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# POWER HOUSE
## NEARLY-ZERO ENERGY BUILDINGS IN DIVIDED/COOPERATIVE OWNERSHIP

"How to finance energy efficiency" workshop
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# Contents


**1. Introduction**

1.1 About the Power House Nearly Zero Energy Challenge
1.2 About the nZEB Divided Ownership Taskforce
1.3 About the workshop
1.4 About this report

**2. Energy efficiency in Italy: a focus on housing cooperatives and divided ownership**

2.1 Socio-economic challenges in the Italian housing sector
2.2 Barriers to developing energy efficient housing
2.3 Opportunities for cooperatives and divided ownership

**3. Financing energy efficient refurbishment**

3.1 Financial schemes in Italy and their application to cooperatives and divided ownership
3.1.1. Tax deduction for energy efficient retrofit
3.1.2. 'Energy Efficiency Certificates' scheme
3.1.3 Energy Performance Contracting (EPC) and Energy Service Companies (ESCOs)
3.1.4. Factor 20 model: integrated approach to planning for energy efficiency involving different levels of authority

3.2 Financial schemes in Europe and their application to multifamily buildings
3.3.1 Green Deal (United Kingdom)
3.3.2 Kredex Revolving Fund (Estonia)
3.3.3 Grenelle de L'environnement and the use of structure funds (France)
3.3.4 Aedes self-financed revolving fund for retrofitting (Netherlands)
3.3.5 Refurbishment promotion schemes (Austria)
3.3.6 Legambiente proposal (Italy)

**4. Examples of nZEB cooperative developments in Italy**

4.1 Casa Light, Coop Casa Brescia
4.2 Cascina Bazzana, Coop Degrado Milano

**5. Conclusions**

# 1. Introduction

## 1.1 About the Power House Nearly-Zero Energy Challenge

Social, cooperative and public housing providers in Europe own and manage 12 per cent of the housing stock.[1] The Power House Nearly-Zero Energy Challenge (NZEC), funded by Intelligent Energy Europe and led by CECODHAS Housing Europe, seeks to build capacity and confidence amongst these providers ahead of the requirement that in 2020, all new buildings should be nearly-zero in terms of their energy consumption and that any energy required is sourced from renewable supplies. Providers have a key role to play in ensuring the actual delivery of the nearly zero energy building (nZEB) requirements, not only in terms of their new construction but also in the retrofitting of their existing stock to reduce its carbon emissions. This is done by taking a close look at the practical experience of four thematic inter-European Taskforces:

- nearly-Zero energy housing experiences in cold, continental climates (nZEB Cold)
- nearly-Zero energy housing experiences in warm/Mediterranean climates (nZEB Med)
- nearly-Zero energy housing in regions characterised by divided/individual ownership (nZEB Divided Ownership)
- financing of nearly-Zero energy housing renovation and new-build (financing nZEB)

The Power House NZEC initiative will help organisations to identify avoidable mistakes and reinvention of the wheel to get on track to meet the nearly-Zero 2020 obligations outlined in the Energy Performance of Building Directive[2].

## 1.2. About the nZEB Divided Ownership Taskforce

As part of the Power House NZEC, the nZEB Divided Ownership Taskforce will investigate what the nZEB standard means in practice and facilitate the adoption of the standard by the social and cooperative housing associations with a focus on the divided and cooperative property housing. This taskforce involves representatives from Bulgaria, Estonia and Italy and focuses on divided/private ownership, which is a type of tenure where there is more than one owner in a building and each of them has a right to participate in the decision-making process concerning the management of the building.[3] Cooperative property housing, on the other hand, refers to a form of tenure where a housing company owns the whole building but the residents are involved in decision-making.

The nZEB Divided Ownership Taskforce is coordinated by Finabita and EKYL. Finabita is an agency of Legacoop Abitanti, the Italian National Federation of Housing Cooperatives, which represents 3,000 cooperatives across Italy. EKYL, the Estonian Union of Co-operative Housing Associations, is an

[1] Diacon, et al. Progress Report: Fair Energy Transition towards nearly-Zero Energy Buildings, 2013
[2] For further info, visit http://www.epbd-ca.eu
[3] Rossi, et al. WP3 Divided and Cooperative Ownership Deliverable D3.1 'Needs Analysis and Work Programme', 2012

independent organisation that brings together over 1,400 co-operative housing associations across Estonia.

One of the key themes that this Taskforce is looking into is financing energy efficiency. Incentivising and implementing nearly-zero housing strategies in divided ownership, where residents play a major role in the decision making process, requires an adapted financial, legal and organisational framework. Moreover, nZEBs have higher construction costs and lower energy costs than a 'normal' building as is the case with renovation projects. Comprehensive energy efficient housing refurbishments require large investments and therefore need financial support schemes that make investments in energy efficient refurbishment more feasible. Additionally, nZEBs might have higher maintenance costs, especially in the case where new technologies are used improperly, so accurate budgeting is necessary to demonstrate the feasibility of the project.

### 1.3 About the workshop

In order to discuss these issues, the Taskforce organised an international workshop on *"How to finance energy efficiency"* with Power House members and experts on 11 June 2013 in Milan, Italy. The workshop was followed by a technical study visit on 12 June to two nZEB cooperative developments in northern Italy focusing on the use of the Renewable Energy System (RES) in multifamily buildings. The use of RES is an nZEB requirement and its integration, especially solar and geothermal energy, in residential buildings is also a significant theme being looked into by the Taskforce.

### 1.4 About this report

This report highlights the discussions and outcomes from the workshop and study visit held in Italy in June 2013 and which focused on the divided ownership and housing cooperatives in the Italian context. It includes a closer look into the current housing situation and financial schemes in energy efficiency in Italy and their implications for the divided ownership and housing cooperatives in the country. A number of successful experiences of financing energy efficiency from different European countries which were presented at the workshop are also briefly described in this report, focusing on the limits and priorities for their application in multifamily buildings. Additionally, the report summarises the key features of the two low energy cooperative developments that were visited as part of this event. The report concludes with some recommendations for the cooperative and divided ownership sector in Italy to address the issues of incentivising and implementing energy efficiency.

## 2. Energy efficiency in Italy: a focus on housing cooperatives and divided ownership

The morning session of the workshop[4] provided an opportunity for representatives of Italian divided ownership and housing cooperatives to reflect on the social, economic and environmental challenges of the housing sector in the country. This was followed by a discussion about the different barriers they face in financing and improving the energy efficiency of their housing stock and the opportunities for addressing these challenges.

### 2. 1. Socio-economic challenges in Italian housing sector

In addition to the economic crisis in Italy, the country has recently seen changes in its demographic mix for example, an ageing population, with many older people living by themselves with limited income and assistance and an increase in both immigration into Italy as well as an increasing number of Italian workers and students leaving the country in search of opportunities.

Access to affordable housing, either for rent or acquisition, was one of the major concerns expressed by participants at the workshop. One of the sectors most affected by the economic downturn in Italy is the construction industry, with significant repercussions on housing prices for residents. High management costs, especially for condominiums and other forms of divided ownership, often become an additional burden. This is topped by high energy bills due to an increase in energy prices, limited awareness of energy saving behaviours and energy-inefficient buildings.

A large proportion of the buildings that characterise the Italian housing stock were constructed in the sixties and seventies, many of which are energy inefficient buildings, offering poor quality housing and contributing to other environmental or health issues. According to statistics[5], about 24 million people in Italy live in multi-family buildings where the energy consumption is higher than the national average, with important cost implications.

As a result, the Italian socio-economic landscape is undergoing significant transformation, with a marked impact on the housing sector. This translates into changing needs and demands, with a pressing requirement for energy efficiency to tackle both environmental and economic concerns. The existing housing stock and previous models of housing construction fall short of these demands and new adaptive and integrated solutions are required.

[4] See workshop programme in the Appendix section
[5] Legambiente using ISTAT and Cresme data, 2012

## 2.2. Barriers to developing energy efficient housing

Progress towards nearly Zero Energy Building (nZEB) in Italy is constrained by several factors as outlined below.[6] This can affect both the retrofitting and construction of buildings.

*a) Differences in local legislation*

In Italy, the Central Government is responsible for formulating the general framework for energy requirements in building construction and refurbishment throughout the country but it is the duty of each of the 21 regions and autonomous territories to adapt standards and certification to local circumstances. This creates a fragmented and unclear regulatory situation for professionals and practitioners in the construction industry, hampering the adoption of standards and the construction of nZEBs.

*b) Limited involvement of private lending agencies*

Banks and ESCOs (Energy Service Companies) tend to be reluctant to provide funding for long-term initiatives and favour safer short-term investments. This affects housing cooperatives, which often struggle to access financial services. The workshop underlined this as a significant barrier and called for further dialogue with banks to work towards reducing the uncertainty of investments but also to highlight more effectively the future savings achieved through reduced energy costs. In the absence of this, banks and ESCOs are likely to remain risk averse and offer little support.

*c) Lack of appropriate public funding towards energy efficiency*

In contrast to other European countries, there is no relevant public financing assistance for nZEBs available in Italy. The main national incentive for energy-efficient retrofitting is a tax credit programme to promote energy efficiency. This consists of financial regulations allowing recovery of a share of the refurbishment costs in tax deductions (see Section 3.1.1. for more details).

This regulation has to be approved annually causing uncertainty and variations from one year to another. This creates significant discontinuity and deters owners of buildings from taking advantage of this financial help in order to retrofit the entire building, especially given the lengthy time needed for this type of interventions. Instead, property owners often opt for specific individual energy intervention. As the incentives are designed as tax deductions for individual owners, cooperatives have so far not been able to benefit from this financial mechanism.

d) *Inadequate knowledge and skills*

Italy lags behind other European countries in terms of expertise in energy efficient construction, retrofitting and technology.[7] Moreover, building owners and tenants are not informed about the advantages of living in an energy efficient home. Training for both owners and residents on matters such as real costs and savings from nZEB or on the impact of user behaviour on energy performance, would be beneficial.

[6] Powerhouse Nearly Zero Energy Challenge WP3 Divided and Cooperative Ownership, Deliverable 3.2 “Introducing the multi-owners buildings obstacles to nearly-zero energy housing refurbishment” version 4/02/2013

[7] Powerhouse Nearly Zero Energy Challenge WP3 Divided and Cooperative Ownership, Deliverable 3.2 “Introducing the multi-owners buildings obstacles to nearly-zero energy housing refurbishment” version 4/02/2013

*e) Decision-making concerning retrofitting*

Taking the decisions to retrofit still forms a significant obstacle to the energy-efficient refurbishment process. This is particularly problematic in the case of divided ownership. For example, if in a building each apartment is individually owned by different members of a housing cooperative any retrofitting decision has to be approved by every owner. This can be problematic as owners may have different views, priorities and incomes. Consensus might be difficult to reach, hence limiting the effectiveness of energy efficient retrofitting. In contrast, when the cooperative itself owns the building, the situation is made easier by the fact that the cooperative does not need unanimous approval and can, in fact, take its own decisions unless there is opposition from a majority of cooperative members. In either case, the members do need to be informed and consulted, raising the possibility of disagreement.

## 2.3. Opportunities for housing cooperatives and divided ownership

The challenges addressed above affect stakeholders in the housing sector in different ways. For example, the consequences for those concerned with public and private provision of housing might differ for different forms of ownership, in particular cooperatives or other forms of divided ownership.

Legacoop Abitanti, the Italian National Federation of Housing Cooperatives, has around 1,000 housing cooperative members to date. Since 1969, the association has built 400,000 dwellings with a large proportion (90 per cent) of the stock being divided ownership. Within this context, the President of Legacoop Abitanti, Luciano Caffini, explained at the workshop that housing cooperatives see their responsibility as responding to the new requirements of its members and called for them to rethink their focus and operations. Luciano Caffini identified the following priorities:

- Greater affordability and security
- Synergy and coordination among stakeholders
- Housing that suits different models of families: smaller apartments for nuclear or single family structures, bigger for larger families, practical and accessible for the elderly
- Features that promote social cohesion, contact and exchange
- Low ongoing costs such as rent and energy bills
- Healthy and environmentally sound structures
- Solutions that can be undertaken by buildings of multiple ownership

Deputy Mayor of Milan, Ada Lucia de Cesaris

These demands have to be understood within a general framework marked by a decreasing demand for new build housing. This situation calls for a shift in focus for cooperatives, from mostly construction towards retrofitting buildings while responding to the abovementioned concerns.

At the workshop, solidarity and information-sharing on adaptive options between organisations in similar situations was highlighted as an important step to finding answers to new demands. New

collaborative relationships could also be established with municipalities or other actors, in particular on initiatives with benefits of which expand beyond the cooperative and reach the wider community, as in the case of the restructuring of unsold or unfinished buildings.

The Deputy Mayor of Milan, Ada Lucia De Cesaris, commented on the importance of addressing the energy efficiency challenge: "*Facing the energy challenge is important both in the private and in the public sphere. It is very closely linked to a wider challenge which is that of the refurbishment of all of Milan's housing stock.*" Moreover, De Cesaris expressed her concerns with regards to the city's current situation and spoke about the need to have a large scale social intervention to manage the heritage of Milan. She stated: *"We should work on what already exists and on what has been left to us after the big boom phase. Various entities can face up to this challenge by creating links between them. If we do not develop a serious plan, we risk creating a situation where a lot of our housing stock becomes abandoned, unsold, or unrented… Today, we are paying for years of bad management and confusion – the cooperative housing sector has to be re-launched."* This comment does not only refer to the physical aspects of the built environment but also to their social and environmental value and potential. She also stressed that the inappropriate use of energy efficiency as a target can lead to ineffective results – and advocated entering a new phase of more realistic and comprehensive planning.

## 3. Financing energy efficient refurbishment

The section below presents the various mechanisms for financing energy efficient refurbishment that were discussed at the workshop.[8]

### 3.1. Financial schemes in Italy[9] and their application to housing cooperatives and divided ownership

The morning session of the workshop focused on the financial schemes for refurbishment in Italy. A critical part of the session was a debate by representatives of divided ownership and cooperatives on the accessibility and application of the current financial schemes in improving their worst performing stock. While some were deemed applicable and could be further developed, other schemes were found to be difficult to apply to the sector.

Discussion on available financial schemes in Italy

#### 3.1.1. Tax deduction for energy efficient retrofit

Tax deduction has been the most successful financing scheme for energy efficiency retrofitting in Italy to date. It has been in place since 2006 as a generous tax deduction from the total costs for retrofitting in line with certain energy standards. Some interventions relate to individual dwellings while others are specific to the overall building.
The type of measures eligible for tax deductions include:

- interventions on the building envelope such as insulation and double glazing
- installation of photovoltaic or solar-thermal systems
- replacement of inadequate heating infrastructure with more efficient models

The tax deduction used to amount to 55 per cent but was updated to 65 per cent in June 2013. From 31 December 2013, private individuals will be entitled to the new tax deduction scheme, while it will be enforced from 30 June 2014 for condominiums. According to workshop delegates, its success is due to the relative simplicity of the scheme and the generous reduction of costs to the owner of the building.

However, the scheme has not managed to address certain issues. First of all, it does not provide solutions for owners that lack the means to afford the initial investment, which is a problem faced by an increasing share of the population, as outlined in section 2.1. In addition, there are no checks on

[8] All the presentations are available online at http://www.powerhouseeurope.eu/nc/news_events/events/detail/back/past-events/arcticle/workshop-on-how-to-finance-energy-efficiency-focus-on-divided-and-cooperative-ownership-multifamil-1/
[9] nZEB Divided OwnershipTaskforce Deliverable 3.4 report Annex 3 (Italian)

the final quality of the renovation works, nor any measure of the actual changes in energy consumption.
Moreover, due to the nature of the reduction in costs through tax deductions, the scheme is ill-suited for retrofitting entire multi-occupancy buildings where the costs would be attached to several families. Hence, it is more suitable for single dwellings. As regulations on tax deduction have to be approved every year, this prevents owners from undertaking significant renovation works and instead they choose individual renovations which are useful but less effective compared to "deep" renovation of the building.

The scheme is applicable to interventions for the retrofitting of common areas in commercial multi-family buildings, especially in terms of minimising energy consumption through heating. However, when the owner of the building is a cooperative, tax deductions cannot be claimed. In fact, housing providers are classed by the tax authorities as businesses and as such could only benefit from tax deductions if the buildings were used as productive capital goods and not as residential spaces. This point was raised by several experts at the workshop that this is only an interpretation given by the tax authorities, and is not a legal requirement. Legacoop has urged the Senate to clarify this point and the law is currently being amended to specify that rented capital goods, not only productive capital resources, have the right to be considered for tax deductions for energy efficient retrofitting.

### 3.1.2. 'Energy Efficiency Certificates' scheme

'Energy Efficiency Certificates' (EEC) are tradable instruments giving proof of the achievement of end-use energy savings through energy efficiency improvement initiatives and projects. This scheme was introduced in 2004 and subsequently went through various modifications designed to increase its effectiveness, the last one of which occurred in January 2013. Buildings that have adopted energy saving measures can be certified as having a surplus of energy efficiency certificates (credits) that can be sold. Each certificate is worth one Tonnes of Oil Equivalent (TOE) saved. The certificates are bought by entities with an obligation or willingness to reduce their energy consumption. Prices vary based on the supply and demand of certificates on the market. The certificates have a life span of five to eight years, depending on the type of intervention.
This scheme is an important resource for entities that are faced with the obligation of reducing their energy inefficiency, such as large gas and electricity suppliers. These companies are required to achieve yearly quantitative primary-energy saving targets, expressed in TOE saved. This scheme allows them to have the choice between undergoing a retrofitting procedure directly or, if preferred, buying certificates. It can apply to whole building or envelope refurbishment, and renewable energy production systems (photovoltaic and solar-thermal). The energy saving can be determined by comparing the energy use against a baseline, which is an estimate of the energy use in the absence of any attempt at saving energy.

Workshop delegates concurred that the scheme has not been appropriately adjusted to promote refurbishment in housing. One of the major obstacles is the market accessibility which requires buyers to have a minimum level of energy saving certificates – between 20 and 60 certificates depending on the adopted solutions, which equals to 7.5 and 23 TOE. This is too high a requirement for divided property owners or housing cooperatives. Owners cannot access the market without passing through an ESCO, which poses an additional barrier and cost. The scheme, however, allows

different interventions by several clients to be grouped together for them to reach the minimum requirement.

A further disadvantage of the Energy Efficient Certificates is that they do not have sufficiently high financial incentives and, given the burdensome procedure required for accessing the market, it is difficult to see the immediate benefits for cooperatives in the short term. However, as the market develops and the certificates acquire more value, these could become a valuable resource if a system and expertise is in place to reap the benefits.

One of the main points raised in the workshop is the need for the divided ownership and housing cooperatives to learn to work together in order to benefit from the scheme. This would allow them to reach the required quotas and to develop a network that will help them gain expertise in going through this process as well as in interacting with ESCOs.

### 3.1.3 Energy Performance Contracting (EPC) and Energy Service Companies (ESCOs)

Energy Performance Contracting (EPC) is a performance-based procurement method and financial mechanism that uses cost savings from reduced energy consumption to repay the cost of installing energy conservation measures. Normally offered by Energy Service Companies (ESCOs), this innovative financing technique allows building users to achieve energy savings without up-front capital expense. The costs of the energy improvements are borne by the performance contractor and paid back out of the energy savings.
This model was presented at the workshop by ACER (Azienda Casa Reggio Emilia), a private agency in Reggio Emilia, Emilia Romagna, which was contracted to manage the municipality's social housing stock. ACER highlighted the example in Reggio Emilia, where 40 per cent of the population lives in multifamily public housing, most of which are characterised by high levels of energy consumption. The municipality took the initiative to retrofit the housing stock through EPCs[10] – and ACER acted as the leading authority in the refurbishment process on behalf of the tenants. The first step was a comprehensive analysis of the energy consumption of the total social housing stock in order to determine a strategic action plan and to estimate both costs and long term energy savings. The process of energy efficient retrofitting involves:

a) the selection, definition and certification of the intervention;

b) the involvement of staff and consultants of the public administration, along with building administrators and residents;

c) the monitoring of results, optimising the system and addressing energy inefficient behaviour.

The contract was signed and awarded to an ESCO through a competitive dialogue process based on open, performance-based specification. The ESCO met the investment costs and also took the financial and technical risks of carrying out the works. The intervention focused on heating and hot

[10] Proposed within the FRESH (Financing energy Refurbishment for Social Housing ) European co-operation project that 'aims to pave the way and demonstrate to Social Housing Operators that Energy Performance Contract can be used for low energy refurbishment on a large scale'. For more information: http://www.fresh-project.eu/project/

water systems: changing the collective gas boiler and switching the hot water supply from electric boilers to a collective boiler.

The contract includes a guarantee of 35 per cent energy savings per year which would be sufficient to repay the initial investment costs, cover winter fuel bills and provide a fee for the ESCO, as well as provide an immediate seven per cent reduction in tenants' annual energy bills. Any savings exceeding 35 per cent during the duration of the contract will be evenly shared between ESCO and the residents. At the end of the contract, all benefits will accrue to the tenants. The guarantee which ACER provides to ESCO reduces the risk of default by tenants.

### 3.1.4. Factor 20 model: integrated approach to planning for energy efficiency involving different levels of authority

Factor 20 is an experimental initiative with the objective of promoting an integrated approach to planning and monitoring the achievement of the EU 2020 energy sustainability goals, while involving authorities at different levels of government. This is done by harmonising the methods used in the data collection and analysis of energy consumption, with the regional authorities supporting local entities in the definition and application of their Action Plans. A complex instrument involving many actors, its ultimate goal is to create a standardised and simplified method to clarify the roles of stakeholders and address energy efficiency through the use of EPC. The ESCO coordinates the whole process of the Action Plan for the reduction of energy consumption: the initial assessment, project design, implementation and management, and post-intervention monitoring.
The discussions were developed further during the roundtable when representatives from Regione Lombardia and Finlombarda explained the role of ESCOs in Factor 20. Throughout the Action Plan for the reduction of energy consumption, the ESCO plays the role of a coordinator hence, it is in charge of finding the suppliers for the retrofitting intervention and of paying up-front costs. This was highlighted as one of the main advantages of engaging with ESCOs as the owners or residents of the buildings – public, private, cooperative or any type of ownership – do not need to have the means for the initial investment but simply repay the intervention costs through their energy savings. Engaging with ESCOs can be beneficial for cooperatives and divided ownership as it reduces the financial strain and risk.

Nonetheless, many cooperatives today are still not accustomed to interacting with ESCOs, therefore it would be important to build up this relationship, possibly in conjunction with other cooperatives in order to share lessons learned. This could be done by internally developing the knowledge and skills to deal with ESCOs or by means of a consultant. Certain obstacles have to be overcome in terms of agreeing on common decisions such as measures to be put in place. However, not having to pay up-front costs creates an enabling environment for stakeholders to engage in a dialogue and potentially increases the willingness to undertake energy efficiency improvements. Given that initiatives such as Factor 20 have the objective of creating a unified and accurately monitored process of moving towards energy efficiency, it would be beneficial for the divided property owners and cooperatives to familiarise themselves with the process in order to participate constructively and benefit from the support provided.

## 3.2. Financial schemes in Europe and their application to multifamily buildings

The afternoon session of the workshop presented a number of successful experiences of financing energy efficient refurbishment from different European countries, focusing on the limits and priorities for the application in multifamily buildings. [11]

### 3.2.1 The Green Deal (United Kingdom)

*Speaker: David Cox, National Landlords Association*

The Green Deal is a UK government policy designed to improve the energy efficiency of all types of buildings. The scheme is open to all households. Green Deal providers pay for retrofitting according to recommendations – so there are no upfront costs to the users – and will attach the repayment of the retrofits to the electric meter and can be paid back within 5 to 25 years. The cost of making the improvements is paid via the electricity bill of the property as long as the estimated savings from making the improvements is greater than the repayment costs added to the electricity bill (this is called the Golden Rule, see Figure 1). Over 40 types of energy efficiency measures can be funded through the scheme. These include cavity wall insulation, solid wall insulation, boilers, heating systems, draught-proofing and other smaller measures.

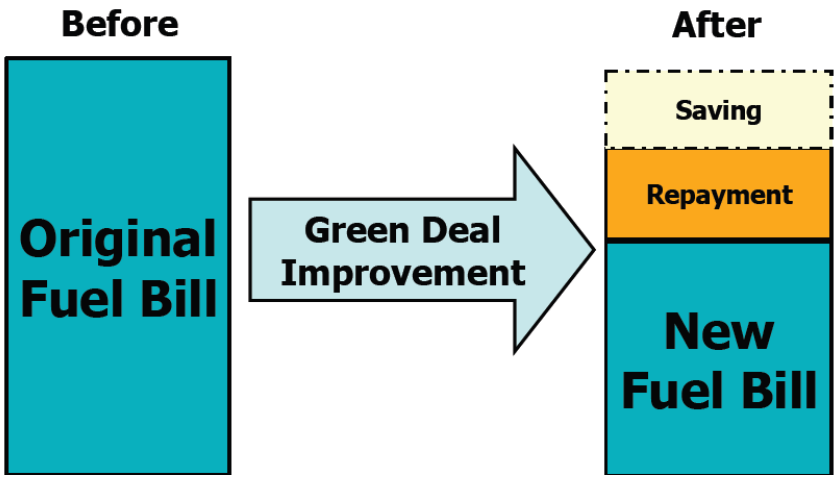



*Figure 1 The Golden Rule: The cost of the new utility bills + the loan repayment must be lower than if nothing had been undertaken ('Pay As You Save')*[12]

Working alongside the Green Deal is the Energy Company Obligation (ECO) scheme. This is an obligation on the six biggest energy companies in the UK to provide around £1.3bn a year, through three subsidy streams, to improve the energy efficiency of the UK's housing stock. The ECO will run

[11] Please note that the European Energy Efficiency Fund is not included in this report. The presentation was cancelled due to sudden unavailability of speaker. For more information about the scheme, please visit the website at http://www.eeef.eu/home.html.

[12] Taken from the presentation of David Cox, National Landlords Association

until March 2015, supporting the installation of energy efficiency measures in low-income households and areas and in properties that are harder to treat.

According to David Cox, Senior Policy Officer of the National Landlords Association, this is particularly beneficial to landlords who often face a split incentive problem which makes the landlord responsible for capital investments that save energy but restricts the landlord's ability to recover the benefits of those investments – the savings. Under the Green Deal, landlords have the financial instruments necessary to improve their properties at no upfront cost and the costs of the improvements are usually directly repaid by the tenant.

The Green Deal scheme, however, would be much harder in multi-occupancy properties as 100 per cent consent is needed from all affected residents in the building in order to attach the Green Deal charge to their electricity bills. A solution for this would be to separate the building (owned by the freeholder or landlord) from the individual apartments (owned by leaseholders or tenants). In this arrangement, leaseholders could individually take advantage of Green Deal for improving the energy efficiency of their in-house appliances. The freeholder, on the other hand, could undertake loft and cavity/solid wall insulation on the building envelope financed through Green Deal and ECO and would not need consent unless the amount to be paid per resident exceeded £100 per year. The cost of the improvements would then be attached to a communal electric meter and charged back to tenants through the service charge.

### 3.3.2 Kredex Revolving Fund (Estonia)

*Speaker: Mirjam Adler, KredEx*

Mirjam Adler of Kredex presented the experience of Kredex's revolving fund scheme for energy efficiency in Estonia. Approximately 75 per cent of the population lives in multi-apartment buildings, the majority of which are poorly maintained and have very high energy consumption. In 2009, Kredex formed a revolving loan fund combining different funding sources: European Regional Development Fund (ERDF), Council of Europe Development Bank (CEB) and KredEx's own funds (see Figure 2) to support the renovation of energy inefficient multi-apartment buildings. These funds provide two local banks with funding which they could then lend to housing associations as loans to finance renovation works. Compared to typical market loans, Kredex loans have a lower interest rate (four per cent on average) and longer loan period (up to 20 years) with no collateral. Funds are available for cooperative housing associations (for housing built before 1993) and municipalities (as owners of social housing). A precondition for getting the loan is the carrying out of an energy audit where priority renovation works have been identified. With the loan, only renovation works described in the energy audit can be financed.

Simultaneously, Kredex's reconstruction grant is available offering to cover 15 to 35 per cent of the renovation cost, depending on estimated energy savings. In multi-apartment buildings, owners' incomes vary and quite large investment is needed for comprehensive renovation of a building. The grant can be used to cover any self-financing requirement (a minimum of 15 per cent is required), which added a real incentive to apply for the loan.

The combination of a loan and a grant has been successful in promoting the take-up of innovative solutions to improve energy efficiency in multi-apartment buildings. From 2009 to early 2013, a total of almost €70 million has been provided as credit and grant to more than 20,000 apartments in over 600 buildings generating annual energy savings of up to 40 per cent. Kredex attributes their success to having a holistic approach - awareness raising, promotion, state and local support, legal and financial framework - to supporting and promoting the renovation of apartment buildings. According to Mirjam Adler, Kredex plans to continue with similar measures for the energy efficiency reconstruction of multi-apartment buildings for the programming period 2014-2020.

### 3.3.3 Grenelle de l'Environnement and the use of Structural Funds (France)

*Speaker: Carine Puyol, Union Sociale pour l'Habitat*

The social housing sector in France accounts for about 17 per cent of the stock of which 16 per cent is provided by *Habitation à Loyer Modéré* (Housing at moderated rents) - HLM - organisations. They include both publicly and privately owned companies acting on a non-profit basis and under the control of the Ministry of Housing and Finance. Under the so called "Grenelle de l'Environnement", HLMs are engaged in a plan to renovate 800,000 social housing units by 2020 in order to improve their energy efficiency. This programme is supported by the EU through the ERDF.

Since 2009, energy efficient refurbishment and the use of renewable energy in existing homes has been able to benefit from Structural Funds amounting to a maximum of four per cent of the total ERDF allocation per Member State. France decided to use this funding to tackle energy inefficiency and made it accessible for social housing providers to improve their worst performing stock.

Carine Puyol of l'Union Sociale pour l'Habitat (USH) – the umbrella organisation bringing together all HLM federations – presented the impact of ERDF on improving energy efficiency of social housing in France. By 2013, almost 200 million euros of ERDF funding (out of €320 million) have been used to support refurbishment projects for almost 60,000 dwellings for low-income households. This has led to an improvement of the energy performance of buildings attaining higher energy performance certificate (see Figure 3) and annual savings of €360 to €1,000 per household.

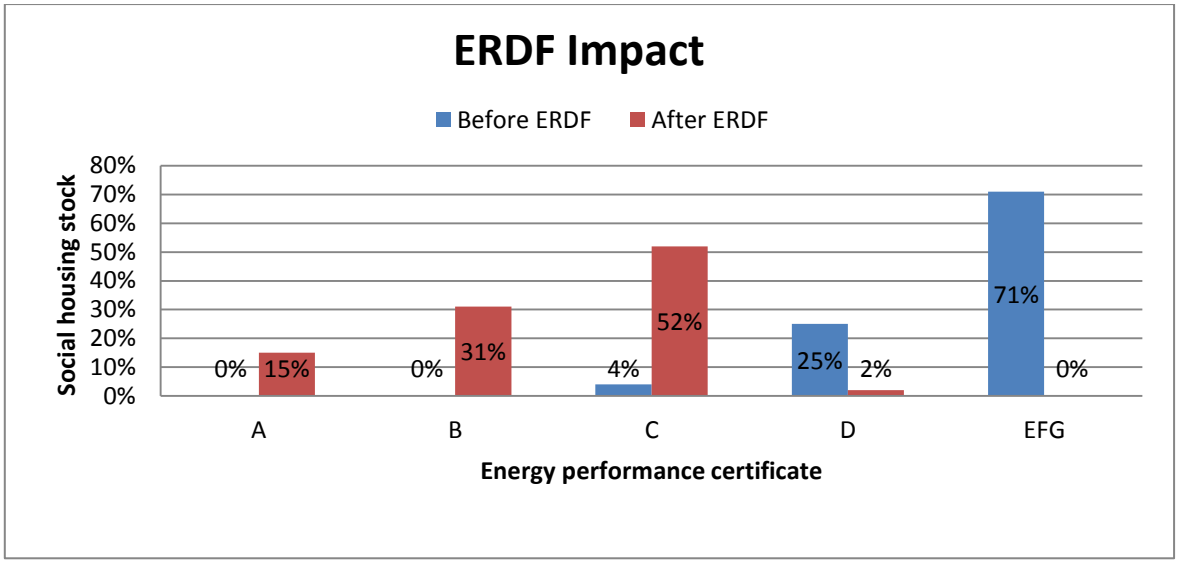



*Figure 2 Impact of ERDF on improving energy efficiency of social housing stock in France*

For the 2014-2020 period, France plans to use 20 per cent of allocated ERDF funding not only to improve the energy efficiency of buildings but also that of urban transport and public infrastructure. With energy as a priority investment of the EU Cohesion Policy 2014-2020, Carine Puyol stressed the importance of mobilising housing actors to identify and further promote energy efficiency in housing as a priority in all French regions.

### 3.3.4 Aedes revolving fund for retrofitting (Netherlands)

*Speaker: René van Genugten, Aedes*

The Energy Saving Covenant is a unique initiative of cooperation in energy efficiency between the Dutch Minister of Housing, Aedes (Dutch association of housing organisations), Woonbond (Dutch union of tenants) and Vastgoed Belang (private/commercial landlords) which aims to increase the energy performance of existing rental housing stock to an average energy label B by 2020. With this initiative, social landlords are motivated to invest in energy improvements, giving them some room to raise rents to repay for the investments. At the same time, to get the needed approval of their tenants, housing associations are required to prove that total housing costs (energy + rent) will not increase after the investment. This so-called 'housing costs guarantee' has been an important feature in overcoming the split-incentive dilemma between social landlords and tenants.

However, the financial structure of the Dutch social housing sector is being threatened as the national government plans to introduce a new tax (€760 million euros/year) on rented dwellings by 2017, which means that one sixth of their revolving fund[13] will be removed instead of being re-invested in housing and related social activities. Likewise, housing associations may be precluded from delivering 'energy services' with only commercial energy providers allowed to provide this

[13] The Dutch social housing financial strategy has been defined as a 'Revolving Fund Model', where housing associations act as independent body in an environment of guaranteed capital market loans and rent-price regulation. Moreover, social housing organisations not only build, maintain, sell and rent social housing stock but also provide other kinds of services that are directly related to the use of the dwellings, to the occupants.

service. If this happens, housing associations would face the significant issue of upfront financing to renovate their stock.

At the workshop, René van Genugten of Aedes highlighted the role of innovation to lower investment costs in comprehensive refurbishment projects. Innovation allows the construction sector to achieve better and more affordable concepts by looking at the whole house as a system and designing it in a way so that all measures are integrated.

The 'revolving energy efficiency fund' is another viable solution. The Dutch government has recently provided €150 million for a revolving fund for investments in the energy efficiency of the existing housing stock. A condition set by the government is that the private sector supplements this with an additional €600 million. The funds are made equally available for privately owned housing and the rental sector. Aedes are currently looking for additional means to boost the fund and are exploring potential options such as ERDF structural funds, European Investment Bank (EIB) funds and private funding through pension funds, etc.

### 3.3.5 Refurbishment promotion schemes (Austria)

*Speaker: Walter Hüttler, e7 Energie Markt Analyse GmbH*

Austria has a long tradition of subsidising housing investments and makes energy efficiency a high priority in everyday practice. It is not surprising then that comprehensive refurbishment projects are widely subsidised by the federal provinces (*Länder*) out of a federal budget. Refurbishments on passive house standard, for example, may get subsidies of more than 50 per cent in actual cash value in some provinces. In 2010 alone, the *Länder* spent €850 million on subsidies for housing refurbishment which went to individual home owners, limited profit housing associations, commercial housing developers, municipalities and tenants. The subsidies have a strong focus on environmental improvements, which has an impact on the quality of retrofit projects. Target groups are granted a share of the subsidy, depending on the energy standard they want to reach, and can avail of additional incentives for improving thermal comfort such as mechanical ventilation.

Financial incentives for pilot projects are also available, such as the Passivhaus refurbishment projects. Moreover, the federal research and development programme 'Building of Tomorrow' (*Haus der Zukunft*) has been developed to realise demonstration buildings or flagship projects. It focuses on service buildings and renovation in order to noticeably increase energy efficiency, set up intelligent comprehensive systems and make more use of renewable sources of energy.

Below are some of the financial schemes in Austria that aim to promote housing refurbishment and which were briefly described by Walter Hüttler of e7 Energie Markt Analyse GmbH in his presentation:

- The *Thewosan* scheme: a comprehensive refurbishment scheme introduced in Vienna in 2000 which focuses on apartment blocks built between the 1950s and 1970s. It provided a non-repayable subsidy of up to one third of the total costs, depending on energy performance after refurbishment. The scheme achieved a high take up among multi-

occupancy dwellers. By 2010, around 60,000 flats in 800 buildings had been completely refurbished costing €600 million of which €200 million were taken from the subsidies.

- "Refurbishment check": a programme introduced by the Federal State in 2009 aiming to give additional incentives to residential and non-residential buildings during the financial crisis to stimulate the labour market. The scheme offers a maximum of 20 per cent of eligible costs or €5,000 non-repayable contribution per dwelling and is an additional incentive to the existing *Länder* subsidies. However, the programme experienced some lack of funds for one year which led to a fall in its credibility. This experience serves as a lesson learned for subsidy schemes. To guarantee continuity and credibility over several years, Walter Hüttler emphasised the need for subsidy schemes to have a stable financial base.

### 3.3.6 Legambiente proposal (Italy)

*Speaker: Gabriele Nanni, Legambiente*

According to Italian environmental organisation Legambiente, the current financial mechanisms in place do not realistically allow multifamily building residents, which account for 24 million inhabitants in Italy (out of approximately 60 million), to reduce their energy consumption. Because of this a proposal for an Italian financial scheme on energy efficiency was presented by Gabriele Nanni of Legambiente at the workshop. However, for a scheme to work, he highlighted the following prerequisites:

- The economic advantages must correspond to *real* and certified energy savings.
- The interventions have to be specifically targeted to increase thermal isolation and to promote retrofitting in order to move the construction sector out of the crisis.
- Stakeholders in housing need to capitalise on the role of ESCOs in following the process of carrying out the interventions, certifying the results and managing the systems. This allows for the possibility of considering the financing of the intervention through the savings generated.

The proposition consists of:

- Establishing a new incentive for energy efficient retrofitting of residential buildings with at least five dwellings through the use of EPC and ESCOs.
- Setting up a new system of accounting for EPC based on the values obtained from energy certification before and after the intervention.

The main objective is to reduce energy consumption by 50 per cent on average, certified by an improvement in the building's energy performance label. The mechanism would incentivise the retrofitting of the whole structure of the building through mixed interventions with specific objectives:

- Up to 50 per cent reductions in energy losses in building envelope
- Reductions equal to 0.3-0.5 TOE per dwelling
- Bonuses for getting close to nZEB standard

The ESCOs will carry out the interventions in agreement with construction companies which will guarantee the achievement of these objectives and their certification.

## 4. Examples of nZEB cooperative developments in Italy

A technical study visit to two low energy cooperative developments in northern Italy was organised as part of the workshop. Around 40 participants took part, including housing and construction experts from Italy and other European countries. The two examples were showcased as models for energy efficiency that responded both to environmental concerns and to other critical aspects such as affordability and inclusiveness. A strong focus was also placed on creating various typologies of dwellings to suit different demands and on the importance of aspects such as spaces for socialisation and the general well-being of residents. The section below provides more details on the technical aspects of each project and outlines the rationale behind the design of the two developments. A video of the study visit can be viewed at http://youtu.be/4rlEXSku2XM.

### 4.1. Casa Light, Coop Casa Brescia

Casa Light in Lonato del Garda, Brescia, developed by Coop Casa Brescia, is the only example of a multifamily building certified to Passivhaus standard in Italy. This project combines passive solutions with solar photovoltaic and heating-cooling- ventilation systems that are simple to operate and easy to maintain. The project was designed to test a concept for multi-storey residential buildings with zero energy balance, suitable for north Italy. During the study visit, Coop Casa gave a presentation to the participants outlining the key features of the housing complex, illustrating technical aspects and outlining social objectives and outcomes, followed by a tour of the two buildings. The participants visited two inhabited dwellings of different sizes, one of the smaller units and one family-sized apartment. The communal areas, the photovoltaic models on the roof and the basement of the building were also visited. The visit allowed the participants to gain a better understanding of the design and construction of the development but also of the quality of life that can be obtained when living in Casa Light. This involved aspects such as the ease with which the energy saving technology can be used and the low costs to users but also the inclusiveness and sociability of these spaces.

**General Features:**

The buildings were constructed near the city centre, between a public park and an agricultural area. The 18 dwellings were completed in 2011 and have been rented to low-income families by means of social housing contracts since 2012. The project was co-funded by local authorities within a social housing support scheme. The development is comprised of two buildings, each with three floors and with three units on each floor; the first two floors are made of concrete and bricks and the last floor of is prefabricated wood construction. The building also features an underground basement and a technical room with a centralised heat pump system on the roof.

**Energy Efficiency**

The success of this project depended on meeting two important requirements: affordability and low energy consumption, while considering the comfort and needs of the final users of the building. These were achieved by:

- combining passive design techniques to contain heat losses in winter (external wall insulation) and solar gains in summer (passive climate control)
- photovoltaic (PV) models installed on the roof, with a focus on maximised PV integration (each of the two buildings is equipped by 20 kWp PV systems)
- adopting a thermal system for heating and cooling with a simple means of operation and maintenance

The two buildings are almost identical and are classed as A+ according to local standards, although only the south block is certified with the Passive House Quality Certificate. The most relevant difference is that the top floor of the south building was constructed using wooden prefabricated elements, while all the other components are masonry walls with external insulation cladding. The wooden structures allow for higher thermal insulation. The decision to use the two methods was in order to experiment with different materials and promote new uses of wooden structures.

Consumptions and production data are currently being monitored within the EU co-funded eSESH (Saving Energy in Social Housing) project, in which advanced ICT solutions for energy awareness and management are developed and tested. The first real data monitoring results show that the energy produced by the PV system is significantly more than what is used for space heating, cooling, production of hot water and ventilation. Personal electrical appliances make up the principle sources of energy use. Taking this into consideration, the PV systems cover 70 per cent of total consumption of the development.

**Funding**

Total construction costs amounted to € 1.887.000. The regional authority Regione Lombardia co-funded this project as part of a social housing support scheme. In addition, the photovoltaic systems benefit from a feed-in tariff through the national *Conto Energia* programme. The feed-in tariff is paid for by the electricity generated by photovoltaic plants and will cover a period of 20 years, starting from the plant commissioning date.

**Residents' feedback**

After the handover of the dwelling to residents, each family was briefed about the correct use of the technical services and of the building. The results of a survey, undertaken with 16 out of the 18 families during the second week of January 2013, showed a generally high degree of satisfaction among the residents.

**Additional information**

Further information on Casa Light can be accessed on the Powerhouse[14] and Hive[15] websites.

The Powerhouse website contains a detailed description of the Casa Light project including key elements of its design and other technical features as well as lessons learned from the development. The Powerhouse Europe website includes case studies of nZEBs to facilitate good practice on new build and retrofitting across Europe.

The Hive website is a database that tracks the consumption data of 30 buildings in Italy as well as buildings featured as case studies on the Powerhouse website. The electricity and heating consumption of Casa Light and its coefficient values such as primary energy, CO2 equivalent and cost as well as the renewable energy production of the building can be viewed on the website. Users can also compare consumption data for up to four buildings simultaneously.

## 4.2. Cascina Bazzana, Coop Degradi Milano

Cascina Bazzana, a development of Coop Ferruccio Degradi, is a new residential complex of 142 dwellings in four buildings due to be completed in summer 2013.

**General Features:**

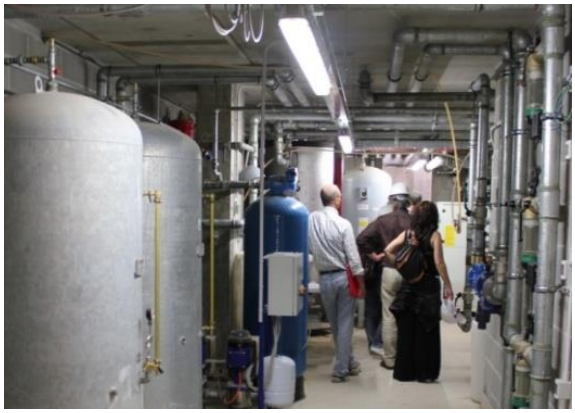
Cascina Bazzana was designed in such a way that it creates a connection between the existing historical centre, with the typical rural court buildings, and the new residential and commercial blocks. The buildings are L-shaped, one opposite the other, with the main façade exposed towards the south and with two large courts in between to create large urban gardens. These green spaces are intended to enhance increased interconnectedness among residents; the multifunctional common spaces of the buildings are directly accessible from the courts. Each building has four floors plus an attic and an underground level for a car park and storage.

[14] Case study: New construction of 18 dwellings in Via fenil novo molini, (Brescia) Italy, Powerhouse website: http://www.powerhouseeurope.eu/nc/cases_resources/case_studies/single_view/?tx_phecasestudies_pi3%5bid%5d=188&tx_phecasestudies_pi3%5bdisplaytype%5d=overview

[15] Lonato Casa Light, Hive website: http://panel.hiveproject.net/building-chart.php

**Energy efficiency**

The construction elements are inspired by the local building traditions but technologically advanced materials and components are used to enhance energy efficiency. Heating of spaces and water is done through the use of geothermal heat pumps which extract heat from the underground water. During the summer, the heat pumps operate with an inverted cycle and provide space cooling through the floor "heating" circuits which use underground water as the cold source.



A 20 kWp PV system was installed, the modules being positioned on the tilt roof. Part of the energy is used for the heat pumps and some is released into the electricity grid. The system benefits from a feed-in tariff.

**Funding**

The PV system will benefit from a tariff scheme which applies to systems with a capacity of at least 1 kW, in operation since August 2012. The PV systems are to be connected to the grid. The feed-in tariff is based on the electricity produced and varies depending on the capacity and type of system. The tariff is place for a period of 20 years.

For systems commissioned by 31 December 2012, the scheme (called Feed-in Premium) provides a tariff for the electricity produced. The electricity fed into the grid may be purchased by the *Gestore Servizi* Energetici (GSE)[16] or offset against the value of electricity withdrawn from the grid (net metering) service.

**Additional Information**

Further details on Cascina Bazzana are available on the Powerhouse[17] website including key elements of its design and other technical features of the development. The website also includes nZEB case studies to enable good practice on new build and refurbishment to be shared and promoted across Europe. Monitoring of the energy consumption of Cascina Bazzana buildings will start on October 2013 with the first results published on the Hive[18] website by April 2014.

[16] GSE is an organisation controlled by the Ministry of Economy and Finances which is responsible for creating economic incentives for the production of electricity from renewable resources. They are also in charge of the promotion and the sharing of information on renewable energy in Italy.

[17] Case Study: nZEC - New construction of 142 dwellings in Bazzana Inferiore, Assago (MI), Italy, Powerhouse website: http://www.powerhouseeurope.eu/nc/cases_resources/case_studies/single_view/?tx_phecasestudies_pi3%5Bid%5D=187

[18] http://panel.hiveproject.net/building-chart.php

## 5. Conclusions

Divided property and housing cooperatives in Italy face a number of barriers in incentivising energy efficiency. A significant barrier is access to financial services for improving their existing dwellings or housing stock. There is a need to have a dialogue with lending agencies (banks and ESCOs) to work towards reducing uncertainty of investments, highlighting future savings achieved through reduced energy costs. There is also a lack of public financial assistance for energy efficient refurbishment. The tax credit programme is the main national incentive for refurbishment projects but this is currently not available for housing cooperatives and only supports 'piecemeal' renovation works. It could be further developed so cooperatives can benefit from the scheme as well as to stimulate comprehensive refurbishment projects in multifamily buildings.

The abovementioned barriers provide an opportunity for those in the cooperative and divided ownership sector to work together and address the issues of financing energy efficiency and developing nearly zero energy housing strategies. There is a need to collaborate among themselves and with other entities, particularly with ESCOs, to reduce investment costs and take advantage of the available financial schemes for energy efficiency. The workshop also highlighted the need to build up expertise within the cooperative and divided ownership sector around these schemes. This will require investing time and resources and engaging other professionals, along with the sharing of lessons and good practices.

The successful schemes from different European countries offer some lessons learned in incentivising and implementing energy efficient refurbishment. Their experiences show that

- having a stable financial base is essential for a scheme to guarantee continuity and credibility over several years as can be learned from Kredex's renovation loan and Austria's refurbishment check programmes;
- energy monitoring needs to be a mandatory requirement to ensure that calculated energy savings are actually reached;
- ERDF structural funds can be effectively used to tackle energy efficiency as in the case of refurbishing HLMs in France. Housing providers need to collaborate and work with the government and other stakeholders to make energy efficiency a priority investment and use the funds for financing refurbishment of existing dwellings;
- there is a need for incentives to promote innovation in the construction sector to lower investment costs and promote housing affordability;
- taking a holistic, integrated approach is important in promoting energy efficiency.

Relevant stakeholders in Italy should take note of the development of financial mechanisms for energy efficient retrofitting in other countries in order to develop potential ideas and solutions which might be applicable to the Italian context.

Retrofitting the existing Italian divided ownership and cooperative housing stock has been identified as crucial within the current financial and housing crises. The economic downturn and financial pressures have led to a decrease in demand for newly built houses and an increase in the need to

retrofit existing buildings. Nonetheless, it remains important to look towards contemporary best practices in energy efficient construction especially as by 2020 all newly built buildings will have to comply with nearly zero energy standards. With this goal in mind, the study visit to the two newly built nZEB cooperative developments serves as a clear reminder that careful planning and budgeting and appropriate design are paramount when tackling both energy efficiency and the needs of the future residents, in order to accommodate varying incomes and housing models, as well as to provide social well-being and positive environmental impacts.

## APPENDIX: Workshop Programme - June 11, 2013

***Morning Session***
*The Financial Schemes on Energy Efficiency in Italy (Italian)*
*Moderator: Sara Zoni, Legacoop Abitanti*

9:15 **Registrazione partecipanti**

9:45 **Inizio lavori e benvenuto**
Luciano Caffini, Presidente Legacoop Abitanti

10:00 **Saluto introduttivo**
Ada Lucia De Cesaris, Vicesindaco Comune di Milano

10:15 **Il fondo Kyoto e il Fondo EEEF (European Energy Efficiency Fund)**
Valter Menghini, Responsabile Area Supporto all'Economia Cassa depositi e prestiti

10:45 **Titoli di Efficienza Energetica**
Gerardo Montanino Gestore Servizi Energetici (da confermare)

11:00 Coffee break

11:15 **Le detrazioni fiscali**
Gaetano Fasano, Responsabile Settore Edilizia residenziale Enea

11:30 **Strumenti e metodologie per riqualificare gli edifici residenziali: presentazione di casi in corso di realizzazione**
Marco Corradi, Presidente Acer Reggio Emilia

*Roundtable Discussion (Italian)*
*Moderator: Rossana Zaccaria, Legacoop Abitanti*

12:00 **Nuove idee per incentivare l'efficienza energetica in edilizia**
Partecipano Prof. Giuliano dall'O' ((Politecnico di Milano),
Pierfrancesco Maran (Assessore all' Ambiente Mobilità Energia del Comune di Milano)
illustra la proposta "Patti Chiari per l'Efficienza Energetica"
Valentina Sachero (D.G Ambiente, Energia e Reti Regione Lombardia) illustra lo strumento del Contratto
di Performance energetica nell'ambito del progetto Factor 20

12:45 **Dibattito e domande**

13:00 End of session

***Afternoon Session***
*Experiences from European countries*
*Moderator: Sergio Rossi, Delsus*

14:00 **Welcome by Legacoop Abitanti**
Presentation of the programme (Sergio Rossi)

14:30 **The UK case: the Green Deal**
David Cox, National Landlords Association

15:00 **The Estonian case: Kredex rotative fund**
Mirja Adler, Kredex

15:30 **The French case: the Grenelle Environnement and the use of structural funds**
Carine Puyol, USH

16:00 Coffee break

16:30 **The Dutch case: AEDES self-financed revolving fund for retrofitting**
René van Genugten, AEDES

17:00 **The Austrian case: Refurbishment promotion schemes**
Walter Hüttler, e7

17:30 **The Italian case: A proposal from Legambiente**
Edoardo Zanchini, Legambiente

18:00 End of session

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