

GREEN – DESIGN & LAYOUT (DELIVERING PERFORMANCE)

General Perception of “GREEN” ?



WHAT DOES GREEN MEAN TO ME?

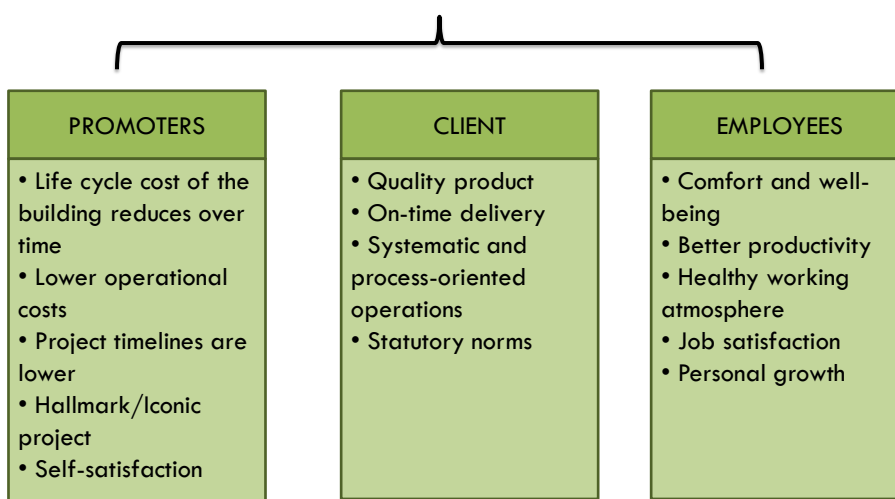
GREEN ↔ **SUSTAINABLE**

As a **Stakeholder**, a **Green Project**

- Should have the best sustainability features
- Should increase the market value of my project
- Should boost occupant productivity
- Should be environmental-friendly

GREEN | An All-Rounder on its own

BENEFITS



HOW DID WE GO ABOUT THIS?

- We decided to follow an appropriate **International Standard** which would cover all aspects of **Design & Construction**.
- Of all the available standards **LEED** rating system was found to be more suited for our factory.
- **LEED** approach was more **holistic** and had enormous benefits.
- LEED rating system covered various aspects like- **Site Selection, Water conservation, Energy Conservation, Indoor Environmental Quality** and **Materials selection**.



WHAT IS LEED?

- LEED stands for '**Leadership In Energy & Environmental Design**'



OUR APPROACH

Our approach was to design the factory to be Environment-Friendly.

Key features include

- Harnessing Natural Daylight
- Landscape
- Adequate occupant comfort through fresh air ventilation
- Usage of recyclable materials for construction
- Energy efficient HVAC system thereby reducing the energy cost

OUR APPROACH | NATURAL DAYLIGHTING

DESIGN APPROACH

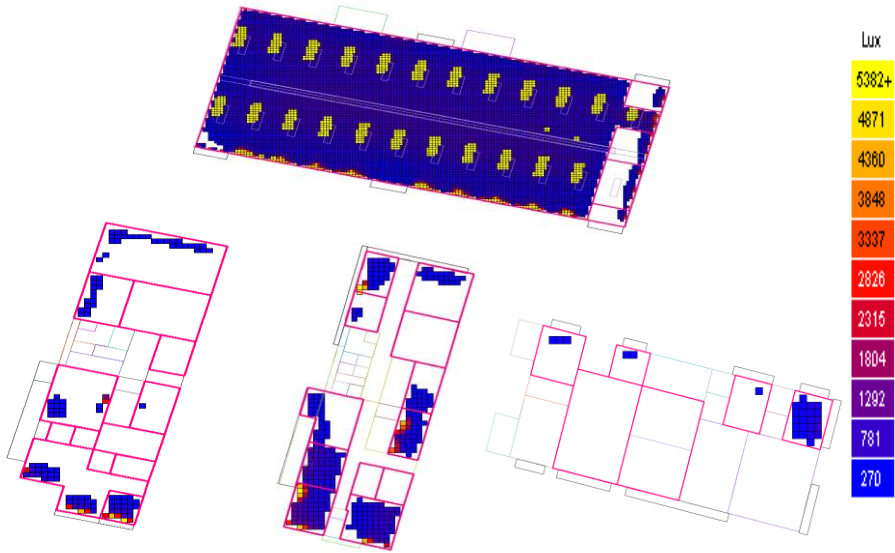
- To maintain the best of occupant comfort inside the factory premises a **Natural Daylighting Simulation** was undertaken.
- Around **85%** of the factory premises is lit by the **Natural Daylight** thereby reducing the need for artificial lighting systems.
- Installation of high-efficient **skylights** and **glazing** with a Visual Light Transmittance (VLT) of **55%** for harnessing more daylight.

ADVANTAGES

- Increase in general well-being of occupants.
- Decreases the occurrence of headaches, Seasonal Affective Disorder (SAD)
- Quality of light can increase productivity
- Increased job satisfaction, work involvement, motivation, organizational attachment and lowered absenteeism.
- Reduction in Energy costs attributed with the use of artificial light.

OUR APPROACH | NATURAL DAYLIGHTING

SIMULATION IMAGES



OUR APPROACH | NATURAL DAYLIGHTING

SITE IMAGES







OUR APPROACH | NATURAL DAYLIGHTING



OUR APPROACH | LANDSCAPING

DESIGN APPROACH

- Over **20%** of the site area has been landscaped with **'Drought Tolerant'** species.
- Drought tolerant species reduce the need for frequent irrigation.
- Vegetation inside the office spaces thereby increasing occupant productivity and wellness.
- **Eyestrain, stress reduction and attentional focus** increases with the presence of Natural vegetation within the workspace.



OUR APPROACH | OCCUPANT COMFORT

DESIGN APPROACH

- Adequate **'Fresh Air Supply'** of **5 cfm/person** as per ASHRAE standards.
- Installation of efficient **'Treated Fresh Air Units'** to supply the necessary amount of fresh air.
- The entire factory area to be **'Naturally Ventilated'** as per ASHRAE and IGBC Green Factory standards.



OUR APPROACH | SUSTAINABLE SITES

KEY FEATURES

- A site management plan which conforms with the best management practices highlighted by the '**National Building Code of India**'.
- Promoting the use '**Alternative Fuel**' based vehicles.
- Allocating over **20%** of the site area for Landscape.
- **Rainwater harvesting system** capable of harvesting around **110 cu.m** of the annual rainfall.
- Minimizing the impact on micro-climate through the installation of high **SRI** (Solar Reflective Index) based **roof** materials.



SUSTAINABLE SITES

OUR APPROACH | WATER EFFICIENCY

KEY FEATURES

- **100%** recycled water use for landscape irrigation thereby reducing the need for potable water.
- Installation of a '**Sewage Treatment Plant**' to treat the waste water to tertiary standards.
- Reusing the treated waste water for flushing purpose.
- Over **45%** savings in the factory's overall water use through the installation of the '**High-Efficiency**' water fixtures.



WATER EFFICIENCY

OUR APPROACH | ENERGY & ATMOSPHERE

KEY FEATURES

- **Zero** use of **CFC** based refrigerants in the HVAC systems.
- **Energy-cost** savings of around **24%** through the incorporation of the following,
 - **High performance glazing**
 - **Efficient Lighting Design**
 - **Variable Refrigerant Volume system**
- Annual energy savings of around **201451 kWh** when compared with the **ASHRAE** benchmark.



OUR APPROACH | MATERIALS & RESOURCES

KEY FEATURES

- **Centralized waste collection & disposal system**
- Over **95%** of the construction waste has been reused in site thereby reducing their disposal from landfills.
- Usage of around **24%** of **recycled materials** for construction.
- Procurement of around **50%** of construction materials from the **local region** thereby enhancing the local economy.



OUR APPROACH | INDOOR ENVIRONMENTAL QUALITY

KEY FEATURES

- Maintaining the **Indoor Air Quality** as per ASHRAE standards.
- More number of **naturally ventilated areas** thereby enhancing occupant comfort.
- Adequate fresh air supply for occupant comfort through **'Treated Fresh Air'** units and **'Natural Ventilation Design'**
- Use of low VOC based materials for interior finishing purpose.
- Adequate **'Thermal Comfort'** for occupants by maintaining the adequate indoor temperatures.



INDOOR
ENVIRONMENTAL
QUALITY

Thanks