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The Circular Challenge Of 'Refurbished' Occupied Housing

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Circular building leads to a different way of thinking and building. BPD development is experimenting with 19 owner-occupied houses on the Zeeburgereiland, to use as many refurbished materials in cooperation with the coming housing owners, so far these are available at the existing materials depots. It is a pilot project because buyers do not know the possibilities sufficiently and do not yet expect the option from a developer. It is interesting how buyers deal with this offer and what we learn from this to stimulate this development nationwide (Sanders and Van Timmeren, 2018)

The current practice of circular construction mainly focuses on the demountable construction of new buildings, so that when demolishing materials at the end of life cycle materials can be reused. Approaching buildings consisting of dismountable parts takes advantage of the building technique of the sixties of the last century, dominated by the ideas of John Habraken (Habraken, 1961). The demountable option implicitly implies that new buildings are built from sustainable materials, which can be stimulated by allowing suppliers to be and remain the materials owner, coupled with lease constructions as introduced by the architect Thomas Rau (Rau and Oberhuber, 2017). Quality certificates such as Breeam are linked to this approach. The approach has a direct influence on the selection of materials for construction and thus stimulates sustainable materials development. However, the circular reuse of building materials, other than with the use of refurbished building materials (Lansink and De Vries-in't Veld, 2010) will only take place in the final demolition, over 50 to 200 years after now.

The first development for refurbished residential construction mainly took place in the rental sector, due to the re-characterizing nature of most of the social housing stock. For the coming years, it is expected that residential properties will mainly be built, because of consumer demands and because the housing construction of housing corporations has fallen

sharply due to affordability. For the energy transition, it is therefore important that new occupied housing is made circular on short notice. Every year, an average of 15,000 dwellings are demolished, what should make it practically possible to re-use building materials 'refurbished' on large scale. Assuming a new construction of 60,000 to 80,000 homes on an annual basis and 60% reusability of building material from demolished homes, this involves approximately 20% reuse at home level.

Matching buyers and developers for the 'refurbished' housing
For a breakthrough in the use of 'refurbished' building materials in the construction of new homes, it is necessary that the circular match between housing buyers and developers be made, logically taking into account the wishes of buyers, future use and developments in construction technology. For housing buyers this means more than making choices out of the total supply of new houses built. The choice for a 'refurbished' circular home affects their way of life too, because the use of old 'refurbished' materials implicitly influences the atmosphere of the home and their furnishing, which can determine personal performance and thus the interaction with others, neighbours and acquaintances. Nevertheless, there seems to be a latent demand among buyers, given the interest in thirties architecture styles and 'vintage' interiors over the past years
The range of 'refurbished' new homes is,

however, minimally probable because this kind of housing is new to consumers and developers and municipalities avoid every potential risk of delays in their building production. The active collection of demolished building materials on a large scale is therefore also postponed. In recent years, many existing depots have been closed due to a lack of interest. With this, the essential opportunity to give circular construction a boost in the short term is shifted to the future. Not only the rental sector, but also the owner-occupied sector is acting insufficiently in this.

Practice shows that such a 'stalemate' between buyers and producers can only be broken in practice. Professionals and consumers therefore have to build up experience and teach municipalities how to give the right environmental conditions. Consumers act on a much smaller scale and with a shorter time horizon than professionals. The buyer of a new-build home first of all cares about his own home and its affordability, while the professionals of both developers and municipalities are mainly concerned with the overall housing production task. These two worlds can only 'match' if both 'camps' move into each other's perception. The consumer must understand that within a development there is always a limited choice because a developer must achieve a cost-efficiency and qualitative result. The professional must realize that every individually sold sustainable home must contribute to better housing stock over time.

Front-running leaders from both sides, people who are 'missionaries' for sustainable housing, appear to be able to stimulate the synergy between buyers and professionals, because each purchase decision ultimately revolves around mutual trust. Subsidies and stimulating regulations from the government side have shown little result. Municipalities should preferably activate positive experiences through 'pilot' projects in which external communication should not be forgotten (Sanders, 2014). A comparison

of the number and types of circular citizens' initiatives of 2017 in the cities of Rotterdam and Amsterdam shows that citizens and professionals also learn from group processes and that green developments promote the motivation to invest sustainably (Sanders and Van Timmeren, 2017).

Research need for the 'refurbished' housing
For a breakthrough in circular 'refurbished' building on the short-term, experience projects are needed to which research is also linked so that the results can be published, popular and scientifically accessible to the citizen and the professional. The Living-lab methodology is extremely suitable for this, because this method has been developed to bring citizens and professionals into dialogue, so that choice behaviour, motivations and the underlying arguments become available and clear. Case studies are required for this, which is in line with the scale of this project from BPD as mentioned. However, it is desirable that the research can contain several pilot locations. In the Netherlands, the construction of a million homes will be prepared for the coming decades, mainly in the five regional cities of Amsterdam, Rotterdam, The Hague, Utrecht and Eindhoven. These municipalities should be the preferred point of contact for such pilot projects. The 'The City of the Future' program, which also includes the Delta Metropolis Association, can provide a good basis for this. But other municipalities and, of course, developers and all other participants in the construction sector may also feel themselves attracted. It is the joint challenge to give progress and prosperity to the realization of the 'refurbished' circular housing construction on the short-term.

For this reason, TU Delft is giving an open invitation to municipalities and developers within the Delta Metropolis Association and, where possible, the combination to propose pilot locations, in collaboration with buyers, partners from the construction sector and the university, to give 'refurbished' circular housing-construction the maximum opportunity for future development.