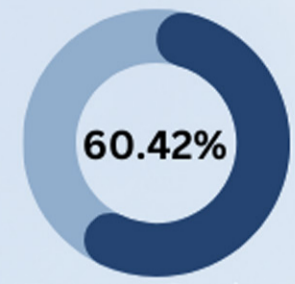
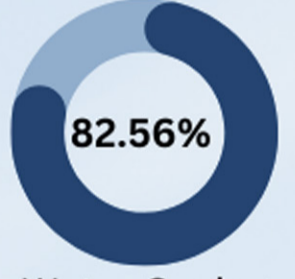


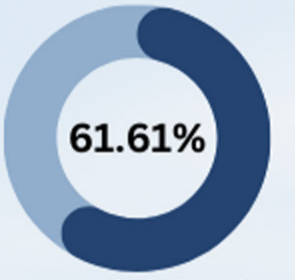
# ARUNIKA TOWER



Energy Savings

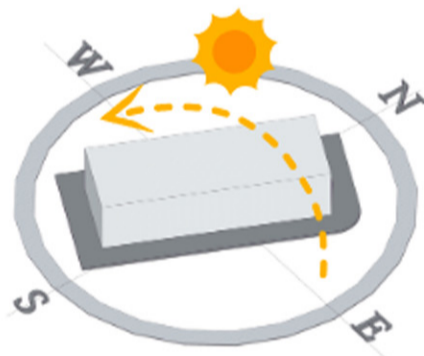


Water Savings

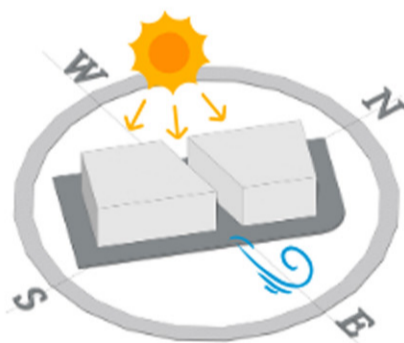


Material Savings

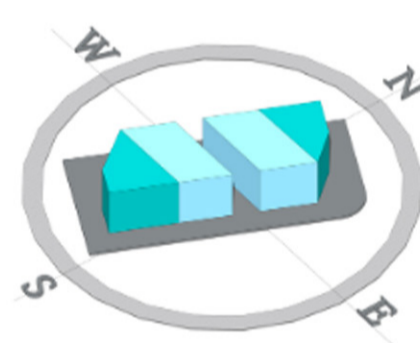
## DESIGN CONCEPTS



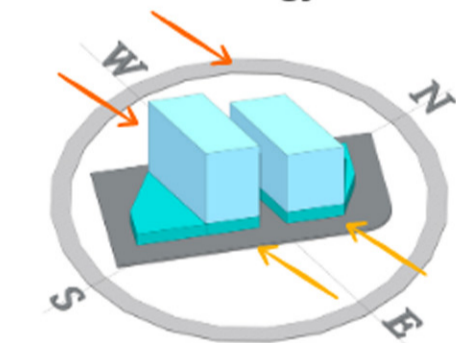
**Initial Shape:** The building mass is rectangular to reduce surface area and minimize energy loss.



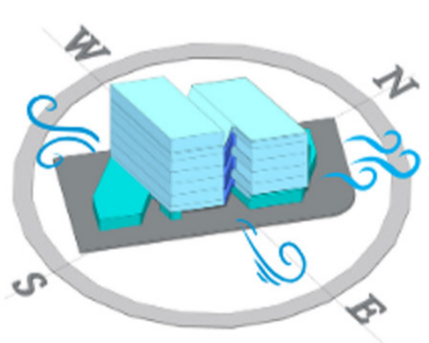
**Mass Division:** The building mass is divided into two blocks with a central void to enhance natural lighting and cross-ventilation.



**Podium and Tower Zoning:** The building is separated into a podium for commercial spaces and a tower for office/residential use, with energy strategies tailored to each.



**Mass Adjustment:** The tower mass is added upward; the podium mass is reduced to optimize natural light access and material efficiency.

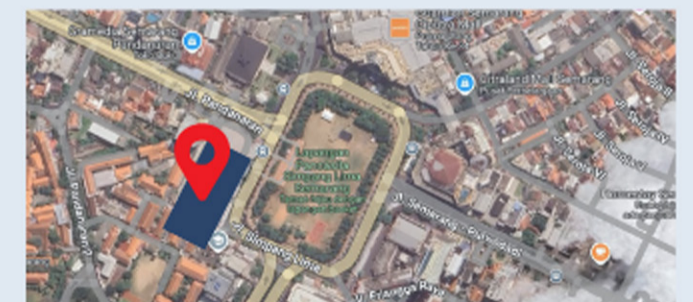


**Tower Zone Connectivity & Openings in Each Zone:** The connector functions as a sky garden for communal spaces, while openings in each zone support cross ventilation.



**Shading Core and Roof Garden:** A core on the west side provides shading, and the roof garden is used for solar panels, rainwater harvesting, and green spaces.

"Arunika Tower" is a Zero Carbon building that combines energy efficiency and comfort within a modern, eco-friendly office rental space. Committed to green technology, the building provides a healthy work environment with green communal areas that encourage interaction. "Arunika" symbolizes progress and environmental responsibility, bringing new hope to urban architecture.



**Location:** Area Simpang Lima, Jalan Pandanaran, Semarang  
**Area:** 9000 m<sup>2</sup>



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## SITE PLAN



## EXISTING



**1. Indosat Office:**  
A modern office building featuring a glass facade with blue and yellow accents.

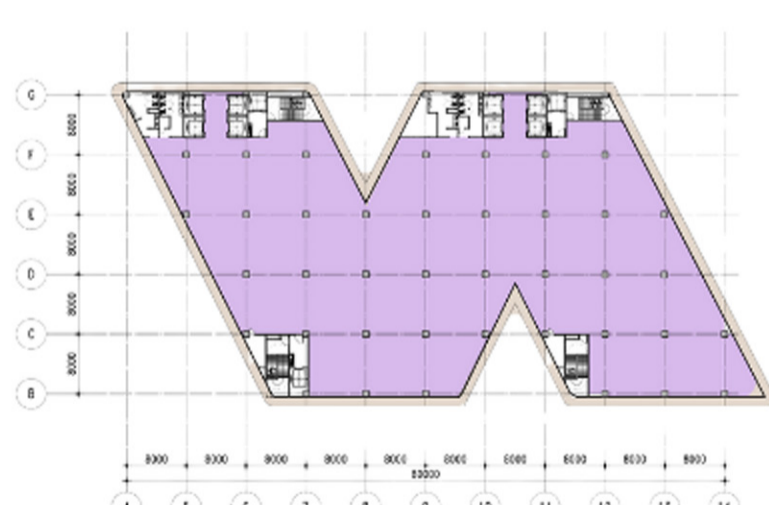
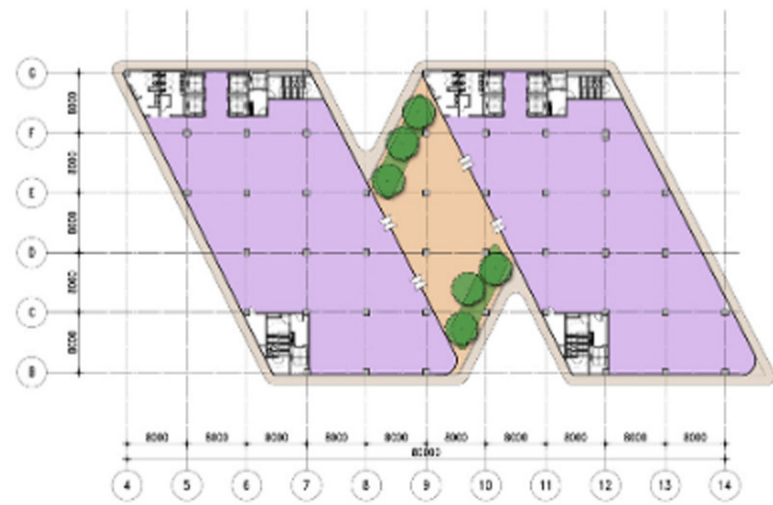
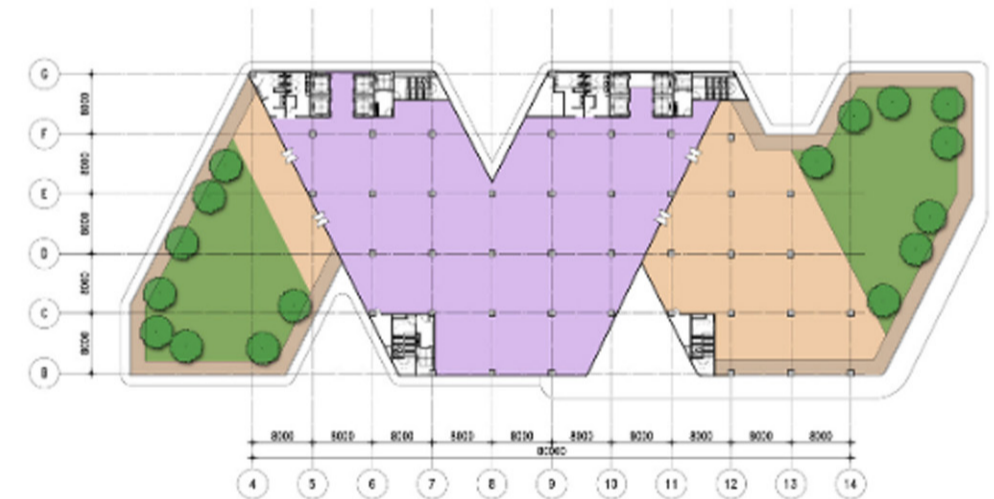
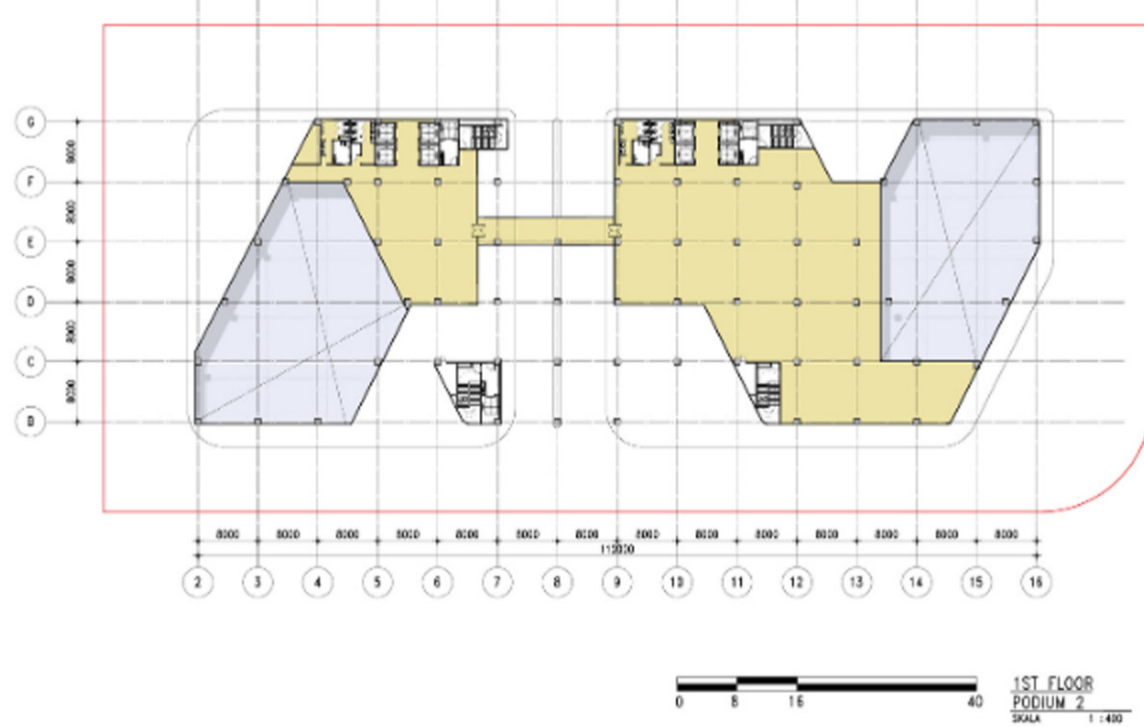
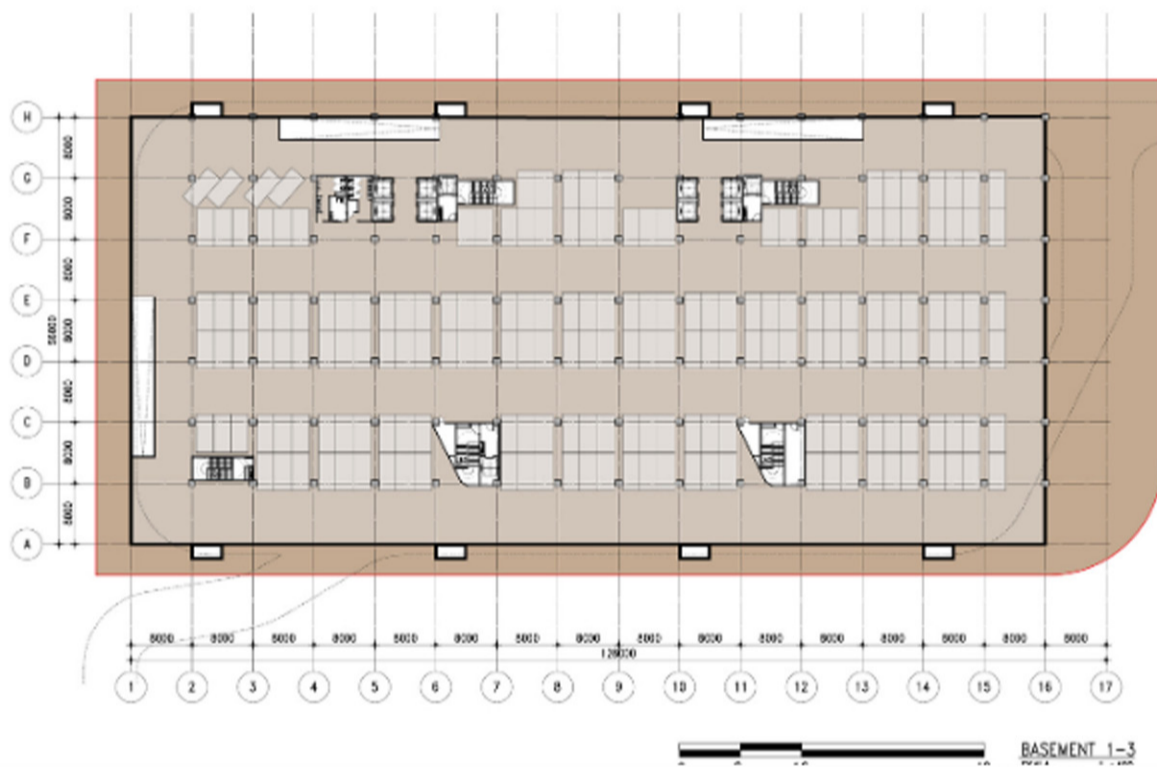


**2. Baiturrahman Mosque:**  
A religious and historical landmark in Semarang.

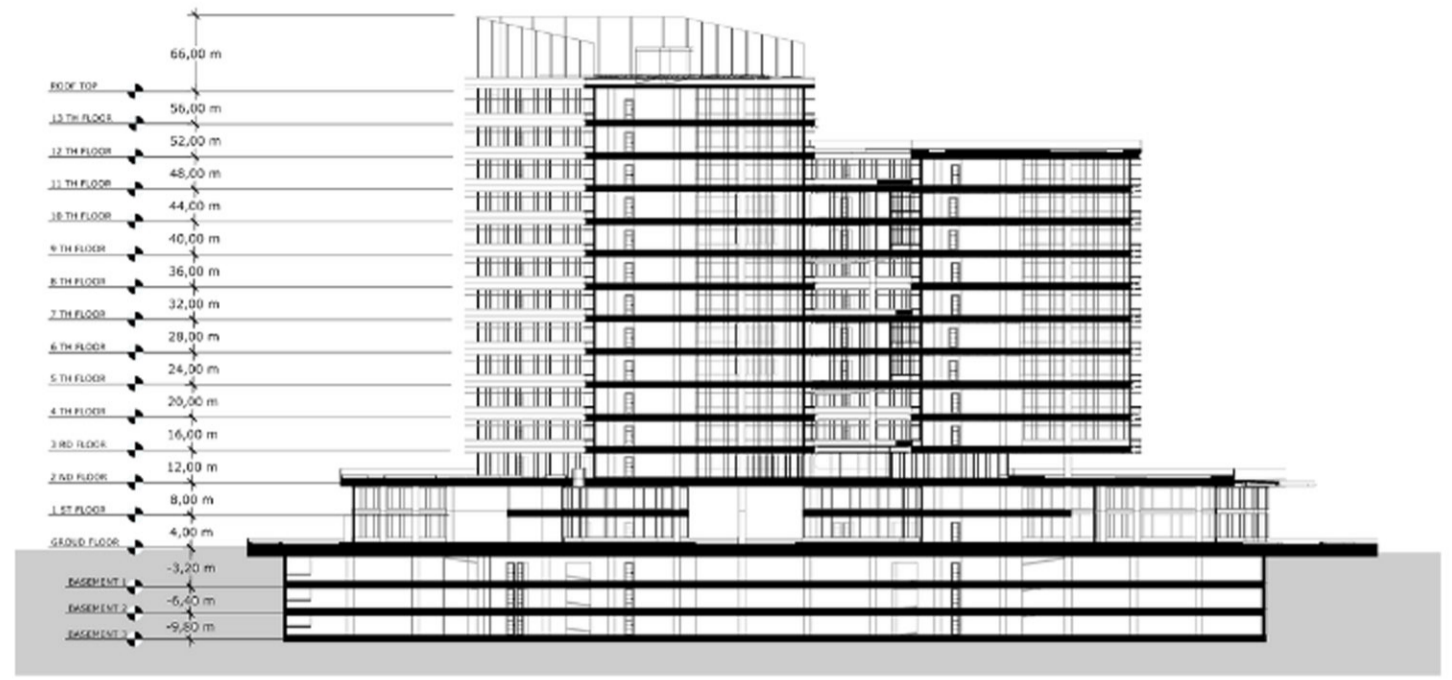


**3. Ciputra Mall:**  
A large shopping center with contemporary architecture.

## BUILDING FLOOR PLAN



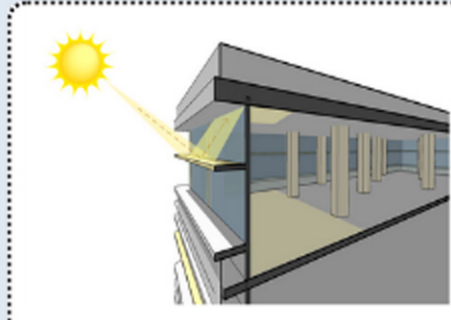
**SECTION AND VIEW**



**BUILDING ENVELOPE**



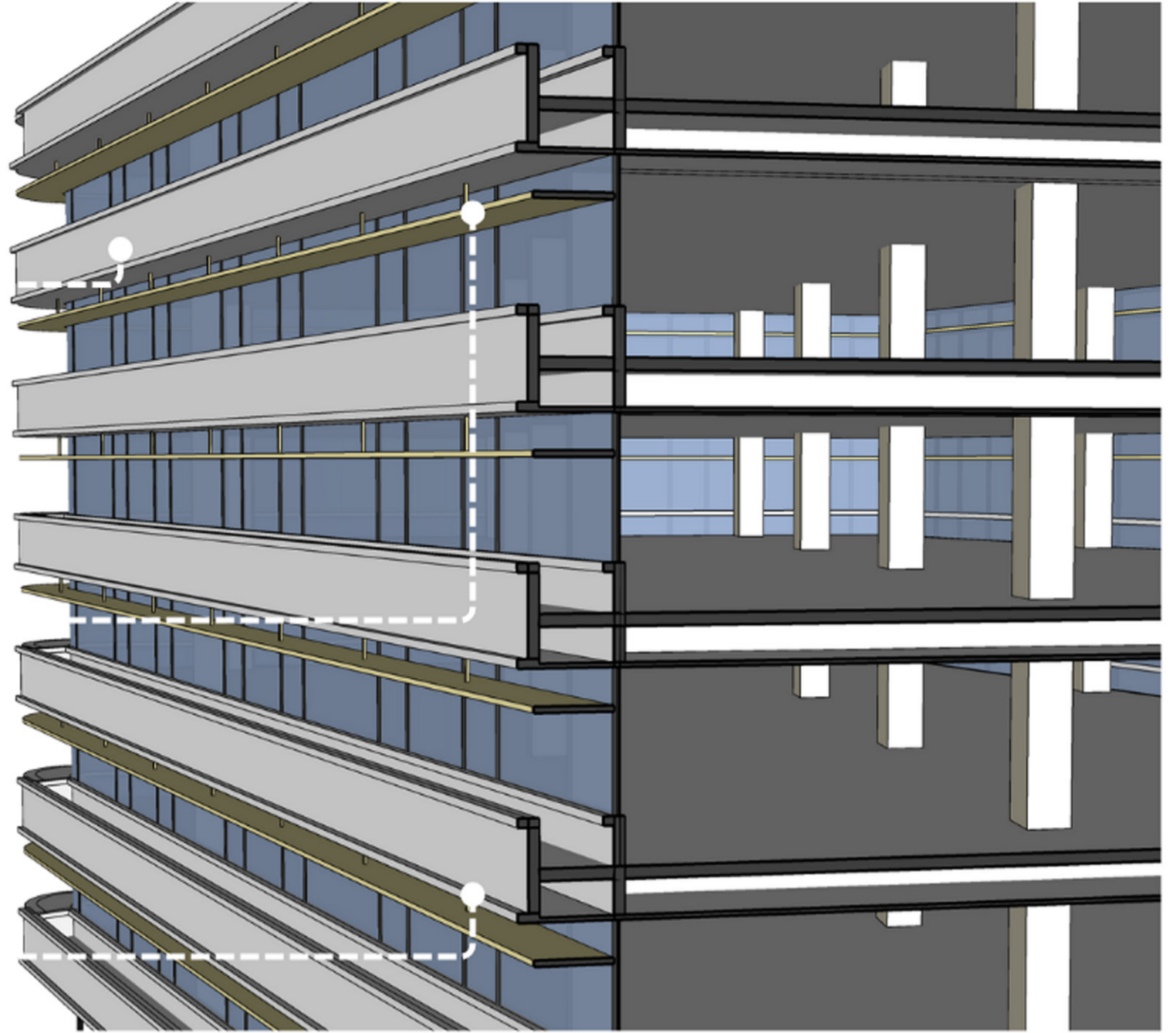
**Reflective Materials:** Reduces heat absorption, keeping the building cooler.



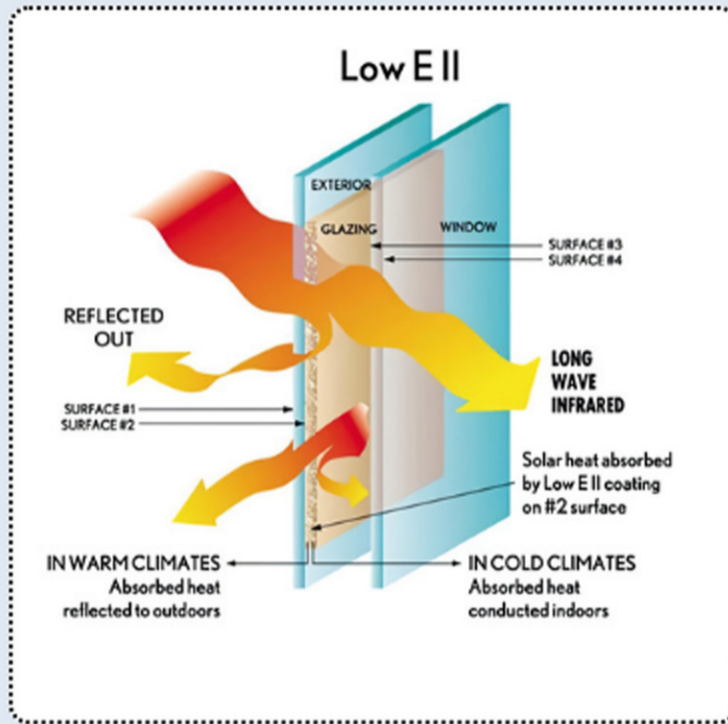
**Daylighting:** Maximize natural light with light shelves and reflective ceilings.



**Shading Devices:** Reduces direct sunlight while allowing natural light to enter.



**MATERIAL**



**Low-E Glass Windows:** Minimizes heat loss in winter and keeps rooms cool in summer.

- Glass Opening Height: 190 cm
- Thickness: 6mm
- SC: 0.70
- SF: 6.1
- Ug: 4.1



**Local Materials :** Use of local and recycled materials.

- Lightweight Brick
- Split Stone



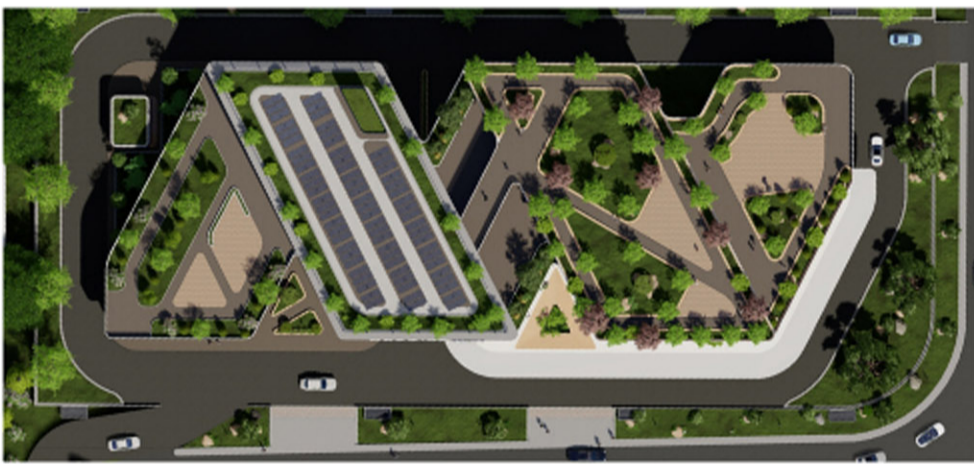
**Low Carbon:** Environmentally friendly concrete.



**Low VOC:** Low-VOC interior finishes.



## ENERGY SAVING STRATEGY



### Drop-off area in front of the main entrance of Arunika Tower:

- Canopy roof for natural shading
- Energy-efficient LED lighting
- Large glass facade to maximize natural light
- Open area for natural ventilation
- Vegetation for natural air cooling
- Reflective materials to reduce heat absorption
- Aerodynamic design for efficient airflow

### Front area of Arunika Tower:

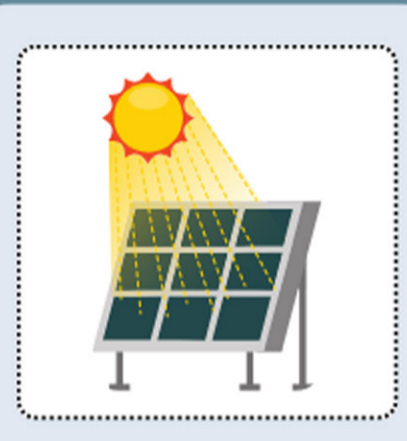
- **Site Elevation:** A 60 cm elevation reduces noise, aids in water management, and lowers flood risk.
- **Green Landscape:** The front garden with diverse vegetation naturally cools the area, reducing the urban heat island effect and cooling needs.
- **Building Design:** The tiered structure with large balconies provides natural shading, reducing direct sunlight exposure.

### Roof garden at Arunika Tower:

- **Thermal insulation:** Reduces heat transfer, stabilizing interior temperatures.
- **Urban heat island reduction:** Lowers the temperature around the building.
- **Rainwater management:** Reduces runoff and potential for recycled water use.
- **Increased solar panel efficiency:** Helps maintain lower panel temperatures when installed together.
- **CO2 absorption:** Reduces the building's carbon footprint.
- **Improved air quality:** Eases the load on the ventilation system.



**Rainwater Harvesting:** Used for toilet flushing and irrigation.



**Energy Storage:** Systems for optimizing solar energy.



**Natural Ventilation:** Optimizes natural ventilation in select areas for energy savings.



**Sky Garden:** Green areas every three floors.



**Roof Garden:** Communal green space on the podium and tower roof.



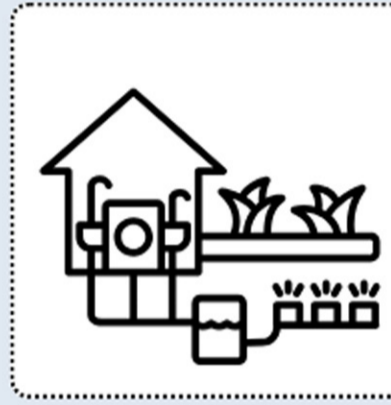
# ENERGY SAVING STRATEGY



**IoT Sensors:**  
For automatic monitoring and control.  
**ALL FLOORS**



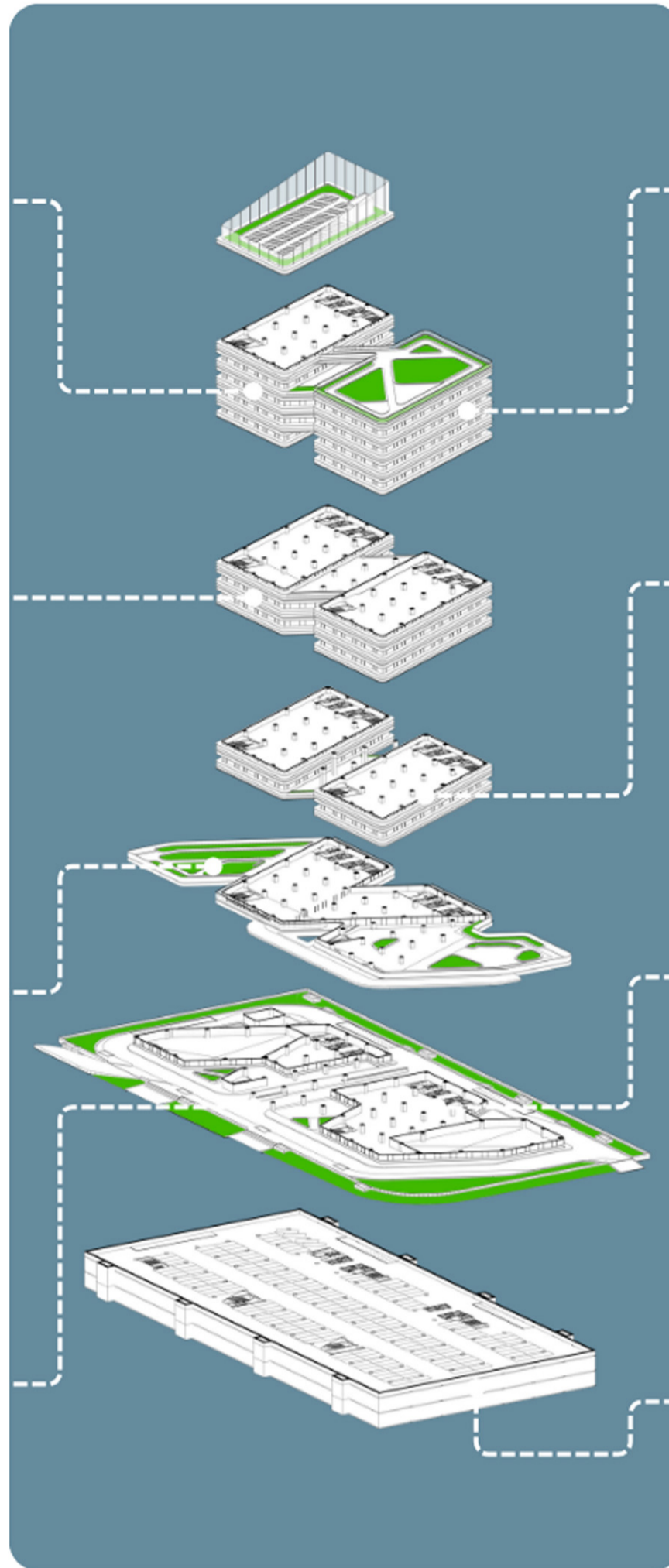
**Water-Saving Fixtures:**  
Dual-flush toilets and aerator faucets.  
**ALL FLOORS**



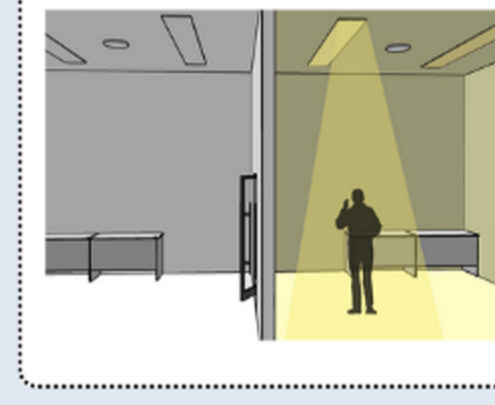
**Greywater Recycling:**  
For non-potable use



**Building Management System (BMS):**  
Optimize energy with real-time monitoring and control.



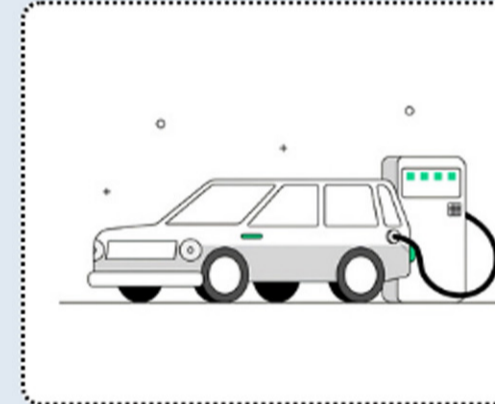
**Water Cooling System:** uses renewable chillers and cooling towers to minimize cooling loads.  
**ALL FLOORS**



**Automatic Control:** Occupancy and daylight sensors for energy efficiency.  
**ALL FLOORS**



**Energy Dashboard:** Educate users through energy usage visualization.



**Electric Vehicles:** Priority parking with charging stations.

PERCENTAGE OF SAVINGS IN ENERGY



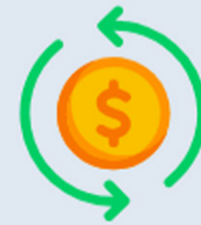
**658,10 tCO<sub>2</sub>/Year**

Carbon Emissions

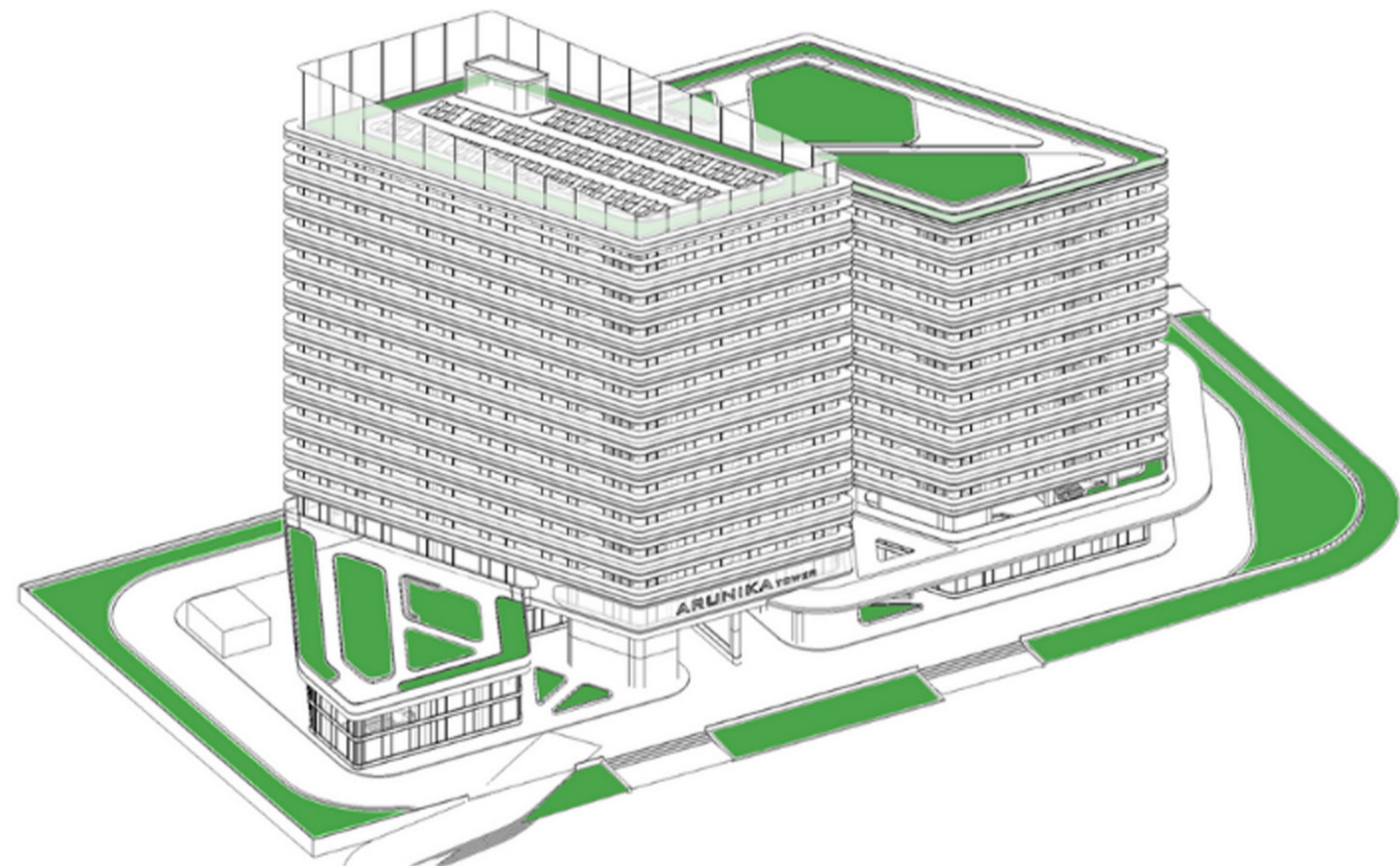


**122.509,9  
Thousand Rp/Month**

Cost Savings

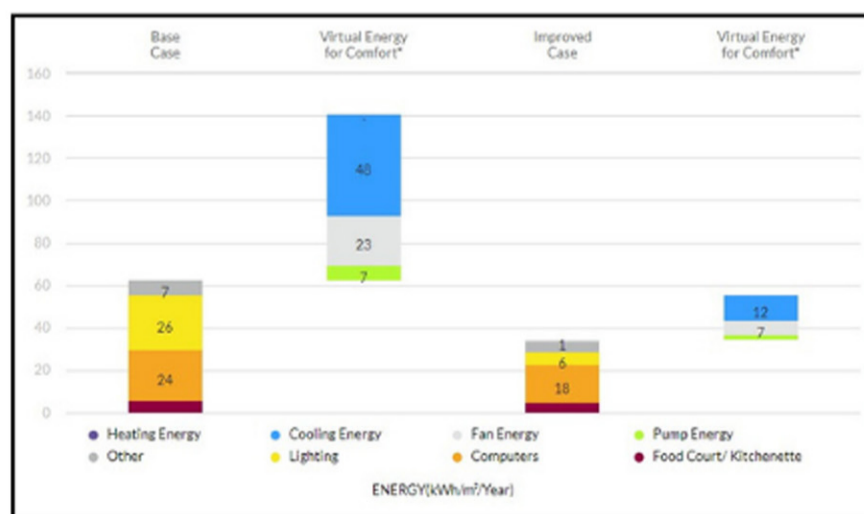


**3.09  
Payback In Years**

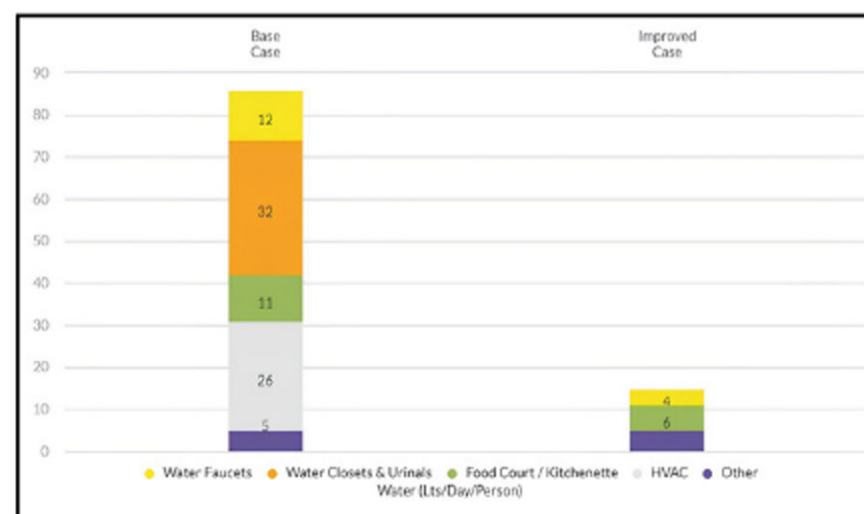


ISOMETRY

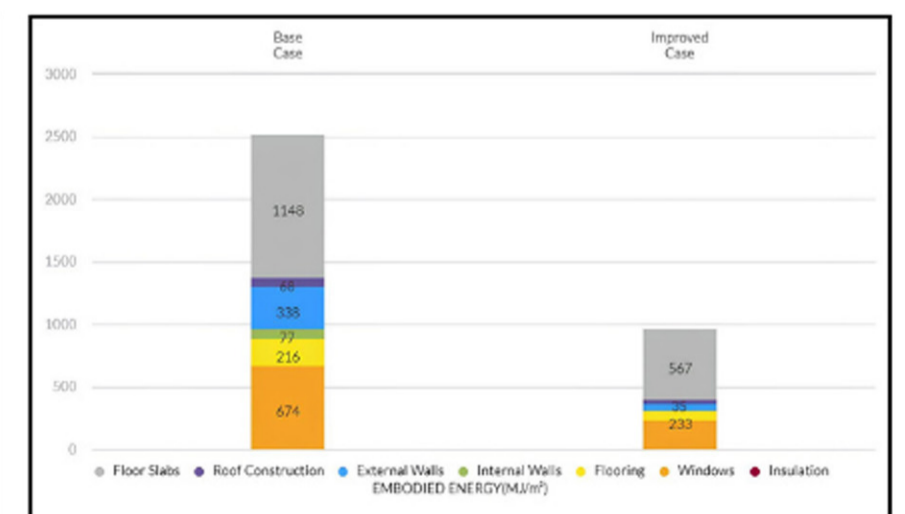
Energy Savings (60.42%)



Water Savings (82,56%)



Material Savings (61,61%)



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