

Raffles City Chengdu, China

SUMMARY

Raffles City Chengdu (RCC) is an epitome sustainable integrated development in the heart of Chengdu.

TYPE AND SCALE

Integrated development comprising two office towers, retail, serviced residences and residential apartments with a total GFA of 311,846m².

TIMEFRAME

The construction of the project commenced in 2008 and was completed in 2013.

COST

The overall construction cost of the project is approximately RMB 5 billion.

MAIN STAKEHOLDERS

The project is owned by Raffles City China Fund and CapitaLand .

CONTEXT AND DRIVERS

One of the CapitaLand's sustainability objectives is guided by its belief that lowering the environmental footprint of its buildings through innovation creates value for its stakeholders.

INFORMATION

Information Sources

Include here website information and media links (for video please use Vimeo)
<http://www.rafflescity.com.cn/>

For details, please contact
chew.weiting@capitaland.com



DESCRIPTION

The project is designed by Steven Holl and located in the heart of Chengdu city with convenient public transportation and numerous green features.

STRATEGY

Vision

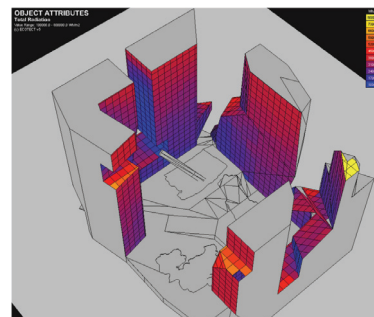
CapitaLand's commitment to environmental sustainability is a natural extension to its credo of 'Building People. Building Communities.'

Goals and Targets

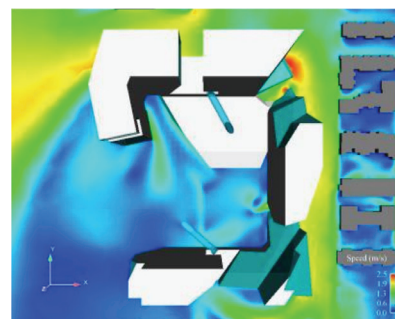
Raffles City Chengdu (RCC) is situated at the intersection of the First Ring Road and Ren Min Nan Road of Chengdu City. The planning and architectural content of the project is of sliced porosity block forming large public plazas with a hybrid of different functions. Creating a metropolitan public space instead of object-icon skyscrapers, this 300,000m² project takes its shape from its distribution of natural light. The required minimum sunlight exposures to the surrounding urban fabric prescribe precise geometric angles that slice the exoskeletal concrete-steel composite frameworks of the structure. The large public space framed in the center of the block is formed into three valleys inspired by a poem of the city's greatest poet, Du Fu (713-770), who wrote, 'From the northeast storm-tossed to the southwest, time has left stranded in Three Valleys.' The three plaza levels feature water gardens based on concepts of time-the Fountain of the Chinese Calendar Year, Fountain of Twelve Months, and Fountain of Thirty Days. These three ponds function as skylights to the six-storey shopping precinct below. This integrated development comprises of five 110m tailor-made high-rise towers including office spaces, hotels and service residences and a 4-storey shopping mall plus a 4-storey basement car parking. This project was completed in 2013.

KEY FEATURES

- **Sustainable Building Material and Construction Waste Management** – More than 15% of construction materials had recycled content. 33% of total materials are extracted, harvested and manufactured regionally within 800 km of the project site (based on material costs). Low-emitting materials were used to improve the indoor environmental quality (IEQ). More than 80% of construction waste was diverted from landfill disposal or incineration.
- **Connectivity and Green Transport** – The project site is located near Sichuan Gymnasium subway station and two bus stations. 1,998 secure bicycles lots are designed for occupancy. 44 preferred parking spaces are provided for low emitting and fuel efficient vehicles.
- **Eco-efficiency and Renewable Energy** – High performance building envelope is adopted to reduce heat gain and allow natural daylight into the buildings. Fair-face concrete was used in the façade, eliminating the need for the typical curtainwall and provides better thermal insulation, also, reduce carbon footprint compare with conventional steel structure. Green roofs on the five towers reduce heat island effect as well as enhance biodiversity. Different sustainable design strategies are applied to Raffles City Chengdu such as geothermal pump, high efficient lighting system and occupancy sensors, which could achieve up to 15% energy costs saving.
- **Water Saving** – Rain water and condensing water recycled system are introduced for irrigation and toilet flushing use. It can achieve no potable water use for irrigation and 40% reduction for indoor domestic water use. The total water saving amount is about 42,000m³/year.
- **Microclimate Analysis** – The courtyard design has significantly reduced the solar exposure of the inner regions of the development based on the simulation result of solar radiation. Besides, CFD analysis could help to optimise massing form of the development, which could effectively obstruct the air movement into the site area during the winter season, also, enhance the air movement in the central open spaces in the summer season.
- **Indoor Environment Quality** – Different green design strategies are implemented to improve the indoor environment quality such as adopting entryway system, high efficiency air filter, low emitting adhesive, sealants, paints and coatings. Particularly, China has suffered from serious air pollution for many years and Raffles City Chengdu among the first to apply green products to reduce the air pollution.



Solar radiation analysis



Wind environment analysis

IMPLEMENTATION

Approach

- The owner of the Project is Raffles City China Fund, and CapitaLand was responsible for the overall project management of RCC.
- The design architect and engineer are Steven Holl Architects and China Academy of Building Research (CABR) respectively. China Construction Third Engineering Bureau was appointed as both the main and MEP contractors.

Challenges

- Due to the scale and complexity of the integrated development, close coordination with the project team is required in order to ensure the effective implementation of green features.
- Life cycle and cost benefits analysis are carefully considered while the project is in very early stage of designing sustainable building in China.

Critical Success Factors

- Top-down management strategy – To set a 'green building' target at the beginning of the project and carry out the actions throughout planning, design, construction and operation stages.
- Integrative design process – Maximize opportunities for integrated, cost-effective adoption of green design and construction strategies, using cross-discipline design and decision making, beginning in the programming and pre-design phase.

PROGRESS AND OUTCOMES

- Successfully achieved LEED Core and Shell 2.0 Gold certification.
- Set a benchmark of sustainable building design as reference for other CapitaLand's projects.
- Total operational energy usage is approximately to be reduced by 15%, which is about 5.5 million kWh/year.
- Water use of landscaping is reduced by 100%. 40% of domestic water could be reserved by recycled water system and low-flow fixtures.
- Overall, there is estimated annual utility savings of RMB 5.4 million.