

Renewable energy sources technologies in the built environment: a new operating scenery in Italy

MARIA FIANCHINI¹

¹ DASTU - Dipartimento di Architettura e Studi Urbani, Politecnico di Milano, Milano, Italy

ABSTRACT: The European 2020 goals have led to an updating of Italian national and regional rules, aimed to speed up the process of development of renewable energy source technologies in the whole country. The new rules have been based on some strategic action lines, such as: the regional sharing of national 2020 goals; the promotion of economic and/or fiscal incentives; the increasing of R.E.S. technologies integrated into the built environment; the simplification of the procedures for the works permission.

This paper presents some of the outcomes of a national funded research on the renewable energy sources technologies integration into "sensible" built environments (such as historical settlements, cultural heritage, etc.).

The new model of process, as it comes from the new national and regional procedural guide lines and from other current regulations, is described and analyzed. The main theoretical and practical problems are put in evidence, regarding both the latent conflict between energy saving and cultural elements preservation goals; and the change of the roles and responsibilities of the different stakeholders involved in the process (people, local administrators, "national trust" bodies, building owners, designers, producers).

Finally, some strategic lines are outlined, aimed to improve the actual process, by the stakeholders' education, involving and empowerment.

Keywords: solar energy; built environment; cultural heritage; procedures; local community

INTRODUCTION

Italy is a country densely populated and built, with a high solar potentiality. There, more than 70% of housing buildings are more than 40 year old, and only about 10% of them have been built later than 1990 [1, 2]. That means, on the one hand, a large part of existing buildings need works for improving their energy-saving performance and comfort; on the other, they could offer high opportunities for enhancing the productivity of solar energy.

The need to act quickly and amply -to meet strategies aimed at improving the processes of energy production and use- implies the possible activation of a variety of parallel intervention processes, in which different decision makers operate independently, even on areas close to or contiguous, and that, consequently, open up important issues regarding the governance of the induced transformations.

Therefore, it seems particularly significant the topic of the R.E.S. technologies integration in built environment, referring to the Italian territory, which is characterized by a widespread presence of ancient towns and landscapes with a great cultural and environmental importance. In those sites, the potential impact of the transformations on the inside of homogeneous contexts would be differently exalted, referring to the degree of

variability of shape and technique, allowable for every single intervention; due to the involvement of a multiplicity of subjects (such as technicians, dealers, customer), each one with different education, taste, intentions, etc..

A leading role has been assigned to the micro-production of energy from renewable sources, by the national strategies for the 2020 targets; despite, in actual fact, the contribution of installations in the built environment is limited by the physical and functional elements of the urban tissue, as to which few types of systems are compatible. In order to pursue, therefore, the widest dissemination of these systems, some rules have been fixed for the economic incentives and the procedural simplification, which give way to great opportunities for intervention, but also engage potential problems, among which it especially highlights the latent conflict between the objectives of the energy sustainability and those of preserving the architectural characters of the settlements.

LEGISLATIVE FRAMEWORK

Since the beginning of the twentieth century, in Italy, the protection of cultural heritage and landscape has been supported by specific laws, updated several times. These have always fixed which groups of public and private

properties should be covered by a special system of protection, through the ratification of a protection bond, owing to which, any intervention should be carefully examined and authorized by the cognizant bodies. These laws have not always been fully effective in pursuing its objectives, so as consistent with the parallel evolution of the theoretical and cultural references. Indeed, both definitions in use of “cultural heritage”- as “every property which is an evidence of civilization” – of the 1964 [3], and of “landscape” -as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” of the 2000 [4]- show to have shifted the focus from the inherent characters of objects or sites, in favour of the connections with the social context. However, the “*Code of Cultural Heritage and Landscape*” -in force by the legislative decree no. 42 of 22 January 2004 and subsequent amendments- goes on with selecting the properties to be listed, by strict criteria, and with choosing the statement of cultural or landscape interest as preservation guarantee.

In fact, the *Code* makes the interventions on the cultural heritage subjected to an authorization of the Superintendent, and those on the landscape heritage subjected to a “landscape authorization” of the regional administration or the local authority delegated, upon opinion of the Superintendent. Then, there are additional areas and ways of protection, potentially guaranteed by other bodies (such as local authorities), through their planning and regulations; especially, the settlements of historical, artistic or environmental importance (named “A Zones” by ministerial decree D.M. n° 1444/1968) are frequently the subject of protection.

Only in the last decade, however, in order to reset the energy processes with a global sustainability view, and to comply with European directives, it has been settled a legislative framework to support the production of energy from renewable sources. Since Legislative Decree n° 387/2003, this has evolved independently from the issue of the protection of the built environment, while ensuring compliance with the regulations relating to the safeguard of environment, and to the preservation of landscape and cultural heritage. However, the continuous raising the objectives of rationalization and simplification of the authorization procedures, through subsequent laws (legislative decree n° 115/2008, law n° 73/2010, ministerial decree D.M. 6/8/2010) led, a bit at time, to the decrease of preservation conditions.

In order to rearrange the procedural system, and make it nationally homogeneous, on 10 September 2010, they were issued the “Guidelines for the procedure ex Article 12 of Legislative Decree 29 December 2003, n° 387 for authorization to construct and operate plants producing electricity from renewable sources as well as

technical guidelines for the plants themselves”, by decree of the Ministry for Economic Development in consultation with the Ministry for the Environment, Land and Sea and of the Ministry for Cultural Heritage and Activities.

REGULATORY MODEL

The process of legislation production -in order to support the spreading of systems from r.e.s.- aims to ensure homogeneity for the procedural criteria at the national level, so as the greatest reduction of constraints and controls for interventions in the built, which are especially considered as impediments to pursue those goals.

In fact, national guidelines are designed to support the regions and the autonomous provinces of Trento and Bolzano, so in their own administrative activities, as in coordinating and supervising administrations with their delegacy; in order to prevent any obstacle and / or unwished unhomogeneity, potentially resulting from the high level of administrative decentralization. In addition, the guidelines should facilitate the harmonization of the goals of economic and social development with the protection of the environment and preservation of natural and cultural resources, so as the procedural simplification, the transparency and the certainty in decisions by the various administrations involved in the authorization procedure. However, the only contribution produced about the preservation, concerns the siting of wind turbines in the landscape; for the rest, they only confirm the need of exhibiting required authorizations and / or deeds of project approbation, where due, according to current legislation at national level.

A primary role is assigned to the Regions and Autonomous Provinces in implementing the program of spreading the r.e.s. systems; in fact, they are called to be a party in the achievement of the 2020 goals -according to *burden sharing* policy-, and to reconcile their policies for the protection of environment and landscape and of cultural heritage with the development and promotion of renewable energy, at the local level. Therefore, each region must issue regional procedural guidelines (conforming to national ones), develop a regional energy planning and, at the same time, identify the “areas and sites unsuitable” for the localization of systems, referring to the various r.e.s. technologies.

However, regions have limited autonomy in the development of strategies for the preservation of sites and landscapes as regards the spread of r.e.s. systems, in the face of a wider freedom of further easing the authorization procedures. In fact, the unsuitable areas can be solely identified among those areas previously listed, and with the only purpose of highlighting the

probability of having the authorization request rejected by the permittees. This was also confirmed by subsequent judgments, which have established that these areas can not be subject to a preliminary absolute prohibition and therefore any refusal action needs to be adequately justified.

Local administrations or any other bodies are no longer entitled to place limits or constraints to interventions for the production of energy from renewable sources, through their regulatory or planning instruments, in addition to / or difference with what defined at national and regional levels.

According to current laws, there are three different types of procedures to be entitled to install r.e.s. systems:

- "Autorizzazione Unica /A.U." (*sole authorization*), which is issued by Region or Province; the process starts upon submission of the application, together with the project, the technical report and the required documentation, and it is developed by a conference of the services, with all the authorities concerned, including the Ministry of Cultural Heritage and Activities, in the case of listed properties;
- "Procedura Autorizzativa Semplificata / P.A.S." (*simplified qualifying procedure*), upon the submission to the City of a statement of compliance with laws, regulations and urban planning rules, together with the project, the technical report and all the required authorizations; the intervention is implicitly acquiesced, in the absence of a forbiddance announcement by the Administration within thirty days;
- "Comunicazione" di inizio lavori (*communication of starting of the works*) to the City, by the proposer: the Administrations have no chance to steer the design solutions and / or to verify their compatibility with the surrounding context.

Moreover, in case of interventions for siting solar energy technologies in built environment, it has laid down that:

- the *Comunicazione* is admitted only for photovoltaic and solar thermal systems, attached to or integrated into the pitches of the roofs, in case of interventions in *A zones* (historic centres); on the contrary, in the other zones, it is admitted for all types of solar thermal and photovoltaic systems, to be put on existing buildings or on their fixtures, when their generation capacity conforms to need for the use on site; however, it can not be applied to properties listed by the Code ex Legislative Decree 42/2004;
- the *P.A.S.* applies for solar systems on Cultural Heritage and Landscape (listed ex Legislative Decree 42/2004), for systems not attached to or integrated into the roofs of existing buildings within the *A Zones*, and for the further photovoltaic systems applied on

buildings, with a generation capacity up to 20 KW (this limit can be extended by the regions);

- the procedure of *A.U.* applies for all other cases, but it can hardly concern the interventions on existing buildings, or however on built up areas.

So, each intervention for laying r.e.s. systems ends up to fall within its specifically appointed authorization procedure, according to the "sensitivity" of the site (with regard to building or context) and / or to the "problematic degree" of the type of system. It follows that:

- only cultural heritage and landscape properties (listed by the *Code* ex Legislative Decree n° 42/2004) are covered by a really preservative system of rules, thanks to the need to have the projects always checked and authorized by the appointed authorities;
- however, in the historic centres (*A zone*), the invisibility of systems from below is considered as condition necessary and sufficient for the site preservation; as a consequence, the laying of panels "sticky to" or "integrated in " the roof can fall in *Comunicazione*, with no further requirement for the cases visible from above, as regards to those features such as size, colour, placing, etc.. For the solutions falling in *P.A.S.*, instead, the project should be verified by the competent Landscape Commission, which can propose convenient modifications of the design solutions, but is not able to prohibit the operation;
- in the built areas outside the *A zone*, the only limit in force regards the quantity of energy production; it is always admitted, in fact, to place solar systems on the existing buildings and on their fixtures, with no limits or requirements for integration, regardless of the characters of buildings and sites;
- in the *unsuitable areas and sites*, it is anyway admitted submitting the intervention project, which will be verified by the persons charged in relation to the listing conditions, according to the regulations and procedures in force.

CRITICALITIES

From the framework of legislation in force, and especially from the national guidelines and those of some regions such as Lombardy, it comes out a process model based on the weak principle, that procedures are the main limitation that prevents a rapid, concentrated and wide spread of systems for the production of renewable energy and, therefore, the overcoming this limitation is the most effective strategy be put in place for achieving the 2020 goals. Actually, a variety of factors can influence the spread of single r.e.s. systems such as the cost / benefit and the payback time of the investment, the highly parcelled ownership of the housing, the common opposition towards technological innovation, etc.. So, it appears a rather simplistic

approach, correlating directly the procedural simplification to a potential high increase of the spread of r.e.s. systems; but above all it entails, as a corollary, that the objectives of sustainable energy and those of preservation of the built heritage can not be actually reconciled, or rather that they need to be constantly opposed in a power game between liberalization and constraint options. In fact, on one side, the principle of procedural simplification -which has to be maximum applied as well in "sensitive" areas, as in "common" ones - involves the prevalence of automatism conditions in operative processes rather than the controls; and, on the other, it strengthens the *statement of cultural or landscape interest* ex Legislative Decree no. 42/2004 and s. a., as the only means for an effective protection.

Simplistic also appears the principle that certain types of r.e.s. systems -especially the solar panels in adherence or integrated into the pitches of the roofs and the micro wind turbines- always produce low impact on their context; and so it follows their inclusion in the *Comunicazione* procedure even in case of sensitive areas such as A zones or, in some regions, for listed sites too. The issue of the integration of r.e.s. systems in the built environment is so complex, that it can be hardly pursued only by the control of a single condition, especially when it doesn't refer to a building but to an urban system. This principle does not take into account the conditions of view from above, from those higher points, which frequently occur, due to the orography of Italian land. These conditions often allow to appreciate the specificities of the local building characters in the various places, just by the different weft of their coverages: from the stone slabs in the Alps, to the clay tiles in central areas, from the slate tiles of Liguria, to the limestones in Puglia, and so on. The new procedural model, instead, doesn't care about the consequences that may occur in many urban areas compact and/or with homogeneous materials, owing to the contiguity of micro interventions with different shapes, sizes, colours, placing of panels, etc., in absence of specific design guidelines or control tools. Moreover, there are no indications or rules aimed at guaranteeing appropriate conditions of maintenance over time, and/or an eventual removal of these elements.

Last, but not least, another high critical element is disclosed in the absolute centralization of the national regulatory model, with the consequent decrease of the autonomy both of Regions and of Municipalities. Regions can only act by *reduction* in their policies for the preservation of the sites, and by *liberalization* in those about permissions of the interventions. Indeed, regardless of their ability to achieve their objectives of burden sharing, they can select and map some areas as unsuitable for r.e.s. systems, only if those have already been listed as of interest by some specific authorities.

On the contrary, they can raise quantitative boundaries of energy production, in order to enlarge the field of the lighter permission procedures. Moreover, local communities (municipalities, mountain communities, etc.) have been bereft of the opportunity to steer the ways of intervention for a large amount of r.e.s. works to be made in the built-up areas, by mean of their own territorial rules and building regulations -consistent with the specificity of the sites-, as well as to take a specific care over their most sensitive areas, such as historic centres. Now, they can rarely evaluate the projects or make suggestions about those design solutions aimed to reduce the impact of the single works and/or to assure the consistency among contiguous buildings.

CONCLUSION

The process of deregulation of the minor works -even if developed in "sensitive" areas as to architectural and environmental characters- is now in progress and seems to be unlikely reversible; nevertheless it would be advisable a wide monitoring of outcomes, in order to bring appropriate future adjustments. However, it is clear that the complexity and importance of the issues would require the deployment of an extensive range of strategies and actions, which -bracing each other- make it possible to effectively pursue the maximum exploitation of the potential renewable energy, ensuring at the same time the protection of the areas of intervention.

Before all, it seems necessary to redefine the system of relation among the various levels of the regulatory authorities, by strengthening the role of local communities, in accordance with the basic principles of sustainable development. Indeed, an approach too centralized and homogeneous could hard support the pursuit of such objectives, which require actions so widespread at the local level. In fact, as it should be avoided too much localism in permission procedures, as well it could be appropriate to allow the local communities to use guidelines and control tools for r.e.s. works in the built environment, similar to those for landscape [5, 6]. At this purpose, the Regions could also promote awareness-raising activities, training and experimentation, in collaboration with the research institutions.

Furthermore, it highlights that local governments need to revise deeply their previous model of governance and control of the interventions, by developing innovative and pervasive strategies. These could be intended, for instance, to promote the social empowerment of the population, through actions aimed to increase the conscious and active participation of individuals and groups in the governance of the modifying processes of their living environment. [7]

Local authorities (or groups of them, which share goals and resources) could also undertake the development of tools (suitable to their specific contexts) to support and control the design solutions; at the same time, they should also find the way to introducing them effectually in the operational practice.

At last, since the r.e.s sector is constantly evolving and the available products are increasingly varied both in energy performance and in materials, colours, laying systems, etc., local communities could encourage and incentive the dissemination of "best practices", by developing experimental projects for introducing highly integrated systems on their own real assets (such as institutional offices, schools, libraries, etc.), and even by the launch of design competitions specifically facing to the local characters.

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