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Frankvard, Katja L. ; Nyholm, Amalie C. ; Birkved, Morten

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Thesis: Absolute Sustainability from a Circular Architectural Perspective

Katja L. Frankvard¹, Amalie C. Nyholm², Morten Birkved*³

1: DTU Civil Engineering *Corresponding author email: birk@dtu.dk

The building industry is responsible for around 30 % of the overall consumption and global resources, and almost 50 % of the global energy use¹. With such a big influence on the global climate impacts, is it obvious that this industry's building methods have to be rethought and reformed if our world has to develop toward a more sustainable future. But what does sustainable development or sustainability mean and how can we reach a sustainable future?

To find an answer or to find a path that will lead to different solution scenarios, this thesis will investigate *to what extend absolute architectural sustainability is achievable in a Danish circular perspective?*

There is no definite consensus about what absolute sustainability is and how it is defined, within all three dimensions of sustainability: Environmental, economic and social sustainability. Therefore this thesis will try to work towards a definition of 'absolute sustainability' in an architectural circular perspective.

In this thesis 'absolute sustainability' is achieved when all of the three parameters: Environmental, economic and social sustainability, are *equally present without compromising their own sustainability*. The complexity of multidimensional architectural sustainability is addressed through a lifecycle perspective at city, building and component scale.

The UN Sustainable Development Goals are used as indicators of sustainability and are related to the used methodology within environmental, economic and social sustainability.

Two cases will be assessed through both quantitative and qualitative indicators of sustainability, that are divided into three main assessments:

1. Life cycle assessment (environmental)
2. Life cycle cost (economic)
3. Social effect (social)

All assessments will be performed at building scale with focus on social housing. The environmental and economic assessments will assess the sustainability through a lifecycle perspective, where the social assessment will focus on the use-phase of the building's lifecycle.

The results will be expressed as an indication of 'absolute sustainability' through the use of Kate Raworth's Oxfam Doughnut². Three 'doughnuts' will be presented as a result of the environmental, economic and social evaluations.

The results will lead to suggestions for changes and improvements on how to ensure a path towards absolute sustainability in the future Danish building industry at building scale.

¹ <http://blog.dgnb.de/en/saving-the-world-the-dgnbs-contribution-to-the-united-nations-sustainable-development-goals/>

² <https://www.kateraworth.com/doughnut/>