3. Ensuring Cost Neutrality

Overview

Renovation can cause gentrification or renoviction, which is the expulsion of lower income families from the neighbourhood. Occasionally the low-income residents have to move to less familiar districts and the outcome of the renovation ends up not benefitting them. The impact of gentrification can be quite serious. Gentrification can also occur as a consequence of relocating – even temporarily – tenants during the renovation. The temporary change impacts the dynamics in the district. Dislocated tenants might never go back to their original housing, either because the renovation took too long, and/or moving is a burden they simply do not want to carry again.

Cost neutrality therefore involves enacting improvements in a building's energy efficiency without significantly increasing the total expenses for residents, but also keeping with the budget constraints of the housing providers. In social and affordable housing, maintaining cost neutrality is paramount given the tight budget constraints. Renovations must be carefully designed to prevent an additional financial burden for those already struggling to access affordable housing, which is the design of a fair energy transition. This requires offsetting additional costs associated with energy upgrades, either through operational cost savings or external financing mechanisms. Indeed, an investment can be "cost-neutral" for the tenant, as long as they benefit from the renovation through lower energy bills.

This concept is also be applicable to the owner. The investment may not be "cost-neutral" if, for example, rental regulations prevent any cost to be passed on to the tenant.

Ideally, cost neutral projects are underpinned in energy savings to repay the investment: the tenant's rent increases in the same proportion as the savings in their monthly expense, and simultaneously, the owner recoups the investment by the fair rent adjustment.

Most of the savings in the operating cost of the households correspond to energy savings. While it depends on the type and extent of building renovations, maintenance savings seldom generate sufficient financial return to cover the investment, and they do not contribute to the climate change targets. Achieving the EU energy and climate change targets requires deep energy renovations which have a more fragile cost-benefit case from the purely financial point of view. Energy savings are a societal goal and only a part of their benefits can be monetised (energy savings).

Cost neutral renovation usually requires financial transfers from EU, state, or city budgets to housing providers or through bank loans. This intervention is often necessary as affordable providers are already inherently navigating a context of marked failure and require external support. In this regard,

a 2018 EU study[16] reveals an annual investment gap of €57 billion in social and affordable housing, indicating a 25% underinvestment gap in the sector.

The recommendations to achieving cost neutrality will primarily focus on energy renovations and their impact on investment costs and cash flows (including maintenance costs and energy expenses). This first step is viewed as a fundamental pre-condition to ensure the business case is sound and the intervention is cost optimal. Subsequently other variables will be added, such as grants, subsidized loans, or tax deductions, offered by public authorities or other organisations with similar goals. In these broader cases, the investment can be considered neutral to the parties involved (tenants, residents and housing providers).

This section will address the following questions:

I. What is a cost neutral investment in social and affordable housing?
II. What measures can a housing provider take to achieve cost neutrality?
III. What are cost-optimal energy investments?
IV. What is the rebound effect and how to prevent it?

Recommendations and Good Practices

I. What is a cost neutral investment in social and affordable housing?

A renovation investment, net of grants, is cost neutral when the net present value (NPV) of the savings is equal to or higher than the investment over the project life:

*[Equation A] Investment (net of grants) ≤ NPV ((Energy Savings * future energy prices) + other non-energy benefits)*

The NPV should be discounted using the appropriate discount rate. In simple terms, the NPV calculates the difference between the incoming and outgoing cash flows of a project, adjusted to present value, that is, considering the value of money over time.

This calculation is difficult to apply in practice, as it does not explicitly refer to the cost of financing. In a nutshell, a cost-neutral investment is when the savings on bills (discounted) do not exceed the cost

[16] https://economy-finance.ec.europa.eu/document/download/82a1420f-5475-4466-a3de-860a3a8553d3_en?filename=dp074_en.pdf

of the work, including financial costs. In addition, the length of the payment period should not exceed the expected lifetime of the investment.

Therefore, if the investment is fully financed by debt and the debt is paid with the same annual instalments, the annual debt payment would be equal to or lower than the annual saving on tenants or housing providers bills. The formula will be as follows:

[Equation B] Annual debt payments ≤ annual savings on tenants or housing providers bills + other non-energy savings

This formula depends on a number of factors such as the financing cost and energy price developments.

The upfront cost of housing renovations is a major investment hurdle for private households and the social housing sector. Renovations are usually financed with a combination of equity (own resources) and external finance, such as bank loans. Depending on the country, the energy component of renovations can also benefit from a variety of grants and subsidies.

Grants and tax deductions decrease the upfront cost of energy renovations, which increases the project NPV and can help achieve cost neutrality. However, the rest needs to be financed by own resources and debt. Therefore, cost neutrality is also affected by the opportunity cost of own resources and the financing cost (interest rate and fees). Subsidized loans decrease the financing cost of the investment and are equivalent to grants from a financial perspective. Energy renovations are characterised by long payback periods. Therefore, debt financing should try to match the payback period (including financing costs) of energy renovations, so that the project is able to repay the loan through energy cost savings and other savings. If the duration of the loan is shorter than the payback period, the cost of financing the investment can be higher than the annual saving during the loan payment. This is problematic from a cost-neutrality point of view. Therefore, the aim is to have loan tenors that are like the payback period and obviously lower than the life of the asset.

Energy measures can have significantly different payback periods. For instance, lighting can have a payback period of up to two years, whereas insulations usually have paybacks of 20 years or more.

However, since renovations usually include several energy measures, it seems appropriate to use on average payback period of all the investments to analyse cost neutrality.

II. What measures can a housing provider take to achieve cost neutrality?

Ensuring cost neutrality in social housing renovations involves careful planning, efficient use of resources, and strategic decision-making. Going back to [*Equation A*] this would mean carrying out sound planning in a way that balances initial investment and long-term cost savings, while resorting to external financial support as necessary. As a corollary, some strategies are listed below that housing providers can consider to achieving cost neutrality and overcoming split incentives in each area:

I. Reduce initial investment

(1) Use Energy Performance Contracts, where the cost of renovation is repaid through achieved energy savings. This financing model can align the financial interests of the housing provider and tenants.
(2) Explore opportunities to reuse or recycle materials from the existing building.
(3) Explore framework agreements with suppliers or contractors. A framework agreement in construction is a contractual arrangement between a client (often a public authority or large organization) and a contractor or a group of contractors. This type of agreement establishes the terms and conditions under multiple construction/renovation projects are awarded and carried out over a specified period. Instead of negotiating individual contracts for each project, the framework agreement sets the framework for future projects, usually reducing the cost for each one individually.
(4) Launch competitive bids to encourage competition and bring the price down. This can help identify the most cost-effective options while ensuring that quality standards are met.
(5) Explore opportunities for bulk purchasing of materials, fixtures, and equipment, for example by aggregating several projects. Seeking partnerships with other housing providers or municipalities can aid the process of achieving economies of scale and increase the buying negotiation power.

Ii. Consider long term cost-savings measures for tenants or housing providers:

(1) Prioritize energy-efficient upgrades, such as installing LED lighting, energy-efficient appliances, and HVAC systems. These improvements may present upfront costs but can lead to significant energy savings over time, contributing to cost neutrality.
(2) Integrate Renewable Energy Integration. While initially expensive, the long-term energy savings can offset these expenses, contributing to overall cost neutrality.
(3) Introduce Smart Building Technologies. Technologies such as energy monitoring systems, smart thermostats, and occupancy sensors can optimize energy use and reduce operational costs over time.
(4) Integrate water efficiency measures.

(5) Utility metering: measure and bill tenants for their individual energy and water consumption. This encourages responsible consumption and provides a direct financial incentive for tenants to adopt energy-saving practices.

(6) Raise awareness and encourage tenants to adopt water and energy-saving practices

Iii. Consider external financial support

(1) Take advantage of available grants, or incentives at the city, regional, state of EU level programmes to support energy-efficient renovations. Dedicate at least a person to find and understand how the financing works and how to access it.

(2) Explore collaborative funding models with municipalities, government agencies or utility companies contribute to the financing of energy-efficient renovations.

EXAMPLE

Western Europe

Wir inHAUSer

Wir inHAUSer project can be described as remarkable in terms of its comprehensive (award-winning) concept to minimise carbon footprint through energy use, where the innovative mobility approach assumed a pioneering role. Tenants were given a say in the planning and the renovation investment was not reflected on a rent hike. The cost of the refurbishment was funded with the national social housing system in Austria, where rents are calculated based on the cost of the refurbishment.

III. What are cost-optimal energy investments?

Deep energy renovations usually involve several energy measures, such as insulation, window replacements, lighting, solar heating, PV or a more efficient heating system. The total cost and energy savings of these renovations must be considered when assessing cost neutrality. In accordance with the Energy Performance of Buildings Directive, deep renovation must be developed within cost-optimal energy investments. According to the same Directive, energy renovation is cost-optimal when the investment is financially and/or economically profitable (including CO2 prices in the latter). The

European Commission has specified a number of requirements for the calculation of cost-optimal levels, which includes the assumptions of future energy prices, discount rates, sensitivity analysis, etc.

Energy prices can have a major impact on cost neutrality. However, the future trend of energy prices is uncertain. Current energy prices should not be used to calculate future energy savings, as past developments show that energy prices are volatile. It is therefore important to use price scenarios published by reputable sources (e.g., the prices recommended by the EU Commission) and perform appropriate sensitivity analyses.

Not all energy measures will be equally affected by energy price variations. For instance, electric heat pumps, whose future energy savings depend on price developments of electricity and the fossil fuel being replaced. Effectively, in the past, relatively low gas prices compared to electricity prices negatively impacted the profitability of electric heat pumps. Moreover, the reduction of energy costs when installing a heat pump in replacement of heating system is dependent on taxes and levies.

EXAMPLE

Western Europe

Loughborough Estate - UK

Brixton Energy Solar 1

This project offered social tenants the chance to invest in renewable energy generation and sell the power back to the grid. This business case was based on the following benefits to the stakeholders:

1) Guarantee households with an annual return on investment of up to 3%;

2) Argue for an ethical and green community investment vehicle;

3) Constitute a community energy efficiency fund to support the implementation of local energy efficiency projects.

The cost savings are passed on to the residents of the estate through a nominal reduction in service charges.

IV. What is the rebound effect and how to prevent it?

Potential variances between expected and actual energy savings in buildings are due to several factors. On one hand, occupants living in energy-inefficient buildings may consume significantly less energy than expected just before the renovation takes place. This phenomenon is called the prebound effect. On the other hand, after the renovation, occupants living in energy-efficient buildings may consume more energy than expected as they trust the energy bills will be lower. This is called the rebound effect. These phenomena have been observed in several countries, such as Germany, the Netherlands and France. Human behaviour is indeed an important determinant of energy consumption (especially space heating), which can be hard to predict and has led to over or under-estimating the actual energy savings in buildings resulting from energy investments. Other factors can play a role, such as technical aspects and a lower occupancy per floor area (especially in single-family homes).

It is likely that behavioural factors explain a significant part of this consumption gap. Indeed, occupants tend to behave more economically than expected, such as keeping their homes at lower temperatures than necessary to achieve a minimum comfort level or heating fewer rooms. Low-income households in Germany report that their heating behaviour is mostly related to energy costs. Meaning that an increase in future energy prices can lead to a decline in consumption (energy price elasticity), further complicating the estimation of energy saving under different energy price scenarios. This can have a significant impact on the profitability and cost-neutrality of energy measures, especially for heating focused renovations, since we cannot save energy that is not actually consumed.

It is important to take into consideration the prebound, rebound effects and the impact of energy price developments, when calculating the financial feasibility and cost neutrality of renovation investments, since energy consumption before renovation could be overestimated, while consumption behaviours might change the energy consumption in the future.

In practice, the best way to assess is to carry out smaller pilot projects to evaluate the impact of retrofitting in households, or by carrying out sensitivity analyses of energy savings, based on information from the literature on the impact of prebound or rebound effects. In any case, in cost neutrality calculations, it is recommended to consider a “prudent” assumption on the savings generated by the investments. Residents should be made aware of these concerns at every time, as raised in the People and Communities chapter.

The analysis on cost neutrality above does not consider non-monetary benefits such as aesthetics, comfort, etc. In some instances, these can play an important role, as they have an impact on the quality of life of residents and image of the building or district. The Commission and Member States usually state that energy efficiency investments generate (co-)benefits other than energy savings (e.g., health improvements, community revitalisation, improved amenities). However, according to a recent

evaluation of the European Court of Auditors, none of the Member States used these indicators to measure these additional benefits.

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