

## Key Findings

### 1. Housing associations can retrofit at scale

With 70% of Europe's 2050 housing stock already built, any attempt to deliver energy efficiency must look at retrofit. However, individual homeowners do not represent a market large enough to develop retrofit technology at scale. Housing associations with their large stock portfolios, either individually or in partnership with others, are best placed to make retrofit happen.

### 2. A flexible approach to the level of energy performance is the guarantee for success

The final achievable level of retrofit varies widely across the models discussed. Some of the most successful models – KredEx and KfW for example – offer a sliding scale of grant or subsidy which is linked to the final energy performance level achieved. In new housing projects, both for very low energy buildings and passive houses, extra costs of construction for additional insulation and ventilation with heat exchange account for a total of 6.7% for small buildings and 9.7% for large (compact) buildings, and cannot be compensated by energy savings in the long run. Between Very low energy vs. Passive buildings differences in consumption are very small; we should take cost implications into consideration when defining the optimal level of nearly-Zero Energy Buildings. Measuring actual savings rather than predicted savings may be an important factor in the overall success of a scheme. The need for flexibility for Member States to meet the goals in different ways while ensuring affordability is vital.

### 3. Cost optimality is a relative concept

Some parameters used to calculate cost-optimal levels are not easy to predict (future primary energy factors, cost development, price trends, performance of new technologies). There are some competition factors between different technical components of energy efficient buildings: insulation vs. heating and ventilation technologies vs. renewable systems (heat pumps, solar plants, PV); the calibration between these components is challenging and definitely not only subject to expert calculations but also a matter of competition between different stakeholders in the energy services sector including energy providers.

### 4. Projects and funding must be brought together – role of intermediaries

Simple, sustainable and reliable financing schemes tailor-made for Public, Cooperative and Social Housing companies are essential in order to gather the initial capital required for deep renovation projects. Loans must be available to complete the subsidy part of the financing scheme, possibly all integrated in the same mechanism. Having seen the issues at stake, qualified support could be required from third parties (such as sectorial association and energy agencies), to support the condominium to start the process and meet the right project partners.

## **5. Quality assurance is needed for the housing organisations and for the tenants**

Training and certification of building professionals is essential to deliver at anything beyond demonstration scale. 'nearly-Zero' is an innovation technology and as such requires the right skills to guarantee its delivery. There is a market for companies involved in the maintenance of systems that have detailed operations within a certain price range, especially in the field of tertiary buildings. In the residential sector, particularly in Social Housing, it is necessary to develop specific maintenance programmes for nZEB. Guidelines should be produced on this topic to help technicians with ordinary programmed maintenance operations as well as with preventive maintenance to avoid damage, over-consumption or even total system failure. Supporting tenants and residents to make best use of the refurbished dwellings is crucial. Residents must be able to understand the technology used in their home and feel comfortable making decisions about the house.