimented in other regions, it took the form of a call for proposal, open to municipalities of over 25,000 inhabitants. The proposals, defined as “local urban development plans,” had to be structured as a set of integrated actions aimed at “increasing competitiveness, attractiveness and sustainability of cities” and were required to cover a well-delimited area, and to focus on 4 topics: recovery of public spaces and buildings; social inclusion and territorial cohesion, including the development of social, cultural and tourism facilities; improvement of environmental conditions, mobility and urban transport; promotion of entrepreneurship and economic revitalisation. The budget for a single plan could range from 5 to 16 million euro, and the deadline for completion was December 2015.

Proposals have been selected following a two stage process: admissibility assessment carried out based on a dossier, in which municipalities described the context and listed interventions targeting the candidate for financing; beneficiaries who passed the first stage successfully were identified in the second stage based on more detailed plans. Evaluation criteria were based on the overall quality of the strategy and its coherence with the general objective of the initiative, technical/administrative feasibility of the projects, and other factors supporting full implementation of the plan such as its management structure and the involvement of private resources. Indeed, Regional Authority, being aware of the need to finalise the whole programme by 2015 in order not to run into ERDF reporting problems with the EU, since the issue of the call for proposal, had imposed specific requirements on potential beneficiaries related to the financing procedures and the implementation process.<sup>2</sup>

Firstly, all the public works tender documents had to be certified by an EU level accredited external body (Standard UNICEI EN ISO/IEC 17020) even though according to the Italian Procurement Code this requirement normally applies only to works over 20 million euro. Moreover, the whole process of performing public works had to respect a strict time frame: within 18 months, all contracts had to be subscribed with the contractors. A relevant incentive

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<sup>2</sup> “Regional disciplinary for the implementation of urban development interventions” approved on 9th January 2012 by the Director of the Department “Economic programmes, research and innovation” – Lazio Region (executive decision no. B00027).

to comply with this requirement was offered by the possibility to re-use tender savings (often even up to 20–25% of the entry cost) to finance further actions within the same redevelopment project.

Other innovative aspects of the programme included a customised cash flow strictly related to the monitoring system, according to which, after a pre-financing payment, municipalities received subsequent transfers as rapidly as they accomplished their reporting duties. Such a system, on the one hand, allowed Municipalities and their suppliers to be timely paid, and, on the other hand, it helped the Regional Authority to track the progress and to detect promptly any problems in implementation. Indeed, in order to prevent these problems as much as possible and to support the beneficiaries during the whole process, the Region had set up a Technical Assistance working group composed of experts in the field of EU funds implementation and reporting and entrusted to document review and on-site visits.

Finally, all the communications between municipalities and the Region occurred through certified mail in order to be fully traceable.

**Table 1.** PLUS Programme timeline

<b>PLUS programme timeline</b>	
July 2011	Call for proposal
September 2011	Deadline for 1st stage proposals
November 2011	Publication of ranking of proposals admitted to second stage
March 2012	Deadline for 2nd stage proposals
May 2012	Publication of final ranking
July 2012	Subscription of the agreement and start-up
February 2014	Deadline for entering into public works contracts
December 2015	Deadline for finalising the plans

Source: Tender documents and provisions by Lazio Region.

As better clarified in the paragraph dedicated to the case of Aprilia, a rigid framework of the programme and strict implementation rules deeply influenced the content of proposals, especially with respect of characteristics of the interventions included in the candidate programme, and management solutions implemented by municipalities.

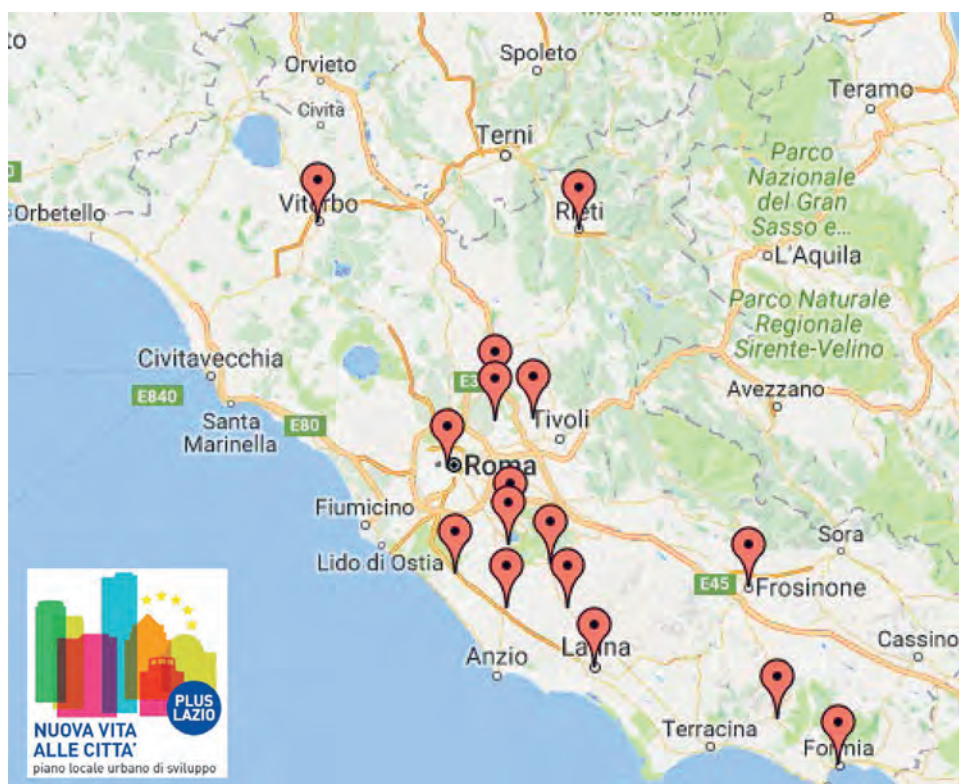
### **Main results of the PLUS programme**

The Region received 29 proposals, which means 100% of the eligible municipalities applied for funding. The definitive funding ranking was published in May 2012, and contained the following 16 funded plans:

- 5 submitted by provincial capitals of the region (Rome, Latina, Frosinone, Rieti and Viterbo);
- 7 submitted by other municipalities belonging to the Province of Rome (Albano, Fonte Nuova, Guidonia, Marino, Monterotondo, Pomezia, Velletri);
- 4 submitted by municipalities belonging to the Province of Latina (Aprilia, Cisterna, Fondi, Formia).

The total amount was over 147 million euro: about 122 were allocated to beneficiary municipalities, 25 million were set aside as a “performance reserve,” a sort of reward allocated to the best programmes in terms of financial effectiveness, management, and implementation.

Out of the 122 million euro of the budget, about 113 million were allocated immediately (88 million from the ERDF – 80 from the 5th axis and 8 from the 2nd axis – and 25 million from the regional budget), while almost 9 million euro – derived from the 1st ERDF axis – were added at the end of 2013 and dedicated specifically to the so-called “Smart Cities applications” according to their original destination.

**Fig. 1.** Logo of the PLUS programme and map of beneficiaries

Source: Lazio Region, official PLUS programme website – <http://www.pluslazio.eu/>.

**Table 2.** List of PLUS programme beneficiaries and amounts assigned

Prov	Municipality	Programme title	Tot. financing 2012	Tot. financing 2014
RM	Albano Laziale	<i>Innovalba</i>	€ 5,100,000	€ 5,207,690
LT	Aprilia	<i>Aprilia Innova</i>	€ 7,471,164	€ 8,302,458
LT	Cisterna	<i>Il centro del centro pontino</i>	€ 6,123,715	€ 7,137,999
LT	Fondi	<i>La città dei servizi e delle nuove centralità</i>	€ 7,962,460	€ 8,362,549
RM	Fonte Nuova	<i>Un cuore per la città</i>	€ 5,051,550	€ 5,051,550

LT	Formia	<i>Appia Via di Mare</i>	€ 6,120,000	€ 7,500,000
FR	Frosinone	<i>La porta della città</i>	€ 5,019,934	€ 5,019,935
RM	Guidonia	<i>Da città del '900 a città del terzo millennio</i>	€ 7,301,760	€ 9,560,274
LT	Latina	<i>Marina di Latina</i>	€ 9,022,502	€ 9,691,502
RM	Marino	<i>Ecco Marino!</i>	€ 5,040,884	€ 5,040,884
RM	Monterotondo	<i>Dalla memoria al futuro</i>	€ 5,059,200	€ 5,059,200
LT	Pomezia	<i>Pomezia Cambia</i>	€ 9,062,626	€ 9,484,641
RI	Rieti	<i>Fare Centro-Fare Città</i>	€ 7,102,293	€ 8,592,526
RM	Rome	<i>Porta Portese una risorsa per Roma</i>	€ 8,865,389	€ 8,865,389
RM	Velletri	<i>Le vie della cultura</i>	€ 8,155,414	€ 8,755,414
VT	Viterbo	<i>Futuro al Centro</i>	€ 10,444,260	€ 10,975,473
			€ 112,903,151	€ 122,607,484

Source: Lazio Region, [http://www.regione.lazio.it/binary/rl\\_a3/tbl\\_news/elenco\\_opere\\_finanziate.pdf](http://www.regione.lazio.it/binary/rl_a3/tbl_news/elenco_opere_finanziate.pdf).

According to the expenditure reported up to March 2016,<sup>3</sup> the 16 financed programmes included 134 interventions, 73 public works for about 101 million euro and 61 actions of other kind:

- 33 initiatives for social inclusion and employment corresponding approximately to 7 million euro;
- 4 SMEs support programmes structured as call for incentives equal to 3 million euro;
- 14 measures concerning ICT and smart technologies, amounting to 9 million euro.

Each programme also scheduled about 2 million euro for communication and dissemination activities at local level. The Region provided guidelines to perform these activities including a common logo and a slogan “New life to cities,” both adaptable to each context.

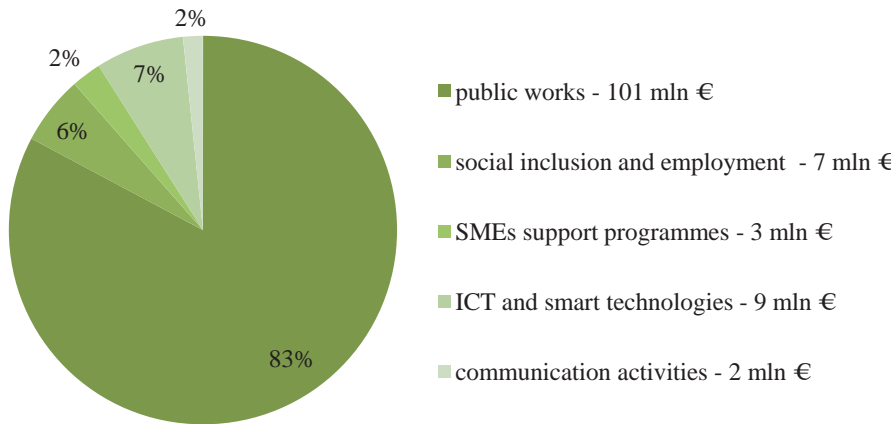
<sup>3</sup> PlusLazio.eu, [http://www.pluslazio.eu/procedure\\_plus-854/](http://www.pluslazio.eu/procedure_plus-854/).



Within the financed projects, the following interventions can be mentioned:

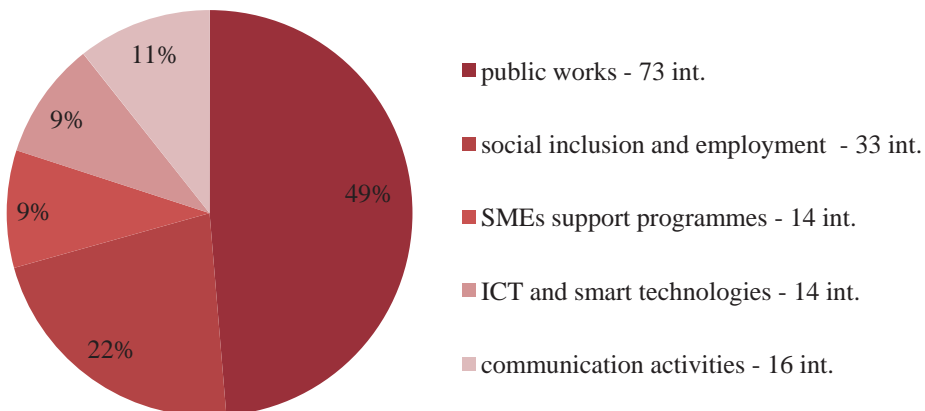
- 13 km of cycling routes;
- 8 public buildings that were subject to energy upgrading;
- 7 new schools (4 kindergartens and 3 nurseries);
- 15 public spaces renewed;
- 8 historical buildings/archaeological areas restored;
- 1024 vouchers for child and elderly care assigned;
- 466 beneficiaries of training courses;
- 175 SMEs awarded with incentives.

**Fig. 2.** PLUS Programme, Resource allocation by topic



Source: self-elaboration on data from Lazio Region.

**Fig. 3.** PLUS Programme, Number of interventions financed by topic



Source: self-elaboration on data from Lazio Region.



**Table 3.** List of PLUS programme beneficiaries, with details on the number of public works financed

<b>Prov</b>	<b>Municipality</b>	<b>Programme title</b>	<b>Amount for public works</b>	<b>% over 2014 budget</b>	<b>Num. public works</b>
RM	Albano Laziale	<i>Innovalba</i>	€ 5,000,000	98%	4
LT	Aprilia	<i>Aprilia Innova</i>	€ 6,150,798	74%	6
LT	Cisterna	<i>Il centro del centro pontino</i>	€ 4,566,699	64%	5
LT	Fondi	<i>La città dei servizi e delle nuove centralità</i>	€ 7,506,373	90%	6
RM	Fonte Nuova	<i>Un cuore per la città</i>	€ 4,050,000	80%	3
LT	Formia	<i>Appia Via di Mare</i>	€ 5,650,000	75%	6
FR	Frosinone	<i>La porta della città</i>	€ 4,721,504	94%	3
RM	Guidonia	<i>Da città del '900 a città del terzo millennio</i>	€ 8,661,373	91%	5
LT	Latina	<i>Marina di Latina</i>	€ 7,995,590	83%	6
RM	Marino	<i>Ecco Marino!</i>	€ 4,083,500	81%	6
RM	Monterotondo	<i>Dalla memoria al futuro</i>	€ 3,640,000	72%	3
LT	Pomezia	<i>Pomezia Cambia</i>	€ 7,603,085	80%	6
RI	Rieti	<i>Fare Centro-Fare Città</i>	€ 6,629,361	77%	4
RM	Rome	<i>Porta Portese una risorsa per Roma</i>	€ 7,257,221	82%	3
RM	Velletri	<i>Le vie della cultura</i>	€ 7,995,504	91%	2
VT	Viterbo	<i>Futuro al Centro</i>	€ 9,109,228	83%	5
			€ 100,620,236	82%	<b>73</b>

Source: self-elaboration on data from Lazio Region.

Since in September 2016 the reporting process definitively ended, the programme can be considered fully closed. Despite the efforts of municipalities to respect the schedule of spending commitments, some works have been delayed and in a few cases they had to be cancelled leading to the reallocation of resources to a reserve list of interventions. In most cases, problems occurred during authorization processes for new public buildings.

## The experience of the Municipality of Aprilia

Aprilia is a city located 50 km south of Rome, with about 70,000 permanent residents. It was established in 1936 as a rural town, part of the *Bonifica Integrale* of Agro Pontino [the Fascist “total land reclamation” project], retaining its rural character until the 1950s, when, as one of the most disadvantaged areas in Italy, it was included in the group of areas eligible for the *Cassa del Mezzogiorno* [“Fund for the South”]. This triggered an industrialisation process, leading to a booming urban development that completely changed its structure and appearance.

Starting from 1951 – in particular between 1961 and 1970, and then until the 1980s – many industrial plants, especially in chemical-pharmaceutical and engineering sectors, have settled in the municipal area. Such employment opportunities have created a very strong demographic growth, which caused rapid and disorderly construction effort, in stark contrast to the original plan. Industrial areas themselves have developed in the absence of adequate planning and are today scattered in the municipal area, giving rise to problems of pollution, congestion of infrastructures, and long transport times.

Starting from the 1990s, after the closure of the *Cassa del Mezzogiorno*, the transition to a post-industrial economy led to some development of the tertiary sector. More recently, the territory of Aprilia has been severely hurt by the global economic downturn, leading to the unemployment rate of 30% at the beginning of 2014 (source: Employment Office of the Province of Latina).

The population keeps growing considerably, especially due to the inflow of newcomers pushed out from the capital city by high housing costs. Whereas from 1951 to 1991 the population has increased almost seven times (from almost 7,000 to 47,400 inhabitants), between 1991 and 2011 it kept growing by more than 40%, reaching 56,028 inhabitants in 2001, and 67,180 in 2011. The main criticalities can be summarised as follows:

- a considerable growth in the number of permanent residents coming from the capital city and immigration from non-European countries, without a parallel increase in the availability of public services, in particular those targeted to the most disabled categories;
- long phase of industrial decline, exacerbated by international crisis, with a consequent increase in layoffs and redundancies;

- lack of high quality public space: development of gathering places such as squares, parks, markets, and sports facilities has not matched the growth of population and industry development;
- inadequacy of the primary and secondary infrastructure: traffic congestion, pollution of water resources, and dependency on the private means of transport, caused by inadequate road infrastructure, lack of water treatment, and poor spatial distribution of urban functions;
- poor environmental quality, exacerbated by a strong predominance of private transport, with negative effects on air quality, liveability, and accessibility.

### **The PLUS “Aprilia Innova”**

Aprilia’s Local Urban Development Plan (PLUS) aims at creating a more sustainable, competitive and inclusive city, through the implementation of innovative projects addressing environmental, economic, and social dimensions of urban life. According to the integrated approach, projects of physical urban renewal combine with measures promoting social inclusion, energy efficiency, and sustainable urban mobility.

The PLUS has followed a selection procedure defined by the Region of Lazio, as described in Table 4, which illustrates main steps leading to the approval of the proposal.

### **The preliminary proposal**

Aprilia’s PLUS has been managed and coordinated by the Spatial Planning Section of the Municipality, together with the municipal Office for European Funds. All relevant offices of the Municipality have been involved in the preparation of the proposal and in the implementation of the projects: Spatial Planning, Public Works, Environment, Social Affairs, Employment, and Education. A central role has been played by the Director of the Spatial Planning and Environment Section, and by the Mayor who, from the beginning, has clearly outlined the strategy to be followed.

In September 2011, a preliminary programme was introduced, including mainly actions of urban rehabilitation that addressed, in particular, public spaces and buildings within a rather wide

area of the town centre. The first proposal was prepared in little more than two months, taking the cue from previous experiences of urban regeneration, such as the “Neighbourhood Contracts,” and the Covenant of Mayors’ SEAP, at the time under elaboration. Only after the approval of the preliminary proposal, the Municipality has set up a working group, involving external professionals, which reformulated the intervention strategy and identified a number of priority actions.

### **The final proposal – the strategy and its synergies with other initiatives**

Compared to the proposal submitted in the first application stage, the strategy of the PLUS “Aprilia Innova” has been reformulated through a targeted selection of the operations, more functional to achievement of the priorities identified in the target area, i.e.:

- 1) environmental regeneration: sustainable mobility and energy efficiency;
- 2) social inclusion and employment;
- 3) improvement of governance.

Starting from 2011, the City of Aprilia has directed its action towards the improvement of environmental conditions through projects, tools and development of skills, in particular in the mobility and energy sectors. The PLUS project aims to integrate the initiatives already launched by the Municipality within the framework of the Covenant of Mayors with new actions concerning the energy retrofit of existing buildings (city hall and industrial buildings) and the creation of sustainable mobility infrastructures and services (bicycle paths, and the so-called Pedibus initiative, i.e. a “walking school bus” for children and accompanying adults). Moreover, in order to guide the medium and long-term policies, the project entails the implementation of innovative environmental monitoring systems, applied to traffic flows, greenhouse gas emissions, and urban heat island.

At the second application stage, the PLUS strategy has been more clearly oriented towards contrasting some of the social and economic criticalities that the target area is facing: an insufficient provision of care services, and the employment crisis. Therefore, some actions have been enhanced in comparison to the first

application stage, in particular those targeting the most vulnerable social groups and citizens at greater risk of social exclusion, such as the unemployed, the disabled, and single women with children. To this aim, the second proposal has been enriched with direct instruments for the immediate access to new, very much needed services, such as:

- vouchers for the purchase of home care services for vulnerable people, for the access of the disabled to day care services;
- guidance, training and vocational integration for disadvantaged people;
- resources and subsidies for young professionals and entrepreneurs;
- training workshops for the disabled;
- municipal nursery.

One of the main initiatives has been the establishment of an “Urban Centre,” intended as a structure dedicated to managing communication actions related to all PLUS activities. The Urban Centre is both a physical and a virtual space: in particular, the Aprilia Innova web portal will function as a “citizens’ virtual helpdesk,” integrating and enhancing the municipal IT systems, with a view to data and process sharing aimed at fostering active participation of citizens and stakeholders, including professionals and entrepreneurs.

## **Objectives**

The second stage has led to a partial reformulation of general and specific objectives, in order to tackle the identified criticalities more effectively.

Objective 1 – Urban regeneration. Starting from the target area, the aim is to produce a decisive change in the liveability of the city, through the regeneration of squares, parks, public buildings, and other gathering places, and actions concerning mobility with a view to environmental and social sustainability. Specific objectives:

- increase in the offer of public spaces and their liveability;
- creation of new gathering places;
- refurbishment of buildings.

Objective 2 – Sustainability and innovation. The PLUS is clearly oriented towards ensuring a sustainable development for the city, with actions and services concerning sustainable mobility

(Mobility Manager), energy retrofit of buildings, environmental monitoring, and education to live healthier lifestyles, also through the participation in the Covenant of Mayors, supporting the creation of jobs in the growing sectors of renewable energies and the energy retrofit. Specific objectives:

- promotion of renewable energies and energy efficiency in buildings;
- monitoring and sustainable management of the urban environment;
- promotion of sustainable mobility and citizens' awareness raising on the issue of sustainability.

Objective 3 – Social inclusion and revitalisation of the production infrastructure. The aim is to strengthen social inclusion and revitalise production facilities – with particular attention to the disadvantaged categories, the unemployed workers and those under redundancy – by activating new services for families or by easing access to the existing ones (nurseries, social vouchers, vouchers for private nurseries), and promoting professional training and retraining, with particular attention to women. Specific objectives:

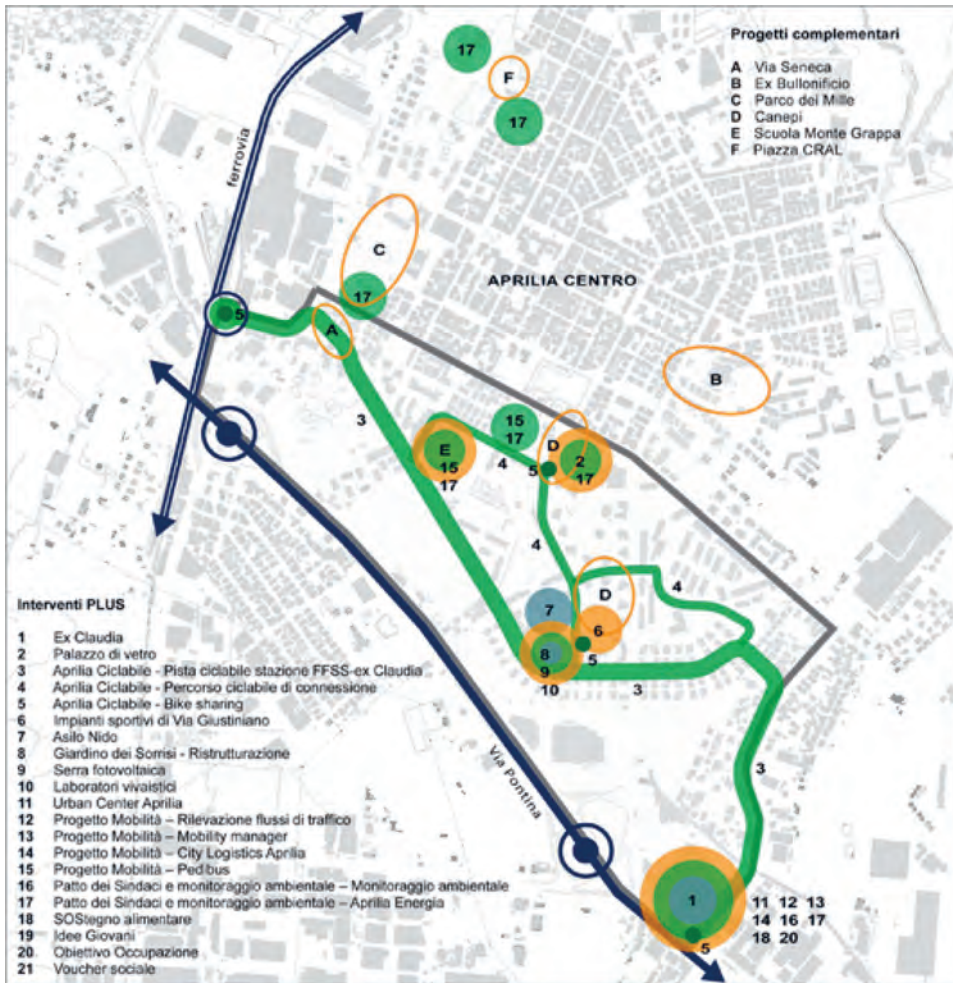
- strengthening social services, and services for the labour inclusion of the disadvantaged categories;
- support to entrepreneurship, especially targeted to young entrepreneurs;
- strengthening training activities in connection with the business world;
- enhancement of social cohesion, information and participation of citizens.

### **Aprilia's list of interventions**

The Aprilia's PLUS was approved for financing in June 2012 and ranked fifth in the final ranking. The original request for financing was almost 10.5 million euro, the Region financed about 8.6 million euro and the Municipality contributed the remaining share. The budget was divided into the following categories: approximately 6 million euro for public works, about 1.8 million euro for social inclusion and employment, and about 700,000 euro for ICT and smart technologies.



**Fig. 4.** Aprilia's PLUS map of interventions



Source: Municipality of Aprilia.



**Table 4.** Aprilia's map and list of the interventions

<b>Num</b>	<b>Interventions</b>	<b>Regional financing</b>	<b>Municipal financing</b>
1	Energy Refurbishment of the "Ex-Claudia" plant	€ 2,000,000	€ 766,832
2	Energy refurbishment of the Town Hall	€ 1,551,142	€ 200,000
3	Bicycle path (Train station/"Ex-Claudia")	€ 760,136	
4	Cycling route	€ 362,378	
5	Bike sharing	€ 260,953	
6	Sport Facility via Giustiniano	€ 106,452	€ 178,177
7	Nursery school	€ 1,383,723	
8	Renewal of "Giardino dei Sorrisi"	€ 317,104	€ 300,000
9	Photovoltaic Greenhouse for social activities	€ 138,693	
10	Plant nursery/laboratories	€ 110,636	
11	Urban centre	€ 350,000	€ 40,000
12	Analysis of traffic flows	€ 100,000	
13	Mobility manager	€ 100,000	€ 50,000
14	City logistics	€ 281,384	
15	Walk-to-school campaign "Pedibus"	€ 80,000	
16	Environmental monitoring about Emissions Scenarios and Urban Heat Island	€ 400,000	
17	Renewable energy plants "Aprilia energia"	€ 80,000	
18	Food Bank initiative "SOSstegno alimentare"	€ 90,000	
19	"Young Ideas" Initiative	€ 127,000	
20	"Objective Employment" Initiative	€ 1,451,840	€ 200,000
21	Voucher system	€ 405,000	
	<b>TOTAL</b>	<b>€ 10,456,441</b>	<b>€ 1,735,009</b>
<b>LEGEND</b>			
<b>Public works</b>	<b>ICT and Smart technologies</b>	<b>Social inclusion and employment</b>	

Source: Municipality of Aprilia.

Among the public works, the most important and innovative interventions concern some new public buildings, energy retrofit and functional transformations of other existing ones, in particular:

- 1) energy and functional retrofit of the former industrial plant “Claudia”;
- 2) energy retrofit of the Town Hall, formerly known as the “Glass Palace”;
- 3) new nursery school.

The “Ex-Claudia” plant was renewed in order to become a community centre for citizens to host new urban services – such as urban information centre, EU help desk, a Food Bank – and to foster social and cultural initiatives. About 1,500 m<sup>2</sup> of interior space has been recovered applying innovative energy saving techniques, while the exteriors were re-organised as a new city square. Energy performance of the building was improved by 82%, moving from G to B class (9.34 kWh/m<sup>3</sup> per year).

**Fig. 5.** The “Ex-Claudia” plant, before and after the works



Photos: Maurizio Sibilla.

The retrofit of the Town Hall allowed renewing about 3,000 square metres of public offices; it included the redesign of the building envelope to improve energy efficiency and the installation of renewable energy systems including an innovative heating/cooling system powered by a 4-pipe-loopground-source heat pump. The energy performance of the building was improved from G to A class, energy consumptions reduced by 90%, with estimated savings of about 15,000 euro/year.

**Fig. 6.** The Town Hall, before and after the works

Photos: Stefano Magaudda.

The PLUS initiative allowed for the renovation of the building of the first municipal nursery in the city for children up to three years. In particular, the nursery is composed of three sections hosting 52 children in total. The building is made entirely of wood, built with the “Xlam” technology, with a wood fibre thermal insulation coating, and other insulation solutions for the reduction of its heating requirements, for which it has been labelled according to KlimaHaus certification scheme as “Gold” and “Nature.”<sup>4</sup> The building has a single heating/cooling system consisting of a water/air heat pump with ground-source pipe loops, underfloor heating, controlled mechanical ventilation, and a PV system producing the energy needed for feeding the heat pump and for other energy needs.

In conclusion, the PLUS allowed the Municipality of Aprilia to apply substantial energy retrofit actions on different types of buildings: public offices, industrial buildings re-used as office buildings and public spaces, and new buildings. It allowed testing technologies that so far have been little used in the Region of Lazio, such as ground-source heat pumps, or ceiling and underfloor heating and cooling solutions. Moreover, the nursery is the first example of a wood structure of this kind in Central and Southern Italy to have received the KlimaHaus Gold and Nature certifications. The buildings have been operational since October 2016, and only a thorough monitoring plan will allow analysing in detail the effectiveness of the chosen solutions.

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<sup>4</sup> Klima Haus certification scheme provides for 3 classes depending on the heating energy requirement: Gold-A-B. Gold one ensures a heating energy consumption lower than 10 KWh/m<sup>2</sup> per year, requiring practically no active heating system. Nature is an additional label referred to the overall sustainability of the building including also requirements on CO<sub>2</sub> emissions, water consumption, and other comfort related criteria.

## **Aprilia Smart City**

The Smart City programme entails the implementation of three projects concerning the monitoring and environmental analysis of the city, plus a fourth project for the establishment of a web platform in line with governmental directives on transparent administration (Legislative Decree 33/2013). The objective is to increase information to citizens and their participation in public life, giving them the chance to directly intervene through surveys, and to use advanced services. The projects that have been funded and implemented are the following:

- Urban Centre;
- Mobility Manager;
- Monitoring of traffic flows and emission scenarios;
- Environmental monitoring of urban heat island and the flows of polluting substances.

### **Urban Centre**

The Urban Centre is intended as a new set of governance tools, and is composed of a unified database shared by different municipal sectors, and a number of applications of different types aimed at fostering active citizens' participation in choices concerning the future structure of the city, intended both as a set of physical elements and urban community.

The information system meets the need to establish a knowledge base appropriate to the challenges of the urban and environmental rehabilitation of degraded areas, and meeting the latest standards on data quality and significance. On the other hand, the set of communication and participation tools is able to ensure the traceability of data flow and access to information and decision-making processes (Open Data and Open Government).

### **Mobility management**

This project led to the appointment of a municipal Mobility Management (MM), with the task of drafting a commuter plan for the civil servants, and coordinating the activities of local private companies' mobility managers. Mobility manager's activities

have been conceived as part of an Area Plan coherent with the European Guidelines on Sustainable Urban Mobility Plans (SUMP). Mobility management software has been developed and supplied, able to analyse the dynamics and problems related to school and job commuting, and to make plans through simulation models. This software is also equipped with a Decision Support System allowing to plan measures and to quantify their impact on both the choice of transport modes and the set of chosen indicators. It provides information on how the mobility scenario will change if certain measures fostering sustainable displacements are put in place.

### **Analysis of traffic flows**

This project has produced a dynamic database, useful for managing a Municipality's decision-making concerning mobility (Mobility Manager and City Police) in connection with the environmental issues, starting the process of the SUMP's implementation.

The method used in the survey entailed a first stage of data acquisition from temporary control units, and a second stage with fixed control units placed on heavy traffic roads; traffic data have been measured by Doppler-effect microwave sensors (number of transits, date and hour, lane, speed, and distance between vehicles).

### **Environmental monitoring of urban heat island**

This project aims at providing the Municipality with an innovative, quantitative tool for monitoring urban heat island and, more general, urban environment quality. In particular, these activities have allowed establishing an innovative and permanent monitoring infrastructure composed of:

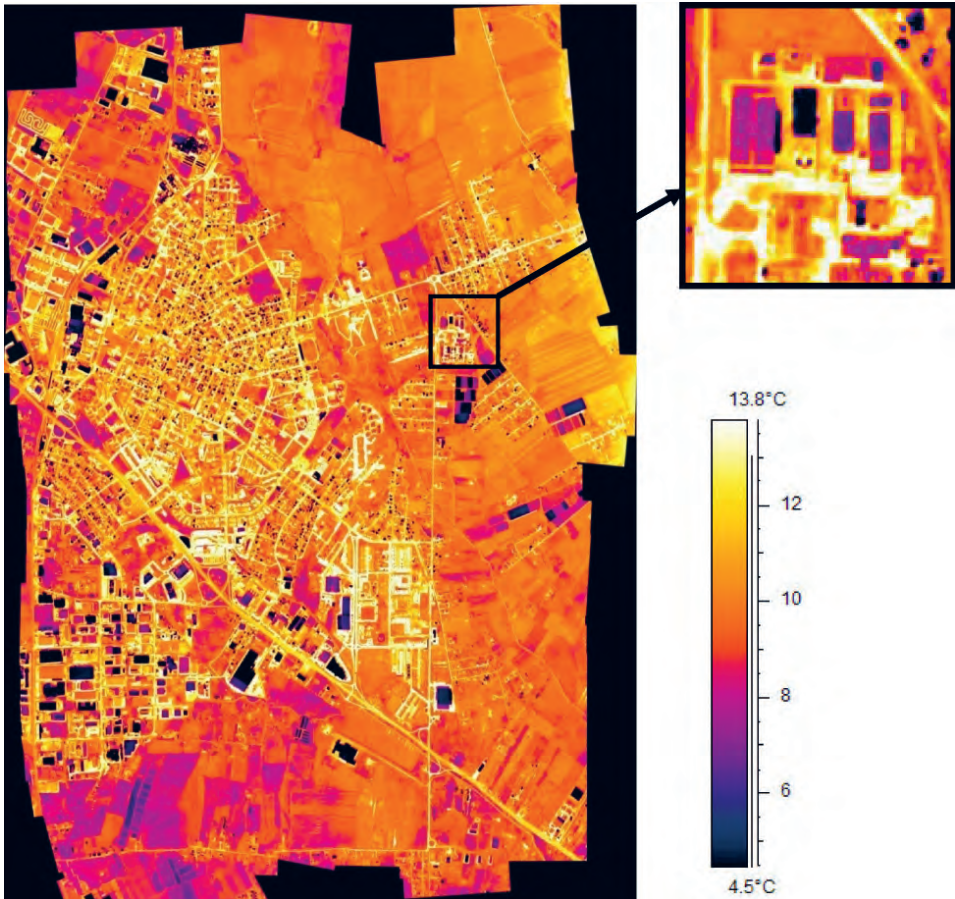
- a fixed network of 4 meteorological and air quality stations;
- a mobile network of 3 air quality stations to be installed on urban public transport vehicles;
- an eddy covariance station;



- set of satellite and aerial data with high spatial and temporal resolution, useful for the elaboration of thermal-multispectral maps and for updating the land cover map.

Database analysis and modelling resulted in a series of outputs useful for mapping the dynamics of the heat island, defining energy balance, and the flow of pollutants in an urban environment. In particular, these data allowed to develop a vulnerability map that integrates the impacts of urban heat island effects with those deriving from the concentration of pollutants. These new knowledge bases have in turn fed the Urban Centre's database.

**Fig. 7.** Urban Heat Island Map of Aprilia



Source: Municipality of Aprilia.

## **Aprilia Smart City, future developments**

The databases and tools have been designed and developed to be also functional to projects not yet implemented by the Municipality, but being in line with a participative and environmentally friendly approach to spatial planning. These governance and environmental monitoring tools will be essential for future programming and planning activities, such as the drafting of the SUMP and SECAP within the framework of the Mayors' Adapt initiative. This theme is connected, in particular, with macro-activity concerning the monitoring of the heat island and polluting substances, which will be essential, together with the local vulnerability map, for the elaboration of a local adaptation strategy.

## **Conclusions**

On the whole, the PLUS programme can be considered a good practice, even though so far not frequently debated in the existing literature. First of all, the programme claims credit for having healed the initial lack of interest of the Region in urban issues, although these were clearly addressed both by the Community Strategic Guidelines and the National Strategic Reference Framework. The initiative finally succeeded in drawing attention to cities as engines of regional development after many years since the last systematic urban regeneration programme, and, most significantly, in a regional context where urban structure is strongly influenced by the proximity of Rome, which too often attracts all urban efforts.

Despite past performances and problems encountered by measures under other axes, the PLUS programme proved that the Region is able to spend efficiently, and has succeeded in removing many obstacles to correct and timely use EU funds. Such a result has been made possible as a result of great effort invested in defining the management framework: strict requirements for implementation procedures, opportunities for the reserve list of interventions in the event of savings or delays, permanent monitoring, and technical assistance. All these provisions allowed the Region to be timely in spending and reporting the ERDF to the EU without financial/administrative artifices, the municipalities to finalise the plans without substantial and expensive project variants, and the involved enterprises to be paid in a reasonable timeframe.



Apart from tangible effects of spatial renovation and the availability of new facilities and services, one of the most important benefits of the PLUS initiative consisted in capacity building: management and implementation rules established by the Region had in fact forced local authorities to build up ad-hoc internal structure including representatives from almost all the administrative departments.

Furthermore, municipal staff members have often ended up acquiring significant expertise on relatively new and increasingly relevant topics, such as energy and mobility management and climate adaptation; these tools also enable getting familiar with ICT/smart applications and with new forms of public participation. In some cases, the PLUS experience led to the activation of permanent structures and monitoring systems conceived to manage future urban transformations such as the Urban Centre in Aprilia, as well as to trigger profitable collaborations with research institutions.

Despite the fact that the PLUS programme originated from a 2011 review of the 2007–2013 OP, it has entailed some significant constraints mainly caused by time restrictions imposed on the planning process. In many cases, plans were not founded on a strong, well-structured development vision, but defined *ex-post*, in order to hold together projects that in many cases were already in the pipeline. All the interventions had to be coherent with the city plan and the zoning code in force, but this compliance cannot be considered completely reassuring, since most of the town planning schemes in the Lazio Region are largely outdated, often characterised by several zoning variants, and do not reflect any development strategy or prioritisation that could address urban regeneration process.

The high predominance of public works in intervention lists has, on the one hand, contributed to compensating – at least partially – for missing offer of public space and services, thanks to the building of new, undoubtedly necessary facilities, such as the nurseries. On the other hand, however, it has highlighted the difficulty encountered by municipalities in involving the private sector beyond the subsidy schemes, apart from a few minor, supplementary interventions. Obviously, the lack of available time and the economic crisis also played a role in these circumstances; nevertheless, it raised concerns about the effectiveness of the programme in terms of its capacity to activate long-term urban regeneration processes.

A similar concern regards the risk of dissipating the expertise acquired by the municipal staff members and missing the opportunities arisen in the absence of a specific medium-long term programme and dedicated resources. Even if the 2014–2020 EU cohesion policy put the urban dimension at its very heart, the Lazio Region, differently from other Italian regions, has again omitted to include an explicit urban axis in its ERDF Operational Programme, even if many, clearly urban-related, issues such as mobility, energy efficiency, and social inclusion are addressed in a crosscutting way.

The challenge now is to figure out if the current regional development strategy, which is based on the principle of integration of the European, national and regional funding sources and programmes, will be able to capitalise on the PLUS experience and continue working actively for urban regeneration, even in the absence of a specific urban focus.

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