

TeMA

Journal of
Land Use, Mobility and Environment

This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

Tema is the Journal of Land use, Mobility and Environment and offers papers with a unified approach to planning and mobility. TeMA Journal has also received the Sparc Europe Seal of Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ).

INPUT 2014

papers selected

Smart City

planning for energy, transportation
and sustainability of the urban system

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

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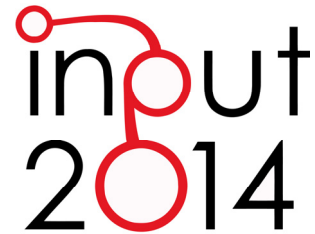
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This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

SMART CITY PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM Special Issue, June 2014

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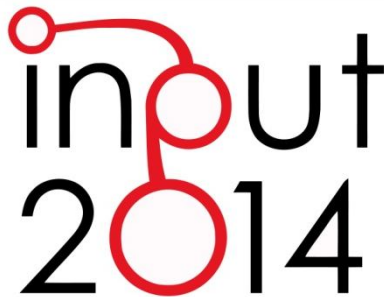
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SPECIAL ISSUE

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CLIMATE CHANGE AND ENERGY SUSTAINABILITY WHICH INNOVATIONS IN EUROPEAN STRATEGIES AND PLANS

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ABSTRACT

In recent years, the effects of climate change on urban areas have pushed more and more policy-makers and urban planners to deal with the management of territorial transformations in a systemic and multi-sector perspective, due to the complexity of the issue. In order to enhance the urban governance of climate change and cope with environmental sustainability, the concept of resilience can be used. In this perspective, the present work has a double purpose: on the one hand to reflect on the need to adopt a new comprehension/interpretive approach to the study of the city, which embraces the concept of resilience, and on the other hand to perform a reading of European strategies and plans oriented to mitigate the effects of climate change and to achieve the goals of energy and environmental sustainability. This paper describes some of the results of the knowledge framework of the *Project Smart Energy Master for the energy management of territory* financed by PON 04A2_00120 R & C Axis II, from 2012 to 2015 aimed at supporting local authorities in the development of strategies for the reduction of energy consumption through actions designed to change behavior (in terms of use and energy consumption) and to improve the energy efficiency of equipment and infrastructure. The paper is divided into three parts: the first is oriented to the definition of the new comprehension/interpretive approach; the second illustrates a series of recent innovations in planning tools of some European States due to the adoption of the concept of resilience; the third, finally, describes and compares the most innovative energy and environmental strategies aimed at contrasting and/or mitigate the effects of climate change, promoted in some European and Italian cities.

KEYWORDS

Environmental sustainability; Climate change; New comprehension approach; Adaptation strategies.

1 A NEW APPROACH FOR THE RESILIENT CITY

The population growth living in urban areas reaches 50% of the total, causing congestion, traffic, polluting air, noise and energy consumption, also due to the high density of urban activities. From the reading of the main world-wide reports (IPCC 2012; EEA 2012), it is clear that the core of the problem of emissions that affect the climate conditions is mainly concentrated on medium and large cities, where temperature is higher at least two degrees compared to less densely urbanized territory.

Cities play simultaneously actions of opposite sign: on the one hand they represent one of the principal source of pollution and global warming, and on the other hand they try to develop strategies of mitigation and adaptation to help combat the effects due to climate change.

Regarding these strategies is evident the essential role played by land use policy (mixed use, compact settlements) both towards mitigation and adaptation actions; the first are aimed at changing lifestyles mainly related to mobility and energy production and consumption in urban areas, while the second are aimed at anticipating the possible negative effects of climate change and at preparing plans, actions and measures for the construction of settlements that is able to conform to the consequences of climate change (IPCC 2001). Therefore it is clear that the declinations of the effects of climate change enhance the hard task of policy-makers and planners who have to work under conditions of increasing uncertainty in the attempt to outline future scenarios in systems characterized by high complexity and dynamism.

Most recent researches and documents regarding this issue strongly reveals the urgency to afford the problem in a multi-sectorial and systemic perspective, that has always characterized the planning theory. The European Commission, henceforth, has pointed out as seventh thematic strategy the urban environment (COM(2004)60), where it is necessary to integrate environmental policy with other actions. In this context it is required to develop new comprehension and methodological approaches, and to update tools and operational techniques of managing territorial transformation that «should adapt to the dynamism and diversity of the city» subjected to climate changes (Papa and Gargiulo 1995). In this perspective, the concept of resilience can be used as a guiding principle for the future growth of the city, integrating a systemic approach, which currently seems to provide good guarantees of connection with the studying systems. There are many authors and institutions that have formulated a definition of the concept of resilience in urban and regional sciences (Alberti et al. 2003; ONU 2009; IPCC 2012), describing it as «the ability of a socio-economic region, to absorb the endogenous or exogenous disturbances by change processes, so that the main functions, structures and relationships being essential for the well-being and sustainability of the region remain intact» (Lukesch, Payer and Winkler-Rieder 2010).

The definition given above underlines the connection between the concept of resilience and that one of sustainability; some authors emphasize that: «resilience is to the 2000s and 2010s what sustainability was to the 1980s and 1990s» (Foster 2010) and also that «a development strategy is not sustainable if it is not resilient» (Perrings 2006). But if the concept of sustainability considers the evolution of urban systems as mainly related to endogenous factors, in the attempt to achieve a stable equilibrium state when the present generation meets his own needs «without compromising the ability of future generations to meet their own needs» (WCED 1987), the concept of resilience looks at urban development as a process that evolves as a result of both endogenous and exogenous events, unexpected and unpredictable, involving the reorganization of the urban system towards a new dynamic equilibrium state. In summary, it is necessary that the tools and techniques of territorial transformation government «are no longer static projection tools and slow and bureaucratic techniques of formal control, but they must adapt to the dynamism and diversity of the city» (Papa and Gargiulo 1995). It is essentially to rethink the development model, and, in particular,

settlement and urban development, identifying the ways by which to reduce energy consumption maintaining sustainable economic growth rates and untying the link between economic growth and increasing energy consumption.

This consideration is confirmed by the fact that the weight of energy production from renewable sources out of the total production in Europe but especially in Italy, continues to be very low, and doesn't respect emission reduction targets. Furthermore the cost of the Kilovattora produced with the cheapest renewable sources available today (windpower) is even more triple than the one produced with traditional methods, such as from a coal-powered plant. This heavy gap doesn't allow the immediate solution to the problem but highlights how major benefits can be reached quickly with the lowest investment costs and how they are related to saving energy. Also in the transport sector, which is considered a major contributor to CO₂ emissions and air pollutants (COM (2007) 551), the goal of greater efficiency in transport sector doesn't depend only on technological innovation, but mostly on an effective reorganization of urban trips discouraging private cars. In this regard, ENEA in 2009 estimated that the doubling the current demand of alternative modes to private road transport, determines a total saving of approximately 2.7 Mtoe proving so that modal shift policies are as effective as those promoting energy efficiency through technological innovation.

Therefore an energy policy environmentally sustainable, characterized by an integration between energy, mobility and urban system, should be quickly adopted. Adopting a systemic and operative approach with a precise set of priorities and specific actions means to address the environmental challenges, impacting significantly on climate change and on urban mobility, two aspects that are strategic for the construction of future resilient cities.

A great deal of studies and researches on energy and environment have showed the lack of a systemic approach, that involves the various actions and initiatives of the territorial settlement. More and more the traditional division between city and countryside has determined a higher soil consumption causing the inevitable growth of road transport demand and worsening the territorial, environmental and energy unsustainability. Moreover, the transformations that took place in the city to meet the growing road private transport demand, have led to intolerable profiles of energy and environmental unsustainability, such as to exclude that policies oriented to improve energy efficiency of existing buildings, although essential, can be produce effects comparable to the scale of the problem. The research lines that afford the energy consumption reduction have been developing their field action only recently within the Relevant National Interest Research Programs (PRIN) and National Operational Programs (PON).

The integration among territorial transformations, planning mobility and environmental sustainability opens interesting perspectives for the definition of new intervention strategies that tie together, into a new model of governance of the territory, different aspects such as: the reorganization of urban system, rail transport, social housing, urban regeneration and the implementation of energy policies and climate adaptation

2 PLANNING AND PROGRAMMING RESILIENT CITY IN EUROPE AT NATIONAL LEVEL

In 1992, 28 European nations signed the United Nations Framework Convention on Climate Change (UNFCCC), which states that parties are committed to «formulate, implement, publish and regularly update National and, when appropriate, regional programmes containing measures to facilitate adequate adaptation to climate change» (UNFCC 1994).

Also the European Union (EU) has made the fight against climate change a priority in its program of action and it set up the European Climate Change Programme (ECCP) as the key vehicle for identifying and

developing, with Member State, policies and measures that can be taken at EU level to reduce greenhouse gas emissions. The second phase of this program was initiated in 2005 containing, in addition to the identification of further mitigation options, a work program on impacts and adaptation to climate change on certain topics of interest. One of them concerns the development of national adaptation strategies.

The European countries involved are at different stages in forecasting, formulating and implementing adaptation and mitigation strategies at national level. Starting from Finland who was the first European country to implement an adaptation strategy in 2005 with the FINADAPT, 23 other European nations including France, Spain, Netherlands, United Kingdom have adopted national strategies in the field of climate adaptation and some countries, such as Denmark, have already released the third update of its national action plan.

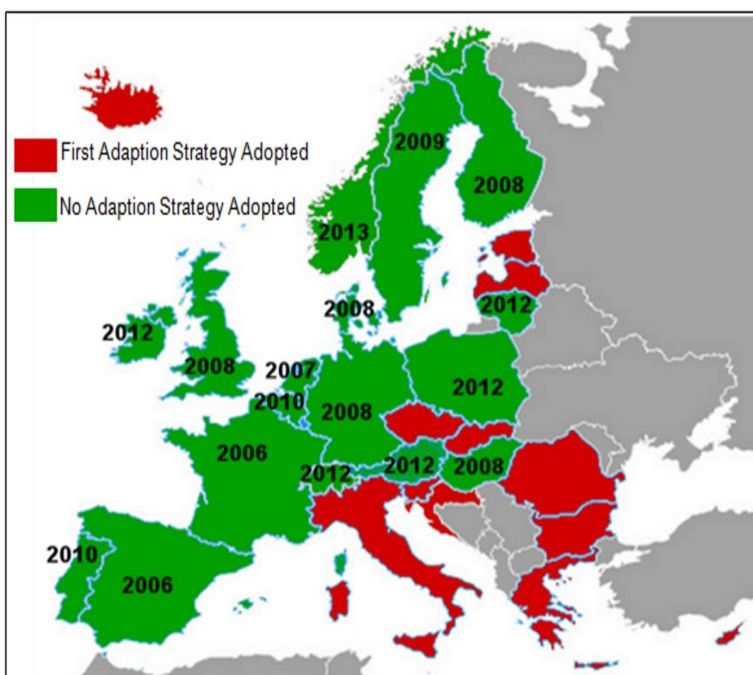


Fig. 1 The status of adaptation strategy developed in Europe: Italy is one of the few European countries that have not developed a unified plan of action at national level

France, for the development of the "Strategie nationale d'adaptation au changement climatique" (2006) set up a special authority called ONERC (Observatoire National sur les effets du réchauffement climatique). The strategy is merged in the "Plan national d'adaptation" (2011) which identified 80 measures to be implemented at different levels of decision in the period 2011-2015, adopting a multidisciplinary approach to the issue of adaptation that takes into account the strategic sectors such as: water, risk prevention, health, energy and industry, transport, construction, etc.

Spain has also entrusted to a special administrative body the OECC (Oficina Española de Cambio Climático) the development of the "Plan Nacional de Adaptación al Cambio Climático", approved in March 2006. The innovative aspect that characterizes Spain is the presence of two national coordinating bodies of the measures and policies on climate change: the Interministerial Group on Climate Change and the Commission's policy on climate change that coordinates and monitors the actions implemented at different administrative levels. The national adaptation plan represents the general framework to address the assessment of impacts, vulnerability and adaptation to climate change to which the administrations and

organizations, both public and private, must refer in order to assess the impacts of climate change in their areas of interest.

In the Netherlands, the government has developed and adopted in 2008 the national strategy for adaptation to climate change "Make Space for Climate!". This document was preceded by the implementation of two major research projects funded in 2005 to fill the gap between theory and practice in the field of climate change: "Climate changes Spatial Planning" and "Knowledge for Climate" that link the coordination between the different stakeholders: government, business and research institutes, assuming climate change and climate variability as guiding principles for spatial planning.

The UK has started to pursue policies on climate change since the late eighties with the "The Non Fossil Fuel Obligation" (1989) and today is the only European country to have a law to reduce emissions carbon by 2050 (Climate Change Act 2008). This document contains both mitigation and adaptation legislative measures that require careful and constant monitoring program to recalibrate objectives, policies and interventions every five years in order to address the risks of climate change. In October 2008 the UK Government created the Department of Energy and Climate Change (DECC). This new department brings together the responsibilities for energy policy (previously with BERR –the Department for Business, Enterprise and Regulatory Reform), and the climate change mitigation policy (previously with Defra - the Department for Environment, Food and Rural Affairs).

Italy, Cyprus, Luxembourg, Poland and Slovenia are the only countries in Europe that have not yet developed a national adaptation strategy. In particular, Italy presents a very fragmented situation: in addition to not having taken any national strategy is in trouble even in the so-called downscaling, the transition from general strategy to the practical application at a local scale (Eco dalle Città 2013).

From the energy efficiency point of view, the European Union has already adopted several legislative measures to increase energy efficiency in various sectors - buildings, generation of heat and electricity, domestic appliances etc. The European Commission started a broad debate in 2006 with a Green Paper on Energy Efficiency which has been realized in the publication of the Action Plan for Energy Efficiency adopted on 8th March 2011. The Directive sets an indicative energy saving target of 9% by 2016 and establishes that the Member States have to submit three National Energy Efficiency Action Plans (NEEAPs), scheduled for 2007, 2011 and 2014.

Energy efficiency is also at the heart of the EU strategy "Europe 2020" for smart, sustainable and inclusive growth. The EU's energy priorities are set out in the Communication "Energy Roadmap 2050", adopted on 15th December 2011, in which the EU committed itself to reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050.

Up to this day, almost all member states have already adopted the second National Action Plan and the results achieved are monitored by relevant experts as provided by the European project "Energy-Efficiency-Watch" that has finalized 27 reports for every EU Member State which provide a qualitative overview of the specific national energy efficiency policies and their implementation.

France has adopted a participatory decision-making approach to prepare its Action Plan for Energy Efficiency (National Energy Efficiency Action Plan), bringing together in a series of meetings (Environment Round Table) State, regional and local administrators; the guiding principle of this decision was to «define a roadmap for sustainable energy development, through drawing up concrete and quantifiable measures with as much agreement as possible from the participants». Two are the main challenges that France energy policy aims at engaging: a more efficient management of energy demand and the improvement of the energy supply to meet the needs of consumption. In particular, in order to support the actions for challenging energy sustainability, is crucial the role played by "Agence de l'Environnement et de la Maitrise

de l'Energie" (ADEME) which is engaged both in promoting the use of renewable sources, and in making more informed citizens and private entities in the field of energy saving.

Since 2005, Spain has begun to develop a sustainable energy policy aimed at improving energy efficiency and at widespreading the use of renewable energy (IEA report 2009). Because of these objectives two tools that contain the priorities for energy policy for the horizon 2020 have been developed: the Energy Efficiency and Saving Energy Action Plan and the Renewable Energy Plan. The process of development of both plans was carried out simultaneously (the plans were approved in July and November 2011), in order to be able to realize in a concrete way a sustainable energy model.

The Netherlands has approved in 2011 the second National Energy Efficiency Action Plan, which sets an energy savings of 2% per year of energy savings by 2020. To achieve the targets for reducing CO₂ emissions and the production of electricity from renewable sources the Dutch government has also promoted the Green Deals, that are agreements between the business community and the local governments to promote the industry adaptation to emission standards and to stimulate new projects of green energy production. However, in the Netherlands there is a lack of ambition and enthusiasm of energy efficiency policies, of stable investment climate due to frequent changes and of funding programmes for building renovation are among the reported critical issues. Positive developments include an increase in fuel taxes which creates better economies for energy savings as well as more private initiatives for energy efficiency, also on regional level (EU 2012).

The UK, in line with the European Directive Energy Roadmap, established in December 2011 a reduction of 80% of greenhouse gas emissions by 2050 with the Carbon Plan, and identified four possible scenarios for 2050, relative to 1990, which imply a per capita demand reduction of energy consumption between 31% and 54% relative to 2007. On 18th October 2011 the UK approved the Energy Act 2011 that provides for a step change in the provision of energy efficiency measures for homes and businesses. The Government has already made progress through radical initiatives such as the Green Deal, a new financing framework to enable the provision of fixed improvements to the energy efficiency of households and non-domestic properties, funded by a charge on energy bills that avoids the need for consumers to pay upfront costs.

Italy has placed the promotion of energy efficiency among the priorities of its national energy policy, elaborating two National Action Plans; the first Energy Efficiency Action Plan (EEAP), which was presented in July 2007, identified the guidelines that the Italian Government has intended to pursue to achieve the objectives of improving energy efficiency and energy services. In July 2011, the second EEAP was approved and, retaining the quantitative target for reducing consumption to 2016 amounted to 9% (126,540 GWh / year), it aims to relate renewable policies with energy efficiency policies. At the same time the National Action Plan for Renewable Energy (PAN) was issued by the Ministry of Economic Development and the Ministry of the Environment, and this Plan provides further guidance for energy efficiency, as a prerequisite for achieving objectives in the field of renewable energy and reducing CO₂ emissions.

3 ENVIRONMENT AND ENERGY STRATEGIES IN EUROPE AT LOCAL LEVEL

In this section the current strategies implemented in some European cities for adapting them to climate change will be discussed. The reading of the strategies has been carried out in function of three sectors which may influence or which may be affected by climate change in urban areas: energy, transportation and planning.

In addition to individual initiatives adopted in each of these three sectors, in recent years many European cities have joined the Covenant of Mayors (Covenant of Mayors) on a voluntary basis; it was promoted by

the European Commission on 29th January 2008, during the second edition of the EU Sustainable Energy Week, aimed at involving the local governments towards energy and environmental sustainability. The main actions of signatory cities of the Covenant to reduce emissions of harmful greenhouse gases by 20% by 2020 are: green mobility, energy efficiency of public and private buildings and public awareness. This formal commitment is to be achieved by the implementation of sustainable energy action plans (SEAP), that many cities have already adopted, to demonstrate how the council intends to achieve the goals of reducing CO₂ emissions by 2020.

The starting point for the drafting is the emission inventory (Baseline Emission Inventory-BEI) which constitutes a snapshot of municipal energy situation with reference to the year since then the reduction of carbon dioxide emissions shall be assessed. In fact, on the basis of the data collected and processed in BEI the municipal administration will be able to identify areas of priority action plan and energy saving measures in the public and private sectors.

London was among the first cities to join the Pact, and to submit, in 2011, the SEAP developing its own action strategies for saving on three pillars: retrofitting green London (retrofitting existing buildings in order to reduce the energy consumed to heat environments and produce hot water), greening London (increase the arboreal soil of 5% by 2025 for a report of a tree for every Londoner and create a network of green areas) cleaner air for London (improving air quality by focusing on the use of non-fossil fuels). A careful identification of direction of intervention allowed the London Government to act jointly and synergically on multiple themes (energy, environment, sustainability and air pollution) to ensure that it becomes «the best big city in the world» (Mayor's Energy Strategy 2011), characterized by low levels of carbon dioxide in the atmosphere and a high quality of life. The action strategies outlined in the several planning tools of the UK capital (Mayor's Air Quality Strategy, Mayor's Transport Strategy, The plug-in vehicle infrastructure Strategy, Hydrogen Action Plan) fully comply with the guidelines and objectives contained in the higher level plans.

As London also Amsterdam has developed and implemented integrated policies in the field of transport, energy and environment thanks to the planning model adopted at national level, the Polder Model, which ensures a sustainable future. To encourage change in the use of energy and reduce carbon emissions, Amsterdam has developed two strategic documents: the New Amsterdam Climate and the Amsterdam Smart City; the last one appears as a great opportunity for a collaboration between the government agencies, the community and the entrepreneurship to design and implement projects in the fields of labour, housing, mobility and production of renewable energy, in order to demonstrate «how energy can be saved, now and in the future» (Amsterdam Smart City 2011). Amsterdam has joined the Covenant of Mayors in early 2009, with the goal of 40% reduction in CO₂ emissions compared to 1990. Actually, on the website of the Covenant of Mayors, where it is possible to consult all information relating to the signatories and their membership status, rather than the actual plan document Amsterdam has published its action strategy that provides only a summary of the real situation and of the main measures that the Administration wants to take. In this document the key actions for a radical change are: the total use of renewable sources and the uptake of electric vehicles articulated with respect to short, medium and long term (up to 2015, 2015-2025-2025, 2040).

Among the European cities that have integrated transport policies with environmental ones, assigning to the energy and environmental sustainability a key role, there is Paris which puts as its main objective of planning strategies the improvement of accessibility and quality of life. In 2006, after consultation of citizens and local communities, the "Plan de la Protection de l'Atmosphere" (PPA) has been approved for the entire region of Ile-de-France, aiming at respecting the limit values for air quality based on 16 measures articulated in four categories: regulatory measures, to be implemented permanently or in case of strong pollution; contractual

measures, based on voluntary participation of transport companies; further measures for the development of transport; recommendations to citizens and enterprises. The environmental plan for reducing greenhouse gas emissions (Plan de lutte contre le dereglement climatique) constitutes the SEAP which, unlike the other cities analyzed, concerns with a metropolitan area such as Ile-de-France. This plan aims at achieving goals far more ambitious than those of European strategy: not 20-20-20, but 25-25-25. The determination of the French Government to reduce air pollution and emissions of CO₂ and other toxic agents related to urban transport has led to a further update of SEAP in 2011 that aims mainly at electrical and even more at cycling mode. To confirm this, Paris government has implemented different initiatives oriented to make favorable the road electric traction transport (Autolib) and the use of alternative transport systems to the private car when the underground trains and buses are no longer in service (Velib).

To drive, manage and monitor Barcelona's energy plans it has been created a public consortium named "Barcelona Local Energy Agency". The first Plan oriented to sustainable energy was approved in 2002 (the Barcelona Energy Improvement Plan (PMEB)) that is an innovative document provided the frame of reference for the city's energy policy between 2002 and 2010. This plan forms the general framework for the work of the Barcelona City Council in matters of energy policy and its environmental impact on the city and establishes a set of local action measures addressed to the achievement of a more sustainable city model. As a continuation of the PMEB, the Barcelona Energy Agency (AEB) has drawn up a new plan called "Energy, Climate Change and Air Quality Plan of Barcelona 2011-2020 (PECQ)". More extensive than the PMEB, the PECQ deals with the current circumstances not just in terms of energy but also in terms of the climatic situation and the air pollution that affects the city. The plan also needs to ensure that the public administration is provided with strategic instruments that lead to improvements in the health of the general public by reducing polluting emissions, promoting the efficient use of energy resources, and reducing greenhouse gas emissions. In order to achieve this objectives several actions and projects have been promoted such as the "Solar ordinance" that regulates the incorporation of solar thermal energy and its use for the production of hot tap water in the new, restored and fully refurbished city's buildings and the pilot project "Live Barcelona" which is the platform that is promoting the electric vehicle in the city by creating a network of electric cars charging public points.

In Italy the issue of climate change is engaged just in some of the planning tools at provincial level (such as the ones of Venice and Syracuse); on the contrary the energy saving theme involved several regions and provinces in the development of appropriate energy plans that define the objectives to which the policies of local governments should tend towards.

At the local level, compared to the 800 cities that have ratified their volunteer commitment in the Covenant of Mayors, only 44 municipalities have a Municipal Energy Plan by 2010 despite the existence of a national law (L. 10/91) which states that «the municipal planning tools, in the city with more than fifty thousand inhabitants, must include a specific plan regarding the use of renewable sources of energy».

From the analysis of some of the Municipal Energy Plans and their associated Action Plans (City of Bergamo 2011; City of Udine 2009; City of Reggio Emilia 2008) it is interesting to observe that the actions for the mobility sector would lead back to:

- promote sustainable transport modes, encouraging a greater use of public transport;
- rationalize and enhance the public transport system, both through direct actions on the physical system (upgrading the transport system) and through actions to improve livability of urban areas (institution of low emission zones, pedestrian island, etc..).

These actions result substantially in individual initiatives promoted by the municipalities and, even if they represent good examples, they are not integrated in an unitary point of view. The measures to reduce

emissions and to increase renewable energy are effective “only in theory”, rather than in reality. For example, Italy according to the EC Directive 77/2011 has to reach the goal 22% of renewable energy production by 2010, but, in recent years, the effective percentage of renewable sources for electrical uses has remained largely steady on the level of 16%. In addition, the transport sector is second only to the civil one for total energy consumption and 95% of the energy used comes from oil source. Currently, in Italy, energy policy refers to the Regulations regarding to real estate already existing or just built are more detailed and are mainly focused on improving the efficiency of buildings; however they reveal little effective because of the complexity of energy problem. These interventions occur with a very wide temporal frequency (30-40 years or more), and it makes the response produced by it inadequate both for the number of interventions that occurs and for the transformation rate compatible with the needs to reduce energy consumption, both globally and locally.

4 CONCLUSIONS

From the analysis of the experiences it can be seen a gap between the current situation of the policies aimed at engaging climate change and those aimed at energy saving. In the first case a gap stands out between the approaches provided by scientific literature as well as by institutional documents and the consequent implementation at local level. In fact, while at European level there is unitarity in the directives and addresses provided, at the lower administrative levels the rate of fragmentation of documents and plans increases.

There are only few European cities, such as London, that have drawn up rules of national planning (planning policy statement) establishing a direct link between planning tools, policies for energy planning and climate protection. The approval of a specific planning rule at the national level has in fact forced local governments to adopt plans oriented to the protection of the climate.

On the contrary, in Italy, through the analysis of urban planning tools and of mobility governance as well as the ones referred to the energy issue, results a strong awareness of the need to adopt strategies oriented toward the reduction of polluting emissions to the implementation of natural mechanisms of uptake (mitigation) and new strategies aimed at contrasting the possible adverse effects of climate change and at drawing up dedicated plans. On the other hand, it's evident also that a national unified reference framework causes heavy restrictions on the implementation of concrete actions.

From climate change point of view the European countries, that have not yet done it (Italy), should develop an action plan at the national level that establishes guidelines for the preparation of mitigation and adaptation actions; secondly these guidelines should be followed up by the preparation of plans and regulations at the local level in order to contextualize the mitigation and adaptation actions referring to the main socio-economic variables that characterize the territory to which they relate, in order to “think globally and act locally”. The aspects that affect the energy efficiency especially at the building level, result deeper and more effective. Currently in Europe, most energy policies now cover the existing or new construction housing stock.

Unlike what happens with the issue of climate change, in which it becomes necessary to shift from the national to the local scale, for energy efficiency it is hoped that the measures and regulations prepared should focus not on the individual building but widen the range action to urban settlements. Therefore the effort that European cities need to take is the passage from the buildings energy efficiency to the settlements energy efficiency as most the energy consumption in urban areas is linked to the city working and its services (IPCC 2012).

Another topic related to the energy issue concerns the transport sector that in Europe has the highest consumption of fossil fuels and is the sector with the fastest growth rate in terms of energy use (EU, 2007). As most international organizations and research institutions believe, the goal of greater efficiency in transport sector doesn't depend only on technological innovation, but also on an effective reorganization of urban trips discouraging private cars. Therefore in order to bring the experimental initiatives into effects (such as car sharing, bike sharing etc.), an energy policy environmentally sustainable, characterized by an integration between energy, mobility and urban system, should be quickly adopted.

Henceforth initiatives such as the Covenant of Mayors might provide a valuable contribution, as SEAP is based on interrelationship between these areas. Anyway the implementation of the SEAP has some points in common with various cities, though each city show its own characteristics and therefore needs specific solutions for transport problems they suffer. In all the proposed European cases an integrated planning process has been developed, focusing on shared decisions among the various stakeholders and particularly with the community.

An open participation is the fundamental element to achieve prearranged objectives as energy sustainability begins mainly with a radical lifestyle change. Italy is making progress too in the definition of integrated policies; however, the integration between urban and transport plans analyzed often remains a theoretical aspect and the description of the objectives to be achieved in the field of urban mobility is almost always in reference to the reduction of greenhouse gas emissions and not to energy saving too.

Energy saving should therefore be regarded as a consequence of the reduction of polluting emissions and not as a goal. All the examples referred to Italy have considered SEAP as an important opportunity in order to identify the best solutions for their own problems about energy efficiency and urban transport. In fact these elements represent both a challenge and an opportunity to rethink the future of cities, to transform and improve life conditions. The definition of a national strategy, however, seems increasingly remote because during the last Conference of the Parties COP17 held in Durban, South Africa in December 2011, the nations who attended the conference have agreed to enter only by 2015 a formal and legally pact that legally bind the different country to reduce greenhouse gas emissions by 2020. This means that until 2020 the signatory countries of the IPCC should only respect the voluntarily commitments made in past years. Summarizing, despite the large efforts currently underway, policies at city level are still fragmented and effective tools to support decision-making processes are still lacking (Corfee-Morlot *et al.* 2011).

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IMAGES SOURCES

Fig. 1: Rielaboration of the authors, on the basis of PEER (Partnership for European Environmental Research) Report: Europe Adapts to Climate Change – Comparing national adaptation strategies, www.peer.eu.

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