IOI CENTRAL BOULEVARD TOWERS

Sustainability Guide

Contents

All information is correct at time of publication (September 2023)

IOI Properties Sustainability Vision

Here at IOI Properties Group, sustainability is pivoted at the centre of our business vision and core values. As a corporation that views sustainability as a transgenerational mission, we strive to uphold the principles of sustainable living of its employees, customers and communities, enhancing sustainable developments and corporate responsibility for society well being and advocating environmental ethics.

We seek to:

- Achieve a sustainable longterm balance between preserving nature and meeting business goals
- Comply to legislations and regulations
- Cultivate a conducive work environment that is inclusive, healthy and safe
- Deliver product and services excellence with innovative strategies and responsible green products
- Commit to continually develop and invest in communities
- Influence lifestyle through sustainability ownership

Awards & Accolades

In support of Singapore's national climate target to achieve net zero emissions by 2050, IOI Central Boulevard Towers has embarked on its own decarbonisation journey as well, committed to green its business and implement all the best sustainability practices.

Cementing its position as an organisation for sustainability that is attentive to the quality of life and well-being of its building occupants, IOI Central Boulevard Towers has since been conferred with prestigious awards that reflect the success of its green efforts.

ASIA PACIFIC PROPERTY AWARDS
WINNER 2023-2024
★★★★★

BCA GREEN MARK

BCA UD MARK (DESIGN)

WIREDSCORE PLATINUM

WiredScore PLATINUM

Asia Pacific Property Awards

IOI Central Boulevard Towers bagged 3 awards at the prestigious Asia Pacific Property Awards 2023-2024 and received the highest accolade as 5-Star distinction winners in the following categories:

- **Commercial High Rise Development (Singapore)**
- **Mixed Use Architecture (Singapore)**
- **Mixed Use Development (Singapore)**

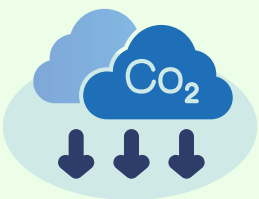
Judged by an independent panel of industry experts, with a focus on design, quality, service, innovation, originality and commitment to sustainability — the Asia Pacific Property Awards celebrates the highest levels of achievement by companies operating in all sectors of the property and real estate industry. An International Property Award is a world-renowned mark of excellence.

BCA Green Mark Platinum

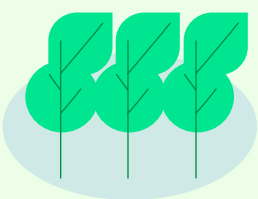
IOI Central Boulevard Towers has been conferred the BCA Green Mark Platinum award for its best practices in environmental design and construction, and the adoption of green building technologies.

As a Green Mark Platinum certified building, IOI Central Boulevard Towers is expected to effectively demonstrate **30% energy and water savings**, as well as environmentally sustainable building practices and innovative green features.

Additionally, the building also focuses on the assurance of the health and wellbeing of the its occupants through the provision of air filtration medias, quality lighting, biophilic features and green and blue spaces.



Over
4,146 tonnes
of carbon dioxide emission reduction per year



An equivalent to
189,272 trees
absorbing this amount of carbon dioxide

BCA Universal Design Mark Gold Award

In recognition for going the extra mile in designing for people of all ages and abilities, the development also received the Universal Design Mark Gold Award for building an inclusive working environment.

WiredScore Platinum

By achieving WiredScore Platinum, the highest trade of certification, the building has met exceptional standards for the quality of its wired infrastructure, resilience, and wireless network. IOI Central Boulevard Towers is the first building in the CBD to be certified WiredScore Platinum.

Now, IOI Central Boulevard Towers is not only a green sustainable building, but it is also future-proofed to provide the best digital connectivity for its tenants by complying with the best practices in terms of technological solutions and back-up plans to ensure that businesses can operate in case of unexpected events and inevitable technological advances.

Green Foundations

The building construction process was optimized to minimise the footprint on the environment. This was done through a detailed **Environmental Analysis** and the execution of a well-crafted **Environmental Construction Management Plan**. The objectives of this study are to understand the environmental baseline of the site, document existing environmental aspects of the site that need to be preserved, and to provide environmental guidelines for future construction activities in order to reduce environmental and surrounding site disturbances.

Design

The design of IOI Central Boulevard Towers optimized the use of concrete in building works, without compromising construction safety and productivity.

- Achieved a **49% reduction in embodied carbon** from the industry reference value with a tabulation of 511 kgCO2e/m^2.
- Precast concrete was used for 75% of the constructed floor area, resulting in a **low Concrete Usage Index of 0.56 m^3/m^2**.

80%

of the superstructure concrete by volume used was low carbon concrete

Environmental Analysis

1. Air Management

- Construction activities such as the clearing of land and construction of the development may potentially generate air pollutants. Hence, dust covers and barriers were installed to prevent dust from being carried by wind to other areas.

2. Waste Management

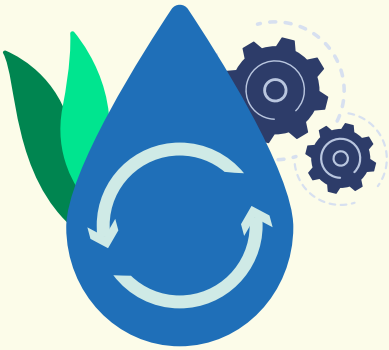
- The expected waste materials for the project were identified and the contractor determined their disposal method and handling procedures, waste segregation areas were then designated on-site.
- The waste management area was clearly labelled to prevent commingling of waste and all personnel have gone through a waste management training prior to the commencement of works.
- The waste destination details of the off-site waste management and disposal were also verified by the Waste Management Coordinator.

86%

of the construction waste was reused or recycled

3. Water Management

- Although the site is outside flood prone areas, construction activities were monitored to prevent negative impact on public drains, sewers, and waterways.
- Measures were taken to manage stormwater runoff and prevent flooding. Outgoing water into the public sewers was tested to meet PUB requirements.



- Non-potable water was utilized for vehicle washing and cleaning of construction equipment.

Tree Conservation

In effort to preserve the natural habitats for fauna in the area, two Pterocarpus Indicus trees with a Leaf Area Index of 4.0 were conserved. The area around the trees were carefully barricaded to ensure site works did not affect them.

Green Features

Architecture Design

1. Facade

High-performance sustainable facades are used for a comfortable indoor environment. The building was designed to minimise thermal heat gain through the envelope and roof, using **double glazed Low-Emissivity Glass**, resulting in:

380,038 kWh

per year of energy savings equivalent to powering 89 HDB 4-Room Flats

2. Roof Spaces

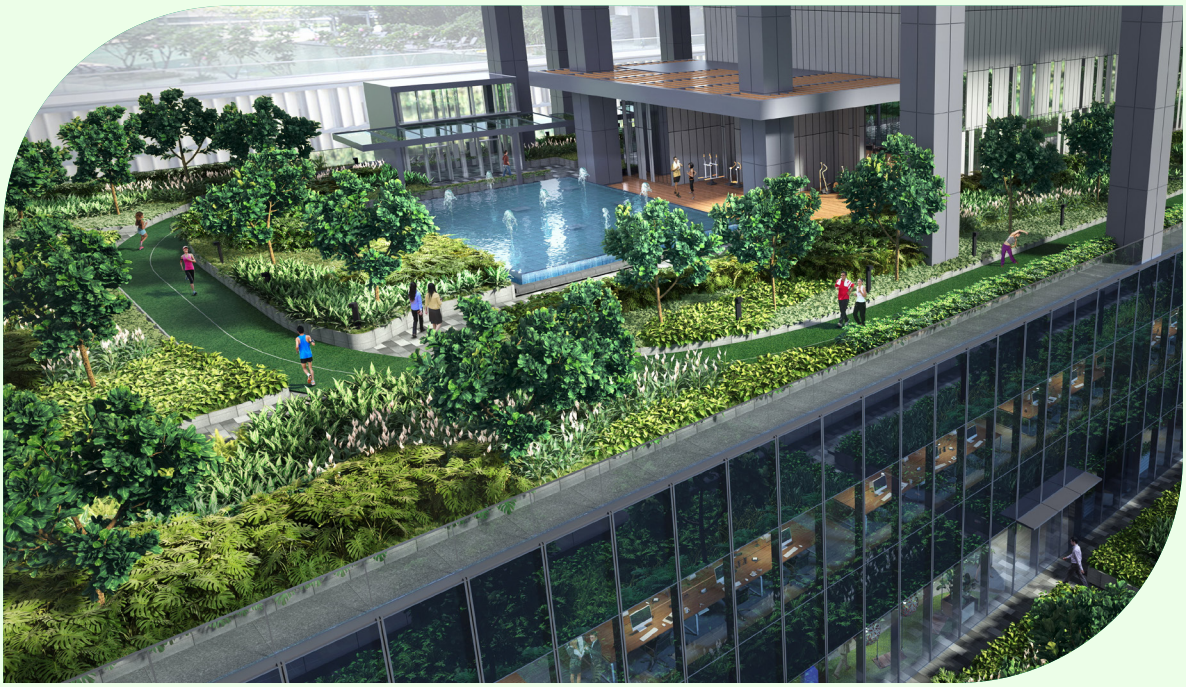
The roof spaces are coated with **heat-reflective waterproof membranes**, resulting in lower roof surface temperatures. This coating improves comfort for tenants, reduces air conditioning cost and extends the lifespan of the roof.

3. Strategic Airflow Openings

The strategic openings at ground level and building setbacks have been intelligently designed to **facilitate airflow and improve air circulation** along the streets, effectively contributing to excellent natural ventilation within IOI Central Boulevard Towers. This design approach not only ensures reduced operational costs through minimised maintenance needs but also enhances the overall well-being of occupants, potentially safeguarding them from pathogens. Additionally, the thoughtful ventilation system minimises noise pollution and encourages social interaction, fostering a holistic environment that promotes health and safety. Computational Fluid Dynamics (CFD) analysis at Level 1 and 7 confirms the efficacy of these measures, revealing a minimum weighted wind velocity exceeding 0.6 m/s in these zones.

Biophilic Design

1. Central Green



Described as the "largest metropolitan sky park" in the Marina Bay neighborhood, Central Green presents a 160m long expanse of scenery, which is equivalent to **3 Olympic-sized swimming pools** placed end-to-end.

Central Green is designed to resemble a mini Gardens by the Bay, incorporating plants of various colors, textures, and types to create a visually pleasing grassy landscape. Expect to find species such as Ficus Lyrata and Bamboo Palm, which provide excellent air filtering benefits.

The park also houses a **200m jogging track**, marking another first in the district. With an increasing emphasis on fitness and health, tenants and visitors will have the opportunity to seamlessly incorporate physical activity into their daily routines.

2. Green and Blue Spaces

Biophilia is an essential element of the development, with a big portion of the location devoted to greenery – over **120,000 sqft** of green landscaping.

The building maximises green and blue spaces and reduces the effects of **Urban Heat Island (UHI)** through careful space planning and material selection. These spaces enhance biodiversity, provide visual relief, and serve as UHI mitigation measures, reducing the cooling load and promoting natural ventilation.

With consideration of optimal leaf coverage design, the development includes **63,504 sqm of greenery** which is equivalent to 9 football fields.

Total number of plants and species in the entire development

Trees & Palms
7 species, totaling 327

Shrubs & Groundcover
25 species, approximately 116,000

Total number of plants and species in Central Green (Level 7)

Trees & Palms
3 species, totaling 233

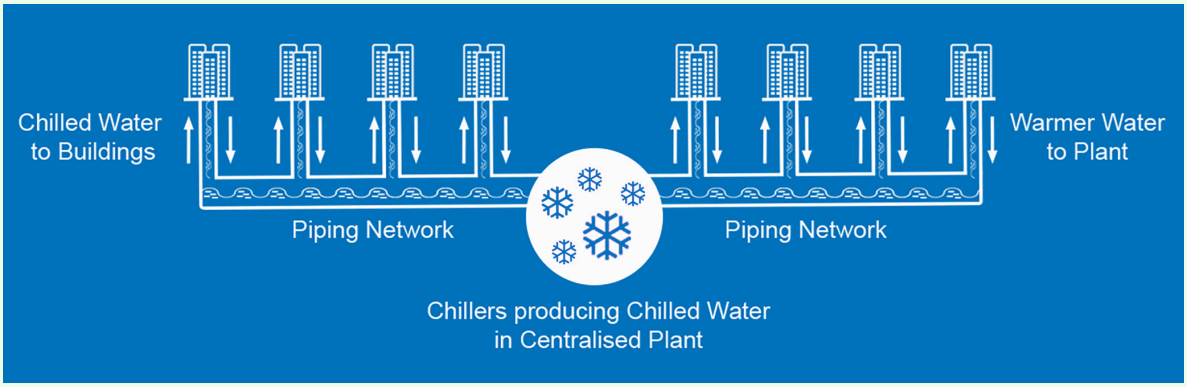
Shrubs & Groundcover
15 species, approximately 68,000

Notably, the building achieved a **high green plot ratio (GnPR) of 5.04** which exceeds the Green Mark recommendation of 4.0. The lush greenery in turn improves air quality and serves as a gathering place fostering social interaction and a sense of community.

Building Management System

IOI Central Boulevard Towers has implemented an energy management dashboard to display real-time data on energy consumption and relevant parameters. This **Integrated Building Management System (iBMS)** can help reduce energy costs by controlling lighting, heating and cooling systems.

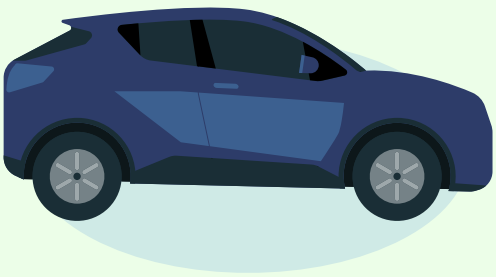
District Cooling Network



We are connected to the **Marina Bay district cooling network**, which is the world's largest underground district cooling network. Marina Bay is designed as a sustainable district and all developments are served by a comprehensive underground network of common services tunnels that house the district cooling system.

This involves centralising cooling plants that distribute chilled water to various buildings through an underground network of insulated pipes, providing air-conditioning services. This approach enables buildings to consume less energy for the same amount of cooling and reduces carbon emissions.

Moreover, buildings no longer need to invest in their own chillers or maintain them, thereby enhancing reliability and freeing up space that would be otherwise required for installing individual chillers.



Annual carbon emissions reduction of

19,439 tonnes

equivalent to removing

17,672 cars

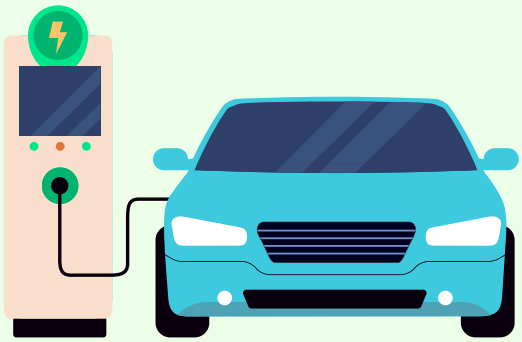
off the roads

End-of-Trip Facilities & Electrical Charging for Vehicles

We encourage the use of alternative transportation through the provision of spaces and facilities.

327 sheltered bicycle lots

near the Downtown MRT Station located along key cycling routes and pathways in Marina Bay



Tenants can also look forward to end-of-trip amenities, such as changing rooms with showers, to freshen up after their journey. **3 EV charging stations and parking lots** are available for use on Level 4 and there is intention to increase this number to **40 by 2030**.

Indoor Air Quality

Providing high Indoor Air Quality (IAQ) for its occupants and visitors is one of IOI Central Boulevard Towers' key priorities. Air handling units (AHU) are installed with the highly effective **MERV 14 (Minimum Efficiency Reporting Value)** air filters to filter out up to **90%** of air pollutants and equipped with **Ultraviolet Germicidal Irradiation (UVGI)** to kill microbes like bacteria and viruses in the air.

The use of **low Volatile Organic Compounds (VOC)** paints and **Persistence, Bioaccumulative and Toxic (PBT)** free lighting help minimise harm to human health and environment.

Lifts and Escalators

The lifts and escalators in IOI Central Boulevard Towers adopts AC **Variable Voltage Variable Frequency (VVVF)** motor drives to provide comfort movement. Regenerative lift drives will allow for energy recovery during lift movement, while sleep mode feature will enable further energy savings during low-use periods.

Together with use of occupancy-based controls of temperature and ventilation demand, these efforts help to minimise energy consumption.

19.1%

in energy savings compared to industry baseline for vertical transport systems

Lightings

The building uses light fittings with **Colour Rendering Index (CRI) of ≥80** and adopts a good lighting design to avoid flicker and stroboscopic effects.

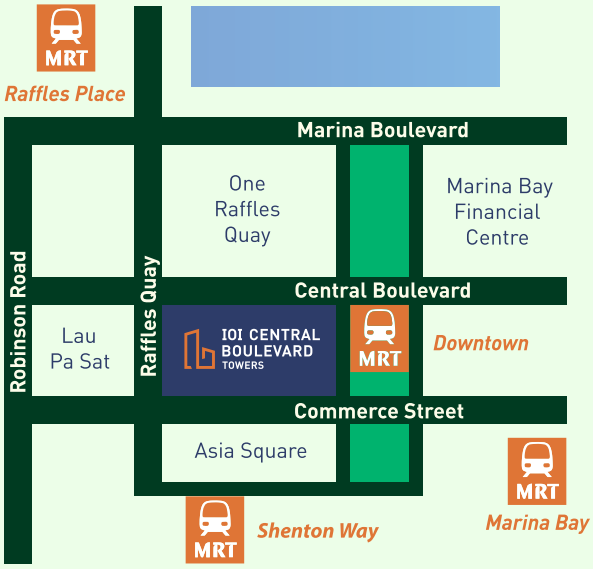
41.2%

in energy savings with reference to industry baseline

Public Transport System

IOI Central Boulevard Towers offers unparalleled connectivity with underground walkways and covered bridges linking to nearby business hubs. Our tenants are also able to walk in sheltered comfort to any of the 4 MRT stations nearby.

- **Downtown Station**
  1 min
- **Marina Bay Station**
  6 mins
- **Raffles Place Station**
  6 mins
- **Shenton Way Station**
  5 mins



Drivers can easily access the **Marina Coastal Expressway (MCE)** and the **Ayer Rajah Expressway (AYE)** for convenient travel throughout Singapore.

Water Consumption

IOI Central Boulevard Towers reduces water consumption by installing 3 ticks **Water Efficiency Labelling Scheme (WELS)** rated water fittings, water meters and leak detection systems as well as automatic irrigation with rain sensor control. We also tapped into alternative sources such as NEWater for use in common toilets.

Water consumption data is monitored and displayed on a water management dashboard to facilitate better management during building operation.

Up to 55,642m³
per year of water savings equivalent to 22 Olympic swimming pools, amounting to
$124,082 per year

Best Practices

Carbon Footprint Management

Reducing business travel helps limit carbon footprint and promotes sustainability. Implementing these strategies raises employee awareness and significantly reduces travel-related carbon footprint while meeting operational needs.

- Encourage the use of public transportation, cycling and carpooling among employees traveling to the same destinations.
- Combine multiple business engagements into a single trip instead of making multiple short trips.
- Evaluate remote work options for tasks that don't require physical presence to reduce daily commuting.
- Replace in-person meetings with virtual alternatives like video conferences, webinars, or teleconferences whenever possible.

Energy Management

Tenants can reduce their carbon footprint by practicing energy-saving measures and using efficient equipment, which also extends equipment lifespan and reduces costs.

Ways tenants can conserve energy:

- Utilise sleep mode and energy-saving features on equipment.
- Maintain clean light fixtures and remind staff to turn off unused lights.
- Power off equipment when not in use for extended periods.

Waste Management

Tenants are also encouraged to set up their own office recycling programs and display posters to educate employees proper segregation and waste disposal.

1. Reduce

- Encourage staff to bring their own cutlery, cups and bottles.
- Digitise internal processes and subscribe to electronic mailing.
- Proofread documents on screen before printing and print double-sided.
- Avoid disposable items and unnecessary packaging.
- Bring electronic devices to meetings instead of printing.
- Choose longer-lasting, useful items as corporate gifts.

2. Reuse

- Reformat or delete old files to free up storage space.
- Use the other side of used paper for drafting, printing and taking notes.
- Reuse envelopes for internal mail.
- Remove old documents and reuse files for filing again.

3. Recycle

- Sort recyclables in the office and place them in designated bins for for paper, plastic, glass and cans.
- Raise staff awareness through circulars, newsletters, talks and activities.
- Do not put food or liquids in recycling bins to prevent contamination.

Tenant Engagement

IOI Central Boulevard Towers aims to demonstrate consistent effort by organising activities in line with IOI's sustainability vision that tenants can participate in.

Educational Programme & Eco-friendly Markets

IOI Central Boulevard Towers promotes environmental awareness through educational programs and activities. Tenants are encouraged to organise workshops, seminars, and staff education sessions on sustainability and practical eco-friendly habits. We aim to collaborate with stakeholders for public talks, group tours, farmers' markets and creative collaborations with artists to highlight climate change.

Health & Wellness Activities

We prioritise the health and wellbeing of building occupants and support social connections in the workplace. Through partnerships with organizations like the Health Promotion Board, we hold talks, activities, and events that positively impact occupant health and wellbeing. Tenants of IOI Central Boulevard Towers can use the Workplace Social app to form social groups with common interests such as:

- Sports/Games
- Cooking/Baking
- Music & Performing Arts
- Wine Appreciation
- Bartering of items to extend the product lifespan

Green Guidelines

Fostering a community with a green mindset is our priority. We aim to work proactively with tenants to encourage responsible management practices during the fit-out* work process. Tenants can benefit from reduced energy, water and waste consumption, and increased employee productivity.

**Refer to Fitting Out Manual for full documentation.*

Energy Conservation

1. Air Conditioning

- Ensure the auxiliary air-conditioning system is flushed by an accredited water treatment specialist to remove impurities.
- Maintain indoor temperature between 23°C and 25°C for comfort air-conditioning.
- Provide dedicated thermostats for individual enclosed areas.
- Implement zoning of the air-conditioning system to cater to different area usage/ occupancy needs.
- Utilise Variable Air Volume (VAV) system with centralized control for zonal operation and control.

2. Electrical Equipment

- Comply with NEA energy efficiency guidelines for other energy-consuming equipment.
- Utilise best energy-efficient standards in the market for commercial equipment, including kitchen equipment.
- Opt for multi-purpose "all-in-one" machines to reduce electricity bills and consumable usage.
- Use Energy Star compliant computer equipment.

3. Light fittings

- Avoid flicker and stroboscopic effects by using LED lighting with a frequency of ⩽ 50Hz.
- All lighting troffers will use energy-efficient LED technology.
- Implement zone lighting to switch off unnecessary areas.
- Choose energy-efficient light fittings for savings in energy, cooling requirements, and longer lifespan at comparable installation cost.
- Install daylight dimming controls to optimise lighting based on natural light availability.
- Comply with Singapore Standard SS530 energy efficiency standard.
- Use task lighting for targeted lighting needs after office hours.

Green Procurement

Green procurement of products and services can have a reduced impact on human health and the environment.

- Purchase environmentally friendly materials with recognised green certifications such as the Singapore Green Building Product (SGBP) label or relevant local schemes.
- Source wood-based materials from sustainable sources, such as Forest Stewardship Certification (FSC) certified products, or consider alternative sustainable options like composite wood, engineered wood, and rapidly renewable natural materials like bamboo.
- Select paper products from sustainable sources, such as those with FSC certification or recycled content and non-chlorine bleaching. Use materials with higher levels of recycled content, such as carpet and wallpaper, whenever possible.
- Encourage the use of regional interior materials and products to support indigenous resources and reduce environmental impact from transportation.
- Order accurate quantities of products and materials to avoid overordering. Choose suppliers that offer product take-back options for unused or excess items. Request packaging consolidation or reduced packaging materials from suppliers.

Indoor Environmental Quality

- Ensure acoustic comfort with wall-mounted sound absorption panels that use fewer raw materials.
- Provide window blinds, shades, or curtains to reduce solar heat absorption and glare from daylight.
- Use low-Volatile Organic Compounds (VOC) paints, adhesives, and sealants certified under Singapore Green Labeling Scheme (SGLS) or SGBP.
- Incorporate biophilic design features like indoor greenery areas, potted plants, aquariums and nature-inspired wallpaper.
- Opt for low-maintenance indoor plants that can reduce airborne VOC concentrations, release moisture and provide heat and noise absorption.
- Indoor planting offers various benefits, including a refreshing atmosphere, improved productivity, reduced workplace stress and decreased respiratory disorders.

Renovation / Maintenance Materials

1. Floor Finishes

Floor finishes (e.g. carpet tiles, laminate flooring, timber flooring, tiles, marble flooring, coatings, grouting, adhesives) have the greatest single environmental impact as they tend to be replaced at the end of every lease cycle. For carpets, choose environmental friendly ones certified under the SGLS or SGBP:

- Modular (tiles)
- Low VOCs carpet tiles
- High recycled content
- Minimum PVC content

2. Furniture

- Avoid materials and furniture containing a high level of VOC to minimise the indoor air pollutants and odour problem.
- Select furniture which are modular systems and/or mobile units which facilitate subsequent removal and reuse. Easily disassembled unit often facilitates more efficient and effective recycling.
- Mechanical fixing (for assembly) in lieu of adhesive to maintain good indoor air.

3. Wall & Ceiling

Use materials (e.g. wall laminate, dry walls, waterproofing, boarding insulation, wall papers, paints, coating, plastering, coating, ceiling boards) with recycled contents certified under SGLS or SGBP.

Waste Management

We are particularly focused on engaging with our tenants to reduce waste to landfills through waste diversion and recycling.

- Ensure proper waste disposal and implement a recycling program. Place designated recycling bins (e.g., for paper, plastic, e-waste) at central or strategic locations to promote recycling.
- Minimise the use of disposable products, such as single-use plastic food utensils. Instead, provide reusable utensils and cutlery in the pantry.
- Set up recycling bins at the building's bin centre for paper, plastic, and metal collection. Encourage cleaners to segregate and transport recyclable waste to the bin centre regularly.
- Recycle printer consumables like toner and ink cartridges, as well as obsolete IT equipment.

Water Management

- Choose energy efficient chiller/ freezer/dishwasher with at least 3 ticks under the Mandatory Energy Labelling Scheme (MELS).
- Install flow restrictors on taps to reduce water flow.
- Provide water meter and leak detector for consumption monitoring and leak identification.

Summary of Key Figures

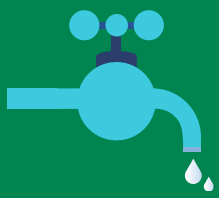
Energy Savings

8,293,036 kWH
per year

$1,668,607.20
per year

Up to **1,947 HDB 4-room** supplied per year

Water Savings

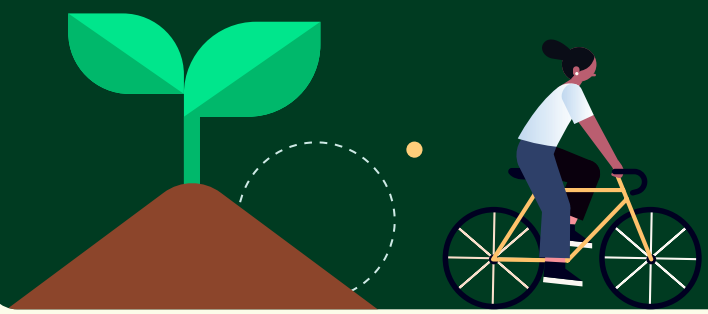


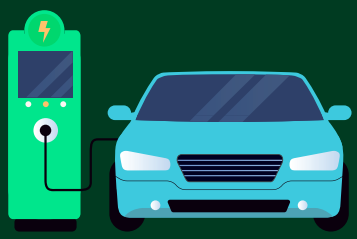
55,642.16 M³
per year

$124,082.02
per year

Up to **290 HDB 4-room** supplied per year

Carbon Emission





Up to **4,164 tonnes reduction** per year

IOI CENTRAL BOULEVARD TOWERS

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