Affordable housing: how modular construction is changing the game

Interview with Stefanie Lütteke and Simon Dietzfelbinger

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The housing market is under immense pressure with skyrocketing rents, rising property prices, and a particularly tight situation in metropolitan areas and for low-income earners. How can we overcome this crisis and achieve affordable housing? Is it a matter of politics, or do technical solutions also hold the key?

Stefanie Lütteke: Taking Germany as an example, the government aimed to build 400,000 new apartments per year in a large-scale initiative. However, this construction boom desired by the state fell victim to the well-known issues of rising interest rates and ever-increasing bureaucracy. The causes are complex and offer many opportunities to point the finger at others. We should rather focus on scaling existing and proven efficient solutions.

Simon Dietzfelbinger: To keep costs under control despite the difficult economic situation, higher efficiency is the key to success. Serial construction and renovation is the method of choice. Despite the advantages of modular construction, the industry is still too hesitant in its approach. Modular construction should be used extensively across more projects. It should be the basis for design. Many people still see modularization as the death knell for architecture, associating it with clunky and dull mass-produced goods and prefabricated buildings.

Which advantages does modular construction offer?

Simon Dietzfelbinger: Modularization could speed up the assembly process at construction sites essentially in future. The actual production process will take place under ideal conditions in industrial halls, supported by digital methods and robotics, achieving highest quality and fewer lost labor hours on site due to snagging defects. Additionally, the houses built in this way comply with all building regulations thanks to the high degree of standardization, leading to faster acceptance and further time savings.

Stefanie Lütteke: It works like this: a building is described as a product, comparable to a car. This product is broken down into modules, such as the technical center, façade or sanitary cell. The repetition of these subsystems is utilized, resulting in modules that are then industrially prefabricated. Instead of joining bricks and mortar on the construction site for months in all weathers, entire façades, wall panels, and even the building technology are produced in factory halls with millimeter precision and consistent quality. Increasing quality is still one of the main issues on every construction site. For the workers on the construction site, this means a considerable reduction in workload. The more work steps are carried out in advance in the hall, the easier it is to work on-site. This is also part of the solution to the ever-worsening shortage of skilled workers.

Back to the architecture. Does modular construction mean affordable but dull residential buildings?

Simon Dietzfelbinger: This has little to do with reality. Using a digital planning methodology, any architectural design, no matter how sophisticated, can be translated into modular catalogs without compromising on aesthetics. On the other hand, there are architecturally high recognised examples for modular housing in history.

Stefanie Lütteke: Exactly. Compared to the conventional Lego modular system, this approach is more complex. On the other hand, developers are not dependent on a single manufacturer, they can act completely product-open. This makes this type of modularization interesting for urban redensification or redevelopment projects, as it can be applied to all building types and also to difficult open spaces between already developed properties.

In the EU, around 85% of buildings are over 20 years old. What potential do you see in renovations?

Stefanie Lütteke: When we look at existing buildings, we see that they can be transformed into future-ready assets through targeted measures. There has been an increasing focus on redevelopments in recent years, and for good reason – it aligns closely with the key goals and challenges of our time: climate neutrality, resource conservation, and waste reduction.

Simon Dietzfelbinger: Serial renovation, inspired by the Dutch Energiesprong principle, offers two major advantages. First, it is quick. Second, it allows us to consider matters such as urban mining and circular economy principles. For instance, construction modules can be designed in accordance with circular principles, so they can be prefabricated systematically in a way that conserves resources. We are already consulting The German Energy Agency on market introduction. The concept is also gathering attention at EU level.

Can you describe the advantages of serial renovation in more detail?

Stefanie Lütteke: Large-format modules such as façade, roof, and technical elements are cut to size in production halls for specific properties. Housing associations, in particular, that want to renovate

Prefabrication, modular construction, and lean management minimized renovation time at Telli Areal, Switzerland. © Sophie Stieger

apartment buildings or a series of identical buildings benefit from this approach. Whether insulation elements or entire system components such as heat pump modules, this principle is transforming energy-efficient refurbishment from individual services to scalable and, above all, affordable package solutions.

Simon Dietzfelbinger: It also saves not only resources but also the patience of building residents, as the assembly of modules is much quieter and produces fewer emissions than the assembly of individual parts. And at the end of the building's life cycle, the modules can be easily dismantled and reused elsewhere if required.

Do you have any positive examples from your experience with residential projects across Europe?

Simon Dietzfelbinger: The Telli high-rises in Aarau, Switzerland, constructed in the 1970s and '80s, are a good example. With a four-year time frame, the renovation began in February 2020 and lasted until 2023. Drees & Sommer Switzerland was appointed as a general partner for overall guidance and building management for the project. The objective: retain the buildings' shape and quality while adapting them to modern energy and safety standards. In order to ensure they met the necessary, tight deadlines a lot of pre-made components and modular construction had to be used. The tenants were able to move back into their apartments after only two weeks of renovation.

Stefanie Lütteke: In order to significantly and sustainably relieve the housing market, however, the real estate industry has to break new ground and completely rethink its own processes. New technologies make it possible to significantly reduce the high proportion of manual and individual assembling. This is urgently needed to compensate for factors such as the prospect of further increases in material and labour costs.

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