



# FROM SNOWFLAKE OFFICES TO CIRCULAR SPACES

WHITEPAPER BY CLESTRA

CLESTRA

**SUMMARY**

**01**  
**INTRODUCTION** **3**

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**02**  
**BUILDING SNOWFLAKES** **4**

---

**03**  
**PROMOTING SPACE CIRCULARITY** **7**

---

**04**  
**CONCLUSION** **11**

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# 01 INTRODUCTION

Recent years have shed a light on inefficiencies plaguing the construction industry and its role in the global fight against climate change. With **38% of global CO2 emissions in 2019**, the highest level ever reached yet, the 'buildings and construction sector' is the heaviest contributor to global warming above other industries like agriculture or transport. Out of the total sector's emissions, **10% are directly linked to construction processes** and materials used throughout buildings lifecycle<sup>1</sup>.

The construction industry has notoriously suffered from excessive fragmentation and lack of innovation in its processes, which is accentuated by the overall low synergy levels between stakeholders. This in turns leads to project delays, quality issues and, more worryingly, increasing levels of waste generation. The 1% compound productivity growth rate the sector has experienced in the past 30 years is a stark illustration of these recurring issues. It does not only pose great challenges to the industry's economic viability, but it also makes the goal of **reducing carbon emissions and waste generation** harder to reach in the near future.

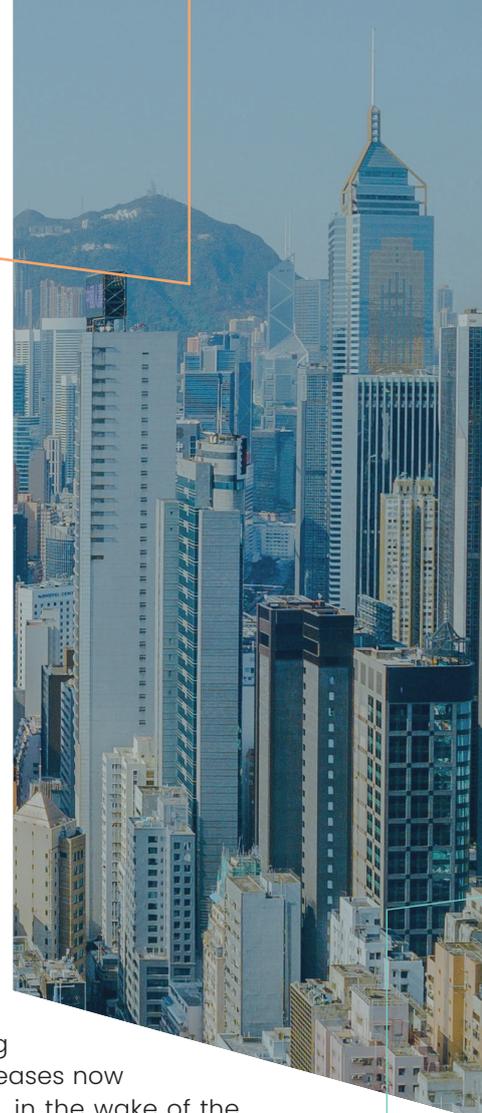
In addition to internal transformations, the sector must also reinvent itself to absorb the tremendous impacts of Covid-19. Industry players are still suffering from supply chains disruptions up to this date and commodities price increases now threaten projects' viability. More importantly, clients around the world are, in the wake of the pandemic, expressing new needs and expectations for their property investments which will need to be addressed by construction players.

In the field of corporate real-estate, the pandemic has accelerated a number of underlying trends around corporate social responsibility, wellbeing and space utilization. Successful implementations of work from home schemes make companies question their future investments in office space and the way to accommodate employees' expectations. Even if office work remains the preferred model, it has become clear that traditionally-built workspaces no longer address companies' need for increased flexibility, while being increasingly detrimental to the environment.

This paper first explores the impact of the current construction approach in the segment of office interior fit-out and the challenges it poses for both tenants and landlords. It then proposes an alternative to this approach through the combination of smart design and modularity. This shift may help stakeholders switching from an **extractive economic model**, where spaces are built to dispose, to a **circular approach**, beneficial in terms of carbon emissions reduction and value generation.

There are now opportunities for the commercial construction industry to be at the forefront of the sector's transformations to fight climate change and address changing expectations of occupiers.

<sup>1</sup> GSR 2020, GABC



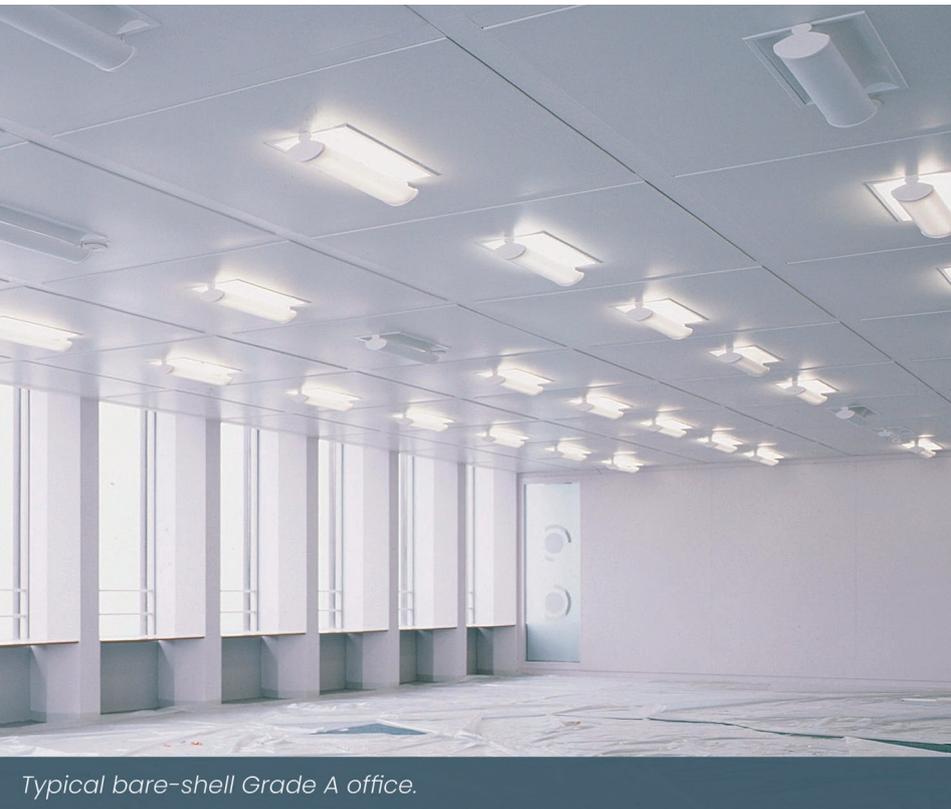
# 02

## BUILDING SNOWFLAKES

The process of building a new office in a large urban centre has remained unchanged for many years. Typically, a corporate tenant looking to rent an office unit will first review a portfolio of options put together by a corporate real-estate broker and select one or several units according to its needs and budget. Developers, or landlords, mostly offer Grade A and Grade B units 'bare finished', empty spaces fitted with raised floors and false ceilings and access to main building areas. These units are often referred to as 'basic landlord fit-out'. Property developers also offer multiple additional services including security access systems, various amenities, facility management, but all leased units remain empty until tenants proceed with the fit-out of their own workspaces. Unless brand new, workspace units have already housed multiple tenants since their initial market release.

Here is the crux of the issue. Office interior fit-outs are done by tenants when they move in but will then be demolished to free the space for next tenants. This repeating cycle forces the industry to build an endless number of one-off projects, where the final result only lasts until tenants depart. A common analogy

used in the industry to describe the process is **comparing each project to a snowflake**, because like snowflakes, each project has very unique features with very low levels of repeatability in the design. When office occupiers secure the lease of a bare finished unit, designers and architects start designing and planning the project from the ground up. Main Contractors must then provide a schedule and budget based on specifications received from architects and consultants to assess how much work will they self-perform and how much will be subcontracted. The schedule and budget can only be rough estimations at this stage because the design is very likely to change even once construction has started. They also have to look for potential cost reduction from sub-contractors and suppliers despite the risks it poses on the project's final execution. Most of office



Typical bare-shell Grade A office.

interior fit-out projects are eventually delivered late on schedule, with additional overhead costs for the user resulting from misaligned work processes and a lack of collaboration between stakeholders to proactively identify issues. These delays and overheads can eventually make the snowflake very expensive to build.

Inefficiencies are very likely to occur again because each project is treated as a one-off.

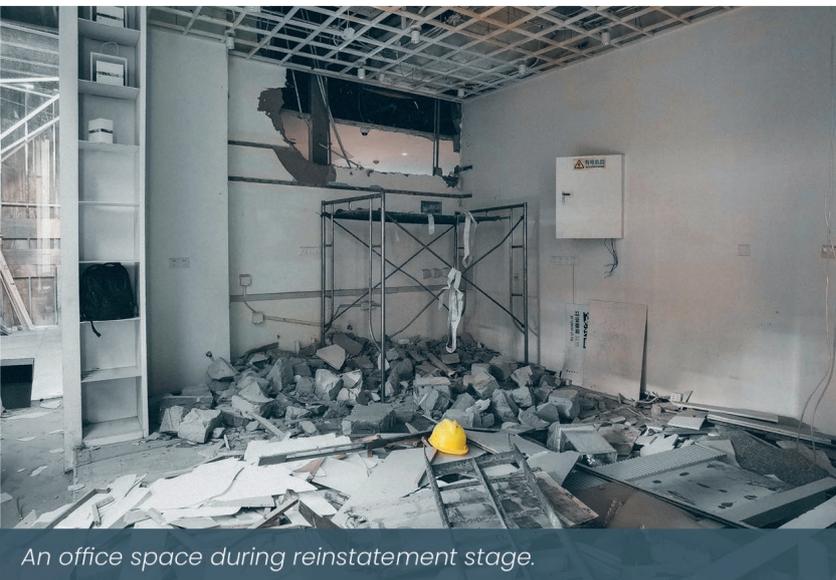
Overall, an average 1,000sqm office fit-out project can take up to 8 months before completion depending on its complexity, from programming stages to final delivery of fit-out before tenants move-in. These one-off projects are also becoming increasingly expensive for the tenant. According to JLL's 2020-2021 APAC fit-out cost guide, the average cost of fit-out for a basic specification office in Sydney reaches USD1,469 per sqm, compared to USD1,147 in 2018.

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On top of execution inefficiencies, tenants potentially face risks of quick asset depreciation with their office fit-out investments. The initial capital invested in an office fit-out project can depreciate very quickly if the tenant decides not to renew its initial lease and move out of the premises, partly because, as said earlier, all units will need to be reinstated into pre-leased condition. It means the tenant not only has to move out its furniture and work equipment, but also to dismantle and take down all previous installations, partitions, bespoke fixtures and fittings. **Reinstatement costs can amount to USD400 per sqm in major Asian cities**, adding up to companies' overall budget allocated for corporate real-estate development. Office leases are reportedly getting shorter, averaging 6 to 7 years in the UK or the US, down to 2 to 3 years for major Asian markets like Singapore or Hong-Kong. Consequently, tenants are eager to move out of their premises more often.

There are many reasons why a tenant would not renew its initial office lease, the most obvious being the need to find a bigger space to house a growing number of employees. However, relocating

office space is a significant endeavour that is not only costly, as said before, but which also comes with significant environmental impact. Short life-cycles of grade A and B offices generate a constant flow of fit-out waste due to reinstatement processes. As an example, unit reinstatements in the Sydney CBD are believed to generate roughly 25,000tonnes of fit-out waste, of which as little as 20% can actually be recycled (Fard Fini & Forsythe, 2020). The recurring nature of office space demolition in large urban centres poses a great challenge in terms of urban waste management and highly contributes to increasing embodied carbon emissions in office buildings. Short office lifecycles also increase the use of virgin materials, while **waste landfilling generates additional carbon emissions**.



'Snowflake' construction projects will likely be the most affected by rising labour and materials costs. Bespoke interior fit-outs are labour-intensive projects and rely heavily on builders work to achieve expected results. Since the cooperation between stakeholders only lasts until the final delivery, it is very hard construction players to develop synergies and common processes which could lead to potential efficiency gains.

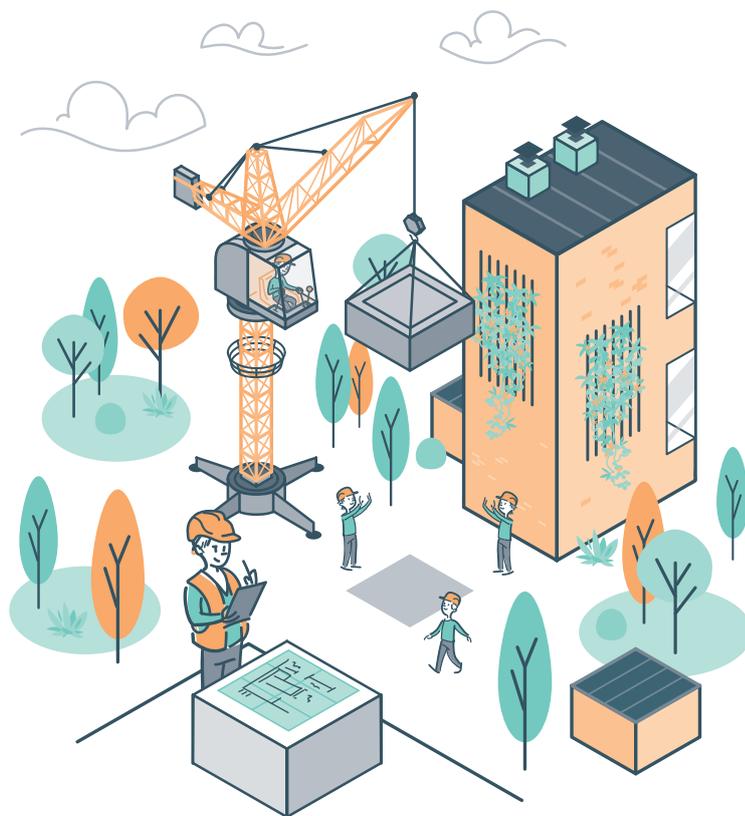
<sup>2</sup> Fard Fini & Forsythe, 2020

In this current post-covid era where many employees have experienced work-from-home schemes, companies might question their workspace investments in the future and seek to re-direct capital spending toward digital tools to adapt to remote-work.

In a survey conducted by Clestra in 2021, 40% of end user respondents said leasing prices were their main current Corporate Real-Estate challenge, and 30% said the cost of new fit-out projects was their 2<sup>nd</sup> most important challenge. It is very likely the covid-19 pandemic and its consequences on work organizations will force occupiers to **rethink their corporate real-estate strategies to better mitigate risks and uncertainties.**

Landlords increasingly offer long rent-free periods as an incentive to retain long-term tenants and allow them to complete their installation process without paying rent. Such incentives can go as high as 12 months rent-free on a 5-year lease in urban areas like London CBD for basic fit-out offices (bare finished spaces), which represent up to 20% of total perceived rent. Regular maintenance is also necessary to make every space look pristine and ready to be leased, adding up to the overall cost of maintenance for the building and affecting long-term asset profitability.

Developers and landlords have an important role to play in this era of changing real-estate needs and expectations. By taking radical steps, they could shift from the current bare-shell model to a more integrated offer, emphasizing flexibility and sustainability at its core. In doing so, they might unlock new sources of revenue and operating expense savings. Tenants could also find great value in **exploring an alternative to build one-off workspaces,** following the take-make-waste pattern, which inevitably leads to materials and economical waste. Many businesses and organizations have already embraced Corporate Social Responsibility (CSR) principles and fully integrated them into their strategic objectives. A real-life application of CSR principles lies in office design and corporate real-estate policies. Clestra, as a global construction partner, seek to offer practical answers to current space design challenges and propose its solutions to stop building snowflakes and start future-proofing workspaces.



# 03

## PROMOTING SPACE CIRCULARITY

The pandemic will have long-lasting impact on the corporate real-estate industry, since it has quickly shifted the balance of power between landlords and office tenants, even in traditionally bullish markets like APAC. It also made abundantly clear that the office of the future will have to evolve faster than previous models, be more flexible to accommodate changing working needs and favour employee's wellbeing. A 2020 Deloitte survey in the Middle-East area shown that as much as **23% of surveyed companies were looking to reduce their office space**, mainly to adapt to potential downsizing, but also because of long-lasting work from home policies. Such policies will obviously impact the total area companies need to house their staff. It may lead some of them to completely reshape their real-estate strategies.

From the landlords' perspective, space optimization and innovative services will be key to attract long-term tenants and remain competitive in this era of decreasing rents and rising vacancy rates.

As tenants seek to decrease their office footprint, they might equally look for **higher levels of performance and flexibility** in their future workspaces. In order to improve user experience in newly leased spaces, developers could relieve their future tenants from the hassle of building bespoke fit-out projects by putting more pre-fitted offices on the market. As described earlier, leasing bare-finished spaces has numerous financial and environmental consequences, shared by both tenants and developers to a certain extent, but affecting the overall value of corporate real-estate assets nonetheless. Alternatives to traditional construction methods can help to alleviate process constraints and improve overall projects quality. In particular, Offsite manufacturing and modular construction have the potential, if applied at the right stage, **to reduce the time required to complete an office fit-out** and help developers increase the availability of their portfolios.

Modular offsite construction can come in various forms and has numerous applications across the real-estate spectrum. This approach is quickly gaining momentum as Real-estate investors and construction players realize the productivity leaps that can be achieved by standardizing building processes and scaling up the work in factories. Many property developers and public actors have successfully embraced offsite manufacturing and modular construction for hospitality or multi-purpose residential projects, seeing a significant impact on project schedule and overhead costs. Modular construction can also be relevant for interior fit-outs where project schedules and cost constraints are

very tight. As said before, the cyclical, short life-span nature of offices and repeated fit-out and strip-out processes **generate a lot of negative outputs**, both environmental and economical.

A modular offsite manufacturing approach is particularly relevant in operations where a certain degree of repeatability applies, allowing contractors to plan and manage stocks easily and deliver quality builds within tight schedules. More specifically, the highest labour-intensive tasks to be performed in an office fit-out are walls and partition build, used to create rooms and define specific areas within an empty office space.



Modular offsite construction in action.

Drywall construction, widely used in bespoke office fit-out, have seen annual productivity compound growth rates fall to -2.3% between 2002 and 2012 in the US<sup>3</sup>. This stagnating – even decreasing – productivity forces contractors to raise prices to remain profitable, resulting in increasing fit-out costs for tenants.

This is where landlords could leverage the benefits of modular offsite construction to offer future tenants a semi-finished, already defined office space fitted with solid walls and acoustic glass partitions. Pre-fitting spaces with modular wall and ceiling systems would allow future tenants to **cut off 20 to 30% of installation time**, and even more time during

planning and design stages. By doing so, developers could significantly reduce the length of rent-free periods given to tenants at the start of their lease and increase actual availability rates of their leased units. Offices fitted-out with modular landlord partitions can then be modified to accommodate each tenant's specific needs, shape new rooms, create focus-work areas and open plans for hot desking. All these modifications can be carried out quickly, without generating waste or jeopardizing the rest of the office space because of volatile organic compounds, while still achieving high level of consistency for the whole interior fit-out. By using modular acoustic ceilings, developers could even save tenants from building acoustic sound baffles in the plenum, generally used to create acoustic insulated barriers above office partitions. Limiting the number of sound baffles built in the plenum would have great impact on landlords' repair and maintenance expenses because virtually no damages would be done to false ceiling structures and HVAC systems. Combining modular wall and ceiling systems would enhance the lifecycle of leased spaces by cutting maintenance and refurbishment needs.

As shown in CBRE's 2020 Occupier survey about the future of the office, 73% of corporate real-estate executives said flexible office space will play a role in their corporate real-estate strategy in the future, be it coworking spaces, office suites or serviced office spaces. Overall, tenants are increasingly emphasizing space flexibility as an important demand driver because they want to be able to react quickly to any organizational changes, induced by external or internal causes. In fact, in our 2021 industry survey,

**75% of respondents belonging in the 'Users' category cited 'increasing space flexibility' as the greatest area of improvement for their offices in the future.**

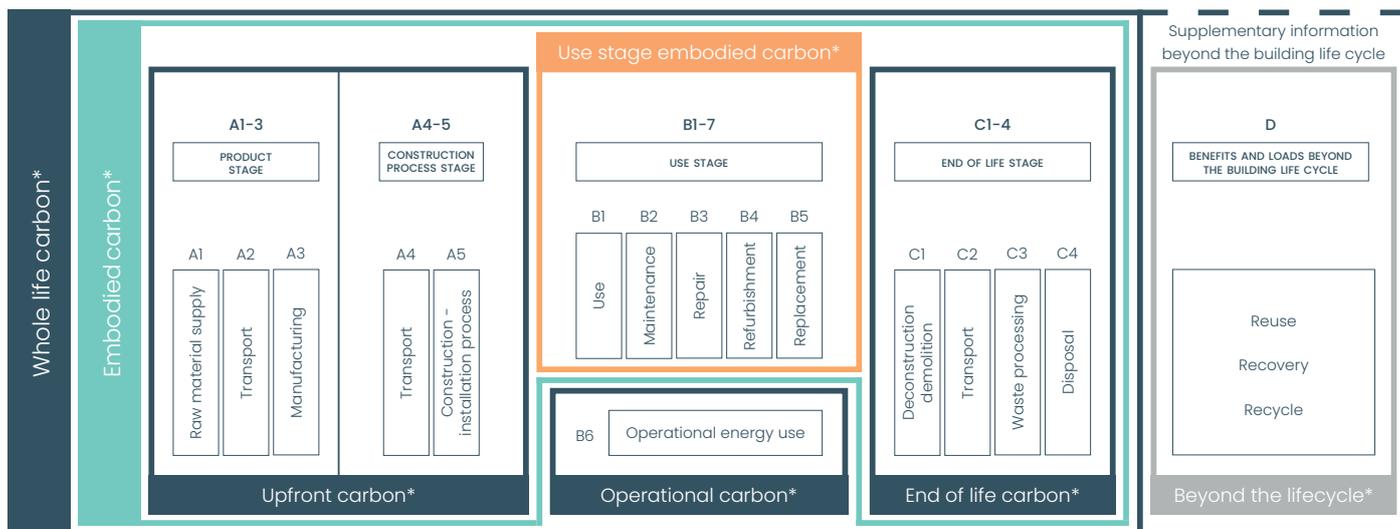
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75% of respondents belonging in the 'Users' category cited **'increasing space flexibility' as the greatest area of improvement for their offices in the future**. Among respondents also belonging to this category, 70% of them deemed maintaining flexible workspaces in the future as being important/very important. Flexibility has become the cornerstone of many future workspace planning, however, pursuing the 'Snowflake' interior fit-out model will be a major hindrance for occupiers willing to create resilient

workspaces. Developers which would bring future-proof workspaces on the market could potentially create competitive edge in the changing landscape of the office property market. Acknowledging and fulfilling occupiers' desire for agility in their spaces could be done by creating flexible workspaces designed for disassembly. Not only would it create economic and financial value for both tenants and landlords, but it would also have a significant impact on office buildings' embodied carbon emissions.

<sup>3</sup> McKinsey, 2017

The World Green Building Council has set up a roadmap to achieve embodied carbon emissions reduction in buildings and reach net-zero construction by 2050.



WGBC classification table for embodied carbon emissions.

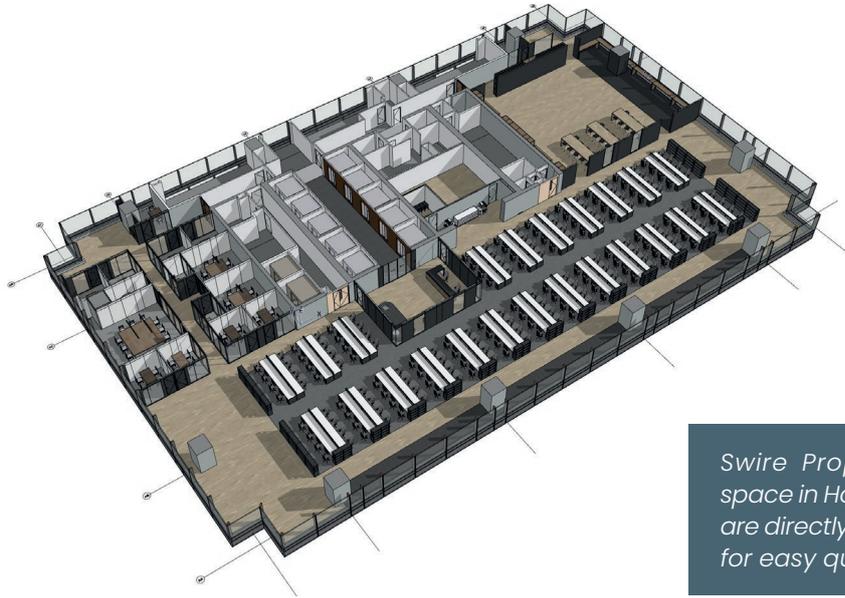
This ambitious target calls for dramatic changes in the way buildings and interior spaces are designed and operated. One of the main focuses in their roadmap is the topic of use stage embodied carbon, described as emissions associated with materials and processes needed to maintain the building or refurbish spaces. The snowflake model for office interior fit-out is typically a big contributor to use stage embodied carbon emissions because of the occurrence of refurbishments, which put a lot of pressure on natural resources extraction. Tackling these emissions requires an alignment of all stakeholders to find ways to extend the lifespan of materials and installations and maximize assets reusability. The WorldGBC indeed emphasizes collaboration between stakeholders as the main driver for the adoption of carbon reduction initiatives in the built environment. In order to create a common basis for collaboration, stakeholders must first share a common vision about the potential design choices that are the most likely to contribute to carbon emissions reduction. McKinsey, in their last call for action to decarbonize the construction industry<sup>4</sup>, deems developers as **having the biggest impact and influence on carbon emissions** specifically because they are the key decision-makers when it comes to design choices and construction methods. Using prefabricated modular partitions and ceilings to pre-finish office interiors would enable developers and landlords to embed circularity at the core of their assets, thus maximizing assets reusability and efficiently tackle use stage embodied carbon emissions.

In this respect, Swire Properties Limited (SPROPS), a major property developer in South-China, approached architect Ed Peter, (Enzyme Apd), in late 2018 with a brief which looked at ways to fit-out a **'swing space'** rapidly. The 2,000 sqm office space was part of a larger footprint that had been pre-leased to a multi-national corporation, with a phased expansion over 3 years and opportunity to secure a short-term tenancy during the void period leading up to Q1 of 2022.

The developer/landlord team and the architect worked together on the key design possibilities that would enable the short-term tenant to enjoy all the technical specifications that an A-grade office space would provide and allowing them to move in and begin their business operations within the shortest possible time. At the end of the short-term lease, in the 3<sup>rd</sup> year, the tenant would return the space in-tact with the original landlord fit-out, which would subsequently undergo reinstatement to SPROPS's bare-shell condition. The multi-national corporation could then move in the reinstated workspace.

<sup>4</sup> McKinsey, 2021

What the above implied was that the landlord, SPROPS, had chosen to commit to capital costs for the fit-out which traditionally they would not do. This was new to them, so the architect, partnering with Clestra, were both able to help in the design and engineering process, leading SPROPS to pursue that model as the prototype for **future flexible office solutions**.



*Swire Properties Limited's circular space in Hong Kong. Modular partitions are directly integrated in the BIM model for easy quantifying and pricing.*

The choice of modular partitions ensured they would be reusable and relocatable to any of the landlord's other sites, thus introducing circularity in a traditionally linear process. The landlord becomes the owner of such fittings and fixtures, and with an inventory managed by Clestra that would serve other adaptable spaces. This in turn offers new possibilities and opportunities of short-term tenancies or Landlord-run amenity spaces, clearly benefitting both landlords and tenants. Future tenants could also choose to keep existing fittings in place and adapt them to their specific needs.

**Through this experimentation, Swire Properties Limited explores new business models and new ways of optimizing their portfolio's value.**

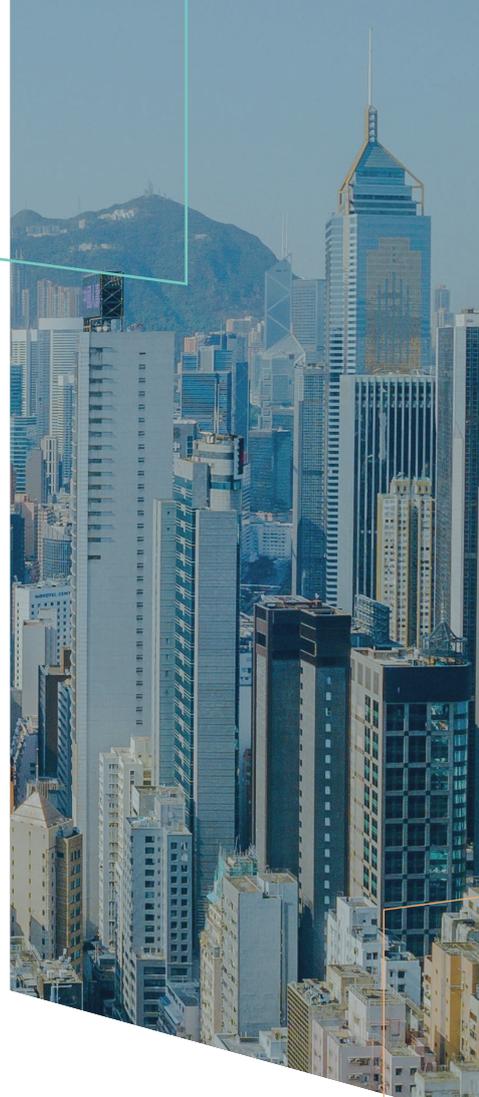
Reusing fittings and fixtures will also have a significant impact on embodied carbon emissions for future office fit-outs. It will help SPROPS to attract tenants which are increasingly concerned about their carbon footprint, thus becoming a landlord of choice for progressive businesses in the area.

Overall, modular fittings and fixtures gives freedom back to developers and tenants. It allows landlords to build spaces with purposes, whether to lease them as pre-furnished unit for a single tenant or convert them into a co-working space to house multiple occupiers. Layouts can be modified at will and spaces can be redefined to fulfil other functions depending on the landlord's portfolio strategy. Prefabrication, combined with digitalization, also ensures reinstatement costs remain transparent and **easily scalable for large property portfolios** spread across several countries.



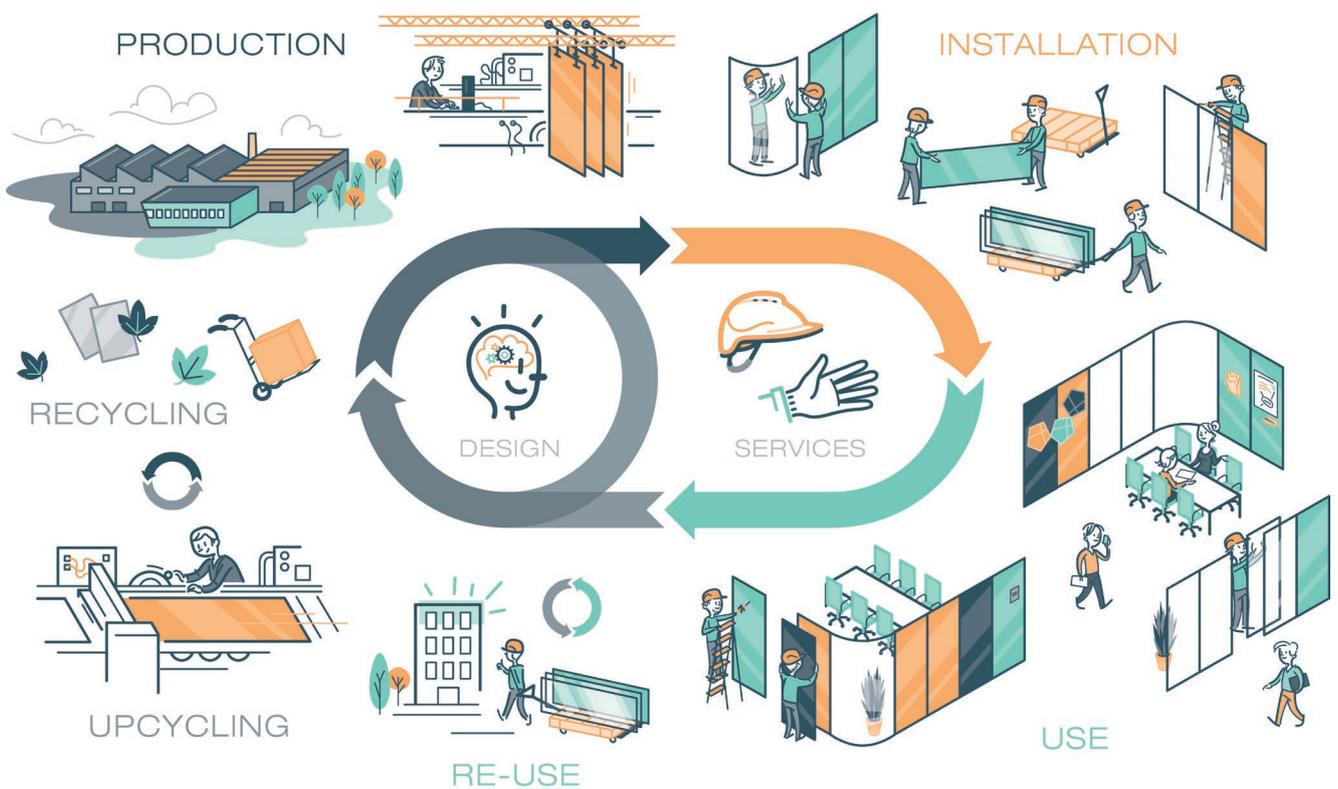
*The fully-fitted workspace.*

# 04 CONCLUSION



As a global construction partner, Clestra delivers highly-performant interior modular systems. Our walls and ceilings systems can adapt to developers and occupiers' needs and create a new standard for office interior fit-out, where designs would be rationalized and focused on economic value and sustainability while maintaining high built quality in the long run.

By aligning the interests of landlords and tenants, we aim at creating a more efficient and resilient construction model in the commercial real-estate industry. Building snowflakes should not be inevitable for tenants willing to move in new workspaces. Nowadays, technology and innovation have the power to support all parties to collaborate more efficiently and optimize resources used in construction processes.



Clestra's circular construction model.

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