

November 2012

# The URBACT

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

Tribune ARTICLE





Retrofitting 315 flats in Budapest with new external wall insulation and solar heating

# RETROFITTING OUR WAY OUT OF RECESSION

BY PAUL CINIGLIO AND ANTONIO BORGHI

**The built environment of European cities must urgently get in-shape so that it is “energy-fit” for the future. In order to achieve this transformation, owners and occupiers of buildings will need to be persuaded to make their assets more energy efficient. Not only will this require unprecedented investment, but our cultural city centres must also be preserved in the process.**

**The URBACT “Building Energy Efficiency in European Cities” workstream has been set up to examine the role of city public authorities for energy efficient urban communities through retrofitting in the building sector. This article presents the first findings of our work.**

**C**ity authorities have a vital role to play in the retrofit revolution. This is no ordinary task; on the contrary, it is without doubt amongst the most challenging prospects Europe has ever faced. Investment in the UK alone to meet national retrofit targets would be the equivalent of building the Olympic games from scratch every year<sup>1</sup>.

As the Energy Performance in Buildings Directive<sup>2</sup> raises requirements and continues to bite, all member states need to develop an even more robust strategy to lower the environment impact of their buildings. This approach must reduce energy waste and consumption while improving energy efficiency and onsite generation from renewables.



It is clear that a multitude of barriers will need to be overcome if we are to collectively realise our European retrofitting aims<sup>3</sup>. If tangible progress is to be made year on year in order to reach our targets, next year is arguably the last year in which politicians and urban policy makers have to overcome the principal obstacles to retrofitting so that climate change can be seriously tackled. If we fail to rapidly pick up the rate of retrofitting, it will be simply impossible to address the task in later years.

A strong and sustainable case exists for retrofitting our existing buildings in preference to their demolition and redevelopment. European policy on retrofitting continues to mature and coherent action must now follow. Despite the most difficult times of austerity, the economic benefits of mass retrofitting could be the best opportunity to pull the EU out of recession.

This article primarily focuses on four interwoven catalysts for change. The first is to stimulate demand for retrofit by improving its appeal to building owners. This offer must be attractive and ideally made at a time to match demand for refurbishment work. The second is the need to seriously address fuel poverty and provide affordable warmth to millions of households in the face of rising energy supply prices and static levels of household income. The third is ensuring that adequate long-term and affordable sustainable finance is in place whilst simultaneously tackling user behaviour as an essential aspect of making the financing work. The fourth issue focuses on our unique urban heritage and the improvement of its energy efficiency. Historic buildings have specific peculiarities arising from their form and construction which relate to their value as material evidence of the past.

### ***How can retrofit demand and appeal be stimulated?***

Cities have a key role in generating demand and appeal for retrofit. They are ideally placed to facilitate, coordinate and drive action through targeted policies, campaigns, seminars and workshops that bring together professionals and stakeholders to discuss potential solutions.

The argument for retrofit at present often suffers from a market-wide communication failure, a so-called virtual “circle of despair”. Owners and users are unaware of the benefits and often fearful of the disruption that retrofitting work will bring, designers are not fully aware of the options, are cautious of the

competence of installers or products and don’t want to increase project budgets, and contractors are not presented with eco-design solutions and don’t develop the skills required. Consequently the circle revolves.

Cities can play an important role in breaking this circle by encouraging the transfer of knowledge to people concerned and by communicating to building owners and users the benefits that retrofitting can bring, such as reduced operational costs, improved comfort, healthier buildings and the opportunity to enhance the layout and facades of buildings at the same time. Moreover, taking advantage of “retrofit trigger points” or “golden moments” that arise when traditional refurbishment work is carried out will minimise the additional costs for eco-fit.

---

### **Taking advantage of “retrofit trigger points” or “golden moments” that arise when traditional refurbishment work is carried out will minimise the additional costs for eco-fit.**

---

Positive messages to potential clients, owners and occupiers shouldn’t be restricted to selling only the economic benefits of retrofit. Broader advantages such as improved thermal comfort (e.g. tackling the cold wall effect) can be a powerful motivator to act as it is more easily understood by many occupants.

### **What about the role of professionals and building contractors?**

The role of architects and other professions in advancing high-quality retrofit is vital. Getting the detailing right is crucial in order to avoid creating problems with future maintenance. Indeed, the retrofit process should be viewed as an opportunity to reduce long-term expenditure on maintenance. Architects and building professionals should also be called upon to provide the professional retrofit services required by the market. This will include helping to engage and motivate the masses of building contractors to improve their skills and understanding of retrofit, especially the “golden moments” that will allow them to up-sell their eco-retrofitting services at the most opportune time.



**University of Applied Sciences, Darmstadt before and after retrofit 2010/11, Cornelsen and Seelinger Architekten**

Estate agents also have a part to play in incentivising retrofit. How can they be assisted to actively help reverse the current public apathy towards Energy Performance Certificates? Is there a case for capitalising the value of a home following retrofit improvements?

### **To what extent does sharing experience and making retrofit visual help?**

Best practice examples of completed retrofit projects can be very successful in generating new demand. Clients generally like to see first hand what is available to them before they invest and retrofit is no different in this respect.

A network of over 500 building users based in cities throughout Europe have helped to improve awareness by participating in “The Display Campaign” to make the benefits of energy-saving visible and is underpinned by effective communication to all building users.



## Best practice examples of completed retrofit projects can be very successful in generating new demand.

A prolonged advertising campaign can be a powerful tool in selling the benefits of energy fit renovation to the wider public. Well-known TV personalities, for example, could help to change customer attitudes. Furthermore, this type of approach could help to build on the good work of the EU Covenant of Mayors and their responsibility to produce a holistic city-wide energy-saving action plan.



If real progress is to be made, citizens must ultimately want more energy-efficient buildings and city authorities must understand their motivation, and should act and appeal to this inclination, whether it is to make their building look better, to make it more comfortable or to safeguard against fuel price inflation.

### ***To what extent can retrofit help alleviate household fuel poverty?***

Fuel poverty can be defined as the inability to keep a home adequately warm at an affordable cost. A common definition of fuel poverty, used in several European countries, is where a household spends more than 10% of its disposable income on annual fuel bills. Recent studies undertaken by European Fuel Poverty and Energy Efficiency (EPEE) revealed that in France and the UK as many as 12% of all households live in fuel poverty by this definition. The EPEE proposes a practical guide to local authorities to address the issue through energy efficiency, using social tariffs, public funds and raising awareness<sup>4</sup>.

Fuel poverty is particularly prevalent in Europe's social housing sector, representing some 25 million homes, as occupants are

typically on lower than average national household incomes. The issue, however, is certainly not limited just to social housing. CECODHAS estimates that tens of millions of people across the continent are adversely affected by the situation, many of whom will reside in private sector and private rented accommodation<sup>5</sup>.

The effects of fuel poverty can be drastic with poor health extremely common amongst those caught in the trap and thousands of excess winter deaths occurring every year, especially among the elderly. Many households are today facing the unacceptable stark choice of simply whether to “heat or eat”.

While there is growing awareness and understanding of fuel poverty and its causes, the issue is not clearly defined in every European country even though similar problems such as unpaid energy bills, an increased burden on health services, under-heating and self-disconnecting from fuel supplies are observed. As climate change takes effect, in order to avoid thousands of summer deaths from heat exhaustion, the demand for affordable cooling is set to grow and will lead to even higher home running costs.

### ***How can the bill for retrofit be paid for?***

Financing retrofit on the scale required presents a raft of difficulties to overcome. Central to this will be the understanding and mitigation of the relationship of technical and financial risks in reaching a proposition. As with all financial investments, it is not possible to predict future market conditions. In the retrofit context, what would be the effect of extremely volatile energy supply prices or the costs of renewable energy equipment in world markets?

The principal financial problem is one of return on investment. Only by taking a long-term view of the investment can this be easily justified. The problem for retrofit is exacerbated where building owners or occupiers do not intend to remain in their property-based assets in the longer term.

In the wake of the financial crisis, it is apparent that banks are reluctant to lend against new finance mechanisms they perceive as higher-risk. This is unfortunately slowing innovative alternative methods of financing retrofit coming to be widely available in the market place.

### **Case study – “Old Home Super Home” network, Sustainable Energy Academy (SEA), UK**

Over 140 home-owners who have retrofitted their homes have joined forces to showcase retrofitting to the public on open days in cities and towns. Public interest in the show homes has been immense with an average of over 20,000 visitors each year learning about a broad range of retrofit techniques. The power of the network is the impartial learning exchange between visitor and home owner. The SEA estimates more than 25% of visitors to a show home go on to spend over €5,000 on their own home following the visit.

The show home pictured in the street below was part of the “Retrofit South East” project and whilst open received over 400 visitors including the local MEP. Here, residents of social housing were responsible for helping to determine the future of their prefabricated homes which were taken from a band “E” to a band “A” Energy Performance Certificate rating. The retrofitted homes have put pride back into the local community and reduced annual running costs by as much as 60%.



## The proportion of ERDF funds available for energy efficient retrofit from 2014 is expected to substantially increase up to 20%.

### The European context

Retrofit is able to attract EU Cohesion funds through the European Regional Development Funding (ERDF) subject to match funding.

The current ERDF fund for 2007-13 was €201 billion with €55 billion allocated to the competitiveness and employment objective. In 2009, rule changes to the structural funds allowed regions to allocate up to 4% of ERDF budgets to the retrofitting of social housing. CECODHAS Housing Europe have witnessed mixed success with the uptake of funds set aside for this purpose by their members.

The proportion of ERDF funds available for energy efficient retrofit from 2014 is expected to substantially increase up to 20%. The challenge will be to make sure that blockages to funding allocation are cleared throughout the EU and that the full quota of resources is used effectively for its intended purpose.

City authority owned and occupied buildings are in a favourable position in which to benefit from retrofitting; in fact they have been directly addressed by the new Energy-Efficiency Directive. Not only does the long-term interest exist, but the savings in the running costs that are realised following energy-efficient retrofitting also remain with the public authority enabling the payback on the investment to be more readily achieved. However, retrofitting 3% per year of the buildings owned and occupied by central government (as indicated in the EE Directive) is not a sufficiently ambitious target.

Where city councils own but do not occupy buildings, which is typical in the case of social housing, the justification to act is less obvious from a purely financial perspective. Having made the investment, the problem of the benefits from running cost savings accruing to the occupant and not the investor are presented and not easily reconciled. The ongoing funding squeeze on local authorities only underlines the difficulty they face in advancing retrofitting.

Some solutions to this problem have been found when government legislation such as the "Warm Rent" approach in the Netherlands allows a Landlord to increase the rent charged for a property where the building has undergone an energy efficient overhaul. Carbon trading such as "White Certificates"<sup>6</sup> is another means of reducing the financial burden on property owners.

### How should user behaviour in relation to retrofit finance be dealt with?

It is usual for energy modelling to be undertaken before work commences to predict the typical savings the occupier should achieve under normal conditions. The post-retrofit reality can unfortunately be very different. The influence of user behaviour, which is notoriously difficult to control, becomes critical to the investment working because it makes energy cost reductions uncertain. Can this risk ever be sufficiently mitigated?

To improve the likelihood of achieving running cost savings, occupants of buildings should be included in the retrofit process from inception to completion. Central to this involvement should be incorporating occupiers in a campaign to change energy behaviour. For housing associations, community-wide approaches work well. The programme should not be a bolt on to the retrofit-process, but rather an integral part as energy-fit buildings require energy-fit users if the investment is to work. There are many good examples of community-based energy campaigns in the EU that once replicated will help to make project outcomes more certain.

### Energy-fit buildings require energy-fit users if the investment is to work.

The URBACT CASH network has documented a number of legal instruments to facilitate the active participation of social housing occupiers in renovation works. "Brindisi City Council has agreed to provide 30% of rental income to the tenants' union for self-management, including energy efficiency measures. The Regional Observatory of the Apulia Region (ORCA) has developed a database of stakeholders' needs and is using it to support the region in drawing up adapted regional regulation on the energy efficiency renovation of public social housing"<sup>7</sup>.

In Germany, the KfW development bank aims to promote the construction of new energy-efficient homes and the energy-efficient refurbishment of older residential buildings by offering grants or loans under favourable conditions. KfW have recently started their "At your doorstep" initiative to directly provide those interested in KfW promotional offers with advice on all aspects of energy-efficient construction and refurbishment. KfW intend to set up an "Information house" in central locations in different cities for three days at a time to offer financial advice.

### What kind of retrofit finance is more likely to be successful?

There are many approaches to finance in operation in the EU although they are often bespoke to central government legislation rather than city policy. In Denmark, a small proportion of the taxation system is specifically allocated to a retrofitting fund while in Italy up to 55% of energy renovation costs can be subsidized by the State over 10 years via tax reduction. These types of initiative have driven a significant reduction in the environmental footprint across the building sector over the last decade and city authorities have the ability to take a more active role in their promotion to encourage wider uptake of retrofit.

The new UK Government flagship initiative called the "Green Deal"<sup>8</sup> was launched in 2012 and in parallel will see a £1.3billion Energy Company Obligation (ECO) invested with the aim of encouraging the mass retrofitting of residential and commercial property. Several city councils such as Birmingham and Newcastle have responded promptly to develop local approaches to maximise the potential of the Green Deal.



## Revolving Retrofit Guarantee Fund (RRGF), Global Environmental Social Business (GESB), Budapest & Miskolc, Hungary

The RRGF model, originally developed by the World Bank, has been highly successful in Central and Eastern Europe with over 100,000 homes in these regions already having benefitted from retrofit loans using a non-asset-based finance programme.

Borrowing takes place against a cash deposit guarantee fund.

In the event of default on loan repayments, arguably the biggest risk to commercial bank lenders, the lender has the option to draw down on the guarantee fund as security.

The experience of GESB's programme in Hungary is that the loan eligibility criteria adopted have resulted in close to zero defaults on loan portfolio repayments.

In this way the lending is effectively de-risked and becomes more affordable.

The model has unrivalled leverage potential, especially as the fund revolves.

Take-up of the socially orientated RRGF loans has been high, especially in formerly state-owned housing as residents feel more secure than relying on traditional loan finance.

## How can cost and carbon savings best be reconciled?

There is much talk within Europe of "cost optimal retrofit". Essentially, this considers the ratio of money spent to the amount of carbon reduction achieved. Selecting the most appropriate retrofit strategy for the building will help to produce more favourable results. However, consensus on how much we can afford to cut emissions in reality appears to remain absent.

The approach to retrofit also requires attention as it has a direct impact on cost. Is it more effective to retrofit a house just once, adopting a holistic package of retrofit measures, or are single or piece meal interventions introduced over time the better approach? The answer will depend on many factors but we

should be mindful that persuading a building owner to take out additional retrofit loans in the future could be difficult.

When considering the urban dimension, opportunities for more cost-effective approaches bringing economies of scale to retrofit can arise. Installing district heating or combined heat and power plant in densely-built zones will proportionately reduce the costs of becoming energy-fit. The role of Energy Service Companies (ESCO) and smart grid infrastructure must be planned well in advance as integrated strategic solutions.

## Transforming our cities: Investing in retrofitting or site redevelopment?

A common feature dominating the skyline of many cities is the unoccupied, old, outdated high-rise office blocks. The demolition of these structures followed by redevelopment of the site is an obvious option, but should the refurbishment of these buildings through retrofitting be the preferred option? A new use for these buildings might even be viable, such as converting undesirable office space into flats which in turn would address demand for housing in city centres.

Much of Europe has become obsessed with "energy in use" of buildings when what really needs to be considered is the through-life carbon emissions. By taking into account the locked-in or embodied energy of the existing structure, the refurbishment process will normally produce a fraction of the emissions caused by demolition and site redevelopment. The "Retrofit South East" UK project<sup>9</sup> included a through-life carbon emissions study concluding that the advanced retrofit of old homes compared to demolition and building nearly zero-carbon new houses is more favourable. The retrofitted home produced lower emissions over a 50-year comparison period and could be delivered at 40% less cost.

Scaling this up to current levels of national housing demolition alone creates a compelling argument for reusing our existing buildings while

## The advanced retrofit of old homes compared to demolition and building nearly zero-carbon new houses is more favourable.

maintaining existing communities. The potential drawback is that the opportunity to increase housing density in the redevelopment process is largely lost. If carbon reduction is the priority, what should be the preference of city authorities – retrofitting or redevelopment?

While robust nearly zero-carbon standards for new buildings must be adopted, the emissions from new energy-efficient buildings represent only a tiny proportion of the emissions needing to be cut from the EU's overall built environment in the long-term. Furthermore, new low-carbon buildings are an expensive and slow way of tackling the problem.

Should it be argued, perhaps controversially that the standards demanded for new buildings are being set too high? Should they be reduced, allowing some of the higher investment that would have been spent to be redirected to concentrate on retrofitting existing buildings? After all, existing buildings represent over 99% of the EU's emissions problem. A balance needs to be struck. The recent work of the "Zero Carbon Hub" and the so called "allowable off site solutions"<sup>10</sup>, enabling a developer to buy out of residual carbon emissions, is interesting for the future.

## How can the retrofit process help preserve the cultural heritage of cities?

Historic centres play a vital function in setting the character and identity of our cities; they help to offer a unique sense of place and history and help visitors navigate from place to place. Most of the cities worldwide preserve their historic centre either in part or as a whole. It is worth mentioning, too, that historic buildings represent a third of the European built stock. These buildings hold special values due to their character as material culture; they are protected by law which means only minimum intervention to preserve their authenticity is permitted. Moreover, they differ from modern structures both in architecture and in construction which increases difficulties in assessing their energy efficiency.

In most cases, historic buildings do not respond well to contemporary needs. As a result, they can often be less desirable to occupy, may remain empty and ultimately decay, detracting from the image of the city centre. Therefore, a major retrofit challenge is how we successfully retain our landmark historic buildings at a time when the need for their renovation and re-use appears to be urgent. Energy efficiency hasn't to date



## The White Rose Foundation, Delft (The Netherlands)

The White Rose Foundation, a case study of the URBACT LINKS Network, transformed a 16th-century-monument, located along the oldest canal in Delft, into a monument of stunning beauty through restoration and retrofitting.

Within the context of the INTERREG IV B Project LivingGreen, the eco-restoration included the use of sustainable materials, measures for energy and water saving, renewable energy generation, and smart technologies to monitor energy use.

This is just an example of how energy retrofitting can be adapted to unique architectural features.



officially extended to heritage buildings. Nonetheless, occupants of protected buildings also need to have a healthy and thermally comfortable internal environment at an affordable price to install and run.

Due to the strong interest of cities to preserve their cultural heritage, important steps have been made in assessing their thermal performance as well as methods of how this can be improved. As a general rule, facades are fully-retained and minimal alterations are made to their internal form and structure in relation to their values. Interventions should preferably also be reversible.

The introduction of double-glazed windows, floor, ceiling and wall insulation undertaken internally can, where permitted, be amongst some of the acceptable retrofit works. In addition, more accessible options include making building services such as heating and lighting more efficient and engaging users and visitors in an energy or water-saving campaign. The use of renewable energy in certain cases may also be allowed.

In general, the possible options and measures need to be determined specifically to suit the building while respecting its individual qualities and the needs of the occupants.

## Future-proofing the Historic Centre of Bayonne (France), Lead Partner of the URBACT LINKS network

The city of Bayonne has identified as the priority objective to enhance energy efficiency of its urban fabric in the historic centre to safeguard its intrinsic quality. To do so, local craftsmen, professionals, suppliers and end users are involved in eco-restoration projects.

The project demonstrates how historic homes can be effectively eco-renovated while maintaining their specific features, using natural materials and how traditional construction skills and repair techniques can be passed down from craftsmen to apprentices.

A series of training events (Café Thématique) and knowledge-sharing sessions (Form-Action) have been organised to mainstream eco-restoration creating new job opportunities.

Frédérique Calvanus from the City of Bayonne says that the project “mobilised a network of actors, identifying opportunities for the local economy, taking part in structuring the eco-restoration market and stimulating demand are the priority objectives of the URBACT LINKS project.” One difficulty that the project has encountered was the amount of time spent in gaining certification for insulation products for historic buildings.

The provision, by the City of Bayonne, of interest-free loans for the retrofitting of historic buildings makes the case for this type of offer to be made more widely available in the EU, especially for those less able to pay.





Frank debates will almost certainly need to be held between cities responsible for safeguarding historic buildings and their occupants or professional agents. What compromises are we prepared to accept if the running costs of historic buildings are to be kept sustainable in the long-term?

## How do we get the knowledge and skills in place?

The retrofitting of historic buildings requires contractors to have the requisite skills and understanding of how old buildings work. The fabric of historic buildings and construction materials function in a different way, which means modern retrofitting techniques are not always suitable.

Another problem under discussion is how to deal with the increasing cost of the retrofit of historic buildings due to the specific demands deriving from their nature and character.

There is still much to be done. Questions such as knowing what the true energy status of historic buildings is, how deep retrofit interventions can go and whether sufficient historic retrofit knowledge exists still need to be resolved on a wider scale. As a labour-intensive economic activity which is impossible to de-localise, eco-restoration can certainly be a major driver of local economic development involving a broad range of suppliers and professionals. Are we really moving towards the right framework to unlock its potential?

## Conclusion: Retrofitting as No. 1 Priority?

It is clear that the retrofit agenda demands that Europe looks back in time at its built environment if we are to create the cities of tomorrow. The opportunities that mass retrofitting can bring are abundant. Indeed, retrofit could potentially hold the key to reversing the current financial crisis by literally retrofitting our way out of recession. In addition, people and the environment are the main beneficiaries of the transformation of our cities through retrofitting.

In addition to city initiatives, national legislation also needs to be reviewed if European emission reduction targets are to be met. A raft of barriers must urgently be eliminated or better managed throughout Europe to expedite the process of scaling up retrofitting

in our cities. Reviewing examples of the best continental practices will help pan-European approaches to emerge.

Paying for retrofit requires special attention by city authorities. Failure to act is not an option as it would lead to dire social consequences. Retrofit is a proven method of helping to alleviate the root causes of fuel poverty, which continues to grow throughout Europe.

With funding priorities for European Regional Development Funding (ERDF) about to be set, the time is right for lobbying and making firm recommendations to decision-makers. City public authorities have a pivotal role to play in driving retrofit forward in the urban environment and must rise to the challenge without delay.

It is asserted that “the” number one funding priority for the EU in the coming years should be retrofitting in order for cities to become energy-fit. So, let the retrofit revolution begin! ●

(1) The London Olympic Games cost approximately £9 billion. To meet the UK's obligations under the Climate Change Act 2008, which requires an 80% reduction in GHG emissions by 2050 on 1990 levels, every year half a million existing homes would require retrofitting to an advanced energy performance standard costing on average at least £20,000 per home or £10 billion in total per annum

(2) The Directive on the energy performance of buildings (EPBD) of the European Parliament and Council came into force on 4 January 2003 committing the EU to reducing carbon dioxide emissions. The re-cast EPBD adopted in 2010 requires energy efficiency measures for all buildings, removing the 1000sqm threshold and setting the ambitious target that all new buildings will be nearly zero-energy by 2020. Regrettably the opportunity to improve existing buildings was missed

(3) Referring to the Energy Efficiency Directive adopted by the EP on 11th September 2012, rapporteur Claude Turmes said that “This essential legislation is not only crucial for achieving our energy security and climate goals; it will also give a real boost to the economy and create jobs. Crucially, it will reduce the sizeable and growing cost of our dependence on energy imports – €488 billion in 2011 or 3.9% of GDP – which is particularly stark in crisis-hit countries”

(4) [www.fuel-poverty.org](http://www.fuel-poverty.org)

(5) CECODHAS Housing Europe is the federation of public, cooperative and social housing [www.housingeurope.eu](http://www.housingeurope.eu)

(6) White Certificates are documents certifying that a certain reduction of energy consumption has been achieved. In most applications, the certificates are tradable and combined with an obligation to achieve a certain energy-saving target.

(7) Legal framework for energy-efficient renovation. Mini Guide no.2 / nov.2011, URBACT CASH Network (Cities Action for Sustainable Housing) <http://urbact.eu/cash>

(8) Under the Green Deal the building owner is not required to pay the upfront capital to finance the retrofit work required. Instead, a loan is taken out which together with borrowing costs is placed as a charge on the electricity meter of the property. The Green Deal relies on the so called “Golden rule” principle whereby the amount repaid in the first year will be less than or equal to the running costs in the previous year. If the building owner moves, the value of the outstanding loan will transfer to each subsequent owner until it is repaid in full. It is unlikely that loans above £10k and repaid over a 25 year period will be viable

(9) [www.radian.co.uk/images/stories/case\\_studies/lifetime\\_emissions\\_final\\_report\\_feb\\_2012.pdf](http://www.radian.co.uk/images/stories/case_studies/lifetime_emissions_final_report_feb_2012.pdf)

(10) [www.zerocarbonhub.org/definition.aspx?page=9](http://www.zerocarbonhub.org/definition.aspx?page=9)

## Acknowledgements to...

### People involved in workstream activities so far:

#### Workstream coordinator:

- *Antonio Borghi*, Lead Expert of the URBACT LINKS network

#### Workstream core group members:

- *Paul Ciniglio*, Sustainability Strategist, First Wessex
- *Kleopatra Theologidou Kalaitzis*, City of Veria, partner in the URBACT LINKS network
- *Emilio D'Alessio*, The European Sustainable Cities and Towns Campaign
- *J. Owen Lewis*, former CEO of the Sustainable Energy Authority of Ireland (SEAI), Professor Emeritus, University College of Dublin

#### Witnesses and advisors:

- *Frédérique Calvanus*, City of Bayonne, Lead Partner of the URBACT LINKS network
- *Jan Dictus*, Lead Expert of the URBACT CASH network
- *Peter Schilken*, ENERGY CITIES
- *Eleni Goni*, IEE Project Officer, SHELTER, Architects' Council of Europe



#### MORE INFORMATION

URBACT 2012 conference website:  
<http://www.conference2012.urbact.eu/workshops/about-conference/themes/building-energy-efficiency-in-european-cities>