# 3D Printing Technology for Real Estate Report – Memo Report

James Liao 7/22/2020

## Overview of 3D Printing Technology

3D printing technology is a manufacturing process of making three-dimensional solid objects based on a self-designed digital mode. The materials of 3D printing process are usually recyclable. **Main benefits of 3D printing techniques: 1. Less labor-intensive 2. Product design is freed 3. Product is more customizable 4. Less waste 5. Lower cost.**

## Overview of Real-Estate Market

The houses shortage with increasing demand occurs globally. The overall construction is lower than in past decades, resulting in limited house supply and soaring house prices.

- Eurozone: Since 2018, more than 82 million EU citizens with low incomes have spent more than 40% of their disposable income on housing, compared to 9.4% of the general population in the EU. **The main cities in Eurozone are experiencing real-estate bubble risk.**

- United States: The total supply of homes for sale hit historic lows in 2020. The home price-to-income ratios keep soaring and up to 4 in the first quarter of 2021. The bubble index risk score shows a relatively unstable and overvalued status (0.5~1.5), stating that the problem of **high housing price and potential bubble risk.**

## 3D-printed house' potential in Green Building Market

Carbon emission reached the highest level since 2019. Nowadays, buildings are responsible for 6% for all global emissions, 38% of global carbon emissions, and 35% of global energy use. 3D printing technology is one of the innovative solutions to sustainable construction demand. 3D printed home can reduce 70% of carbon footprint with record speed. **The 3D construction market growth and is expected to reach $4.63 million in 2021 at a CAGR of 21.7%.** The market is expected to reach $329.01 million in 2025 at a CAGR of 190%. 3D printing reduces labor costs by 50%-80%, production time by 50%- 70%, and construction waste by 30%-60%.

## Environmental Analysis

Except Terrestrial ecotoxicity, all other impact categories show **conventional building is way more harmful to ecosystem.** Top 5 toxic impact from both 3D and conventional construction is: Marine Ecotoxicity, Freshwater eutrophication, Human Toxicity, Freshwater Ecotoxicity, and Agricultural Land Occupation

## Product Analysis

- Advantages: Relatively Low Cost/Infinite Design Possibilities/ Stronger vertical resistance/ Stronger thermal Insulation/ Sustainability
- Disadvantages: Size limitation/ Compete with mature real-estate market/ Lack of regulation protection

## Summary and Future Outlook

- 3D printed houses generate less construction waste and protect the environment by using recyclable materials.
- **It has economically advantageous for future developments.** The cheaper, smaller 3D printed house can possibly solve house affordability and supply shortage.
- If government cooperate with 3D printing companies, it will be feasible to make the urban redevelopment plan and **alleviate potential real-estate bubble risk** by building 3D printed houses.

All in all, the development of 3D techniques will lead to the revolution of house construction methods and infrastructural changes in the future with no doubt.