

LIFE CYCLE ANALYSIS & LOW CARBON ROADMAP

CO2 EMISSIONS FROM CONSTRUCTION INDUSTRY





Fig: CO2 Emissions by Building Typologies in India

NEED OF THE HOUR



ACCOUNTABILITY **FOR CARBON**

deconstruction waste processing disposal transportation





maintenance repair replacement refurbishment alia III construction

installation process transportation



ROADMAP

CARBON

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ANALYSIS

CYCLE



BUILDING LIFE CYCLE ASSESSMENT







LCA OF A BUILDING



LCA OF A BUILDING



- Efficient passive design addressing resource consumption
- Selection of products and materials considering circularity and whole life cycle in mind (procurement to demolition)
- Set target for footprint





CI







CII

Design	Procurement
 Efficient passive design addressing resource consumption Selection of products and materials considering circularity and whole life cycle in mind (procurement to demolition) 	 Low carbon products and Materials Local materials Recycled / with high recycled content Efficient product and technologies
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Set target for footprint

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CONSTRUCTION BLOCKS

Autoclaved Aerated Concrete Blocks

- Kg of Carbon Emissions:
 - > AAC blocks (9 inch): 15-20 kg CO2 / MT
 - Earthen Brick : 240 kg CO2 / MT
- Thermal properties of construction blocks significantly affects energy performance
- Overall heat transfer coefficient
 - > AAC blocks (9 inch): 0.7 W/m²K
 - Earthen Brick : 2.0 W/m2K
- Reduced structural load in high rise buildings







CEMENT

Portland Pozzolana Cement (PPC)

- Low CO₂ emission per tonne of cement
 - ➢ 650 kg of CO₂ / MT of Cement
 - Reduction in embodied carbon
- Higher long term strength (beyond 90 days)

Portland Slag Cement (PSC)

 < 350- 400 kg CO2 emission per tonne of Cement Reduction in permeability and corrosive resistance increases durability







STEEL

Low Carbon Steel TMT Rebar

- High strength, ductility and corrosion resistar
 - Strength > Fe 500e
 - Corrosion resistance (CRE) > 0.4
 - ➢ Ductility(TS/YS) > 1.15
 - Enhanced durability of the building
 - Reduced construction materials demand
- * TS Tensile Stress and YS Yield Stress * CRE = Cr + Cu + P + Mo + Ni







 Efficient passive design addressing resource consumption

Design

Procurement

Low carbon

Materials

content

products and

Local materials

Recycled / with

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Efficient products

and technologies

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 Set target for footprint





AIR CONDITIONING

Energy Efficient Chillers

- Increased Efficiencies
- Water Cooled Centrifugal Chillers
- Specific Energy Consumption:
- 0.5 kW/ton





VFD - Secondary Chilled Water Pump



LIGHTING



Conventional Case

- 72 W/ fixture
- Efficacy: 60
- No of fixtures : 211



Energy Efficient

- 38 W/ fixture
- Efficacy: 132
- No of Fixtures : <100

CASE	LPD (W/ft2)
Conventional Case	1.04
Energy Efficient Case	0.2 -0.3





RENEWABLE ENERGY SYSTEMS

On - Site systems

- Wind Solar Hybrid
- Building Integrated Photo-voltaics
- Wind turbines



Parking area shaded with Solar PVs





Solar PVs provided for charging electric vehicles





RENEWABLE ENERGY SYSTEMS AT IGBC HQ







RENEWABLE ENERGY SYSTEMS

Off - Site systems

- Invest in off site renewable power sources and wheel through Grid
- Get into renewable power purchase agreements with IPPs / State distribution companies
- Purchase renewable power through energy exchanges









REPURPOSED FOR SECOND LIFE



EXISTING SITE CONDITIONS

EXECUTION PHASE

AFTER COMPLETION





CONVERTING DEMOLITION WASTE INTO NEW CONSTRUCTION MATERIALS



Recycled Aggregate

Produced by Crushing & Washing of Brick Aggregate, Stone Aggregate, Tiles etc.



Manufactured Sand

Produced by crushing & washing of C&D waste. It is a fine mixture of Stone & Brick Aggregates



Cement Brick



Grey Milano Shape Paver

Products Manufactured By Indo Enviro Integrated Solutions Limited





NEED FOR LCA OF BUILDINGS

Achieve Circular Economy

Reduce Supply Chain Carbon Footprint

Reduce Building Carbon Footprint



Achieve National Net Zero Goals !





THANK YOU