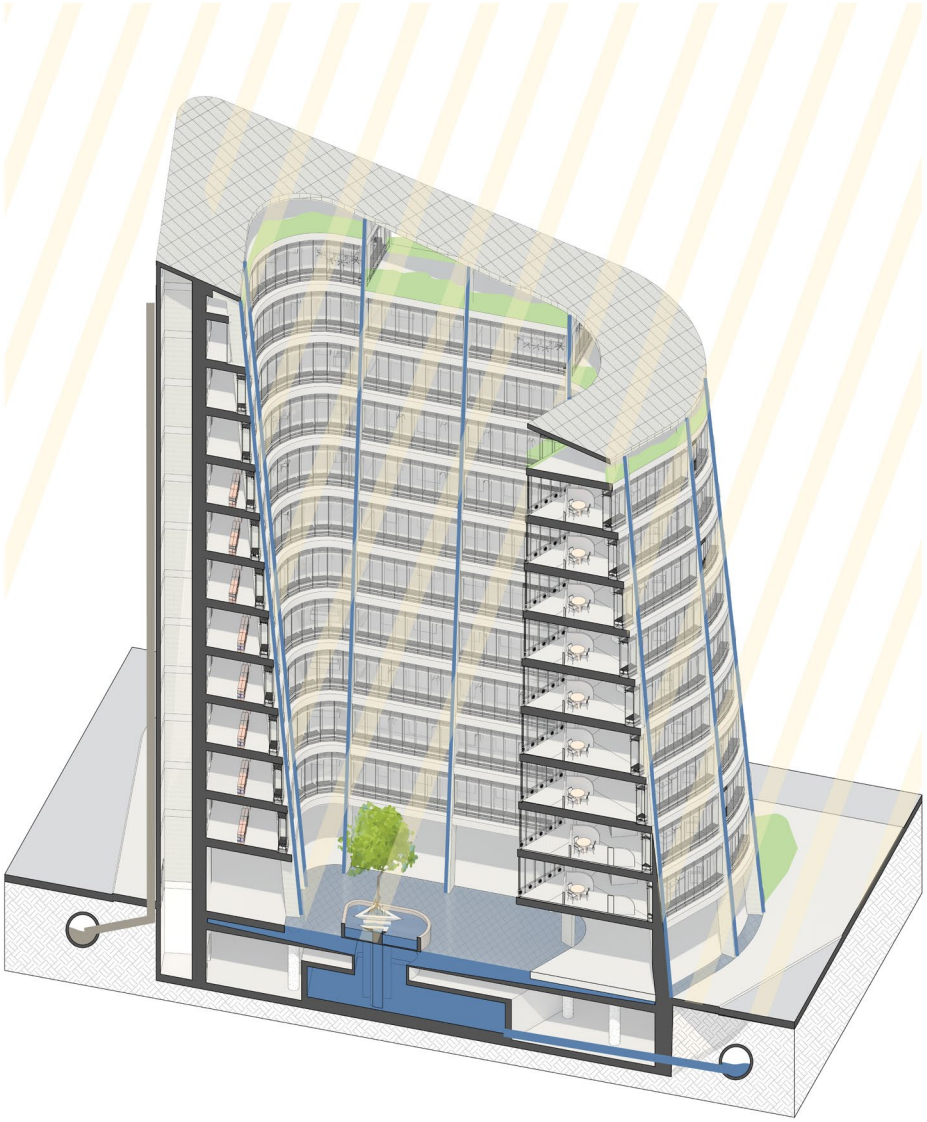

Project Brief

# KINETIC SHIFTS

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## Introduction

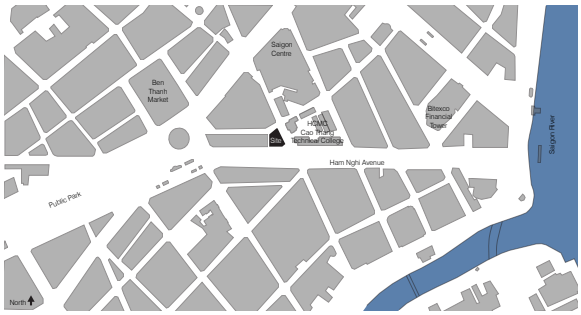
'Kinetic Shifts' proposes the development of an 'Urban Smart Green Office' building in the central Ben Thanh district of Ho Chi Minh City, Vietnam. Through considering the microclimate design of different systems of movement such as air, water, people, workspace, and daylight, 'Kinetic Shifts' strives to be a building that has optimised the user comfort experience in a green and innovative way.

The following are key deliverables for 'Kinetic Shifts' proposal:

- User-comfort as a priority such as temperature control, natural light, flexible spaces
- Emphasis on humidity for comfort (as a green climate control solution)
- Architectural form driven by daylight
- Offices for the future, redefining the workspace to shared 'co-work' zones
- Utilises passive design and green building management systems

## Site

Located at 130 Ham Nghi, Ho Chi Minh City, Vietnam, the site is a vacant plot of land on one of Ho Chi Minh City's major arterial roads. Situated within a commercial precinct with well-established public transport infrastructure, a abundance of nearby businesses and an adjacent tertiary education initiation, this site is well suited to the development of a new workspace for the private tenant or the casual worker.

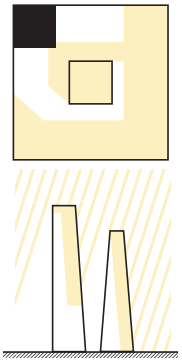



In a tropical climate, Ho Chi Minh experiences a strong wet season with high average humidity and temperatures all year round. Also, the city has between 100-160 average monthly hours[1] of daylight, making access to natural light easily accessible and desirable.

## Concept

The main motivation driving the design concept is to achieve a healthy and productive working environment. To do this in tropical Ho Chi Minh City, Vietnam, we understand that mitigating humidity would be a key factor to control the internal microclimate and create a comfortable workspace. This would be achieved through both passive and active systems utilizing green technology to produce a building that is future adaptive.

An overall Building Management System (BMS) would be implemented to monitor and control air flow, air temperatures, water systems, power, and daylight, which would promote its information to the public. Through the implementation of an open 'co-work' office layout, the building is flexible and adaptable to changing needs of technology and society over time. The building itself is an optimised form for passive design features such as for direct daylight and internal climate control, while also being a feasibly constructible structure for the context of Ho Chi Minh City. With regular floor plates, local materials and ability to be pre-fabricated, the proposal would be a plausible development venture for the city.



## Design Strategies and Methods

As introduced, our proposal for an 'Urban Smart Green Office' seeks to manage the microclimate of individual work spaces through the innovation of a dehumidification system integrated within the building's facade. The result of such a system combined with overarching themes such as optimising the design for maximum daylight penetration. The building also encompasses a variety of green design strategies and systems to improve the quality of space and achieve a 'Smart Green Office'. To achieve a desired level of green building, the local Vietnamese green rating tool was utilised of 'LOTUS'[2] which has informed the structure of this brief break-down of the proposal.

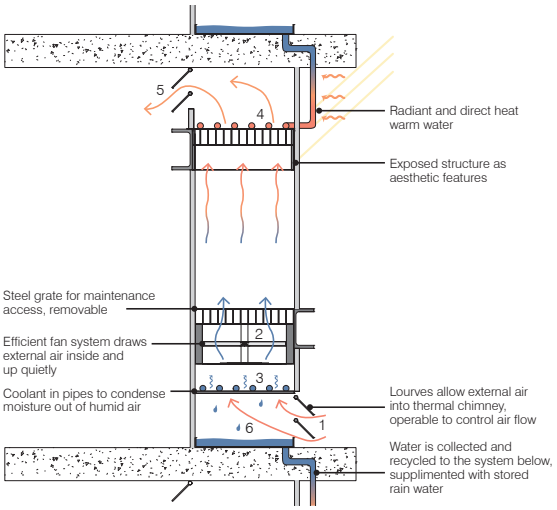
1 www.weather-and-climate.com
2 LOTUS Non-Residential Rating Tool (Vietnam Green Building Council) Version 2.0, June 2015

*- Energy*

The building mass combined with open atrium space is optimised to allow maximum natural daylight penetration into each level. The subsequent 'shallow' floorplate depth allows shared workspaces to be naturally lit all day, significantly reducing the active load of artificial lighting and contributing to a healthier working environment.

The building's envelope consists of a double glazed skin that acts as a thermal chimney, designed to monitor and control internal temperature and humidity levels. The exterior glazing has a high thermal transfer capacity to passively reheat air as it pushed through the fenestration system post cooling for dehumidifying. The interior double glazed pane to the atrium has a low thermal transfer capacity and is coated to mitigate glare as required.

Solar panels on the roof generate renewable energy to power the active systems within the integrated facade, with any additional electricity given back to the local grid. All climate control, lighting, mechanical services are controlled centrally by a 'smart' Building Management System (BMS) that maintains a pre-programmed 'comfortable' arrangement.



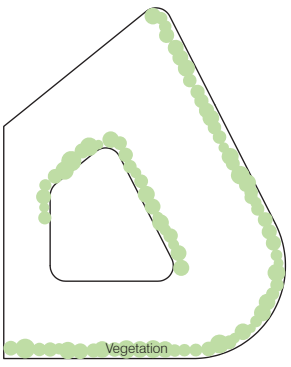

*- Water*

The captured rainwater on the rooftop is collected in tanks on both the roof and in the basement. Water storage towards the top of the building contributes to the passive nature of the dehumidification facade system through employing gravity to distribute the water downwards. The captured rainwater feeds down through the fenestration systems, floor-by-floor, captured below ground level and fed into a tank underground. Through mechanical pumping, this water is recycled to private amenities for flushing, the roof balance tanks, and in the atrium to the feature pool.

A 'smart' central water monitoring system is implemented throughout the building and in order to promote the water efficiency of the building and educate the wider community, a water use status is updated on a screen in the atrium for the public to viewing. Landscaping throughout is designed through the use of indigenous vegetation that have water demands appropriate to the natural rainfall of the area.

*- Materials*

The proposal integrates local materials throughout the building, such as local timbers to the floors in the workspaces. Furthermore, all pipe work utilises recycled plastics, recycled timber offcuts and steel reinforcement is recycled from waste or unused from local building sites. A concrete slab and column system has been utilised to minimise embodied energy when compared to a full steel structure. Other high embodied energy materials have been avoided for this proposal, such as ceramic tiles and carpets.




*- Ecology*

As the site has been previously cleared, there was no existing vegetation on the site. To help re-introduce flora and fauna to the area, the building footprint has been offset from the boundary at the corner of Ham Nghi and Nam Ky Khoi Nghia to introduce a landscaped cluster. Also, rooftop vegetation re-establishes indigenous local plant-life such as the Banyan Tree and bamboo, and the feature pool in the atrium supports water-based vegetation native to the region (such as the mangrove). An Environment Impact Assessment and a Construction Environment Management Plan would be prepared to ensure continual maintenance and protection of the local ecology.

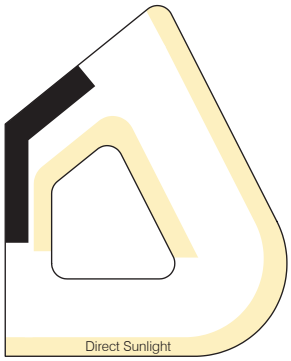
*- Waste & Pollution*

As the dehumidification system utilizes refrigerants, careful consideration is required to mitigate and limit emissions. This would be achieved through using natural refrigerants with a Global Warming Potential (GWP) below 2000, and ensuring that the refrigerant atmospheric impact is low through a leak monitoring system.

The proposal has been designed using BIM software, which helps to more accurately estimate the quantities of materials required, that consequently reduces on site material waste. Where possible, the concrete structure can be prefabricated off-site, thus further reducing construction waste. During the operation of the building, a recycling bin has been separately provided on each floor to help recycle paper, bottles, cans and or any other everyday item.

*- Health & Comfort*

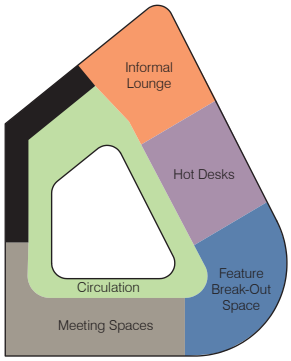
Daylight has been maximised as a priority of the building's form with a shallow floor depth and atrium core, producing a majority proportion of the floor area receiving natural daylight. The permeability of the daylight is supported through the open plan 'co-work' style of office, which also allows for quality views externally and to the internal atrium space. The proposal will be a smoke-free building and all spaces have a fresh air supply.




All specified materials have low VOC and surfaces are left as their natural finish to avoid the need to re-paint and introduce potentially toxic fumes. With the double facade integrated dehumidification system and cross ventilation design, the thermal comfort of the space is optimised with both active and passive systems.

*- Adaption & Mitigation*

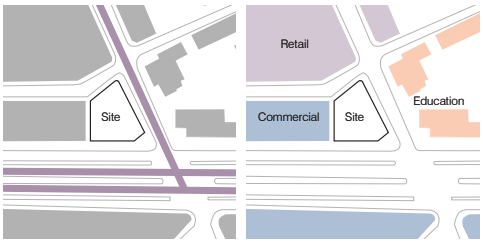
To ensure resistance to flooding, the building is surrounded by a trench gutter with grate to collect surface run-off during periods of heavy rain. The water is redirected to the building's water tanks in the basement and then into the city's storm water system should it reach full capacity in both storage and for reuse in the building.




For the user, the building provides easy access to both public transport routes and has opportunities for bicycle parking in the atrium space. In the event of an electric car user, a charging station connection point is provided to the north of the building.

As an office space, careful design of the furniture layouts has been done to ensure adaption to difference users of the space and as technology develops over time. To be a more informal 'co-work' space rather than formal offices suites, the proposal is able to meet individual needs of a variety of businesses or workers.

*- Community*




Site is central in Ho Chi Minh City, close to public transport, commercial centres, and tourist attractions, making it ideal as both a business centre and gathering point. With the ground floor as open public space, the proposal is inviting to all passing by and encourages people to explore inside. All surfaces are flat or graded to allow access for people with disabilities and all circulation spaces are design to allow wheelchair access with minimum 920mm doors and 1200mm wide circulation paths.

*- Management*

During the construction stage, a safety and operational plan would be formed to ensure a safe worksite and that all structures and systems are installed as specified. Once works are completed, a green Building Management System (BMS) will be installed that monitors and controls all the systems of the building through a central source. The information from the management system would be promoted on a screen on the ground floor public space for the users to see the building's smart green systems and how their activities influence the building's operation.

*- Innovation*

The dehumidification facade system is an innovative application of a modular mechanical system that is integrated into the building's fabric. The implementation of the dehumidification facade system in this proposal will give an example to other green office buildings on how to control internal climate without excessive plant equipment or waste space for services.

## Conclusion

By striving for a green smart office building, 'Kinetic Shifts' embraces the systems of movement in a building to provide a comfortable and flexible working environment. With the dehumidification facade system and the building's mass driven by daylight penetration, the design implements both active and passive climate control solutions. The open 'co-work' office plan achieves an adaptive space to changes in technology and culture preferences over time, while the provision of a public ground floor encourages community engagement. 'Kinetic Shifts' successfully balances function and aesthetic perception to meet a green agenda.

## Appendix

*LOTUS Analysis*

## LOTUS Non-Residential Rating Tool - 'Kinetic Shift' Building Analysis

| Section | Criteria | Pre-requisite Points | Additional Points Available | Total Points Earned | | Comments |
|---|---|---|---|---|---|---|
| **Energy** | | | | | | |
| E-PR-1 | Passive Design | 2 | | | | Passive Design Analysis would be completed |
| E-1 | Total Building Energy Use | 5 | 14 | 8 | | Total energy use is reduced approx. 20% compared to the baseline |
| E-2 | Building Envelope | | 4 | 3 | | Roof gardens and high solar reflective through solar panels (no external shading devices) |
| E-3 | Natural Ventilation and Air-Conditioning | | 6 | 6 | | All internal spaces are naturally ventilated |
| E-4 | Artificial Lighting | | 3 | 3 | | Efficient LED arterial lights and full monitoring system integrated into the building |
| E-5 | Energy Monitoring and Management | | 2 | 2 | | Total building monitoring of systems, included power (PMS) and a building management (BMS) |
| E-6 | Renewable Energy | | 2 | 1 | | Total roof area is approximately 700sqm which is completely covered with solar panels, with potential to generate 180kWh daily |
| **Total** | | | **31** | **23** | | |
| **Water** | | | | | | |
| W-1 | Water Efficient Fixtures | 1 | 5 | 5 | | All fixtures are efficient 'green' models |
| W-2 | Water Efficient Landscaping | | 2 | 2 | | All local vegetation are planted to for minimal irrigation needs |
| W-3 | Water Monitoring | | 2 | 2 | | Central water monitoring systems used throughout main building management system |
| W-4 | Sustainable Water Solutions | | 4 | 4 | | Large rainwater collection tanks in basement allows for capture, filtration and distribution of water to recycle in the building |
| **Total** | | | **13** | **13** | | |
| **Materials** | | | | | | |
| M-1 | Materials Reuse | | 2 | 1 | | Reused structure steel |
| M-2 | Materials with Recycled Content | | 3 | 2 | | Recycled timber off cuts, recycled plastics in pipe work |
| M-3 | Non-Baked Materials | | 2 | 1 | | No brickwork or ceramic tiles in the proposal |
| M-4 | Sustainable Timber and Rapidly Renewable Materials | | 2 | 1 | | Use of timber floors from sustainable renewable material source |
| **Total** | | | **9** | **5** | | |
| **Ecology** | | | | | | |
| ECO-PR-1 | Environment | 1 | | | | Would prepare the Environmental Impact Statement to ensure vegetation protection |
| Eco-1 | Construction Environmental Management Plan | | 2 | 2 | | Plan would be create that analyses any disturbance to the local ecosystems caused by the proposal |
| Eco-2 | Habitat Restoration | | 3 | 1 | | Perimeter roof vegetation includes re-establishment of indigenous flora |
| Eco-3 | Development footprint | | 2 | 2 | | An offset at the southeast corner of the site and the inclusion of the atrium reduces the building's footprint |
| Eco-4 | Green Roof | | 2 | 1 | | Approximately 30% of the roof |
| **Total** | | | **9** | **6** | | |
| **Waste and Pollution** | | | | | | |
| WP-PR-1 | Wastewater Treatment | 1 | | | | Ensure that all waste water is treated on site through filtration systems |
| WP-1 | Refrigerants | | 3 | 2 | | Natural refrigerants with a Global Warming Potential (GWP) below 2000 |
| WP-2 | Demolition and Construction Waste | 2 | 2 | 1 | | BIM design modelling reduces on-site waste, with all waste materials to be recycled as detailed in the construction management plan |
| WP-3 | Dedicated Recycling Storage Area | | 2 | 2 | | Have dedicated bins on each floor adjacent to the service lift |
| WP-4 | Light Pollution Minimisation | 3 | 1 | | | Lights monitored for impact to adjacent properties and localised artificial internal lights |
| **Total** | | | **8** | **5** | | |
| **Health & Comfort** | | | | | | |
| H-PR-1 | Indoor Smoking | 1 | | | | Building is a non-smoking area |
| H-1 | Fresh Air Supply | | 2 | 2 | | Full interior volume has natural ventilation |
| H-2 | CO2 Monitoring | | 2 | 2 | | As part of the Building Monitoring System, CO2 levels would be monitored |
| H-3 | Hazardous Materials | | 3 | 2 | | Low VOCs materials specified, with raw finishes |
| H-4 | Daylighting | | 3 | 3 | | Good daylight access to majority of internal floor space |
| H-5 | External Views | | 2 | 2 | | All workspaces have direct line of sight to the outdoor environment via floor to ceiling fenestration systems |
| H-6 | Thermal Comfort | | 2 | 2 | | Through the dehumidification facade system with glazing to control thermal bridge capabilities, internal microclimate is at a comfortable temperature and humidity |
| **Total** | | | **14** | **13** | | |
| **Adaption & Mitigation** | | | | | | |
| A-1 | Flood Resistance | 1 | 1 | | | Flood risk report would be prepared with the need to meet local flood levels |
| A-2 | Stormwater Runoff | | 2 | 0 | | No pervious surfaces |
| A-3 | Heat Island Effect | | 2 | 1 | | Light reflective materials reduce heat retention |
| A-4 | Green Transportation | 2 | 3 | 3 | | Green transportation options are included in the proposal with nearby public transportation access, green vehicles charging point to the north of the building, and ground level bicycle store |
| A-5 | Local Materials | | 2 | 2 | | All building materials will be sources locally |
| **Total** | | | **10** | **6** | | |
| **Community** | | | | | | |
| CY-1 | Community Connectivity | | 2 | 2 | | Located in the central district of the city with commercial, tourism, retail, transportation nearby uses |
| CY-2 | Public Space | | 2 | 2 | | All of the ground floor is open to the public |
| CY-3 | Access for People with Disabilities | | 2 | 1 | | All spaces are accessible with minimum 1200mm circulation pathways, but with restricted amenities access |
| **Total** | | | **6** | **5** | | |
| **Management** | | | | | | |
| Man-1 | Design Stage | 1 | 1 | | | A LOTUS AP member would be assigned to the design team |
| Man-2 | Construction Stage | 2 | 2 | | | Safety and operational plan would be prepared for construction |
| Man-3 | Commissioning | | 4 | 2 | | Ensure all commissioning of the building's services are completed correctly and to the relevant codes |
| Man-4 | Maintenance | 3 | 2 | | | Building Maintenance Manual to be prepared |
| Man-5 | Green Management | 4 | 1 | 1 | | Building User's Guide provided, with information accessible to the public via the screen in ground floor public open space as part of the BMS |
| **Total** | | | **10** | **3** | | |
| **Innovation** | | | | | | |
| Inn-1 | Exceptional Performance Enhancement | | 4 | 2 | | The proposal meets the requirements of the LOTUS credits and goes beyond their scope |
| Inn-2 | Innovative techniques/initiatives | | 4 | 3 | | Dehumidification façade system is an innovative approach to internal climate control |
| **Total** | | | **8** | **5** | | |
| **Grand Total** | | | **118** | **84** | | **84 is a 'Platinum' Certification** |