

6. Neighbourhoods of Tomorrow

Overview

Introduced by the European Commission in 2020, the New European Bauhaus (NEB) is a movement to collectively think the Residential Neighbourhoods of Tomorrow, guiding the transformation of our societies along three inseparable values: sustainability, aesthetics, and inclusiveness. This allows crossing bridges between different contexts and disciplines and building engagement at all levels. The NEB entails also the renovation of existing buildings, particularly affordable housing. The idea is that by renovating these buildings to be more energy-efficient and sustainable, they can help reduce energy consumption and emissions, while also improving the quality of life for residents. The NEB emphasizes social innovation in the processes of engaging and empowering communities in the design and renovation of affordable housing. This can include involving residents in the planning and decision-making process and providing them with training and resources to take an active role in the renovation of their homes.

Questions that will be addressed in this section are:

- I. What will the Neighbourhoods of Tomorrow look like?
- II. How will the New European Bauhaus programme support social innovation?
- III. How will New European Bauhaus projects be initiated?

Recommendations and Good Practices

I. What will the Neighbourhoods of Tomorrow look like?

The NEB envisions neighbourhoods of the future as spaces that combine functionality, sustainability, and beauty. The initiative is aimed at fostering collaboration among architects, artists, scientists, and citizens to develop innovative solutions for the built environment. The vision included integrating nature into urban spaces, using sustainable materials, and promoting energy efficiency.

The initiative seeks to transform neighbourhoods into vibrant and inclusive communities where people could live, work, and connect with each other. It aimed to promote a holistic approach to design that takes into account environmental impact, social cohesion, and cultural identity.

The main goal of the NEB is to implement the European Green Deal and make the deal more familiar to people throughout Europe. It is also a long-term interdisciplinary plan on how to connect the world

of art, culture, and education by linking them to science and technology. New European Bauhaus can also complement the European renovation strategy by creating a climate-neutral building stock by upskilling the workforce to include green and recycling skills and by developing new job profiles, such as deep building renovation specialists, including professionals and craftsmen.

The NEB movement presents a policy framework for the challenges of smart cities. They are integrated with the overarching vision of contributing to the European Green Deal via modern and fashionable buildings and the Renovation Wave, with strong links to the Affordable Housing Initiative. These are particularly meaningful for cities, whose buildings are often more vulnerable to climate change³. The NEB supports innovations aimed at integrating sustainability, inclusiveness, and aesthetics into innovative solutions and products. The real strength of the New European Bauhaus in its work is primarily to address the environmental and social challenges in Europe. It needs solutions that reflect the diversity of voices within our communities. Local citizens need to be engaged to co-create solutions that work. Each initiative awarded through this program brings a unique approach to solving the problems of community members.

The NEB initiative promotes social innovation in affordable housing retrofitting by addressing the need for sustainable, inclusive, and accessible housing solutions in Europe. One of the initiative's key social innovation aspects is inclusiveness. The initiative aims to design and provide housing solutions that are accessible and inclusive to all members of society, including people with disabilities. This includes designing spaces that are physically accessible and considering the social and cultural needs of residents. Another aspect is community engagement. The initiative aims to involve community members in the design and delivery of housing solutions to ensure that they meet the needs and preferences of local residents. This approach helps to create a sense of ownership and pride among residents and ensures that housing solutions are socially sustainable.

II. How will the NEB support social innovation?

Social innovation plays a key role in the New European Bauhaus, as it aims to create solutions that are inclusive, participatory, and people-centred. This can be achieved by involving the community and residents in the design and decision-making process of the energy renovation of affordable housing. The NEB can promote the use of co-creation and co-design methods, where residents and community members are actively involved in the design and planning of the renovation project. This can help to ensure that the solutions are tailored to the specific needs and preferences of the community and that they are more likely to be accepted and adopted. Another option could be using digital tools and platforms to facilitate communication and collaboration between different stakeholders.

The NEB programme could potentially support a range of social innovations in the energy renovation of social housing. The NEB will provide funding, technical assistance, and other resources to help social housing providers and residents retrofit.

Community engagement

The NEB principles include community engagement, or the involvement of stakeholders in project planning to ensure that it is mindful of the needs and priorities of the residents. The programme promotes dialogue and collaboration between social housing providers, residents, and other stakeholders. Training and other support to social housing providers and residents can be provided on how to carry out the collaboration and outreach activities effectively.

Innovative financing models

The NEB programme includes innovative financing models that make it easier for social housing providers and residents to fund energy renovations. For example, the shared savings agreements model provides upfront funding for an energy renovation project, and the social housing provider pays back the financing over time from the energy savings generated by the project. Social housing providers issue bonds to finance energy renovation projects with environmental benefits, such as energy-efficient retrofits. Investors can purchase the bonds and receive a return on their investment. The programme provides funding, technical assistance, and other resources to help social housing providers and residents access these financing models.

III. How will NEB projects be initiated?

The European Institute of Innovation and Technology (EIT)⁶ has announced funding for 18 projects that are dedicated to engaging citizens in solutions that transform living spaces. EIT Climate-KIC will work directly with six of these awardees, who will receive funding and tailored support to address local challenges through local solutions sustainably and inclusively. Following the New European Bauhaus mission and vision of working together to create beautiful and sustainable experiences, the EIT community is supporting the development of innovative and collaborative models of local initiatives to increase civic engagement and engage communities in the design of sustainable public spaces to have a lasting impact on the challenges faced at the local level. Each initiative is uniquely encouraging more climate-friendly habits, enabling citizens to implement new solutions to local problems and create sustainable practices that can transform cities and communities.

⁶ Through EIT Community New European Bauhaus initiative.

The first winners of the EIT Climate-KIC are shown in the following table.

Table 5. Award-winning projects from EIT Climate-KIC support.

COUNTRY	PROJECT NAME	PROJECT ADVANTAGES
Portugal	Porto Think Tank	The project aims to renovate 24 Lavadouros (laundry rooms) in Porto from architectural artifacts historically associated with women by consulting with the local community and understanding how they can be transformed sustainably to be useful again.
Slovakia	Imagine Your City: Building Stronger Communities with Urban Co-design and NEB Principles	The project brings together residents of Košice and Ukrainian refugees to develop specific sustainable interventions to improve the area around the temporary refugee shelter. In addition, the project aims to share prototypes of scalable solutions that can address immediate problems and future challenges posed by the climate crisis.
Romania	CONNECT, Timisoara Community	Working throughout Timisoara, this project aims to integrate Ukrainian refugees, especially women, into the community by raising awareness of foreigners' role in urban development. This will be explored through gatherings that adopt artistic and social perspectives, using sustainable materials to connect art to history and create connections between communities.
France	Seaport Highlights Initiative: Reconnecting citizens with the beauty of the river	Seaport will use summer workshops and learning explorations on the river to design and activate the shipyard district, interweaving art and innovation to explore the common heritage of the Seine in Paris. The project will prioritize vulnerable groups such as young people and older adults and connect citizens directly with professionals and policymakers.
Spain	ASD-publics	Activating spaces with neurodiverse publics (ASD-publics) will aim to explore nature-based solutions to improve play areas for neurodiverse people, children with autism, and their families. The project will pilot co-creation with the ASD community to learn how to transform the space to create a better overall multi-sensory experience for that community.
Greece	Adama: Community solidarity for a sustainable future	Helping to understand local issues in Elusis through a participatory approach and co-designing them through sustainable solutions.

Further reading and online resources

Neighbourhoods are being planned and developed according to the principles of the New Bauhaus.

You can check inspiring examples in the related EU site: https://new-european-bauhaus.europa.eu/get-inspired/inspiring-projects-and-ideas_en?page=0

Chapter 4 TECHNOLOGIES AND TECHNICAL APPROACHES

To double the annual energy renovation rate of residential buildings as foreseen in the Renovation Wave, there is a renewed push for mainstreaming the recent approaches such as digital, smart energy building management systems, prefabrication, low carbon materials, eco-design, renewable energy technologies and other innovations. The synergistic adoption of these advanced technologies represents a significant step towards a greener and more sustainable future in the built environment. By leveraging innovation, the construction sector will be better prepared to contribute substantially to the goal of decarbonising the building stock in the affordable sector.

However, technology providers face a number of integration and regulatory challenges, coupled with the necessary requirement from housing providers to keep costs down and continue to function as actual alternative to the real-estate market. The enhanced and ever-changing building performance standards add another layer of complexity. The latest revision of the Energy Performance of Buildings Directive (EPBD) sets a series of measures in order to achieve a decarbonised building stock by 2050.

Upgrading the local skills and competencies for introducing innovation in the technical aspects of renovation is key for tackling these challenges. Most of the innovation needed has already been invented and developed, however, knowledge and access at the local level is still low. Going beyond the business-as-usual building design and construction process as well as investing added resources in maintenance after renovation also hold considerable potential for improvements.

More recently, local actors are facing additional challenges related to the increase in construction material, energy prices and labour costs, the lack of data and data analysis to improve energy efficiency, waiting periods typically caused by legal and administrative obstacles (obtaining permits, miscommunication between stakeholders, delays in logistics, etc.) and discrepancies between ambitious construction plans and actual conditions on the ground.

This chapter provides guidance and pathways for renovation of social and affordable housing at district level from the technical and technological perspective alone. Different solutions are proposed throughout this document to ensure that the renovation process is carried out with increased efficiency and economy of means, including industrialised approaches, circularity in renovation, energy efficiency and combination of different sources of energy, and digitalisation of social housing service provision, among others.

1. Developing Industrialised Approaches

Overview

While the building sector belongs to the industrial sector, it has not seen the same level of productivity rise as other areas in the last decades, brought upon by new automation and digitalisation-based systems. Indeed, the cost of construction projects have risen faster than inflation. This gap is pronounced for example in France and Germany, where construction costs rose by around 60% between 2008 and 2016, while the inflation, measured by the consumer price index, rose by 10%.

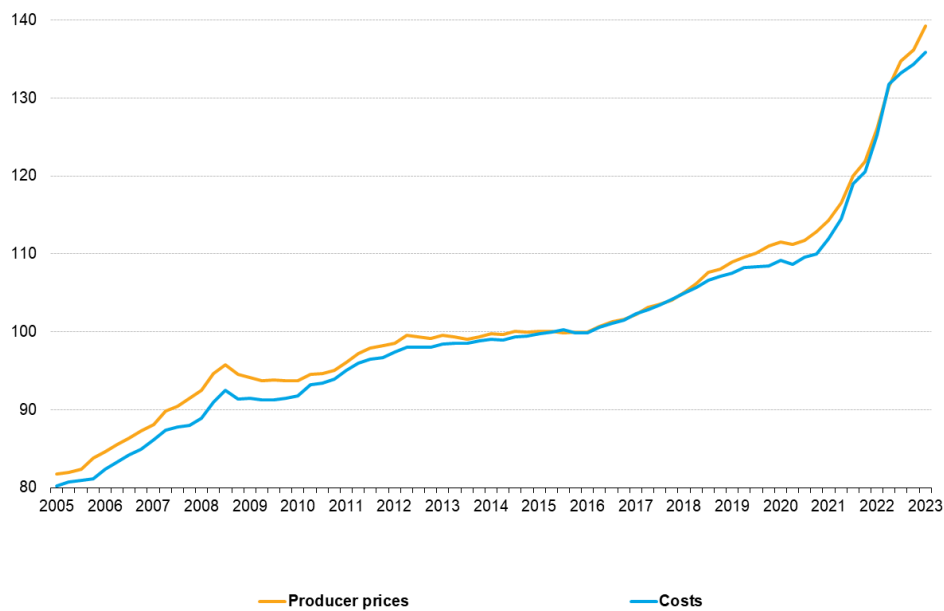


Figure 4. Construction costs since 2005 (Source: Eurostat)

The use of industrialised approaches in construction and renovation is being put forward as one solution to improve the productivity of the sector. These are facilitated by improvements in Building Information Modelling (BIM) and standardised, modular solutions (see Modular Building Systems sub-chapter in the full version). Digital models are used to build and adapt solutions to the buildings, which are then prefabricated in a controlled, offsite environment. And then set up and applied at the building premises in a fraction of the traditional time. Industrialised renovation makes it possible to achieve a high volume of renovations in a limited time, making them cheaper and quicker to install, which is why they are frequently mentioned in the context of achieving the ambitious renovation targets of the EU.

In addition to price, industrialised construction improves delivery times. Between 80% and 95% of the work is carried out in the factory, a method of operation that allows the different stages of a construction project (which traditionally follow one another), to be carried out simultaneously. Industrialisation and, above all, the assembly process, reduce the risk of unforeseen risk events and

therefore allows for predictable outcomes. The value created by productivity gains could also be transferred to customers in the form of lower prices, through additional services in housing (personalization, etc.), employees in the form of higher salaries, or subcontractors in the form of higher margins.

Another advantage of industrialised construction is quality control. Combining a digital model with industrial machines allows high precision design. This entails industrialised processes with effective quality control. As with industrial assembly lines in other sectors, quality issues can be identified as soon as the modules leave the assembly line and solutions can be found even prior to the modules being shipped to the site. Thanks to constant checks, identifying failures is easier in this environment than on a building site.

The questions to be addressed in this section are:

- I. What are the requirements for a company to adopt an industrial approach to renovation?
- II. What actions can a buyer (housing owner) of industrialized approaches put in place to encourage this kind of renovation?
- III. What are some of the drawbacks associated with industrialized approaches?

Recommendations and Good Practices

I. What are the requirements for a company to adopt an industrial approach to renovation?

Adopting an industrial logic in the renovation of a given building implies that the building company chooses to undertake this approach. As a novel approach, the company should be prepared to adopt the required processes that the approach entails. The following requirements should be anticipated:

a) Developing an industrialised renovation product

Industrialisation cannot take place without a pre-designed standardised product. Industrialisation is inserted into the process of creating the standardised product so that it can be prefabricated on a large scale, reducing costs, time and improving quality. The product must therefore be designed for large-scale production. Industrialisation can only be achieved through a triple transformation leading to digital design and monitoring, centralised and automated production sites and lean manufacturing.

b) Digitalising the retrofit process through Building Information Modelling (BIM)

The use of BIM is becoming increasingly prevalent in the construction sector. In the context of industrialised energy retrofitting the extensive use of these digital tools is essential to guarantee the correct production of prefabricated elements according to an industrial logic. A specific section on BIM is available in sub-chapter 2 on prefabricated modular systems in the full version of the Blueprints.

c) Considering non-standard building specificities

Building-specific constraints may cause difficulties to the application of industrialised solutions and increase costs or installation times. These constraints may be related to heritage protection, façade offsets, the proportion of glazed surfaces, the presence of asbestos or fire constraints and the need to take account of existing cabling. It is then recommended for companies to identify which building archetypes adapted to their solution in order to bid on adapted contracts.

d) Integrating up-front investment into the company's strategy

The investment cost of developing a solution and then setting up production lines can be high. As construction companies often work with tight profit margins, they are often reluctant to invest in new processes. An industrialised approach investment often represents 15 to 20% additional cost compared to traditional construction or retrofit methods. Companies must therefore calculate the critical number of renovations needed to achieve profitability. As industrialised solutions require design costs to be mobilised, it is often more cost-effective to start with the social housing sector, where the potential for replication and the resources of social housing organisations are greater than for private owners.

AN INDUSTRIALISED APPROACH TO RENOVATION IN FRANCE

Western Europe

France - Wattrelos



In the BuildUp project an off-site energy renovation was carried out for a social residential area in Wattrelos, France. The façade and roof elements were prefabricated in a fully automated process. The company then wrapped the buildings in an insulating envelope of pre-assembled, energy-efficient elements. In ten months, it renovated 160 social housing units zero energy.

II. What actions can a buyer (housing owner) of industrialised approaches put in place to encourage this kind of renovation?

Industrialised approaches imply a change to the common binary procedure that is prevalent in construction: project management first, construction contracting later. Indeed, an industrialised renovation service provider often sells a complete engineering and materials service. Also, given the tight margins often, any company will require a large volume of orders to make their product profitable. In this sense, there are a number of actions that the housing owner (contracting entity) can put in place to favour industrialised approaches and attract innovative companies:

- a) Working on a common set of specifications to adapt contract volumes to industrial standards

Project owners (and in particular social housing owners) can group together and work on a common set of specifications, allowing them to commit a significant volume of housing to be renovated and to give visibility to solution providers.

- b) Offering multi-year orderbook visibility to companies on housing stock retrofit demand

Industrialisation implies, as explained above, committing large volumes of production to be competitive. Thus, it is advisable that project owners devise a multi-building / multi-year contract agreements for a high volume of housing to be renovated, so that the companies are able to provide an economical solution and adapt their production capacity to cater for the future demand.

An example on how an industrialised approach is being implemented comes from the Overijssel Province Authority in the Netherlands. Province Overijssel has partnered with industry, research, and policy partners, in a flagship project INDU-ZERO, to design and test a fully automated factory for complete renovation package manufacturing – The Smart Renovation Factory. Applied to construction or renovation sites, this factory has the capacity to produce standardised renovation packages at an industrial scale (at least 15 000 packages per year).

- c) Taking into account industrialisation techniques in the award criteria in energy renovation procurement

Owners have the power to direct the choices made by contractors through the technical specifications in energy renovations tenders. Contracting authorities can include criteria such as volume thresholds, time on-site, serialised renovations, or other industrialisation-based requirements in the contract award criteria to encourage bidding from the appropriate companies.

III. What are some of the drawbacks associated with industrialised approaches?

Apart from the multiple benefits addressed above, industrialisation is not without its drawbacks, which can sometimes seem counterintuitive. These are some of the challenges to take into account:

- Dependency on global supply chains: the reliance on a globalised supply chain for materials and components makes the construction industry susceptible to disruptions, leading to project delays and increased costs during supply chain interruptions. This was the case of the Covid-19 years, where global supply chains were disrupted and a number of sites renovated with industrialised approaches were ground to a halt.
- Loss of craftsmanship: standardised and repetitive industrial processes can diminish the need for skilled craftsmanship, leading to a decrease in traditional building techniques and the uniqueness of building architecture and structures.
- Job displacement: automation and machinery in industrialised construction may replace manual labour, resulting in shifts in work offers and challenges for workers who lack the necessary skills for new technologies.
- Local environmental impact: mass production and resource-intensive processes in industrialised construction may contribute to localised environmental degradation.
- Increased CO2 emissions: when industrial production facilities are far from the construction/renovation site there are added transportation related emissions.

Further reading and online resources

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- EnergieSprong, France: <https://energiesprong.org/Retrofit> - In Wattrelos (FR):
<https://www.buildupoffsite.com/wattrelos>
- Indu-zero project <https://northsearegion.eu/indu-zero>