



Climate change, urban energy and planning practices: Italian experiences of innovation in land management tools

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ABSTRACT

Climate change and energy saving are challenging the city and the territorial organization. Innovative spatial and urban planning methods and procedures are required, and new approaches and instruments must be elaborated and applied in order to shift from the building scale to the urban and territorial ones. In fact, while energy saving and emission control measures are usually applied to single buildings, plants and technological systems, the urban and territorial scales are not fully considered, although energy consumption and greenhouse gases reduction are connected to the urban form and density, to activities allocation, to mobility, etc., thus involving spatial and land-use planning decisions. It is therefore urgent to overcome the divide between energy and urban planning by elaborating and using new implementation tools. In general, the usual top-down, public-led actions are no longer politically and economically viable, whereas new methods based on public-private partnerships are being progressively adopted. This is a major change, which may set new objectives for planning practices in terms of urban quality, equity, and energy efficiency. This perspective requires redefinition of the usual methods for development rights assignment, and the activation of new planning procedures based on the assessment of actions in terms of performance instead of conformance to pre-defined rules. The expected results regard a more efficient land market and better performing development (or re-development) choices.

The article focuses on the Italian case and analyzes the possibility of integrating energy planning with spatial planning, the effectiveness of plan implementation mechanisms, and the prospect of integrating public-led interventions with market tools. Recent innovations in the legislative framework support the inclusion of energy saving and climate change adaptation and mitigation goals in plan implementation procedures.

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Climate change and energy. A challenge to urban policies and planning

The causes and effects of climate change have long been debated by scientists, opinion-leaders and politicians, and there is consensus that the risks are of paramount importance, thus soliciting urgent actions in the perspective of a 'low carbon society', which entails reducing the impact of human activities on the climate by abating greenhouse gases (GHG) emissions and reducing fossil fuel consumption. This perspective involves many actors in different fields, and particularly challenges the organisation and management of the city and the urbanized space, which are the places where most of the GHGs are produced and energy is consumed (Campbell, 2006; OECD, 2008; Gossop, 2011; Romero-Lankao, 2012). The impact is caused mainly by the use – generally in an

inefficient way – of fossil fuel energy to manage the built environment (heating, cooling) and transport (Owens, 1984, 1992).

It has been affirmed that "[c]ities are part of both the problem and the solution" (Lindseth, 2004, p. 328), and therefore "[m]uch of the necessary action will have to take place at the level of the city where half of the world's population lives" (Gossop, 2011, p.495). Response to the challenge of climate change regards mitigation (GHGs abatement) and adaptation (according to the new climatic phenomena and risks) policies and actions, in pursuit of a built environment which is less energy eating, less pollutant and more resilient. Appropriate urban policies must therefore be activated, innovating the manner in which buildings and cities are designed, constructed and managed in order to improve their performance in energy use and to provide greater support for diffuse energy production (Meijer et al., 2011; Baglioni et al., 2010).

Since the first Scientific Assessment Report, published by the Intergovernmental Panel on Climate Change (IPCC) in 1990, many initiatives at international, national and local levels have been taken in the fields of climate change and energy saving: the UN Framework Convention on Climate Change (UNFCCC)

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agreed in 1992 in Rio de Janeiro, the Kyoto Protocol Treaty agreed in 1997 (but the follow-up Durban Conference in 2011 cannot be considered a success), and many actions of the European Union (European Commission, 2010, 2011a,b). A recent document (European Commission, 2011c) emphasizes that “up to 75% of CO₂ emissions are generated in cities” and has launched the ‘Europe 20-20-20’ strategy aimed at improving the use of resources and at reducing GHGs emissions. The recent proposals for ‘low carbon cities’, ‘post carbon cities’, ‘transition towns’, smart cities’ are good examples of how to address the endeavour innovatively (<http://www.lowcarboncities.co.uk/cms/>; <http://www.smart-cities.eu/>; <http://www.transitionnetwork.org/>). Other initiatives have been taken by national states, developing mitigation and, in particular, adaptation strategies, in order to build an ‘adaptive capacity’ of cities and regions – which in many countries are facing highly risky conditions (Bicknell et al., 2009) – although generally a minor role has been given to spatial planning (Greiving and Fleischhauer, 2012).

As regards the specific issues to be tackled, particular attention must be devoted to the residential sector, which plays a key role: in 2005 in Europe it accounted for 26.6% of the final energy consumption (EEA, 2008). It has the highest potential for energy efficiency increase once the constraints generated by the urban form and organization have been overcome, and spatial plans and building regulations have been innovated. The goal of high-energy performance buildings is the object of a EU directive (EPBD Recast: European Union, 2010) defining a path towards ‘nearly zero energy buildings’. This endeavour regards new constructions, while a previous directive (EPBD 2003: European Union, 2002) also considered the existing stock, establishing mandatory energy certification for property transactions. This was transposed into Italian law in 2007.

A local-level initiative, supported by the European Commission, is the ‘Covenant of Mayors’. This promotes the involvement of local authorities in fighting climate change, in particular by actively working to meet the target of a 20% reduction in CO₂ through “increased energy efficiency and development of renewable energy sources”. The key instrument is a Sustainable Energy Action Plan (SEAP) and the subsequent monitoring of how it is applied and to what extent the measures adopted really to achieve the targets.

The activation of ‘low carbon’ policies and measures therefore requires renovated spatial planning practices (Biesbroek et al., 2009; Laukkonen et al., 2009; Priemus and Davoudi, 2012), as well as the use of effective implementation tools (Bulkeley, 2006, 2009; Betsill and Bulkeley, 2006; Wilson and Piper, 2010; Gossop, 2011, Torres and Pinho, 2011). A first problem to be addressed regards the efficiency of energy use in terms of performance by buildings and plants (the ‘nearly zero energy buildings’ perspective); a second one concerns the urban form (urban sprawl control, in particular) and solar exposure, which affects energy needs and production potentials (Steemers, 2003; Ratti et al., 2003, 2005); and a third one regards mobility (Naess, 2003, 2005), which must be managed within coherent urban policies (Echenique et al., 2012). All these aspects are closely interrelated and involve other urban planning issues, such as urban density, the presence of an appropriate mix of activities (reducing local mobility), the role of green areas (mitigating summer heat), and the effectiveness of public transport (Wilson, 2006; Banister and Anable, 2009; Wilson and Piper, 2010; Romero-Lankao, 2012). Attention must in particular shift from the building scale to the urban one so as to assume responsibility for the energy impacts of urban development, to take advantage of urban potentials, and to control urban micro-climates, by supporting not only the refurbishment of single buildings but also the reorganization of inefficient and run-down districts, the appropriate selection of development areas, the improvement of collective mobility, the reduction of heat island effects, etc.

The agenda of land management research and practice must therefore be innovated, firstly by overcoming the divide between energy and urban planning (Dente, 1996), and secondly by applying new implementation tools incorporating saving and production energy goals based on appropriate indicators measuring efficiency and effectiveness. This is the endeavour to remedy the “implementation deficit” (Campbell, 2006) affecting public policies oriented to sustainable development and climate change, and energy efficiency as well (Owens and Hope, 1989; Kearns and Paddison, 2000; Betsill and Bulkeley, 2006; Lombardi et al., 2010).

Planning practices are progressively being characterized, and not only in Italy, by new methods based on public-private partnerships in search of equity and effectiveness in the planning process, and they can include new objectives in terms of urban quality and energy efficiency. The urban space management toolbox is characterized by a variety of instruments. Regulation and authoritative tools are traditionally used in Italy, both because of its ‘urbanism tradition’ and the Roman law system (Tira and Zanon, 2011), but public-led and top-down actions have largely proven to be no longer politically and economically viable (Kearns and Paddison, 2000) because of the scant consensus on authoritative tools (such as expropriation, but also regulation) and due to the shrinkage of public money. Moreover, the effectiveness of regulation tools regards only some of the processes to be activated, and the involvement of households and the mobilization of economic operators require market-based mechanisms making it possible to balance or to trade local advantages and disadvantages, including those connected with energy – and GHG emission – factors. In fact, the emergence of energy issues has modified even the mechanisms of urban land rent, because values increasingly involve energy factors: solar exposure, proximity to urban activities, possibility to connect buildings to energy waste re-use systems or to co-generation plants, etc. The energy challenge therefore requires redefinition of the usual methods of development rights assignment, and the activation of new planning procedures based on the assessment of actions in terms of performance instead of conformance to pre-defined rules. Motivations for the innovation of urban policies and tools regard the search for better performing development (or redevelopment) choices and a more efficient land market, that means incorporating energy issues.

The questions addressed by the article can be stated as follows:

- Are climate change and energy saving issues to be included in urban policies and in planning practices?
- Are regulation measures to be integrated with market-stimulation tools?
- Can award-based mechanisms be appropriate tools with which to support urban energy efficiency and energy generation? In this regard, can the recent Italian scheme making use of a reward-based mechanism be a starting point for further innovation?

The article first presents an overview of the importance of GHG emission control and energy saving at the international level and the role of urban policies, and then addresses these issues in relation to urban space and spatial planning (Tracing connections. Urban space, GHGs and energy section). On the basis of an analytical framework connecting policy analysis with a neo-institutionalist approach (A theoretical framework. Integrating energy policies and urban planning section), the article focuses on energy planning and plan implementation tools with particular regard to the Italian case. In particular, the possibility of integrating energy planning with wider urban policies and the effectiveness of market oriented devices are developed and discussed on the basis of a survey on the Italian municipal energy plans (*Piano Energetico Comunale*) (Energy planning. The experience of four Italian cities section and Discussion. Energy planning and urban issues section), and on the

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