# Energy refurbishment for sustainable SOCIAL, PUBLIC AND COOPERATIVE HOUSING

Insights on the current market and trends towards 2020

March 2014

Bax & Willems
Consulting Venturing

BEEM-UP

CECODHAS

## Current, predicted and recommended annual investment in social, public and cooperative housing retrofit


Current annual investment €10.4 Billion

Industry Expert predicted annual investment €13.6 Billion

Policy objectives EU 2020 €37.8 Billion/year

Estimated Funding Gap Over 7 years

**€180.6 Billion**

***Bax & Willems Consulting Venturing***

Rolf Bastiaanssen
*Consultant*

Piotr Zietara
*Consultant*

Sam Taylor
*Copywriter*

***CECODHAS Housing Europe***

Julien Dijol
*Policy Coordinator*

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 260039.

# Executive summary

## About this report

Large-scale energy refurbishment has a vital role to play in Europe's transition to a low-carbon economy. If we consider that energy demand from buildings accounts for 40% of Europe's total, and that 80% of 2050's buildings have already been constructed[1], it stands to reason that improving the energy performance of existing building stock should be high on the EU's sustainability agenda.

The question then, is where and how to make such improvements. Residential buildings make up a large majority of Europe's building stock, and over one in ten of these fall into the Social, Public and Cooperative (SPC) housing category. Moreover, these often belong to publically owned organisations with the technical capacity, the socio-economic drive and the long-term investment horizons needed to carry out energy renovations on the necessary scale.

To assess the ability of SPC housing organisations to achieve both their own objectives for 2020 and those of European policy, we have completed the first cross-European analysis of trends and projections in the sector. The study offers quantified insights into expected reductions in energy consumption, and recommends policy actions to accelerate progress to the desired level. The survey covers 16 of 24 EU countries, between them accounting for around 60% of the total SPC housing stock of 27 million dwellings.

## Quantifying the issue

A substantial part of SPC building stock was constructed prior to 1960. Such buildings have, on average, an energy efficiency labelling of E or F (although definitions do vary by country). The current average refurbishment rate across countries surveyed is 1.19% per year. These buildings are generally upgraded to a C label at an average cost of **€32,250 per dwelling,** with the sector currently investing around **€10.4 billion** each year.

Looking towards 2020, an increase in activity is expected. The renovation rate is currently expected to rise to 1.39% and the average investment to **€36,200 per dwelling,** Annual investment is expected to rise to **€13.6 billion**.

As recently demonstrated by the BEEM-UP project, energy demand reduction to a much higher standard is both feasible and cost-effective. However, a demand reduction of more than 65% has been shown to cost in the region of **€70k per dwelling on average.**

If the sector is to meet 2020 targets and achieve a 20% energy demand reduction in line with European policy objectives, an even greater funding gap must be addressed. In order to attain this figure using current best practices, an additional total investment of **€180.6 billion** will be needed for the period 2014-2020.

1 http://www.eui.eu/Projects/THINK/Documents/Thinktopic/THINKTopic72012.pdf

## The tip of an iceberg

Buildings account for 40% of Europe's energy consumption, and for one third of its greenhouse gas emissions. Thanks to improvements in technology and increased understanding of climate issues, buildings of the future are now being planned and built to far more rigorous energy efficiency standards than those of the past. These buildings, however efficient, represent but a fraction of those currently in use. In fact, 80% of 2050's buildings are already standing today.

To a large extent then, Europe's hopes of meeting climate and energy security targets will depend on its ability to reduce energy consumption of these existing buildings. The potential for improvement here is clear, as recognised in the Energy Performance of Buildings Directive, but a feasible method of unlocking that potential has not thus far materialised.

## A social solution

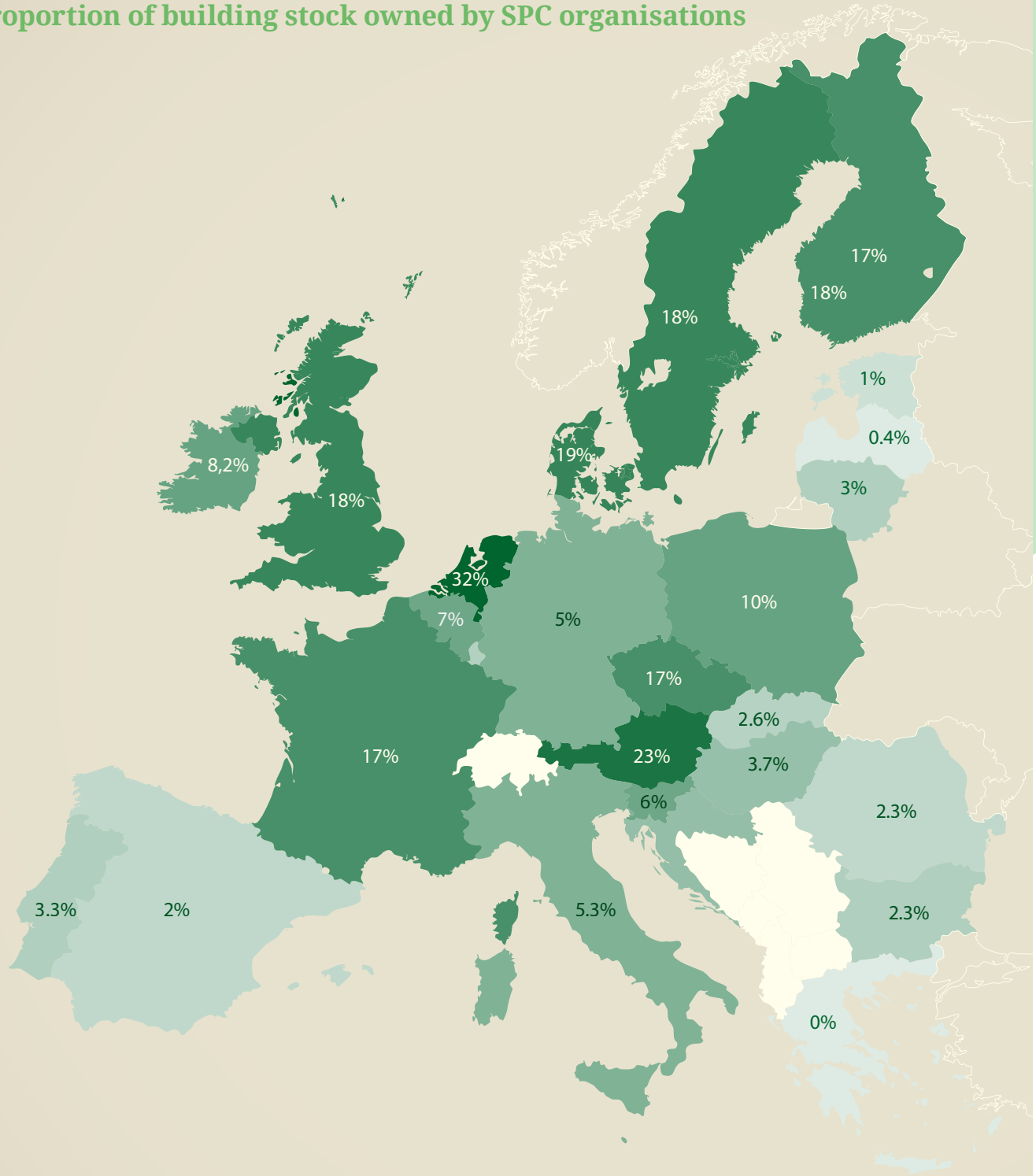
It stands to reason then, that energy efficiency retrofitting could play a vital role in achieving ambitious European targets, but in order to achieve optimal results, initial efforts must be targeted as effectively as possible. This report will argue that the social, public and cooperative housing sector represents the ideal starting point for such an initiative.

Publically owned SPC housing organisations have the technical ability, the socio-economic drive and the long term investment horizons necessary to carry out energy renovations. What's more, there are good prospects for scalability, both within and outside of the sector.

Around 12% of the total European building stock is currently owned by SPC housing organisations – some 27 million dwellings. Prevalence ranges from 3% in southern Europe to around 20% in the north-west and 32% in the Netherlands. Most of these buildings are multi-family residential buildings with a tenant rental structure, thus the impact of each individual renovation is likely to be high.

Best practices established and developed through work in the sector have high potential for replication. As first mover, the sector could help develop economies of scale and expertise in the private sector to reduce the cost of future work and increase adoption elsewhere.

## Proportion of building stock owned by SPC organisations




Source: www.housingeurope.eu

## The market for SPC housing refurbishment

Estimates of current and projected refurbishment rates from twelve European countries provide some insight into the market for renovation in Europe. Defined as the ratio of major renovations to overall housing stock, current refurbishment rate across studied countries stands at **1.19% each year.**

Insights into refurbishment plans from companies in the SPC housing sector indicate that this number is expected to rise slightly to **1.39%** in the run up to 2020, representing an **additional 54,000 buildings** each year.

Projected increases remain small, due largely to the limited financial resources of SPC housing companies. Increased awareness of sustainable development, long-term planning and housing portfolio optimisation, whilst encouraging future development, has done relatively little to offset the problem.

Similarly, the average spend per refurbishment is expected to rise slightly across 14 surveyed countries. Aggregation of data shows that housing companies in Europe spend on average **€32,250 per dwelling** for a major refurbishment. We estimate that as we head towards 2020, this will rise to **€36,200.**

This expected growth can be explained in part by ambitious long term refurbishment plans, though public funding expectations also play a key role: some of the federations we spoke to expect subsidies to become available in coming years and have factored this into their projections, raising expected average investments. A second upward pressure results from the higher costs associated with hard-to-treat properties that have thus far not been renovated but will need to be in coming years.

## Sizing it up

Based on the above indicators, the current size of the market for SPC housing refurbishment is estimated to be **€10.4 billion.** Projected increases in both refurbishment rates and average investments indicate that this figure will rise to **€13.6 billion.**

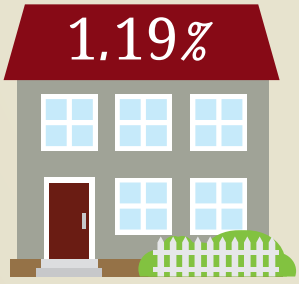
## Investment per Dwelling

Current


Forecast


## Refurbishment Rate

Current




Forecast

## The cost of efficiency

2020 targets call for a reduction of energy consumption by 20% across the sector. At the predicted rate of expenditure, the Social, Public and Cooperative housing market will not meet this requirement until the year 2029.

Considering its size and the quality of its building stock, the sector has the potential to make major contributions to European sustainability objectives. The data clearly shows, however, that current predictions suggest that a reduction in energy demand of just 15% is expected by 2020 (with respect to the baseline period of 1990).

**In order to meet the 20% target by 2020, at least 2% of SPC housing stock would need to be refurbished each year to achieve an average reduction in energy demand of 65%.**

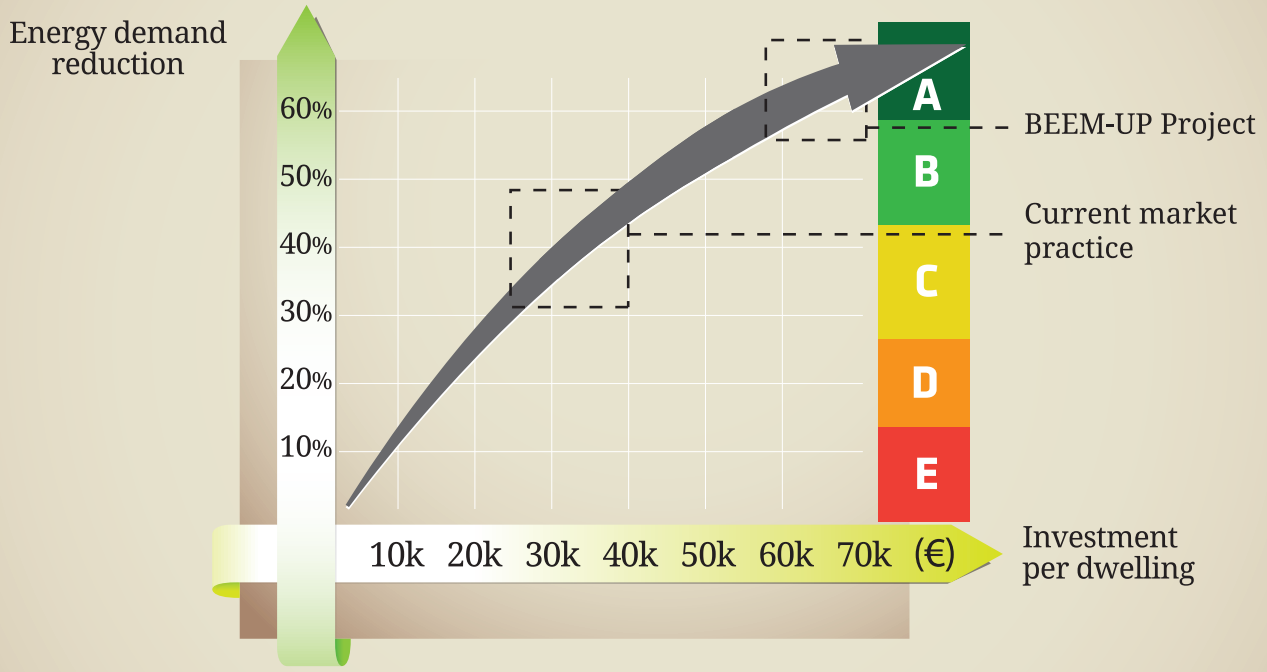
## Bridging the funding gap

Survey data shows that the average energy performance of social, public and cooperative housing due for renovation in Europe sits at an energy efficiency label of E or F. At the current level of average expenditure per refurbishment, a reduction in energy demand of around 40% can be expected – **enough to raise an E or F-rated building to roughly a C label.**

Recent results from the BEEM-UP project[2] demonstrate that reducing energy demand by more than 70% through deep energy refurbishment is indeed feasible in the long term[3]. In most cases, such an energy saving would be enough to reach an energy efficiency label close to A.

[2] The BEEM-UP project demonstrates the economic, social and technical feasibility of deep energy retrofitting in social and public housing. The project includes 340 dwellings in across three northwest European countries: France, Sweden and The Netherlands.
[3] http://bwcv.es/assets/2013/12/4/BEEM-UP_-_Building_Energy_Efficiency_for_Massive_Market_Uptake.pdf

## What does an efficient building cost?



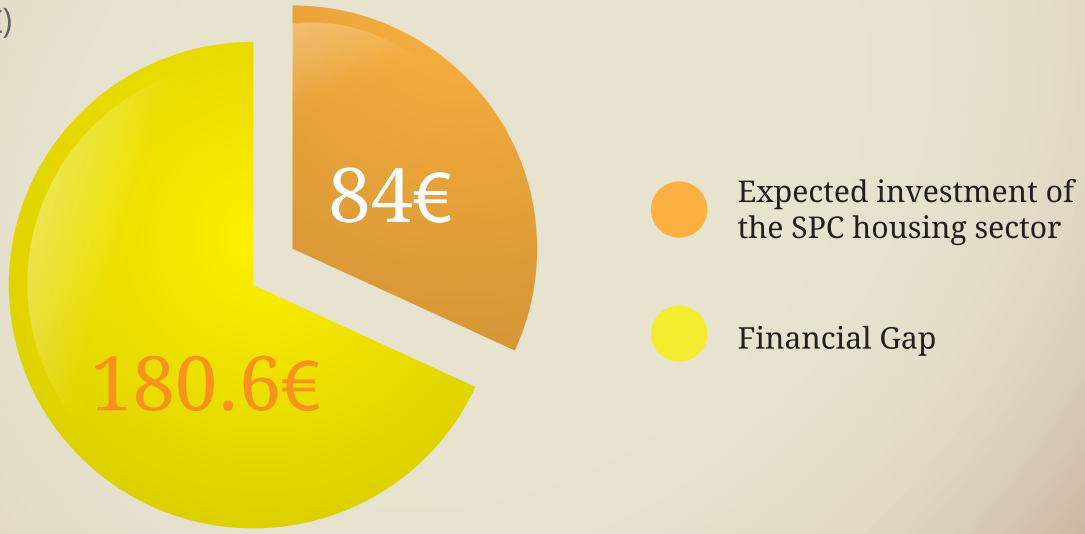

B&W elaboration based on data from the BEEM-UP project

Taking the discussed costs and refurbishment rates into account, we estimate the total annual investment needed to reach EU 2020 targets to be **€37.8 billion annually**. The SPC Housing sector is expected to spend an average of **€12 billion** annually, representing a yearly gap of **€25.8 billion** on average.

**For the period 2014-2020 this represents a total gap of €180.6 billion.**

## Investment required to reach EU 2020 targets for energy demand reduction

**(Billion €)**



## Weighing the impact

The benefits of social housing renovation extend far beyond sustainability. Besides the huge potential for $CO_2$ reduction, expected outcome of increased renovation across Europe include accelerated economic growth and the creation of new jobs.

### Higher employment

According to latest figures on construction sector labour intensity[4], each €115,600 of turnover is assigned to one permanent job. The current expected investment in SPC should create an additional 103,806 jobs by 2020. Taking into account that one job created in the construction industry is expected to create two more jobs in the economy, this rate of investment predicts the creation of 311,418 jobs across Europe[5].

In the specified 2020 scenario, an annual investment of €37.8 billion would contribute an additional 980,968 jobs.

### Reduced CO2 emissions

Buildings account for 40% of Europe's total energy demand. Given that residential buildings constitute 75% of total building stock, and that SPC housing accounts for 12% of these, we estimate that the sector consumes 63.3m tonnes of oil equivalent (TOE)[6].

Under current refurbishment plans, the Social, Public and Cooperative Housing sector will achieve a 3.9% reduction in energy demand by 2020 (with 2013 as a baseline). This translates to a saving of approximately 6.15 million tonnes of CO2 (2.49t $CO_2$/TOE)[7]. Given the price of CO2 under the EU Emissions Trading Scheme (€16.50 per tonne[8]), we estimate a saving of **€101.5 million**.

Under the second scenario, with the sector meeting the 2020 target of 20% energy demand reduction, the estimated saving is valued at **€239.5 million.**

[4] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Construction_statistics_-_NACE_Rev._2
[5] http://www.efbww.org/default.asp?Issue=CONSTR
[6] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Gross_inland_consumption_of_primary_energy,_2000-2010_(million_tonnes_of_oil_equivalent).png&filetimestamp=20121012130325
[7] http://www.energy.eu/publications/KOAE09001_002.pdf
[8] http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf

## Improved public health

Renovation of residential buildings has a real impact on the health of residents. Retrofitted energy efficiency measures not only improve temperature regulation, but also the indoor climate. People in industrialised countries spend up to 90% of their time in buildings[9], and improvements to these environments can yield a number of indirect benefits, from lower incidence of disease and lower mortality rates, to higher productivity and an improved quality of life. Consequently, fewer hospital visits and workplace absences translate to public budget savings.[10]

[9] Höppe, P. Different aspects of assessing indoor and outdoor thermal comfort. 34 (2002)
[10] http://www.renovate-europe.eu/uploads/Multiple%20benefits%20of%20EE%20renovations%20in%20buildings%20-%20Full%20report%20and%20appendix.pdf

## Policy implications

This report asserts that a financial gap of approximately €180.6 billion must be closed in order for the SPC housing sector to reach 2020 targets for energy efficiency. It concludes that the sector has an important role to play in the European economy, and should, due to the following characteristics, be considered a central focus of a number of policy actions.

- SPC housing providers each manage a considerable housing stock (often more than 20,000 dwellings) compared to private landlords, which creates a leverage of individual investment decisions and a great deal of scope for replication.

- Housing stock is managed in the long term (30-50 years), thus there are strong incentives to reduce future operational and maintenance costs.

- The majority of SPC housing stock has a rental structure with controlled rent levels, which means that rent cannot be raised after a renovation. This imposes constraints on both return on investments and possible business models.

- The sector, with 12% of European building stock, provides housing for a great number of low-income families and disadvantaged people. It significantly raises the living standard of these groups and provides positive externalities in areas including health and productivity.

## What can be done?

From various European projects and the daily experience of affordable housing providers, it can be said that some ingredients are missing to trigger the ecological transition in the affordable housing sector:

### *Creation of a European Housing Fund*

There is a compelling need for a European entity to facilitate the financing of major investments in retrofitting of houses. A European Housing Fund could combine the financial capacities of major European banking institutions in order to finance those investments with a long-term strategic importance to European society. Such an entity would be capable of providing low interests loans for major renovation projects in the SCP Housing

sector. A European Housing Fund could also provide grants for technical support of investments' execution. Involvement of such an institution could have strategic value in setting up the necessary structures to encourage further investment from the private sector.

At present, housing companies have still little experience in implementing long-term renovation plans and managing major retrofitting projects. Experience of the ELENA grant programme across Europe provides evidence that a technical support grant can mobilise major renovation projects with a leverage of more than 50 over the financial grant.

A new technical support programme for the period 2014-2020 would greatly contribute to the acceleration of investment programmes in building renovation.

### *Facilitation of applied research and standardisation*

Three lines of research have been identified as beneficial for the fostering of energy-retrofitting projects.

- The continuation of applied research to develop low-cost technologies for the improvement of energy efficiency and renewable energies in housing, including a focus on prefabricated modules aimed at deep renovation of affordable dwellings within a short period of time.

- Standardisation of the appraisal of green value investments, including a credible evaluation of external benefits related to energy retrofitting.

- Training of both housing professionals and tenants in order to enhance their ability to benefit from the energy transition, to include financial engineering and major retrofitting project management.

## Further considerations

Appropriate legislation is needed to allow the development of low carbon market finance. This may be achieved through, for instance, the standardisation of Energy Performance Contracts and the transfer of receivables (energy savings which represent guaranteed cash flows) into asset portfolios of investors, or as underlying assets for bonds.

Indeed the emission of specific bonds based on the securitisation of the future energy savings could be envisaged since bond emission would enable to raise funds at lower cost than through a usual loan, and thus to offer ESCOs better refinancing conditions. However, the emission of bonds requires a critical size and homogeneity of assets, which can only be reached in a mature market.

## *Annex 1: Methodology*

This survey is based on a questionnaire and telephone interviews with 16 of the 24 members of the Energy Experts working group of CECODHAS Housing Europe. The working group members represent national SCP housing federations in Europe.

The survey reflects best estimates by experts at time of interview. The data provided should not, however, be considered reflective of the formal positions of participating experts, nor the organisations they represent.

The following organisations participated in the survey:

| Organisation | Country |
|---|---|
| EKYL | Estonia |
| GdW | Germany |
| NABCo | Ireland |
| LegaCoop Abitanti | Italy |
| NBBL | Norway |
| AVS | Spain |
| Riksbyggen | Sweden |
| BHA | Bulgaria |
| VMSW | Belgium |
| USH | France |
| Federcasa | Italy |
| AEDES | The Netherlands |
| ZRSMRP | Poland |
| SFHA | Scotland |
| GdV | Austria |
| NHF | UK |

This survey and accompanying report has been the result of collaboration between Bax & Willems S.L., the industry-led BEEM-UP project, and CECODHAS Housing Europe.

## Bax & Willems
Consulting Venturing

Bax & Willems is a specialised consultancy firm with extensive experience in market studies and analysis. For more than 25 years, the firm has designed and implemented Open Innovation strategies for large industrial corporations as well as smaller high-tech companies, research institutes and governments.

Energy efficiency in the construction sector is one of Bax &Willems' key areas of expertise.

***www.baxwillems.eu***

BEEM-UP

The BEEM-UP Project is one of the largest European projects (FP7). It demonstrates the economic, social and technical feasibility of deep energy retrofitting in social and public housing. The project takes an integral approach to overcome barriers through three ambitious retrofitting pilots located in Sweden, the Netherlands and France.

BEEM-UP aims to retrofit 340 dwellings with an average heating energy demand reduction of 75%. The overall objective is to explore innovative building and energy management approaches, which could de replicable on the large scale.

***www.beem-up.eu***

CECODHAS

CECODHAS Housing Europe is the European Federation of Public, Cooperative & Social Housing - a network of 45 national and regional federations, which together represent about 41,400 public, voluntary and cooperative housing providers in 19 countries.

***www.housingeurope.eu***