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Afterlife HK is a concept that proposes to retrofit the façade of existing buildings to improve their environmental impact. It aims to promote the reuse of existing commercial building stock by preserving the original structure and retrofitting it with new façade elements relying on passive systems such as shading and natural ventilation, to improve internal conditions and energy use. Our proposal concentrates on the potential of existing buildings to be improved by re-thinking the façade as an active environmental improvement tool.

To achieve "carbon-zero" in the long-run, we can:

- Improve building system energy efficiency and performance
- Reduce energy consumptions through behaviour change
- Reduce cooling loads and optimize energy consumption
- Compensate the energy usage through renewable energy sources

Our proposal focuses on solar gains as being the main contributor to the building's energy use. Therefore the following features on the building envelop will be helpful to achieve reduced energy consumptions:

- Renewable distributed energy resources (DERs) in smart grid
- Active façade systems
- Green roof

We strongly believe that 3 key features embody the basics of good quality offices, and that existing buildings can be adapted to offer these.

- Good quality daylight exposure - to ensure quality of natural daylight throughout various moments of the day and minimize glare.
- Thermal comfort – to provide healthy airing of the internal spaces and assist cooling when possible.
- Access to vegetation & outdoor space – by provision of communal breakout spaces.

We propose to achieve these with passive solutions retrofitted as modules to the façade of the existing building. These include the provision of **external shading devices**, sized to the relevant façade orientation and solar angles, to stop solar radiation before it enters the building.
Wind catcher elements will be used to channel wind from prevailing directions, through high-level, secure openings on all accessible sides of the façade, allowing for cross ventilation to occur.
The use of **vegetation in skygardens** and **green roofs** will also provide external shading, landscaped communal amenity spaces and soak up carbon dioxide through photosynthesis

Thermal comfort will be improved by the reduction of solar gains through the façade. A secondary impact of that will be that internal blinds will not be needed as often, therefore improving daylight levels and reducing artificial lighting use.
The ability to open secure high-level windows will also contribute to controllability, which research shows improves the perception of thermal comfort. These windows will allow occupants to control internal air quality with the provision of fresh air in cooler months.
Finally, the wellbeing of occupiers will be enhanced by the effects of biophilia through the addition of greenery in communal breakout spaces, both enclosed and open. These enable good social life opportunities and spaces for people to get together

The new façade elements also fulfill the double function of producing energy through renewable sources:
On the south/east corner, where the circulation core is located, micro wind turbines will be installed in the wind catcher elements and at the top of the circulation shaft in order to harness the city's strong wind speeds and produce energy.
Additionally, all new facade elements include the use of building-integrated photovoltaics (BIPV) as thin-film collectors.

The proposal can be configured at a range of densities depending on the original hosting structure. The measures proposed aim to increase the longevity of the building by increasing its resilience against climate-driven comfort issues and grid dependency. As a result, it would improve its lifecycle carbon performance.

Initial calculations have been carried out, which show that the passive design interventions have the potential of **reducing the landlord energy consumption by approx. 10%,** not accounting for contributions from renewables.

The most carbon intensive part of existing buildings (structural frame and slabs) will be retained as part of the proposal. Natural materials and innovative bio-materials that sequester carbon will be used in an offsite pre-fabrication process for the façade modules, which will drastically reduce the embodied carbon content and construction site impacts. All construction elements will be modulated and designed to enable disassembly and repurposing at the end of the building lifetime.
Office floors will benefit from reduced glare and benefit from good quality natural daylight as well as enhanced ventilation and thermal regulation . Both strategies have the potential to limit in-use energy demand and reduce operational costs for users.
Overheating risk are reduced through the placement of new façade elements on the existing building facia, which serve both as horizontal overhangs as well as communal amenity spaces.
Extensive deployment of PVs on all façade elements exposed to sun will actually produce energy and compensate the energy usage. The communal nature of the system facilitates future connection to wider district heat networks within towns/cities.
Smart and intuitive technologies that enable detailed energy use monitoring will be in place to facilitate and encourage energy use management.
Landscape planting and internal gardens provide amenity and meeting opportunities which enhances community spirit and draws users closer to nature. Together with the use of natural materials that are toxic and VOCs free throughout the proposal, the new façade modules will contribute to good indoor air quality which is vital for health.

The team's goal is to demonstrate that passive design can be retrofitted into urban high rises, and that carbon strategies for those buildings don't need to be mostly dependent on active systems.

If we can retain more existing structures through intelligent retrofit, we will educe carbon emissions and embodied energy costs, help conserve resources, and set buildings up for a longer life. It is a cost-effective and generally less controversial solution to respond to future needs, because it has the potential to conserve and enhance existing places and neighbourhoods into attractive communities.

The proposed interventions are targeted as the first step in the overall decarbonisation of the building. The goal is to test the proposed solutions that can be then rolled out in additional areas. Further measures should include behaviour strategies, seasonal commissioning of equipment and additional areas of renewable energy.