



# Housing for Europe

Strategies for Quality in Urban Space, Excellence in Design, Performance in Building

URBACT II

Housing for Europe - Strategies for Quality in Urban Space, Excellence in Design, Performance in Building gathers the results of the Urbact II Working Group "Hopus – Housing Praxis for Urban Sustainability".

It is a multi-disciplinary reflection on urban development, encompassing strategies, governance models, guidance instruments and assessment tools, all considered in the wider framework of current European policies on the city, housing and building technology. The looking glass of a two-year transnational exchange project, bringing together universities and local administrations, allows us to understand the great challenge lying ahead in the 21st century: the quest to create cities which are beautiful, healthy, and attractive places to live

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Housing for Europe

AN URBACT II PROJECT



EUROPEAN  
PROGRAMME  
FOR  
SUSTAINABLE  
URBAN  
DEVELOPMENT



Connecting cities  
Building successes





■ Housing for **Europe**



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Strategies for Quality  
in Urban Space,  
Excellence in Design,  
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Housing for Europe  
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# European Cities: A Brighter Urban Future?

The history of Europe is a history of cities: these are the places where everything took place, arts and inventions, philosophy and trade, wars and revolutions. They are the very embodiment of European culture, and have played this crucial role for centuries. For a long time they have also been the designated place of beauty: beautiful places where monuments and cathedrals acted together with ordinary houses, giving life to amazing streets and squares where people lived and thrived. Even the 20th century, with its convulse history of splendor and destruction, saw cities flourish and grow. But while planners and architects were inventing new ways to build and experience urban space, something else was happening: for the first time, cities were growing out of control, becoming large and complex conglomerations where true urban space was absent, the environment was heavily damaged, and which were very difficult to govern.

This is our European urban present, a mixed-feeling situation where our extraordinary city cores are surrounded by anonymous city crowns, where quality goes from high to low, and beauty has often left the ground. Is it possible to take action against this urban decadence, imagining innovative ways to build and govern the city, allowing both new developments and the transformation of the existing to achieve a high quality? Does a European urban tradition still exist? Will Europe be able to strive for the aims of the Leipzig Charter, which calls for our cities to be the driving force behind our future?

Housing lies at the heart of urban space, and our project studied the ways in which good residential design can lead to the creation of a good city and vice-versa. There are few things as tightly connected to local culture as dwelling, while at the same time referring to universal matters embodied in human beings. In some ways, understanding this double nature of housing means capturing the very problems of a large, diversified community such as Europe, constantly seeking a balance between what is common to everyone and what is specific to each person. We know that Europe aims to be the place of differences, a community of cultures and people who have joined forces to move together in one direction and learn from each other. The cities in our continent well represent this: different traditions, different ways

of building urban space, some successful, others less so, but with a common intention to improve what we have now. The will and ability to learn and understand is the greatest enrichment which different – and at times very distant – realities can gain from each other. This is what our Hopus project has been all about: understanding. There is no way we can transport a good urban practice as it is from one place to the other: for cities are made of people and places, and you cannot change either as if by sheer magic. But we can understand the logic behind this good practice, and try to devise a gradual change in our own way of doing things, interpreting what has been done somewhere else in the light of our local reality.

What the Hopus project has been capable of understanding is that there are, today, good ways of building the city, of designing housing, of achieving a sustainable urban development through intelligent construction. But the overarching problem is that of merging the general with the specific, the universal with the local: a problem which has so far hindered Europe from truly taking action in this direction, since it could, in doing so, betray its very nature of harboring difference and specificity. It is no easy task, and the road ahead promises unparalleled complexity. Nevertheless action must be taken, and the Leipzig Charter was a first, important step in this direction: it is the promise of a brighter urban future for Europe, and its coming implementation, in the hope that it will be as far-ranging as possible, is a challenge we must all contribute to winning.

The two years during which Hopus was enacted were a time of learning, and we believe that the result may contribute a tiny piece to the enactment of a better urban future for Europe. It was the shared effort of many people, whom we thank for their support and contribution: the whole Urbact II Secretariat, who led the way and made a fruitful exchange inside the programme possible; our Thematic Pole Manager Philip Stein, who followed the project's development from the beginning, providing precious advice all along the way; the many friends from other Urbact projects with whom we had a chance of exchanging views and experience; our project partners, who worked with us throughout the not-always-easy development of the project: Manuela Almeida, James Arnold, David Kemp, Piotr Lorens, Martino Milardi, Deborah Pennestri, Saverio Putorti, Milly Tambach, Gabriela Rembarz and all the people on their teams; our lead expert Matthew Carmona, who gave us invaluable insight into the project's content; our administrative staff and our communication officer Manuela Pattarini; and, last but not least, our lead partner project team, who created Hopus from the very ground up and worked incessantly on it for two years: Carola Clemente, Livia De Andreis and Federico De Matteis.



**PART 1**  
Policies and  
Strategies  
for European  
Housing





## 1

# Decoding Design Coding

HOPUS LEAD EXPERT

Prof. Matthew Carmona

THE BARTLETT SCHOOL OF PLANNING, UCL

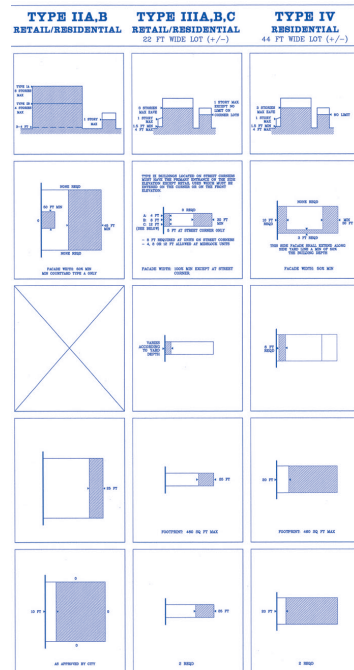
## 1.

## A story to start

## 1.1

### From Rome to Gdansk, and everywhere in between

HOPUS has brought academics and practitioners together from across Europe to discuss questions of design and sustainability in housing and its regulation through public sector guidance and control (De Matteis 2008). Our first meeting in Rome provided the opportunity to steel a little time to pound the well-worn tourist trail, and to re-charge our urbanism batteries through absorbing the delights of Piazza Navona, Campo de' Fiori, Piazza del Campidoglio, Piazza della Rotonda, and the like. With our batteries well charged, we set off on a tour of contemporary housing developments in Rome's fast expanding suburbs. We were sorely disappointed! It seems that despite Italy's unique and enviable urban heritage, and the seemingly highly desirable absence of separate planning and architecture professions (planning and architecture are simply branches of the same profession), there is no real tradition of urban design in Italy, at least not in the suburbs. In these areas developers (and architects) focus on buildings, whilst planners focus on the production of two-dimensional zoning plans. No one focuses on the bit in between, the public realm, which remains largely un-designed (figs. 1 and 2). As a result, instead of being linked by a coherent and connected urban fabric that encourages walking and social and economic exchange, and which allows people to simply enjoy the city (as millions of Romans and tourists do every year in the city's historic centre), what





Figures 1, 2, 3. Rome

we have is buildings constructed in un-related plots, with the spaces in between dominated by parking and roads, and by very little else. Instead of a corner shop or café, American style, these new suburbs rely on their privatised malls to serve their low-density edge city communities (fig. 3).

In Rome, the result is all the more surprising given the historic context, but presentations from the other nations represented in HOPUS – UK, Poland, the Netherlands, and Portugal – soon revealed that we all suffer from exactly the same unsustainable anti-urban environments. In Gdynia, for example, where we held a HOPUS conference, despite the careful and exemplary reconstruction and restoration of the neighboring city of Gdansk during the second half of the last century, the suburbs of Gdynia are seemingly left almost entirely to the market. The results are hugely variable in their quality, but favour smart but gated enclaves for the wealthy (fig. 4), and often soulless estates for the rest (fig. 5), although a minority of housing developers are attempting something more democratic and enlightened (fig. 6).

## 1.2

### Suburban design, boiling it down

It seems that whatever the system, whatever the governance, no matter what our rules and regulations, however we organise our professions, and no matter what our histories, sprawl seems to be the inevitable consequence of our development processes. Moreover, this is despite the ubiquitous condemnation of such environments as sub-standard by almost every built environment professional you ever meet (including all in HOPUS).

What, one might ask, do we all have in common that leads to such fragmented and sub-standard suburbs. One answer can be found in love of crude regulations that substitute for design; the volumes of standards that together act to control and often indirectly perpetuate such unloved suburban space – parking standards, highways regulations, zoning controls, density guidelines, health and safety regulations, construction codes, etc. Typically these are limited in their scope and technical in their aspiration, and are not generated out of any designed vision for a particular place. Similarly, they are often imposed on development



Figures 4, 5, 6. Gdynia

projects without regard to what type of spaces they generate, or to how they impact on other design-based aspirations, from sense of community to sustainability.

The process is one of design in that such places are being actively conceived by professionals, but it is a sort of 'unknowing' design in which nobody is consciously designing the end result. Instead, it simply emerges as the happenstance of applying the various regulations. Given the very obvious ability of public authorities all over Europe to deliver such 'technical' standards, the question arises, might it be possible to 'boil down' some higher order urban design principles in order to establish a set of irreducible minimum standards for delivering a more human, coherent and sustainable public realm? In other words, what are the urban design 'must-haves' that might form the basis of country by country regulations in order to overcome our seeming inability to deliver better 'suburbanism'? These, of course, would need to vary from city to city and from country to country, but by way of illustration nine simple rules would go a long way to overcoming many of the problems seen amongst the HOPUS group.

Their adoption would dramatically improve the chance of a better quality suburban public realm; although no rules could ever guarantee it:

1. Streets should form a continuous urban network with all streets joining at least two others
2. Streets should be designed for a maximum vehicle speed of 30Km per hour
3. Every street and / or building block should host at least two (preferably more) major land uses
4. Buildings should face public space and create a coherent, continuous, building line
5. Blank facades at street level should not be allowed  
Space for private front planting and / or street trees should be provided
6. Setbacks and front gardens, should never be covered by any more than 30% parking
7. Existing trees, landscape and natural features should determine site layout and character
8. Design to reduce, reuse and recycle natural and energy resources

It may be that a simple code of this nature could help to deliver the coherent urban framework that suburban areas so often lack. Within the rules, huge scope would remain for different architecture styles, densities, housing forms (terraced, semi or detached), landscape treatments, road layouts, morphologies, sustainable technologies, and market segmentation, whilst ensuring that at least a basic, coherent urban fabric is delivered.

The historic centres of our great cities, including those referred to above, are based on a not dissimilar set of simple (if typically un-written) urban rules. The HOPUS group has explored how more intelligent forms of regulation might be developed and used in order to deliver such objectives.

### 1.3

## This paper

This framework paper is structured in five substantive parts. Following this introduction, it:

- Explores questions of public sector regulation of design and the tools available to public authorities to do so
- Examines design guidance as a generic tool, and the forms of guidance available to regulators
- Focuses in one particular type, the design code, and examines the potential of these tools to deliver better design outcomes
- Concludes with a case study that used coding to deliver the types of urbanism principles espoused above.

## 2.

## The conundrum of design regulation

### 2.1

## To regulate or not to regulate

Nan Ellin (2006: 102) poses a critical question about public intervention, asking whether we should “...*step aside and allow the city to grow and change without any guidance whatsoever?*” She answers her own question:

*“No, that would simply allow market forces to drive urban development. Markets are only designed to allocate resources in the short term and without regard for things that do not have obvious financial value like the purity of our air and water or the quality of our communities”.*

Good design might fall into such a category. In this respect, although public intervention and regulation of development might be seen as an appropriate response to the dysfunction of markets that results in poor design and place-making, this presumption is susceptible to the fallacy that the solution to imperfect markets is (perfect) government. Just as markets fail, so do governments. Hence, the presumption that ‘good’ design regulation, *ipso facto*, leads to ‘good’ design must be treated with caution and scepticism. In reality the situation is complex and raises fundamental questions about the state’s role in a market economy.

Some argue that often there is no market failure in the first place, and the expensive and time-consuming bureaucracies put in place to correct presumed failure



Figure 7. Barcelona



Figure 8. Barcelona

often have worse side-effects than the problems they seek to address. Van Doren (2005: 45; 64), for example, argues that regulation is inherently costly and inefficient, but difficult to change because of political support for it from what he describes as 'bootleggers' (special interests who gain economically from the existence of regulation) and 'Baptists' (those who do not like the behaviour of others and want government to restrict it). He quotes the work of regulatory economists who have generally come out against regulation, arguing that in most cases no market failure existed in the first place. So, whilst admitting that forms of design guidance have not been subject to such analysis, he concludes that they inevitably create barriers to change and innovation. In arguing the case against zoning in the USA, for example, Siegan (2005) suggests zoning increases the price of homes by limiting supply; encourages sprawl by imposing restrictions on uses, densities and height; and is exclusionary because it acts against the needs of disadvantaged groups by distorting the market from meeting their needs (e.g. discount shopping or an auto

repair shop in a residential area). It may be, however, that rather than a fault of intervention *per se*, this is the fault of poor public intervention that has, first, failed to allocate enough land for development, and, second, as Leinberger (2008) argues, has been based on a 'drivable urbanism' (fig. 7) model of development (namely sprawl), rather than a walkable neighbourhood model (fig. 8) of the type encompassed in the principles outlined at 1.2 (above). Clearly, just as there is good and bad development, so there will be good and bad regulation.

As land - and the power and resources to develop it - is in large part vested in private hands, in some form, public sector intervention and regulation is inevitable to protect the property rights of other land owners and protect the rights of society at large against inappropriate development. There is no such thing as a 'free' market, as even in the least regulated places, controls of some form or other can be found on the use of space. In Houston, for example, the only major US city without zoning controls, ordinances have been adopted to alleviate particular land use problems including banning nuisances, imposing off-

street parking, and regulating minimum lot, density and land use requirements (Siegan 2005: 227).

Rather than a debate about whether to intervene or not, the debate is thus about what type of intervention and how that intervention occurs. It is therefore vital to understand where public sector interventions in the development process can be most effective - typically before or during the development design stage rather than after it, namely as a proactive rather than reactive form of intervention.

## 2.2

### The tools: guidance, incentive and control

The public sector has a range of possible 'tools' at their disposal to intervene in the design process (see Chapter Three). Schuster & Monchaux (in Schuster 2005: 337-8) have categorised these as:

- Ownership and operation, the public sector may choose direct provision by owning land and building itself (the state will do X)
- Regulation, by intervening directly in the actions of others who seek to develop (you must or must not do X)
- Incentives (and disincentives), might be offered to encourage certain behaviours, for example grants, land transfer or enhanced development rights (if you do X the state will do Y)
- Establishment, allocation and enforcement of property rights, for example through zoning or re-zoning land uses (you have the right to do X which the state will enforce)
- Information, by collecting and distributing information that is intended to influence the actions of other actors, such as the production of guidance on desirable

design attributes (you should do X or you need to know Y in order to do X).

For the purposes of the public sector influence on the design of private development, these can be simplified and expressed in terms of three related processes of 'guidance', 'incentive' and 'control':

- **Guidance** equates to the 'positive' encouraging of the right sort of development (development in the public interest) through the production of a range of plans and guides. These will have more or less authority depending on the statutory powers under which they are prepared. They will range from simple 'Information' tools to 'establishment, allocation and enforcement' devices to guide the distribution and redistribution of land uses. Ultimately, however, it will be for landowners to determine whether they wish to seek to develop (or not). The power to make positive proposals is thus limited by it typically being the private sector that has access to resources.
- **Incentive processes**, by contrast, equate to more 'proactive' processes of enabling development that is in the public interest, through actively contributing public sector land or resources to the development process (perhaps to fill a funding gap), or otherwise moving the goalposts to make the prospect of development more attractive to landowners; perhaps through the provision of public amenities, development bonuses, changing allocations, or providing a high quality public realm.
- **Control processes** give public authorities the power over the development process through the ability to say 'no' to development. If guidance and incentive fail, then



Figures 9, 10, 11. London pastiche, good or bad?

control offers the ultimate sanction for municipalities to ensure the public interest is being met via a series of overlapping regulatory regimes – planning, conservation, highways adoption, environmental protection, building permits, etc. Although denying relevant development permissions is a negative act, control processes often involve negotiation, advocacy, persuasion and even bluff (threatening to deny permission). Controlling development is thus often a complex and highly skilled process involving the weighing and balancing of public against private needs and aspirations.

Rather than a top-down, command-and-control activity, a better way of understanding the role of the public sector in regulating design is thus as a means of encouraging and enabling the production of higher design quality and better places, where processes of control are shaped by allied processes of guidance and incentive which, ideally, should precede the act of control.

John Punter (1998: 138) highlights how public sector control has changed from an inherently negative con-

cern with *design control* to a more positive concern for *design quality*. He argues that the traditional view of design has been a static one of an ‘end product’ – a particular piece of built form – rather than a dynamic one of a process – a creative problem-solving process – through which a development is produced. The need, therefore, is for tools that reflect the potentially positive and proactive role of the public sector in shaping places, but which are backed by the ultimate sanction of control.

## 2.3

### Design quality, but whose?

‘Design quality’ is of course a problematic concept, not least because it will mean different things to different stakeholders. Furthermore within any particular community or society, there is unlikely to be consensus on what is meant by higher design quality, nor about what makes a good place (figs. 9-11). Indeed, a primary task of the public sector may be to build consensus about what constitutes design quality through consultation and engagement with key stakeholder groups, over time.

Based on restrictions of private property rights, systems of regulating design and development invariably arouse great passions and sometimes controversy. Those who perceive themselves to be most directly affected – designers and developers – often make the most strident case against such forms of control. As Walters (2007: 132-133) argues: *“Many architects are guilty of knee-jerk reactions to design standards, preferring the ‘freedom’ to produce poor buildings rather than be required to improve standards of design to meet mandated criteria.”* Not uncommonly designers hold the inherently contradictory attitude that design controls should apply to everyone but themselves.

Brenda Case Scheer (1994: 3-9) has articulated many of the perceived problems with public sector attempts to ‘improve’ design. She suggests such processes are:

- Time-consuming and expensive
- Easy to manipulate through persuasion, ‘pretty pictures’ and politics
- Performed by overworked and inexperienced staff
- Inefficient at improving the quality of the built environment
- The only field where lay people are allowed to rule over professionals directly in their area of expertise
- Grounded in issues of personal rather than public interest, particularly in maintaining property values
- Violating rights to free speech
- Rewarding ordinary performance and discouraging extraordinary performance.
- Arbitrary, vague and superficial
- Encouraging judgements that go beyond issues outlined in adopted guidelines.

- Lacking in due process (because of the sheer variety of issues and processes of control)
- Failing to acknowledge there are no rules to create beauty
- Promoting principles that are abstract and universal, not specific, site-related or meaningful at the community scale
- Encouraging mimicry and the dilution of the ‘authenticity’ of place.

In his response to these criticisms, Witold Rybczynski (1994: 210-211) outlines why, despite their perceived faults, processes of design regulation continue to command significant commitment within public authorities. Given the frequency and ferocity of debates on the issue, he argues such processes can be considered to be ‘extremely effective’. Furthermore the processes reflect both public dissatisfaction with the idea of professional expertise and an apparent lack of consensus in the architectural profession about what constitutes good design. He, therefore, suggests such processes should be seen as tools to guarantee at least a minimum compatibility between ‘new’ and ‘old’, and are of particular value because they reflect and promote deeply held public values.

Moreover, noting that by the end of the C20th, such values had a ‘nostalgic’ rather than ‘visionary’ flavour, he argues this is entirely understandable in an era when the explosion in building techniques and materials has unleashed a multiplicity of design styles and possibilities, many of which contrast unhappily with established contexts (Rybczynski 1994: 210). He concludes that historic experiences of state intervention in design:



Figures 12, 13, 14. Delft

*“...in cities as disparate as Sienna, Jerusalem, Berlin, and Washington DC, suggest that public discipline of building design does not necessarily inhibit the creativity of architects - far from it. What it does have the potential to achieve ... is a greater quality in the urban environment as a whole. Less emphasis on the soloist and more on ensemble playing will not be a bad thing.”* (Rybczynski 1994: 211)

Experience within the HOPUS group confirms that careful control does not necessarily imply ‘conservative’ design or a failure to innovate (good or bad) (figs. 12-14). Although debates will undoubtedly continue, the processes increasingly carry political commitment and widespread public endorsement, particularly in Europe. This is critical because before there can be guidance, incentive or control, built environment professionals must persuade politicians and other decision-makers that concern for design quality is necessary and worthwhile. Equally, if they are to have any impact, they also

need to persuade those with the power to make a difference – developers, investors, occupiers – of the benefits of investing in place quality. Thus, if they are to move beyond the crude forms of regulation discussed in 1.0 (above), practitioners working in the public sector and local politicians need a better-developed understanding of place-making.

Carmona (2001: 132) argues that the priority given to design by public authorities is evident in four key ways:

1. Through the development of design criteria considered relevant to the public interest and appropriate for guidance and control
2. Through the responses to, and concern for, local context
3. Through the value placed on the different mechanisms used to regulate design
4. Through the resources devoted to design and securing better places

Taken together, these factors largely define the public sector’s approach to design. A range of other factors

can, nevertheless, act to undermine local initiative, including:

- A lack of political will to engage in design concerns (nationally and locally)
- The strength of local investment and property markets
- The ‘conservatism’ and anti-development attitudes of local communities and politicians
- The capacity of the European historic fabric to accommodate change
- The availability of skilled designers (particularly those with urban design expertise)
- The willingness of developers and investors to consider issues of, and invest in, design quality
- A lack of flexibility in some regulatory systems to work outside their own technocratic processes and narrowly defined design standards.

Getting the right tools in place cannot address all of these issues, but it can directly address the last of them (and thereby a key Europe-wide disincentive to delivering better quality development) and indirectly impact on the rest.

### 3.

## The nature of design guidance

### 3.1

#### What is design guidance?

This section focuses on the use of design guidance as a tool in the design regulation process. Through examining design guidance as a generic type, it is possible to reveal its variety and distinguishing characteristics before, in

section 4.0 (below), discussion moves on to examine one particular form of guidance in greater depth – the design code. The discussion here and in 4.0 recognizes that the nature and limitations of all forms of design guidance need to be fully understood before they are applied in practice.

At its most basic, design guidance can be defined as: a generic term for a range of tools that set out design parameters with the intention of better directing the design of development. Different countries have different traditions and use different forms of guidance to greater or lesser degrees. In France typo-morphological guidance is commonly used to understand and respond to the character of larger historic areas (fig. 15). In Australia, Victoria’s Rescode provides a state-level design guide for residential developments, whilst in the USA, the New Urbanists’ Transect offers a generic form of design guidance offering prescriptive design solutions for all types of development across the continuum from city core to countryside. In the UK, the detailed and unwieldy residential design guides produced by local authorities up and down the country since the 1970s are now widespread; the Essex Design Guide being the most famous (see [http://www.the-edi.co.uk/?section=publications\\_EDG](http://www.the-edi.co.uk/?section=publications_EDG)).

These various forms of guidance are produced by the public sector to guide (predominantly) the design of housing developments. Yet design guidance does not have to take this form, it does not have to be produced by the public sector, it can relate to all types of development, and rather than generic guidance for all areas within an administrative jurisdiction, it can be customized to guide development for specific areas or sites. In Germany, for example, Bebauungsplans represent

sophisticated site-specific tools for guiding the urban structure of developments (fig. 16).

Reflecting this diversity, there has been a proliferation of types of design guidance. In the UK alone, this proliferation extends to: design guides, design strategies, design frameworks, design briefs, development standards, spatial masterplans, design codes, design protocols, action plans, indicators, labelling schemes, and design charters. These terms are often confusing, poorly defined and over-lapping, and despite attempts to classify them in relation to one another (e.g. Carmona 1996), their sheer variety only helps to illustrate the ambiguity of design guidance as a regulative tool, and the confusion that can too easily result from their use.

Space does not allow discussion of each of these types of design guidance and the many others found across Europe. Instead, by way of example, discussion will focus on one particular form of design guidance – the design code (see 4.0) – that quickly became the focus of HOPUS (De Matteis 2008). Before that, it is first necessary to briefly put some flesh on the bones of the definition of design guidance proposed above, by discussing the nature and diversity of design guidance generically as a tool, and starting with what design guidance is not:

- First, design guidance is not a legally defined and binding ordinance or policy, because such tools suggest an element of enforceability that the term ‘guidance’ cannot possess. Instead, guidance suggests advice rather than compulsion.
- Second, it cannot be a ‘blue-print’ such as a fixed masterplan, because ‘guidance’ equally suggests a sense of direction for, but not an end solution to, a design problem.

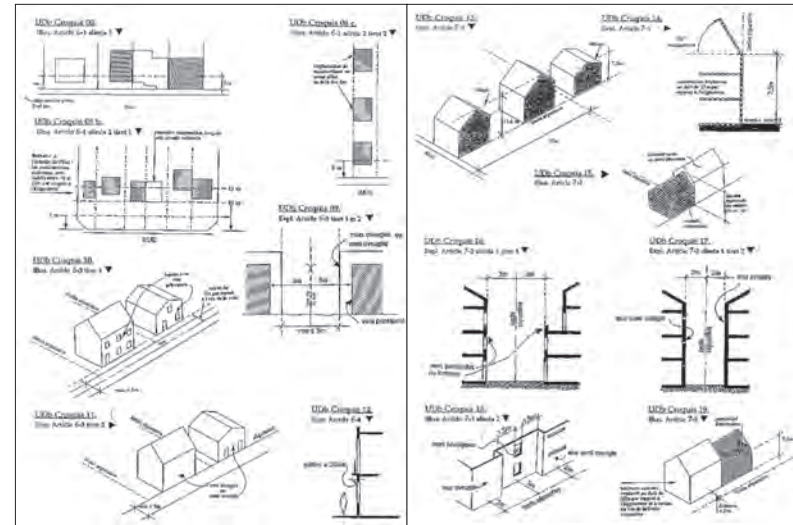


Figure 15. Ville de Montreuil



Figure 16. Vauban Freiburg

- Finally, guidance cannot simply be analysis such as site or character appraisals, as analysis in isolation does not suggest a design direction at all, only information that might be useful in establishing one.

As such, it is not always immediately apparent how design guidance fits into the range of tools available to those in the development process. Kevin Lynch's (1976: 41-55) four modes of urban design action for public authorities – diagnosis, policy, design, and regulation – for example, make no reference to guidance. In fact, aspects of design guidance will often have a role in each of Lynch's modes, and the boundaries between guidance and at least the first three are not clear: some forms of policy may contain guidance, some design guidance will contain site or character appraisal information, and seemingly fixed design schemes may be open to reinterpretation and change as successive phases of a development are realised over extended periods of time.

### 3.2

## The characteristics of design guidance

Despite the ambiguity and the surfeit of labels for design guidance, it is possible to classify different forms of guidance through a number of its characteristics:

1. **Subject matter** – Classifying by subject matter is the most obvious and straightforward, in other words by land use, location (suburban, urban, rural), or development issue (e.g. infill sites, shopfronts, building additions, etc.). Some forms of design guidance may deal with more than one of these.
2. **Context type** – A related issue is the context to which guidance pertains, and in particular its relative sensitivity, for example whether concerned with extensive new-build sites, in-fill development in established urban areas, or change within a historic setting.
3. **Scale of application** – A further related issue concerns the scale of application; whether dealing with strategic design concerns such as infrastructure provision, urban design issues (space networks, public realm, mix of uses, etc.), or questions of architecture and detailed landscape design.
4. **Governance level** – Design guidance is produced at all levels from central government and its various agencies, to regional and sub-regional, to local government. This can produce complex regimes of policy and guidance that are sometimes conflicting and repetitious, although this varies from country to country.
5. **Generic vs. specific** – A related question is application, whether guidance relates to specific and well-identified sites, or is generic, relating to large areas (e.g. a whole municipality) and undefined sites. Generally, the smaller the scale of application, and the lower the governance level, the greater the degree of specificity.
6. **Level of detail** – Different forms of design guidance vary considerably in terms of their level of detail, from broad aspirational principles of 'good' design, to very detailed guidance on particular aspects of a design problem. The level of detail will even vary within a particular guide, from subject to subject.
7. **Level of prescription** – To some degree the level of specification will depend on the level of importance

attached to a particular design concern, which may also be reflected in the way guidance is expressed. Although design guidance should remain advisory, some aspects may be expressed with a greater or lesser degree of conviction than others, for example: 'developers should normally ...'; as opposed to 'developers might consider ...'.

**8. Ownership** – Whether instigated and owned by a public or private organization offers a further means to classify guidance. Typically design guidance is associated with the desire of public sector agencies to improve (in the public interest) the design of private sector development. But design guidance is also produced by the private sector both to guide an enterprise's own developments and to shape the inputs of different corporate partners into a common project; for example where different housebuilders are working on neighbouring phases of a larger development. As in the public sector, the contents and style will vary from case to case.

**9. Process or product** – A critical distinction will reflect the relative emphasis in guidance on the design, development and regulatory processes as opposed to the desired products or outcomes. Design guidance typically incorporates both sets of concerns, although some will focus solely on one or the other.

**10. Medium of representation** – A final classification reflects the medium through which guidance is represented, be that traditional printed form, or through more interactive electronic and web-based means. This will not necessarily change the content of guidance, but will determine its style and most likely how and by whom it is used.

The above distinctions can be demonstrated for three very different (but historically influential) examples of design guidance in the UK (fig. 17).

Knowing that a great variety of design guidance exists, however, is of little value unless users understand, first, why different forms of guidance are used and, second, their problems and potentials. The first of these questions appears simple; all forms of design guidance exist for one purpose, to inform the process of design so that it is more likely to achieve a specified set of design ends. Thus guidance can be deemed successful if these outcomes are better than would have been achieved without it.

The goals envisaged for design guidance, however, may vary, depending on the ambitions of its instigators and the nature of the development context; whether the intention is to establish minimum desirable thresholds for quality or to raise the bar and strive for superior design. The former – a 'safety net' approach – may be the limited ambition of a generic design guide or a guide in an area beset by poor quality development. The latter – a 'springboard to excellence' – should be the case for site-specific guidance or for guidance in an area where stakeholders are already committed to achieving better quality. Although not mutually exclusive, these aspirations would depend on the nature of likely users, the extent to which they are receptive to the content of guidance, and on the balance of power between stakeholders (particularly between public and private sectors) within the development process (Bentley 1999: 28-43).

All this implies that the nature of the development process and how design guidance is used within it needs

to be fully understood. This is best discussed through focusing on a particular type of design guidance – the design code – that in different forms has increasingly been used across Europe in some of the most high profile and successful development projects, such as Vauban in Freiburg and Kirchsteigfeld in Potsdam (Ger-

many – figs. 18 & 19) and Borneo and Sporenburg in Amsterdam (Netherlands – fig. 20). Thus through analysis of the use of design codes in England in 5.0 (below), an attempt is made to clarify the problems and potentials of design guidance and to extrapolate lessons of relevance across Europe.

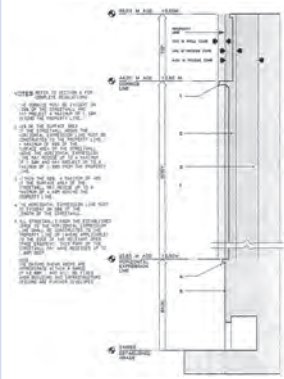

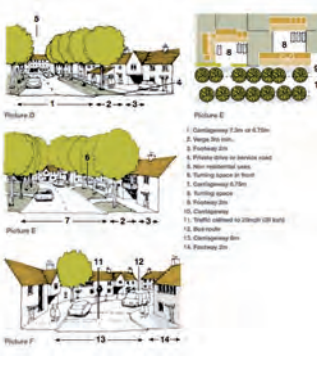
	Canary Wharf Design Guidelines (1987)	Hulme Guide to Development (1994)	Essex Design Guide (2005)
<b>Generic 'type'</b>	Design code	Design strategy / code	Local design guide
<b>Subject matter</b>	Commercial office and public realm	Residential development and public realm	Residential and mixed use areas
<b>Context type</b>	New build brownfield	Clearance and regeneration	Infill and new build greenfield
<b>Scale of application</b>	Architecture & landscape	Urban design	Urban design, architecture, landscape
<b>Governance level</b>	n/a (enterprise zone)	Local	Sub-regional
<b>Generic vs. specific</b>	Specific	Specific	Generic
<b>Level of detail</b>	Highly detailed	Broad principles	Comprehensive coverage
<b>Level of prescription</b>	Highly prescriptive	Advisory	Advisory
<b>Ownership</b>	Private	Public, quango	Public, local government
<b>Process or product</b>	Product	Product	Process and product
<b>Medium of presentation</b>	Traditional	Traditional	Traditional
			
<b>Goals</b>	Higher quality	Threshold quality	Threshold quality

Figure 17. UK design guidance



Figures 18, 19, 20. Vauban, Kirchsteigfeld, Borneo and Sporenburg

## 4. Design codes as a tool

### 4.1 The English pilot programme

No one sets out to create poorly laid out, characterless places of the type discussed in 1.0 (above), yet throughout Europe much of what is built today continues to display these characteristics. In England, for example, recent analysis of new-build housing schemes across the country has revealed consistent failures to deliver even basic design aspirations, such as distinguishing between public and private realms; letting public space and buildings, rather than highways, dictate layout; and taking advantage of the positive characteristics of sites (CABE 2004, 2005, 2007 – figs. 21-23).

Driven by concerns over quality, coupled with a national need to deliver more housing, in 2004 the British Government launched an extensive pilot programme aimed at assessing the potential of design coding to deliver better quality development. This national pilot

programme involved the detailed monitoring and evaluation of nineteen development projects over a two-year period (Carmona et al 2006a) and revealed a range of potential benefits of design codes, including:

- Better designed development, with less opposition locally, and a more level playing field for developers
- Enhanced economic value derived from the positive sense of place that better quality design can deliver
- Less uncertainty with the planning process and a resulting positive climate for business investment
- Streamlined regulatory processes, saving time and money for developers and local authorities alike
- A more coordinated development process, built on consensus instead of conflict.

On the face of it, such benefits might seem puzzling when many of the generic development standards used to guide the design of the sorts of sub-standard schemes referred to above and discussed in 1.2 could be described as coding – of sorts. The construction



Figures 21, 22, 23. poor quality housing, England

regulations, highway design standards, density, and open space standards used by many municipalities all fall into this category. These, however, are about achieving minimum thresholds across the board and apply to whole administrative areas, they are what Ben-Joseph (2005) has described as ‘the hidden codes of the city’. Confirming the arguments made above, research has suggested that the slavish adherence to such guidance is a direct cause of much bland and unattractive development (Carmona 2001).

Site-specific design codes, by contrast, are a distinct form of detailed design guidance that stipulates the three-dimensional components of a particular development and how these relate to one another without establishing the overall outcome. The aim is to provide clarity over what constitutes acceptable design quality for a particular site or area. Used in this way, and unlike generic development standards, design codes can provide a positive statement about the qualities of a particular place (fig. 24).

## 4.2

### Why choose codes?

In England today, national planning policy requires that “Planning authorities should plan positively for the achievement of high quality and inclusive design for all development” (ODPM 2005: para 34). In the residential sector, the increasing imperative to deliver better quality design has led to a decline in the traditional way of doing business which typically saw developers ignoring local policy and guidance, submitting sub-standard planning applications, then using their often considerable resources to battle their way through the permissive national planning appeals process in order to obtain planning permission (Carmona 2001).

Today, instead, most large-scale residential or mixed-use development proposals are preceded by the preparation of detailed design guidance in order to create the confidence that design quality will be forthcoming. Such guidance may be of several types, for example a detailed masterplan, or a loose development frame-



### 4.3

## Where do codes fit within the development process?

If design codes are the guidance of choice, the next question is how should they operate? Production of a new development involves many disparate processes and design codes may play a role in each:

- Design processes – design codes are tools to set the detailed urban design parameters of projects across the different scales of design intervention, from street and block sizes and layouts to landscape and architectural concerns, towards a coordinated place vision.
- Development processes – because of the detailed up-front work required for their preparation, the design phase of codes offers an opportunity for stakeholders to explore and negotiate different design options and their associated costs.
- Planning processes – the preparation of design codes provides an opportunity for planning authorities to engage directly in the design process, rather than reactively responding to already completed development proposals. They also offer a ready means against which to evaluate and monitor detailed planning applications.
- Adoption processes – design codes have a role in the legal adoption by the state of highways, open space, drainage and other infrastructure produced through development projects. They enable these processes to be coordinated with design, development and planning matters at an early stage, thereby avoiding possible conflicts later in the development process.

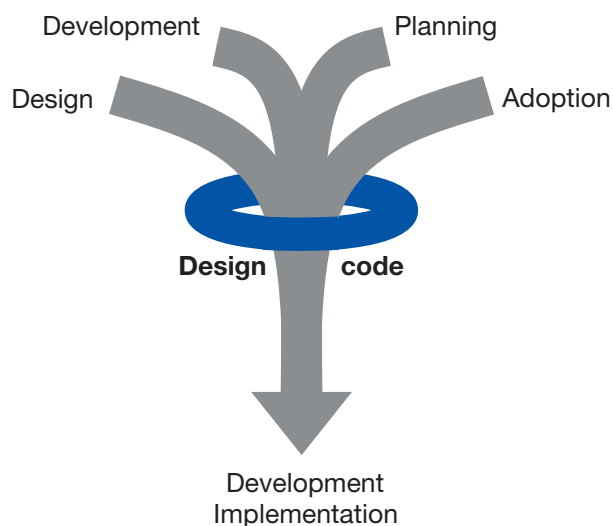


Figure 25. Four linked processes

Through the English national pilot programme it was possible to identify a common set of phases involved in successful implementation of design codes. Although the process is essentially linear, it is often necessary to return to and refine earlier decisions in the light of later information (fig. 26). In summary it incorporates:

- 1. Initiating the code** – defining an agreed process and establishing leadership arrangements
- 2. Coordinating inputs into the coding process** – the skills, financial resources, and the roles and relationships of various actors who will in turn design and implement the code
- 3. Appraising the local context for coding** – including existing policy and guidance or consents already

covering the site, the character of the site, and any existing physical vision such as a masterplan

4. **Designing the code** – devising, structuring, writing and illustrating the content and expression of the code
5. **Formalizing the code** – giving the code institutional status by adopting for planning, highways or other purposes, or by other means such as tying it to a land sales agreement
6. **Implementing the code** – using compliance with the code as the basis for selecting design and development teams for individual land parcels, to inform the site design process, and also for assessment and regulation of the resulting proposals
7. **Managing code compliance** – via monitoring and enforcement processes to evaluate performance of the code in order to refine it, and through use of the code for project aftercare.

The creation and use of a design code also draws from and feeds into the broader development process. In reality the various phases of development do not always follow a neat sequence and every development process will be different, particularly when a pan-European context is considered. Nevertheless, it is valuable to consider coding and development processes together in order to understand how the code can be informed by the wider processes of development. Importantly, code preparation will draw information from other development stages (e.g. masterplanning and community engagement), and likewise, once prepared, the code will feed into and inform later development stages such as parcel (or phase) design and any detailed approvals processes.

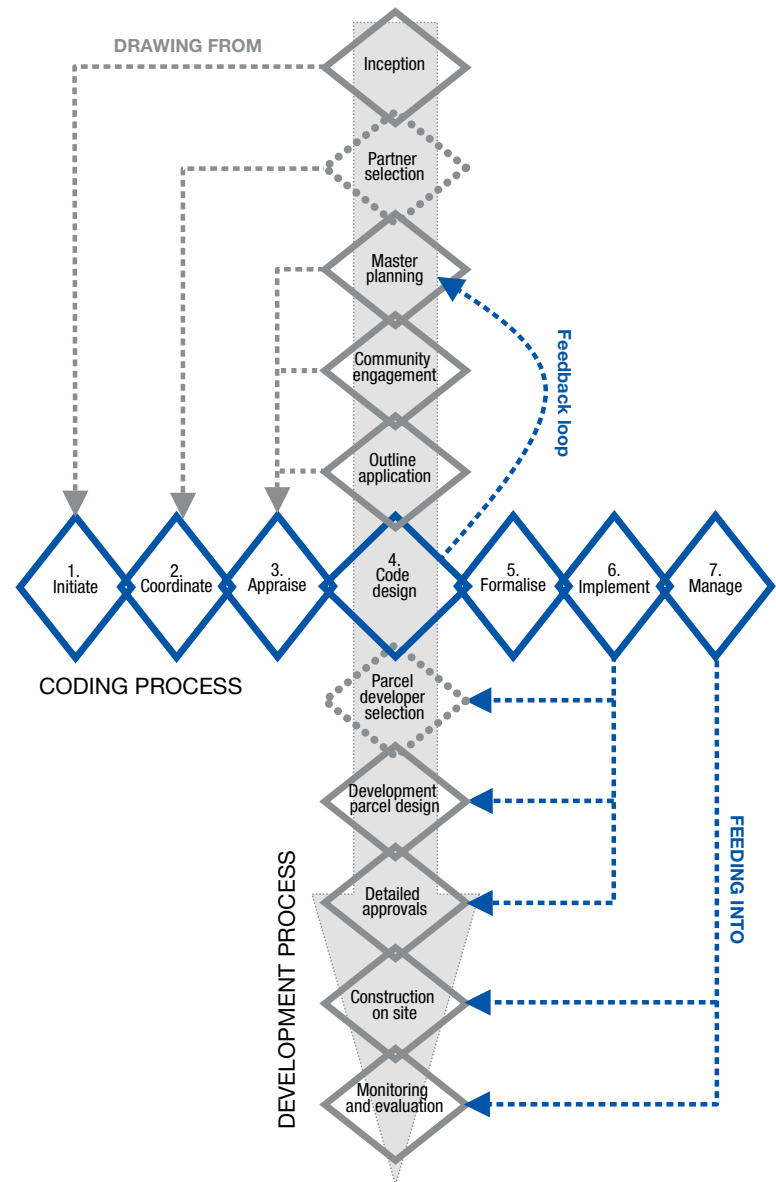


Figure 26. Coding and the development process

Groups	Interests	Stakeholders	Prime motivations	Key potential stakeholder roles include
Coding Team	Land interests	Landowner	To get the land developed and make a profit	Establishing aspirations from the start for design quality, using freehold rights throughout to guarantee delivery against the design code
		Master-developer	To maximise site potential and thereby long-term profit	Initiating the site-based vision and code design process through appointment of designers, and subsequently assessing parcel development proposals against the code
		Funding agency	To deliver a return on public investment	Using landownership and funding powers to deliver the requisite skills, resources and know-how for a high quality coding process, and effective assessment and enforcement
	Design interests	Masterplanner / framework designer	Within client objectives to deliver a coordinating design vision	Preparing the masterplan or development framework as a strong vision for the long-term development of a site(s), reflecting any existing policy and guidance, local consensus on the vision and the client's brief
		Code designer	To make the design vision deliverable	Coordinating different interests as a basis to prepare the design code as a means to implement the essential principles contained in the masterplan / vision
	Development interests	Parcel developers	To maximise site potential and thereby profit	Developing proposals and achieve consents to deliver on site a development parcel within the masterplan / vision
		Social housing providers	To house social tenants	If involved, developing proposals and achieve consents for the delivery on site of a development parcel – or part thereof – within the masterplan / vision
		Parcel designers	Within client objectives to deliver a viable design solution	Creatively interpreting the code and masterplan to develop high quality designs for individual land parcels and their constituent buildings, spaces and areas
	Public interests	Planning authority	To protect and deliver complex economic, social and environmental public interest objectives	Establishing aspirations from the start for a high quality development, initiating or playing a role in initiating the masterplan / vision and design code, and administering the development control and any enforcement processes on the basis of the code
		Highways authority / agency	To deliver a safe and efficient movement network	Playing a role in design code production, revising and updating existing highways standards as necessary, and assessing and adopting the infrastructure that results
		Environment Agencies	To protect local environmental resources	Approving discharge from drainage facilities (i.e. sustainable urban drainage – SUDS), and advice on incorporation in the design code
		Construction permits / control	To satisfy technical building regulations	Approving parcel proposals against the national building regulations, and advice on incorporation and adaptation for the design code
Wider interests	Private interests	Utilities providers (including water)	To establish an efficient and profitable utilities network	Adopting service infrastructure, and advice on incorporation of requirements in the design code
	Community interests	Local politicians	To satisfy statutory obligations whilst protecting local voter interests	Establishing design aspirations in advance of development interest, approving masterplan / vision and design code and delegating authority to officers to manage the delivery
		Existing community	To protect and enhance local amenities (and often property values)	Engaging in the masterplanning / vision making process through serious and significant involvement
		Future occupiers	To meet future community needs	Involvement through normal planning processes and engagement in long-term management and maintenance processes on the basis of the design code

Figure 27. Roles and motivations of key stakeholders within a typical coding process

#### 4.4

### The stakeholders, roles and motivations

The central role of the design code within the development process means that it brings together a wide range of individuals and organizations with a stake in the development outcomes. These can be divided into two groups: the ‘coding team’, which comprises the full range of professional stakeholders involved in producing and using the code, and ‘wider interests’, such as the local community. The coding team can be broken down into four sets of interests: land, design, development and public interests. Again, local practices will vary across Europe, but fig. 27 illustrates a typical set of roles, even if titles and relationships vary.

The English national pilot programme suggested that understanding the intersecting roles and primary motivations of these groups is the key to forging a successful coding process. Individually they will vary, but collectively motivations will encompass:

- The delivery of high quality design
- Optimizing investment returns – a necessary precondition
- Creating a predictable and efficient development process – to facilitate investment
- Delivering planned development capacities – e.g. determining densities, use mixes, etc.
- Achieving key technical design parameters – whilst avoiding their over-dominance
- Establishing consensus over the development.

Arguably, therefore, to succeed, design codes will need to address these collective motivations that – it is hy-

pothesised – will be remarkably consistent across the continent, at least as aspirations, if not (yet) as achievements. But not every scheme that is subject to a design code will follow the same process, and the roles of key stakeholders will vary correspondingly. For example, whether public (see Swindon example above – fig. 24) or private (see Newhall example below – fig. 31) sector stakeholders lead the process may determine who takes which role within the coding team. Certain roles can also be combined in single stakeholders, for instance: municipalities with appropriate skills in-house may take on the role of code designer; landowners may act as the master-developer; or the master-developer may subsume the role of parcel developer.

#### 4.5

### Seven fundamentals of coding

The national pilot programme revealed seven further fundamental factors for the success of coding projects. These begin and end with a commitment to design quality and have broad application across Europe:

**Urban design first:** The achievement of good urban design should be the primary objective of all involved in the preparation and use of design codes. Increasingly, a compatible range of urban design principles are being advocated in practice manuals across Europe (e.g. European Union 2004). These look beyond narrow debates about architectural aesthetics, and also reject purely technical design solutions. The goal of sustainability in particular needs to inform almost every aspect of code production, from considerations of density and

Scales of action	Masterplan	Design code
<b>Settlement pattern</b>	Major infrastructure Structure planting Water management Road /cycle network Open space network Character areas	Major roads, bridges, public transport network, design principles for combined heat and power systems, Continuity, species, relation to topography Drainage, recycling, reed beds, water features Road types, hierarchies, dimensions, capacities & characters, cycle network continuity Standards, open space typology and features, connectivity Centres and sub-centres, walkable catchments, parcel size and sub-divisions,
<b>Urban form</b>	Connections Street network Block pattern Building lines Plot form Building location Density contours Views and vistas	Edge treatments, boundaries Urban grain, grid types, connectivity Block form, privacy distances, interiors Frontage continuity, set backs Plot size, width, adaptability Orientation, position on plot, overlooking and overshadowing, natural surveillance Plot ratios, dwelling per hectare, intensification nodes Relation to topography, corridors, backgrounds
<b>Urban space</b>	Open space Public space Carriageways Cycle and footpaths Public/private space Private gardens Play spaces Parking	Standards, types, forms, layout, access, landscape, planting, management Patterns, types, enclosure ratios, forms, layout, connection, uses, management Road tracking, junctions, road specifications, traffic calming, services routing, servicing Path spec., cycle tracks, paving, kerbs, gutters, road markings, other details Principles for courtyards, mews, cul-de-sacs, covered streets, arcades, colonnades, Standards, back gardens, front gardens, roof gardens, landscaping Standards, types, equipment, management Standards, car parks, parking courts, on-street types and treatments, overlooking, lighting, landscaping
<b>Local character</b>	Building forms Building types Building frontage  Mix of uses Townscape features Heritage assets Street trees Soft landscape Public realm	Bulk, massing, height storey height, forms building envelopes, plan depths, adaptability Detached, semi-detached, terraced / town house, flats, fronts and backs Active frontage, entrance frequency, architectural styles, features, proportions, rhythms, expression, window / wall ratios, materials, colours, balconies, porches, signage, shopfront design Distribution, proportions, mixing – vertical, horizontal Eave lines, rooflines, chimneys, corner treatments, landmark / background treatments, focal points, advertising Integration, preservation, management Species, numbers, placements Standards, planting species, biodiversity, lawns and verges, planting beds, planters Street furniture, bollards, boundary treatments / materials, public art, fountains, paving materials, colours, utilities equipment, street lighting, amenity lighting, bus shelters, CCTV, public toilets, cycle storage and parking
<b>Technical factors</b>		Environmental standards and energy efficiency Access standards and disabled parking Refuse storage and recycling Tenure mixing, affordable housing Management and maintenance issues

*Note: It will not always be necessary to include all these elements in a particular masterplan or design code*

Figure 28. Design codes, building on the spatial vision

mixed-use to the use of particular building materials or the choice of species in landscape design. It also implies a concern for social and economic sustainability, where good quality urban design has an important role to play in promoting social inclusion and economic revitalization across spatial scales.

**Setting quality thresholds:** Design codes should establish the essential unifying elements of ‘place’, encouraging and enabling interpretation around that theme. First, they can set clear thresholds below which quality should not fall by providing both the parameters for design and the criteria against which formal assessments of the quality of proposals can be made. These criteria need to be expressed with a clarity and comprehensiveness that will allow proposals to be assessed in an objective manner. Second, codes can inspire those who design with them to strive for better design than they otherwise would do. Just as the constraints and opportunities of the site or the clients’ brief provide a focus around which designers will creatively develop proposals (RFAC 1994: 69), so should the content of design codes, providing the freedom to innovate within the clearly established and unifying parameters of place.

**Investing up front:** The preparation of design codes involves a significant up-front commitment of time and resources by all parties. In many European countries today, code or no code, such an up-front investment is to be expected for the types of major development proposals for which design codes might be used. The English national pilot programme suggested that de-

sign coded schemes enhance sales values and increase land values which more than compensate for the additional resources required during the design process. For the public sector, many potential ‘sticking-points’ will be resolved during the coding process that would otherwise require negotiations during the processing of the planning application. Codes simply re-distribute the time and resources required from both the public and private sectors – effectively front-loading them – rather than significantly adding to them.

**Rules for delivery that build upon a spatial vision:**

Design codes are effective tools to help interpret, articulate and deliver the design vision expressed elsewhere, typically in a masterplan or development framework. As such, codes need to be built upon the firm foundation of a robust spatial vision that has been tested for its technical and financial feasibility. Usually the vision will be prepared for a particular site, but sometimes it may apply to a wider area containing a number of development sites. Design codes themselves vary considerably along a continuum from those that significantly develop the core urban design principles of a spatial vision that otherwise remains largely conceptual, to those that only express (in a technical sense) the detailed design principles that are already established in the vision. Codes are equally valid at all positions along the continuum, whilst the level of detail and prescription across codes, or from coded element to coded element, will be a matter for local decision (fig. 28).

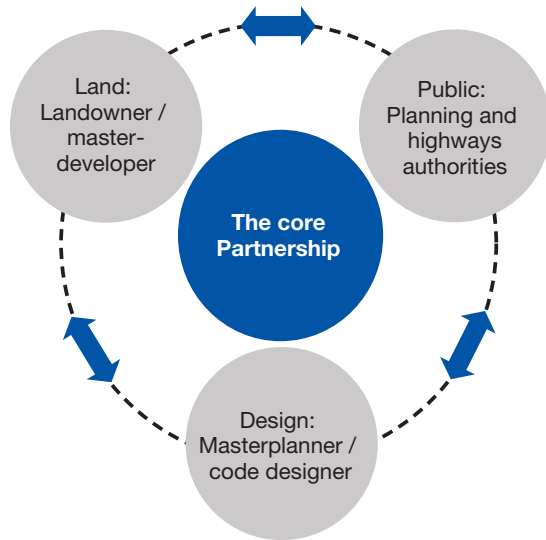


Figure 29. Core partnership of interests

### A collaborative environment and a partnership of interests:

A strong commitment to collaboration between partners and within organizations is a pre-requisite for successful and efficient coding. Designs of very different character and quality can still be produced using the same design code, emphasising the critical importance of other factors as well, namely the quality and commitment to achieving excellence of all members of the coding team, and the resources at their disposal to secure this. Critical to the success of such a partnership is a core three-way relationship between the key public sector, land and the design interests (fig. 29). If a strong three-way relationship can

be forged early on, then a commitment to the design code can be developed and maintained across these stakeholders, thus obviating any negative external pressures later in the process.

### The importance of clear and effective leadership:

Clear leadership is critical to effective coding, for keeping up the momentum and making decisions. More often than not, successful examples of coding are characterised by one party or another being strongly motivated to achieve quality, and acting in effect as a design champion. This leadership can come from landowners, master-developers, local authority officers, funding agencies or code designers, or a combination thereof. Political leadership is also required. Involving key local political decision-makers early within the coding process can help to gain political support, lead to a smoother planning process, and will give local politicians the necessary confidence to delegate decision-making authority to their professional advisors on the basis of the agreed design codes.

### No substitute for skills – a multi disciplinary approach:

Design codes require the exercise of advanced design skills throughout the process of their preparation and use. Unlike other processes of development, coding distributes the creative input across three phases of design (fig. 30). The quality of the development is dependent upon the quality of the area or site-based spatial vision, the quality of the code itself, and the quality of the parcel or scheme design. This compares favourably with other design intensive approaches such as development based solely on a detailed masterplan where the design work is split between two phases of design

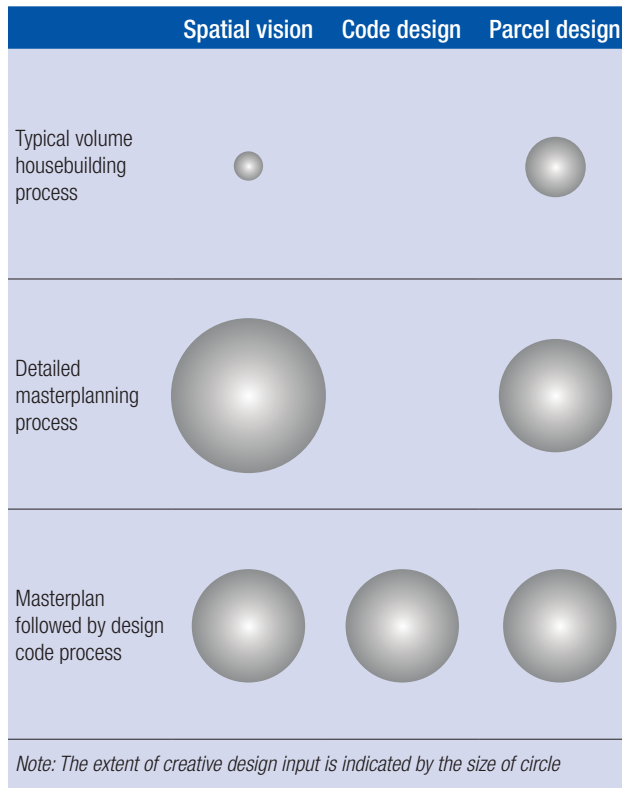


Figure 30. Design and development models compared

(masterplan and parcel design). In the UK it has marked a major advance on what has been the dominant model for large-scale residential development, where the basic design parameters are established to gain the outline planning permission, after which a specialist layout designer prepares detailed schemes for each parcel of land based on standard housing units and technical, generic, development standards.

Across Europe the availability of skills to prepare design codes and other forms of detailed guidance will vary considerably. HOPUS has revealed advanced skills in countries such as Germany and the Netherlands, emerging skills in countries such as the UK and Italy, and a skills gap in countries such as Poland and Portugal.

## 4.6

### To code or not to code?

Throughout the national pilot programme in England, arguments for and against the use of design codes raged in the architectural and development industry press: that they would stifle design creativity; be excessively bureaucratic and restrictive; and only deliver traditional design solutions (see Carmona 2009). Just like any other form of detailed design guidance, if design codes are poorly designed, or inappropriately used, then they may be part of the problem, and not the solution. However, experience elsewhere in the world (see Carmona et al 2006b: 232-234) suggests that these misconceptions have little basis in fact.

Used correctly, codes have a particular role to play in helping to deliver design quality for types of development – particularly large-scale predominantly residential developments – where it has typically been lacking in the recent past. The seven fundamentals discussed in 4.5 (above) relate directly to design coding, but also, in their essence, to other forms of design guidance. Design codes are not alone as tools with a role to play in enhancing design quality, and are certainly not appropriate for all forms of development. However, where they are appropriate, the evidence now suggests that they can make a real contribution to raising the bar and delivering a better quality built environment (fig. 31).

Newhall is the first phase of a proposed urban extension of 2,800 homes and supporting amenities, with outline planning permission for 440 dwellings on a site of 17.4 hectares. The development is promoted by the landowner, New Hall Projects Ltd, a family concern with a vision for a contemporary extension to Harlow. The scheme follows the preparation of a planning and design brief which was agreed with the council. An outline application was then submitted for the first phase.

A planning condition to this required the approval of a detailed masterplan, a requirement that is being met through the preparation of design codes. The codes are being prepared for each parcel of land that is marketed, and these form part of the brief to potential developers. The code designer assesses developer submissions and takes an active role in making sure that the masterplan vision is achieved. In later phases a joint venture arrangement has been established between the landowner and parcel developers in order to retain more control over the final outcomes.



Figure 31. Newhall case study

## 5.

### A story to conclude

#### 5.1

#### A simple code

In 1.2 (above) it was argued that our love for, and obvious ability to implement, crude development standards might be turned to advantage, through adopting instead a simple set of generic rules that focused on getting the fundamentals of urbanism right.

The 2009 URBACT annual conference took participants to Stockholm. Stockholm, like all large European cities has its fair share of suburban sprawl; sprawl which is largely the same as anywhere else in Europe. But Stockholm is a city of islands, and in places, this waterscape is used to great advantage to give the suburban landscape a more distinct character, Hammarby Sjöstad is one of these and illustrates how such a set of simple but fundamental rules might vary remarkably little across Europe. Developed with the countries represented in HOPUS in mind, the nine rules apply to Stockholm as well. Taking each in turn:

1. **Streets should form a continuous urban network with all streets joining at least two others:** The street network is well connected, direct and legible, with streets forming a grid that connects the lakeside to the development's main spine along which a tram and bus routes run. To aid way finding, streets are punctuated by a series of local (but subtle) landmark buildings, or terminated by more dramatic landmarks situated in areas that surround the development; a church, a chimney, etc. (fig. 32).
2. **Streets should be designed for a maximum vehicle speed of 30Km per hour:** Streets are short,



Figures 32, 33, 34. Hammarby Sjöstad

narrow, lined by parking and have regular turnings, all of which clearly identifies to drivers that speeds should be kept low. Only on the main spine is there potential to drive faster, although there, regular pedestrian crossings, turns and traffic calming measures have much the same effect without the need for signage (fig. 33).

**3. Every street and / or building block should host at least two (preferably more) major land uses:**

The development is truly mixed use, featuring a wide range of commercial uses, cafes and restaurants, local shops, and a full range of community facilities, including schools, a library, sports facilities (internal and external), play areas, health facilities and a church. Almost all blocks have a mix, and typically ground floor space is flexibly designed so that uses can come and go without affecting the overall urban quality of the street space (fig. 34).

**4. Buildings should face public space and create a coherent, continuous, building line:**

The urban feel is maintained by the continuous street wall

that establishes a strong building line and a series of well-defined, well-overlooked urban street spaces that feel safe, well used and crime free. Building heights vary from four to eight stories, with street widths set appropriately to maintain the sense of enclosure (fig. 35).

**5. Blank facades at street level should not be allowed:**

The blocks themselves are lined with attractive, clearly contemporary buildings, exhibiting a range of styles and treatments whilst avoiding prima donnas. Ground floors are often active or alternatively carefully landscaped and designed to give a sense of the activity inside, whilst maintaining privacy (fig. 36).

**6. Space for private front planting and / or street trees should be provided:**

The whole development is exceptionally well landscaped, both in communal and private areas. Although the density of the scheme means that few private front gardens are possible, careful landscaping of the public/private interface reinforces the character of individual units,



Figures 35, 36, 37. Hammarby Sjöstad

whilst the whole development is interspersed with a network of green pedestrian only routes with very high quality landscaping. The best of these, along the canal and the lake provide an innovative and continuously changing set of edge treatments that play a large part in establishing the unique character of the development (fig. 37).

- 7. Setbacks and front gardens, should never be covered by any more than 30% parking:** Parking is never allowed to dominate the scheme, and is handled by a series of discrete parking courts, underground parking, on street parking and a car pool to which all residents have access. The on street parking does not detract from the street quality because of the high quality public space within which it is set.
- 8. Existing trees, landscape and natural features should determine site layout and character:** Hammarby Sjöstad integrates the natural landscape and features in spades, using the lake and canal as primary structuring features of the development,

whilst preserving trees, higher ground and other natural features in order to give character to the public and private spaces of the scheme, and to inspire the creative talents of the development's architects who have had something to respond to in the absence of any built context.

- 9. Design to reduce, reuse and recycle natural and energy resources:** In essence, the development meets every urbanism rule above, and does this whilst adopting the most up to date sustainable development strategies and technologies, many of which are subtle and do not unduly intrude on the qualities of place that give Hammarby Sjöstad its character. A critical initiative is the Glass House, an environmental education centre and resource for residents to encourage and support them into leading more sustainable lifestyles.

Sitting on the Hammarby Lake to the south of the city, the development is suburban in location, yet has achieved an outcome that is urban in nature in the sense that it features the network of clearly urban streets and spaces,



Figures 38, 39, 40. Hammarby Sjöstad

attractive blocks and high quality public realm that Europe is rightly famed for.

Critical to its success has been the presence of a clear hierarchy of design guidance to establish a vision for the scheme and to manage and control its delivery. This has required strong leadership from the municipality across every stage of the development process (<http://www.cabe.org.uk/case-studies/hammarby-sjostad/design>). In particular, the masterplan was led by the City Planning Bureau. Architects from the private sector have then been appointed to ‘test’ each phase of the masterplan as it comes forward for development, whilst the city has evaluated these proposals (three or four ‘sketch’ schemes for each phase from different designers) and assimilated the best ideas into a refined masterplan. Design codes have subsequently been prepared for each of these phases or sub-districts in order to ‘fix’ the key design parameters of the masterplan, and this forms an appendix to the development agreement between the city (also the major landowner) and each development partner. Finally each code has been adopted for plan-

ning purposes and becomes in effect the delivery tool against which successive parcels of the development have been assessed and controlled.

## 5.2

### A long-term investment, but we need to start somewhere!

The experience at Hammarby Sjöstad demonstrates that high quality outcomes are not delivered by accident. As argued in 2.3 (above), to maximise the potential of delivering such outcomes will require:

- A broad conception of design, extending beyond mere ‘aesthetics’ and basic ‘functional’ considerations to include a concern for urban design – broadly defined – and sustainability – economic, social, and environmental.
- An approach to design informed by context, based on a deep understanding of the character and qualities of areas and sites and on public / user involvement in developments.

- An integrated hierarchy of design guidance extending from broad strategic city-wide design principles and policies, to a clear vision for large-scale projects, to detailed design guidance for particular sites and development opportunities.
- A public sector urban design / planning team with the means and capabilities to: engage in the design / development process by proactively preparing policy and guidance frameworks, incentivise key development opportunities, and respond positively to development proposals.

This requires both leadership, acceptance of the value of better design, and the necessary resources to deliver on such an agenda. Getting the resources in place is a long-term process, as is winning over hearts and minds across stakeholder groups. Where these do not exist, as was predominantly the case in some countries represented within the HOPUS group and intermittently within all, securing high quality outcomes is undoubtedly harder. Hammarby Sjöstad shows us what can be achieved. It demonstrates how a sophisticated site-specific hierarchy of design guidance can (as part of a wider process) help to deliver superior design and sustainable outcomes. However, it also reveals that much of the success can be put down to the application of a remarkably simple set of urbanism rules or principles that will be applicable with minor modification across much of Europe.

Based on the lessons of the English Pilot Programme discussed in 4.0 (above) such principles would ideally be added to, moulded and re-cast in the light of the spatial design vision for each development site, based on a full understanding of local contextual factors, per-

haps in the form of detailed site-specific design codes. However, where the skills and resources are lacking for the adoption of such a sophisticated (and potentially costly) approach to design intervention, it may be that the adoption of simple municipality or city-wide codes reflecting the type of urbanism fundamentals represented in 1.2 (above) will be the next best thing and the first step on the road to a more design-led approach to development.

If Europe is to retain its reputation for possessing a high quality built environment and reinforce its credentials for delivering a high quality of life and a sustainable way of living, then the investment needs to start somewhere. The sooner the better!

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## 2

## Housing Europe

*A roadmap for the definition of quality in residential building*

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## 1.

### Buying food vs. buying a place to live

Imagine yourself standing in a supermarket, in front of the meat counter (Fig. 1). Countless tidily packed containers are neatly laid out in refrigerators, each enclosing, under a thin transparent plastic film, their succulent content. Beef, pork, chicken, turkey, are proudly displayed in rows under a friendly, color-emphasizing light, ready to be picked up by the shopper and carried away in a cart. How can we make our choice amid this mouth-watering arrangement of gastronomic wealth? Our eyes allow us to make a good deal of decisions in the first place: is the meat red enough? Is there too much fat? Does the food look alright? But often this is not enough: we need to know if the meat is fresh, how long it has been sitting in the counter, where it comes from, or, in other words, if it will hurt me if I eat it. European regulations set clear rules regarding food labeling: a consumer must be able to easily gather pieces of significant information related to the product's wholesomeness. The labels on the packages therefore report dates, country of origin, etc., allowing me to make an informed decision.

Nowadays, most fresh foods and a good deal of preserved ones are required by law to disclose the information necessary to make the product traceable. Many others also provide data related to the amount of calories, sodium, fat, etc. the food contains.

In the same supermarket, we can also find another category of products: organic food. Interest in this kind of production has been steadily increasing in consumers and the EU is in the process of outlining a clear reference framework for the definition of "organic". Why do we

Figure 1. Buying meat in a supermarket



choose organic products, even though they are generally more expensive than normal ones? Because we know that they do not rely on pesticides, GMO's or other things that might, on the long run, harm our health.

Finally, scattered among the various shelves or refrigerators we can find yet another category of culinary gems: PDO (Protected designation of origin) products. What is that? The EU officially recognizes that some foods are typical of a specific region, and that they are produced following certain well-established, traditional methods. PDO's tend to be very sophisticated (and accordingly expensive), but they carry in them the message that food is not only nourishment but a cultural expression as well. Originally born to control the production of wine, a DOP label is today the warranty that your Gamoneo cheese was actually made in Asturias, or that the Prosciutto di Parma you are buying was not made from Chinese pigs. All of this points in one direction: quality. Through the implementation of various protocols and labels, the consumer is informed that what he eats will not make him sick, or that it has been produced in a "natural" way, or that it is a culturally authentic gourmandise. Consumers' health has been at the center of the legislators' concern while elaborating the various systems, and the entire food industry has embraced them recognizing their strong marketing potential. When "designing" a new product, food companies are not only interested in something which will respond to the public's taste, but also in what will stand out because of its "quality". The food market is certainly a very sensible sector, since it directly influences people's health. But under many aspects, it is not much different from other markets. Even here, market analysis is crucial during the design stage,

because no investor would even think of launching a new product which people don't like. In other words, quality is important, but at the end of the day the food must also be "good".

Let's now step out of the supermarket and try to purchase, in the same city where we were trying to buy a hamburger or steak, an entirely different product: an apartment. There is a housing market just like the food market, but somehow things are different here. First of all, the variety. Depending on where you want to live, and on what your budget is, it might turn out that no matter how many different apartments for sale you visit, all of them turn out to be: chicken. And if by any chance you don't like chicken, then you will have a really hard time putting together a decent meal. Still, with some perseverance, you might be lucky enough to find an apartment that suits your needs and that you can also afford. Maybe you would have liked to live in a building which looked a little more "typical", and not just like all others. But those were either very expensive, or felt somehow "fake". Still, you now have a roof over your head.

But here emerges another problem: as soon as you step outside, you find yourself in a barren urban void, crossed by unfriendly highways where cars reach tantalizing speeds, trees are a distant memory, sidewalks are reduced to the mere essential and, most of all, there is no one around. At night, the last thing you want to do is take a walk in your neighborhood – since there is no neighborhood at all – and to get "somewhere" you must either drive the car out of the garage or wait for some form of public transportation to carry you there. In other words: the chicken was good, but there were no potatoes in the plate (Fig. 2). And after some time, other issues start



Figure 2. Fragmented urban development in the northern suburbs of Rome

coming up, like your energy bills, which impact heavily on your budget. The apartment is freezing in winter, and scorching hot in summer, so you turn up the heating and end up installing an ugly air conditioner. Other apartments you saw before buying yours were sold as being energy efficient: but again, they were expensive. Furthermore, there is less air and light in the apartment than you expected, and even the view is not that great.

Finally, a happy event comes along: your family is growing. So you ask a friend from high school who is now an architect to find a way to carve out a new room in the apartment. But there is very little to do: the structure, installations, and fixtures are very inflexible, and the transformation would become horrendously expensive. So in the end you decide to move out to a suburban area, where you buy a single-family home on a tiny plot of land. Here you will need to ride to work every day, but at least it will be a better place to raise your kids. Anyway, you never really felt at home here.

It turned out that the apartment you bought was not good for your health, maybe not affecting your physical condition, but certainly not benefiting your psychological one. In retrospect, too many things regarding the good you were buying were not disclosed to you before: would you have purchased a steak under the same conditions?

## 2.

### The problem of defining quality

Lack of variety, the absence of urban space, poor energy performance, low indoor quality, reduced flexibility: these are only some of the problems the average user can meet. This parable – which could have taken place pretty much all over Europe – tells us one thing: the housing market is, unlike the food market, a very unregulated sector. Many of the problems our fictional character experienced could have been avoided if only he had been put in the position of making an informed decision when buying a place to live. With the exception of energy and environmental labeling, which are spreading in practice throughout Europe, all other factors adding up to quality are only very rarely accounted for, and the average user is generally unaware of them.

Why is European legislation so backward in terms of urban and housing quality, especially if compared to other sectors such as food?

Possible reasons could include:

- If the impact of food quality on health is very direct, the same cannot be said in relation to urban and housing quality. Nevertheless, the long-term impact on the physical and mental health of the individual and on the environment is a scientific fact;

- Urban and architectural quality is, arguably, more difficult to define than in other sectors, since only few aspects can truly be quantified, while the majority remains subjective and connected to cultural factors;
- The housing market itself is not dynamic: if a consumer can easily compare products in other sectors and rapidly determine which one he finds more suitable, it is not as easy for him to compare different housing solutions. Consumers are therefore led to opt for well-known alternatives, stifling innovation;
- Housing developments in Europe are today mostly private, little public (De Matteis 2008: 15). Introducing strong regulations would therefore mean orienting the market, which is something the EU tends to avoid;
- It is not the market alone which leads to greater or lesser quality: local authorities play a fundamental role in its achievement. Directives on urban quality could outline some objective factors connected with the building industry, but be unable to impact on the governance models.

For these and various other reasons, the EU does not consider housing – or at least the individual dwelling – as something within its competence, so much so that social housing is generally excluded from ERDF funding. Nevertheless, recent modifications (Regulation (EC) No 397/2009) allow up to 4% of total ERDF allocation to be used for the improvement of energy efficiency in the existing housing stock. The reduction of housing's carbon footprint is recognized as a priority, since it can be immediately quantified in terms of CO<sub>2</sub> emissions: but what about other, fundamental aspects, which, although of less immediate evidence, may bring on the long run to a real improvement in environmental quality?

Sustainable building is indeed at the heart of current EU policies. Besides the wide-ranging effort related to the 2002/91 EPBD directive, a clear declaration of interest in this sense, the recent Lead Market Initiative<sup>1</sup> further stressed the importance of the sustainable building sector in the development of European economy. The Commission's mid-term report published in September 2009 (SEC (2009) 1198 final) identifies the progress achieved in relation to a set of specific actions intended to promote green building throughout Europe: attention is paid, among others, to the screening of national building regulations, the recasting of the EPBD directive, the implementation of Life Cycle Costing (LCC), the introduction of 2nd generation Eurocodes, and various strategies for the skill upgrading in the construction sector. Environmental and technological quality is being strongly promoted: urban and architectural quality lies all around this, but it seems that somehow there is a major difficulty in "bridging the gap" between the two faces of the same medal. The problem of urban and architectural quality is likely to lie in one fundamental aspect: it is very difficult to measure it. Energetic consumption is a very straightforward quality indicator: the lower, the better. In urban and housing matters, what is good for one individual may be bad for another, and vice versa. Furthermore, it is possible that a housing development checking positive to a good number of quantitative indicators may still, in the end, turn out to be a rather bad place to live. In housing matters, 1+1+1 could sum 0. The lack of reliable measuring tools often proves ruinous for housing developments. If a centralized form of quality control over housing is absent, then other "tyrannies" are likely to take over, propelling the developments in potentially unwanted directions (Carmona 2009: 34).

**3.****A silent urban revolution**

May 2007 saw the publication of the Leipzig Charter, the first EU-level document somehow addressing the quality of urban space and promoting a principle of integrated urban development. About two years later, the implementation of the Charter still to come (in part because urban development has been slowed down by the global economic crisis) criticism regarding its contents has been abundant, claiming that it is a very generic document, little more than a pamphlet, that it is too oriented towards large metropolitan areas, while it leaves aside the problems of medium and small cities, that it does not consider the factual consistency of a continent made of sprawling cities, and that it puts too much effort in hailing the strong city cores, and finally that it is too German-centric.<sup>2</sup> In any case, a true “European urban quality policy” is still absent, although, undeniably, some form of “urban agenda” is already present.



*Figure 3. Housing on Sporenburg island, an outstanding urban development in Amsterdam*

Notwithstanding this, the fact that the problem of urbanity seems at least to have been taken into account for the future, competitive development of Europe vis-à-vis what other geographical areas can offer (hence the Leipzig Charter’s implicit insistence on traditional urban models), the interest in housing is actually limited to its energy performance and very little else. This is the more surprising given that the last decades have witnessed, on behalf of some national and local administrations, a thorough process rethinking the way new developments are designed and carried out. It is enough to briefly consider the synthetic housing case studies presented in this volume to understand one thing: that good practices can be considered those creating a stringent relationship between urban space and buildings, considering the two elements as necessary to achieve a truly high quality standard, also in relation to environmental performance. We know that a well-designed urban space is often enough to ensure the outcome of a new development, and that the quality – not to speak the aesthetics – of the individual buildings are maybe of minor importance in this respect. Nevertheless, excellence in design emerges only when both urban space and the buildings framing it have been conceived with a common, strong underlying logic.

A silent “urban revolution” has been taking place throughout Europe, where the last twenty years have witnessed the revision of city models inherited from the past, combining the findings of early and late 20th century urban design into new, convincing models. For the first time in about a century there seems to be a paradigm related to urbanism not too heavily influenced by ideology: the city is no longer the theater of class struggle or a romantic, picturesque backdrop for historicizing buildings. Count-



Figure 4. Alfa Alfa Housing in Sevilla by Carrascal Calle and Fernandez de la Puente. An accurate urban design "mends" a gap in the city's historic center (elaboration by R. Ianigro)

less cases of well-conceived developments, based on sound pragmatism, a reasonable understanding of ecology, merged with an intelligent invention of new aesthetic models have been realized. Practice, it seems, has overtaken policy (Figg. 3, 4).

That this housing renaissance is effectively taking place is also attested by the increased interest presented by academic and research institutions throughout Europe: after decades of reduced attention, where the main focus was shifted to public buildings, monumentality, and

architectural language, a growing number of publications is trying to chart the development of housing at the European level, and research networks and associations are becoming more and more vital.

Nevertheless, this proliferation of good practices still remains marginal in respect to the vast, sprawling, low-quality growth which most European cities have experienced during the past decades and are still undergoing today. Yet the tools to avoid this catastrophic process, as we have seen, exist: how is it possible that no action is taken to prevent the consumption of one of Europe's most precious resources, i.e. space?

Finally, the buildings: again by working on a revision of modernist models and housing solutions, reconsidered under the light of sustainable design, a new, consolidated landscape of residential building has emerged. Since it does not represent the mainstream of today's urban development, it has gone largely unnoticed, especially at policy level. Is it possible that this fertile production of quality urban design and architecture has left little or no trace in the European legislators' action?

## 4.

### Housing quality by design: a primer

Clearly enough, housing is a very cultural issue: this accounts to a good extent for the fact that no supranational agency is willing to enter this domain, lest it lose its super partes attitude. Energy, on the other hand, is a fairly universal issue, and therefore it becomes quite simple to legislate on that, at least by defining homogeneous calculation methods.

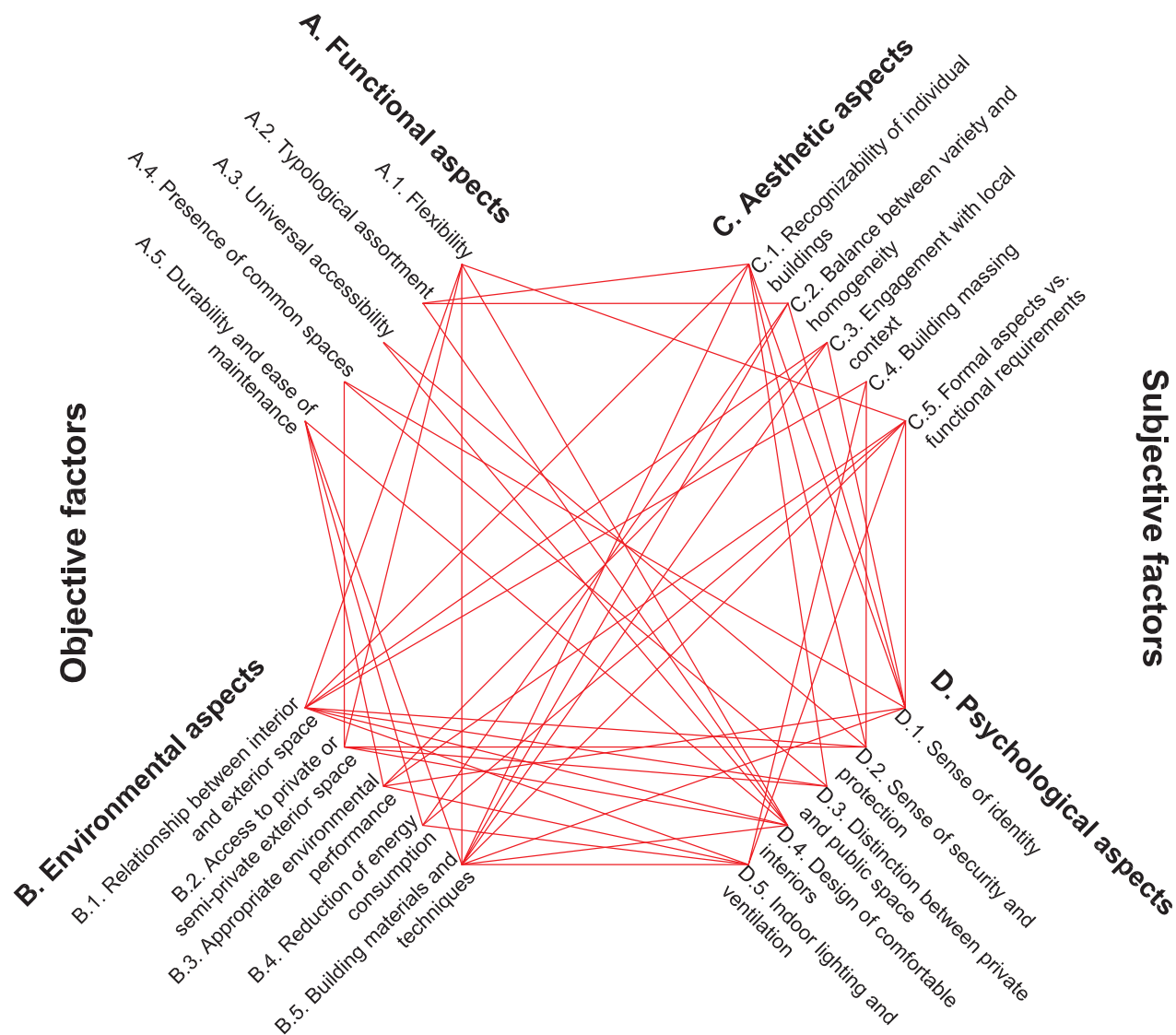
Nevertheless, considering to what extent urban and housing design has changed and how many ground-breaking innovations have found their way into common practice, it seems peculiar that such wealth of knowledge should be neglected at EU level. Matthew Carmona's contribution earlier in this same volume outlines a number of general criteria which can be considered vital to leverage urban quality in new residential developments, analyzing how a specific form of design guidance, design coding, can help streamline the process of achieving such quality.

Successful housing design cannot do without good urban design: no matter how good a residential building looks/feels/functions/interacts with the environment, it will only be sustainable (environmentally, socially, economically, etc.) if it is part of a larger, organic whole. Once we get down to the building scale, it is in fact possible to identify a number of specific aspects, starting from the threshold of urban space up to the intimate interior of private apartments, which enable such developments to acquire high quality.

What are the key aspects we are speaking of?

A. FUNCTIONAL ASPECTS	B. ENVIRONMENTAL ASPECTS
<p>A.1. Individual dwellings should possess a high degree of flexibility over short, medium and long terms</p> <p>A.2. Typological assortment should be extended</p> <p>A.3. Universal accessibility should be maximized</p> <p>A.4. Common spaces for special uses should be made available</p> <p>A.5. Building construction should ensure durability and ease of maintenance</p>	<p>B.1. Relationship between interior and exterior space should be guaranteed</p> <p>B.2. Individual dwellings should have access to private or semi-private exterior space</p> <p>B.3. Environmental behavior should be appropriate for local climate</p> <p>B.4. Energy consumption should be reduced</p> <p>B.5. Adopted building materials and techniques should reduce environmental impact (including during the building process)</p>
C. AESTHETIC ASPECTS	D. FACTORS IMPACTING ON PSYCHOLOGICAL WELLBEING
<p>C.1. Individual buildings should be recognizable and allow users' orientation</p> <p>C.2. Building aesthetics should be balanced between variety and homogenous expression</p> <p>C.3. Building design should engage context</p> <p>C.4. Building height, mass and density should be accurately controlled</p> <p>C.5. Functional and energetic needs should be balanced with formal aspects</p>	<p>D.1. Housing developments should be capable of producing a sense of identity in inhabitants</p> <p>D.2. Individual dwellings should provide a sense of security and protection vis-à-vis the exterior space</p> <p>D.3. A clear distinction between public and private space should be achieved, without creating impenetrable borders</p> <p>D.4. Dwelling interiors should provide sense of comfort (in relation to spatial layout and materials)</p> <p>D.5. Adequate natural lighting and ventilation should be guaranteed</p>

## The Housing Quality Mesh



The 20 key points listed above outline a possible reference framework for quality in housing design, ranging from the relationship of buildings to urban space to the interior aspect of individual residential units. These key factors are tightly interdependent, providing in fact a complex “quality mesh” (Fig. 5) where no one aspect can actually be present in absence of several others. Furthermore, we can distinguish a gradual passage from the objective to the subjective, from what can be generalized to what must absolutely be framed in a local cultural, social, economic, climatic context. Functional and environmental factors, being mostly related to measurable, statistical indicators, tend to be more objective; aesthetic and psychological factors, which are connected to the cultural sphere, demand a far greater adaptation to context. Clearly enough, it is difficult to imagine how a field so deeply influenced by cultural factors such as housing can

be schematized in 20 – or for that matter 100 – single points. What is considered good in Greece may be abhorred in Denmark; the very starting situations – just consider how different European cities are among them – can actually invalidate this outline of housing quality. Nevertheless, we might consider how many of the above-listed issues can truly be said to impact positively on housing – or at least on urban, collective housing – throughout Europe and also beyond. What we are trying to produce here is not an “arithmetical mean” of all positive aspects of housing, which could become an unusable, theoretical contraption: on the opposite, the criteria we have listed should each be considered as a starting point for a local interpretation, to be carried out before any possible process of implementation. So let us take a closer look at each of these criteria, in the attempt to understand what quality in housing is all about.

## A. Functional aspects

The functionality of housing units has been one of the main aspects of the modernist revolution. The need to reduce the average dwelling's surface in order to contain building costs was seen as the occasion to rationalize the apartment's interior. Today we have inherited not so much the individual solutions, which have by now almost reached a century of age, but rather the method for optimization, now also based on a strong industrialization of furnishing components. What early 21st century housing should offer in addition to what rationalist elaborations produced is:

### A.1. Flexibility

A generic term indicating the aptitude to being transformed intrinsic in a dwelling. A residential space (or an entire building) can be used in different ways throughout the day (maybe as a home-office or a nursery during the morning, and as a regular dwelling in the afternoon and night); use can change over the seasons (the presence of greenhouses, winter gardens, or various exterior spaces can lead to a different spatial use during summer and winter). Finally, a dwelling should be capable of being transformed after a certain number of years, if the living conditions of the owners demand so (i.e. change in number of inhabitants, change in ownership, etc.) The possibility of increasing or reducing the dwelling's size, of modifying its layout is bound to the load-bearing structure, and to the type of technical installations used. Some technologies consistently prove more flexible than others.

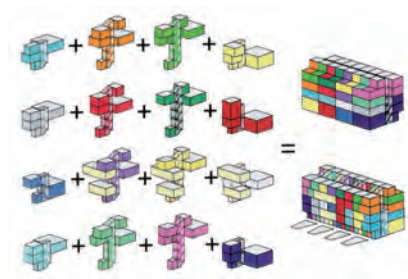
**How can this aspect be achieved? Building solutions allowing flexibility should be privileged; designers should develop various alternatives for each dwelling type, providing proof of the transformation potential, also bound to controlled building costs.**

### A.2. Typological assortment

Closely connected to the previous point, typological assortment represents a clear evolution in relation to modernist standards for interior design. Well into the 1980's, apartment layouts were often based on a single model considered to be optimized at least at local level. Variations were limited to changing apartment sizes, and the increase was usually limited to the sheer addition of rooms. Today, the varying assortment of dwelling typologies has become the norm in a number of contexts: in some Dutch developments, for instance, it is not uncommon to find more than 100 distinct layout solutions. These can respond to the demand of very diversified social groups (single parent-households, singles, elderly, communities, temporary residents, etc.), reflecting the dynamically changing structure of society.

**How can this aspect be achieved? This is a mere design aspect: designers should be expected to produce numerous variations on dwelling layouts, meeting the expectations of users / presumed future users.**

*GWL Terrein, Amsterdam:  
Block 8 by W.J. Neutelings.  
Typological assortment ensures  
a large functionality  
for different user classes*

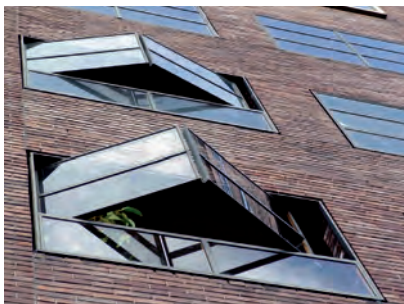


### A.3. Universal accessibility

National regulations throughout Europe define accessibility for special need groups, such as elderly or persons with reduced mobility. Nevertheless, a condition of reduced mobility can also be temporary (illness, presence of infants), calling for an easy access for all residential units. Although this contrasts with the traditional multi-level housing solutions widely adopted in some contexts, it is clear that accessibility means more than just absence of stairs: it is the possibility of free movement within a given space, allowed by an accurate dimensioning and ergonomic functionality of the interiors.

**How can this aspect be achieved? Applicable accessibility regulations must be enforced; in addition, transit spaces such as staircases, corridors, entrances, etc. should not be minimized, in order to guarantee flexible and unhindered movement.**

*Piraeus building in Amsterdam by Hans Kollhoff. The use of large windows allows a flexible seasonal use of the winter gardens*



### A.4. Common spaces

Collective housing is by definition the aggregation of individual residential units inside buildings: inhabitants therefore share some common spaces, such as all those granting entrance to the apartments. Although this can be hardly planned, there is always the chance that a sense of community be established among owners or tenants. This clearly depends on many distinct factors and, to a good extent, on chance; nevertheless, it is a potential which sensible architectural design may in fact foster. The presence of common spaces is important to host activities organized by inhabitants: these spaces can be designed to meet, spend time together, provide some larger room for children to play, etc. It is however quite important that these spaces be as little characterized as possible, since given the near impossibility of effectively foreseeing their use, it is likely that they will be inhabited in very distinct fashions. Flexibility is again the keyword, so that a room can become meeting hall, home theater, storage room, common kitchen, bicycle parking, utility room and workshop, etc., depending on the collective needs of inhabitants. In the worst-case scenario, if no communitarian identity eventually forms, the spaces can be still reverted to overflow storage.

**How can this aspect be achieved? A flexible, multipurpose space should be identified for each minimum aggregation of inhabitants, allowing them the freedom to use it the way they prefer.**

### A.5. Durability and ease of maintenance

Quite evidently, the durability of a residential building is bound to its construction and finishing materials. Considering the issue the other way around, a building becomes durable once it is correctly used by its inhabitants. This aspect is also connected to the units' tenure, since owners will obviously go about more carefully with their belongings than tenants. Social housing has always been subjected to varying degrees of vandalism, but this phenomenon has been significantly reduced by the practice of mixing tenures and income levels within residential developments. Nevertheless, the use of some building devices such as screenings, shadings, and other movable parts can, if not accurately designed or executed, lead to malfunctions. In particular, low-energy housing usually requires, to correctly function, a certain degree of interaction on behalf of users: this increased complexity can at times become a hindrance to full functionality.

**How can this aspect be achieved? Adequate choice of building materials and components, minimization of complex building parts, design of easy "operation" on behalf of inhabitants.**

## B. Environmental aspects

The environmental performance of buildings is today largely intended under the two-fold principle of reducing the impact of a building on its site, and minimizing the consumption from non-renewable energy sources. Although both interpretations are of fundamental importance for the achievement of sustainability, they clearly refer to a technological viewpoint. Sustainable design also encompasses the ability of a building to engender sustainable behavior in its occupants.

Environmental aspects are also fundamental for the achievement of an overall high quality in residential developments, given that for environment we can understand both the natural environment as an abstract whole, and the immediate setting of the building, providing the physical ground and context for its edification.



### B.1. Relationship between interior and exterior space

Few architectural elements are arguably as universal as the relationship which a dwelling sets up with the exterior surrounding it. This relationship can be more or less mediated by the building's boundary, in relation to how windows are designed and dislocated, and depending on the effect of continuity or separation which must be achieved. Introverted and extroverted dwelling spaces can be alternated within the same residential unit, establishing a diversified condition; otherwise full permeability or extensive enclosure can be proposed in presence of specific contextual factors (e.g. particularly enticing surroundings offering good exterior views, vs. negative settings calling for a greater degree of separation). Far view vs. close-up view constitute two alternative quality factors strongly influenced by cultural aspects. Although the relationship to site features is conditioned by the urban layout, the way the buildings are crafted can contribute strongly to the definition of this particular aspect. Furthermore, this factor is a prerequisite for many others influencing the quality of indoor space, such as natural lighting and ventilation.

**How can this aspect be achieved? On the basis of well-conceived site planning, it is up to the designer to create continuity or discontinuity with the exterior space. Positive effects can be achieved through the skilled use of glazing and flooring, removing physical and visual barriers between inside and outside.**



### B.2. Access to exterior space

Exterior spaces in their different declinations can again be considered to be a quasi-compulsive requisite for contemporary housing design. Private exterior spaces such as gardens for ground-floor dwellings, balconies, loggias or terraces for upper-floor dwellings not only increase the functionality of the interior space, they also in various ways improve its environmental performance. Many housing developments throughout Europe introduce a gradual sequence from public space to semi-private space, treating the latter not only as a passage towards the private interiors but also as the location for specific activities, most notably children's games. Besides the possibility of using a common exterior space, most apartments still can avail of a balcony or loggia, fundamental functional extensions of the interior.

**How can this aspect be achieved? Shared interior spaces can be realized through some specific urban layouts (block housing, open-block, linear slabs with private enclosure, etc.). Loggias and balconies are design choices, if correctly used they can improve a building's energetic performance, and represent important volumetric elements for the massing of the buildings.**

*La Mola Conference center in Barcelona by b720 Arquitectos. In warm climates the primary need is that of creating appropriate shading devices*

*Housing by Thomas Herzog in the Linz-Pichling Solar City, Austria. Sustainable construction in cold climates is characterized by compact building envelopes*

### B.3. Appropriate environmental behavior

Sustainable housing's first large-scale diffusion took place, starting in the 1990's, in Europe's northern nations, in particular in Germany, Denmark, and Austria. For a long time, before sustainable design methods and practices became well-known, and software for building performance calculation started to become easily accessible, the northern European model spread throughout Europe (and beyond) with little possibility of keeping the actual results under control during the design stage. The results were often problematic, given the dramatic climatic differences which can be recorded between the various geographical areas in the continent. Today, it is well known that in cold climates the main problem consists in preserving heat loss, thereby keeping compact building envelopes with limited openings, whereas in southern climates the main issue is that of preventing overheating by adequately shading the buildings' surfaces. All this also accounts for major differences in the formal language that sustainable housing acquires in different regions, hinting towards the possibility of generating a regional character of sustainability.

**How can this aspect be achieved? Energy performance must be simulated in advance through the use of specific software and with exact reference to local climate. The production of a site-specific image can and should be sought through the implementation of sustainable building techniques.**

### B.4. Reduction of energy consumption

Of all aspects related to contemporary housing design, this is probably the most straight-forward and easily quantifiable, since it refers to measurable amounts of energy consumed by a building or household. Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 outlines rules and criteria for the measurement, delegating member states to identify application protocols. In the seven years since its promulgation, the EPBD Directive has been successfully implemented in several member states, and is in the process of being adopted in others. Nevertheless, an ongoing negotiation concerning the Directive's revision has been showcasing disagreement between member states on a number of issues, such as methods for calculation of heating energy, the definition of "low-energy" housing, the introduction of compulsory incentives for sustainable building, or the proposal by some member states that all housing should become zero-energy by 2019. Behind these discussions lies the non-negligible fact that building highly efficient buildings is actually expensive. If this might not be a problem in times of economic growth, it does establish a major setback during stagnation. Despite these obstacles, the field of energy reduction is still the one where EU legislation is more advanced in relation to the housing sector. The buildings' orientation plays a fundamental role in the optimization of energy performance, and it also becomes relevant in terms of site layout and building morphology.

**How can this aspect be achieved? Follow the national implementation laws for the EPBD 2002/91. Building orientation should be studied to optimize performance while not stifling urban layout.**

### B.5. Choice of building materials and techniques

The environmental impact of building materials and components is determined by their entire life cycle, therefore including the raw materials' origin, transformation process, transport, assembly, demolition and recycling. The widespread use of recyclable building materials is still to come, given the building industry's intrinsic inflexible nature, but more and more producers are carrying out significant research efforts to improve the environmental qualities of their materials. In 2003 the EU CRISP network collected a database of over 500 indicators related to construction and urbanism; ISO 14000 sets standards for products' environmental performance and life cycle. In the meantime, however, popular labeling systems such as LEED or BREEAM are "overtaking" the European effort on the definition of the environmental quality and performance of materials. Finally, the practice of "green" building sites, which are sustainably organized and managed, represents a further frontier for the reduction of environmental impact in the construction sector.

**How can this aspect be achieved? During design phase low-impact materials and techniques can be selected by referring to existing ISO certification or environmental protocols. Building site management can be devised in order to reduce environmentally disruptive practices, especially when working in inhabited locations.**

## C. Aesthetic aspects

The aesthetics of buildings can at times be considered a negligible aspect when it comes to large-scale developments; nevertheless, the importance of aesthetics which must be stressed here is closely connected to the perception of space, to the act of recognizing, and to many other factors which intrinsically influence the way urban space and architecture impact on users. It is not so much a matter of artistic expression, as of providing a consistent aesthetic landscape, which can efficiently support the users' integration with the development.

Commonplace "pleasantness", not to speak "beauty", are out of the question here: the attempt to identify common aspects related to housing may not refer to utterly subjective matters connected to taste.

*St. Josephhof, Nijmegen, Netherlands.  
Mecanoo Architects use simple variation  
of material to induce diversification within  
homogeneous construction*

*Parc de Bercy, Paris.  
The redevelopment engaged the  
former agricultural character of the area*

### C.1. Recognizability of individual buildings or of their parts

The users' ability to recognize a building or a specific part of it plays a fundamental role in ensuring orientation as well as the development of identity. The basic conditions for appropriate orientation are set out through the overall urban design of developments, yet the buildings' definition is necessary to complement the process at the visual scale. Especially in cases of very large developments, individual buildings should be distinguishable, in order to avoid estrangement.

How can this aspect be achieved? Residential buildings can be varied on the basis of typology, dimension, relationship to the ground, finishing materials, colors, etc. Designers can avail themselves of a wide variety of options to produce distinctive identities for single buildings.



### C.2. Balance between variety and homogeneity

In direct relationship with the previous point, it is necessary to strike a balance between variety of expression and homogeneity. This proves necessary to provide a sense of continuity for the urban fabric, which can again become a problematic aspect in the case of large developments, where buildings are designed by different architects on the base of a given master plan. To this end, specific guidelines such as design codes can prove particularly efficient, since they can outline possible variations within a set of preferable solutions.

How can this aspect be achieved? In the case of large developments based on the use of master plans, design codes or other forms of guidance can encompass variation within a homogeneous system. For smaller developments, which are likely to be carried out by individual designers, it is up to their sensibility to devise a homogeneous, harmonic overall image.



### C.3. Engagement with local context

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This point presents a high level of complexity, since the very concept of “local” is unclear, leading to its being heavily challenged by a significant part of architectural culture. Local context implies on the one hand specific typologies, building solutions and materials; on the other, it signifies the establishment of a meaningful relationship between buildings and site. Urban design acts in this sense by considering pre-existing site features, and including them in the new development’s strategy; residential buildings realized on the basis of master plans conceived with this kind of attention will benefit from it. Engaging context also means identifying ways to connect a new development with an existing urban fabric, be it designed or spontaneous, establishing a functional and aesthetic link to the pre-existing city. Nevertheless, successful solutions can also derive from contrasting design choices: closed urban structures (e.g. those based on the use of residential blocks) could benefit from the juxtaposition of layouts emphasizing open settlement structures, etc. The use of a limited set of building or finishing materials as a means of engaging context cannot be imposed on designers unless it is done in the framework of design guidance, since it would reduce expressive freedom. A particular case can be considered for new developments in historic contexts: here decisions must be assumed by local administrations, including superintendent authorities for architectural heritage.

**How can this aspect be achieved?** Continuity with established urban fabric can be orchestrated at both the urban and architectural design level. Use of widespread, traditional building materials can be considered, with the caveat that it is not sufficient by itself to actually engage context.

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### C.4. Building massing

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The massing of buildings represents one of the main factors impacting on urban spatial perception. Volumes with excessive height, insufficient distance between each other, or appearance of great density can reduce the users’ capacity to appropriate the urban space, besides causing harmful effects of the overall environmental quality. Recent housing developments throughout Europe have largely pointed on low-rise, high-density patterns, a solution proving economical in terms of density while creating well-dimensioned open spaces. In cultural contexts where the “open-view” factor is not of paramount importance, this kind of development can prove successful; on the contrary, if wide-ranging views are to be privileged, the increase in building height still provides a reasonable solution.

**How can this aspect be achieved?** The accurate study of layout and density in the urban design is crucial for the definition of well-balanced building massing.

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### C.5. Formal aspects, functional and energetic requirements

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The rise of sustainable housing design in the 1990’s originally prompted the introduction of a wide range of technological systems and building components strongly characterizing the buildings’ appearance. Subsequent elaborations have to a good extent smoothened the harshly technological “language of sustainability”, yet still today residential developments are often strictly governed, under the formal viewpoint, by energy concerns, at both the urban and building scale. Since the formation of a densely settled urban fabric not always matches the need for optimal orientation (e.g. in the case of iterative linear blocks seeking full solar exposition), it is necessary to identify a balanced condition between functional, energetic and formal requisites. Also at the building scale, a similar balance can lead to well-crafted solutions in terms of morphology and massing.

**How can this aspect be achieved?** Designers should attempt to achieve image neutrality, avoiding the use of overly characterized technological elements. In residential building, most energy requisites can be resolved through the implementation of visually neutral components and materials.

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## D. Psychological wellbeing

Psychological wellbeing in relation to housing can be asserted on the basis of statistical indicators referring to overall health aspects (2). Clearly enough, it is difficult to pinpoint quality through indicators alone, since these tend to highlight mean values, whereas a very subjective issue such as psychological wellbeing changes in relation to cultural, social, economic, age, gender, and ethnic aspects. Environmental psychology studies have abundantly highlighted the relationship existing between human beings and their environment, yet only a fraction of these has already found widespread implementation in design. As the most subjective and elusive category of “quality by design”, psychological wellbeing cannot easily be reduced to a basic set of criteria; nevertheless, an attempt must be made at highlighting those factors which can reasonably be considered as extensible to a wide territorial, social and economic context.

### D.1. The sense of identity

Residential areas possessing a strong sense of identity often do so for reasons lying far outside the realm of design: identity can derive from history, traditions, social cohesion, and many other factors still. It is nevertheless common knowledge that developments are described by users through the use of anthropomorphic adjectives such as “friendly” or “hostile”, referring in doing so to a complex tangle of factors ranging from urban layout to architectural forms, from social mix to the perception of safety etc. The sense of identity can in fact derive from the feeling of belonging to a specific place to the awareness of being part of a certain community: the two aspects are often inextricably linked to each other. How this positive identification can be achieved by design is an overly complex issue, and it is clearly linked to numerous cultural factors. To the extent of their capacity, designers should nevertheless attempt to engage the difficult task of creating housing developments which are likely to engender a sense of identity.

**How can this aspect be achieved?** The creation of specific identity is a complex task not always fully under the control of designers. A relevant role is played by the balance achieved between formal identity, leading to recognizability, and the attitude of urban spaces, buildings and interiors to be flexibly “interpreted” by users, becoming an adequate setting for everyday life. The adaptation of known and previously experimented residential models can support the process of users’ appropriation of spaces.

### D.2. Sense of security and protection

Although this aspect is connected to the individuality of the users, there are nevertheless recurring factors mostly related to visibility. Urban spaces provide a sense of security when they are designed to be “transparent”, i.e. when the user is empowered to have a timely perception of danger when crossing them. Furthermore, overlooked spaces, i.e. those where public control can be exercised from adjacent buildings, tend to be perceived as being safer than blind areas. Visual factors are generally sufficient to ensure the perception of spatial security, as opposed to the presence of physical barriers and enclosures, often causing an unnecessary fragmentation of space. Concerning the dwellings, the problems of security is generally present only for those located at the ground level: in this case the differentiation between heights can contribute to providing greater security and privacy.

**How can this aspect be achieved?** An adequate study of the visual relationships in open spaces, together with the careful dimensioning of public areas vis-à-vis built fronts and the avoidance of “blind spots” are vital for the achievement of the sense of security. Furthermore, public illumination can greatly influence this crucial aspect of psychological wellbeing. Residential units located at ground level can be raised from the exterior height, or separated from the public areas by external private spaces.

### D.3. Distinction between public and private space

This design factor is fundamental to promote a sense of identification in users, foster a sense of privacy and security, while preserving spatial continuity. Thresholds, i.e. objects defining the transition from outside to inside represent a constituent factor in architectural characterization. Nevertheless, they must not represent impenetrable physical barriers, in order to avoid the fragmentation of the urban space. The distinction between public and private should herald the progressive and hierarchical passage from the city as a whole to the neighborhood, from the neighborhood to the user's building, and from this to the private sphere of the residential unit.

**How can this aspect be achieved? Marking points of access to neighborhood and individual buildings, characterizing thresholds and places of transition to foster the acquisition of progressively privatized spaces.**

### D.4. Designing comfortable interiors

The apartments' interior, as the most private space users have access to, should represent a point of arrival for the above-mentioned process leading from the public, through the semi-private, to the fully private condition. As is the case for the creation of a "friendly" urban space, an interior becomes comfortable when its inhabitants are empowered to interpret it in the individual ways they find more suitable. Environmental psychology plays a fundamental role in this respect, since the widely subjective notion of comfort is determined by spatial, visual and tactile factors, given that the full appropriation of interior spaces is ultimately carried out through individual personalization.

**How can this aspect be achieved? Single residential units should provide a gradual hierarchy of extroverted (public) and introverted (private) spaces. Formal aspects should be conceived in order to remain sufficiently neutral. Visual relationships between interior and exterior should be measured to strike a balance between opening and enclosure.**

### D.5. Indoor lighting and ventilation

Natural lighting and ventilation inside residential units is a cross-reaching factor relevant to energy performance, physical health as well as psychological wellbeing, thus representing a fundamental aspect of design. Adequate levels of daylighting and natural ventilation are related to climatic conditions as well as to cultural factors, making it difficult to pinpoint an optimal amount; nevertheless, they must be accurately taken into account during the building design phase.

**How can this aspect be achieved? Indoor lighting conditions are determined by building morphology (in particular by its transversal section), orientation, quality of the building envelope, geometry, dimension and location of openings, screening devices, coating and cladding materials. Interior ventilation is also influenced by the layout of the apartment. Detailed design should analyze these factors to determine optimal solutions.**

*Voltastrasse housing in Frankfurt by Stefan Forster. The interior courtyard is a semi-private space creating a sense of enclosure and protection*

*A residential development in the suburbs of Rome. The attempt to produce a recognizable image results in a low-quality architectural pastiche*



## 5. Designing and assessing quality housing

Designing quality housing is a complex issue, since it brings together local authorities, private investors who find the field of residential development very lucrative, and many other stakeholders each aiming at different objectives. In times of economic drought social housing programs around Europe have lost much of their momentum, and are in many cases altogether absent: this is the reason why private developments have taken over, leading to a more or less fragmented urban growth depending on how efficient the local governance model is. The result is a strongly market-oriented city, where housing is offered for sale not unlike in a supermarket. As we have seen, however, the accurate quality control imposed on food products finds absolutely no equal in the housing market, creating a situation where it is difficult for consumers/users to evaluate ahead of time what they are investing in.

Innovative tools in some local contexts characterized by efficient governance models have successfully led to well-designed, effective master plans, often also providing guidelines and indications concerning the further development of the individual residential buildings. Design codes, which are the center of Hopus's attention, are one of the possible ways of keeping under control the process leading the city-making, while allowing substantial expressive freedom within a homogeneous whole (De Matteis 2008: 28). Matthew Carmona's in-depth analysis of design coding earlier in the book helps us understand what this sophisticated tool can do for urban development, assessing its strengths and weaknesses,

together with the prerequisite conditions which must be in place for the coding process to actually be carried out. Design coding, being a complementary aspect of master planning, is capable of bridging the "gap" between urban vision and building design, guiding designers in achieving a homogenous outcome within a varying range of possibilities. In their site-specific nature, design codes are meant to address individual developments: in the case of a general framework of key quality factors such as that outlined above, it would be necessary to identify an overarching reference system, not connected to specific cases, incorporating the "quality mesh". This system should on one side be able to provide an output in terms of guidelines, coding, etc., thus acting on the "process"; on the other, serve as the basis for an assessment of the "product", closing the full circle.

Ensuring quality therefore requires control over both the process and the product. How can the quality of the product be assessed? In analogy to what has been done in other market sectors, most notably again in the food industry, labeling systems have been implemented in the attempt to establish a standard reference framework for urban design and architecture. Labeling and protocols have been especially successful in relation to energy and environmental assessment, since they can refer to standardized calculation methods, as set out by the EPBD 2002/91 directive. This allows a pre-assessment to be carried out by designers, often using specific software tools, whereas the certification is produced by habilitated professionals.

Other forms of certification gaining progressive ground in several national contexts are also closely connected with energy aspects, but include a wider range of con-

siderations related to the overall design, such as the developments' or buildings' impact on the site, connection with existing urban infrastructures, accessibility, social and economic sustainability. In this respect, the LEED certification system, created by the United States Green Building Council, and the BREEAM, belonging to the private group BRE in the United Kingdom, are increasingly proposing their methods as "global" systems of environmental assessment, to be used where local protocols are not available. Although the certification process differs, the quality checklists for both protocols are largely overlapping. Both LEED and BREEAM protocols, being connected to privately operated organisms, are clearly oriented towards a marketing purpose. A developer seeking to achieve a quality certificate does so because he understands the importance of providing a third-party assessment to potential customers: it is like saying that "what you are about to buy will not hurt your health and limit its impact on the planet". The design effort and the additional construction costs connected to environmentally certifiable developments should in turn produce a marketable good which can be put up for sale at a higher price than comparable, non-certified realizations. For investors, this should be a win-win situation, whereas for buyers who are able to afford it, it becomes the guarantee of higher quality, where the cost difference can be paid back in a certain number of years thanks to the reduced energy consumption of the building.

Analytical certification systems are usually based on checklists: designs are awarded a score on the basis of a varying and generally large number of criteria, ranging from the relationship to the site to the kind of flooring applied in interiors. Certification scores are awarded on

the basis of the total number of "boxes checked", where different indicators are assigned weighed values. Clearly enough, the problem with analytical scoring methods is related to the fact that, although a building may add up a significant number of points, in terms of quality it sometimes happens, as we have stated above, that  $1+1+1=0$ . Furthermore critics (Bernstein 2010) argue that at times high certification levels are achieved by adding up many negligible or marginal factors, not truly impacting on the overall environmental quality, while fundamental aspects remain substantially unresolved.

In some ways similar to LEED and BREEAM, the German Bewertungssystem für Nachhaltiges Bauen (BNB) is a sophisticated, analytical environmental assessment method devised for the evaluation of public buildings by the German Federal Ministry of Transport, Building and Urban Development. Although it is not applicable to housing design, its methodology is nevertheless interesting, given the wide number of considered quality factors, ranging from energy performance to the design process, from user satisfaction to the artistic value of the building. Each quality point is weighed and the general score leads to the awarding of a sustainability certificate. Differently from the previous protocols however, it is not intended as a marketing tool, but rather as an internal assessment instrument for local authorities for the evaluation of their own building initiatives. The Deutsches Gütesiegel Nachhaltiges Bauen (DGNB), created by the Deutsche Gesellschaft für Nachhaltiges Bauen is a commercial environmental certification protocol with strong analogies to LEED.

Few quality assessment systems have the ambition of covering, albeit in a general way, the entire range of aspects related to urban design and building, in a bal-

anced relationship between environmental and design factors. These are usually those labeling systems connected to public authorities, such as the Building for Life system, promoted by UK's Commission for Architecture and the Built Environment (CABE) and the Home Builders Federation. Building for Life (whose quality criteria significantly overlap the 20 key factors we have outlined above) is meant to be administered by local authorities only, thus serving as a guidance and assessment tool for planning departments, whose staff members can qualify for training at CABE. Building for Life's fundamental interest lies in the fact that, in respect to most other labeling systems, it proposes a very balanced relationship between distinct requirements: since its evaluation is

synthetic rather than analytic, it does not rely on a simple scoring method, where an outstanding result may be the outcome of a very unbalanced design. Through the lens of the various quality factors, designs are evaluated in their wholeness, without "breaking them up".

Labeling alone is certainly not the solution to promote good housing: it only becomes efficient once a true quality culture is formed. Nevertheless, it has the potential to play a crucial role within the housing market, by propelling the sector towards a healthy competitiveness, where certified buildings will "stand out" among ordinary practice. Furthermore, labeling can become an indispensable complement to design guidance, assessing both the product and the process.

## LEED – Leadership in Energy and Environmental Design Green Building Rating System™

Designed and administered by the United States Green Building Council ([www.usgbc.org](http://www.usgbc.org))



LEED certification is increasingly becoming a popular, “globalized” assessment system for the environmental performance of planning and buildings, and it encompasses a significant number of distinct protocols related to different types of development, such as residential, office, neighborhood development, etc. at both the design and operation level. Each protocol includes a very large number of factors, in the attempt to carry out a “holistic” evaluation of each design. LEED certification was introduced in 1998 and was designed on the base of various existing protocols such as BREEAM. The LEED certification process is complex and articulated in various stages: designers can become LEED-accredited through specific training, operating preliminary assessment; the final evaluation is carried out by the US Green Building Council.

Smart Location & Linkage	Green Construction & Technology	Neighborhood Pattern & Design	Affordable Rental Housing
Smart Location	Construction Activity Pollution Prevention	Neighborhood Pattern & Design	Affordable For-Sale Housing
Proximity to Water and Wastewater Infrastructure	Certified Green Buildings	Open Community	Reduced Parking Footprint
Imperiled Species and Ecological Communities	Energy Efficiency in Buildings	Compact Development	Walkable Streets
Wetland and Water Body Conservation	Reduced Water Use	Compact Development	Street Network
Agricultural Land Conservation	Building Reuse and Adaptive Reuse	Diversity of Uses	Transit Facilities
Floodplain Avoidance	Reuse of Historic Buildings	Diversity of Housing Types	Transportation Demand Management
Brownfield Redevelopment	Minimize Site Disturbance through Site Design		Access to Surrounding Vicinity
High Priority Brownfields Redevelopment	Minimize Site Disturbance during Construction		Access to Public Spaces
Preferred Locations	Contaminant Reduction in Brownfields Remediation		Access to Active Public Spaces
Reduced Automobile Dependence	Stormwater Management		Universal Accessibility
Bicycle Network	Heat Island Reduction		Community Outreach and Involvement
Housing and Jobs Proximity	Solar Orientation		Local Food Production
School Proximity	On-Site Energy Generation		
Steep Slope Protection	On-Site Renewable Energy Sources		
Site Design for Habitat or Wetlands Conservation	District Heating and Cooling		
Restoration of Habitat or Wetlands	Infrastructure Energy Efficiency		
Conservation Management of Habitat or Wetlands	Wastewater Management		
	Recycled Content in Infrastructure		
	Construction Waste Management		
	Comprehensive Waste Management		
	Light Pollution Reduction		

## BREEAM – BRE Environmental Assessment Method

Designed by BRE Global Ltd ([www.breeam.org](http://www.breeam.org))



The BRE Environmental Assessment Method was set up by BRE and is at the moment the world's most widespread system of environmental quality certification. Evaluation of registered designs is carried out by authorized assessors, who then submit results to BRE for quality assurance. Although BREEAM's quality criteria are very similar to those of the LEED protocol, the main difference lies in the fact that the actual checklist is drafted for each individual application, in the attempt to customize the quality assessment on a case-by-case basis. Nevertheless, the increasing number of worldwide application has prompted BRE to devise a system which also includes a number of standardized protocols. At the moment, BREEAM is the world's most using environmental quality assessment system. In relation to housing design, BREEAM is directly connected to UK's Code for Sustainable Homes, the national standard for sustainable housing design. Buildings are assessed against nine different environmental quality criteria, which also include minimum standards for energy and water use at each certification level. Starting April 2008, all social housing initiatives in the UK were required to achieve at least level 3 certification with the code, while it remains voluntary for private developments to apply for certification.

The considered criteria are:

- Energy and CO2 emissions
- Pollution
- Water
- Health and wellbeing
- Materials
- Management
- Surface water run-off
- Ecology
- Waste

## Building for Life

Designed by the Commission for Architecture and the Built Environment – CABE ([www.buildingforlife.org](http://www.buildingforlife.org))

Administered by CABE and local planning authorities in the United Kingdom



Building for Life is meant to be administered by local authorities only, thus serving as a guidance and assessment tool for planning departments, whose staff members can qualify for training at CABE. CABE itself provides counseling and carries out assessment for large developments on a voluntary design-submission basis. Nevertheless, several planning agencies in the UK now require a mandatory Building for Life assessment for all new housing developments. Building for Life is a synthetic quality evaluation method, where the 20 fundamental questions are not intended as a scoring checklist but rather as a guide for designers and assessors.

Environment and community	Character	Streets, parking and pedestrianisation	Design and construction
01. Does the development provide (or is it close to) community facilities, such as a school, parks, etc?	06. Is the design specific to the scheme?	11. Does the building layout take priority over the streets and car parking?	15. Are public spaces and pedestrian routes overlooked and do they feel safe?
02. Is there an accommodation mix that reflects the needs and aspirations of the local community?	07. Does the scheme exploit existing buildings, landscape or topography?	12. Is the car parking well integrated and situated so it supports the street scene?	16. Is public space well designed and does it have suitable management arrangements in place?
03. Is there a tenure mix that reflects the needs of the local community?	08. Does the scheme feel like a place with distinctive character?	13. Are the streets pedestrian, cycle and vehicle friendly?	17. Do the buildings exhibit architectural quality?
04. Does the development have easy access to public transport?	09. Do the buildings and layout make it easy to find your way around?	14. Does the scheme integrate with existing streets, paths and surrounding development?	18. Do internal spaces and layout allow for adaptation, conversion or extension?
05. Does the development have any features that reduce its environmental impact?	10. Are streets defined by a well-structured building layout?		19. Has the scheme made use of advances in construction or technology?
			20. Do buildings or spaces outperform statutory minima, such as building regulations?

## Deutsches Gütesiegel Nachhaltiges Bauen (DGNB)

Designed and administered by the Deutsche Gesellschaft für Nachhaltiges Bauen ([www.dgnb.de](http://www.dgnb.de))



The DGNB is a sophisticated, analytical environmental assessment method devised for the evaluation of buildings in Germany. Its interesting methodology relies on a wide number of quality factors, ranging from energy performance to the design process, from user satisfaction to the artistic value of the building. Each quality point is weighed and the general score leads to the awarding of a sustainability certificate.

The general quality categories considered are:

### 1. Ecological quality

- Impact on the general environment
- Use of natural resources
- Economical quality:
  - Life cycle costs
  - Leverage capacity
- Social, cultural and functional quality:
  - Wholesomeness, comfort and user-friendliness
  - Functionality
- Design process and artistic quality

### 2. Technical quality

- Technical execution
- Process quality:
  - Planning and design quality
  - Quality of the building process

**6.****In conclusion: bridging the gap for European housing quality**

What we have seen so far in relation to EU policy on housing (see also Livia De Andreis's contribution in this same volume) helps us outline one central problem: what can be quantified can be subjected to regulation at supra-national level, whereas subjective issues connected to local cultural factors cannot. In our understanding there is however a mistaken interpretation of what can be regulated. It is not necessary – or by any means possible – to establish at EU level how housing developments must be organized or what they must look like: these are problems which can only be confronted at the local level. It would however be very reasonable – and in our opinion feasible – to define a common method for the promotion of urban and architectural quality, which must then be interpreted at national and local level. Just like the EPBD directive, and basically all other forms of European regulation, the method is set out at the general level, and it is then up to the single member states to produce their nationally applicable interpretation. In

the specific case of urban and housing quality, which plunges all the way down to the very local, site-related, there would be the need for a further step of interpretation leading to implementation, presumably at regional level. In other words, the distinction between objective and subjective quality factors could lead to a three-step process, where the EU sets the general methodology, leaving to national authorities the benchmarking of the objective factors, and to regional authorities the definition of subjective criteria, while keeping the methodology under control all along the way (Fig. 6).

Nothing new must be invented here: best practices such as design coding or quality certification are already in place in many European realities, and the effort required would mainly consist in the coordination of existing pieces of knowledge, allowing for the introduction of common methods for guidance and assessment, to be interpreted at national and local level. This does not mean making all housing in Europe the same, but rather introducing a shared idea of quality which is able to go well beyond the “dryness” of quantitative methods. It is the occasion of effectively “bridging the gap” between



Figure 6. A possible process leading from EU directives on urban and housing quality to national and local implementation

the understanding of energy and environmental quality and the larger, broader, and in our eyes more important understanding of urban quality as a whole.

To conclude, let us briefly return to the comparison between housing and food: what reaches our tables today is subjected to strict quality controls, ensuring the wholesomeness of what we eat, and to a certain extent its authenticity. But will the food, in the end, actually taste good? If the ingredients are quality-certified, isn't it ultimately up to the cook to concoct an exquisite meal? We can think the same way for housing: environmental certification – which is well under way – can put a label on the individual ingredients, but only through a more comprehensive system of guidance and assessment will we ever be able to produce exquisite urban development in Europe.

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<sup>3</sup> The work carried out by the Urbact II thematic network Building Healthy Communities, Lead Partner the City of Turin, with the support of experts Marco Santangelo and Antonella Cardone, focuses on the use of statistical indicators in the planning and assessment of urban transformation processes, identifying specific sets of criteria to be adopted for each specific case. For more in-depth considerations on the use of indicators related to housing development, see Marco Santangelo's contribution in this same volume.

## 3

## Policy-based & design-based housing research in Europe

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This short paper, which is one of the various contributions to the final output of the Urbact II Working Group Hopus, aims at giving an overview about the developments in housing studies over the last twenty years, both in the fields of policy-based research and design-based research. The objective of this brief text is, in fact, to highlight similarities and differences between the two approaches to housing in order to verify possible common links and issues.

It seems that comparative research on housing policy in Europe has had, during the last two decades, a much broader development in terms of implemented methodology, theoretical framework and instruments than the research focused on design aspects. From the mid 80s onwards, there has been a major renovated attention for international comparative housing research, because of academics and policy makers' interest. More recently, a new trend in international studies emerged, which argues to adopt a truly European approach and intends to distinguish itself from the previous (the "comparative") one. This is the EU-focused research.

Thus, the first part of this text considers the developments in international housing policy studies and describes the state of the art in this lively field of research. Two preliminary considerations are of great importance. Firstly, Housing policy-based research is intended here as international comparative studies and EU-focused housing research (although these are just a small proportion in the field of housing studies), not only because of the deep impact they had so far, but also because they seem to have the so called "European added value" that Hopus project tried to promote. Secondly, it is important to define comparative study: "Comparative study is not a field

of study. Strictly, comparative housing policy describes a methodology or an approach" (Doling 1997: 23). Only by identifying comparative housing research with an approach, rather than a matter in itself, it makes sense to look for links with design-based research in Europe.

The second part of the paper briefly describes the developments in design-based research in Europe. Due to the vastness of the latter field, I have chosen a particular (and, compulsorily, partial) point of view: the purpose of the "contextual approach" as emerging theoretical framework for design-based housing research.

The paper argues that design-based research needs a stronger theoretical framework to describe and explain recent changes in dwelling patterns and developments in housing design. On the other hand, it also suggests that comparative policy-based studies could pay more attention to the design dimension of policy.

## 1.

### Policy-based housing research: comparative studies and EU-focused research

Two common features of housing research in Europe in the last decades, throughout all the social sciences and commonly in policy-based and design-based research, are the accounting for qualitative issues on the one hand and the attempt to make housing research more international on the other.

The concern for quality is still strongly present in the debate, after being a priority for half a century, both in policies and in architecture, due to the urbanization process of the nineteenth century. However, since the late 80s onwards there has been a shift from the traditional

concept of "quality" towards the concept of "complexity". Such an issue fits more with postmodern societies and their attitude to pluralism. Therefore, rather than an exhaustive survey of the developments in policy-based research since 1990, the emphasis will be on those theories which seem to be more stimulating with respect to quality (and design) contents.

In doing so, it is important to take into account both comparative housing studies and EU-focused housing research as the two dominant perspectives on international studies from the 90s onwards.

**Comparative housing research** can be divided in two main schools, depending on convergence or divergence approach. The convergence approach, which Schmidt (1989a) traces back to the work of Donnison (1967), explains differences and similarities within policies through economics and industrialization: housing policies are supposed to converge because a correspondence between economic and demographic developments in European countries and despite social and cultural differences. Here, politics take a minor role in defining housing policies. Doling (1997) includes in convergence theories four theoretical schools: the theories of moral necessity, of citizenship (Harvey, 1994; Avramov, 1996), of the logic of industrialization (Donnison, 1967; Donnison and Ungerson, 1982; Burns and Grebler, 1977) and of the logic of capitalism (Harloe, 1985; Ball et al. 1988).

**Convergence theories** seem to have common features: firstly, they are contextually determined: the economic and social conditions of the 60s and 80s could suggest that European countries were moving forwards to some common "end state", but from the perspective of the 90s it seems rather that some governments with-

drew their intervention in housing systems. Secondly, they follow a “stage model”. Finally, qualitative issues are conceived in a standard-based approach.

Donnison is the first who provides a clear theoretical framework for convergence perspective, with a distinction between institutional (or comprehensive) housing policy and residual (or social) housing policy. These represent two different patterns of responsibilities depending on the level of housing quality: comprehensive policy is typical of industrialized countries, where governments take the role for the construction, distribution and management of the housing stock, striving to increase its level of equity and quality, while social policy aims at ensuring a basic level of housing quality just to help the weakest in society. Governments’ role progresses through three stages: passive role, temporary interventionism (when necessary) and permanent interventionism (the most comprehensive pattern). Other scholars sit within the convergence framework, although with certain differences; among others Burns and Grebler (1977), whose concept of disequilibrium is useful to explain quantitative/qualitative aspects. Notwithstanding the fact that with the term disequilibrium they intend more a quantitative problem (the disparity between the stock of dwellings and the quantity which is considered to be “needed”), the concepts of need and demand<sup>1</sup> in-

volved describe a contradiction that is generally implicit in housing policy. Housing policies regulating residential development by setting minimum standards of quality, provoke the problem that social objectives exceed private means. The result is the so-called cost-income gap between citizens’ housing aspirations and income. This paradox always follows policies of regulation, independently from theoretical models, as far as issues of citizenship and social justice are concerned. Burns and Grebler’s convergence theory is focused on the strategies that governments can adopt to resolve this gap. Later, in the 90s, Lundquist’s theory also relates to the cost-income gap when analyzing the contents of housing policies.

In the 90s research by Boelhouwer and van der Heijden (1992) seems of great interest with respect to qualitative and design aspects. Through the use of four “policy stages”,<sup>2</sup> a comparative analysis of housing policy in seven European countries from 1945 to 1990 is done. From a methodological point of view, the theoretical framework (Boelhouwer and van der Heijden 1992: 17) for the study is centered on the objective characteristics of the housing market, which is seen as the key factor in determining housing policy. The variables affecting the housing market are socio-economic factors, demographic factors, administrative and legal factors, spatial factors and physical planning systems. Thus, design concerns are relevant but they are “relegated” in the “country chapters” as factors which cannot be read and compared uniformly at

<sup>1</sup> Need “is a socially accepted aspiration describing the standard of adequacy which a society as a whole adopts as an expression of the collective interest” whereas demand “refers to the ability and willingness of the individual consumer to pay for housing”. Similarly, at the upper level, social demand is the ability of a society to pay for housing. Housing policy can be identified with this and government intervention in housing systems aims at replacing individual demand with social demand

<sup>2</sup> High degree of government involvement; greater emphasis on housing quality; greater emphasis on problems of housing distribution; reappearance of quantitative and/or qualitative shortages.

European level, mainly because of missing homogeneous statistical data. This is confirmed in the structure of the research, which is split in several modules: the “housing quality” and “land-use policy” modules are somehow in a marginal position. Despite the adoption of “the stage model”, Boelhouwer and van der Heijden explicitly reject to simply have a convergence approach<sup>3</sup>.

**Divergence theories** have arisen in recent years, particularly since the 90s. Boelhouwer’s approach reflects this fruitful contribution to comparative housing research. Although convergence theory has been dominant for the last twenty years, as Wilensky and others have shown (1987), criticism has also been expressed for several reasons (Ball et al. 1988; Schmidt, 1989; Oxley, 1991a; Kemeney, 1995). This alternative approach to policy-based research stresses differences rather than similarities between European countries and says that the demographic and economic structures of a society are not the only factors determining policy.<sup>4</sup> Since the late

80s there have been various contributions in this sense. Schmidt (1989a; 1989) demonstrates through empirical data that west European countries tended to diverge rather than converge in the 80s; shows (1988) how corporatist developments have influenced and differentiated policies, both in the formulation and implementation process; indicates (1990) the institutional context as the key factor in determining housing policy; uses a model similar to the cost-income gap to describe the housing market and the policy options which governments can choose in order to influence the purchasing power of households and the cost of housing. In this approach, policy is one of the variables affecting the housing market. Harloe and Martens (1987) describe housing market processes in every country as the specific output of the interaction between political, ideological and economic factors. This means that specific institutional structures matter, in order to explain housing market processes. Kemeney, in different publications (1981, 1992, 1995), relates increasing differences between industrialized countries to differences in the social structures (collective/private forms of social structures) rather than to levels of industrialization or development of the welfare state. Oxley and Smith (1996) assume “the government” as the source of policy decisions and refuse the “false dichotomy” that housing provision depends on either “the state” or “the market”. Rather they explain differences in housing systems throughout Europe on the basis of the national governments’ role as policy makers. The differences which exist between countries depend on policy decisions and other forces operating in the society. Balchin (1996) focuses the attention on

<sup>3</sup> “Clearly market forces are a significant factor in determining the pattern of housing policy, but it is also clear that there is some scope for the pursuit of purely political objectives. In spite of the similarities between housing policies and between housing markets, there is no convincing evidence to suggest that the characteristics and the problems associated with housing systems in the countries under review are tending to converge. Housing market structures, which are the product of a series of historical developments unique to each country, the institutions that have been established in the course of time and the activities of government, which are influenced partly by tradition and partly by ideology, are much too diverse for this to be a credible supposition”, Boelhouwer and van der Heijden, 1992, p. 295

<sup>4</sup> “We assume that policy does matter and it can make a difference to housing conditions in a country and, furthermore, differences between countries are partly a function of policy decisions, while also being influenced significantly by the wider forces in society”, Oxley, 1996

the different forms of housing tenure and the household choice, by examining the factors determining this variety throughout Europe.

**EU-related housing research** is the trend focused on the effects of European integration on housing systems and housing policy. Among the scholars there are, for example, Alegre (1990); Chapman (1994); Drake (1991; 1992); Ghékiere (1991, 1992); Kleinman and Metznetter (1998); Priemus (1994); Stephens (1996, 1997); Wyles (1994). Notwithstanding responsibility on housing remains with national governments, it is clear that European rules, directives and procedures affect organizations operating in the housing sector and that matters as environment, health, construction, consumer protection etc. are relevant both to housing providers and consumers. Thus, EU-related housing research is concerned with those European policies indirectly affecting housing, and investigates how such policies are formulated and what institutions and policy networks are involved. Those who advocate a major role of the EU on housing ask for the right to housing and the allocation of funds to be put among the Commission priorities. Kleinman et al. (1998) distinguish two waves of research in this field: one looks at the completion of the single market, the other evaluates the impact of the monetary union.

## 2. Design-based housing research

Although this kind of research is dominated by economists and studies with a different approach are the minority, in this context it is interesting to account just for those dealing explicitly with quality and design aspects in order to explore the potential for a European design-based research. As shown by Karn and Nystrom (in Kleinman 1998), housing design is the subject of regulation by national governments in Europe, where a wide range of definitions of quality and regulatory structures co-exist. In particular, there are three levels of regulatory instruments: building regulations, housing quality norms and planning legislation<sup>5</sup>. The control over housing production has been influenced in Europe since the 90s both by deregulatory forces, among which also the EU must be directly and indirectly considered, and by the extension of regulation, mainly in the fields of environmental protection and accessibility. All EU countries have strict regulations on several housing topics (sanitary, environmental and health prescriptions, daylight, stability, etc.) but these are quite dissimilar to each other and the diversity becomes even greater if topics such as the size, layout, internal space and so on are considered. This is clearly because variety between countries depend on cultural preferences and traditions. We have seen from a few examples how qualitative as-

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<sup>5</sup> Building regulations regulate basic health and safety aspects of housing construction; energy and acoustic performance; accessibility for disabled people; housing quality norms regulate internal space, layout, amenity; planning legislation concern external environment and location.

pects are strongly considered in comparative studies, and in particular in convergence theories, sometimes as key parameters, but also to what extent the standard-based approach is dominant. This is also because comparative studies are forced to be based on statistical data, which needs to be objective and homogenous, so that qualitative aspects are often reported to quantitative ones. Furthermore, under comparative models, quality seems to be intended mainly as “equity”: the search for a decent home or for the setting up of a minimum standard for new housing is essentially a moral or economical imperative. Divergence perspectives seem more capable to account for complexity and pluralism. Therefore divergence approach could potentially avoid that the research ends up dealing only with material facts, but actually the study of “humanistic” or less quantifiable aspects of housing is neglected.

EU-related housing research, instead, has the potential to take into account factors which in appearance do not affect directly housing and those factors which could remain otherwise excluded from comparative housing studies for being less quantifiable than standards. It is the case, for example, of the subjects under environmental regulation: energy-water consumption, waste recycling, but also public transport/infrastructures and preservation of landscape are all topics which actually have a direct impact on housing.

The effort to evaluate how European integration processes impact on national housing policies, obliges to account for a multitude of factors (no longer only demographic, economic, institutional) that have their roots in the cultural dimension. On the other hand, the findings of comparative design-based research (or EU design-

based research) are not reassuring. Indeed, they suggest that processes of convergence and divergence between housing policies in European countries necessarily co-exist and that systems of regulation adopted should be appropriate to national policy goals, in order to avoid that the harmonization of standards is reductive.<sup>6</sup>

In parallel to policy-based housing research it is instructive here to describe briefly the approach of design-based research. Aiming at an exhaustive survey of housing design in Europe from the 90s to the present day would be absurd, due to the great vastness of the matter. It would be harder than a survey of developments on housing policy research. For this reason, just an emerging approach is presented here which seems to be stimulating and to have some features (and objectives) in common with the policy-based research described so far.

Housing research has been dominated by studies concerned mostly with normative aspects, rules and material facts. It is true that there are several studies on housing dealing with a multiplicity of design issues: density, environmental/sustainability aspects, technological or typological experimentation, but very few of them have the same theoretical concern that can be found in policy-based housing research<sup>7</sup>. Almost none of them try to purpose an innovative theoretical frame-

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<sup>6</sup> “It is also likely that the process would be to continue the moves towards simplification of regulations, the use of functional rather than dimensional standards and towards substantial deregulation of those aspects of housing design for which the rationale is most vague”. Karn and Nystrom, in Kleinmen et al., 1998

<sup>7</sup> “Housing study has not overly concerned itself with the nature of the built form”, Franklin, 2006

work which some scholars (Lawrence, 1990; 1994; 1996; Rapoport, 2001; Franklin, 2006) consider essential to re-organize information<sup>8</sup>.

These scholars indicate that a multiplicity of factors must be taken into consideration also in design-based research, in order to account for the complexity of contemporary society and its changing patterns of dwelling. This approach to research should therefore be contextual and identify a wide spectrum of variables (social, geographical, cultural, individual) determining the use of space and that can be used to interpret the built form of housing. Diversity in housing design and housing forms across Europe is explained as a function of cultural context.<sup>9</sup>

I would like to conclude this text with Figure 1, which re-proposes the conceptual framework given by Bridget Franklin in "Housing Transformations" (2006) because of the similarity between her method and divergence theories arisen since the 90s in policy-based research suggests that it is possible to indicate the contextual approach as a main feature of research in the study period.

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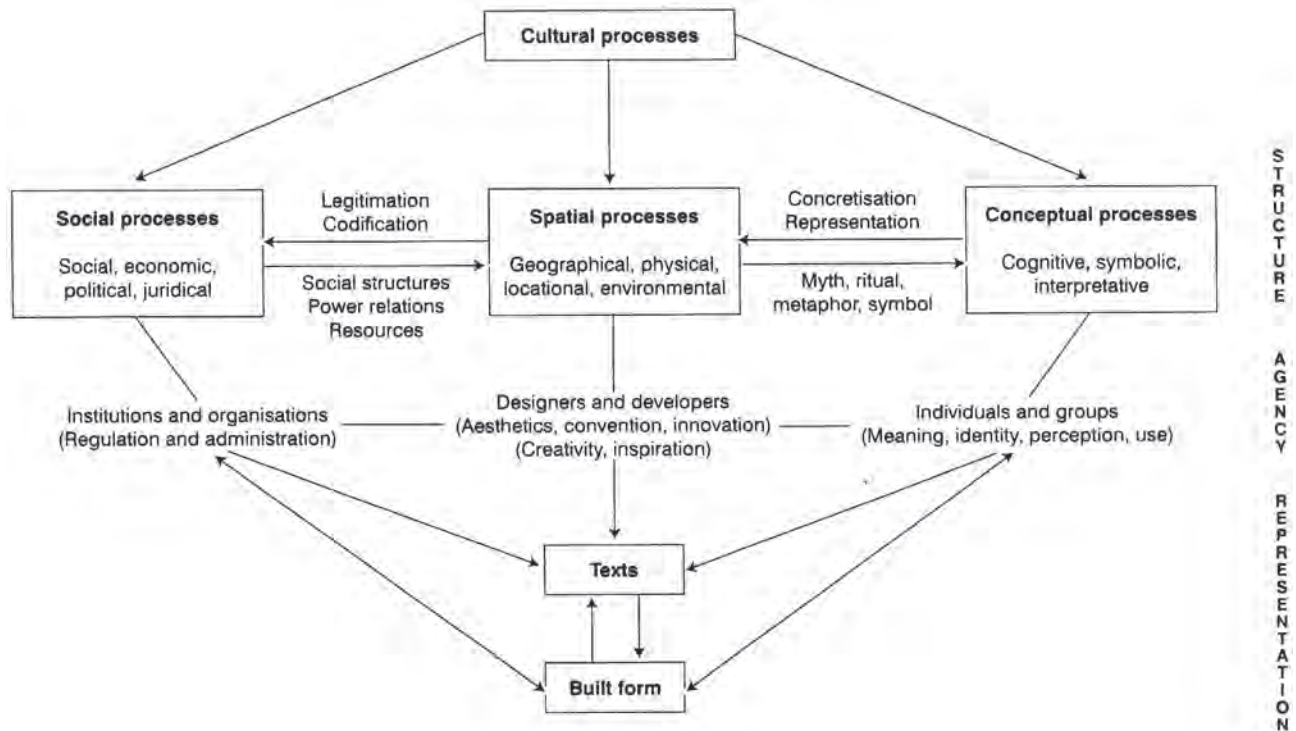
<sup>8</sup> "Housing is a particularly striking example of the need for theory. There is too much information, numerous disconnected pieces of empirical research, which in effect become counterproductive... Even a conceptual framework can help by organizing material, although not as much as theory", Rapoport, 2001 p.145

<sup>9</sup> "The distinctiveness is a function of the diversity of cultural context and it is this which helps to determine how any given society produces and uses the built forms within which its people dwell. The resultant multiplicity of house styles and modes of dwelling has been given little sustained attention in academic discourse.", Franklin, 2006

**Figure 1**

A model to illustrate the contextual framework of built form.

Source: Franklin B. *Housing transformations*, London 2006



# 4

## Rules, language and energy

HOPUS LEAD PARTNER

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In recent years we have witnessed a consolidation, a very slow and gradual evolution of design culture which is energetically conscious thanks to certain particularly stringent and effective drivers. This phenomenon has been more or less physiological and spontaneous differing from the regional and productive contexts from which it developed, but the phenomena that have supported and promoted it are usually the same at the continental level. Certainly, the increased cost of energy from renewable sources contributed to it and the resulting impoverishment of the end users who must bear the burden, the development of technologies for better and more integrated systems for energy production in the technical elements of buildings, the improvement of performance in energy terms of materials and building product components. In this context, in recent years several addressing measures used both on a continental and national scale, which led to the development of a body of law, articulated on local level in a very widespread way, causing a drastic review of the standard procedures of planning/design and construction practices of the building/facility system as a whole.

Figure 1. Housing-Montpellier, France-Edouard Francois, 2000



### 1.

## The evolution of a conscious design culture

The first legislative instruments published after the EEC Directive 2002/91/EC on energy performance of buildings, not always coordinated with each other, tackled head-on the problem of reduction of energy consumption concerning the management of the winter season, or a reduction of energy loss due to low efficiency of production facilities and distribution of heat and especially to the poor insulation of the technical elements of the



building. Later began contemplation of reducing energy consumption for the summer season, or a reduction of costs associated with air-conditioning/cooling and thus the reduction of energy consumption in countries located warm temperate regions. These regulatory environments, more or less ambitious in their objectives to change the context in which they found themselves and operated, did not generate the desired effect immediately, even in the most virtuous reality, due to two unavoidable factors: the first is the traditional resistance of the operators the construction industry to experiment with new technology and the second, more importantly, is the heavy dowry represented by the size and condition of existing housing stock. In most European countries, the percentage of new housing construction in one year does not exceed 5% in relation to the existing one, in some countries, such as France, the economic impact of interventions on newly built constructions represents 50% of the total turnover in the construction sector. This has led to a very slow affirmation of a new operational culture related to renewed indications or regulations set forth by the European and national, which fortunately in

recent years is yielding its first fruit visible and verifiable in terms of performance and quality assessment architectural and urban achievements completed.

It is possible to also find another type of indirect driver, which has strongly influenced the enlargement of the basis of market acceptance of certain technical solutions and plants, or the demand for higher and more diffused levels of comfort inside buildings, these are the residential ones that are intended for productive activities. Therefore, a new quality request that implies an dissatisfaction on behalf of the users with reference to the current building stock and since, when it comes to the quality of an architectural or urban project, we must speak of its level of quality, a level of compliance responding to the need that generated it, this gap between demand and supply is mainly due to changing needs and requirements of end users that have not been collected and interpreted in time by production operators.

The construction market is developed for a long time without paying attention to the real needs of end users, offering building products trivialized on traditional models, very innovative and very conservative compared to a ca-



pability and culture that is design oriented and relatively consolidated and never technically risky. Continued to be put on the market were buildings measured by production only in terms of the relationship between construction cost and value of market positioning, without assessing the cost of management and operation. In many contexts, the factor that had the greatest impact on the exchange value of the property was not its intrinsic quality, whether it be environmental or functional, but its advantageous position, or its location. This trend has held up until the explosion of the recent economic and financial crisis that has more or less directly affected all productive sectors of developed economies, drawing a fierce selection of players in the market, declaring the closure of a positive construction cycle in Italy that had lasted since 1995.

In Italy this phenomenon was particularly evident in the housing sector, despite the fact that the housing market continues to always report an emergency situation due to the large gap between demand and supply of housing – particularly in social housing market - while a need for social housing at considerably low costs and capable of generating new situations deep poverty and social

marginalization, the housing market of the middle and upper levels has prospered with growth factors highly relevant to the private market and at range of supply and demand still solvent.

Whether facing the social needs of a quantitative nature or in the case of a qualitatively more complex question in the private sector, the market responds with a trivial and flat offer regarding technological definitions that are very traditional and with solutions that are typologically blocked - in part by current regulations - such as offering only value-added extra facility spaces or equipment. In the face of this picture of the relationship between demand and supply of homes on the market that it is possible to define that the quantity needs arise from the perception of the quantitative inadequacy of existing housing stock, while the demand for quality stems from an awareness of the need to establish a new relationship also with the surrounding environment, building scale and complex settlement. This gap between supply and demand in recent years has generated a significant increase of unsold housing stock, because it was not absorbed by the market demand for inadequate performance, a functional inadequacy, location inadequacy or an

erred market placement, or still yet the inability of potential buyers to get credit at the time of purchase. The general economic crisis has refined the critical selection of buyers and awareness of leave for good quality response that you purchase, whether the dwelling or structure instrumental in its production. The survey carried out by Cresme for the preparation of the Report SAIENERGIA 2009, showed how factors such as thermal insulation, comfort noise, orientation of buildings, the provision of advanced engineering solutions, are no longer foreign to the widespread culture of end users and above these factors begin to affect market choices and lives of those who are preparing to choose their own home or workplace.

It is clear that when energy efficiency and performance of building products, understood in the widest sense of the term, is one of the conditioning factors of its market positioning and its rating, it means that we are facing an environment mature and consolidated kept alive by a growing culture of widespread energy sustainability and economic choices that are implemented by each trader in the market. This applies to the individual who is about to choose his residence, as the collective or public entity that undertakes a complex building initiative. Obviously we are not in these conditions but all the indications are that the gradual maturation of the application also will force the industry to evolve more reluctant to work for a better and more qualified offer of building production. In this context, the role of legislation, the institutional impetus that the government can exercise leadership through addresses and directions in performance on the final quality of the built environment is fundamental and critical to trigger a virtuous cycle of improvement in the average standard of buildings and urban environment created.

## 2.

### Governance's dynamics for the built environment

The dissemination of tools such as guidelines or industry codes of practice, standardized protocols or technical recommendations, allows the government to exercise, consistent with its technical and economic resources, to exercise oversight functions and policy of building public policy areas such as social housing, the residential student housing to health and education, succeeding also significantly affect the production of private housing. In sectors where the government fails to act without the participation of private capital, or where it is also important to target interventions on private environmental quality standards controlled and consistent in the absence of detailed technical plans of action (brief) administrations ever more often they use documents address and support the design, to be made effective, are associated with implementing or planning instruments to traditional local building regulations in order to entrench their effectiveness on the ground. This new generation of tools for directing planning activity in interventions, that are also useful in the control phase of the outcomes of building production in terms of energy efficiency and housing effectiveness, have a role, essentially, in the quality of the definition of the project. These instruments support the planner in two key moments of planning: principally in the preliminary phase before planning proper, and later at the moment when the project moves on to the phase of technical and technological definition in detail.

In the preplanning phases, a moment in which the planner faces the cognitive part of the project, in which he/she re-reads the client's indications in an explicit and implicit way

regarding the project to be carried out, rather than confronting the project at the outset with a building plan of a functional and quantitative character, the planner has at his/her disposal an important quantity of supplementary information that allows him/her to complete the picture of the disciplinary problems of the building or building complex he/she is planning, being able to look further at some of the implications of a performance, technical-constructive and plant character, as well as of a distributive character, right from the first phases of the preliminary project.

In this phase, the alignment of guidelines or codes of practice for the building programme contained in the preliminary planning documents or in the technical disciplines allow the planner an immediate integrated approach to the planning, when he/she do not have access to all the necessary technical competences required for the requested specialist planning. We also have to underline how the accumulation of exemplary experiences that have been made available through these instruments and the cataloguing of typical solutions from a constructive or functional point of view can also allow a more reliable estimate to be made of the economic costs of the interventions being planned.

In the phase of defining in detail the preliminary analysis, support instruments for planning allow us to predict or foresee with greater certainty the behaviour of defined technical elements and the response of the planned use of space. This also permits the introduction into projects of elements of technical and functional innovation providing greater security in respect of the final outcome of the works, thus dealing with the traditional distrust of workers in the sector towards the use of innovative elements that aren't well-consolidated in the use and technical culture of the opera-

tors or the administrations in charge of the technical control and carrying out of the project. Some local administrations, in particular those involved in phases of particular and intense urban building development, have started to place alongside their traditional control instruments for directing building activity and planning, codes of practice and guidelines in support of planning interventions.

Rome City Council intends to direct the planning process for interventions included in the new Zone Plans, in other words, the provision of guidelines to improve the quality of the definition of projects to improve their level of quality at the building stage, including as it does a more finely tuned and complex control tool to the evaluate predicted performance. On this occasion, all of the regulatory indicators in force can also be made operative in an organic way by the Council with single measures and the new regulations of the General Regulatory Plan with regard to environmental sustainability in building interventions, and also go beyond a certain traditional rigidity of these same urban tools that are currently in use. The "Code of Practice" is intended as a support tool and indicator for the realization and control of sustainability in building interventions, in particular in social housing, and it proposes a highly integrated approach to planning. The code provides the answer to housing requirements in economic, social, functional, environmental and energy terms. Proposals for innovative useful types of additions to the creation of urban spaces are analyzed in terms of both the comfort of public spaces, and as a functional and social mix in a way that obviates the phenomenon of social and economic segregation that is typical of metropolitan suburbs. The Code also deals with the evaluation of appropriate and measured technological solutions to the



types of buildings to be constructed in a way that ensures they don't clash with the aim of the local promoters, even if this requires a higher level of technological performance aimed at the environmental sustainability of the interventions. The analysis of the innovative technological solutions for the realization of residential buildings is examined closely, down to the study of construction materials to be used so as to orientate in an intelligent way the choice of the construction solutions and their successive control in the phases of construction and building management. By the same logic, the most appropriate plant for energy efficiency was analyzed and evaluated in the light of the most recent legal requirements regarding energy saving and management. To support these requirements, the code proposes an integrated model of analysis of the sites where interventions take place that includes all of the environmental aspects and characteristics of the single sites, in order to create a space within projects and planning strategies for the natural and human character of these sites. This is only one of the most recent examples of that which is establishing itself as a new culture of public city planning, looking in a particular way

at the growth of the residential building patrimony that is innovative both for its quality of use and its environmental impact on the territory and its resources.

These examples, however, are also testimony to a need for a profound renewal of the normative system that governs public and private residential building, both at the level of territorial planning of interventions and at the level of the qualitative and quantitative offer of services or the use and management of resources. The established normative system is now considered tired and inadequate for interpreting the needs of contemporary society, as well as not being malleable and flexible enough to be able to welcome the occasions offered by the advances in technological innovations in the sectors of the construction industry, of management and energy services. The national normative framework of reference on the planning and management of interventions on residential buildings struggles to gather the input that comes from localised contexts and other economic sectors; this is why local administrations are moving to provide themselves with local systems of regulation and guidance to be able to manage in a peripheral man-



ner the evolution and innovation of the system and the construction of new buildings.

Even if the normative intervention of local bodies, generally of an obligatory or recommended nature, cannot limit the area of application of a national provision, they do allow the improving of the requests for additional services to be provided, increasing and detailing the specifics and adapting them to the local context. There are very many local initiatives in this direction that have been promoted in the last ten years by different public bodies, often supported by the collaboration of collective groups of representative cooperatives of the final users or the economic operatives in the sector.

Regional, provincial and city governments in Italy, not without a certain difficulty and since the '90s, have started to become aware of the need to promote environmental policies aimed at improving the living conditions of citizens and mitigating the effects of building and manufacturing activities on the urban ecosystem, which is often already compromised. The evolution of environmental sensitivity and the spreading of the awareness that a common response that is sustainable socially,

economically and technologically, supported by the acceptance of various European and national laws have led to the defining of a number of instruments of a local normative character for the preliminary definition and control of building activity from an energy and environmental point of view.

These normative instruments, that gather together national indications especially in terms of the energy efficiency of buildings and consequently on the energy management in building activities, are overcoming the traditional approach to building activity based on static control, health and spatial parameters. Local regulations (building rules, technical norms, regional guidelines, etc) have as their aim that of directing individual choices towards the collective interest that can be obstructed or damaged by the actions of individuals.

Considering the environmental impact of the building sector on the global environmental balance of human activities, and that 80% of European citizens live in urban areas and spend 90% of their time inside buildings, it appears evident how the insertion of themes relating to the sustainability of building interventions represents a call

to the public and private purchasers for a new system of needs that's more structured and mature and expressed by citizens, whether implicitly or explicitly.

Sustainability puts itself forward as an additional value in the actions of local government, but also as an economic surplus in building up the exchange value of a property. The new needs picture that defines itself in relation to building activities, whether aimed at the construction of residences or buildings for the service industries, expresses a request for quality connected to the transformation of the models of use for buildings. In particular, this renovation is most easily perceived in housing where the traditional model of use has been profoundly challenged by a large number of factors; new ways of working, the presence of home working, the cohabitating in the same spaces of traditional dwelling activities with those of free time and amusement, the presence of a substantial amount of refined technologies such as IT which, until a few years ago, would have been extraneous to the domestic setting, these have all profoundly changed and rendered more complex the system of guideline requirements for the planning of buildings. Where once the healthiness of the environment had to be and could only be guaranteed by the positioning of a building and the control of air movement, today it also has to be evaluated in terms of the density and distribution of the plant networks within the structure. Even if this type of control action of the impact of building on the environment is assuredly an absolutely positive factor, the lack of coordination at national level may cause a number of difficulties in terms of harmonising the measures promoted and the control of their effects, leading to a certain amount of confusion among operators in the sector.

### 3.

## Local governance and levels of action

The levels of action of the policies relating to sustainability in building are primarily three: regional, provincial and communal; these three levels of action echo the levels of the articulation of government of the territory and building activity. The regions provide indications about behaving in the general interest and specific techniques relating to sectors, those that are particularly pertinent to them (social housing, health, education, etc.), the provinces have a very important role in the policies of specific sectors, in particular in housing, educations (schools) and on the management of resources and energy consumption (provincial energy plans), while the communes provide indications of a technical building nature relating to the construction and management of the entire building stock, irrespective of their intended use, while the communes also exercise a controlling role during the phases of construction and approval. The actions proposed by the various bodies are therefore in keeping with their various fields and levels of intervention in the management of building activity. In particular, in the management of public and private residential housing, the regions are in charge of the management and technical and economic planning for social housing and also manage the resources relating to the support of social leases, as well as coordinating the activities of the Territorial (or Local) Agencies for Residential Building (ATER or ALER); the provinces have direct relationships with the Agencies for Residential Building; the communes in turn directly run their own building patrimony and administer in their territory the economic resources destined to

the support of social leases, and, in close contact with the Agencies for Residential Building, manage the assignation of public residences to the end users. On the basis of recent national laws, they manage throughout their territory all the initiatives aimed at overcoming the “housing emergency”, and are therefore responsible for the final “local action plans” (2007-2011).

The normative actions and guidelines launched by the various administrations and different scales of action all represent activities aimed at the promotion of a culture and widespread practice of sustainable building; the sustainable approach, in fact, requires a concrete and profound change in the practices and behaviour of all the operators in the building process, in urban planning, in new public and private buildings and in operations of building renovation. In this process of innovation of planning and building behaviour, the public administrations and, in particular, the local bodies entrusted with the role of directing and controlling the process of transforming the territory have to make themselves promoters and models of correct behaviour in the theme of sustainability. Local administrations are entrusted with the task of identifying best practices to be carried out by the operators in the building sector in their construction initiatives. This type of action requires a great planning effort of the part of local administrations, who are called upon to try out new ways of prefiguring the behaviour of the players in the process, and having to substantially remove themselves from traditional building norms that were generally obligatory and generalist, usually free of any contents to do with use, that are also useful in verifying the efficiency and efficacy of the proposed planning solutions or the technical solutions applied by the builders.

The regions have a strategic role in the cultural renovation of the construction sector. The work of the regions on elaborating the guidelines on the control and governance of building activity contains in fact all the characters of the complex strategic approach that allows, in the successive levels of action, the formulation of a policy of integrated approach in a sustainable key to the transformation of the human environment.

It's important to underline that in the near totality of cases the introduction of a system of norms for promoting indications or regulations on the sustainability of building interventions has not overturned the traditional structure of regulation in the sector. In many cases, the introduction of criteria of sustainability or best practices aimed at the creation of sustainable buildings runs alongside the traditional indications and regulations, defining a new quality profile that is more complex and efficacious in terms of environmental impact, the wellbeing of users and the reduction of energy consumption.

Paradigmatic of this type of behaviour is the document of the Emilia Romagna Region that defines the criteria for the drafting of building rules for use by the communes in its territory. In this case, building activity is regulated on the basis of the buildings agreeing to two sets of requirements, one that is obligatory and compulsory, the other voluntary, the Suggested Requirements, whose contents were then updated and transformed into Voluntary Requirements, relating to the wellbeing and correct use of building works. This packet of requirements aims to improve the quality of life of the users in respect of the receptive capacity of the ecosystem, of the possibility of renewal of natural resources and of the balance between manmade and natural systems. The indications relating



*«Home for € 100k» - MCA Mario Cucinella Architects, 2008; Housing HQE, ZAC Cardinet-Chalabre, Paris - Franklin Azzi Architecture, 2008; Housing HQE, Paris - Frédéric Schlachet, 2008*

to the interactions between building and environment to reduce non-renewable energy consumption to reduce CO<sub>2</sub> emissions in the atmosphere are of great relevance. This articulation of the directing actions of the region prefigures a hierarchical articulation of the indications that are given about building activity; the binding requirements give indications about security, stability and the health of buildings and the ways to respond to the general indications on energy saving, acoustic isolation and the use of spaces. The voluntary requirements define an area of extra value in the performance of buildings; they define the dispositions on dangerous emissions, surface dampness, artificial lighting, temperature and air movement. The voluntary recommended requirements define an “additional” quality in the building project that the administration renders attractive from the economic point of view for the promoter by means of discounts on the costs of urbanisation.

The path taken by Emilia Romagna was followed by other administrations who articulated their guidelines, always

distinguishing between regulations of a binding character and indications of a rewarding character, always identifying environmental quality and the sustainability of the interventions among the rewarded behaviours, but coming together to consolidate the perception of “added value” for environmental sustainability in building interventions. Recent norms on the energy efficiency of buildings, the putting into effect of EU Directive 2002/91, and their consequent fallout on the management of building activities probably also come together to create a knowledge of the added economic value of a building’s better energy performance; this induced effect might function as a lever to trigger good behaviour at the level of installed complexes as well and not just buildings, involving not only the evaluation of energy consumption, but also evaluating user comfort, the production of harmful substances and rubbish and on the rationalisation of the use of water resources.

This is the case in the Commune of Rome that, in 2006, emitted a provision that integrated its building regulations



*Competition «abitareECOstruire» Legambiente + Ancab/Legacoop, Pesaro - 2tr + Noos, 2009; Olympic Village, Torino - Benedetto Camerana, 2005; Social Housing, Milan - Spsk+, 2009*

with a packet of indications aimed directly at the promotion of the creation of interventions for environmental improvement and for the use of alternative energies with particular regard to solar energy, the optimal use of materials, components and systems to attain adequate levels of thermal isolation and thermal inertia in the building envelope, as well as ensuring the profound permeability of the ground soil in urban areas. The path chosen by the Commune of Rome wasn't that of voluntary adherence to these indications but the forced imposition of specific regulations, turning therefore to indications of a quantitative character rather than relating to performance.

This provision follows the indications already contained in the new General Regulatory Plan with which were inserted among the permissible categories of interventions those of Bio-Energy Improvement (Miglioramento bio-energetico - MBE), that is, the totality of interventions aimed at improving the bioclimatic performance of the building components. These interventions include climate regulation and acoustic protection or recovery

of buildings in line with the principles of bio-architecture, the maintenance of the deep permeability of the ground soil, the use of natural or renewable energy sources, the recovery of flow-back or rain water for irrigation purposes, soil fertilisation or toilets, the use of durable and maintainable construction materials, and the use of greenery with the aim of microclimatic regulation and protection from acoustic and atmospheric pollution. The commune linked this provision to an awards system of incentives to encourage private promoters to take on these interventions, foreseeing a prize of extra cubic capacity to compensate any eventual investment costs to provide for their installation.

Another type of methodological approach, corresponding moreover to an intermediate level of action of territorial governance, is that that has been launched in a number of provinces. The case of the Province of Lecco is representative of this approach. The province elaborated a packet of "Guidelines for the promotion of sustainable development in the instruments of governance of the

territory and in building regulations”, which, starting from local energy programming, describe the use of instruments and strategies aimed at the promotion of sustainability in territorial, urban and building planning. They are an integral part of the guidelines for the best practices aimed at illustrating for public local administrations how to behave to promote sustainability in their territory, describing in particular the accompanying measures that many administrations have already put in place; in this case too different types of incentives have been considered. Local building regulations for construction in this case are indicated as being binding or voluntary and are described in terms of their performance to render their application by the administrations easier.

This is a very flexible document and it is aimed at administrations, and as such it is put together in a very efficient and streamlined way; the levels of action identified are only seven and their implementation is delegated to the communes who will follow the indications. The levels of action regard site analysis, the use of ground soil and the quality of the external environment, the quality of the internal environment, materials and technologies, the rational use of climatic and energy resources, and management quality.

Another interesting experience is that of the Itaca Protocol for the energy and environmental quality of a building. This document is the fruit of the action undertaken by the national work group made up of representatives of all the regions and also attended by APAT (Agenzia per la Protezione dell’Ambiente e per i Servizi Tecnici – Agency for the Protection of the Environment and Technical Services), set up in January 2002 in the home of ITACA (Associazione nazionale per l’innovazione e la

trasparenza degli appalti e per la compatibilità ambientale – National Association for Innovation and Transparency in Tendering and for Environmental Compatibility). The fruit of the work group’s activity is a shared work protocol that permits the attribution of eco-sustainability points to buildings, but, above all, with the adoption of the protocol, a shared method of evaluating sustainability in building interventions was established.

The protocol is expressed in a series of guidelines gathered together in seventy evaluation forms that correspond to the same number of requests for environmental compatibility. The forms are completed by informative elements, namely the legal and technical references and the weight of the requirement. The matrix of reference is the GBTool. The criteria for evaluation of the level of eco-compatibility of the construction under consideration in the system were structured and codified in areas of evaluation, which, in turn, foresee a series of performance sub-requirements. The system of awarding points is also adapted from GBTool, with the possibility, for each administration, of adjusting the weight of each individual requirement to adopt it to local realities.

Already a number of administrations are referring to this document, including Tuscany Region which has placed alongside this methodology adapted for the drafting of “Guidelines for sustainable building in Tuscany” a “Basic list of materials for sustainable building”, a document that represents a support instrument for planners and administrations for the knowledgeable choice of technical solutions for the construction of buildings.

The Lazio Region, with the scientific support of iISBE Italy, ITC-CNR and Citera, has adopted the Itaca Protocol both for residential and non-residential buildings.

Thus, the Administration has followed legal prescriptions in energetic and environmental certifications, both in new constructions and in renovation projects.

The case of the city of Turin probably represents an evolution of this operating culture. The city of Turin, apart from having recently rewritten its building regulations (2004-2006), had to confront, for the Winter Olympics of 2006, a phase of great investment in planning and control both of civic buildings as well as of huge facilities and infrastructure. This preliminary planning commitment has produced among other things a series of instruments that were useful in planning and controlling the construction of these works: among these instruments we remember in particular Valutazione Ambientale Strategica (VAS) del piano degli interventi per i Giochi Olimpici Invernali Torino 2006 (Strategic Environmental Evaluation of the Plan for Intervention for the Winter Olympic Games, Turin 2006), which, other than providing general indications for the phases of activating the Olympic Programme formulated regulations for the elaboration of the projects of the Olympic works, and the “Guidelines for sustainability in the planning, in the building and in the running of the Olympic and Multimedia Villages”.

These documents represent specific strategic planning instruments of intervention and are not documents of general interest for the city, but given the dimensions of the interventions and the level of fallout from the works in the area of the commune, they came to constitute a major precedent in building practice in the city. Many of the indications elaborated in these documents were then taken up by the communes’ successive building regulations, in particular as regards the indications relating to energy. The “Guidelines for sustainability in the planning, in the

building and in the running of the Olympic and Multimedia Villages”, drafted by Environment Park in collaboration with experts from the Polytechnic of Turin, are put forward as an operative instrument, aiming both at subjects involved in the running of the Olympic Programme and planners of the works foreseen for the Olympic Villages. The organisation of the guidelines is finalised with the aim of facilitating their application and therefore helping towards the attainment of defined objectives. In fact, apart from the requirements of environmental quality, the most appropriate technologies, the normative references, the indicators and the instruments to verify the satisfaction of each phase of the project, construction and use were also indicated. For the first time in a single document, all the fundamental requirements that characterise the energy-environmental quality of a building were synthesised and quantified. This document derives from the political-strategic will of the promoting committee to place the promotion of sustainable development, also by means of this document, as one of the fundamental objectives of the Olympic Movement, as stated clearly within Agenda 21 of the IOC. The “Guidelines for sustainability in the planning, in the building and in the running of the Olympic and Multimedia Villages” were developed bearing these principles in mind, aiming, therefore, at obtaining with the construction works foreseen in the Olympic Programme concrete results for a more sustainable built environment.

This brief description of the panorama, even if it bears witness to a slow evolution of the culture of governance in building activities, also testifies to the distance the Italian reality still has to travel to provide a uniform acceptable level of behaviour of local bodies towards the territory they manage in terms of sustainability. For the



*Casa Ellen, Moarbach, Brunico (BZ) - Walter Werner Franz, 2008; Tamersaussen - Rubner Haus, 2007*

experiments in course to ensure that sustainable building becomes a widespread and constant practice, it is necessary, on the part of local bodies, to promote a profound revision of the methodologies they have used up to today as a constant procedure in the provision of general urban and effective instruments.

The ex-post evaluation of these instruments in their application over time also allows us to evaluate if and how these new methods of aiming building activity have effectively influenced the quality of the built environment and the life of citizens. It's evident how the impact of the new building regulations, provided by local bodies, when these were influenced by the intermediate information instruments pertaining to the protagonists of the process, were more efficacious and immediately productive. The case of the city of Turin is emblematic for the way in which the Guidelines for interventions for carrying out the Olympic Programme then went on to have an influence of the way of running ordinary building processes as well. The introduction of guidelines or codes of practice allows the

speedier and more immediate rendering of the assimilation of planning and building behaviour than would have been achieved under legally obligatory regulations. The guidelines contained in a code of practice do not impose turning to a set way of behaviour or a given technical solution, but they help the planner and then the operator to choose in a more informed manner the best solution for the type of scenario they find themselves working in. When then, as in the case of the Turin guidelines or the Itaca protocol, the choice of a given behaviour or of a particular construction procedure is also linked to a considered evaluation of efficacy in terms of efficiency, use or reduction of impact, this type of instrument can serve to trigger a process of healthy competition about the efficacy of single projects. In other terms and contexts, the rewards mechanism of the CasaClima certification is based on recognising the merit of those who render it most evident: the building that is made well and most rewarded will also be worth more in market terms, not just in economic terms relating to its life cycle.



*Casa Reisigl, Merano (BZ) - Michael Tribus/Lana, 2008 - CasaClima Oro+, CasaClima Awards 2009*

#### 4.

### Process, Production and Quality of Life

#### Environmental qualification of the product, qualification of the process and quality of life for users

These instruments for directing and controlling planning activity in the specific case of public residential building allow the insertion into a sector of low, not to say very low, technological complexity, almost always run on a minimal budget, processes and product innovations that otherwise the operators in the sector would tend to refuse, considering them incompatible with their established practices, their economies of scale and their company profits.

The risk of impermeability to technological innovation in the residential sector is also often due to the separation that exists between those who construct the buildings and those who manage them. In fact, those whose only role is to carry out interventions have no interest in

investing in the efficacy of an object from which they will receive no economic benefit. Those who only build and limit themselves to marketing new dwellings have no interest in investing in solutions that might be more expensive but that render that building much more efficient; this distorted behaviour can be found just as much in energy management as in the management of land suitable for building.

The first really innovative interventions from the point of view of the application of innovative and efficacious provisions in terms of resources, space and energy management, are coming to light thanks to the investments of cooperative groups, of which there are many in Italy, and the agencies for public residential building.

In these contexts where the economic promoter, builder, manager and end user are involved together from the outset of the process, the living efficacy and energy efficiency of the interventions are absolutely central to the development of the projects. These subjects often turn to internal codes of practice or “agreed codes”, defined between end

users and constructors that contain minimum undertakings to guarantee the satisfaction of specifics of use identified by the managers and end users as qualified into the entire life cycle of the building. Obviously, the more decisions are shared and agreed, the greater will be the overall efficacy of the intervention, both for those carrying it out and for those who will have to live with it. These types of best practice are the same ones that allow opposition to the growing phenomenon of energy poverty, which in the social housing sector is unfortunately ever more widespread, exposing the weakest members of society and the institutions who assist them to an ever-greater economic precariousness triggered by the merely modest efficiency of the building system (structure/plant) where they live.

It is important therefore to place alongside every new means of directing, planning or legislating building activity, instruments for evaluating and directing planning in such a way as to render immediately available for planners and builders an additional supply of competences and instruments to confront in a knowledgeable manner the planning of dwellings that are really suitable for those who will then go to live in them and/or manage them. This type of instrument can in fact have an impact on the technical culture that is found in the sector: providing “unusual” competences and innovative technical solutions will also have an impact on the technical formation of single operators. Correct use and the implementation of codes of practice for the activity of planning and construction can lead to the demolition of the traditional distrust among workers in the sector, enriching their range of professional experiences and instruments. Accompanying these indications with accurate economic evaluations of the various building procedures

in terms of parametric costs related to the total cost of the works, placing them in relation to the performances of single procedures, will also allow the builder or the planner to choose the solution they prefer without compromising the overall performance of the building to be constructed, since they are always able to control with established and traditional instruments the overall cost of the interventions.

The code of practice or the guidelines, if used in such a way as to become also a means of capitalising on competences and technical know-how, will tend to become a real instrument of the technical brief at the disposition of the clients and end users.

In the case of habitual clients, such as Agencies for Residential Housing or the local bodies in charge of managing great housing patrimonies, or again in the case of housing cooperatives, who bring together the thousands of small and medium cooperatives of users/inhabitants or constructors, who characterise the social and productive make-up of the Italian reality, the development and implementation of a codified technical brief allows the modelling of a number of planning and constructive behaviours, thus allowing the optimisation of the single intervention in function of the specific environmental and dimensional characteristics to be confronted each time and in each case. This, other than guaranteeing an average raising of the quality of the different constructions and the quality of life of the users, permits the optimisation of the technical costs for single projects and the reduction of extra costs due to any eventual planning or construction errors, normalising a number of processes of elaboration and above all of control of projects and their outcomes.

The construction and development in time of a codified technical brief allows the consolidation of the competences of the client who has imposed and promoted them, leading to a profound redevelopment of the entire life cycle of the building system. The technical knowledge of clients, planners and constructors can therefore grow in a physiological manner around the settling in of the practices that are analysed and evaluated in the codified technical brief. It's as evident as it is banal that the patrimony of technical competences should be updated continually or periodically, drawing in any eventual feedback from the projects that have been carried out by various subjects, otherwise the risk would be that of ending up proposing an infinite series "catalogue solutions" proposed over and over in a sterile manner throughout Italy. If well managed, these instruments can be extremely useful for a redevelopment, that will also be economically sustainable, of the small commissioning organisations present in our country.

As things stand, the dissemination of this type of experience in a very compartmentalised sector both at the level of demand as well as supply, is undoubtedly strategic to reach all the subjects involved in the sector of residential building, much more so than legal provisions that are often perceived as oppressive and incomprehensible by those they affect. It is not possible to intervene on the environmental quality of the residential market if we don't think first of having an impact on the technical culture of the operators in the sector, modifying some of the systems of operational relations that are not compatible with the new needs of the sector and the users. On the one hand we have some growing number of highly innovative achievements pilot level, often

the result of design teams are supported by composite manufacturers particularly interested in testing and/or research centers interested in operational field test their theoretical options that work as a reference and example for other actors and a production problem that painstakingly pursues new directions and requirements of regulatory, marrying technical solutions, materials and components, now widespread in the market, more reliable and efficient. However, a good part of the design professionals, received no training on these issues and is forming on the ground, very gradually, the use of these technical solutions and new ways of design development. This led to years of coexistence with traditional models typologically and morphologically or functional system solutions aimed at satisfying one or more requirements of energy or environmental character.

The case of the diffusion of solar thermal or photovoltaics is absolutely exemplary. The full integration of these systems was the culmination of a location where it has gone from a simple overlap-enhancing elements on buildings and traditional technical elements morphologically, according to the modeling of the building to maximize energy production, yet at the architectural quality and use. The culmination of this growth path is the compromise between quality and efficiency of the morphology of the architectural object, compromise now beginning to be in the form mature enough.

The need to communicate in a very explicit and to share the end user led innovation that characterized his clothes or building, has resulted in exposing the most innovative technical elements almost grotesque, however exasperating forms, colors and visibility, if one side has created almost a folklore sustainable, the other has



*BedZED o "Beddington Zero Energy Development", Sutton, London UK - Bill Dunster, 2000-2002.*

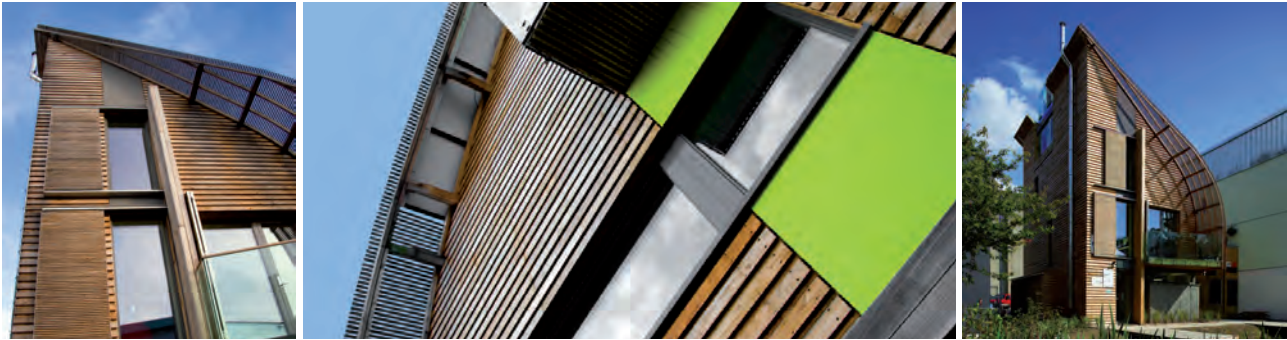
created an imaginary new common references that are rooted in non-specialist public basic elements of the technical vocabulary and formal sustainability.

The roots of certain construction practices and responsible use of the building, but also the obligation to comply with certain performance standards is proving the most effective way to accompany the growth and development of an idea of the city in which the 'sustainable construction is not only the value added of some occasional special occasions, but is common practice. The observation of more advanced production contexts can highlight this new culture of design and socially conscious energy is actually creating a language code and constructive self-developed from established forms and settlement patterns, including questioning and references development dynamics.

At the level of urban plan was passed by the development of model districts, isolated and protected from the rest of normal tissue to mend experiments and metabolism of tissues also strongly degraded to return resources to the city and citizenship in terms of quality of

space of life and rationalized use of resources. In terms of building, the consolidation of a new language is even more striking, more aware of the use and management of innovative technology solutions, as this is less marked at morphological level. The use of natural light, cooling systems or natural ventilation systems capture solar energy systems tend to lose focus in the formal implementation of this new generation of buildings because they are physiologically integrated system. Some building / facility, there is no need to show the enslavement of the building to its environmental performance or energy, the building is primarily the place of life quality or the quality of life and no longer an efficient liveable car.

All of this in view of the production of housing is even more striking, the ancestral home is a concept with dynamic evolution very slow and very cumbersome from security that the image of tradition, a formal language and the tendency towards a formal and constructive language represents the conclusion of a very painstaking process, even the simple constructive innovation in the past has been forced to pay to the tradition, concealing



*Lighthouse Sheppard Robson, Watford, UK - BRE, 2007*

his appearance in forms more reassuring and very normal, so that even the introduction of a new material can be an injury or an element of mistrust by the end user. A paradigmatic example of this evolutionary dynamic is the experience of the CasaClima (Klimahaus) and buildings were completed in territories which have acceded to its protocol design and implementation, the roots of this culture of project implementation and management of buildings has led to a gradual departure from the traditional formal models and construction that characterized the early achievements. Initially we found ourselves in front of types and forms of traditional alpine architecture, weighed down by thick dell'iperinsulation, made awkward by the overlapping of the elements of traditional solar panels on the roofs of stone or wood, in recent years, further improving the final performance buildings and materials, there is a final liberation from the traditional forms that is leading to the establishment of a new scenario of alpine absolutely contemporary, but perfectly integrated with the natural, cultural and productive when it is rooted and from which inspired. The evolution of this

new language is also due to technological leap made by designers and implementers that finally are not limited to superimpose new performance structures and traditional techniques, but are experimenting with new construction techniques, or are interpreting traditional building technologies and systems such as wood, so completely new construction coming to full maturity, performance and form. The case is unusual because CasaClima rooted in a territorial context clearly bounded both geographically and environmentally culture with a mature technique, nourished by a desire for experimentation and investment in innovation that affected the entire production sector, where manufacturers of materials components and designers collaborate in the establishment of product quality building increasingly comprehensive and complex.

Similarly, in contexts characterized less environmentally and architecturally, this trend is taking place, always at a thrust impressed by the government and by an increasingly articulated, especially in the residential sector. After several years of stalemate in the general production of

social housing and the typological and technological experiments on living, in all European countries was a resurgence in the business of construction and design experimentation on the theme of social housing.

Since the publication in 2006 by the European Commission's Communication of the Thematic Strategy on the Urban Environment "to the recent Communication of the European Ministers of the House in November 2008, the promotion of a new housing policy and in particular a new culture of a sustainable social housing and is considered central and strategic for the complete realization of a truly integrated policy of economic and social cohesion continental focus on quality of life of European citizens and the quality of urban environment, connecting the need to write a real response and quality to a large part of citizenship in terms of profound economic and social precariousness, reducing the weight of this construction industry on the environmental and economic impact of individual countries.

Thanks to this cultural revolution, producer organizations, cooperative or collective subjects are group together to propose a new settlement model, manufactured housing and sustainable socially, economically and energetically, based on sharing and optimization of its technical knowledge and its delivery capacity, enriched by the innovative stimuli from the most advanced production and testing. This trend is leading to a profound renewal of the culture technique also too small and medium enterprise (SME) that characterizes the widespread quality of our cities have an impact on the exchange value of the property, proposing environmental efficiency and sustainability of achievements, as including economic value added.

By contrast, the maturation of the design culture of the operators can metabolize so accomplished innovative stimuli coming from the production, balancing quality of life and sustainable management of energy resources, to fully and effectively "re buildings as power plants and convert the meshes of world power in networks of smart utilities to deploy that power opens the doors to the third industrial revolution in the twenty-first century, should have an economic multiplier effect equal to those of the first and second industrial revolution of the nineteenth and twentieth century (... ) with the objective of enabling millions of people to produce clean and renewable energy through their own businesses, public institutions and homes, and to share the surplus with other intelligent network via public services, thus contributing to initiate the third industrial revolution and a new post-carbon dioxide was dedicated to the democratization of energy and sustainable economic development." (Jeremy Rifkin "Carta per l'architettura del prossimo millennio", Venezia, 2008)

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# 5

## Systems and innovative technologies for residential building

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Recent institutional initiatives for the relaunching of housing policies have once more brought to the fore housing policies and highlighted the need in our country for a redefinition of intervention models in social housing. More than 80% of the entire Italian stock is owned, while the remaining 18% circa is rented: a threshold that places our country near countries like Greece, Spain and Portugal and where spending on housing consumes a monthly average of a 29.5% of income, a cost that already today risks being unsustainable whether as a mortgage rate or rent.

The functions of social housing and the general state of demand outstripping supply of low-cost housing are however common to all countries. Problems such as the deficit of new builds, greater access to owned property and the general increase in the cost of renting represent the principal factors that are leading to the increase in demand for low-cost housing to which can be added shared social and demographic tendencies.

The assessments reported here highlight the two lines of housing policy: an emergency demand (the homeless, those in precarious housing conditions) and a demand of intermediate difficulty (new families and families who rent and/or are single-income and unable to access the free market thanks to the prices reached in recent years). In these two segments of the housing market we can recognise the evolution of the needs framework that is leading to – in functional, morphological and technological terms – a significant restructuring of the social housing market and conforming to a new model of offer characterised by:

- a housing policy on the part of public bodies, able to integrate actions of support for families in emergency

situations, with new models of subsidised housing involving no-profit housing bodies;

- a policy of offer regulated for the old and new segments of the demand in difficulty, in better conditions than the emergency demand but unable to gain access to the free market.

What appears central is that the housing policies should be based on the concept of limited profit housing, that is: supporting the growth of bodies with moderate expectations of profit, through interventions aimed at containing the costs of production and acquisition of the areas, widening an area of the market that is able to intercept the weakest segments of the demand to buy and rent but also some sectors of social demand.

This intervention on the system of the operators and promoters of the interventions of social housing should be accompanied by a focused innovation of this sector of building production since the segment of residential building production at the national level is still strongly characterised by a traditional sort of productive organisation. The low technological complexity of residential building allows operators to continue to intervene with traditional technologies, that are consolidated and scarcely innovative, employed by a workforce with limited skills all at a limited cost. The low level of industrialisation of these interventions, the historical conservative tendencies of the promoters, both public and private and their constructors, has led again in recent years to promotion on the market of traditional models of buildings, that are reassuring in



terms of their proposed image, in the technologies and plant solutions employed, absolutely invariable in their typo-morphological organisation both at the level of urban planning and distributive planning at the level of the dwelling. Where on the other hand technical-constructive solutions have been attempted, the building organism has evolved in a manner that is absolutely indifferent with respect to its typological characteristics.

The theme of social housing is characterised by the extreme diversity of solutions proposed at national and regional level, both as regards the construction of the housing units and their assignation. The absence of a shared definition of social housing and EU legislative framework on the subject contributes to render even more difficult the identification of shared scenarios. Only last year the

European Parliament pronounced on the argument, recalling the need to use as widely as possible European financial instruments (such as Jessica and Jeremie) for the construction of new buildings and the redevelopment of the areas that house pre-existing buildings.

The process of urban regeneration still appears to be incomplete in numerous Italian, Spanish, Polish and Hungarian settings, but the urban dimension of the problem is without doubt one of the few common traits that can be identified in all the member states.

The existence of a dynamic of growth in residential demand continues to sustain the market and the value of the productive investment in housing. In Europe this pressure has stimulated the development of many typological, constructive and technological experiments on the theme of housing. In particular the sustainable drive has imposed on residential research an important acceleration in all the aspects of the building organism involved in the control of energy management, in the reduction of the human impact of establishments and in the improvement of the conditions of comfort of the users. Differently in the Italian context the recourse to more or less integrated industrialised constructive systems, shows up today as one of the factors that is useful in reducing the costs of the intervention, responding with contained construction times to that need for affordability that is typical of operators in the limited profit housing sector, such as public bodies and cooperatives.

Starting with these assumptions and following these good practices a number of attentive regions and councils in Italy are expressing themselves within the panorama of social housing with experiences of planning, designing and producing innovative constructive



systems for social residential building, finding new points of coordination with management bodies but also a new collaboration between public bodies and new generation private bodies such as foundations.

And it is to these institutions, such as, for example, the Fondazione Cariplo in Milan, that a number of councils in the North are making available areas for free, thus lowering the costs of building and rental to recuperate as soon as possible the costs of investment. In this sense the most advanced and practised experiences become, for operators in the sector, interesting and verified methodological traces of the financial channels and procedural means through which to carry out interventions in social housing throughout the country that are able to respond clearly to:

- an increasingly diversified housing demand and one of a social character: houses aimed at both the weakest sectors of society and the welcoming of workers from abroad, as well as middle-low income groups (young couples, old people, students, etc.) for whom the means and terms of access to public residential housing are being proposed;
- the need for a great efficiency and functionality in the dwellings which implies a characterisation both in operating terms (referring to materials and the technical solutions to adopt) as well as in terms of a new architectonic image;
- the need for an improvement in the dwelling standards as demanded by the new needs of users;
- the need to rethink the whole eco-energy life cycle and planning of the built in respect of the criteria of bio-architecture (lower energy management costs) in the light of the emission of EU directives on energy saving;

- the need to prefigure technical modalities not only in the phase of building the project but also in the management and maintenance of the built in terms of low economic impact and complexity of the maintenance interventions.

In parallel to this encouraging procedural and financial model, new players can be seen in the residential building market who have come together in cooperative and consortium arrangements that increasingly carry out a sharing of knowledge and awareness, employing their skills and experience and introducing on to the market “proprietary building systems” defined by the integration of the specific technical components of each single producer.

Having satisfied the requisites that were non-negotiable, the matrices of compatibility are defined for the various technical elements and components in the light of their actual performance and their constructive characteristics – as in the case of elements for dry assemblage, prefabricated structural components or of innovative and high-performance materials that enter the market. The matrices of compatibility thus elaborated represent a first instrument for the verification of the technical feasibility in operational terms of industrialised specialised constructive systems.

The organisation of the building system remains clear and recognisable but the technical elements of the residential building evolve in terms of typo-technological innovation through:

- the optimisation of the constructive processes with a return to a sort of “soft” industrialisation of a new generation;

- the innovation and/or trying out of innovative constructive solutions or techniques whose aim is the reduction of environmental impact and water and energy consumption and the promotion of rational use of natural resources;
- the promotion of passive strategies for climate control, the proper use of natural illumination and the increase of acoustic comfort internally and externally;
- the use of ecologically compatible materials and technologies that can be reused and recycled in line with LCA procedure;
- the improvement of the operating performance and energy consumption through the efficacy and efficiency of the new plant networks;
- the operational evaluation, both in advance – through the simulation of their performance in situ – as well as through the verification of the efficacy of the finished process, in terms of cost controls and production and setting-up times, through forms of certification on the Leed® model.

The diversified building systems we made reference to above, actuated through the innumerable modalities and possibilities of the building market, today undoubtedly represent qualifying aspects for the project: the technology chosen, starting from a few invariable elements, can in fact permit a great flexibility and wealth in the internal and external fittings of dwellings, both in terms of initial flexibility and flexibility of use and in time.

This characteristic also becomes qualifying for the user who, when varying their housing requirements, can intervene on their dwelling in a relatively simple manner, economically or assisted by the management in

the transformation of their dwelling. This sort of building system privileges the widest architectonic variability of buildings and of the different dwelling models, ensures the adoption of a series of technical solutions that come with a clear architectonic identity and recognisability and respond to the planning needs that spring from the varied demands of the housing market.

We can catch a glimpse then of a building culture that evolves in the production of catalogue systems where it is possible to recognise the traceability of the elements and producers: construction systems that are able to noticeably lower the costs of production and the times of execution guaranteeing all the same both the architectonic quality as well as the sustainable and ecological quality of the intervention, and the economic and financial sustainability of the projects.



## 6

## Power House Europe

## 1.

## Overview

The CECODHAS-Housing Europe POWER HOUSE EUROPE initiative, supported by the European Commission's Intelligent Energy Europe programme, will serve to accelerate empowerment of residents and the up-skilling of professionals working to reduce the carbon footprint of the social housing sector. This is being done by drawing on the existing pool of know-how and resources and facilitating the exchange of success stories and lessons learned throughout Europe.

POWER HOUSE EUROPE can be considered a knowledge base at European and national or regional levels providing the information practitioners need and allowing building professionals from Social Housing Organisations from all over Europe to contact each other and to access information on best practices on all aspects of energy management. The project revolves around three key interlinked elements: Toolkits, POWER HOUSE Platforms, the Website and Exchange.

## 1.1

## Toolkits

The starting point of the project are resources which have been produced by projects already supported by IEE under the Vertical Key Action "Retrofitting of Social Housing". POWER HOUSE EUROPE will maximize the impact of these projects through the creation of tailor-made toolkits designed on the identified needs at national, regional or local level.

The project is also securing an active hands-on targeted dissemination and knowledge exchange campaigns to promote the maximum deployment of these toolkits



and to boost the introduction of optimal intelligent-energy practices at all operational levels of social housing organisations. This will pave the way for similar developments in the wider residential sector.

## 1.2

### The Platforms

POWER HOUSE EUROPE national or regional platforms have been established by each partner in order to build the capacity of their members, the local housing providers, and create synergies with those bodies which will optimise the dissemination and deployment of project outputs. POWER HOUSE aims to encourage all the enablers of the energy transition from all sectors to work in partnership at national and European level and to diffuse the toolkits to relevant stakeholders.

## 1.3

### The Website

POWER HOUSE EUROPE website ([www.powerhouseeurope.eu](http://www.powerhouseeurope.eu)) is a window to case studies from public, cooperative and social housing organizations and the most interesting resources and ideas to help housing providers improve their energy strategies. The site is also a source of updates on relevant EU policy developments and a strategic way to help housing providers find partners for EU projects through a customized forum where they can also get advice or tips from other organizations around the EU. The site is also the link to members own national or regional energy platform pages. The POWER HOUSE EUROPE site works in connection with the European Commission's BuildUp site, an initiative of which CECODHAS- Housing Europe is a Partner.

## 1.4

### Exchange

To move from isolated pockets of best practices to large-scale take-up will require a structured and continued exchange between professionals. This will be fostered through study visits, bilateral contact and study visits fostered through POWER HOUSE. The exchange component of POWER HOUSE EUROPE is supported by The Building and Social Housing Foundation (BSHF).

[www.powerhouseeurope.eu](http://www.powerhouseeurope.eu)

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## 2.

### Description of the Italian Power House Platform

The starting point of the activities of the national platform was the need analysis which have helped POWER HOUSE platform to establish its priorities and form its strategies at national and local level. The national federations asked local, cooperative and social housing organizations throughout the Italy what it would take to help them to radically reduce energy consumption and increase the use of renewable energy in the homes they build, own



Figure 1, 2, 3.

*Castlefields Estate Regeneration - Plus Dane Group – 2013*

*BIRD - Bioarchitettura Inclusionione Risparmio (energetico) Domotica - ALER di Brescia – 2009*

*Botticino Mattina - Abitazioni Solari - Coop Casa Brescia – 2003*

and manage. The federations asked their members to outline what they perceive to be the key challenges and the main obstacles blocking progress in this field.

Led by CECODHAS Italy, the ITALIAN POWER HOUSE PLATFORM is working to mobilize actors in the energy transition in the residential sector. The work of the Italian platform is divided thematically into 3 themes, social technical and financial. The aims are to increase the number of homes which are retro-fitted annually by 20% in comparison to year 2007, to decrease household energy bills by 10% in comparison to 2007 and by the end of 2020 decrease the energy consumption and the production of CO<sub>2</sub> by 20% compared to 2007. The platform facilitates collaborations with other key actors such as the public administrations, trade associations in the construction sector and environmental organisations.

For coops of Federabitazione, the needs analysis survey revealed high interest on architectural integration of renewable energy and life cost effectiveness of innovative materials, technologies and construction methods related to energy savings. Information on efficient water management is also in growing demand. The PHE survey

along showed the need for training of coops' managers in Life-cycle-costing approach as a way to reduce cost-misperception and demonstrate effective benefits against first cost obsession of coops' members. and operative tools and methods, as dwelling manuals, for raising awareness of inhabitants along the occupancy phase. Feder-casa's members showed a high interest in learning about refurbishment project management and financing and on the technical side, management of heating systems, new heating systems, renewable energy and ventilation were the 'hottest topics'. The cooperatives affiliated to Lega-coop Abitanti expressed a demand for low cost customised training courses providing neutral information. For both cooperative federations, while new housing is being built to high energy standards, because the large majority of their stock is owned by the co-operators, the challenge is to rebuild a relationship with residents to promote refurbishment and asset management strategies. The Federations are drawing on the resources generated in European projects and case studies of interest from around Europe to put together a toolkit to aid their members in improving the energy performance of their stock in a systematic way.

**Platform contacts**

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*Legacoop Abitanti:* Roberto Fabbri

The big green housing  
and energy exchange  
(POWER HOUSE EUROPE)  
<http://www.cecodhas.org>

Duration: 01/10/2008 - 30/09/2011

Contract number: IEE/07/779/SI2.500397

**Partners**

- AVS - Asociación Española de Promotores Públicos de Vivienda y Suelo - Spain
- BHA - Bulgarian Housing Association - Bulgaria
- BSHF - Building and Social Housing Foundation - UK
- Consorzio Nazionale CasaQualità (*Federabitazione*) - Italy
- EKYL - Eesti Korterühistute Liit - Estonia
- Federcasa - Federazione Italiana per la Casa - Italy
- Finabita (*Legacoop Abitanti*) - Italy
- HSB - HSB Riksförbund - Sweden
- HTC - Habitat & Territoires Conseil - France
- NHF - National Housing Federation - UK
- SABO - SABO Aktiebolag - Sweden
- USH - Union Sociale pour l'Habitat - France
- VMSW - Vlaamse Maatschappij voor Sociaal Wonen - Belgium

## 7

## BHC and HOPUS: healthy and sustainable cities<sup>1</sup>

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*LEAD EXPERT, BUILDING HEALTHY COMMUNITIES*

*URBACT II THEMATIC NETWORK*

The WHO has published in 2008 a report, “Closing the gap in a generation: health equity through action on the social determinants of health” (Commission on Social Determinants of Health), in which three recommendations are stressed: the first regards the improvement of daily living conditions, i.e. relates to the circumstances in which people are born, grow, live, work and age; the second refers to the possibility to tackle the inequitable distribution of power, money, and resources, i.e. relates to the structural drivers of the conditions of daily life – globally, nationally, regionally and locally; the third recommendation regards the capacity to measure and understand the problem and assess the impact of action, so to expand the knowledge base, develop a workforce that is trained in the social determinants of health and raise public awareness about the social determinants of health.

These recommendations have been considered in designing the Building Healthy Communities project structure since the beginning because they are directly linked to a main issue in Euro6+9\*pean cities and to three keywords. The main issue regards the theme of quality of life in cities, that is the quality of living conditions, of the urban environment, of the equality of access to services and opportunities etc. The three keywords – lifestyles, cooperation, and knowledge – and the main issue highlight the relations between BHC and HOPUS, and final considerations on the possibility of measuring the quality of life in cities and of going further with the debate will stress this link.

<sup>1</sup> The “Building Healthy Communities” URBACT II Thematic Network brings together ten partner cities and their Managing Authorities from seven EU member states. BHC deals with health and quality of life in EU cities and its partners work together in order to capitalise knowledge and practices on urban factors influencing health and to create opportunities for cities to shape and implement healthy policies for their citizens. BHC partners are: Torino (Italy, lead partner), Amaroussion (Greece), Bacău (Romania), Baia Mare (Romania), Barnsley (United Kingdom), Belfast (United Kingdom), Lecce (Italy), Lidingö, (Sweden), Łódź (Poland), Madrid, (Spain) and the respective Managing Authorities.

## 1. Lifestyles

The way in which citizens live their lives is in great part influenced by the possibility to catch different opportunities, to maintain or improve certain levels of daily existence, to choose among possibilities. On the contrary, the lack of these basic citizenship conditions produce and reproduce disadvantaged people and areas and strengthen the stigmatisation of certain situations, making it almost impossible to overcome a difficult moment in everyone's life, to access to some opportunities no matter the place in which we live, to improve living conditions so to contribute to the general wellbeing.

Cities are by definition the first level of policy-making for citizens' wellbeing and their capacity to design equal development strategies is directly linked to their capacity to include health and quality of life in all their policies and to design them as inclusive policies.

The Leipzig Charter (2007) – which we may consider as the ultimate document on European cities that have been produced and approved by the EU – states that “all dimensions of sustainable development should be taken into account at the same time and with the same weight. These include economic prosperity, social balance and a healthy environment. At the same time attention should be paid to cultural and health aspects” (p. 1). Everything seems to fit into this statement and its fairness is evident, also its relevance to lifestyle is clear, since economic, social, environmental, cultural and health goals determine life conditions and lifestyle choices completely.

## 2. Cooperation

Cities alone cannot tackle the problems that equal opportunities bear, especially in times in which the economic and financial global crisis has narrowed the margins for action at all levels. Yet cities can become the place where innovative ways of facing problems can be experimented and hopefully translated in good practices to be shared. This process cannot be done by cities alone or, in the best cases, by networks of cities, but a cooperation is needed upwards, with the regions, the national and the EU level, and downwards, with public and private actors that operate in the city. The cooperation process among different actors is already a reality in European cities and BHC is not an exception: agreements with private economic actors or the managing authorities of the Structural Funds define the strength and universality of welfare policies since at least the Nineties. The involvement of the different partners should be foreseen since the definition of strategies and policies, since local public authorities have seldom the capacity to carry on a public policy only with internal resources. Since the white paper “European Governance” (2001) the European Commission has stressed the role of new forms of cooperation among different actors in the Union scenario, and cities have played a big part in redesigning the institutional framework. Still some practices have not been fully analysed, as in the case of cooperation to improve health and quality of life conditions in cities, so making it necessary to advance in this field.

### 3. Knowledge

This keyword is clearly related to the third WHO recommendation and is linked to a wider debate that is present at the European level (for instance in DG SANCO's documents and analysis). Much of the efforts have been directed to improve the knowledge-based capacity of cities in relation to health and quality of life conditions (see, for instance, the impressive work done on the Health Impact Assessment by the Healthy Cities network of the WHO-Regional Office Europe: [http://www.euro.who.int/healthy-cities/phase/20040719\\_1](http://www.euro.who.int/healthy-cities/phase/20040719_1)). In the BHC project the knowledge process has been considered as a process that could be easily adapted to each different context in order to monitor specific situations or to select markers able to address certain policies in a way or another. The result of this ongoing process is a toolkit that will neither substitute nor reproduce any existing instrument but tries to provide a first-step toolkit to influence local policies and actions so to take into account health and quality of life for all citizens.

### 4. A toolkit on urban health indicators

Urban Health Indicators can be used to harmonize criteria on how to measure environmental health issues, to monitor environmental health policies and programmes, to facilitate the systematic exchange of information between countries, to forecast trends, to facilitate the identification of risk factors, to measure the impact and effectiveness of interventions or policies.

Indicators can provide a basis for assessing the impact of a project, a change, a programme within a major urban regeneration plan on health and well being of the citizens in that urban area. They can act as a basis for monitoring and evaluating the effectiveness of a project, a change, a programme within a major urban regeneration plan on reducing health and well being risks on the citizens in that urban area. Indicators can, eventually, provide a template for developing other indicators as needed to address issues of specific local concerns.

Among the different indicators that have been selected from BHC partners, there are some that directly refers to the quality of public spaces, of the urban environment and of living conditions in cities. They have been grouped according to their mainly economic, social or environmental characterization and are presented in the following table. This selection from the bigger toolkit (presented in BHC first thematic report) takes into account that different issues matter in different places and provide a first set of possible measure of the health of our cities.

**Table 1.** Healthy sustainable urban development focusing on economic development, cultural and social cohesion, environmental regeneration

ISSUES	OBJECTIVES	INDICATORS
<i>Economic development</i>		
Living conditions	Reduce/Increase/Maintain the cost of living	Cost of living Cost of households per square metre
<i>Cultural and social cohesion</i>		
Housing	Improve the conditions of homeless Increase/reduce/maintain social homes Reduce the proportion of unfit (housing) stock	Rate of homeless people by ethnic group, gender and age Rate of social homes Rate of homes judged unfit to live in
Leisure time	Increase leisure time Opportunities for all Improve access to recreational opportunities	Level of attractiveness of parks, green areas and playgrounds Level of satisfaction of the cultural activities implemented by season in the area
Access to services	Improve/maintain accessibility to private services	Proximity of shops
Safety	Increase the level of safety	Level of crime Rate of reported domestic violence Self reported level of safety by age, gender and ethnic group
<i>Environmental regeneration</i>		
Air Quality	Reduce air pollution and improve air quality	Contamination per capita
Indoor Air Quality	Improve Indoor Air Quality	Contamination per capita
Noise	Reduce noise	Contamination per capita
Contaminated land	Reduce/treat/isolate contaminated land	Contamination per capita
Radiation	Reduce/isolate radiated area	Contamination per capita
Waste	Promote recycling Reduce generation of waste	Rate of recycled waste per total kg of waste produced Rate of waste produced per capita
Greenhouse gas emissions	Reduce greenhouse gas emissions	Greenhouse gas emission per capita
Energy usage	Reduce energy usage increasing the usage of energy saving materials for new buildings	Used electricity per household/person
Traffic and congestions	Improve choice in transport; improve access to education, jobs leisure and services; and reduce the need to travel by private cars	Road traffic
Parks, green areas and playgrounds	Increase the number of green areas and playgrounds, improve accessibility to parks, playgrounds and green areas.	Green areas square metres per capita Playground square metres per child under 15

## 5.

### More (greener) ideas

The keywords, topics and indicators that have been described above represent possible ways of facing the problem of health and quality of life conditions in cities, but many other concepts and ideas can contribute to enrich the debate and suggest possible solutions. To this extent, BHC cities are aware of the role of sustainability both as a driving concept for the definition of healthy policies and as a goal to be achieved. Sustainability, a holistic word in itself bringing together social, economic, cultural, environmental, political aspects, is a core concept of every development strategy especially when standing for the possibility for all to take part to the life of the city and to make any effort to keep this possible in the future.

Other ideas are enriching the debate and should be taken into account. There is, for instance, a whole set on new experiences that refers to the “green side of life”: whether

it is about green energy, green economy or green revolution tout court it is undeniable that the attention to sustainable development is not only a matter of ethics and/or economics but also of opportunities: see, for instance, the experiences in one of the most deprived areas in New York, where the idea of a green approach to disadvantaged areas brought to “Sustainable South Bronx” (<http://www.ssbx.org>); another interesting idea comes from Sweden, where food labels now give eco-report, to know the carbon footprint of the food production and to influence customers’ habits (<http://www.slv.se/en-gb/>); a different example is given by the Green Gym initiative in the UK (<http://www2.btcv.org.uk/display/greengym>), that combines a healthier lifestyle with shared outdoor activities. These are very different examples whose main role is to show that actions and policies that influence health and quality of life can start from small and local initiatives and be effective, as long as people’s spaces, places and lifestyles are considered.



Building the city,  
creating housing.  
Good practices  
in Europe



## PANDREITJE HOUSING

Author  
**Haverhals Heylen  
Architecten**

Location  
**Bruges**

Year  
**2002**

TEXT BY  
*Francesco Sabatini*



The Pandreitje housing development in Bruges was built on a former prison ground following a design competition calling for high-density and typologically varied projects. It is located in the heart of the city, and serves as a buffer between the touristic core and the residential neighbourhoods. The whole development adds up to approx. 8 610 m<sup>2</sup>.

➤ **PUBLIC HOUSING**

➤ **OPEN URBAN FABRIC**

➤ **PEDESTRIAN ACCESSIBILITY**

The competition was won by the young Antwerp office Haverhals Heylen, mainly due to the area's internal space, which is varied and complex. The building was realized between 1997 and 2002, and hosts a total of 80 dwellings, a large underground parking garage, and commercial spaces.





Contrasting the typical street layout of the existing medieval urban fabric, based on additive growth and not following a predefined urban design, the designers have structured the area with a square geometrical grid of 10x10 m. Residential buildings were placed on this grid, leaving empty spaces in order to achieve a balance between public areas and houses. There is a clear reference to the historical model of the Beguinage, which was composed of a large number of small dwellings grouped around an open public space. Although the dwellings are designed with a large typological variation, each apartment disposes of a private exterior space at the ground floor, designed to serve as extension to the living room.

➤ **HOMOGENEOUS IMAGE**

➤ **VARYING TYPOLOGY**

➤ **UNDERGROUND PARKING SPACES**



## DE LANDTONG

Author

**Frits van Dongen,  
de Architecten Cie**

Location

**Kop van Zuid, Rotterdam**

Year

**1997**

TEXT BY

*Luca Rijtano*

The residential development occupies an entire peninsula in the Kop van Zuid former port in South Rotterdam, an area subjected for decades to vast transformations. The complex is composed of two distinct buildings, one with square layout and a single interior courtyard, the other on a rectangular plan with two courtyards separated by a green plaza. The buildings account for remarkable morphological complexity: they can be split into separate urban fragments, characterized by different architectural languages, nevertheless made homogeneous by the use of red brick, gray windows, and balconies with light gray plaster parapets. Each corner marks a transition in urban and typological conditions. Along the quays to the north, the skyline is broken by towers with different height, producing a urban impression. From inside the garden plaza three of the towers are revealed as the 12-floor cornerblocks of buildings with large south-facing terraces sloping down to five levels on the south



↘ **STREET LEVEL FRONTAGES HOST MIXED ACTIVITIES**

## ↘ MIX OF SOCIAL HOUSING AND PRIVATE DEVELOPMENT

## ↘ ARTICULATED PUBLIC SPACES AT GROUND LEVEL: PLAZA, GARDEN, QUAYS

## ↘ TYPOLOGICAL MIX: 150 APARTMENT LAYOUTS

façade. On this side, the building seems a suburban arrangement of terraced housing on four levels. The east and west end are blocks of respectively 11 floors with commercial spaces at the recessed glass ground level, hosting large apartments with wide openings facing the river and the city center, and 8 levels hosting social housing. The complex, with an overall surface of 100 000 m<sup>2</sup> on 4 ha, comprises



625 apartments with overall 150 different typological solutions, from single-family houses with independent entrance, to maisonettes, penthouses, etc. The interior courtyards have been differentiated as well: the central court is a green public plaza, connecting the two sides of the peninsula; the west court is raised above the parking, with trees at the level of the cars; the two east courts, connected by a portico, host a sports center.



## ↘ VARIATION IN HEIGHT (4 TO 11 FLOORS, 12-33 M) CREATES A DISTINCTIVE MORPHOLOGY

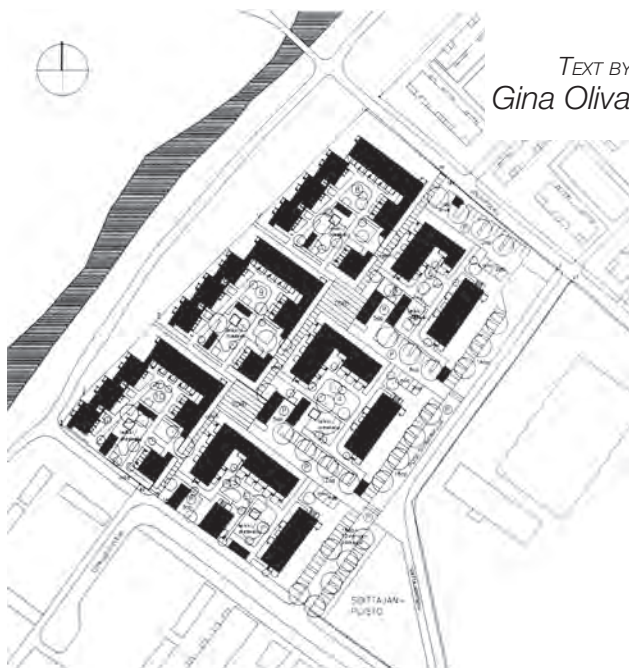
## KANNELNIITTY

Author  
**Arkkiehtitoimisto  
 6B Pekka Heikkinen/  
 Ark-house arkkitehdit  
 Markku Erholtz,  
 Kaisa Tynkkynen**

Location  
**Helsinki**

Year  
**2003**

TEXT BY  
*Gina Oliva*



## ➤ RELATIONSHIP TO NATURAL SITE FEATURES

## ➤ TYPOLOGICAL VARIATION

## ➤ COMMON COURTYARDS

Kannelniitty is located in the western district of Helsinki, near the main roads and infrastructures that, starting from the city center, connect all suburban neighborhoods belonging to the metropolitan area. Kannelniitty is part of the Modern Wooden Town Project, a nationwide program started in 1997 and sponsored by the Finnish government to promote and develop the use of wood in residential architecture and building construction, following the criteria of cultural sustainability. In 1999, an amended town plan was approved for the area converting its destination from school site to residential development.

Architects Pekka Heikkinen and Markku Erholtz with the team of Helsinki City Planning Department designed



## USE OF RENEWABLE MATERIALS: CULTURAL AND ENVIRONMENTAL SUSTAINABILITY

## WELL-CONNECTED, PROTECTED PEDESTRIAN LAYOUT

## MIXED PUBLIC AND PRIVATE DEVELOPMENT

the general masterplan of the area; in 2000 the ATT (Housing Production Department of the City of Helsinki) organized an architectural competition for each residential plot design.

The residential area is at the edge between residential developments from the 1970s on the west side and a wide sports area on the east side near the course of the Mätäjoki river.

The masterplan is organized in six open clusters enclosed by residential buildings, creating courtyards and green spaces connected by a narrow system of pedestrian routes. The residential site is predominantly

flat, yet a more articulated profile is created through a gradient in building height: from 4-storey buildings along the western border (near to the other suburban areas) to 2-storey buildings towards the green area. There is a total of 114 flats of different typologies (block of flats, row houses, linked semi-detached houses), belonging to 3 main housing companies, in order to mix various types of housing tenure (rented + owner occupied) and social derivations. Residential buildings have a wood frame or at least a wooden cladding, except for the 4-storey buildings realized with colored prefabricated concrete panels.



## HOUSING IN CHIADO

Author  
**Álvaro Siza**

Location  
**Lisbon**

Year  
**2005**

TEXT BY  
*Vittorio Sanna*

The building by Portuguese master Álvaro Siza matches a renewed rigor of expressive minimalism with his universal inventiveness.

The building stands as an updated icon of the architect's capacity of making variation on a lifetime's research theme. It is located near the Chiado neighborhood, redesigned by him after the big fire in 1988. The area has a high historical value and is located on a steep slope in the historical centre of the city of Lisbon. The presence of some archeological findings made it as difficult as interesting to design. The architect designed a building made of two parallel blocks, divided by an internal *ilha* that hosts and emphasizes the findings, transforming them in picturesque bits of landscape. The higher block is



↘ **PUBLIC HOUSING**

↘ **RELATIONSHIP  
TO HISTORICAL  
CENTER AND  
ARCHEOLOGICAL  
REMAINS**

↘ **CHARACTER  
ACHIEVED BY USE  
OF TRADITIONAL  
MATERIALS**

↘ **PRIVATE INNER  
GARDEN**

## CONNECTION TO COMPACT URBAN FABRIC

## UNDERGROUND PARKING

carried by sculptural pillars that, together with the findings, forms the inner garden. The façade is made of Portuguese *azulejos* with colors and dimensions that recall the Expo 98 Pavilion and the restoration of the Bouça neighborhood. This solution makes the façades and the entire complex iridescent. It gives a sense of liquidity to those seeing the building when coming from the alleys of the city centre. The housing blocks are divided, or split off, to create vistas and unexpected city views, frames and poetic pictures of Lisbon. The geometry of the balconies and terraces contrasts with the severe two-blocks layout.



## GEMINI RESIDENCE

Author  
**MVRDV**  
with  
**JJW Arkitekter**

Location  
**Islands Brygge, Copenhagen**

Year  
**2005**

TEXT BY  
*Matteo Costanzo*

Everywhere in Europe old harbor areas are being reconverted into high-quality living neighborhoods. Excellent views, waterfronts, proximity to the center and an original character make most of these developments instant successes.

The most wanted apartments in these projects are usually the converted warehouses that combine a modern lifestyle with a touch of character.

The conversion of the Frøsilo in Copenhagen fits into this picture, but can also be considered as a more radical next step. Whereas a warehouse can be seen as a more or less complete building, which should be modestly treated not to lose its original charm, the silos are incomplete, a bare structure. In this incompleteness lies the challenge of the project. In the structural limitations of the silo lies the solution of the intervention.

Making big openings in the concrete rings of the silo is difficult and limited. Making door-high openings is possible but complicated and can only be made in limited



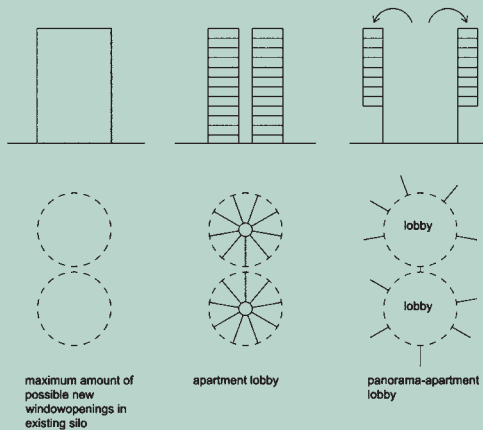
↘ **NATURALLY  
LIT COMMON  
COVERED SPACE**

↘ **PRIVATE  
DEVELOPMENT**



amounts. If there were apartments to be situated in the silos this would mean that in an area where views count, the apartments are inwardly directed.

For a warehouse this might be acceptable, due its monumental status, but in this case it is a missed opportunity. And if you would fill up the silo houses and floors, it would destroy the most exciting aspect of its present state, its emptiness.



By flipping the projected floor inside out, this potential problem is eliminated, and turned to its advantage. Maximum views are possible and maximum flexibility can be achieved. Both cores can be covered with a glazed roof, creating a futuristic lobby where people move up and down. In this way the silo will form a new core for the project and all the usable space, every room, profits from the unique location of the project.

➤ **RECONVERSION  
OF INDUSTRIAL STRUCTURE**

➤ **HARBOR AREA  
REQUALIFICATION**

➤ **PRESERVATION  
OF ORIGINAL CHARACTER**



## PILESTREDET PARK

Author

**GASA Architects,  
Lund+Slaatto Architects AS**

Location

**Oslo**

Year

**2006**

TEXT BY

*Michela Esposito*

Pilestredet Park is the name of the area in Oslo where the University Hospital was situated from 1883 until it moved to new premises in 2000, after which Statsbygg assumed responsibility for the 8,7 ha site. The site was transformed into an eco-friendly residential area in the inner city, containing mainly housing, offices, business activity and educational institutions.

Approximately 1380 apartments were built, marking a transition from small pilot studies to large urban implementation of sustainable building in Norway. Statsbygg and Oslo City Council laid the parameters for the development of Pilestredet Park based on principles for urban ecology. The project's aim was to bring together the best solutions in the field of ecology so that it could emerge as a leading example of sustainable urban design. The goal was to develop methods and solutions that contribute to higher quality urban dwellings and more environment-friendly construction, maintenance and refurbishment, including: energy saving, water savings,

↘ **SUSTAINABLE  
BUILDING SITE**

↘ **EU-FUNDED PILOT  
PROJECT FOR  
RENEWABLE ENERGIES**

↘ **MASTERPLAN  
WITH GUIDELINES  
FOR ENVIRONMENTAL  
QUALITY**

↘ **PROTECTED  
PEDESTRIAN AREAS  
UNDERGROUND PARKING**



## ↘ HIGH-DENSITY DEVELOPMENT ↘ PRESERVATION OF EXISTING NATURAL AND HISTORICAL SITE FEATURES



reuse of materials, waste reduction, avoidance of harmful substances. The goal for heating and electricity use was 100 kWh/m<sup>2</sup> per year, half of the national average and 25% below revised building regulations in Norway.

Waste produced during construction was collected and sorted in containers that were reserved for the different waste fractions. In this way, approximately 75% of the construction waste was recycled.

There was also a strong focus on the reuse of demolition material in new constructions. The environmental properties of construction materials were documented to ensure that the most environmentally responsible materials available were selected.

Great attention has been given to high quality outdoor areas on ground and roofs, reduced run-off water, reduction of noise, dust spreading and vibrations from construction work, leading to an improvement of local climate, good indoor air quality and focusing on pedestrian, bicycle and public transport.



## ↘ DIFFERENTIATION OF INTERIOR COURTYARDS AND GARDENS



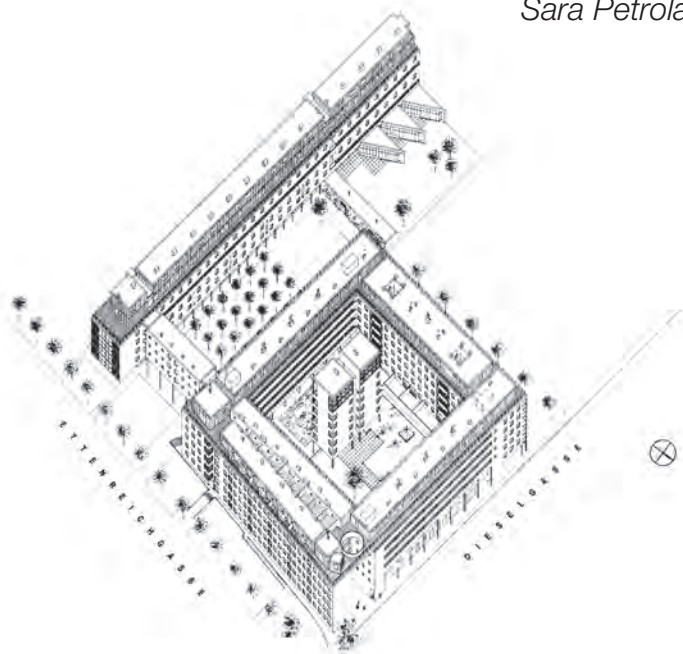
DIESELGASSE RESIDENTIAL  
DEVELOPMENT

Author  
**Martin Kohlbauer**

Location  
**Vienna**

Year  
**1997**

TEXT BY  
*Sara Petrolati*



➤ **PUBLIC HOUSING DEVELOPMENT**

➤ **COMPACT BUILDING FORM  
PERMEABLE GROUND FLOOR**

➤ **T TYPOLOGICAL VARIETY  
FUNCTIONAL MIX**

The Dieselgasse residential development, designed by Martin Kohlbauer, is located in Vienna's 10th district. Its design, which won a competition held in 1993, is inspired by the residential estates of the 1920's, especially Hoffmann's 1925 "Klose-Hof" in Döbling, where the inner court is characterized by the presence of a tower. Kohlbauer's design is composed by a linear slab, connected via a bridge on stilts to a large building hosting two towers in its interior courtyard. The elongated slab is served by three staircases, distributing 25 duplex apartments per level. The courtyard block has four



staircases in the corners and serves the apartments through exterior corridors.

One of the corners also hosts the building's main entrance, which is carved out at all levels and is covered by a roof slab characterized by a large circular opening, creating dramatic light and shadow effects.

This entrance is marked by a rotation of the courtyard block, allowing for an enlargement of the interior space, hosting the corridor and small bridges serving the two-bedroom apartments on either sides.

At the center of the building, a further staircase serves four square-plan apartments at each level.

The linear slab, the courtyard block and the central towers form a single system where 360 apartments are connected to 386 underground parking spaces on two levels, three kindergartens, green areas, commercial spaces and a restaurant at ground floor.

The architect carefully designed a urban-type layout, through the organization of public spaces meant to

improve the overall quality of life. The ground floor plan is meant to be porous, permeable on all sides, with a strong connection with the Salvatorianer Platz, through the introduction of a number of public pedestrian routes. The connection is made more visible by the establishment of a number of interior and exterior "visual markers", capable of producing a strong relationship between dwelling and city.

↘ **UNDERGROUND PARKING**

↘ **GREEN INTERIOR  
COURTYARD**

↘ **PHYSICAL  
AND VISUAL CONNECTION  
TO SURROUNDING  
URBAN FABRIC**



PRÁTER STREET  
SOCIAL HOUSING

Author  
**Kis Péter**  
**Építésműterme**

Location  
**Budapest**

Year  
**2007**

TEXT BY  
*Sara Petrolati*

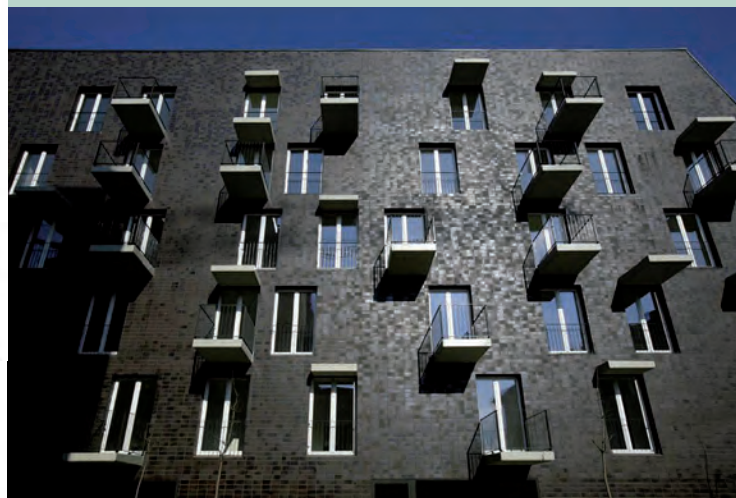
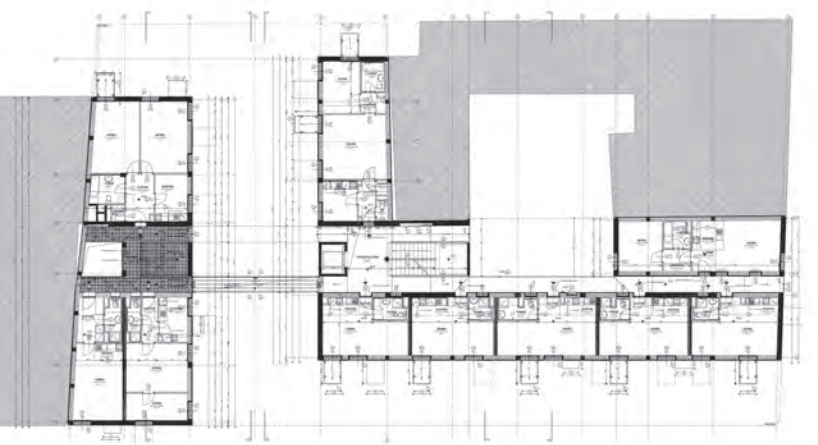
The Práter Street Social Housing complex is the completion of a lot in the south-eastern area of Pest, on the oriental banks of the Danube.

The architects have produced a design intended to mend the severed preexisting urban fabric.

The buildings recreate an interior courtyard, with a smaller inner garden visible from the street, by closing the lot with an L-shaped building, facing the existing facades with new ones.

The two parts are connected by a small suspended bridge, allowing great pedestrian permeability, making of the courtyard an interesting public space.

The two blocks' staggered layout creates an enlargement on the street, capable of becoming a small plaza, leading into the buildings' interior courtyard. The designers' idea was thus that of creating not only an individual residential building, but rather a neighborhood-level public space: the new building had to be annexed to the existing ones.



↘ **PUBLIC/PRIVATE  
INTERIOR GARDEN**

↘ **RELATIONSHIP  
TO EXISTING URBAN FABRIC**

↘ **DISTINCTIVE  
ARCHITECTURAL IMAGE**

↘ **PUBLIC HOUSING**

↘ **ENHANCEMENT OF EXISTING  
PEDESTRIAN ROUTES**

↘ **UNDERGROUND PARKING**

Although composed of two blocks, the use of alternated flat and sloped roofs gives homogeneity to the complex, while the choice of materials and the cantilevered balconies provide a certain sense of distinction.

The design approach included a wide-ranging reflection on the very concept of dwelling, where the public / collective sphere could be synchronized with the individual / family level through the experimentation of a public/private space of new conception.

The L-shaped building uses a single staircase and exterior corridors to serve five apartments of different sizes for each of five levels.

The second building serves three apartments per level, totaling 18. The buildings' functional quality was furthermore coupled with a strict control over the costs related to buildings, maintenance and management.



Author  
**Babled  
Nouvet  
Reynaud**

Location  
**Montreuil,  
Île-de-France**

Year  
**2001**

TEXT BY  
*Carlo Maggini*

The realization of this social housing estate was made possible by a synergy created among the designers and the technical offices of the city of Montreuil, producing an interesting solution. The double shared objective consisted in responding with a design to a certain demand for low-cost social housing, while experimenting with a particular layout, meant as a pilot for the urban renewal of the entire POS. The area is located in a characteristic part of Montreuil called Murs à Pêches, a large terrain still today bearing the traces of its original agricultural history, and surrounded by a suburban landscape dotted by small buildings, defined by a peculiar land fragmentation. From the reading and reinterpretation of this preexisting condition, joined with the decision to ensure a tight relationship between buildings and green spaces, derived the site's wholly original organization, characterized by the permeability of semi-private spaces.

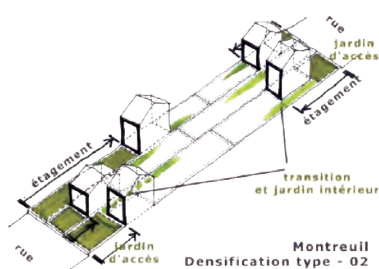
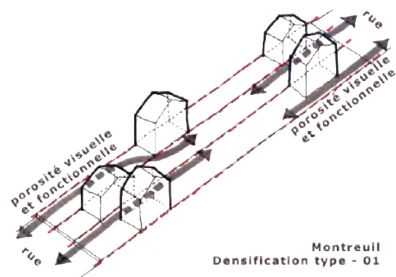


↘ **SOCIAL HOUSING DEVELOPMENT**  
 ↘ **SPONGE-LIKE URBAN FABRIC**  
 ↘ **INTERCONNECTION**  
**AND CONTINUITY OF PEDESTRIAN**  
**PATHWAYS**  
 ↘ **PRESERVATION**  
**OF VISUAL PERMEABILITY**  
 ↘ **REINTERPRETATION OF LOCAL**  
**AGRICULTURAL CHARACTER**  
 ↘ **MORPHOLOGICAL VARIETY**  
**PRODUCES CHARACTERISTIC IMAGE**

The general layout offers the possibility for the densification of building lots through the modification of the individual buildings.

This potential is meant to highlight the existing urban form, with specific reference to the diminutive size of the individual land parcels and the preexisting street network. The design creates a mesh of external spaces delimited by approximately 40 medium-sized dwellings. The dimensional definition of service spaces directly connects the new buildings with the existing urban fabrics, producing a new volumetric balance, readable at various different scales.

Each dwelling is enhanced by a specific localization, so that they can all count on east and west facades, with living rooms opening towards the private patios, and all upper floors are outfitted with exterior spaces such as terraces or balconies.



## FORT PIENC HOUSING

Author

**Conxita Balcells  
Associats**

Location

**Barcelona**

Year

**2007**

TEXT BY

*Tullia Ricciardi*

The project consists in 51 housing units for young people. The demand of this development was clearly expressed in the “Pla d’Habitatge 2004-2010” and it is located in the Eixample District, in an atypical block (“manzana”) of the urban layout of the Eixample, based on the 1859 Pla Cerdà. More than half of the block is occupied by a soccer field, which lies under the street level. This manzana between Sardenya and Marina streets is visibly smaller in comparison to the traditional ones, since Marina street is one the biggest in the Eixample. The building design by Conxita Balcells Associats is formed by two blocks based on a L-shape: one of these follows the line of Ali Bei street, while the other is placed at a 90 degree angle. Thanks to this form the corner of the manzana has been broken, opening a square in front of the entrance to the building, while the façade on the soccer field, given the difference in levels, hosts an underground floor for parking. This arrangement of the two blocks favors cross-ventilation and exposure



to sunlight. Opening the corner of the manzana, thanks to the L-shape of the blocks, the façades of the building, usually considered “interior”, become “exterior” and directly face the public square and the streets. The entrance to each 40 m<sup>2</sup> apartment is served by collective corridors, divided in two bays containing a core set of facilities that can be easily accessed from the common corridors. The apartments facing the soccer field also define a different treatment of the façade, through the use of sliding shadings. The common corridors also use different colors (green, orange) to distinguish the two blocks. One of the main aims of this project has been sustainability: active and passive energy saving measures and management systems are included in the project to improve the comfort of the units in climatic, acoustic, and lighting terms. Each apartment has its own system to produce hot water and individual heating, thanks to the solar panels located on the rooftop.

## CHARACTERIZATION THROUGH COLOR

## COMPLETION OF A URBAN BLOCK

## IMPLEMENTATION OF ENERGY-SAVING TECHNOLOGIES

## PUBLIC HOUSING DEVELOPMENT

## RELATIONSHIP TO URBAN FABRIC AND SITE FEATURES

## UNDERGROUND PARKING



# GREENWICH MILLENNIUM VILLAGE

Author  
**Ralph Erskine**

Location  
**Greenwich, London**

Year  
**1997-ongoing**

TEXT BY  
*Livia De Andreis*

Greenwich Millennium Village is the first of the Millennium Villages implemented in the UK as demonstrations of the most up-to-date sustainability principles at the scales of planning, architecture and building.

A two-stage brief was prepared by English Partnership for the redevelopment of the 14 ha Millennium Village site on the Greenwich Peninsula.

In 1997 an international team led by Ralph Erskine won the competition and prepared a master plan whose key principles are flexibility, mixed use and mixed tenure.

At Greenwich, Erskine merged the British tradition of the “village” with the South-European model of dense urban pattern (public, private and semi-public spaces).

The master plan is structured by the central spine, following the perimeter of the park intersected by radial routes penetrating into the urban mass from perimeter roads and by the public squares located at the junction of the routes. The layout of the urban mass is U-shaped, opening to the river and to the eco-park, which is a core



↘ **MASTER PLAN  
AND IMPLEMENTATION  
OF DESIGN CODE**

↘ **MIXED USE, MIXED TENURE**

↘ **HIGH STANDARD  
FOR ENVIRONMENTAL  
SUSTAINABILITY**

↘ **PRESERVATION  
OF EXISTING NATURAL  
SITE FEATURES**

↘ **REDEVELOPMENT  
OF FORMER INDUSTRIAL SITE**

↘ **EXTENSIVE  
PEDESTRIANISATION**

part of the village. The whole settlement has a strong urban character and is carefully landscaped.

The final master plan was approved in May 1999; four sub phases (666 homes) have been approved to date, with a density below 136 habitable rooms per acre on average, 4500 m<sup>2</sup> of new commercial and retail development and 1770 m<sup>2</sup>

of new community buildings to ensure a mixed use.

The mixed tenure was achieved by specific requirements that up to 20% of the provided housing units were to be allocated for social housing.

Planning conditions included a range of sustainability targets during the life cycle of the project:

80% reduction in primary energy consumption, 30% reduction in water use, 50% reduction in embodied energy, 50% reduction in construction waste and 25% reduction in car usage within 10 years from implementation.



## BERLIN WASSERSTADT

Author

**Klaus Theo Brenner** (Master plan),  
**Klaus Pudritz,**  
**Bernd Paul**

Location

**Berlin**

Year

**1997**

TEXT BY

*Enrico Puccini*

The intervention, called Wasserstadt (Water City) is part of a larger initiative aimed at the reclamation of former industrial sites around Berlin. The master plan was developed by Klaus Theo Brenner, who subsequently collaborated with the individual building designers.

The results of this choral design work is manifested by the full integration of the buildings with the master plan's intentions. The operation's key factor was the relationship with the landscape element represented by the Spree river. The entire settlements seeks, through its morphology, the creation of a compact street front while opening up a visual relationship with the natural elements: notwithstanding the area's depth, all apartments have an opening towards the river.

The development's layout is based on the reinterpretation of Berlin's urban blocks, with an alternation of open and closed fronts, and a variety of architectural articulations in the interior courtyards.

The compactness of the front is here broken, allowing



## MASTER-PLANNED DEVELOPMENT

## LAYOUT CHARACTERIZED BY RELATIONSHIP WITH NATURAL FEATURES

the individual residential units to have a loggia opening towards the interior and the view on the river.

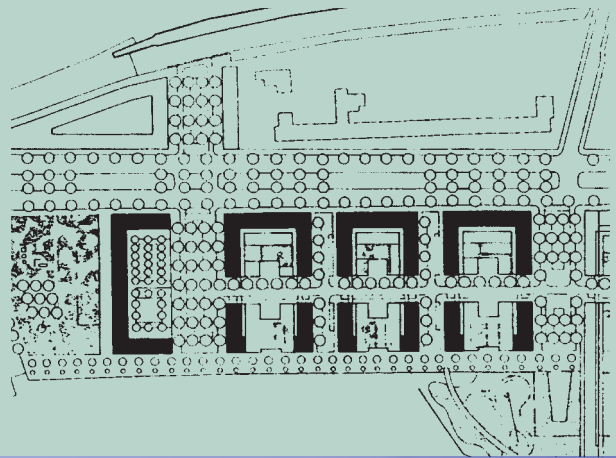
The courtyards are treated as green spaces organized on various levels, with terraces descending towards the waterline, play spaces, etc.

All buildings within the master plan are characterized by a homogeneous treatment using red brick cladding for the exterior facades, a design choice again expressing the continuity with Berlin's building tradition.

The Wasserstadt development hosts approximately 1300 inhabitants in 544 residential units.

## REINTERPRETATION OF BERLIN'S URBAN ARCHITECTURE

## STRONG FOCUS ON PERSPECTIVES AND SIGHTLINES



## SEMI-PRIVATE INTERIOR COURTYARDS



## USE OF TRADITIONAL MATERIALS



## **PART 2**

# Transnational perspectives from Hopus





## 8

# Towards Energy Neutral New Housing Developments

## *Municipal Policy Instruments In The Netherlands*

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The Dutch government has expressed the intention to increase the current energy performance standard of the national building regulations for new buildings (EPC) step by step to an energy neutral level by 2020. In their climate policies, municipalities are preparing to meet this level for new buildings, some of them even earlier. Nevertheless, the possibilities to impose energy performances, higher than laid down at national level, are limited for municipalities: Article 122 of the Dutch Housing Act prohibits municipalities to undertake an act of civil law regarding issues covered by the Dutch Building Decree, e.g. the energy performance standard for new dwellings. National (UKR and SLOK) subsidy schemes for municipalities are financially limited, and not permanently available. Although Dutch municipal authorities can reach a voluntary agreement with developers on a higher EPC for new dwellings, this doesn't alter the fact that outside 'excellent areas' - limited to 13 - they cannot impose an EPC, which surpasses the current standard. This paper investigates, how and by which policy instruments Dutch municipal governments can plan for and realize highly energy efficient new houses, which in some cases lead to surpassing the current EPC. The research was conducted under the framework of the EU URBACT II project HOPUS, focusing on design and sustainability in housing and its regulation through municipal guidance and control. It included a literature and documentary study, three case studies in different municipalities, and open interviews with civil servants and developers (housing associations). All three municipal governments seek to structurally embed energy performance indicators for new dwellings, among others, in climate and/or sustainable building

policies, plans, tenders, and in agreements with housing associations. Nevertheless, performance indicators vary, which may make comparison and monitoring of energy conservation policies on local and national level more difficult. Regional collaboration of municipalities and coherent policies of province, city-region and municipal government in the renewable energy sector may strengthen the regional economy and create new jobs in this sector. Innovative public-private financing together with housing associations or energy companies lies behind area (re)developments, which include energy efficient new houses. By investing in renewable energy technologies and the quality of public space, municipal governments can function as change agents for private investors. Communication and knowledge transfer with developers, businesses and citizens is applied in all three case studies to gain a broad social basis. Moreover, a sustainability tender for several municipal lots, disposed of in building packages and with fixed land prices on Buiksloterham industrial estate (Amsterdam) seems both a promising policy instrument and to offer a legal valid answer to the aforementioned Article 122 dilemma of the Dutch Housing Act. Design criteria in this tender make use of the first two trias energetica steps, which imply the reduction of energy demand and the use of sustainable energy sources. Apart from a focus on the sustainable quality of a design, a focus on a location's identity can belong to the merger of interests in public-private area (re)developments. A location's identity can be shaped or enhanced by renewable energy technologies in building or landscape design, and steered towards by municipal codes, which make use of such technologies in building or landscape design, but leave room for creativity.

## 1.

### Introduction

In 2008, the Dutch housing stock consisted of around 7.000.000 dwellings. For the next years, the Dutch government aims at an annual production of around 70.000 new dwellings, mainly located within or at the borders of large towns and some of it appointed in middle-sized towns that will grow considerably (cf. Todaro et al., 2008a,b). New housing estates will mostly form a mix of social rented houses owned by semi-public housing associations, a major share of owner-occupied, and a minor share of commercial rented houses. New dwellings are introduced e.g. as a function to reduce the environmental burden of a location, such as of an industrial estate within the city (Korthals Altes, Tambach, 2008). "Although the energy performance of newly-built dwellings has improved, the total average energy consumption of dwellings built after January 1<sup>st</sup> 2006 under the current Dutch energy performance standard (EPC of 0,8), and equipped by high-performance gas boilers, is still 20 GJ" (Van de Griendt, 2010 and forthcoming). Therefore, the energy performances of both new dwellings and of the areas, where new developments take place, will be of increasing importance, and adaptation to climate change effects will have its influence on housing design.

The national government has expressed the intention to increase the energy performance standard for new buildings step by step to an energy neutral<sup>1</sup> level

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<sup>1</sup> We define 'energy neutrality' as in Klimaattafel (2008, p. 13), meaning that for the total energy consumption in buildings fossil energy supply is no longer needed.

by 2020 (see section 2). Whereas minimum physical requirements are determined at national level, municipalities have major influence on planning aspects and the architectural appearance of dwellings. Today, municipalities are in the process of formulating high-ambitious local climate policies (cf. Tambach, 2009), which may imply that building regulations based upon the Dutch Building Decree (2003)<sup>2</sup>, in particular the current EPC for new dwellings, need to be surpassed. A barrier for the realization of such aims lies in Article 122 of the Dutch Housing Act (1901) revised in 1991 and 2007, which prohibits municipalities to undertake an act of civil law regarding issues covered by the current Dutch Building Decree (2003), among what the EPC for new dwellings (cf. Hoekstra, Van der Veen, 2008). Although Dutch municipal authorities can reach a voluntary agreement with developers on a higher EPC for new dwellings, this doesn't alter the fact that outside 'excellent areas' (see section 2) they cannot impose an EPC, which surpasses the current standard. In addition, Article 121 of the Dutch Housing Act prohibits municipalities to sharpen Building Decree standards, such as the EPC, in local acts (in Dutch: gemeentelijke verordeningen) (cf. Fieten, 2008). National (UKR an SLOK) subsidy schemes for municipalities are

financially limited and are not permanently available (Tambach et al., 2010).

The research was conducted under the framework of the EU URBACT II project HOPUS, focusing on design and sustainability in housing and its regulation through municipal guidance and control. Carmona (2009) found that design codes focus on urban design principles, aimed at delivering better quality places, for example the requirements for streets, blocks, massing and so forth, but may also cover landscape, architectural and building performance issues such as those aiming to increase energy efficiency. With regard to Dutch national legislation limiting municipalities in their freedom to realize higher energy performance standards, higher than laid down in the current Building Decree (2003), we consider municipalities as problem holder, taking on the role of 'code designer' (cf. Carmona, 2010, p.27). We consider design codes as municipal policy instruments to deliver highly energy efficient new houses and to deliver better quality design and places. The research question in this paper is how and by which policy instruments Dutch municipal governments can plan for and realize highly energy efficient new houses, which in some cases lead to surpassing current (sustainable) building standards, in particular the EPC. The aim of our research was to determine policy approaches and instruments used by Dutch municipal governments to plan and realize highly energy efficient new houses, which may lead to surpassing the current EPC. Three case studies were conducted, including a literature and documentary study, as well as open interviews with civil servants at municipal housing and development departments, and developers (housing associations).

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<sup>2</sup> In the Netherlands, the national Housing Act (1901) poses technical building requirements to all buildings, and the connected national Building Decree (2003) contains technical building regulations for both new and existing buildings, for different building functions, and includes minimum requirements in the field of safety, health, usability, energy efficiency and the environment. The latter field is not yet filled in the current decree (2003).

All three municipal governments seek to structurally embed energy performance indicators for new dwellings, among others, in climate and/or sustainable building policies, plans, tenders, and in agreements with housing associations. Nevertheless, performance indicators vary, which may make comparison and monitoring of energy conservation policies on local and national level more difficult. Regional collaboration of municipalities and coherent policies of province, city-region and municipal government in the renewable energy sector may strengthen the regional economy and create new jobs in this sector. Innovative public-private financing together with housing associations or energy companies lies behind area (re)developments, which include energy efficient new houses. By investing in renewable energy technologies and the quality of public space, municipal governments can function as change agents for private investors. Communication and knowledge transfer with developers, businesses and citizens is applied in all three case studies to gain a broad social basis.

The case studies also suggest that apart from a focus on the sustainable quality of a design, a focus on a location's identity can belong to the merger of interests in public-private area (re)developments. A location's identity can be shaped or enhanced by renewable energy technologies in building or landscape design, and steered towards by municipal codes, which make use of such technologies in building or landscape design, but leave room for creativity. Moreover, a tender on sustainability for several municipal lots, disposed of in building packages and fixed land prices on Buijsloterham industrial estate (Amsterdam) seems both

a promising policy instrument and to offer a legal valid answer to the aforementioned Article 122 dilemma of the Dutch Housing Act. Design criteria in this tender make use of the first two of the three distinctive steps of the sustainable design method 'Trias Energetica' (Duijvestein, 1997)<sup>3</sup>:

1. Reduce the energy demand, by taking energy saving technologies;
2. Use sustainable energy sources as much as possible;
3. If there is still an energy demand left, use fossil fuels as efficient as possible.

This is in line with Carmona's (2009) findings, which suggest that in regulating future urban development, design coding 'does not stifle the potential for creativity and value generation, and may even enhance these critical contributions to place-making'. Section 2 presents the Dutch government's energy policy for new dwellings, and important agreements on the energy performance of new dwellings. Section 3 describes the case study results by treating the approaches and instruments applied by three municipal governments to plan for and realize highly energy efficient new houses. Section 4 provides a brief summary with conclusions.

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<sup>3</sup> Design strategy, which follows three steps to achieve a sustainable energy supply, to reduce the dependence on fossil fuels, and save the environment. The notion of 'Trias Energetica' was first introduced in 1996 by Novem (E. Lysen), but was further developed by TU Delft (C.A.J. Duijvestein).

## 2.

### Dutch national policy: towards energy neutral new housing developments

Since 2007, Dutch policies and plans seek to respond to the need to reduce the use of fossil energy in the built environment, among what the Energy Transition Plan PeGO (2007), of which transition management is the plan's main strategy, organized by coupling research and innovation to the realization of large-scale demonstration projects and to scaling up. 'Leaders among research institutes, municipalities, principals in the construction and the supply industry will form the transition groups' (PeGO, 2007, p. 42). The plan aims at an 80% reduction of fossil fuel consumption in all buildings by 2050, compared to 1990 levels, and at the realization of 80 large-scale demonstration projects (2008-2012) with rising ambition levels of 45%, 60% and 80% CO<sub>2</sub>-reduction in three consecutive cycles.

The Dutch government has expressed the intention to increase the energy performance standard for new dwellings (home construction) to an energy neutral level by 2020 (MVROM, 2007). To reach this aim, their current Dutch Energy Performance Coefficient (EPC = 0,8) will be sharpened by 25% in 2011 and by 50% in 2015, and the Dutch government has signed the following agreements<sup>4</sup>:

- Climate Agreement (2007) with the Association of Dutch Municipalities (VNG), which also aims at dwellings' energy consumption to be reduced by more than 50% and at all municipal purchases to become sustainable by 2015, among other things.
- Spring Agreement (2008) with branch organizations construction industry (Bouwend Nederland), project developers (NEPROM) & developers and building contractors (NVB), which also aims at a reduction of the standardized energy consumption in the entire new production (housing, commercial and industrial buildings)<sup>5</sup> of 25% by 2011 and 50% by 2015, and at the development of a new energy performance norm, which better fits in with actual energy consumption and with consumers' experience (comfort and housing costs). 10 areas will be selected to experiment with highly energy-efficient new developments (at least surpassing the Spring Agreement's ambitions by 25%) on large scale (including 5-10% of the total annual new building production), among other things.

The first UKR subsidy tender 'Towards energy-neutral housing' (2008), based on the Dutch 'Regulation for Unique Chances' (UKR), a driver behind transition experiments and demonstration projects (cf. Tambach et al., 2010), granted up to € 500.000 to municipalities, housing associations or project developers for highly energy efficient housing projects comprising at least 50

<sup>4</sup> Beside these two agreements, the Dutch government signed the Energy Saving Covenant Housing Associations (2008) with the branch organisation of Dutch housing associations (Aedes) subscribing to reduction aims of the Spring Agreement, and with Woonbond, the federation for Dutch tenants and tenant organizations.

<sup>5</sup> Compared to the building-related energy consumption in buildings, built under 2007 building regulation and under scope of Dutch energy performance norm 'EPN'.

dwellings, and a reduction of at least 45% CO<sub>2</sub>-emissions on the total energy consumption<sup>6</sup>, compared to 1990 levels. New housing projects needed to achieve an EPC of less than 0,55. The tender intended to come to concepts, suitable for extensive upscaling and further energy saving (SenterNovem, 2009a), and was open for proposals for several months in 2008. The SLOK subsidy scheme succeeded the BANS climate subsidy scheme<sup>7</sup> and runs from 2008 until 2013. It is introduced to stimulate municipalities and provinces to undertake structural activities and measures and aims at the reduction of greenhouse gas (GHG) emissions by reducing project costs for personnel, research, communication, and education among other things. Municipal projects have to meet programme performance targets in the reduction of GHGs, per building type, and preconditions to strengthen organizations (see also Tambach et al., 2010). A first application period was organized from July 2008 until September 2009.

In addition, municipalities can now apply for grants, stemming from the 2008 Spring Agreement, up to € 300.000 per project for extra process and support costs (Van der Laan, 2009a). Up to 13 projects will be appointed as 'excellent areas' by the Minister of Housing, Communities and Integration, in which municipalities and market parties can experiment in building highly energy efficient and innovative new houses. A project

needs to contain new dwellings with an EPC, which surpasses the current standard: e.g. by at least 25%, if building works start before January 1<sup>st</sup>, 2011. First projects must start on December, 31<sup>st</sup>, 2011 at the latest. Municipalities must work together with developing parties, and in the excellent areas, they are allowed to enforce a higher than current EPC, upon which they have agreed with developing parties. Therefore, the way in which compliance (by developing parties) and enforcement of a higher EPC standard (by municipalities) is regulated is a further selection criterion. In addition, projects need to entail at least 1500 new dwellings (Van der Laan, 2009b), and have a learning effect for other areas. Innovations and renewals may be in the field of technology, organization or applied (e.g. economic) instruments. Experiences will be gathered and spread via a knowledge and learning route.

Beside the aforementioned energy policy for new dwelling's, energy makes part of sustainable building policy, formulated in the policy letter sustainable building of April, 16<sup>th</sup>, 2002, and covering three spearheads: energy, materials and health. Sustainable building and renovation are also included in the 2008 Dutch cabinet's approach for sustainable development (MVRM, 2008). With regard to sustainable building and renovation, the aim is to make buildings and urban development sustainable, by innovation in new-construction processes and the renovation of existing buildings. By 2020, all new developments must be energy neutral. Nevertheless, the Article 122 Housing Act prohibition for municipalities to impose an energy performance standard for new dwellings surpassing the current standard remains into force.

<sup>6</sup> Inclusive of household consumption. Source: SenterNovem, 2008.

<sup>7</sup> In the first BANS ('bestuursakkoord nieuwe stijl') climate covenant (1999), national and local governments agreed to dedicate themselves to reduce CO<sub>2</sub>-emissions.

### 3.

## Case study results

This section presents the policy instruments used and developed by the municipal governments of Heerlen, Amsterdam and Almere to develop highly energy efficient new housing projects, which in some cases lead to surpassing national sustainable building regulation, in particular the EPC. The pallet of municipal instruments is neither complete, nor can it be considered a panacea for surpassing national building regulation, but reflects local trends, unique to the Dutch context.

### 3.1

## New complex 'Gen Coel' as part of the Mine Water Project (Heerlen)

### Climate Policy Heerlen

In the 'Climate Policy Plan Heerlen 2004-2010', the Municipality of Heerlen intends to take responsibility in the climate change problemacy, and to work on the identity of the city. In Heerlen's philosophy, "energy first needs to become a familiar phenomenon, before people can become aware of the true value of energy (...). Starting from this point, one can start working towards a behavioural change in the field of energy saving and investments in renewable energy" (Municipality of Heerlen, 2004, p. 5).

In the first BANS ('bestuursakkoord nieuwe stijl') climate covenant (1999), national and local governments agreed to dedicate themselves to reduce CO<sub>2</sub>-emissions. Heerlen applied for BANS subsidy to cover costs of activities, contributing to the covenant's aim. Its cli-

mate policy plan (2004) makes use of the 'performance card for municipalities' of the BANS subsidy scheme with 6 themes and 3 ambition-levels. For new housing projects, the following ambitions were formulated: 'front-running', by applying an EPL of at least 7.0 in housing projects with more than 250 dwellings, and to realize a sharpening of the EPC with 10 to 15 % for the construction of new housing (Municipality of Heerlen, 2004, p. 21). In addition, the ambition-levels 'innovative' and 'active' were worked out, the latter also including an energy vision, to be integrated in a development plan ('bestemmingsplan') for housing projects with more than 250 dwellings.

Today (2009), Heerlen aims at the realization of climate neutral dwellings from 2011 onwards, and intends to come to new agreements with housing associations on dwellings' energy consumption: for newly-built dwellings the municipality aims to achieve an A-label (Dutch buildings' energy certificates range from A- to G-labels). Together with housing associations, the municipality will investigate how climate- and energy targets can be achieved and will take the initiative to draw up a new plan, which is expected in 2010 (Municipality of Heerlen, 2009).

### Parkstad Limburg's mining history and its cooperating and communicating municipalities

From 1800 to 1975, the winning and production of energy in the form of coal has formed the city of Heerlen. But at the end of the sixties, the mines were closed, ushering in the energy transition from coal to natural gas. Today, the socio-economic consequences of these closures are still palpable. Parkstad Limburg, a

'WGR<sup>8</sup>-plus region' and collaboration of 7 municipalities, faces the problem of a shrinking population - restructuring has become preferable to new housing. It obtained a key role in the field of sustainable energy in the Province of Limburg's plans to boost the regional economy and create new jobs. Its municipalities successfully cooperate on demonstration projects and on knowledge transfer towards organizations and citizens. To gain a broad social basis among citizens for the Mine Water Project, a first meeting with former mineworkers was held in 2004 by the municipality. The idea of reusing the mines evoked enthusiasm among Heerlen's population, among what former mine workers, and public and private parties, also in other municipalities in the region.

### Gen Coel as part of the Mine Water Project

One of Heerlen's international demonstration projects is the Mine Water Project (Interreg IIIB), which Heerlen executed together with Midlothian (Scotland). The Municipality of Heerlen invested in drilling five wells to subtract mine water from mine galleries up to 700 metres below the Heerlen surface: it finances the primary net (wells, main transport pipes, certain pumps, etc.) for delivering a half-fabricate. In this sense, the municipality

<sup>8</sup> City-regions (WGR plus-regions), are based on a so-called 'Joint Arrangements Act plus' and consist of a large city with surrounding municipalities, forming part of the same daily urban system. City-regions have several areas of responsibility within the field of transport, housing, the environment and the regional economy, and its budgets are considerable, although not comparable to the size of the budgets of large cities or of provincial budgets. Source: OECD, 2008.

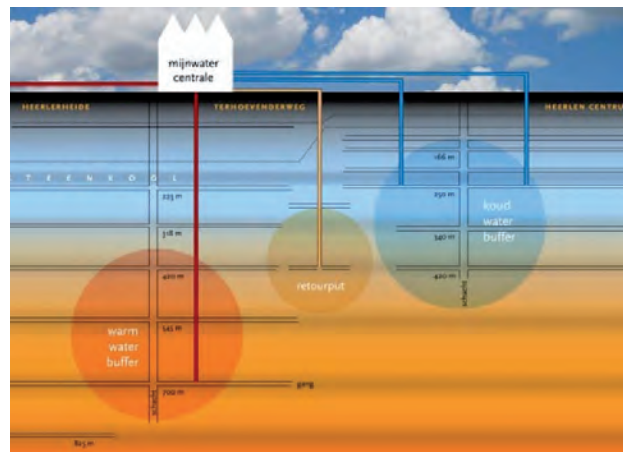


Figure 1. Mine water power station deriving hot water from deep layers and cold water from less deep layers.

Source: [www.heerlen.nl/smartsite.dws?id=39949](http://www.heerlen.nl/smartsite.dws?id=39949)

functioned as 'change agent' (cf. Van Hal, 2000), giving the good example by re-investing in the mines for the use of renewable energy. Housing association Weller invested in the construction of a mine water power station (Figure 1) for upgrading heat and cold (to useful heat, cold, and hot tap water for end-users) and became owner. It invested in the main installations, such as the great heat-pumps, the central-heating boilers, and the secondary and tertiary net.

The cultural centre with the mine water power station (Figures 2 and 3) functions as landmark (Lynch, 1960) and 'brand' for Heerlerheide Centre, accentuating the 'genius loci' and creating a new identity or 'sense of place' by referring to the cooling towers of the mine history, and by its valuable public spaces for pedestrians. The energy station is used to heat and cool about 200



Figures 2 and 3. Left: 'Gen Coel' on the right with public square in Heerlerheide Centre, the Netherlands. Source: adapted from Weller. Right: New complex 'Gen Coel'. Source: [www.heerlen.nl/smartsite.dws?id=39949](http://www.heerlen.nl/smartsite.dws?id=39949)

dwellings, shops, a supermarket, a library, a district office and community centre.

The EC CONCERTOII project REMINING-Lowex (2007-2012) intends to develop sustainable communities in mining and former mining areas with a transition to renewable energy by using water of abandoned mines in combination with other local renewable sources for heating (LTH or 'low temperature heating') and cooling (HTC or 'high temperature cooling') of buildings.

### **Integral system approach for the total built environment**

The Lowex-approach for the Mine Water Project Heerlen is based on balancing the supply side of RES (mine water, biomass and solar energy) with the demand side (buildings, suitable for the use of low-valued energy, meaning LTH and HTC) on the basis of low exergy principles with an integral system approach for the to-

tal built environment. There are three grids: a primary (municipal) distribution grid runs from the wells to the energy station, which is connected to the secondary grid for heat and cold delivery. Finally a tertiary net runs in the buildings. The primary distribution grid connects the wells and the districts Heerlerheide Centre, Maankwartier, possibly the Campus area (Arcus, HS Zuyd, OU), as well as the old and new office of 'Statistics Netherlands' (CBS) and the existing ABP office. The programme for Heerlerheide Centre exists of 312 apartments, commercial buildings, public and cultural buildings, health care and educational buildings, and an energy station. The programme for the Maankwartier district includes 110 apartments, commercial buildings, hotels and offices (Op 't Veld, Roijen, 2009). The Municipality of Heerlen will establish Corio Energy NV, the mine water production company. Weller Energie BV is the name of the exploitation company. Calculations

indicate that mine water energy rates will not exceed those of traditional energy sources.

### **Making buildings suitable for mine water: surpassing national building regulations**

According to Op 't Veld and Roijen (2009) extra conditions, surpassing national building regulations, needed to be set up “to make a building mine water /lowex proof”, among what “extra thermal insulation (but not to passive house standard) with transmission value  $U < 0.25$  for the building envelope ( $U_{\text{envelope}} = 0.37$  in Dutch building regulations), and  $U < 1.2$  for glazing ( $U_{\text{glazing}} = 3.0$  in Dutch building regulations); demand controlled mechanical ventilation and heat recovery system with an energy efficiency of 95% (no system requirements for ventilation in Dutch building regulations); air-tightness  $n_{50} < 1$  ( $n_{50} = 3$  in Dutch building regulations); an emission system by floor heating (LTH) and cooling (HTC), whereas Dutch building regulations don't pose any requirements for the emission system; and an EPC for dwellings of 0,5 instead of 0,8. Low-temperature floor heating and floor cooling for dwellings creates comfortable, constant indoor climate” (Op't Veld, Roijen 2009).

### **Open business model**

An open business model with a clear financial forecast would appoint the economic and energetic return of the system, as stated by Op t'Veld and Roijen (2009).

## **3.2**

### **Redevelopment of industrial estate Buiksloterham (Amsterdam)**

#### **Climate Policy Amsterdam**

Amsterdam aims at a 40% reduction of CO<sub>2</sub> emissions by 2025 (compared to 1990). Over the coming years, Amsterdam aims to focus on climate and energy, but doesn't intend to neglect other environmental aspects. The city council has decided that starting from 2015, all new dwellings and commercial and industrial buildings need to be built 'climate neutral'. Amsterdam's climate policy is laid down in the Air Quality Action Plan (Actieplan Luchtkwaliteit), the Climate Vision and the programme 'New Amsterdam Climate', which intends to implement climate policy aims in plans and in the municipal organization, but also offers a framework for public-private cooperation. To provide the necessary support, the Amsterdam Climate Office has been established, and to implement 'New Amsterdam' Climate', the municipality established a 'Climate Table' to set up sustainable, public-private alliances. As a first result of the climate table, ABN AMRO, Cisco, Amsterdam Chamber of Commerce, Koninklijke BAM Groep, KPN, MKB-Amsterdam, Nuon, PricewaterhouseCoopers and the Municipality of Amsterdam agreed to carry out a joint study, on how the Buiksloterham area can be developed 'as CO<sub>2</sub> neutral as possible' (Nuon, 2008). On September 10<sup>th</sup> 2008, the city council decided positively on a municipal policy note 'Sustainability in new buildings' which distinguishes two ambition levels (Municipality of Amsterdam, 2009, p.2): (1) 'climate neutral': all energy for heating, cooling, tap water and all building-

related electricity-use will be saved or renewably generated 'on location' without the use of fossil fuels; (2) 'half climate neutral': half of all building-related energy is saved or renewably generated 'on location'. As rule for area-bound energy performances, the municipality uses EPL<sup>9</sup>: whereas climate neutral means an EPL-score between 9 and 9.5, half climate neutral means an EPL-score of 8. For building-related energy performances, the Passivhouse method needs to be applied: a dwelling is climate neutral, if the standardized primary energy consumption for heating and cooling is 15 kWh/m<sup>2</sup> to the maximum (Municipality of Amsterdam, 2009a).

### Municipal set of instruments

A working group of the municipality's climate office, its environment and building inspection department, as well as its development corporation has made the aforementioned climate ambitions more explicit. For dwellings, the following set of instruments is developed (the use of this set depends on the specific circumstances in the projects) (Municipality of Amsterdam, 2009a):

- **Technical (energy saving) measures.** The municipal environment and building inspection department has developed a calculation model, which shows, how climate neutral building can be achieved

by a proven set of measures and extra costs: two variants, following the 'trias energetica' have been worked out for stacked apartments in Amsterdam: one making use of city heat and solar energy, the other making use of Passive house building combined with heat-and-cold-storage.

- **Financial feasibility and financing system.** Climate neutral building of stacked apartments in Amsterdam seems to be financially possible (Municipality of Amsterdam, 2009a, p.1) with around € 13.000 additional costs, an investment expected to be paid back via the energy bill. Financing solutions for both rental and owner-occupied sector will be developed.
- **Selection of market parties (procedural instrument).** The municipal development corporation has developed a procedure, in which sustainability plays a role in the selection of market parties and in the allocation of building packages, and which fits in with the European tendering regulation. The intention is to 'root' this starting point more structurally in 'Policy rules for selection processes for real estate development', in which sustainability must weigh substantially, respectively significantly, in the selection of market agents and in granting projects (Municipality of Amsterdam, 2009a, p.5). The extent to which sustainability will weigh in the selection and granting procedure, as well as the exact criteria will be determined per project. Buiksloterham functions as a pilot, and results of the tendering process will be evaluated, and the developed rules will be tested on usefulness and applicability for other Amsterdam' projects. The precise criteria will be laid down in a 'Manual for the selection of market parties' (Municipality of Amsterdam, 2009a, p.5).

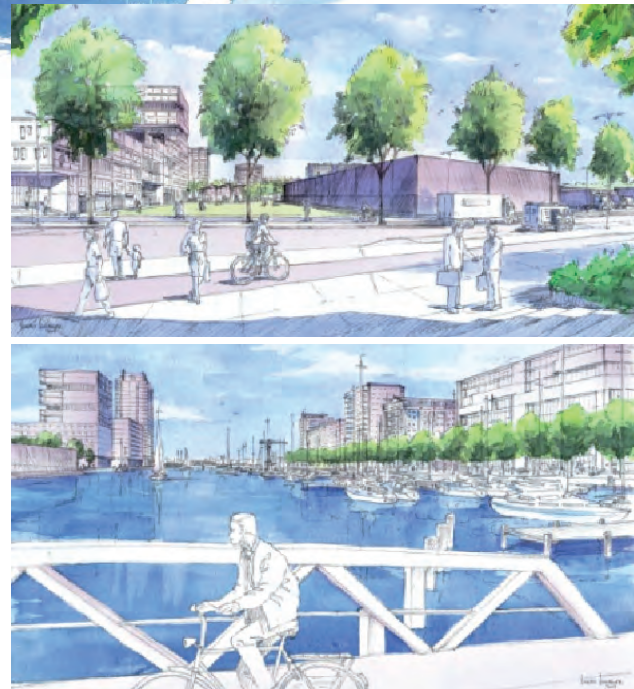
<sup>9</sup> EPL (Energy Performance on Location) is a measure (with maximum score of 10) for the energy quality of an entire building location, including the energy supply for or in this location (SenterNovem, 2009b), and used as communication instrument and calculation method by the municipal government - and other local parties - to support the realization of a reduction of fossil fuel consumption and in their decision-making processes in choosing an optimal energy infrastructure. EPL is also used in the aforementioned BANS subsidy scheme.

- **Energy visions (policy instrument).** The Amsterdam Plaberum (Plan- en besluitvormingsproces ruimtelijke maatregelen) obliges project owners (urban project groups and districts) to draw up an 'energy vision' in the research phase (Municipality of Amsterdam, 2009a, p. 5). The municipality will organize expert meetings, in which the consequences of climate neutral building on urban development will be mapped. This is intended (together with housing associations and districts) to result in a manual with building blocks, criteria and a procedure for making energy visions.
- **Pilot Buksloterham to become climate neutral area.** Buksloterham is undergoing a gradual transformation from an industrial estate to a mixed-use urban area. Around 2.000 dwellings will be realised by 2015, of what 30% social housing. The municipality intends to invest largely in the quality of the area's public space. Industrial noise is an important barrier to the development of housing, and for this the municipality needs to communicate well with the industries involved to downsize noise nuisance (cf. Korthals Altes, Tambach, 2008). The municipality owns 75% of the Buksloterham area, mostly bare ownership, and is acquiring land and rights of emphyteusis, an enduring title, comparable in some aspects to freehold with a restrictive covenant that may be assigned to private agents. The land is disposed of in 'building packages' with a specific redevelopment programme for larger lots, to give market agents more scope for optimizing functions within each lot (Korthals Altes, Tambach, 2008). The ambition is to develop Buksloterham climate neutral. UKR subsidy was granted to a housing association for a new housing development.
- **Sustainability tender: unique in the Netherlands.** As the enforcement of an EPC, which surpasses national regulation, is prohibited for municipalities by Article 122 of the Dutch Housing Act, the Municipality of Amsterdam has put out a first public 'sustainability tender' for 5 lots, in which the municipality selects developers on sustainability criteria, with a fixed land price by the municipality. Per lot, the developer with the 'most sustainable plan' is selected on the basis of the GPR@gebouw-score 4.0 to measure 'sustainable building', and the Amsterdam 'calculation table climate neutral building', to measure 'climate neutral building'. The latter includes an EPL-score as selection criterion, but also 'stepping stones' for climate neutral building (with scores), including energy saving measures for heating, cooling, tap water and electricity, sustainable heat/cold, renewably generated electricity on location. The scoring system for climate neutral building supports the execution of only the first two steps in the trias energetica: eg. by the integration of PV panels in building design, developers can both obtain a higher score on climate neutral building, and achieve a more innovative design. GPR@gebouw 4.0 is a communicative performance instrument and label with a 10-point rating scale for buildings to calculate their environmental burden. It is used by civil servants, architects, developers and housing associations to formulate ambitions in the field of energy, environment, health, usage quality, and future value, and also supports integrated design approaches. For every field, the highest score is 10.



Figure 4. Artist impression Buiksloterham area after redevelopment. Source: Projectbureau Noordwaarts, 2009.

■ **The tendering procedure.** The selection procedure of the sustainability tender includes one public and one nonpublic round, and tenderers have to sign for the entire course of the selection process (cf. Municipality of Amsterdam, 2009c). Prior to the tender, developers are provided all necessary background information, among what the policy note ‘Sustainability in new buildings’, which includes the climate ambitions for both city and for Buiksloterham, definitions in the field of sustainability (Municipality of Amsterdam, 2008), building packages including a ‘sustainability paragraph’<sup>10</sup>, and an entry (tendering) brochure with the legal protocol, among other things. The artist impression (Figure 4) makes part of the preselection and definite selection brochure for tenderers. Figures 5



Figures 5 and 6. Distelweg after redevelopment. Source: Projectbureau Noordwaarts, 2009. Ridderspoorweg after redevelopment. Source: Projectbureau Noordwaarts, 2009.

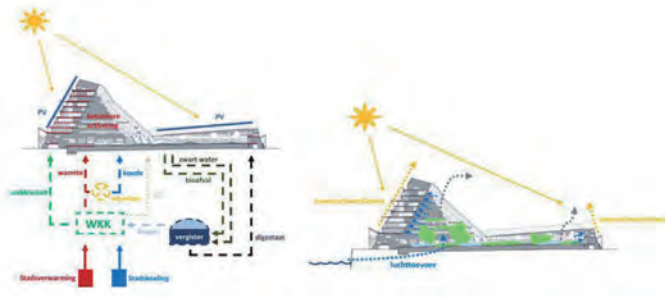
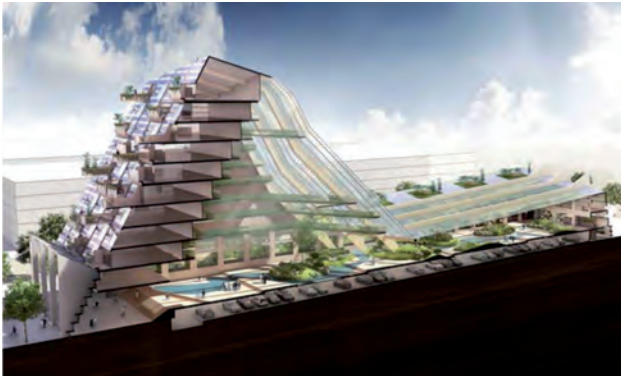
<sup>10</sup> Including requirements in the field of energy saving, sustainable energy generation, waste, use of materials, at least 30% plants and trees per lot, and flexible use of space, by referring to GPR@gebouw and the aforementioned calculation table.

and 6 further presents the way in which the municipality envisaged the area's future with quality public spaces and green and water elements.

Preselection is based upon a public tender on the basis of the entry brochure. Preselection criteria are (1) a 'general vision on sustainability' (philosophy of the company, experience in the field of sustainable project development) as well as a 'vision on sustainability in Buikslooterham' (ambition in the field of project development, technology, consumer: occupant/entrepreneur, future value), (2) the company profile, and (3) the financial situation of the developer. Per lot, a jury selects the (maximum) four most promising tenderers. Preselected tenderers participate in a nonpublic second round, in which they submit their building plans (designs) for definitive selection, and an evaluation on sustainability aspects (SenterNovem, 2009b), which must consist of a proposal for a 'quality score' in the field of 'sustainable building' and 'climate neutral building' with a corresponding design proposal. To calculate the 'quality score' of the building package, tenderers must use GPR@gebouw 4.0 for 'sustainable building, and the 'calculation table climate neutral building', including EPL. Together, both quality scores form the 'score in the field of sustainability', which weighs the highest in the definitive selection. Moreover, plans are assessed on the architectural/urban development translation of 'sustainability' in the design and on consistency and coherence with the vision on sustainability, submitted in the preselection phase. Both the 'score in the field of sustainability', and the 'design score' form the definitive score of the plan. The plan with the highest score is nominated by the selection committee (Municipality of Amsterdam, 2009 a,b,c).

Often, the best plan is selected by an EMAT (Economically Most Advantageous Tender) norm (scoring), in which normally the provider of the best price/quality ratio is chosen (SenterNovem, 2009b). But in this case, 'quality' is what counts with sustainable building, climate neutral building, consistency with the vision on sustainability, and the architectural/urban development translation of 'sustainability' in the design as final selection criteria. The land price is fixed, and building costs of dwellings and business accommodations and the future exploitation are paid by and for the risk of the developer. The selection committee has recently selected four winners of the sustainability tender, mainly small developers, cooperating with small architectural firms, and with innovative, climate neutral designs (cf. Van Poelgeest, 2010).

Kroese et al. (2009) found that small architectural design firms are often excluded from Dutch tenders for public buildings, commissioned by municipalities, which tend to interpret the European Directive for tendering architectural services too strict by giving priority in preselections to financial turnovers of these design firms. Our findings suggest that by laying the emphasis in preselections more on a firm's general and site-specific vision on sustainability and more on the sustainable quality of the design in the definitive selection of tenders, those stalemates can be overcome. One of the winning designs is projected on a lot, on which at least 35% up to 70% dwellings, as well as at least 30% businesses must be realized, with PV panels, city heat and cooling is presented in Figures 7 to 9. This mixed-use building plan has an average GPR-score of 9.37. The new blocks of flats have 9 for energy, 9.9 for health, 9.8 for future value, 9.7 for usage quality and 8.8 for environment.



Figures 7 to 9. Design 'De Kameel van Noord' by: Heddes Vastgoed, op ten noort blijdenstein architecten en adviseurs, Deerns raadgevende Ingenieurs. Source: Municipality of Amsterdam, Noordwaarts.

### 3.3

## Solar island, Almere

### Local climate policy Almere

Since the 1970's, Almere has committed itself to a programme of sustainable development (Crrescendo, 2007). Almere's policy note 'sustainable new living environments' (1997) and the letter of intent Sustainable Building Flevoland (1998) laid down the minimum level for sustainable house-building, among what a 10% lower EPC standard than required by the Building Decree at that time (Municipality of Almere, 2003). Almere's commitment for a sustainable development of the city is continued in its Environment Plan 2003-2007, which aims at 20% CO<sub>2</sub> reduction within 6 years, 25% sustainable energy for housing by 2010 and the inclusion of a large scale wind energy network (Crrescendo, 2007). Today, the municipality aims at an ecological, economical and socially sustainable development of Almere by 2030. To realize this aim, the 'Almere Principles' were formulated, based on the Hannover Principles by William McDonough Architects (1992) (DLG, 2009, 18). In short and simplified:

1. diversity – as characteristic of robust ecological, social and economic systems
2. connect place and context - make identity stronger
3. combine city and nature - increase human bond with nature
4. anticipate on change – include flexibility in plans and programmes
5. keep innovating – in processes, technologies, infrastructures

6. *design healthy systems – ‘cradle to cradle’* (McDonough, Braungart, 2002) *in urban systems*
7. *people make the city – citizens are driving forces behind the making, preserving the city and making it more sustainable.*

### Design healthy systems: Solar Island

Solar island (Figure 10) has a surface of 15.000 m<sup>2</sup> with around 7.000 m<sup>2</sup> solar collectors heating water, which is pumped into the city heat net, which supplies 2.700 dwellings of heating and hot tap water. With the new solar island, the municipality of Almere intends to create a new icon and entry to the Noorderplassen-West district. In 1997 the municipality put out a tender for the integral energy supply of the Noorderplassen-West district. Requirements were a minimum CO<sub>2</sub> reduction of 30%, an EPC-sharpening by 10%, and energy to be sustainably generated for 10%. The tender by Nuon (1998) was selected as the best, including a proposal to connect the district to the existing city heat net of Almere Stad with collective solar collectors to renewably generate part of the city heat.

The final contract was signed in 2008 by the municipal authorities of Almere and Nuon. Nuon Warmte will build an oval island covered by solar collectors, generating 9.750 GJ per year, 10% of the total yearly energy demand of 2.700 new dwellings. 90% of this demand will be supplied by a power plant's waste heat nearby. Energy is generated by a heat power plant and by solar island, bundled by a heat transmission station, and distributed via a district heating grid to the households (tap water). Solar island is public-privately financed:

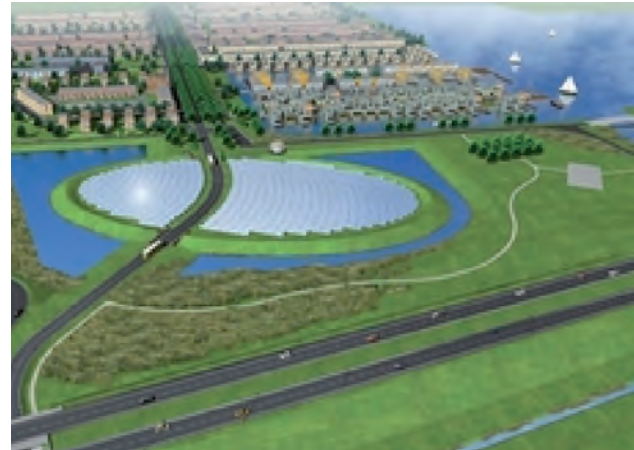


Figure 10. Artist impression solar island.

Source: [www.almere.nl/de\\_stad/stadsdelen/stadsdelen\\_content/\\_rp\\_kolom1-1\\_elementId/1\\_546753](http://www.almere.nl/de_stad/stadsdelen/stadsdelen_content/_rp_kolom1-1_elementId/1_546753)

about half of the costs are beard by Nuon, about 1/3 by EU subsidy, and about 1/6 by some buyers of private lots and of new houses in the district and the municipal government (detailed information: cf. Almere City Council, 2009). Solar island's collectors combined with district heating is expected to cut CO<sub>2</sub>-emissions by 50%. 2000 'eco-homes' are being built in the Noorderplassen-West and the Columbus district. "Specific innovations with these developments include the integration of RES and the application of energy efficiency measures in city planning, area development, public tendering, architecture and building. 500 of the new dwellings will be certified as so-called 'solar homes': wood-built, low-energy homes with solar power supply" (Crrescendo, 2007).

## 4. Summary & Conclusions

The Dutch government aims at a production of around 70.000 dwellings per year to be realised in existing and new urban areas, and the energy performances of both dwellings and areas will be a key quality issue. The Dutch government has expressed the intention to increase the current energy performance standard of the national building regulations for new buildings (EPC) step by step to an energy neutral level by 2020. For new dwellings, the energy performance standard will be gradually increased. In housing design, building towards energy neutrality marks the shift from houses that merely consume energy towards houses that also generate energy.

Beside national energy conservation policies, municipalities have formulated high-ambitious local climate policies and are in preparation to meet the energy neutral level for new buildings – some, earlier than 2020. Nevertheless, an important barrier for municipalities to demand energy performances for new houses that surpass the current EPC of the Dutch Building Decree (2003) is found in Article 122 of the Dutch Housing Act. In addition, national UKR and SLOK subsidies for municipalities are financially limited, and not permanently available (Tambach et al., 2010). Moreover, the latest grants for ‘excellent areas’ to experiment with house-building surpassing the current EPC are granted only to a maximum of 13 areas. This paper explores how and by which policy instruments Dutch municipal governments can plan for and realize highly energy efficient new houses, which in some cases lead to surpassing current (sustainable) building standards, in particular the EPC.

Energy performance aims for new dwellings are laid down in either a climate policy plan, in municipal agreements, e.g. in covenants, with housing associations on dwellings’ energy consumption and certificate (Heerlen); in a climate vision with a coherent implementing programme (Amsterdam); in a policy note on sustainable new living environments and in a letter of intent on sustainable building, including a minimum level for sustainable house-building with a sharpening of dwellings’ EPC, in an environment plan, including a rate of sustainable energy to be used for housing, as well as in guiding principles for a sustainable development of the city (Almere). Apart from plans, organisations and processes for daily municipal practice are ‘locations’, where energy conservation policy for new dwellings is structurally laid down. As for Amsterdam, a climate office and a climate table were established. The latter to set up sustainable, public-private alliances. EPC-values, Dutch energy labels, GPR@gebouw-scores, Amsterdam calculation table climate neutral building including an EPL-score, are among the performance indicators, municipal governments use in local climate policies and in their communication with developing parties – they are often combined in an integral approach of both area and buildings.

A municipal set of instruments is developed by the Municipality of Amsterdam, including technical measures and a calculation model climate neutral building, in which two variants for stacked apartments have been worked out: one making use of city heat and solar energy, the other making use of Passive house building combined with heat-and-cold-storage. Financing solutions for both rental and owner-occupied sector will be developed. A

procedure has been developed, in which sustainability plays a role in the selection of market parties and in the allocation of building packages, intended to lead to policy rules for selection processes for real estate development. Buiksloterham functions as pilot. A first public sustainability tender for several lots in the Buiksloterham area, in which the developer with - besides a design score- the highest scores on the sustainable quality of a design was finally selected seems to offer a 'legal valid' answer to the aforementioned legal problem for the Municipality of Amsterdam. In the sustainability tender, winners were mainly small developers with innovative, climate neutral designs (cf. Van Poelgeest, 2010). Design criteria make use of the first two steps of the trias energetica. The Amsterdam Plaberum obliges urban project groups and districts to draw up an energy vision in the project's research phase. The Municipality of Heerlen has worked out several ambition levels for housing, among what the 'active' level, which includes an energy vision to be integrated in a development plan for housing projects with more than 250 dwellings.

Communication and knowledge transfer with both developers, businesses and citizens is of major importance in all three case studies: in its climate policy plan, the Municipality of Heerlen recognizes that energy first needs to become a familiar phenomenon, before people can become aware of the true value of energy, and that starting from this point, one can start working towards a behavioural change in the field of energy saving and investments in renewable energy.

To gain a broad social basis for the Mine Water Project, meetings with citizens, many former mineworkers, were organized by the municipality. The idea of reusing

the mines evoked enthusiasm among Heerlen's population. In addition, the policies of the Province of Limburg, Parkstad Limburg and Heerlen strengthened each other in the field of sustainable energy to strengthen the regional economy. The seven municipalities of Parkstad Limburg collaborate on demonstration projects and on knowledge transfer towards organizations and citizens. Apart from a focus on the sustainable quality of a design and on the Triple P of sustainable development (people, planet, profit), a focus on a location's identity or genius loci (cf. Lynch, 1960) can belong to the merger of interests in public-private area (re)developments. A location's identity can be shaped or enhanced by renewable energy technologies in building or landscape design, and steered towards by municipal codes, which make use of such technologies in building design, but leave room for creativity. This can create value in the area: e.g. in Heerlen, the Gen Coel complex functions as a brand for Heerlerheide; and in Almere, solar island functions as icon for the Noorderplassen-West district. This is in line with Carmona's (2009) findings, which suggest that in regulating future urban development, design coding 'does not stifle the potential for creativity and value generation, and may even enhance these critical contributions to place-making'. Innovative public-private financing such as in Heerlen and Almere lies behind area (re)developments, which include energy efficient new houses. Certification of sustainable and energy efficient 'solar homes' in Almere seems to function as marketing mechanism to sell these new homes. By investing in the use of renewable energy sources themselves, municipalities can set an example for developing parties.

Working out financing instruments for both rental and owner-occupied sector to stimulate energy efficiency investments will become an important and complex issue for municipalities and for other parties involved. Furthermore, there are different municipal climate ambitions and aims, as well as different performance indicators (besides the EPC) used by municipalities to measure dwellings' performances in the field of energy efficiency and sustainability. This may make an inter-municipal comparison of municipal energy conservation policies' progresses and successes, and a monitoring of such policies on local and national level more difficult.

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## 9

# Retrofitting Actions for a new Housing quality

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Mediterranean University  
of Reggio Calabria*

## 1.

## Introduction and references.

Martino Milardi

## 1.1

### The researchers and the research framework

#### Preliminaries

The existing buildings in the city of Reggio Calabria are largely characterized by high energy consumption and consequent environmental impacts. This is due to design procedures, construction systems and installation practices that have not taken into consideration the connection the building establishes with its own context. The matter regarding the review of design/planning processes and the addressing of construction methods in relation to qualitative operations of an environmental-energy matrix becomes the strategic objective of the research conducted. The “technical guide scenarios” and local action plans identified by the research may indicate a direction for works on existing buildings aimed at the reduction of the intensity of the energetic and environmental impact on the construction sector, from which arise undeniable relapses on the quality of the urban environment. In fact, the definition of instruments intended to address public and private entities, is widely reflected in the insistence of codes and protocols (design and technology) useful for decision support for interventions aimed at urban sustainability and building.

## 1.2

### The research group

The research procedure, developed within the project HOPUS, was conducted by the Unit Operating APSIA - Analysis and Design for Sustainability and the Environmental Hygiene. APSIA carry out its activities within the Department DASTEC Mediterranean University of Reggio Calabria and is composed of researchers who deal with issues relating to energy efficiency in buildings, to retrofit, the evaluation of the life cycle of materials, on indoor air quality and environmental quality control processes. In particular, composed: Professor Maria Teresa Lucarelli, scientific coordinator of the U.O., Professor Martino Milardi, the project head to hopus for WP of RC, Architect Deborah Pennestri, coordinator of the GSL, architect Francesca Villari, coordinator of GSM, architect Mariateresa Mandaglio. Participated in the phases of relief and return of the XXIII and XXIV doctoral stages of DDR in the Architectural Technology DASTEC: Barbara Maria Concetta, Fouad Ben Ali, Francesco Casile, Maurizio Diano, Alexandra Focà - who oversaw the drafting of the major cards - and Peter Gaetano.

### Summary of Objectives

General, supporting the Project HOPUS:

- Review of the Leipzig Charter on Sustainable Cities;
- Creating a Local Support Group and networking among research Centers, PA, stakeholders and local businesses;
- Dissemination practices for the implementation of the Practice Codes. Specific of the RC U.O.:
- Definition of technical solutions for the retrofit energy generation;

- Testing and validation of Technical Solutions through the contribution of the PMI;
- Contribution to the definition of Design Codes for a building high-quality energy;
- Establishment of LSG; Definition of Local Action Plan, and New Articles of Building Regulations.

### The Partners

- City of Reggio Calabria - Department of Urban and Built Heritage;
- Province of Reggio Calabria - Section 18 Environment, Energy, Water and River State Property;
- Confindustria - Section of the Province of Reggio Calabria;
- ANCE - National Association of Builders of the Province of Reggio Calabria;
- ESEFS – Institution Building School for Training and Safety in the Province of Reggio Calabria;
- INNOVAREGGIO - Consortium for Innovation and Local Development
- Gnosis - Diagnostics and non-destructive surveys for architecture
- Order of Architects and PPC of the province of Reggio Calabria Engineers of the Province of Reggio Calabria

### Field Testing

Upon the recommendation of City of Reggio Calabria, the method of experiments will be performed on two cases of public housing. Thus, the aim of triggering processes synergy between research institutions, government and industry, we will use the operational contribution of construction companies participating to the ANCE inside the Confindustria of the Province of Reggio Calabria.

## The Research Places

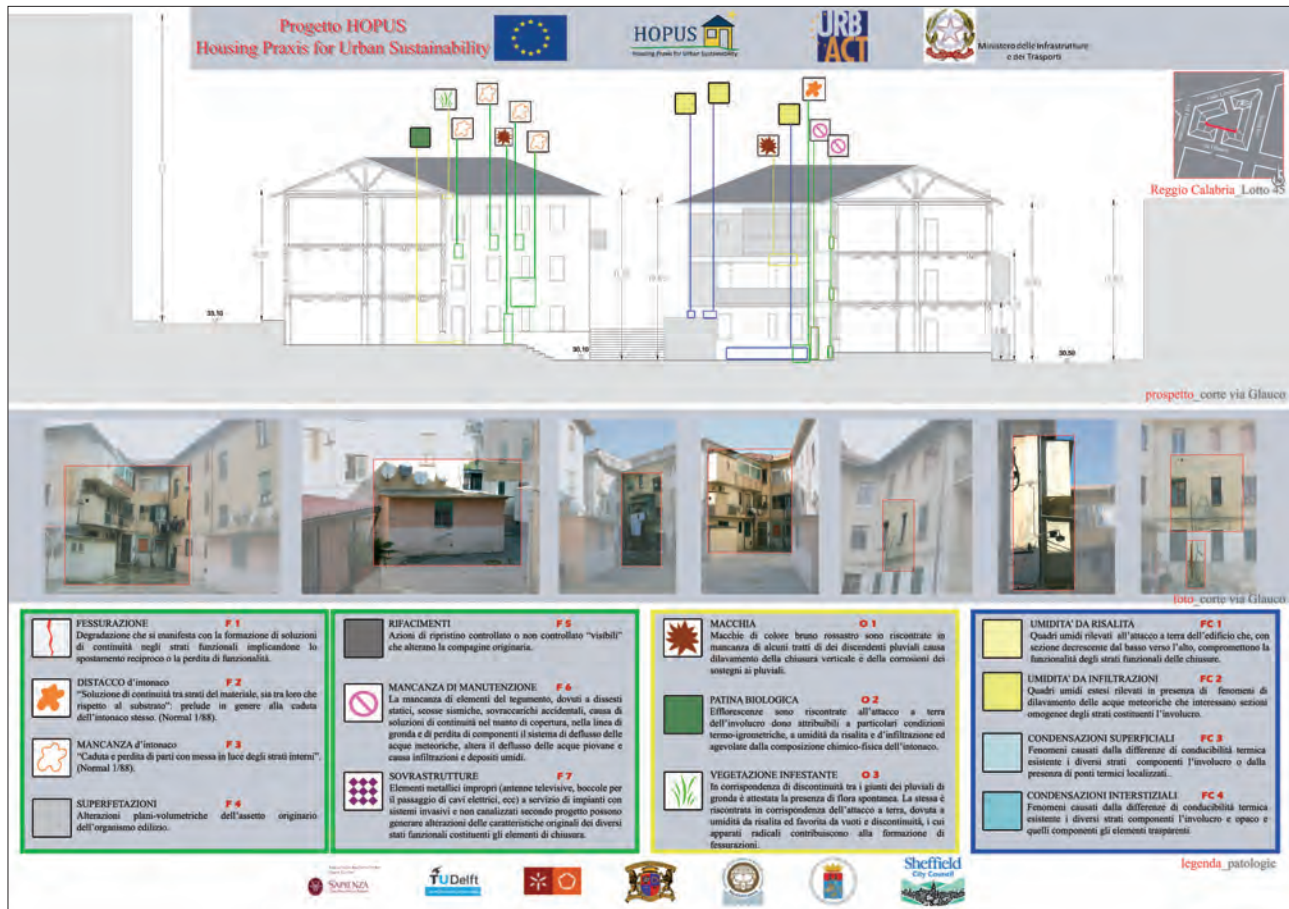
### *Lot 45 of the Tremulini District*

The construction lot, completed in 1936 and placed in a perpendicular urban fabric is characterized by a type “in court”, two and three levels above the road, with a pitched roof systems. This configuration, built after the earthquake of 1908, is characterized by the particular construction system consisting of a reinforced concrete structure framed completed with brick curtain walls co-operating with the framework through detachable, lintels and creases break is. The intermediate floors are made of brick-cement a warping mixed with secondary vein of extradados beams “dovetail.” The roof is made of a mantle with Marseilles tiles laid on a warping of rafters carried by wooden trusses with eaves projecting from the edge of the prospectus of the building. It is evident that this particular system determines performance thermo-physical and unusual energy result. The overall picture highlighted from surveys and from all the tests carried out, shows a remarkable state of degradation of isolated. In particular, the widespread transformation of the original, by increasing volumes and surface areas, have changed substantially static operation, technology and especially the energy behavior of the entire building structure. This low level of quality is the result of both the malfunction of all the technical elements, due to obsolescence and lack of maintenance program and the various operations do not comply with the rules of art, made by users on the buildings. Through technical equipment / protocol were conducted investigations that have highlighted failures and recurrent disease, and allowed the construction of the performance framework aimed at defining the energy behavior of buildings ac-

cording to the strategic landscape of the retrofit. These surveys and scenarios are described below and illustrated in the Annex.

### *Block 5 of the Marconi District*

The District of Marconi is one of the neighborhoods of public housing built in the mid-70s, to meet strong demand for housing in the city's expansion. The body building object consists of two buildings adjacent, to five heights above ground and staggered on the short, regular shape, with long sides facing north / south. The prospects of long sides, originally scanned in a sequence of filter spaces, are now almost completely enclosed by volumes porch or even opaque which alter substantially the overall operation. The construction system is consisted of reinforced concrete framed structure with vertical closure of brick masonry monolayer and intermediate floors in brick and cast on site. The flat roof, waterproofed and paved, is assisted by a system of ducts and pipes made of pvc for the removal of storm water. All of the information resulting from investigations mentioned above and the systematic collection and classification of the data of interest, returns a context of specific diseases is due to lack of maintenance that uncontrolled tampering. In fact are present alterations and compensation procedures conducted through method of installation and materials in sharp contrast to the original layout. With a short exercise period, the building shows a picture of performance rather compromise, not so much in apparent response to the requirement of appearance, as guessed at (later shown by in situ diagnosis) poor supply performance on the behavior of energy ' building envelope.

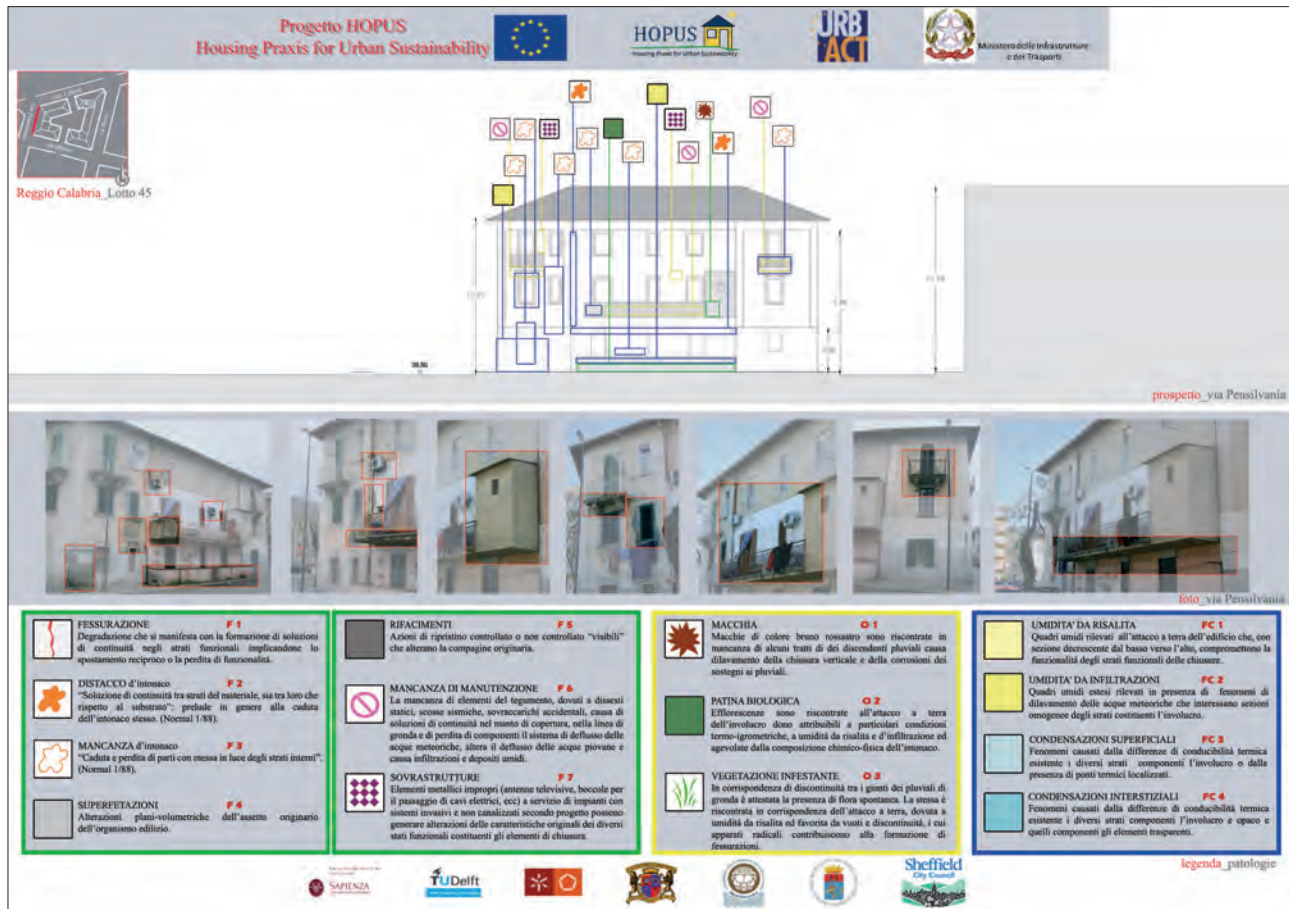


## Energy Scenarios for New Housing Scenarios

Up grading the environmental and energy of existing buildings has taken in recent years, a central role in the issue related to urban sustainability. Assuming that the processes of development and transformation of the city, new construction activities are a percentage decrease compared to the existing building instead of recovery

record, it can be argued that at this particular time of economic assistance Recovery is one of the main driving forces of the construction sector.

In this light, there is a clear need to develop methodologies and intervention procedures for building restoration to meet the provisions of regulations on energy performance of buildings. In particular, studies consolidated



puts strong emphasis as the existing buildings on the national territory is characterized by high energy consumption during use and management. This is often due, at stages of design decision, a formal choices and technology that do not take into account the microclimatic characteristics of the context of intervention. The question of the necessary revision of the construction

methods, especially the recovery in retrofit, and management processes thus becomes a strategic goal of the research. The latest statistics on energy consumption by sector show that the incidence of fund "civilian" has substantially exceeded the threshold that was often mentioned in these years, or the 40% of energy used (only for end-use ). In addition, the same data show a significant

increase in consumption for air conditioning in summer. More than 75% of the buildings that make up the Italian real estate assets have been designed and dated earlier than 1976 and, therefore, in the absence of specific rules and regulations concerning thermal insulation envelope and on energy efficiency. It is estimated that for the management of buildings with inadequate levels of energy performance will be reached very high consumption, which could be reduced as much as 50% through appropriate redevelopment.<sup>1</sup>

This is confirmed by tests carried out on the entire building stock that the national annual consumption per unit area (about 250 kWh/m<sup>2</sup>) is above average than other European countries (estimate "Brita in PuBs-Bringing Retrofit Innovation to Application in Public Buildings"). In this context, the character of emergency priority actions that define appropriate strategies for energy retrofit applicable, specifically, targeting housing also recently built characterized by energy-marked by:

- scarce attention in the definition of design choices and technology, towards climatic characteristics of the intervention context;
- a choice of building systems are often inappropriate in terms of physical and thermal performance and satisfaction of indoor comfort conditions;

- a near-total absence of an adequate caulking system of the exterior insulation;
- a dependence on a plant design systems, often outdated and inefficient for controlling internal thermo-hygrometric comfort conditions.

It is also clear that more than 75% of energy consumed for heating and air conditioned buildings Italian is essentially wasted due to inefficient insulation wrap, poor sealing of windows, as well as the poor performance of plants. On the basis of forecast scenarios, despite the difficulties due to numerous internal and external variables and economic policies, it can be assumed however that the recovery will continue to grow and, since 2020, will cover the 80% of the market.

In relation to this context, it seems that the interventions of building recovery must necessarily be re-oriented energy, and environmental existent to respond adequately to the new regulatory requirements.

derived from the scenario briefly sketched, therefore, the urgent need to define actions and interventions targeted diagnostic evaluation ("energy audit"), elimination of avoidable waste ("energy saving") and technological upgrading of building organisms in relation to components Housing and engineering ("retrofit" energy). These strategies are the areas for the sustainable management of energy quality of buildings, in order to streamline and optimize performance and subsequent consumption.

The Energy Retrofit existing building can then perform actions through both technological matrix involving the building envelope (ie, housing and facilities, possibly to be considered integrated) both management or appropriate for use by users (which should now begin to be

<sup>1</sup> The Green Paper "Towards a European strategy for the security of energy supply" (COM (2002) 321 final) state that at least 22% of energy used in buildings can be saved by intervening on energy efficiency. Further important results are considered achievable with the development of renewable energy, including its integration into buildings, as shown in White Paper "Energy for the future – renewable sources of energy" (COM (1997) 599 final).

properly educated). In order to meet current regulatory requirements, the combination of these actions must therefore be intended for a new or higher quality performance in terms of energy efficiency.

In general, energy redevelopment of existing buildings should be designed to achieve the following objectives:

- Improve the interior comfort;
- Low consumption of energy;
- Reduce the pollution emissions and its impact on the environment;
- Use resources in a rational way, through the exploitation of renewable energy to replace fossil fuels;
- Optimize the management of energy services.
- This need is particularly urgent in virtue of the transposition ensemble of European directive 2002/91/EC on the energy performance of buildings.

### 1.3

## The requirement of environmental quality in Housing Works.

**Maria Teresa Lucarelli**

The new emergency housing linked to social and economic changes of recent years have highlighted the need to provide design solutions, technological and economical, valid for a growing demand urgent and complex. Exceeded, in fact, anchored to the construction phase to the response of “quantity” and crossed the stage of the quality of living, it arrives today to a new phase where the heterogeneity of needs and ways of living will always need an answer more diversified, with an eye toward broader horizons, complex and articulated those hitherto considered. Models of intervention at different scales, old and new housing types, use of new technologies and new

materials, innovative financial solutions are therefore now the design parameters for a timely response to new housing needs and improving the quality of urban metropolitan residential areas. A reference model is represented by the housing policy of social housing.

Today, next to the proposition of subsidized housing programs and facilitated, surface, introduced by Finance Act 2008, new expressions building designed to meet the growing demand for accommodation for families not classified as “high risk of social exclusion, but that have the income as a prevalent problem. That statement legislation, in support of public welfare policies, defines urban areas between the instruments or property be allocated to social housing in relation to local needs and depending on the extent and value of the conversion (subject the free supply of the owners). In these areas can provide for the possible provision of social housing to rent and agreed.

This is testimony to the willingness to respond to a new social need for housing with no longer with “dormitory towns”, but systematizing the growing demand with the needs arising from the context, and to those users, by following the building design, unlike in the past, changes social and new lifestyles. In this sense, the use of techniques of “participatory planning” - already successfully tested in several European countries - allows to enhance the wealth of knowledge of population and those who work and operating to build regeneration projects shared. Against this background, it should be stressed that the Requirement of Environmental Quality, applied across the board in different regulations and different decision-making tools, has become a key theme across the entire spectrum of construction projects.

Wanting to clarify the meaning of “urban quality” in terms of performance requirements, is important to emphasize the relativity of this concept varies according to users’ context and historical period. According to the consolidated approaches can be said that the urban quality to be understood as the capability that the configuration of the environment has to satisfy in terms of quantity and quality, the overall needs, tangible and intangible, implicit or explicit user by offering performance requirements. The large scale approach, precisely that of the urban design of the last few decades, which did not take into account the characteristics of both social and environmental context, in fact, resulted as ineffective, as it was the bearer of solutions foreign from the reality of action. The cities grew by addition of new volume compared to consolidated fiber without being able, most of the times, to reproduce the complex environment, resulting in settlements of low overall quality.

Today common strategies, urban scale, regardless status of the places, call for a careful redesign of the elements connoting action spaces of the urban environment, in an attempt to achieve the new quality of sites that allow arrest process of social decay, but according to different uses and types of construction sectors of intervention, blew on understanding the elements representing the unexpressed needs of users and context.

In the light of Planning Tools exposed and the resulting operation plan (eg the Recovery Complex Programs), the ability to direct restoration and rehabilitation construction to increase attention to environmental problems requires that the processes of transformation of resources and the mode to conception design contain sufficient elements to minimize the impact of development on the environ-

ment. For example, the relationships between sustainable development and the construction sector may be investigated from multidimensional analysis, these highlight at least three size guide:

- Ecological principles: counter the dwindling resources and environmental degradation, creating healthy environments;
- Resources: Control land sectors, energy, water and materials;
- Life cycle of the construction process: plan, plan, design, manufacturing and construction, management, the not use, recycling and disposal.

In this sense, the strategy of environmental management, beyond the protective actions, focusing on targets ranging from the enhancement of the environmental elements - naturals and urban - in a systemic and use the same report, the promotion of participatory development logic and environmental management, the provision of services specifically aimed at promoting environmental sustainability and reduce the impact of economic production environment.

## 2.

### Some staring references.

Deborah Pennestrì, Francesca Villari

The scenario inherent to problems related to energy efficiency of buildings<sup>2</sup> in recent years has passed the stage of “taking into account” the features emerging more and more towards the formulation of decision-making processes of offering intervention systems. Undoubtedly, this issue has increasingly involved the areas of scientific research, government, industry production occupations. This led to a remarkable production, and dissemination of significant results arising from the study, testing and validation can be considered reliable and useful starting points for the research.

Further reference can be considered the views of various programmatic and policies actions implemented at international and national levels, which are aimed at promoting the development of methodologies and strategies that achieve adequate levels of environmental quality and energy both at the urban scale that the building<sup>3</sup>.

<sup>2</sup> The research aims VKA2 “Retrofitting of Social Houses” program “SAVE” - “Intelligent Energy - Europe 2003-2006” and the results of research conducted in several European countries, primarily under the “Rebuild”, Research SHE Sustainable Housing Europe reveal that this theme are now part of the objectives of any policy instrument programmatic

<sup>3</sup> Community reference documents are Decision 1600/2002/EC “Environment 2010: Our Future, Our Choice” as well, for what concerns the wider issue of the redevelopment of urban settlements, the Communication “Towards a Thematic Strategy on the Urban Environment” (COM (2004) 60) whose main themes are, by involving all the actors: the urban environmental management, transport and building sustainable urban design

## 2.1

### Some International Scale Examples

Among the references we can mention the project “INTEREB-Integrated Energy Retrofitting in Buildings” whose results were published in 2008<sup>4</sup>. This project, in line with EU targets on rational use of energy (URE) and in particular with the provisions of Directive 2002/91/EC on energy efficiency in buildings, was intended to establish the procedures necessary to promotion of energy retrofit as part of the recovery of existing buildings, so as to align the energy performance to the new regulatory parameters. The results of INTEREB are addressed primarily to local governments, the methodology developed by the research aims to evaluate the potential energy savings achievable in the construction projects.

The Project BRITA in Pubs “- Bringing Retrofit Innovation to Application in Public Buildings, funded by the European Commission within the Sixth Framework Program (2000-2006), contained in the EU ECO-BUILDINGS Program, which is configured as a starting point towards developing short-term interventions, which define how to evaluate energy efficiency and use of renewable technologies through integrated body building.

Other major research activities have addressed the relationship between environmental quality-efficiency of buildings, particularly residential, and quality of life, investigating the theme of housing as an opportunity to ensure social welfare. Among them are considered especially useful as a starting point, the Program of Actions

<sup>4</sup> View the document: [www.anit.it/PDF/NORMATIVA/Intereb\\_LineeGuida%20per%20riqualificazione%20energetica.pdf](http://www.anit.it/PDF/NORMATIVA/Intereb_LineeGuida%20per%20riqualificazione%20energetica.pdf)

towards Factor 4 in existing social housing in Europe<sup>5</sup>. The project, financed by the European Commission - Intelligent Energy Agency Executive, was completed in 2008. Specifically, he investigated the problems related to the social or reducing healthcare costs and improved the quality of life, to Business Sector or reduction of management costs and the appreciation of the good economic and, ultimately, to reduce Environmental reducing climate-altering gas emissions and air pollution. To this end, it was used “BREA” (Building Retrofitting Efficiency Assessment), an instrument to support decision making in pre-diagnosis to define the strategic choices of redevelopment energy in the light of “overall cost efficiency.

## 2.2

### Some National Scale Examples

At a national level are both numerous research activities and actions to address regulatory and technological design strategies geared towards ensuring adequate levels of energy efficiency of buildings.

Among these, we note the BEEPS - Building Energy Performance Environment System, a program of the Ministry of Environment and the Department of Technical Physics, University “La Sapienza” of Roma on the energy certification of existing buildings. It is based on the contents in the documents of the European Community:

- Working Party on National Environmental Policy, Environmental Policy Instruments for Sustainable Buildings, ENV / EPOC / WPNEP (2001).



- Proposal for a Directive of the European Parliament on the Energy Performance of Buildings ENER 135 ENV 547, CODEC 1139.

What is also clear with more evidence from an examination of the national context, is the adoption by a growing number of Italian towns, of building regulations focus on environmental issues and energy. In particular, we encourage the use of renewable sources, of devices designed to optimize the thermal insulation of the envelope, and improvement of natural daylight and of natural interiors illumination. The municipalities that have developed building regulations focus on sustainability are distributed throughout the peninsula, with a pre-dominance in the center-north, with particular concentration in Toscana, Emilia Romagna and Lombardia.

<sup>5</sup> View the document: [www.suden.org/english/actions\\_projects/factor4.php](http://www.suden.org/english/actions_projects/factor4.php)

### 3. Rule and procedures and procedures for retrofit measures and energy qualification.

Deborah Pennestri

The scenario for the current regulatory framework expresses unequivocally the need for building projects geared towards the needs of environmental sustainability and in particular to control the energy performance of buildings. Necessity is expressed in the legislation governing the Public Works, is that which governs the private sector. More specifically, first the evolution law (Decree Law 109/94 to 163/06) stresses the need for new approaches like “performance” in relation to the minimization of the commitment to renewable energy resources and the maximum reuse natural resources. These must be regarded as engaged in respect of compatibility with the characteristics of the local context and environment, both during construction and in home management and in relation to maximum maintainability, durability, interchangeability for easy controllability of the benefits of the intervention over time.

The framework aims to reduce energy consumption during building management is illustrated by the process started with Law 373/76, which required the first thermal insulation of buildings, and continued with the law 10/91 (a true “framework law”) which led to the definition of renewable and so-called “assimilated”, including “energy savings achieved in air-conditioning and lighting of buildings with interventions on the building envelope and installations.” A next step is the Legislative Decree no. 192 of 2005 - which implements Directive 2002/91/EC on energy performance, integrated and corrected by legislative decree. 311 of 2006 which defines, among other things,

that regions should prepare a program qualifying energy of the housing stock based on information campaigns, energy audits and promotion of financing instruments, until you reach the Decree No. 115 of 2008 implementing Directive 2006/32/EC on end-use efficiency and energy services and defines an ‘energy audit’ means a systematic procedure to obtain adequate knowledge of the energy consumption profile of various building types and to identify and quantify the opportunities for energy savings from a cost-benefit analysis.

The final regulatory action, or the “National Guidelines for energy certification of buildings”, in D. M. 26.6.2009, establishes a system of energy certification of buildings can provide clear information on the energy quality of buildings and tools to assess the cost-effectiveness to achieve redevelopment energy housing as well as take into account the energy performance of buildings in buying and leasing properties<sup>6</sup>.

The overall building energy performance is expressed by the summation of energy supply for winter heating, hot

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<sup>6</sup> The procedure for energy certification of buildings includes:

1. performing a diagnosis, or design verification, for determining the energy performance and identify interventions that are cost-effective energy regeneration:
  - a) obtaining input data on the climatic characteristics of sites, user characteristics, energy use, the specific features of the building and facilities;
  - b) determination of the energy performance with the application of appropriate methodology, covering all energy uses, expressed by the indices of total and partial energy performance EP;
  - c) identify opportunities for intervention to improve the energy performance
2. classification according to building energy performance index and its comparison with the legal limits and potential for improvement based on the identified redevelopment;
3. I of the energy performance certificate.

water production, summer conditioning artificial lighting. For the determination of the energy performance of buildings, the Guidelines identify two methods:

The “Method of project that considers the input data of the energy project and plant systems. The method of reference for new buildings and refurbished ones for the preparation of the certificate of energy qualification. Using the UNI / TS 11300 Part 1 and Part 2.

The “method of survey calculation on buildings or standard”: an evaluation of the energy performance from input data derived from existing surveys on the building. This can be done through:

1. Survey procedures, whether instrumental, the building and/or devices. Expected, for existing buildings, show how the data describing the building and facilities in the form of schedules and tables in the report, for example, the types and year of manufacture.
2. Constructive analogy with other Buildings and Systems contemporary, integrated with databases or schedules national, regional or local. Using, for example, the DOCET method of calculation, prepared by the CNR and ENEA on the basis of technical standards. This procedure is applicable to existing residential buildings with floor area up to 3000 sq.m.
3. On the basis of key climate data, typological, geometric and engineering. Using a simplified reference contained in Annex II, referring to the calculation of energy for domestic hot water production with UNI / TS 11300 (EPacs) for the simplified relative to existing buildings. This procedure is applicable to existing residential buildings with floor area up to 1000 sq.m.

### Methodology of Classification of Buildings

As previously stated, the Legislative Decree no. 192/2005, to achieve a reduction of energy consumption and pollutant emissions, establishes a mandatory energy certification of buildings through the issuance of the Energy Performance Certificate. The energy classification divides buildings into classes based on energy consumption refers to the usable area, and then heated, and the overall building energy class is the label given to the building energy efficiency under a range of conventional reference to ‘which is placed inside of its overall energy performance. This energetic class, marked by eight points to scale from A + (or gold, at best) to G subclasses include certificates representing individual energy services: heating, cooling, hot water and lighting in fact provides a section for class of thermal insulation and a high quality plant efficiency. Although the energy classification of buildings is not yet adequately considered from the estimate property, an energy performance certificate for buildings, with the attribution of specific class performance, is an instrument of market orientation to better energy efficiency in buildings. It is therefore appropriate to check what might be the difference in value as between buildings located in different classes of performance efficiency.

The technical guidance document by June 26, 2009 regulates the legal sector on energy certification of buildings is the “National guidelines for energy certification of buildings.” Annex A of this document defines the overall building energy performance is expressed in the benefit ratio overall energy EPgl, taking into account:

- The primary energy demand for winter heating or summer, for the production of hot water and lighting system;

- Energy output and energy plant auxiliary systems, including systems for self-handling or use of energy.

$$EP_{gl} = E_{pi} + E_{pe} + E_{pacs} + E_{pill}$$

- E<sub>pi</sub> is the index of energy performance for winter heating;
- E<sub>pacs</sub>: the index of energy performance for producing hot water;
- E<sub>pe</sub>: the index of energy performance for air conditioning in summertime;
- E<sub>pill</sub>: the index of energy performance for artificial lighting.

In the case of residential buildings all indices are expressed in kWh/sq.m. per year. In the case of other types (collective residences, commercial, industrial) indices are expressed in kWh/m<sup>3</sup>year.



## 4.

### The conditions for a course of study.

Martino Milardi

The results of the more established studies in the field of construction property have highlighted the measures of improvement of environmental comfort and welfare conditions implemented over the last forty years that have focused on technological equipment neglecting all information related to the context environmental and climate. Data which introduce important indications in order to put them in relation to the design choices and the adaptive capacity of man and his surroundings. Conversely, in the past, the optimal exploitation of available resources ensured maximum efficiency with a minimum expenditure of energy.

The synthesis of short critical state of the art analysis has shown how local policies and EU efforts to encourage their own solutions using the best environmental and climatic features of the site, the thermo-physical properties of materials and components to achieve Internal comfort conditions limiting the use of plant systems.

In order to conserve natural resources, to meet the needs of comfort and quality, more profitable results are also achievable considering the building as a body able to interact with all the endogenous and exogenous factors. With regard to interventions on the existing, these considerations meet the constraints of its initial condition of the system already complied, in the positioning, orientation, form and size of the building, as well as techniques and construction technologies or tracking of openings are already defined. In light of the requirements indicated by recent laws, the research applied to

the design of high performance components and energy to the development of strategies aimed at design time type of integrated approach are now priorities. Such notions were favorable to significant savings in operating costs and produce while improving energy efficiency and comfort of existing buildings like those of new construction. All this supported by recent data on energy consumption in the residential sector, which revealed that approximately 68% of consumption comes from heating buildings, the contribution related to the needs of cooling provided is still undervalued. These high rates compared to total consumption are due mainly to the poor quality of building exteriors.

The measures to improve energy efficiency and environmental impact of buildings that may not, however, be conceived as isolated initiatives, “but in close correlation with each other and with a coordinated and integrated approach”, according to two levels: global and local.

The research line followed is among the approaches that take as a reference when designing the control of environmental similarly to typological and technical-constructive, pursuing the goal of achieving energy and environmental quality standards, at least the levels of values threshold indicated by the latest EU directives and national legislation.

Specifically, regarding the relationship-building environment we refer to:

- Careful planning at the local climate and micro-climate;
- A design relation to the site both as natural aspects (morphology, presence of vegetation and watercourses) and artificial (shadows, surface materials...).

Concerning the control of typological aspects, factors that were considered influential on the energy behavior of the building were:

- As compact as possible (to get the most favorable ratio between surface and volume);
- Guidance and internal distribution of housing units, considering the intended use;
- Distribution, guidance and protection systems of transparent surfaces, their relationship with the matt surface in relation to the exploitation of solar direct and control inputs of radiation in summer and obtaining an adequate level of natural light;
- Presence of overhangs or shading, portico, loggias or filter spaces that can be structured according to the season.

Regarding the control of technical aspects of construction, the factors that are considered heavily on energy behavior incidents were:

- Characteristics of materials for housing;
- Presence of high thermal performance windows;
- Passive use of solar energy for the exploitation of energy inputs directly or indirectly;
- Integration of active solar technologies;
- Use of efficient technologies.

Considering these crucial aspects in the existing measures on construction, these were considered to carry out a thorough energy audit, to identify so driven intervention strategies more compatible contexts.

At the same time it was considered that the purpose of recovery of existing buildings designed to improve building energy performance must be prepared suitable means of joint operations with particular reference to the following issues:

- Technological innovation report / climate
- Report technical innovation / production and monitoring of energy gain
- Report technical innovation / production and use of materials and components.

## 5. Methodological development of the research.

Martino Milardi

In line with what was presented in the proposal, the research objective of the Work Package developed by the APSIA Operating Unit is the definition of an instrument of support for decision-making that configure the technical scenarios for energy retrofit interventions in existing public buildings in a Mediterranean climate.

It should be pointed out, though, that such objectives, even if located within a research procedure, have often been “monitored” by continuous confrontations with the results of the state of the art in the specific field. In particular, despite not defining a system as such but an instrument, this has, all the same, in its originating references, in its founding paradigms and analytical/critical schemes, the characteristics of Decision-Making Support Systems (Sistemi di Supporto alle Decisioni - SSD). The choice to elaborate an instrument of this sort is born from the necessity for interventions, especially on existing buildings, that are able to take into consideration the characteristics of the context and the object of the intervention. Such an approach, on the one hand, allows the limiting of the risks of insufficient performance linked to improper interventions; and, on the other, the avoidance of excessive performance on the basis of the necessity

to optimise the use of resources, employing efficiency and efficacy strategies within the logic of interventions that can be defined as tailor-made<sup>7</sup>.

With this aim in mind, what is very important is the phase of acquiring knowledge of the object to be intervened on and its surrounding conditions that could influence, both positively and negatively, its behaviour and on which, in turn, the building in question may have a certain influence. With its methodological articulation the research aims at, among other things, identifying the reciprocal influences between the object of the intervention and its environmental context.<sup>8</sup>

“... in any activity, according to the theory of decisions, the primary element with which to operate is information. It is always opportune, therefore, to employ approaches that aim at the control of the actions, employing guiding instruments that, case by case, allow the operators to use information correctly...”<sup>9</sup>

The proposed methodology has as its objective contributing to establish the relationship, through a structured series of operating steps, between the phase of knowledge of the building that will be subject to the intervention, the characteristics of the wider context in

<sup>7</sup> Term used by Prof. Sergio Croce to indicate interventions that are perfectly adequate for and compatible with the object of intervention, on the occasion of the Seminar for the Research Doctorate in Technology of Architecture, DASTEC Department of the Architecture Faculty of Reggio Calabria, 2005.

<sup>8</sup> Intended in a broad sense, insofar as both natural and artificial and anthropic aspects will be considered.

<sup>9</sup> Lauria M., I protocolli per l'uso della conoscenza, in Nesi A. (editor), Normativa Tecnica Locale per il progetto dell'esistente premoderno, Gangemi Editore, Roma, 2002.

which the subject of the intervention is inserted and the strategies to be carried out with the aim of improving energy performance. In choosing the technical solution to adapt in intervening on the existent what will be considered, furthermore, is the energy cost in the production phase. The existent, in fact, already encompasses a certain energy quantitative, defined as latent energy.<sup>10</sup> This energy “baggage” should not undergo excessive increases as a result of over-enthusiastic interventions in energy redevelopment.

From the above it emerges how the problems connected to interventions on the existent take shape through the complexity of the aspects that have to be taken into consideration, for example, energy saving, the set-up of the constructive system in its performance aspects, the quality of the internal air, plant integration for the technical aspects relating to the building organism. The framework of inhibitory constraints, of procedures, of prescriptions of the sector, of the local companies employed, of the local distribution network, for the aspects relating to the normative context and works process.

While it might be relatively simple to plan a new building shell that respects the indications and limits of the norms, this is not the case in interventions on existent shell systems. Current norms of building energy performance demand that shell systems employ determined thermo-physical characteristics that are increasingly rigid.

The necessity of defining a methodology of intervention on the existent and of associating it to systems that from the phase of production have an energy performance in line with the necessities to guarantee low-impact interventions,<sup>11</sup> and ensure determined standards of quality for the indoor environment are at the origin of the research. The general objective is that of knowing the existing built patrimony with the aim of intervening on it in the most appropriate way possible. And all this by means of a planning code in support of the planning and practicable choices in interventions, that are able to support the planner in the definition of practices that are characterised by their efficiency and efficacy, also with the aim of avoiding excess in interventions in the light of current norms.

The proposed instrument will be structured in such a way as to indicate the modalities of assessment of the status of the existent and its residual performance in the light of the problems considered (energy, quality of internal air), that will not be analysed separately from the context of the intervention.

The elaborated model will allow the diagnosis and evaluation of the energy performance of an existing building shell through a series of parameters and indicators, strictly related to the setting of the intervention. The analysis of the existent will be conducted through instrumental inquiries (use of thermal cameras, thermo flow meters, etc.), through visual inquiries and the structur-

<sup>10</sup> Milardi M., La definizione degli indicatori di eco-efficienza in edilizia. Un contributo al recupero sostenibile dei centri storici minori in area mediterranea, attraverso la misurazione del “Valore energetico Latente” degli elementi tecnici pre-moderni, Doctoral thesis, ITACA, University of Rome La Sapienza, Rome 2000.

<sup>11</sup> Milardi M., Recupero and requisito energetico, in Nesi A. (editor), Normativa Tecnica Locale per il progetto dell'esistente premoderno, Gangemi Editore, Rome 2002.

ing of robust indicators. From the results of the analysis will emerge the possible strategies and relative actions of intervention that will pass through a series of “filters” represented by the technical and technological characteristics of the object of the intervention, by the regime of controls and norms in force, and by the technical and procedural feasibility of what has been proposed.

This will involve a cataloguing of the shell constructive systems most widely used in the context under study, with the identification of the relative thermo-physical characteristics (thermal inertia, thermal conductivity, damping of the thermal wave). The study of the technological options for the retrofit actions will be strictly related to the residual performances of the existing system and to the principal conditions of the context of application (orientation and general surrounding conditions).

The proposed methodology is being tried out on existing structures characterised by different constructive typologies:

1. a structure framed in reinforced concrete with support plugging in full brickwork, with massive behaviour;
2. a structure framed in reinforced concrete with single-strata plugging

## 5.1

### Parameters for the performance evaluation of the shell

These parameters, apart from describing the thermal behaviour of the existing shell, and allowing the identification of the residual performance level, will be useful for identifying the gap between performance and normative requirements and to defining later the technologies for retrofit intervention.

The parameters relating to the shell can be distinguished in two typologies:

1. technological parameters: that describe the technological characteristics of the elements of the shell, that is: typology of shell (heavy or light), position of the insulation, etc
2. physical-technical parameters: relating to the thermal-physical characteristics of the elements that make up the existing shell.

## 5.2

### The sources of the parameters of the shell.

Part of the information can be obtained by deduction, knowing the era of the construction of the building. Other information can be obtained through visual and non-destructive investigations. To obtain stratigraphic information it may be necessary to carry out tests.

As regards the physical-technical aspects, once the material consistency, the stratigraphy and the thicknesses have been established of the shell's elements, in the absence of instrumentation for measuring, it is possible to establish useful values using some UNI norms (Italian National Standards Institute).

For the calculation of the thermal transmittance and thermal resistance of the opaque components of the shell, reference can be made to:

- UNI EN ISO 6946 – Components and elements for building. Thermal resistance and thermal transmittance. Calculation methods
- UNI 7357 FA-3– Calculation of thermal requirements for the heating of buildings

**Table 7.** Evaluation of the requisite of appropriateness and levels of applicative possibility of energy retrofit strategies

STRATEGIES AND TECHNIQUES	STRATEGIES AND TECHNICAL ELEMENTS	NEW CONSTRUCTIONS	EXISTING CONSTRUCTIONS
Innovative isolating systems	Increased thickness of thermal isolation		
	EPS with graphite		
	High-performance plaster		
	Vacuum isolation		
	Transparent isolating materials		
	Solar fireplaces		
Advanced energy efficient fixtures	Improved openings and frames		
	Improved G value (reflection)		
	Reinforced glass-fibre fixtures		
	Super-insulating glass		
Passive heating systems	Thermal mass		
	Cushioning spaces		
	Glass walls (conservatories)		
Passive strategies for the reduction of overheating	Thermal mass		
	Shading		
Hybrid ventilation	Hybrid ventilation based on mechanical aspiration systems		
	Hybrid ventilation based on air-supply conduits		
	Hybrid ventilation based on balanced ventilation (overpressure/underpressure)		
Improved levels of illumination	Light redirection systems		
	Light orientation systems: light conduits and solar fireplaces		
	Innovative glass (aerogel and TIM)		
Solar heating	Thin-panel collectors		
	Evacuator-tube collectors		
	Direct systems (open cycle)		
	Indirect systems (closed cycle)		
	Natural systems (radiators)		
	Forced systems(active)		
Solar heating and cooling systems	Closed cycle		
	Open processes		
Integration of photovoltaic systems	Non-integrated		
	Partially integrated		
	Integrated		
	Shadowing devices		
	Continual façade		
	Ventilated façade		
	Hot façade		
	Cold façade		
	Climatic façade		
	Double-skin façade		
	Triple-skin façade		
Heat pumps	Water-water		
	Water-air		
	Air-air		

Key: Very appropriate



Applicable



Need for careful planning



- UNI 10346, Heating and cooling of buildings. Exchanges of thermal energy between ground and building. Calculation method.
- UNI 10351 – Construction materials. Thermal conductivity and steam permeability
- UNI 10355 – Walls and floors – values of thermal resistance and calculation methods
- For the calculation of thermal transmittance of the components of glass shells:
- UNI 10345 – Heating and cooling of buildings. Thermal transmittance of windowed building components. Calculation method
- For the calculation of the linear transmission coefficient of thermal bridges
- UNI 7357 FA-3– Calculation of thermal requirements for the heating of buildings
- UNI EN ISO 14683 - Thermal bridges in building. Thermal linear transmission coefficient. Simplified methods and reference values

For the calculation of the volume coefficient of dispersion:

- DPR 1052/77,
- DM 30 July 1986
- L. 10/91 and successive decrees
- 

For the calculation of the Standard Energy Requirement (Fabbisogno Energetico Normalizzato - FEN):

- Presidential Decree 26 August 1993 no. 412,
- UNI 10344 – Heating buildings. Calculation of Energy Requirement
- UNI 10379 Automatic regulation for wellbeing plant. Prescription and trials for climatic regulators.

For the hygrometric check

- UNI 10350. Building components and structures - hygrometric performance

For the overall performance of the shell as regards the Energy performance in building and the efficiency of final energy and energy service uses:

- EU Directive 2002/91
- LEGISLATIVE DECREE 192/2005
- LEGISLATIVE DECREE 311/2006
- LEGISLATIVE DECREE n° 115/2008
- Presidential Decree 59/2009

## 6.

### Instruments of knowledge and diagnosis.

Francesca Villari

In identifying the energy performance of the existent, there is no doubt that the period of construction has direct consequences of the state of conservation, not only in terms of eventual conditions of degradation but also in relation to the technological solutions and constructive systems that were typical of the period in which the building was constructed.

In terms of energy efficiency, in fact, the quality of a building depends, in particular, on the characteristics of the building shell as a result of which it becomes very important to develop adequate procedures and reliable instruments of investigation and diagnosis. For example, buildings from the post-war reconstruction in general are built in reinforced concrete constructed with plugging walls in brickwork or with prefabricated panels and flat sheeting; they are characterised by poor quality build-

ing techniques that cause considerable heat dispersion, thermal bridges, condensation dampness, mould, water infiltration from the façade coverings, draughts and water infiltration from the windows.

The company Gnosis, which carries out diagnostic plans for evaluating the thermal-physical and energy behaviour of buildings, was involved in the project. The thermal and flow measurements carried out allowed the verification of the efficacy of this diagnostic procedure in relation to successive phases of analysis of the results and elaboration of the data useful for the definition of the scenario of the retrofit energy interventions.

This procedure allows the visualisation and measuring of the thermal energy emitted by an object and constitutes the quickest non-invasive method to identify eventual defects in the construction and to document the quality and adequate execution. Thermal imaging allows the recording of the transmittance taking place in the building shell which is of fundamental relevance for the energy diagnosis of existent buildings in which often the stratigraphy of the perimeter walls would be unknown without carrying out tests or core sampling. Through thermal imaging it is possible to verify the presence of eventual critical points in terms of wall insulation and the presence of thermal bridges that cause heat dispersion, leading to the increase of energy consumption, especially in winter.

The principal constructive technique for residential buildings in the local context is reinforced concrete. It is possible, though, to draw up a classification of construction techniques in relation to the period of building:

- 1908-1957: Constructions in this first period were made for the most part in reinforced concrete with

supporting walls in full brick. The bearing structure is made up, generally, of very close together vertical elements, especially near openings, often caged between the horizontal and vertical elements in reinforced concrete.

- 1957-1985: Buildings constructed for the most part with a structural frame in reinforced concrete. The building shell is characterised by perimeter walls in perforated brick, continuous covering with concrete roofs with no thermal isolation and aluminium fixtures with simple windows.
- Post-1985: Buildings with reinforced concrete skeletons, the building shell might be built with perimeter walls in perforated brick or hollow brick, with or without insulation, terrace covering with insulated or layered concrete, the fittings can be in aluminium or wood with simple or double glazing.

## 7.

### Towards the definition of the intervention Strategies.

Francesca Villari

The evaluation phase having been completed, the research activity concentrated on the identification of the possible strategies of intervention for energy upgrading. The results obtained from the evaluation led to the definition of the field in which to identify the potential scenarios of intervention with the intention of pointing the choices towards the most potentially appropriate intervention. Such scenarios were evaluated according to variables, acquired during the initial phases of the application of the proposed methodology, namely the typological characters, the capacity to welcome even-

tual changes (also in relation to legal obligations and regulations) and the residual performance.

The energy upgrading of existing buildings is, in fact, defined through technological actions, in relation to the shell and plant, and management actions so as to guarantee performance standards in energy efficiency that fully satisfy normative requirements. Up to today, the majority of the solutions aimed at improving these above-mentioned standards are additive systems that foresee the addition of insulating strata to the initial building shell, as well as support structures of active solar systems or other devices of “passive gain”. Furthermore, it is opportune to also deal appropriately with the problem of protection from overheating in summer, which, in the activities of calculation and simulation are already complex in the planning of new buildings, and prove to be particularly critical when applied to existing buildings.

A primary theme for further study is the introduction of natural air-conditioning devices in retrofit interventions that, involving parts or components of the building organism, and leading to formal and morphological solutions capable of optimising the conditions for cooling through self-ventilation and natural heating through thermal solar accumulation, can improve the architecture/energy relationship and, together, the morphological qualities of buildings. It therefore follows that the principal technological shell solutions applicable for the implementation of the performance aimed at energy retrofit are:

- Massive shell, capable of operating thermal accumulation and slow release of heat, also as a heat exchanger through irradiation with the human body, acoustic and thermal insulation.

- Traditional plugging with the addition of “overcoat insulation”, able to thermally insulate to guarantee balanced forms of thermal exchange between the internal part of the build-up and the living space<sup>12</sup>.
- Transparent shell, able to create, by “greenhouse effect”, a thermal build-up with a relatively rapid passage of heat towards the interior, as well as improving the opportunities for natural indoor lighting.
- Ventilated wall to isolate thermally and protect from overheating in summer, it guarantees an efficacious implementation of the shell’s performance. The succession of the strata that make it up render efficacious the response of the building organism to climatic and atmospheric variations.
- The ventilation stratum contributes to the control of the hygrothermic characteristics of the wall through natural exchanges of air. The difference in temperature between external and internal sparks off in the interspace a convertive air motion (chimney effect) that increases the thermal k on the internal shell, through dissipation of solar irradiated heat, and limits the formation of interstitial condensation.
- The insulation layer: can support the thermal efficiency of the ventilated walls, allowing an “overcoat” insulation, eliminating the thermal bridges, the most common escape route of heat from the inside outwards.

<sup>12</sup> The overcoat system involves attaching to the outside of the walls, using glues and screws, insulating panels made with a wide variety of materials both of natural origin (cork, calcium silicate, wood fibre, to mention only a few) or with products derived from the hydrocarbon cycle (polystyrene, styrene, polyurethane). that can be levelled with a special glue and strengthened with an alkali-resistant glass-fibre netting before the final application of the covering thick enough to protect the layers below.

- The support layer: has the task of supporting the loads of the building, those that pertain to it and incidental loads, including those of other components of the façade system.
- Ventilated covering, capable of refreshing the volume of space below and reducing excessive summer overheating through a conception that is analogous to the “ventilated wall”.
- Screening systems, even if they intercept thermal contributions from solar radiation, they are able to guarantee the control of the intensity of natural illumination and of its refraction and diffusion.
- Innovative integrated plant (FTV and thermal solar). On existing structures it is possible to insert photovoltaic modules, superimposing them on traditional building components or substituting the covering materials or façades with photovoltaic modules without nullifying the constructive functionality of the covered surfaces. Furthermore “double-glazed” photovoltaic modules can substitute the transparent systems, leaving the illumination of the internal spaces unaltered. Sunblind systems or balustrades and parapets can also be fitted with photovoltaic modules.

The technical-planning solutions described so far have been analysed with oft-stated aim of leading to the integrated planning of a building organism that is able to respond actively to changes in the external environment and to guarantee adequate conditions of comfort for its inhabitants without excessive energy waste. These choices have to be linked to three fundamental parameters: the physical and mechanical properties of the materials, the integration between the elements that make

up the construction, and the position of the components in respect of the solar path, prevalent and dominant winds, and to the other parameters of the context, such as temperature, humidity, rain fall, etc...

In the specific case of the interventions on the existent it is also necessary to consider the technical compatibility (structural, material, relating to reversibility, relating to maintenance), normative and formal aspects of the intervention, as well as its real feasibility (economic compatibility, market conditions). The most appropriate solution emerges, obviously, from the knowledge on the part of the planner of the possible consequences of each action and from the correct combination of the different strategies.

It should be highlighted that none of the following measures should be intended as a stand-alone initiative, but only a coordinated and synergic approach between the aforementioned parameters can lead to the definition of the energy efficiency of a building.

For the definition of the potential intervention strategies, categories have been identified for the control and management of energy movements through the shell, in terms of thermal gains and dispersion:

- strategies for thermal insulation;
- strategies for the reduction of the thermal load;
- strategies for the temporal shifting of the thermal load;

For each of the proposed strategies, all referring to the shell, a series of actions is described for the implementation of the strategy itself and a number of technical solutions are suggested. Naturally, the types of strategy and the number of actions can be modified and increased,

insofar as the proposed method does not presume to cover the whole field of the possible interventions. For this reason, the instrument appears to be open and lends itself to being implemented.

## 7.1

### Strategies for thermal insulation

The dispersion of heat through the building shell can be reduced by adopting components (opaque and glass) with high thermal resistance. The minimum standard of reference to be respected is represented by the limit values of the volume dispersion coefficient, established by Law 10/91 and related regulations for implementation. With reference to opaque shells, the factors to be taken into consideration are:

- definition of an overall thermal insulation strategy (concentrated or divided insulation, light or heavy structure, traditional ventilated façade, “active” ventilated façade, etc.);
- choice of insulating material (technical and geometric characteristics) taking into account thermal conductivity, steam permeability, mechanical behaviour (resistance and deformation under loads), environmental compatibility (in terms of volatile and fibre products, possibility of disposal, etc.);
- substitution of window components with others with better performance characteristics;
- positioning of insulating layers and eventual vapour barrier with a view to verifying interstitial condensation;
- study of the behaviour of the component in a variable thermal regime over time (thermal inertia), in relation to the use profile of the building (continuous or discontinuous), to the typology of thermal plant (radia-

tors, radiant heaters, fan-coil units, air heaters, etc.), to the logics of regulation (continuous heating, heating with night-time reduction, discontinuous heating switched off at night, etc.).

### Thermal insulation on the external surface of the shell (“overcoat”).

External insulation is advisable for environments heated continuously with interruption at night. The heat accumulated by the walls during the period of the functioning of the thermal plant is released, with the heating off, during the hours of night, notably improving the levels of thermal comfort. Furthermore, this solution gets rid completely of thermal bridges. The most widespread methodologies in external insulation are the “overcoat” system and ventilated façade. Some technical components of this system, furthermore, allow the control of solar irradiation in summer. The work of energy adaptation in existing buildings using “overcoat” techniques allows non-invasive interventions.

*Adaptability level of the existent: Medium-High*

### Thermal insulation on the internal surface of the shell.

Solar irradiation, although it heats the environment, does not accumulate efficiently because of the internal position of the insulation, and, in the absence of the sun, these cool quickly. Such a solution is advisable for environments that are heated occasionally or, more generally, buildings with autonomous heating plant. The most common methodologies of perimeter insulation from the inside are the pre-coupled counterwall or the counterwall on a metallic structure. This system, though not expen-

sive, has technical limits and, in particular, does not resolve the problem of the shading of the thermal bridges and that of the hygrothermic wellbeing of the inhabitants.

*Adaptability level of the existent: High*

### Thermal insulation in air space

Even considering the thermal bridge that is created in the points of connection between the shell and the structural system, the insertion of insulation into the air space between the external and internal plugging wall is the most convenient solution and suitable for new constructions for which it is possible to choose between panel or brickwork external functional layers. In interventions on the existent, the use of this technique should be considered only in the presence of sandwich brickwork with air space, employing a sort of melted insulator (expanded clay or expanded perlite). Positioning the insulating layer ensures protection from external atmospheric conditions. To further improve the efficiency of the shell, it is possible to place a ventilated air space in front of the insulating layer.

*Adaptability level of the existent: Medium-Low*

## 7.2

### Strategies for the reduction of the thermal load

In this phase the thermal loads deriving from metabolic activities, the functioning of electrical equipment and light sources will be interrupted to give plenty of room for the analysis of the loads related to solar radiation and possible solutions for the control and reduction of this. As has been noted, solar gains, favourable in the winter, in summer can cause overheating to the

extent of increasing the energy demand for the cooling of the building.

As a consequence the shells, in hot climates, have to possess a good thermal-kinetic behaviour especially in the summer period.

Translating these concepts into meta-planning requirements, it is necessary to control:

- the capacity of the shell to suitably insulate the internal from the external during the hot daylight hours;
- the capacity of the system during the night to dissipate the daytime heat accumulated by the walls;
- the capacity of the transparent closures to control the flow of solar radiation that passes through them, compatibly with the requirements of natural illumination.

Furthermore these requirements can also be satisfied by intervening on:

- surface shadowing (solar control);
- the landscape;
- systems of natural ventilation.

## 7.3

### Control of the solar gains of transparent closures

The control of the thermal-solar contributions of transparent closures is activated through appropriate planning choices relating to: orientation, inclination and area of the windowed surface; the thermo-physical and optical-solar properties of the transparent materials used and screens. The base parameters to consider in defining the transparent closures of a building in relation to the control of the thermal-solar contributions are: orientation, area and inclination. In general, the most appropriate orientation

is strictly connected to the conditions of irradiation and inclination of the sun's rays. Specifically, in Italy, at 12:00 in summer, the sun's rays hit horizontal surfaces at an angle superior to 70°. The greatest thermal load therefore regards horizontal surfaces. The surfaces facing south are the simplest to protect during the summer period, while during the winter period, when the sun's rays are more inclined, they guarantee good thermal gain. The surfaces to the east and west are those that are most affected, during the hours of morning (east) and during the afternoon (west), as a result of which it is not a good idea to have large transparent openings on these surfaces. North-facing transparent openings create major problems of dispersion during the winter period, so it is advisable to reduce them to the minimum possible.

*Adaptability level of the existent: Medium-Low*

The area of the transparent external closure depends, at most, on the balance between the needs for natural illumination, and those of the reduction of the overall annual energy requirement for heating, cooling and illumination. Having determined the minimum surface in relation to the requirements of natural illumination, the area of the closure (transparent component) has an optimal value, beyond which any ulterior increase in surface would produce an increase in thermal requirements both in summer and winter, without producing any benefits in the reduction of energy consumption that are foreseeable for illumination.

*Adaptability level of the existent: Medium-Low*

The inclination of the transparent closure is another factor that influences the efficacy of the control of thermal-solar contributions: the inclination towards the sky (to

the horizontal) increases incident solar radiation in the summer period, so it is not advisable; the option should be for the vertical plain or, even more efficacious, that inclined towards the ground.

Skylights, useful when it necessary to have natural light penetrate into buildings along the N-S axis, whenever they are present in an existing building, represent a vulnerable element from the point of view of summer solar control and therefore have to be shaded.

*Adaptability level of the existent: Medium-Low*

### **Typology of the transparent elements and screening**

As regards the thermo-physical and optical-solar properties of the transparent materials used and screens, below are reported some of the performance characteristics relative to the principal types of glass that can be used for solar control. In the case of interventions on the existing it might be opportune to employ substitution.

Coloured glass (absorbent) – The conventional type of coloured glass has the disadvantage of an elevated coefficient of absorption of the incident solar radiation (35÷75%), which produces high temperatures in the glass and, therefore, high emission (long waves).

Coloured glass (reflective) – The type of coloured glass with an external reflective mirror surface reduces greatly the light radiation that enters and therefore is not advisable for environments that require good natural illumination or winter sun contributions, and furthermore it is a cause of possible dazzling phenomena.

Glass with low-emission film – It is the most efficacious system for reducing thermal solar transmission while still allowing good illumination.

Multilayer glass components – One of the most efficient double-layer configurations is composed of absorbent glass on the outside, a ventilated air chamber and low-emission film on the outside side of the internal glass.

Translucent material and transparent insulation – Components that are indicated when visibility is not an essential requisite, as in the case of skylights; the transparent isolating materials (TIM) have the lowest coefficient of thermal dispersion of all the transparent closure components and are therefore particularly suitable where the prevalent annual thermal load is for heating (residential buildings, mountainous zones).

Variable transmission transparent materials – These are electro-chromic, photo-chromic or thermo-chromic materials; the most promising is electro-chromic, whose performances can vary: from 10 to 50% and from 20 to 70% of the incident transmission, respectively, luminous and total; from 10-20% to 70% of the transmission of radiation in the range of near infrared (that which has the greater incident on the coefficient of solar transmission).

*Adaptability level of the existent: High*

### Shading systems for solar control

Since planning on the existent foresees a limited range of interventions compared to a new construction, and acting on the orientation or transparent surfaces could prove to be difficult, a possible technical intervention is the use of shading systems, which allow the “moving away” of the radiation. Shading can be distinguished by geometry, horizontal and vertical, by position, external and internal or by management, fixed and moveable. Horizontal shades are efficacious if located on the south façade of the building, where they prevent the penetra-

tion of direct radiation while allowing the contribution of the winter sun. Vertical shades are efficacious, on the other hand, with every orientation, and require that the surface of the screen (single stave of a brise soleil or a wall lateral to the window) forms a sufficiently wide angle of incidence with the sun's ray to prevent the penetration of the rays themselves<sup>13</sup>.

External shadings offer an improved solar control with respect to the internal solutions since they push away the solar radiation before it reaches the surface of the glass, this avoiding the triggering of a micro-greenhouse effect between the surface of the shading and the glass. The advantages deriving from the use of shading systems can be listed as follows:

- efficacy in the reduction of the thermal load, insofar as they push towards the external part of the absorbed solar radiation;
- improvement of internal comfort in winter as well as summer months;
- interception of solar rays before they can reach windowed surfaces;
- interception of solar rays before they can reach opaque surfaces, avoiding the overheating of the thermal mass in summer periods.

*Level of adaptability on the existent : high*

<sup>13</sup> For example at the latitudes under study, the vertical shades are useful in the orientations S-SE and S-SW, while those with staves (possibly at variable inclination) work well in the orientations SW-NW and SE-NE. But it has to be pointed out that for research purposes, at latitude 38° it is very important to control the shading on the horizontal surfaces during the overheated period, because on these the thermal load is almost four times higher than on the vertical ones.

### Interventions on surfaces adjacent to the building

In evaluating the microclimatic and environmental characteristics of the open spaces adjacent to the buildings, the flooring and covering materials, as well as those constituting the furnishing and plant (vegetable) elements have a fundamental role and their selection requires the same degree of attention as other parts of the building. External surfaces have to present with a minimum tendency to overheating and limit the irradiation in the infrared spectrum insofar as they influence the temperature and air quality near the construction. Such surfaces take on a great importance when, along with the wall barriers that mark out their limits, they influence in a determining way the temperatures in the immediate vicinities of the building shell.

The principal variable that describes the thermal interactions of these materials with the outside environment is the surface temperature, influenced by the conditions of irradiation of the surfaces and by the coefficient of emission (spectrum of wavelengths of the infrared); this last depends on the type of material, its colour, treatment and the wear and tear on the surface.

*Level of adaptability on the existent : Medium-High*

## 7.4

### Strategies for the time lag in the thermal load

For the reduction of energy consumption an approach is necessary that contemplates a transitory regime therefore taking into account, as well as the degree of insulation of a structure, also the velocity with which this exchanges heat with the bordering environments,

expressed by parameters of thermal diffusivity<sup>14</sup>, damping and thermal time lag.

Shells with an elevated thermal mass, such as tanks, heat up and cool down slowly, as a result of which the introduction of heat is delayed by almost 12 hours (at lower outside temperatures); furthermore they reduce the thermal flow that reaches the interior since part of the heat stored during the day is re-irradiated towards the outside. Thermal improvements can be reached by intervening with “damping” strategies and “time-lagging” the thermal loads over the arc of a day, shifting them towards the night time. The modulation of the thermal loads is in fact managed by acting on the thermal inertia of the shell<sup>15</sup>. One of the characteristic parameters of the thermal inertia of opaque technical elements is the time-lag coefficient<sup>16</sup> (measured in hours), representative of the delay

<sup>14</sup> Thermal diffusivity  $a$  [ $\text{m}^2/\text{s}$ ] is given by the formula,  $a = l / \rho c$  where  $l$  is the thermal conduction [ $\text{W}/\text{mK}$ ],  $\rho$  is the density [ $\text{kg}/\text{m}^3$ ] and  $c$  is the specific heat [ $\text{J}/\text{kg K}$ ] of the material, and represents the velocity with which the heat is exchanged between the structure and the environments that surround it; the lower its value, the greater the time taken to exchange the heat. Materials with low diffusivity guarantee raised values of thermal dampening and thermal time lag. With the aim of improving the energy behaviour of the structures of buildings (both in summer and in winter) it is opportune to use structures that have low global conductivity and low diffusivity.

<sup>15</sup> The “requisite” of thermal inertia is a thermo-physical property of the constituent materials that make up the building organism, linked to the accumulation of heat and the time it takes to release into the internal environment. The greater the thermal inertia, the lower will be the velocity with which the internal temperature of the air rises, or falls, in response to an increase, or decrease, in the outside temperature.

<sup>16</sup> The coefficient of the time lag of walls made of homogenous material is directly proportional to the square of their thickness and inversely proportional to a characteristic parameter of the material, known thermal diffusivity ( $a = \lambda / \rho c$ ,  $\text{m}^2/\text{s}$ ) – the relationship between

with which the element itself releases, towards the internal environment, the heat accumulated both from solar contributions, as well as from internal sources.

A second parameter, for the evaluation of thermal inertia, is the harmonic attenuation factor (also known as the coefficient of attenuation or factor of decrement), that is to say, the relationship - characteristic of a certain building mass - between the width of the thermal oscillation of the average temperature of the air inside and that of the average temperature of the air outside, over a cycle of 24 hours; this factor varies from 0 (maximum attenuation, infinite inertia) to 1 (minimum attenuation zero inertia) and it is inversely proportional to the thermal time lag with which the mass releases, within the building, the accumulated heat.

Attenuation, and, therefore, the thermal inertia, of an opaque closure depend on the thickness both of the wall mass and the insulating layer as well as the position of the latter in relation to the external-internal direction. The position of the insulating layer on the internal surface of a wall does not lead to any evident attenuation of the variation of outside temperature, while elevated levels of attenuation, and, therefore, of thermal inertia, are obtainable both using thick non-insulated walls, as

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conductivity ( $\lambda$ , W/m<sup>2</sup>°K) and volume thermal capacity ( $\rho c$ , J/m<sup>3</sup> °K) - and indicates the rapidity with which the heat spreads into the depths of the material. Materials in wood are those with the lowest diffusivity, while this increases with the density in concrete. With the exception of the extreme values, represented by stone (heading towards the high) and wood (towards the low), the thermal diffusivity of materials does not vary much, stabilising around an average value of 0.5 mm<sup>2</sup>/s. Insulating materials have lower density than all the other materials, but quite high diffusivity.

well as adding an isolating layer on the external surface of a thinner wall.<sup>17</sup>.

### Ventilated walls

One of the technical solutions aimed at modulating the thermal load of a building shell is the use of ventilated walls. Although it has numerous advantages (partial reflection of the incident solar radiation, homogeneous and continuous insulation, protection from atmospheric agents, the possibility of improving acoustic absorption, the limitation of interstitial condensation, precise maintainability), against it this solution has insufficient thermal performance in the winter period.

The factors the performance of the system might depend on can be classified in three categories:

- characteristics of the materials: what have to be considered principally are the parameters that describe the behaviour with respect to radiation: coefficient of absorption and of transmission both of the covering and the wall behind it, conduction and thermal capacity. The level of reflection of the solar radiation increases with the use of clear and shiny materials. If the external covering is made with reflecting metallic materials, this noticeably increases the influence of the radiation and the consequent draught effect. Therefore the best performances are to be obtained using materials with a high mass such as brick, stone and concrete.

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<sup>17</sup> The effect of attenuation, for example, of a wall in concrete 40cm thick is more or less equivalent to that of a wall of 20cm, with external insulation in rock wool 1cm thick, or that of a 10cm wall with external isolation of 3cm.

- the geometry of the system, which influences the importance of ventilation in the air space and the velocity of the air. In particular the following are important:
  - the dimension of the entry and exit openings for the air;
  - the conformation of the entrance and exit;
  - the width of the air space.
- climatic and geographic parameters such as:
  - intensity of solar radiation,
  - air temperature,
  - velocity and direction of the wind

*Level of adaptability on the existent : High*

### 8. Local support Group & Local Action Plan.

**Deborah Pennestrì**

One of the aspects that primarily characterise the Urbact II Programme is that each project partner structures and establishes their own Local Support Group (LSG) with the aim of supporting the activities and directing, through shared initiatives, the result achieved in the territory.

Furthermore, the programme identifies as a Guide Instrument the Local Action Plan (LAP) that has to be defined by the LSG's main partner in agreement with all the components of the group.

The general objective in the constitution of the LSG is to start a "dialogue" between the stakeholders, the players in the P.A. and the LSG itself, with the aim of representing an efficacious way to improve the governance of a territory, therefore directing the actions of urban redevelop-

ment (or of transformation) in an eco-sustainable way to spark off positive fallout on the quality of life.

The Project Partner DASTEC of the Università Mediterranea of Reggio Calabria, through the APSIA operating unit – in agreement with the other Project Partner Reggio Calabria Council, through the Council Office for Urban Development – have identified Stakeholders with the characteristics that are appropriate to the HOPUS Project and, therefore, has established the Local Support Group. Involved in the LSG then are: the Public Administration (with the Council Office for the Environment Energy of the Province of Reggio Calabria; a number of businesses that work in the construction sector and the building materials supply sector; professional orders; study centres; centres for services and training for businesses).

In accord with what was foreseen in the introduction of the Urbact action plan, elaborated by the APSIA operating unit with contributions from the components of the Local Support Group, is an operative instrument aimed at identifying and programming the action necessary to concretely activate the aims of the HOPUS project. In particular, the proposed LAP wants to define the shared totality of the steps - of process, project and intervention – that can really be translated into interventions on public residential housing.

The plan defines the roles and activities of the components of the support group placing itself as a central element for actively involving all the local actors who will have an impact on the decision-making, productive and practical spheres of the building industry.



*Components of the Local Support Group*

## 8.1

### Local action plan: operative instrument for the realisation of the project's aims.

The LOCAL ACTION PLAN was elaborated by defining the general objectives that dictate macro-actions to attribute to each component of the Local Support Group, that is:

- DASTEC has the task of elaborating the methodology, articulating the phase of energy diagnosis and defining the scenario of the possible interventions and, finally, trying out and evaluating the method through models with the objective of defining the protocols of intervention aimed at the energy redevelopment of residential buildings.
- Reggio Calabria Council defines the emergencies in the council's residential patrimony, identifies the buildings for the trying out of the method and supplies graphic elaborations and technical information with a view to orienting the research activity in the area of real needs of the P.A.
- Reggio Calabria Province supplies information on provincial policies aimed at energy saving and participates in dissemination activities.
- the Professional orders of Architects and Engineers, to promote the acquisition of the method elaborated by the professionals, organise meetings to inform and teach about the possible applications of the elaborated instrument.
- Confindustria, has the role of realising an opportune link with the building industry sector with the aim of providing and exchanging information of a technical/performance nature.

- ANCE, with the aim of identifying the problems connected to the phases of realisation of the interventions and the possible applied solutions, involves the companies operating in the building and plant sectors, promotes the exchange of information of the means of carrying out interventions of energy redevelopment and, furthermore, offers, through the active involvement of the businesses, skills and workers for trying out the method
- ESEFS makes available its competences in the implementation of know-how of companies for the training of the businesses involved in the experimental phase.
- Innovareggio and CISER, to guarantee an appropriate diffusion of the results, will link and manage the information, organising activities of territorial dissemination and marketing of the initiative.

The local action plan was then implemented through its continuous confrontation and feedback with the methodological system of the research project. From the articulation of the study activities, analysis, proposition, experimentation, validation, and, finally, diffusion and dissemination, emerge the critical points tied to the socio-economic context of the territory, the characteristics of the building patrimony, the procedures for the management of this, the administrative, and productive set-up from which is derived the scenario of the possible solutions and the ways to involve the components of the Local Support Group

## 8.2

### The local action plans for the management of information flow

The local action plans establishes a strong interaction between the various subjects who make up the Local Support Group, defining a flow of information that, starting from the project's objectives, follows a path of critical analysis of the information that derives from both the production sector as well as that of the businesses. Through this network of technical information the possible scenarios of intervention are codified that are then validated through the experimentation carried out by the companies involved. The results obtained will be, therefore, aimed at those involved in the industry so as to allow their real application.

## 9.

### Articulation and Functioning of the activities within the methodological procedure.

Martino Milardi, Deborah Pennestri

Here follows an illustration of the declination of the phases that have been articulated according to the methodological procedure of the whole research set-up.

From the First Phase, that saw the involvement of DASTEC, R.C. Council and Province, what emerged is the shortage at local level, of the instruments, both mandatory and indicative, that point the interventions to satisfying the norms on the energy standards for buildings. Following the analysis of Building Regulations aimed at environmental and energy sustainability that a growing number of Italian councils are adopting such as, for example, the Council Building Regulations pub-

**Table 9.** *Synthesis of the Local Action Plan*

<i>Local Action Plan</i>			
<b>SUBJECT</b>		<b>MACRO-ACTIONS</b>	<b>GENERAL OBJECTIVES</b>
Project Partner	DASTEC	<ul style="list-style-type: none"> <li>■ Elaborate the methodology.</li> <li>■ Articulate the phase of energy diagnosis.</li> <li>■ Define the scenario for possible interventions.</li> <li>■ Evaluate and experiment the elaborated method through models (mock ups).</li> </ul>	Produce an operative methodology aimed at the energy redevelopment of residential buildings.
	Reggio Calabria Council	<ul style="list-style-type: none"> <li>■ Define the emergencies in the council's residential building patrimony.</li> <li>■ Identify the buildings on which to try out the method.</li> <li>■ Supply graphic elaborations and technical information.</li> </ul>	Orient the research activity and experimentation in the area of the real needs of the P.A.
Local Support Group	Reggio Calabria Province	<ul style="list-style-type: none"> <li>■ Supply information on provincial policies aimed at energy saving.</li> <li>■ Participate in dissemination activities.</li> </ul>	Implement the actions for the sustainable management of energy resources.
	Professional orders	<ul style="list-style-type: none"> <li>■ Organise conferences and seminars with the aim of spreading the results of the project.</li> <li>■ Inform and train about the possible applicability of the elaborated instrument.</li> </ul>	Favour the acquisition of the method elaborated by the professionals.
	Confindustria	<ul style="list-style-type: none"> <li>■ Create an opportune link with the building materials and components supply industry.</li> </ul>	Gathering technical information.
	ANCE	<ul style="list-style-type: none"> <li>■ Involve the companies operating in the building and plant sectors.</li> <li>■ Promote the exchange of information on the ways of carrying out energy restructuring interventions.</li> <li>■ Offer means, skills and workers for the trying out of the model.</li> </ul>	Identify the problems related to the phases of carrying out the interventions and the possible applicative solutions.
	ESEFS	<ul style="list-style-type: none"> <li>■ Make available the consolidated skill in the implementation of the know-how of the companies.</li> </ul>	Contribute to the training of the companies.
	Innovareggio CISER	<ul style="list-style-type: none"> <li>■ Connect and manage the information.</li> <li>■ Organise the activities of diffusion and dissemination and the territorial marketing of the initiative.</li> </ul>	Guarantee an appropriate diffusion of the results.

lished in 2000 by Lombardy Region that identifies the requisites for environmental comfort to minimise energy consumption in buildings, the Council has highlighted the need to draw up planning and technological indications that can be translated into articles for new Council Building Regulations.

In the Second Phase the professional orders were also involved and they highlighted the difficulty on the part of planners of defining the modalities of critical reading for the evaluation of the energy performances of existing buildings. It was opportune to identify a set of indicators in this direction - in relation to the phase of experimentation - referring both to the building organism and its context, that direct and offer support to the phases of energy diagnosis.

The Third Phase, identifies the necessity to supply technical information aimed at the energy performances of building materials and components since they are indispensable for the correct definition of the interventions. The production sector and professional orders have also been involved.

The Experimentation Phase actively involves ANCE and, therefore the companies, in the creation of experimental mock-ups that allow the acquisition of the technical know-how to apply technological solutions that implement the energy performances in existing buildings.

The Diffusion Phase to transfer concretely the results obtained from the experimentation to the planning and building stages, will make use of the contribution from the professional orders, ESEFS, Innovareggio and CIS-ER, for the organisation of meetings, conferences and technical forums aimed at the training of professionals and companies.

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# 10

## The HOPUS project in Gdansk

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### 1.

#### Could **design coding** be used as a tool to increase energy efficiency and provide better urban design of new housing districts in the suburban areas of Polish cities?

In Poland the actual speed of spatial development on *green fields* is incomparably more intense than that of any highly developed EU country, where revitalisation of existing urban structures became the key issue already decades ago. During the last 20 years the development of Polish economy has resulted in huge growth ratio and major changes in lifestyles. From 1988 to 2008 Polish GDP has increased over 70%, when in the same time inflation was reduced from level of 60% to 3,3%. That has caused the rapid growth of Polish cities and means that in the coming decade *green fields* urbanisation process in metropolitan areas will remain the main topic. In the same time municipalities and their agencies will have to renew a large part of communal infrastructure. Thanks to these changes in cities like Gdansk and Gdynia (within which the main part of the housing stock was developed already during the post-war period according to Athens' Charter principles) average living area per person increased from 11 m<sup>2</sup> in mid 90s up to 20 m<sup>2</sup> in 2006. But these cities are growing mainly in numbers of flats but not in households (with few exceptions like in Warszawa), even if actual housing needs are estimated on ca. 1, 4 Mio units. At the same time these cities are facing the growing need of affordable housing, which will remain as the major problem for the next decades. Spatial standards of Polish new housing districts, especially quality of public space, are incomparably lower

than in highly-developed countries, among which one can find Poland's close neighbors like Germany and Scandinavia. That raises a basic question about the future revitalization needs of today's new housing estates – including the issues of timing, spectrum and costs. Actual knowledge allows to state that only those housing estates which stay socially accepted are protected against future degradation. But this to large extent depends on well-done urban planning (beauty) and the low cost of running these structures (energy). These issues are in contemporary Europe well understood, which comes from analysis of frequent difficult cases. Unfortunately it is still not so obvious in all young democracies and to their new liberal leadership. In results, the suburbanization processes are still developing.

Suburbanization, in form of urban sprawl, is often recognized as a natural urban development. This was the case also in the Polish municipalities, where only recently this phenomenon was understood by local authorities and wide society as a serious problem, mainly because of traffic issues. Also the weak regional planning was not of much help. In result, esthetical values as well as urban and architectural qualities are still understood as something not so much important, and what counts are practical aspects perceived in short perspective seen as cheaper (and easier) solutions. That's why rapid development, consisting mainly of the private sector's activities, have not been accompanied with appropriate, sustainable spatial planning.

In Poland local authorities are responsible for the site planning regulation (local law). But the small communities, especially those located within the metropolitan areas, are organisationally and financially too weak to be

able to conduct consequent planning policy effecting in spatial harmony. They are also not able to cooperate successfully with forces of the private sector and to protect the urban harmony against speculative investments. But good planning is expensive and must last longer. Once development policy is accepted by the community, it should be respected and protected from any immediate changes. Regulations in the sphere of urban design are neglected, an effect of the weakness of Polish community governance and financing of public sector. It also has its roots in recent history of transformation from socialistic state<sup>1</sup> and cannot be overcome in a short period of 20 years. On the other hand constant dynamic of changes have much potential for further improvements.

Despite this, awareness of the consequences caused by wrong planning policy among local authorities and society is increasing. The first phase of developing the new planning strategies in the age of transformation was to elaborate site plans of maximum flexibility, which could result in a wide spectrum of architectural interpretations and individual visions. Fulfilling all wishes of private owners and investors was the understanding of the democratic planning system. Maximal individualisation and independence instead of state regulated life under totalitarian governance was the natural societal reaction, especially when up until now the Polish public sector is not offering

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<sup>1</sup> Just to remind important facts from the new democratic history: in 1991 establishment of local communal government, 1997 the new democratic state constitution, 1994 new spatial planning system, 1999 new 3 stage administrative system (województwo, powiat, gmina) and 16 new regions instead of 49, 2003 reshaping the spatial planning system, 2004 EU member



coherent and efficient governance systems people could trust in. This accompanies the policy of privatisation of all still communal infrastructures – water, energy, heat and gas supply, wastewater treatment, provision of schools etc. But nowadays communities realise the costs and consequences of this policy – next to boring “un human” socialistic prefabricated slab-housing districts with central heating, full social infrastructure and public transport, the new liberal city landscape has appeared. Communities look now forward to better national legal acts which could help them in improved spatial management to stop spatial chaos and enforce better control over public obligations to run the new urban structures, which represent very often rather uneconomical parameters. Local administration requests more national regulations instead of deregulations and liberalisation when in the same time all tools of soft planning are not used and recognized as not effective.

The Polish state does not see the spatial harmony of urban structures as one of the main priorities in development policy. That is why strict regulations concerning urban planning and especially urban design, which are now theoretically possible due to the Polish law, are recognized as obstacles against economical growth. And indeed very often they have been reduced from tool of sustainable development's management to pure administrative procedure. As a result, the debate on further liberalisation of national spatial law is actually ongoing. In this situation it seems appropriate to raise the question of the energy efficiency of urban structure. Cities are the first-line energy consumers and have become in leading EU countries the main aim of many strategies towards technological renewal. Unfortunately, energy is-

sues in Polish urban development strategies are limited only to problems of energy supply and danger of unexpected blackout. Renewable sources of energy (wind, biomass, sun) are still not explored, favoring the public debate about new nuclear power plants over the complicated reshaping of urban planning culture. Nevertheless, thanks to advanced planning methods total energy efficiency balance could be illustrated in numbers, which makes debate around important roles of urban design better understood and realistic. In particular, if all strategies towards the increase in energy efficiency promote cluster (group) solutions, demanding better spatial and urban planning. EU leaders in sustainable planning<sup>2</sup> have proved that mere changes in legal regulations do not change the planning culture. State-supported *model projects* promoting advanced planning methods and technology solutions are needed. Communities have to make stronger demands to the parliament and government for better legal tools allowing them to carry out an active role in the process of urban development. Here comes the question about further Polish national spatial policy. Sustainability and energy efficiency cannot remain an empty declaration to fulfil the interna-

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<sup>2</sup> Germany - question on energy effectiveness of urban structures became one of the main aims of federal policy German National Strategy for Sustainable Development that problematic has been separately mentioned as well in new federal act the National Urban Development Policy. The German federal government has set the goal of reducing land consumption for new settlement and transport-related areas from currently 115 to 30 hectares per day by 2020. The federal research program REFINA- Research for the Reduction of Land Consumption and for Sustainable Land Management was implemented as its continuation. The large group of this scientific supervision project was addressed to the problem of suburbanization.

tional political obligations, as in the case of the European Landscape Convention 2000, EPBD - Energy Performance Building Directive 2002/91/EC, Leipzig Charter on Sustainable European Cities 2007). This is especially important after Poland's fight (2008) in EU for higher limits of CO<sub>2</sub> emissions and ETS, which was justified by the condition of Polish economy and the inability of the society to adopt the *package*<sup>3</sup> of regulations from the previous project. The question now is if we are able to fulfill agreements signed in the framework of energy and climate change *package* without changes in Polish spatial policy. New legal regulations must bring results in real numbers. The conclusions of this hard debate in December 2008 came together with the Conference of COP 14 hosted by one of Polish Cities, Poznan. Media outcry which was caused by both events has put new light on the connection between the whole spectrum of energy issues and urban planning. So now it seems to be clear that the lack of advanced spatial and urban planning could become a strong barrier in the usage of renewable energy resources.

Research in the framework of URBACT II HOPUS group at Gdansk University of Technology focused on the following questions:

1. What is the Design Coding planning method about?

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<sup>3</sup> The energy and climate change 'package' to reduce in borders of EU greenhouse-gas emissions and promote renewable energies by 20% by 2020 determinates European debate on urban development in at least two years. The package is designed to raise EU's independency on imported fuels and to accelerate the usage of advanced technologies oriented on energy effectiveness. In the last several years, cities being the first line energy consumers have become the main aim of many strategies heading the implementation of the 'package' resolutions

Could it be implemented in Poland? Which documents used in Polish planning system show similarities to this tool?

2. How could EU directives (regulations) and financial support be effective in increasing the energy efficiency of new housing districts?
3. How could we use know-how from highly developed EU countries to improve spatial standards and energy effectiveness of new housing estates?

The work resulted in main conclusions that design coding could be promoted in Poland as a tool of informal planning. To promote it as an effective method of planning the 'model design coding' for chosen districts in main metropolitan cities should be financed by the state. It is very unlikely that without this kind of state support design coding will find financing from communal budgets since codes are not an obligatory part of planning conduct.

In spite of financing there is a big question about architectural and urban guidelines which should form a base for design coding in suburban areas of Polish cities. Majors of Polish regions like Pomorze, determined by agriculture, do not have any strong characteristic urban architecture style from the past which could serve these purposes. This would need a separate research work and further promotion. Leaving this issue only to the local authorities and for public debate (popular taste) could become a tool of promoting bad taste and kitsch.

To use design coding as a method of improving energy efficiency of new suburban districts a special applied interdisciplinary research must be conducted. There

is a huge barrier of missing advanced knowledge and practical experience between urban planning and infrastructure engineering practitioners. Even if several foreign examples are known in Poland, without practical local experience this knowledge could not be spread for common use.

## 2. Hopus at Gdansk University of Technology

URBACT II HOPUS group at Gdansk University of Technology team has created a LSG which contains regional and communal authorities, commercial developers and planners' associations: Marszałek Województwa Pomorskiego, Miasto Gdynia, Miasto Kartuzy, Gmina Pruszcz Gdański, Północna Okręgowa Izba Architektów, Towarzystwo Urbanistów Polskich o/Gdansk, Grupa Inwestycyjna HOSSA SA., PANORAMA DEVELOPMENT Sp. z o.o.

With the help of these bodies we have developed and implemented Local Action Plan, which contains three types of actions:

1. preparation of overview on the HOPUS topic:
  - on case studies from metropolitan area of Gdansk: City of Gdynia (350 000 inhabitants), City and rural Community of Kartuzy (30 000 inhabitants), rural Community of Pruszcz Gdański (10 000 inhabitants), rural Community of Tczew (30 000 inhabitants)
  - on cases from commercial developer Grupa Inwestycyjna HOSSA SA
  - on cases of metropolitan region of Pomorskie Region (regional authority)
2. promotion of the HOPUS problematic field among

planners, scientists, local community administration and politicians,:

- organization of the international conference in Gdynia
- preparation of the mobile exhibition on best practice examples of housing districts from Germany (presented already in the municipalities of Gdynia, Kartuzy, Kobudy, Tczew, Gmina Pruszcz Gdanski)
- organization of seminars for planners and local community administration and politicians (Kartuzy, Gdansk)
- preparation of publication on HOPUS topic in Polish
- releasing the local press information about HOPUS and conference in Gdynia
- presenting the scientific article on 45th ISOCARP Congress in Porto/Portugal

**3. promotion of the HOPUS issues among students of Architecture Faculty at GUT:**

- organisation of the two study tours concerning topic of energy effectiveness of urban structures – exchange of students' groups from GUT and HCU (Hafencity University of Hamburg/Germany)
- student design studio: elaboration of the urban study for few new housing estates in borders of rural Community of Pruszcz Gdanski
- student design studio: elaboration of the urban study for the new community of Baczek village
- student's master diploma design for reurbanisation of suburban villages Straszyn –Juszkowo ut.: "Suburban ReAnimation"
- program for new combined study course (design studio and seminars) concerning HOPUS topic which could be implemented for master studies at the architecture faculty.



As one of the main results from the work on URBACT II HOPUS, besides development of the introductive research and promotion of it, one should note the establishment of new contacts with other research groups. This relates – among others – to the project LONGLIFE in frame of INTEREG IVB, which is now under execution at GUT in partnership with City of Gdynia.

## 11

# Rome and the urban planning of popular neighborhoods: ancient roots of contemporary fragmentation

*Marco Tamburini*

*RISORSE RPR SPA*

The history of construction of popular neighborhood housing in Rome since the Unification of Italy has always been closely linked to events in city planning. In all ages, in fact, the development of settlements of an economic nature and intended for the most vulnerable social groups has provided an opportunity to re-launch construction activity and to implement the expected growth of the city. From a strictly urban planning point of view, the planning of economic and popular neighborhoods has always represented a period of high cultural production and strong innovative experimentation. It can be argued that the best achievements of the last century in Rome are the result of the implementation of programs for popular housing, and even today, in perhaps the final stage of planning, we are witnessing an effort to boost quality and technological innovation in the formation of settlements. This premise is even more fundamental when applied to the current scenario in place in Italy and in Rome in particular, where we are seeing, as pointed out by F. De Matteis in the presentation of the program, “a public initiative that has been at this point reduced to crumbs on a plate of “the kings of Rome”, a handful of homes against millions of cubic meters “ built by the private sector.

The creation of expansion districts with houses for workers coincides with the need, following the transfer of the capital to Rome, to face the growth and modernization of the economic-productive apparatus of the city after centuries of stagnation due to Papal State's power. In 1883 the municipal offices, led by engineer A. Viviani, were assigned the task of drawing up an urban Plan for the government of city expansion through the design of new neighborhoods near the ancient city center and for the completion of the inner urban fiber of the Aurelian Walls

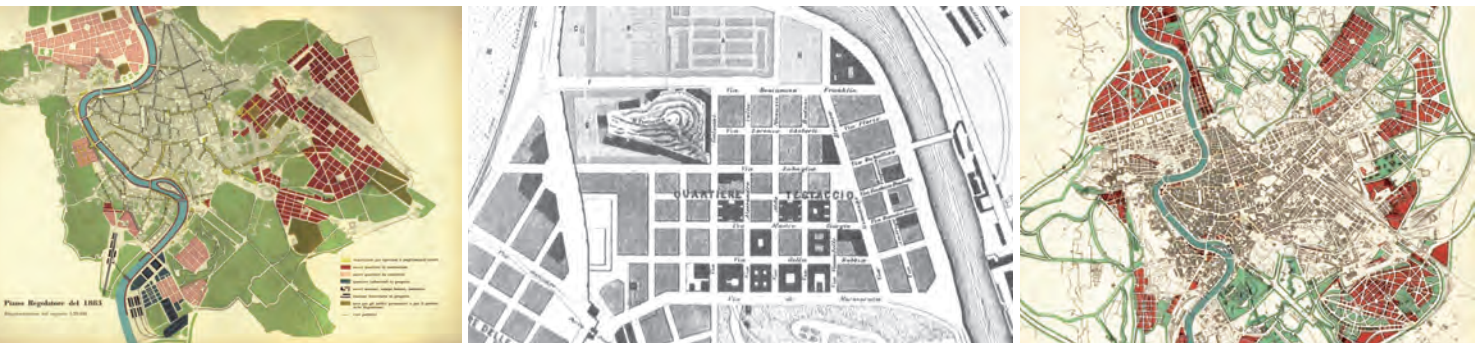


Figure 1, 2, 3.

*The 1883 development plan for Rome, Masterplan for the Testaccio workers' housing neighborhood, The 1909 plan*

(Prati, Esquilino, Via Nazionale)(Fig. 1). These are high-density settlements with private housing sold or rented at market value to employees and managers of the new unified State. Nevertheless, overproduction in housing puts the entire productive sector in a slump and was one of the main factors of the economic crisis that hit the city around 1887. In order to revitalize business and the city economy, development projects for industry and service sectors were quickly promoted, resulting in the need to meet the growing demand for housing for the working class that moved to Rome in search of employment.

1888 marked the beginning of the history of social housing and thus were born the neighborhoods Testaccio, San Lorenzo and Santa Croce-Porta Maggiore near the main industrial city (Fig. 2). A rapid development of a working class city occurred according to the classic models of nineteenth-century expansion, with urban geometric installations of regular city blocks, which differ from the private speculation neighborhoods only due to the poor construction and environmental quality of the buildings. From an

urban planning point of view, however, new neighborhoods were created, with the exception of Testaccio, outside the areas covered by the General Town Plan, in order to take advantage of lower cost areas on behalf of primary implementing subjects often represented by railway companies, tram drivers, sanitation workers, etc. It is particularly necessary to dwell on this last question issue, since, as we shall see, it will be one of the permanent elements in the development of public residential housing.

The Institute for Public Housing (ICP) was created as a result of the "Luzzatti" law No. 251 of 1903 in order to facilitate and manage the construction of social housing as part of a renewed national policy of equity and distributive justice for the benefit of the working class. Nevertheless, in Rome in 1907, the ICP built, once again, outside the perimeters of the Plan, and the neighborhood of San Saba was created on the borders of the town, hidden on a hill behind a monastery bearing the same name and devoid of fundamental services. Two years later, in 1909, the City of Rome approved a new



Figure 4, 5, 6.

*Piazza Mazzini in the Prati district, Buildings in the Garbatella settlement, Quarticciolo housing by Roberto Nicolini (1938)*

town planning instrument (PR Saint Just of Teulada), in the wake of liberal political reform of the early decades of last century (Fig. 3). The Plan introduced, in fact, the granting of loans and easy (payment) terms for the ICP and identified benchmarks and indicators for the design of services in the newly installed neighborhoods. As the crown of the ancient city center, the Plan provides for 5 areas of expansion structured around the same number of squares which focus on the regular design of the jersey road (Piazza Mazzini, Piazza Gentile da Fabriano, Piazza Verbano, Piazza Bologna, Piazza Re di Roma) (Fig. 4). Also in this case, as previously in PR 1883, the planning for urban growth follows the “like wildfire” growth pattern, with the expansion of the city in all directions from starting from the core, a model that characterizes, over time, all stages of the formation of the urban fabric. In implementing the provisions of the PR, starting from 1924, popular settlements are created around Piazza Verbano (INCIS houses for civil servants) and Piazza Mazzini, taking advantage of, in this last case, the opportunity to

build over vast publicly owned areas acquired during the International Exhibition of 1911. The construction projects were entrusted to the best architects of that period (Limoncelli, Magni, Marconi, Palmerini, Pirani, Polidori, Sabbatini), who built buildings based on urban design set forth by the General Town Plan and who experimented new models of housing with equipped quality standards that were a novelty at that time. Simultaneously, however, in 1920, the ICP, not taking advantage of the facilities contained in the Plan, promoted the construction of two new neighborhoods for popular housing outside the city and bypassing the PR. In compliance with the model of the “garden city”, the neighborhoods of Monte Sacro and Garbatella (a project of G. Giovannoni) were built north and south of the city, characterized by a lively mix of types of buildings with different densities and surrounded by nature (Fig. 5). These building achievements manifest another one of the characteristics that from this moment on would seal the urban fate city of Rome. If on the one hand the standard procedure of building neighborhoods outside the

confines of the General Town Plan, on the other hand there is the tendency to develop public settlements far from the city so as to increase the value of revenue in the intermediate private property areas.

This expansive logic of progressive “coalescence” governs in a systematic way the operations of an economic and popular nature entrusted to ICP during the Fascist period, when the outlying suburbs were created to meet the housing needs of the displaced people that previously lived in the city center following the demolition of those areas and of the immigrants who came to the city in search of employment. Starting from 1924, along the consular roads and at an average distance of 10 to 12 kilometers from the city center, the neighborhoods of Acilia, S. Basil Gordiani and Prenestina were built, these areas were made up of shacks devoid of any urban and building quality, while from 1935, in compliance with the implementation of new PR of 1931 (Piano Regolatore – General Town Plan) neighborhoods of homes were created in Val Melaina, Tufello, Pietralata Quarticciolo, Trullo, Primavalle and Tiburtino 3 (for 15,000 inhabitants), new “bridgeheads” for the subsequent coalescence to the city (Fig. 6). For the construction of public housing, the Municipal Administration provided for the infrastructure of the areas and their connection to existing networks, actually serving even the empty intermediate spaces, would be occupied by private speculation neighborhoods.

Moreover, this is also the end of the experimentation and architectural - urban quality period. The suburban neighborhoods were built “in series” with projects quickly and easily achievable without attention to detail regarding living spaces in an attempt, rather, to hide and ghettoize the inhabitants settled there.

By the end of World War II, the problem of reconstruction and especially the need to deal with migration flows towards large cities drove the new Republican State to put in place a comprehensive program of development of the construction sector to revive the economic - productive fiber of the country and improve living standards of citizens. The “Fanfani” law No 43, 1949<sup>1</sup> which launched the INA Home Program within the next two seven year periods (1949-1963) lead the development and reconstruction of most Italian cities. In Rome, in particular, through the management of INA Home, about 110,000 homes were produced within some of the best experiences of urban design of the last century, with the participation of prominent representatives of architectural culture of that time (De Renzi, Fiorentino, Gorio, Libera, Marconi, Muratori, Quaroni, Ridolfi).

The program represents a significant return to research and composite, technological and typological experimentation and, for the first time, the activity of design was accompanied by publications containing the main guidelines and direction for the construction of settlements.<sup>2</sup> Again, however, selected areas are located far from the

<sup>1</sup> Law No.43, February 24, 1949 - Measures to increase working class employments. Homes for workers.

<sup>2</sup> In the two seven year periods of the Program, 4 dossiers were published, two in 1949/50 and two in 1956. They are “functional handbooks” containing suggestions and recommendations for the implementation of interventions. In particular, dossier 1 – Tips, rules and schemes for the preparation and presentation of projects. Job postings, Dossier 2 - Tips, examples and rules for urban design. Projects such as; Dossier 3 – Manual for the review of INA Home building projects to be implemented in the second seven year period, Dossier 4 - Rules for buildings of the second seven year period. (...).

city and outside the boundaries set by the General Town Plan (PR- Piano Regolatore), along the consular roads that innervate the Roman countryside (Tiburtino, Tuscolano, Valco San Paolo, Stella Polare, Ponte Mammolo and Torre Spaccata just to mention the most important). The size of the new neighborhoods is substantial and the expected density is very high (50,000 inhabitants in Tuscolano), but the attempt to experiment with new forms of urban space and housing quality leads to the creation of settlements rich in green and organic spaces in the composition of different building types (Fig. 7). Alongside the INA Home Program, the ICP tries to redeem its image, strongly compromised by the Fascist regime, expanding many of the previous suburban settlements, through the replacement of buildings and always in places outside the perimeter of the current General Town Plan of 1931 (PR 1931). At the same time other agencies also built low cost housing as can be seen in the case of the INCIS which built the Olympic Village and the neighborhood of Decima (project of L. Moretti) in 1960, inspired by the models and rational theories of the Modern Movement, but always areas outside the city and forecast differing from the that which was set forth by the General Town Plan (Fig. 8).

This great production of housing, coupled with immense activity in the private sector, radically changed the face of the city, and yet failed to fully satisfy housing needs. The closure of the extraordinary operations led managed by INA Home Program and the continuing demand for housing brought on the one hand, a systematic development of the phenomenon of illegal housing and on the other hand, a rethinking of the methods of production and management of public housing. With the introduc-

tion of Law 167 of 1962, it was established for the first time that the issue of construction of popular housing must be set within a comprehensive program under the responsibility of the Municipal Administration and consistent with the general planning tools. The Plan for Popular and Low Cost Construction (PEEP), established by Law 167, is a twenty-year planning tool, organized by the Municipalities, which identifies, from the estimated needs for the entire period, the areas to be devoted to popular housing that will be implemented through the preparation of individual plans Zone (PDZ) (Fig. 9). It essentially goes from extraordinary interventions (such as in the case of INA Home Program) to ordinary interventions, planned by local authorities in line with the choices of urban development and economic-financial resources available. The City of Rome, which at that time was involved in drafting the new Urban Plan, placed, for the first time, a specific area of expansion in the PRG plan to be allocated to public housing (area E4). In the following years (1964), the City adopted the The Plan for Popular and Low Cost Construction (PEEP) of the city, which identifies, in accordance with the PRG, 72 areas in which housing for 711,909 people was to be built. Over the next 5 years, the city equipped itself with two important tools for urban programming and planning, which could radically change the culture and practices that had before then characterized urban growth. So clearly, in reality, some logic related mainly to speculative interests still exists. The areas included in the The Plan for Popular and Low Cost Construction (PEEP) are once again outside the existing city (to favor coalescence), are served by large urban motorways (which will never be built) and are arranged around the city in the



Figure 7, 8, 9.

*The Tiburtino neighborhood by Ridolfi and Quaroni (1949), The Olympic Village (1960), Social housing in Rome's first PEEP*

logic of expansion known as “spread like wildfire”. It’s also true, moreover, that the intention of the designers was to create large residential settlements, with all the functional services necessary for living and connected amongst themselves and with the city through a dense road network built for quick flowing traffic.

Following the principles of mono-functional zoning and rationalist urban planning, one imagines residential areas divided on morphological and typological models free of strict nineteenth-century urban rules, in rejecting traditional urban design and through the exaltation of the function that determines the shape of cities.

Unfortunately, the economic crisis that hit the Nation in the mid 60s penalized the investment capacity of the government and implementation of interventions were slowed due to a lack of funds necessary for the expropriation of areas and construction of buildings. In any case, in 1968, the planning and construction of first Plan of Roman areas, the PdZ Spinaceto 46, a pilot example for future implementation, was launched (Fig.

10,11). The neighborhood Spinaceto is located 14 km from the city center along the Via Pontina, in a virtually uninhabited area where they built housing for 26,000 people. At the same time, a massive new wave of illegal construction developed, with the construction of numerous areas scattered in the countryside favored by the speculative interests of the owners of the areas and private entrepreneurs.

After about 10 years, during the late ‘70s, when even the private construction sector was entering a phase of suffering and housing problems took on considerable dimensions, the left-wing City Council undertook a massive investment program to re-launch the issue of public and subsidized housing to restart construction. Consequently, many neighborhoods provided for in The Plan for Popular and Low Cost Construction PEEP (Tor Bella Monaca, Corviale Laurentino 38, Vigne Nuove, Serpentara etc.) were planned and built, with less than excellent results due to the failure to achieve common areas and the lack of attention to building quality (Fig. 12,13).



Figure 10, 11, 12.

*Spinaceto: the first social housing development created following Law 167, Vigne Nuove Housing*

Due to a failure to control the volume and the scarce resources, the settlements that were supposed to be high-density residential settlements surrounded by nature and self-sufficient commercially speaking and service-wise, “dormitory” neighborhoods were built, poorly connected the city but completely, nonetheless, dependent on it. And, it is a fact already known that the intermediate areas continue to increase their value to the benefit of private owners and of illegal expansion.

In 1984, upon the natural expiration of the PEEP I, the City of Rome, not having built all the housing that had been forecast, proceeded to draw up a second planning instrument, PEEP II, which was profoundly different from the previous PEEP in size and in inspirational principle. The failure of large housing complexes built in implementation of the previous program and the simultaneous explosion in the '80s of illegal occupation of the territory lead the City Council to review design parameters and addresses on the basis of the experiences and new trends in urban planning. The PEEP II absorbed the residue of the

previous operation and was re-dimensioned with respect to a housing need for nearly 200,000 people.

The choice of the areas was oriented in the direction of requalification of margins of the existing city (illegal and legal), through the completion of the peripheral fibers and the rediscovery of morphological and typological rules for the definition of urban design. Within many urban interstitial voids many interventions that were more contained compared to previous ones were identified, but above all, an attempt was made to identify a methodology for the drawing up of projects that involved designers to deal with requirements relating to design of the city to be proposed. In this sense a legend was defined, a type that contained, in addition to the components of a functional nature, a set of indicators for a quality construction (silhouettes of buildings, alignments, pedestrian spaces and walkways, porticos, corner solutions, building types, etc.). Almost all areas identified once again differ from the PRG's plan and are mainly located in agricultural areas on the outskirts of the built city.



Figure 13.  
Corviale,  
the one-kilometer  
building in Rome's  
western outskirts

The first town-planning schemes were assigned to groups of talented professionals who offered high quality urban and construction projects that were respectful of the environmental morphological rules defined by the program. In the implementation phase of the projects, nevertheless, something new occurred compared to the history of popular settlements. Due to unexpected archaeological discoveries, but also because of poor project management and coordination by the Administration, the neighborhoods created ended up being quite different from the original plans, losing quality and uniformity of spatial and urban planning.

The design review was assigned to the Municipal offices and businesses and assignees of the lots, and, with a

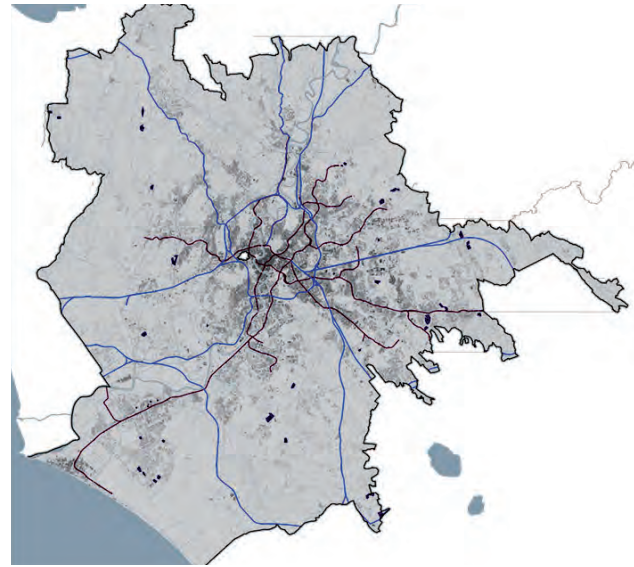
succession of later variants, the area was interspersed by numerous settlements largely standardized and in general lacking quality and services. In the twenty years of the duration of PEEP II, more than 50 additional and equivalent variants that deleted the original areas and always replaced them with others, always different from the PRG, according to random logic often driven by speculative interests, attracted by the complete absence of subsidized housing within the Area Plans.

In the final maneuver of 2007, just months after the end of the program, the City (Resolution DC 65 of March 2007) decided to allocate, bypassing the PRG, the remaining amounts (about 7,000 apartments for 22,000 people), within 32 areas located on the edge of the vast municipal territory (Fig. 14).

At the same time, innovative methods and tools for the achievement of quality standards and urban construction were put into place. It was in this way that the idea of the "Code of Planning Procedures" was born, an integral part of the details of the Area Plan, made up of guidelines and planning tips shared with citizens and the business community.

It is obviously impossible to summarize in a few pages the 100 year popular urban history of a city like Rome. What can be revealed in these brief notes are some of the recurring aspects in the construction of the public city that still today have some construction interventions in act. Beyond the formal visible results in the area, and, as mentioned above, some of the best examples of contemporary architecture are represented by the popular neighborhoods, that were typically created outside of the forecasted General Town Plan in force at the time and in many cases became a tool for the development and

*Figure 14.  
Localization of the last social  
housing neighborhoods  
approved in 2007*



speculation of private land through the mechanism of “co-alescences”. The huge economic and financial resources that were spent for the construction of public housing were not always able to cover the cost of services and activities necessary for the life of a city, often reducing the neighborhoods to anonymous areas, squalid and lacking quality, the exact opposite of the planning goals.

Still in place today are some good procedures especially traceable to the early interventions that followed the Plan of 1909 (Piazza Verbano) or to some completions inserted in the INA Home plan (Tufello, Val Melaina), but these are sporadic examples compared to the standard procedures that still persist today.

Finally, as far as future prospects are concerned, it is necessary to carefully monitor the developments of some initiatives implemented on national and local lev-

els. The reappearance of a “housing issue” in the Italian metropolitan reality has prompted the central and regional government to enact a new extraordinary measure to deal with the housing hardship (Housing Plan of 2009), but the implementation procedures linked to it are not yet clear. Locally, however, the next few years will be dedicated to verifying and insisting on the application of the indications contained in the Code of Planning Procedures and on their extension to all local public and private construction works, trying to prevent an increase in land consumption and operating in the direction of urban, construction and environmental quality.



## 12

## Density, public space, landscape

*Three values for an urban project in Rome**Dr. Luca Reale*

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In the late '80s, thanks to the spread of satellite maps, we found ourselves faced with a situation that was expected, but of which designers and planners did not know the exact extent. The phenomenon of an urban sprawl, which moreover, had been since growing, was starting to be recognized. Italy, with a few exceptions, is now showing a strong delay in the field of anti-sprawl regulations, in most parts of Europe new buildings are constructed, in fact, (by law), on brownfields on already urbanized areas.<sup>1</sup>

Parallel to this phenomenon, an instrumental use of an urban sprawl as a template (something to study but up against which you have no power of transformation) has pushed architects in recent years towards a greater self-referentiality. Architecture has become the leader in image, formal invention and ostentation of technology, becoming increasingly distant from city construction. Architects' refuge in artistry and in the "signature" as an affirmation of a personal language development has produced more effective constructions in terms of communication and consensus both on a level of social utility and civil and cultural roles. This movement away from the specific discipline has increasingly reduced the sense of responsibility; planning issues such as collective housing projects or the definition of public space have received less and less interest from designers and even less from the publishing industry. Proof of this the overwhelming

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<sup>1</sup> Since 2001 in England, a national law exists that requires that 70% of new developments be built on brownfields; the Ken Livingstone's City of London - as recently recalled Richard Rogers - has grown in population by 1 million in 10 years not using a single hectare of remaining free soil (greenfield)

number of projects published in the last twenty years, few regarding residence, public spaces and yet a lot about museums, expos and single family houses.

Today because of the global financial crisis, or perhaps thanks to it, there is a trend reversal. Architecture re-vamps its practical being which addresses necessary issues or ones of social urgency or need, so we go back to thinking of the project also in terms of problem solving, besides as in terms of aesthetics or of communicative impact. The scenario is changing: the difficult economic conditions, uncertainty about jobs and professions, cultural homogenization and the questioning of the global star system of architecture<sup>2</sup> suggests an alternative to the naturalized sprawl and to the relative cultural and social impoverishment that has resulted from it. If we suppose that in the coming years architects cannot escape the role of privileged speaker of urban transformations and that architecture must return to affect the growth processes of the city, then we must figure out how this will happen. After numerous incursions into the world of the arts, science and sociology, architecture today has the duty to return to affect the processes of transformation of cities. Establishing the rules of urban design, an instrument now implementing many transformative practices, will be the first ground of comparison with town-planning. In fact, today there is indeed a cultural and disciplinary vacuum in all of the

intermediate stages between urban planning and architectural design. It is from this point that it is necessary to start again.

## 1.

### The crux of density and the housing issue

The first value to reflect upon is density. In recent years - as mentioned - a continuous and unbalanced consumption of land and a paradoxical - compared to this strong building activity - and progressive increase in emergency housing by the middle and low class has been registered.<sup>3</sup>

Targeted social housing in a consolidated city may mark a turnaround. On the one hand, a signal against the continued use of agricultural land through the use of urban brownfields (ex-factories and second-hand warehouses, unused railway areas, unfinished lots and spaces); on the other hand, a tool to revitalize the city center through increased social and functional diversity (*mixité*) and the introduction of really “necessary” housing, unlinked to exclusively speculative transactions. Architecture must create proximity. Density makes possible the recovery of sequences of spaces, work on conjunction, on the in-between, on urban porosity, as it is fashionable to say today. The city must begin to produce (or shrink) a density of settlements likely to foster relationships,

<sup>2</sup> Serious self-criticism in the world of architecture is still lacking, meanwhile the non-architects’ attack is harsh and sometimes prejudiced. In this regard please see: F. The Cecla: F. La Cecla, *Contro l’architettura*, Bollati Boringhieri, Torino 2008, N. A. Salingaros, *No alle Archistar. Il Manifesto contro le avanguardie*, Libreria Editrice Fiorentina, Firenze 2009

<sup>3</sup> That segment of the population – which continues to grow – is not poor enough to qualify for the list for public housing and not wealthy enough to pay a mortgage in order to buy a house on the open market. In this regard please see: G. Caudo, *Dalla Casa all’abitare*, in F. Garofalo, *L’Italia cerca casa*, Electa, Milano 2008

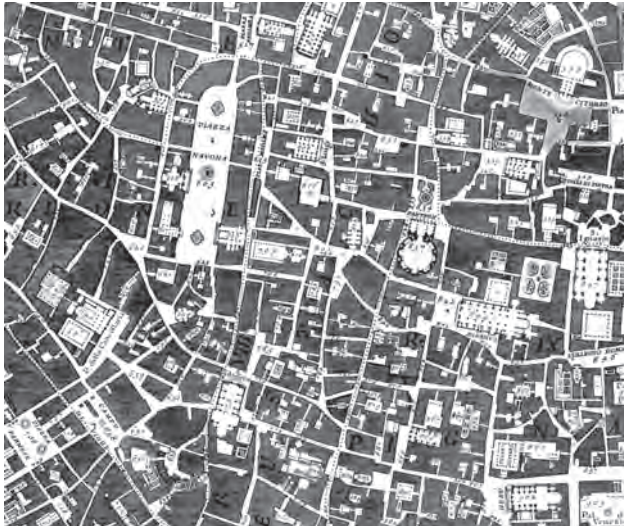


Figure 1. G. B. Nolli, detail from the *Nuova Pianta di Roma*, 1748



Figure 2. Rome, archipelago of urban islands  
(from: F. Fratini, *Roma arcipelago di isole urbane*.  
*Uno scenario per il XXI secolo*, Gangemi, Roma 2000)

ensuring overlapping of functions and human activities, the coexistence of different social and cultural categories in the same places.

The attracting component of the city is undergoing profound change. The independence of the inhabitants in terms technological equipment and the ability to communicate directly from home is the cause of the dissemination of the inhabitants in the area, more so than the mass motorization of the '60s, more than any process of the outsourcing of work that was in progress since the '80s. The search for a renewed relationship with nature and refuge in "home-life" rather than "social-life" separates and further deconstructs human settlements. At this point, the city seems superfluous. Yet in recent years, a renewed need for cities has been recorded, confirmed by the continuous increase in urban populations. Cities must increase the quality and the "necessity" of what it offers: it will then be essential to focus on a level of density that favors spatial quality and sociability. Therefore, we are faced with a real change of values. The new values are centered on the quality of public space, landscape and architecture.

## 2. The reinvention of public space

The future of contemporary cities gambles on the three terms. In a consolidated city the potential of open spaces is "activated" through single relevant projects relevant (Auditorium, Mercati Generali a Roma-General Markets in Rome), or is the same open space in the form of a structural element of urban landscape, perhaps reusing abandoned infrastructures (High Line in



Figure 3. OMA, *City of youth: Transformation of Rome's former central market* (photograph of the model presented for the 2004 international design competition)



Figure 4. *Playgrounds, Amsterdam*, Aldo Van Eyck 1947-1961 (from: Lotus 124/2005, p. 72-85)

New York ). Through these transformations, or “regenerations” that culminate in events (the Olympics, a city of culture, fairs, festivals, biennials, etc.), but that try to transform “functional” opportunities in new attractions (the new headquarter campus of Bocconi University in Milan, the bridge over Grand Canal in Venice), cities - through their centers - are placed in competition in the international cultural-tourism market, offering as an potential their urban, empty, interstitial spaces, or spaces that are to be transformed. How can we activate similar processes of regeneration in the unstructured outskirts of Rome?

We must first return to focus on the quality of public space, which is truly missing in the urban sprawl. If the compact city was historically based upon a hierarchical sequence of public spaces, the urban sprawl is a sequence (and extremely dilated) of private fences. The historic city, continuous and defined in its physical and social functioning, was a single body, a compact system marked by certain clearly established gaps. The public space practically disappears in the city sprawl in the face of, paradoxically, a huge amount of land designated for infrastructure. What is missing is the hierarchy of spaces, differentiation and overlapping of activities that are all concentrated in mono-functional districts. The territory takes on strong homogenous features and the places become ever increasing similar amongst themselves. It is not only a physical fact, but also a social one: the city sprawl is the city of individuals, a private place, how can one still think of a public space in this context?

Public space and infrastructure of roads should be designed together and require a rethinking of the com-

mon paths, of road sections, of margins.<sup>4</sup> A master plan for “linear” public spaces in the city could initiate a first regeneration process also through a reflection on the containment of vehicular traffic. The social and environmental costs of commuting are no longer sustainable by people forced to endure congestion as a permanent condition and the home – even more so the neighborhood – is seen as an oasis, a refuge isolated from urban congestion.

### 3. In the direction of the city-landscape?

The renewed interest in the issues of form and urban design now cannot ignore the theme of landscape. Rome is a city that has grown irregularly, certain parts separately, a city in which a void still prevails as it did not have this growth historically, it had no physical strength to contain a broad distribution throughout the territory. In ancient times the Pontine Marshes were a huge swamp land lacking free historic villages. The town then developed in enclaves (on the hills) and large arteries of traffic (in the valleys). Even today, the growth of the city confirms this original predisposition, supporting the primary element in its topography of urban morphology.

The expansion of settlements also suffered a great acceleration since the early 1900s, when the first neighborhoods built “not-according to plan”, as the purchase

of areas evidently cost less. Since then, the policy of “coalesced areas”, or rather, the use of new settlements as bridgeheads for the future development of the city, became a habit. It was like this for the townships (the temporary ones and the second generation ones), INCIS quarters, before the law 167/62, but also for Area Plans. The illegal settlements will also have an important role in this type of urban development and city planning also contracted the “plan as you go” will eventually fall into the same pattern: one purchases (or receive as compensation for previous rights to build) farmland because it is cheaper, the empty spaces are saturated before reusing areas already compromised and thus coalesce the settlements. Yet in the pulverization of the galaxy outskirts of Rome, vacancy still prevails, and it is precisely open space which is the element most highly characteristic and qualifying of this area that is so extensive, where the only structural element is at the bottom of the GRA. Sprawl, economic crisis, difficulties of administrators and the public opinion to realize that settled sprawls are a problem so serious makes the current situation unstable; how do we come out of this impasse (em-passe)? Is there is a possible urban model? Perhaps the city-landscape, a city that acquires the features of the landscape<sup>5</sup> maintaining its urban properties (density, structure, intersection between systems). The landscape is obviously no longer that of Alinari, but it is also not the one set by the European Landscape

<sup>4</sup> in regard to these topics please see the substantial text of: W. Tocci, I. Insolera, D. Morandi, *Avanti c'è posto. Storie e progetti del trasporto pubblico a Roma*, Donzelli, Roma 2008

<sup>5</sup> R. Panella, *La nuova frontiera della Città che si integra nel Paesaggio*, in: R. Panella (a cura di), *Architettura e città. Questioni di progettazione*, Gangemi, Roma 2008

Convention, especially in the Italian translation of the text.<sup>6</sup> Today, the inner-vision and the inner-edge of emptiness (spaces) prevails over full (spaces). Inner vision is not only subjective, but the fact that one lives inside the urban sprawl means that there is no public use of such urban sprawl. In a city-landscape made up of empty spaces more than full ones, the internal margin of these empty gaps become fundamental. The Roman landscape, consisting of developed enclaves and large archaeological areas that reach right into the consolidated city, can have this theme as an identifying and founding element for its future urban planning: empty spaces will be the connecting and structural element of the city-landscape.

#### **4.** **Densification and thinning, two aspects of the same strategy**

If emptiness is identified, preserved, and “redefined” through targeted thinning, the city will once again, in some way, “grow on itself”, as has always historically occurred. The new Town Plan of Rome introduces mechanisms that facilitate renovation within the fiber of the city, but also within in the consolidated city, replacement of degraded areas or particularly saturated with constructions of poor quality. The demolition and reconstruction interventions may have different objec-

tives: to strengthen, prioritize, structure, create intersections between systems, but also diversify, thin, free, even re-naturalize.

If we do not want to nostalgically re-propose a compact city made of fabric and the urban scene (a model that works very well in the business of large retailers, let's think of outlets), nor do we want to accept the as a pure status quo the destruction of the city and its relative social deconstruction, perhaps the “public” city produced by the large operations of 167 is one of the first places at which to start and upon which act in the near future. The city built according to the Area Plans has very low density, slightly higher than an illegal city,<sup>7</sup> a lack of services (often the ones originally planned are not achieved), a major problem of social integration, open spaces between buildings that are indistinct and without any order and a limited typological variety of housing. However, it is almost always a city with a strong structure, a system of infrastructures that is actually oversized, a correct measurement of standards for the population. The introduction of new types of buildings, the redesign of the connective urban quota through diversification of vegetable or mineral fields (parterres), a different programmatic identity for various open spaces, the introduction of land and services capable of mediating between residents and

<sup>6</sup> Paesaggio designates a certain portion of territory, as perceived by the people, whose character derives from the natural factors and /or humans and from relation between them

<sup>7</sup> refers to the calculation of the “surface” density, FAR (Floor Area Ratio), corresponding to ‘It = index use planning (or land building index) of the planners, or the maximum achievable gross floor area per sqm territorial. In regard to these topics please see L. Reale, Densità, città, residenza. tecniche di densificazione e strategie antisprawl, Gangemi, Roma 2008



Figure 5. Xaveer De Geyter, Urban network for the Flemish Diamond sprawl area, Belgium (from: X. De Geyter, *After-sprawl*, NAI Publishers/De Singel, Rotterdam 2002)



Figure 6. Study for an atlas of density in Rome (from: L. Reale, *Densità, città, residenza. Tecniche di densificazione e strategie anti-sprawl*, Gangemi, Roma 2008)

landscape (vegetable gardens, playgrounds, gardens), are all operations of densification, mending, infill, which can revitalize these neighborhoods.

The flaws of the sprawl are instead that of being weak and monotonous, but also very prone to this transformation.<sup>8</sup> In a city of settlements spontaneous in nature (the ex-zone or ex-plan), the possible interventions are both ones of demolition and selective densification. The targeted thinning will make space for services and places for socializing, meeting, temporary activities and events. Densification could become a means to more clearly define the margin of an enclave to strengthen a road axis perhaps turning it into public “linear” space, in order to finally introduce a sudden attractive polarity within a uniform and repetitive tissue.

Through urban design – which the NPRG of Rome established as a direct implementational tool,<sup>9</sup> but for which it does not dictate the rules - these strategies will be implemented, trying systems different from those suitable for historic cities: in the deconstructed outskirts densification and diversification will be sought rather than the functional stratification. The urban project, as much as it is guided by complex procedures and connected to variables other than the architectural project (time, flexibility, participation, etc...) cannot evade the issues of architectural inspection, of the morphological configuration, of the control of open spaces. It is this tool that architects should concentrate its forces on if they want to begin influencing urban transformations in the coming years.

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<sup>8</sup> In regards to this please see:  
Xaveer De Geyter, *After Sprawl*, NAI Publisher, Rotterdam 2002

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<sup>9</sup> Art. 16 of the NTA in Rome's NPRG

# Housing in Rome

*A photographic investigation by the students  
of the Faculty of Architecture «Valle Giulia»*

When it comes to housing, the subjective perception becomes a very important issue.

This is why, in view of Hopus's final conference, we asked our Faculty's Flickr Student Photography Club ([www.flickr.com/groups/vallegiulia/](http://www.flickr.com/groups/vallegiulia/)) to organize a contest dedicated to "Living in Rome".

As always, the results were surprising, with technically amazing shots but, above all, a poetic eye for the unexpected beauty, and an unforgiving accusation of the blatant ugliness of our city's new developments.

*Photographers:*

Alessandro Acciarino

Elena Caruso

Matteo Cavalieri

Enrica Corvino

Marco De Simoni

Daniele Frediani

Sirio Gori

Luca Marcotullio

Guido Massantini

Lorenzo Ranghiasi

