

A HOLISTIC THRIVEABLE DESIGN APPROACH TO THE FUTURE BUILDING

According to the Brundtland Report to the United Nations in 1987, “sustainability” is to “meet the needs of the present without compromising the ability of future generation to meet their own needs.” The definition suggests maintaining the status quo, limiting damage, and protecting existing resources without leap, growth, or innovation. Unfortunately, the most popular word associated with environmental responsibility nowadays is about not ruining it for our children, as if less bad would be good enough. “Net Zero” is indeed synonymic to “Sustainability,” regrettably still an underachieved aspiration 34 years later.

We advocate what environmental strategist Ralph Thurm coined “ThriveAbility” which is the sum of Sustainability and Innovation. Consequently, our Future Building proposal does not merely offer an inventory of green design features. Any environmental conscious owners and professionals can easily list out green systems and materials that claim to attain sustainability. However, they would still come short of carbon neutrality due to the embodied carbon in materials extraction and manufacturing, logistics, and operational and end-of-life emissions.

Instead, our proposal recommends a paradigm shift not only in hardware, but also in software, which includes revolutionizing our thinking and the conventional practice. We challenge the status quo by re-considering the concept of “a building”; by designing not just the hardware, also the software; by optimizing efficiency and eliminate the need for excessive energy consumption; and by conducting research and development in materials and systems that work with instead of against nature.

Not every feature in our Future Building proposal might be visible or installable, but the holistic idea embodies the entire ecosystem of design and construction process. The progressive approach shall include but not limited to the following criteria.

First, Thomas Friedman said in *Hot, Flat, and Crowded*, “when you start to think of building as a system, not a block of bricks... imagine all these highly efficient smart buildings being integrated into an intelligent Energy Internet, where each building’s flexibility is used to serve the needs of other buildings, not just its own.” The Future Building has its local system to harvest energy and serve its users, and networked to an energy-grid to share resources, to compensate one another due to differences in scale, use, foot traffic, siting, solar orientation, etc. Therefore, the Future Building should be part of a larger network, whether it implies the buildings along Tong Chong Street, or Quarry Bay, or Hong Kong Island, or the City.

Second, we do not merely design based on form and function, also should consider building maintenance and its afterlife. Thus, we should design the *constructive process* on how it is assembled, and the *reversal process* on how it should be disassembled when retired. The concept of “demolition” would no longer exist but replaced by a new phase “disassembling.” While 3D model is for visualization of the built environment, it is the embedded parametric information and attributes that

address construction materials, means, methods, and sequencing. In designing the Future Building, the use of BIM is mandatory because everything could be simulated in 3D virtual space, meaning we can foresee and eliminate problems during early design phases, minimize wastage in materials and time, streamline problem-solving utilizing a BIM digital twin during operation, and anticipate the reversal process during disassembling. The Future Building should take advantage of BIM compatibility with Augmented Reality, to do on-site virtual setting out, full-scale simulation, and real time "AR-to-Actual Construction."

Third, according to Friedman, "the best form of power is the power that doesn't have to be generated at all because you eliminated demand for it." Majority of energy consumption for a building in operation attributes to cooling and lighting. The Future Building shall be integrated with passive design including but not limited to double façade skin and wind chimney to naturally ventilate warm air, and innovative façade glazing that maximize daylight while minimize heat gain. Fiber optics system could be used to capture natural light for interior lighting use.

Fourth, the building should be built in hybrid structural system with the use of Cross-Laminated Timber (CLT) as main components, thus reducing the use of concrete and steel that embodied high carbon content. All components shall be prefabricated off-site and optimized in modularity to reduce construction waste and increase efficiency. R&D must be conducted on upcycling materials and components such that their intrinsic value worth more than their predecessors. Owners often see nature as the enemy as it deteriorates materials. In fact, nature is only doing what nature does without bias. Like how cedar wood ages and self-protects against insects and rotting, or copper and Corten steel rust to become stronger, the Future Building demands new materials and methods that work with instead of against the nature, to consider nature as providers of fresh inputs and resources in the upcycling process.

The design and construction of the Future Building requires a complete change in work habits and thinking such that we do not automatically assume the same conventional practice. Experience tells us certain materials and methods work, unfortunately, experience is also one of the biggest obstacles in true innovation which often defies what had been done before. ThriveAble Design is a movement in defying such old habits.

Economist Jeffrey Sachs summed up perfectly why innovation is the only way moving forward: "countries have a big market, further raises productivity and expands the size of the market, and creates new incentives for innovation. This momentum creates, in fact, a chain reaction, which economists call endogenous growth." We need continuous economic growth, and continuous innovation is about the only means to increase market size, raising the currency to enhance a larger market and drives further innovation. Therefore, innovation and economic growth must be interdependent of one another, walking hand-in-hand. A holistic ThriveAble Design approach is a vision to build responsible living environments that protect the health and wellbeing of people while respecting the land and our finite resources. The Future Building would be the prototype demonstrating so.