Bureau of Energy Efficiency

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Government of India
Ministry of Power

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DEUTSCHE ZUSAMMENARBEIT

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ANGAN

Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLiT, New Delhi

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THIS PRESENTATION WAS SHARED BY

Dr. Sunita Purushottam,

Sustainability Head, Mahindra Lifespace Developers Ltd., Mumbai

FOR THE SESSION:

"Steps towards Net Zero Energy Buildings"

DURING ANGAN 2019

Knowledge Partner

teri The Energy and Resources Institute
Creating Innovative Solutions for a Sustainable Future

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Mahindra LIFESPACES
JOYFUL HOMECOMINGS

Towards a low carbon world

Building Sector and the story of carbon

Dr. Sunita Purushottam

Head Sustainability
Mahindra Lifespaces

Contents

Mahindra LIFESPACES
JOYFUL HOMECOMINGS

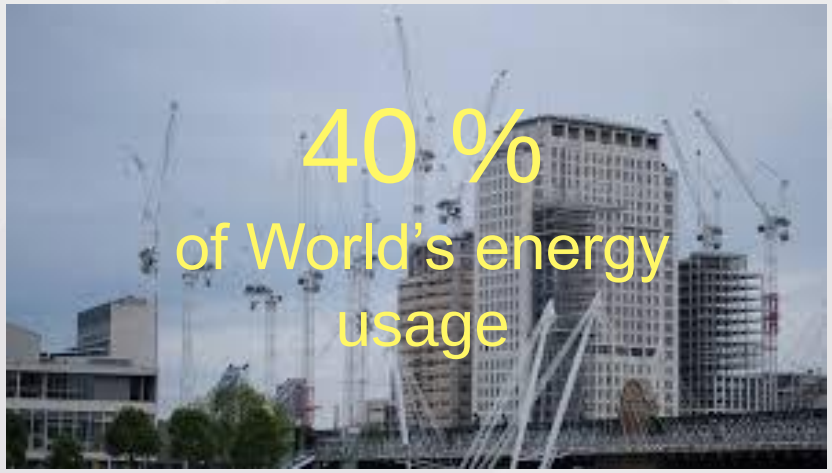
Mahindra LIFESPACES
JOYFUL HOMECOMINGS

What *has carbon to do with the homes we build today?*

Impact of Real Estate on Environment

23%
air pollution

40%
drinking water pollution



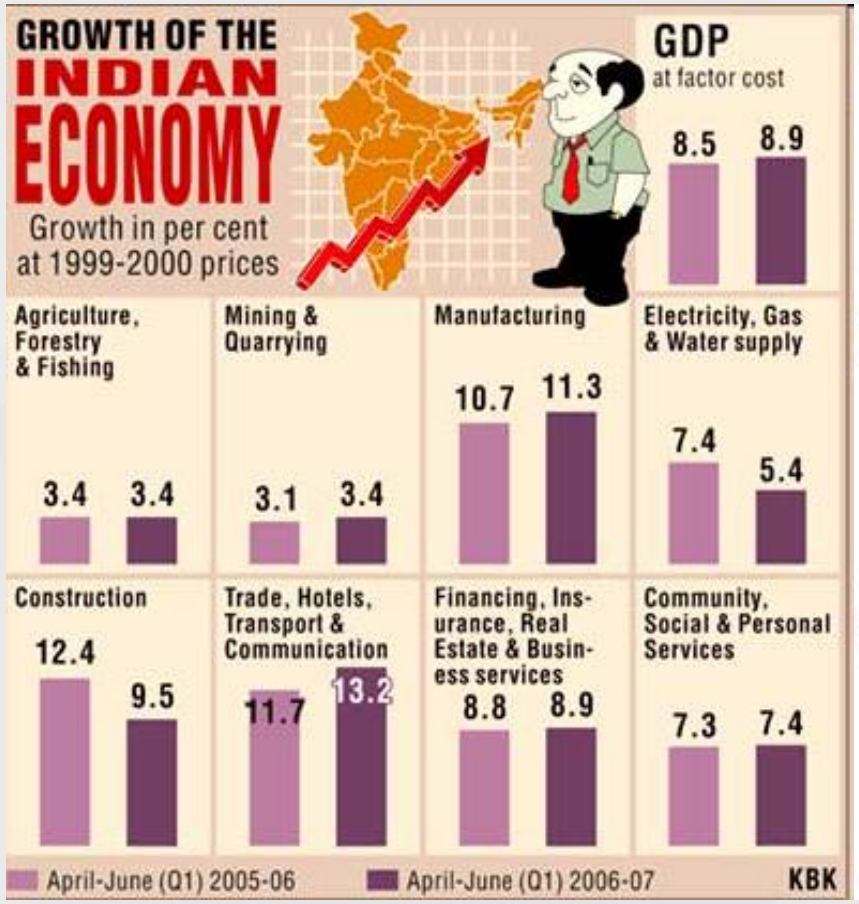
40 %
of World's energy usage

50%
climatic change

50%
landfill wastes

Bimhow https://www.initiafy.com/blog/how-does-construction-impact-the-environment/

The Growth Challenge



Expected Growth Rate 7 to 8%

More than 70% infrastructure which will exist in 2030 is yet to be built

Energy Consumption and GHG Emissions + Pollution

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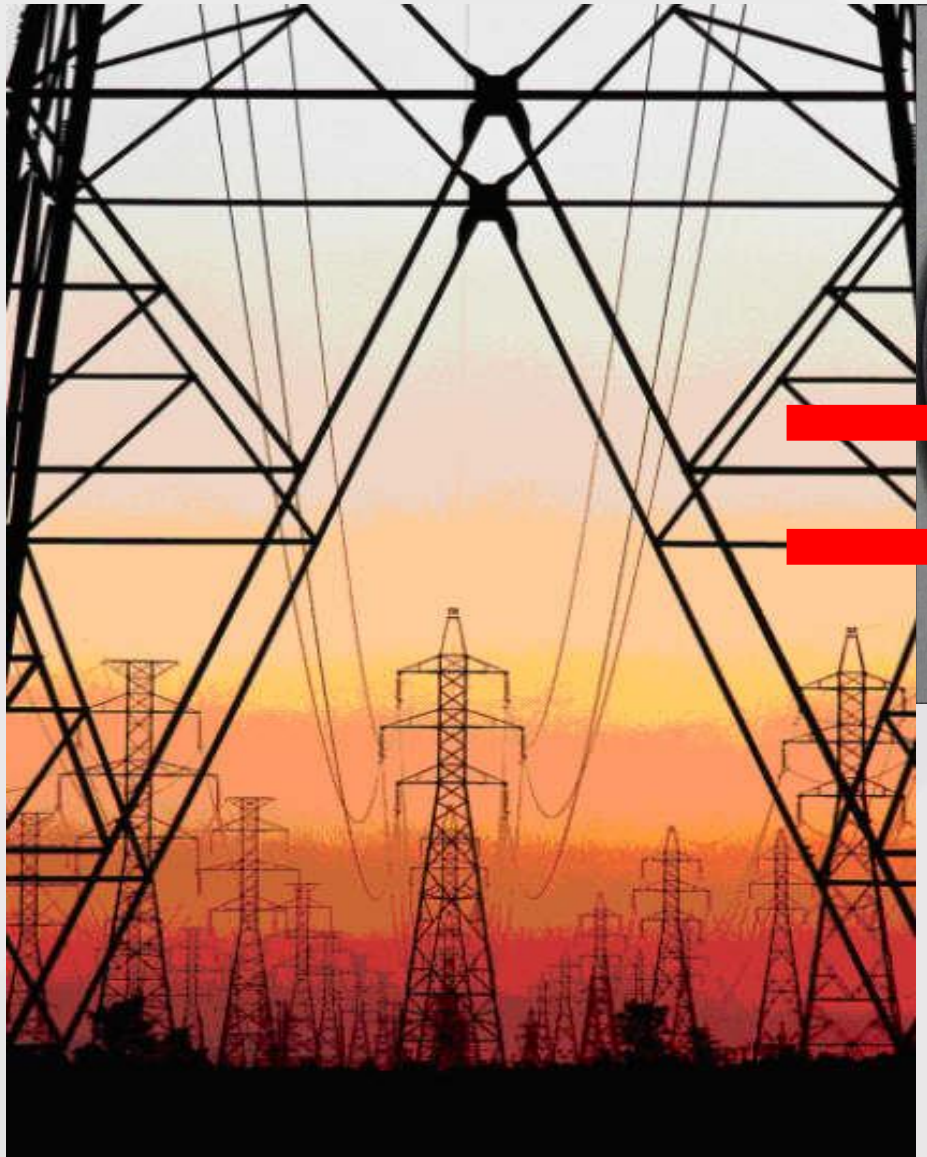

Economic Growth Paradox

Municipal Solid Waste

- Over 377 million urban people live in 7,935 towns and cities and generate 62 million tonnes of municipal solid waste per annum.

- Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites – what happens to the rest????

- Garbage burning and open dumping! – yes even from most sophisticated societies!

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Commitments we have made

Harnessing the power of commitments to drive action

The Commitments we have made.....

Mahindra and Mahindra commits to set Science Based Targets

20 Companies sign up to set SBTs in next 2 years

- 16 Domestic Companies
- 4 International Companies

4 Companies have their SBT's Approved

- Mahindra Sanyo Special Steel Pvt. Ltd.
- Tech Mahindra Ltd
- First Choice
- Bristlecone

Mr. Anand Mahindra -

- Issues a challenge to corporations around the world to set SBTs at the WEF conclave at Davos in 2018
- Commits to Carbon Neutrality for all it's group companies by 2040

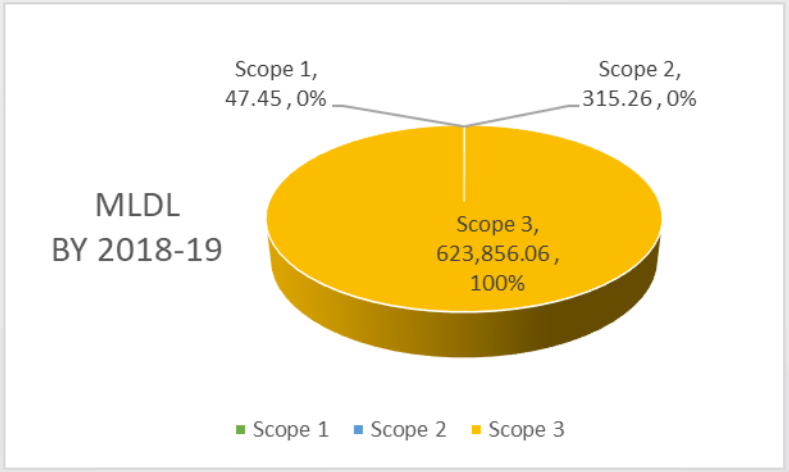
Where are we at Mahindra Lifespaces?

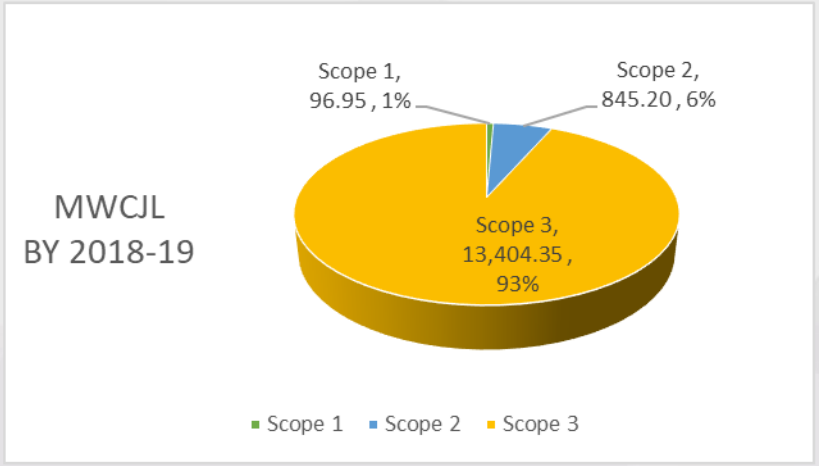
Commit to set a Science Based Target	Develop a Science Based Target	Submit your Science Based Target to SBTi	Announce your Science Based Target
Committed in April 2018 1. Mahindra Lifespaces 2. Mahindra World City Jaipur 3. Mahindra World City Chennai	1. Develop baseline inventory 2. Detailed Scope 3 *3. Verification* 4. Develop targets	1. Submitted our target in August 2019 2. Cleared preliminary screening 3. Awaiting approval	1. Post approval announce

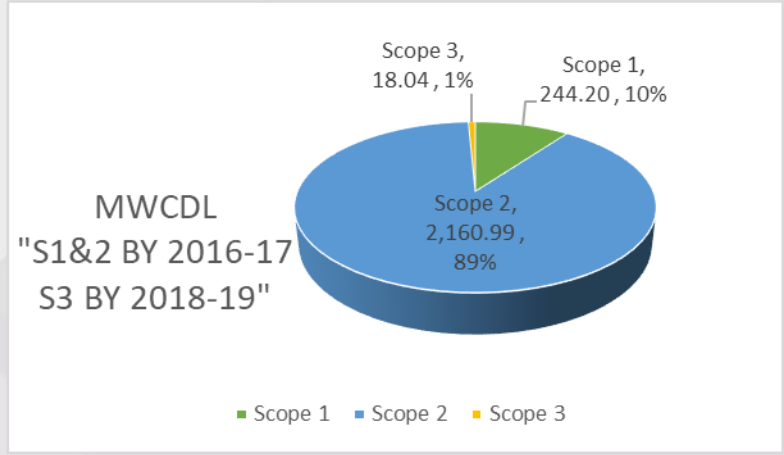
Categories

Scope 1	Scope 2	Scope 3
• Stationary Combustion	• Purchased Electricity	• **Upstream Category** 1. Purchased Goods & Services 4. Upstream Transportation & Distribution 5. Waste Generated in Operations 6. Business Travel 7. Employee Commute 8. Upstream Leased Assets • **Downstream Category** 11. Use of Sold Products 13. Downstream Leased Assets

GHG Emissions Share - by Scope



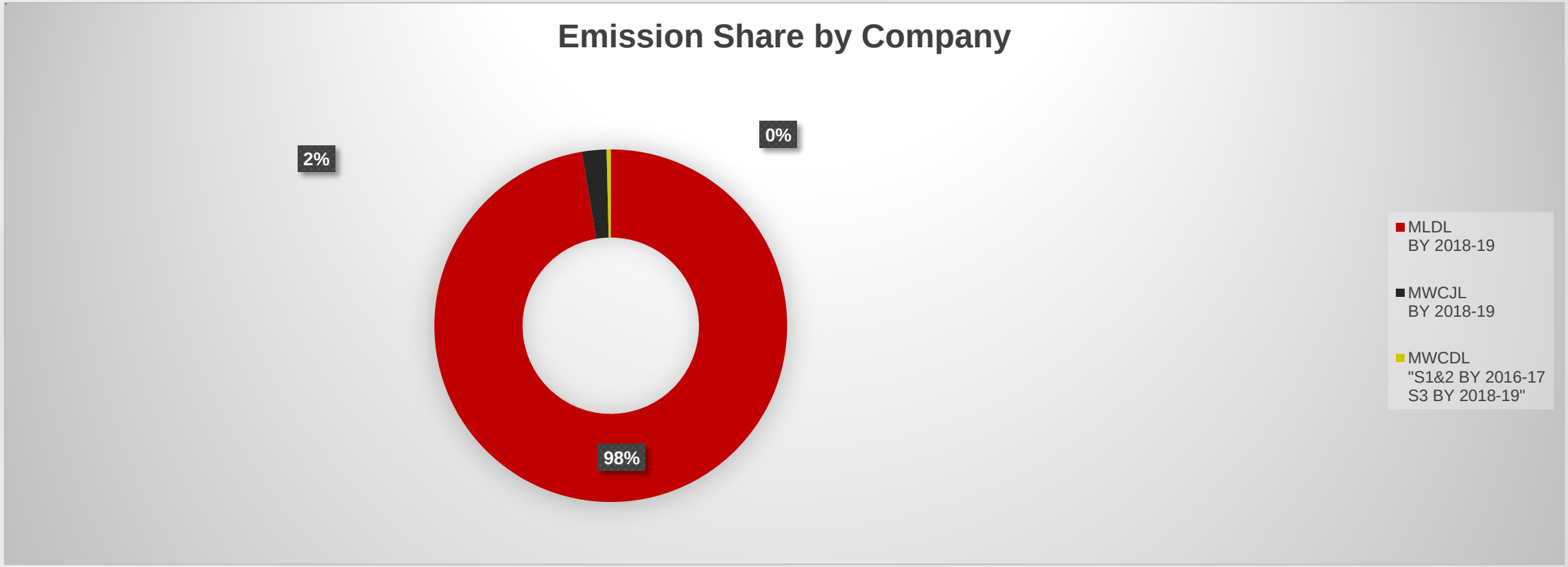




Company Scope	MLDL	MWC Jaipur	MWC Chennai
Total Scope 1	47.45	97	244
Total Scope 2	315.26	845.20	2161
Total Scope 3	623,856	13,404	18

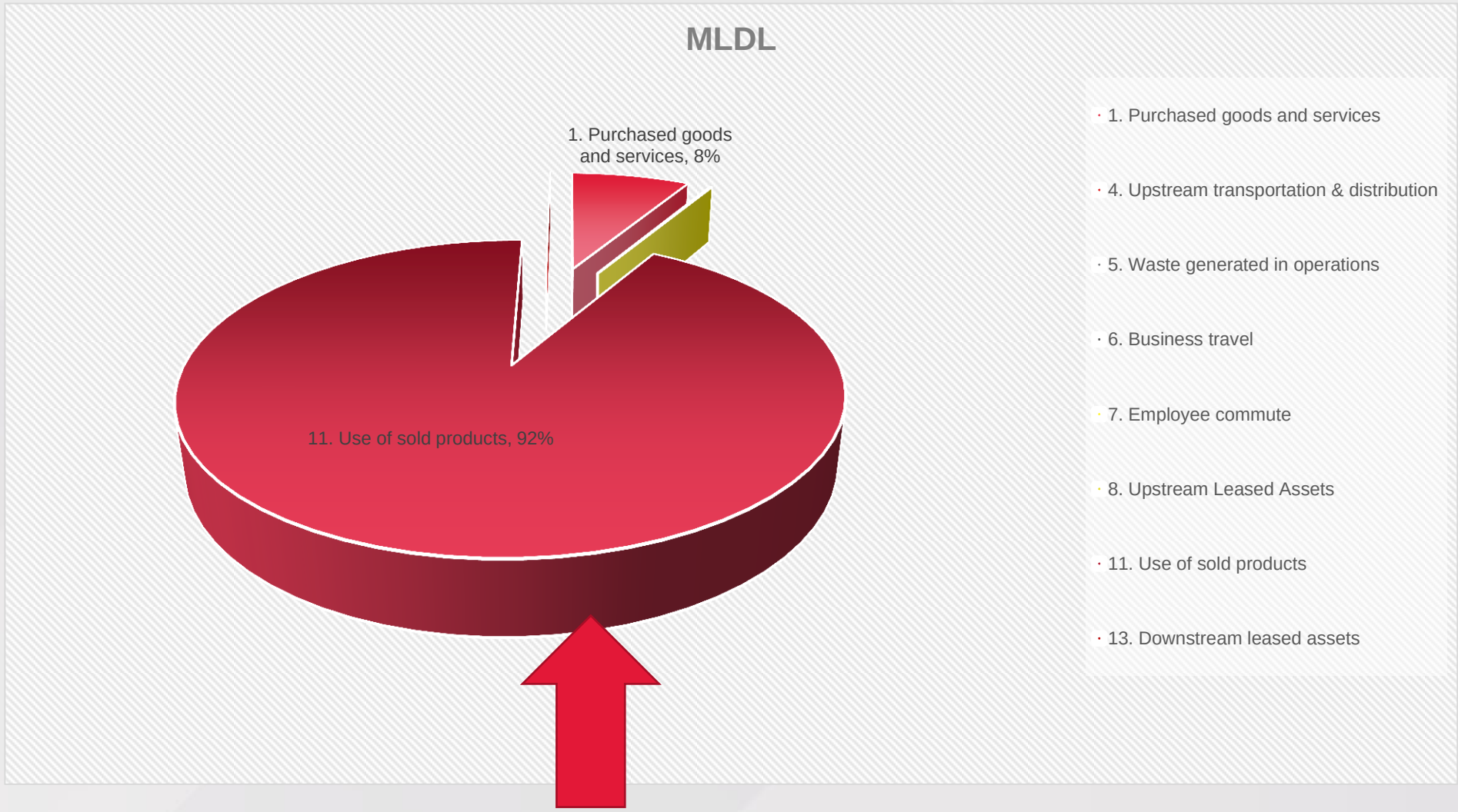
Note: All figures are in t CO_2-e

GHG Emissions Share – by Company



Note: All figures are in t CO_2-e

MLDL - GHG Inventory – What does it say?



Scope 3 Category	MLDL
1. Purchased goods and services	48893.8
4. Upstream transportation & distribution	192.9
5. Waste generated in operations	27.2
6. Business travel	242.7
7. Employee commute	181.6
8. Upstream Leased Assets	45.7
11. Use of sold products	574272.2
13. Downstream leased assets	0.0

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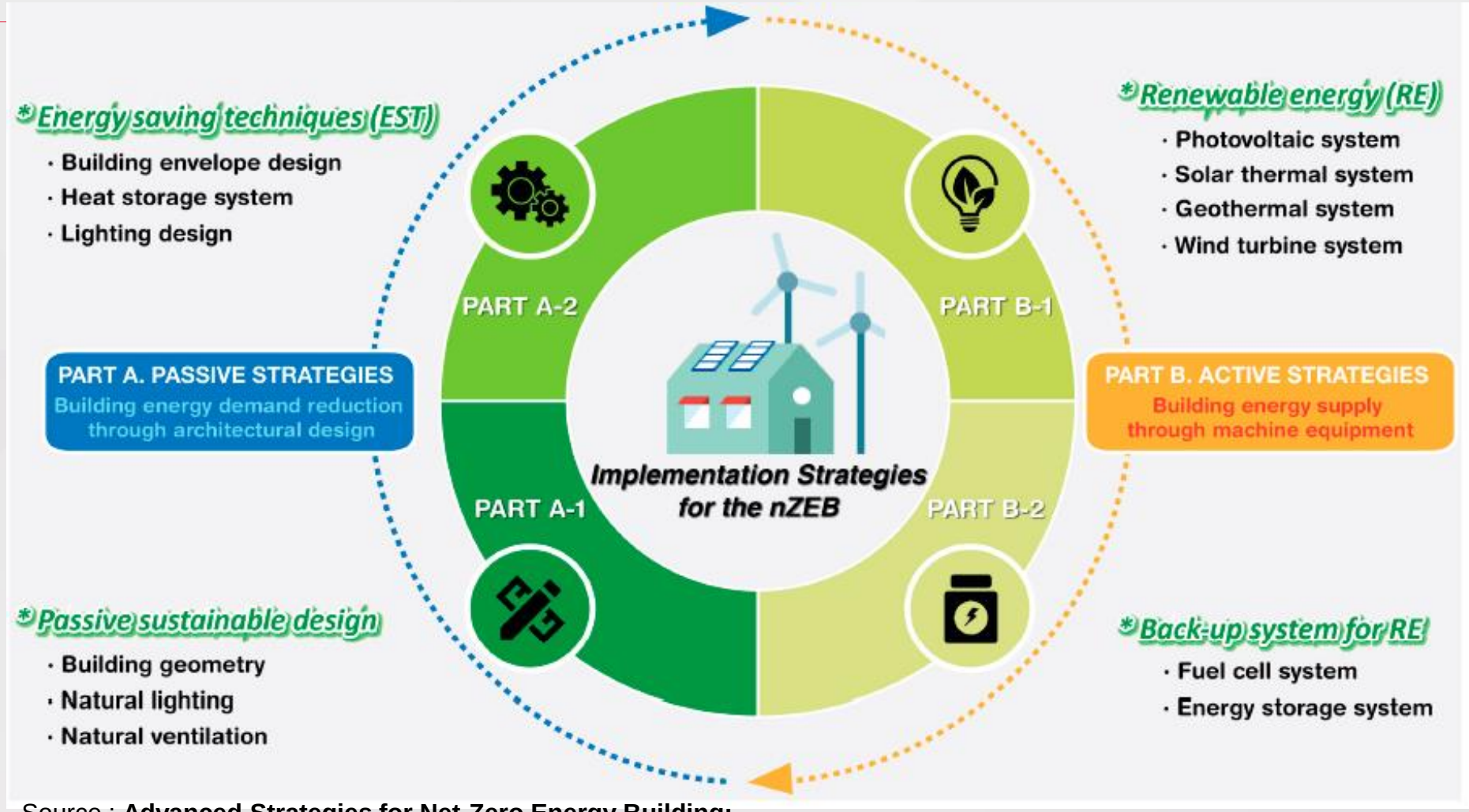
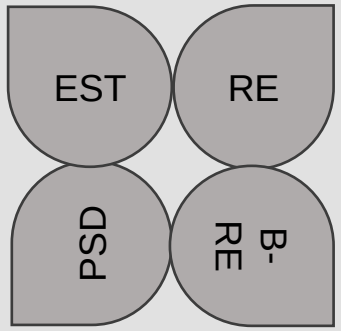
Strategies

Influence Within

To reduce carbon emissions in what we build

Building Level Strategies





Source : **Advanced Strategies for Net-Zero Energy Building: Focused on the Early Phase and Usage Phase of a Building's Life Cycle**

Passive Strategies

EST RE PSD B-RE

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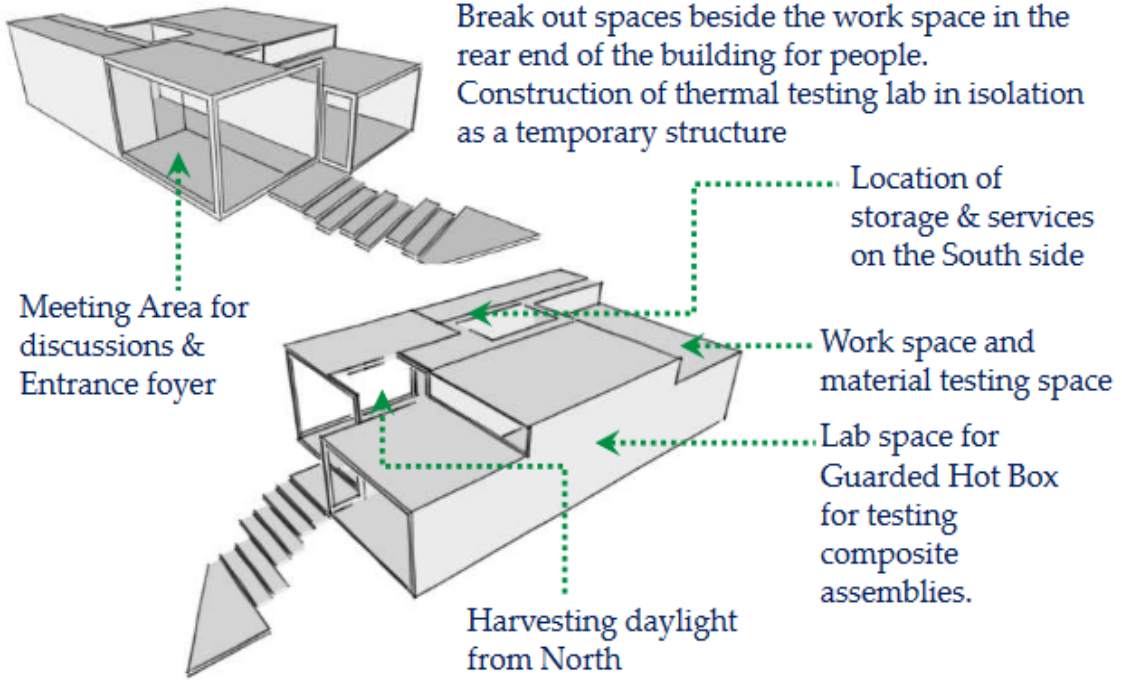
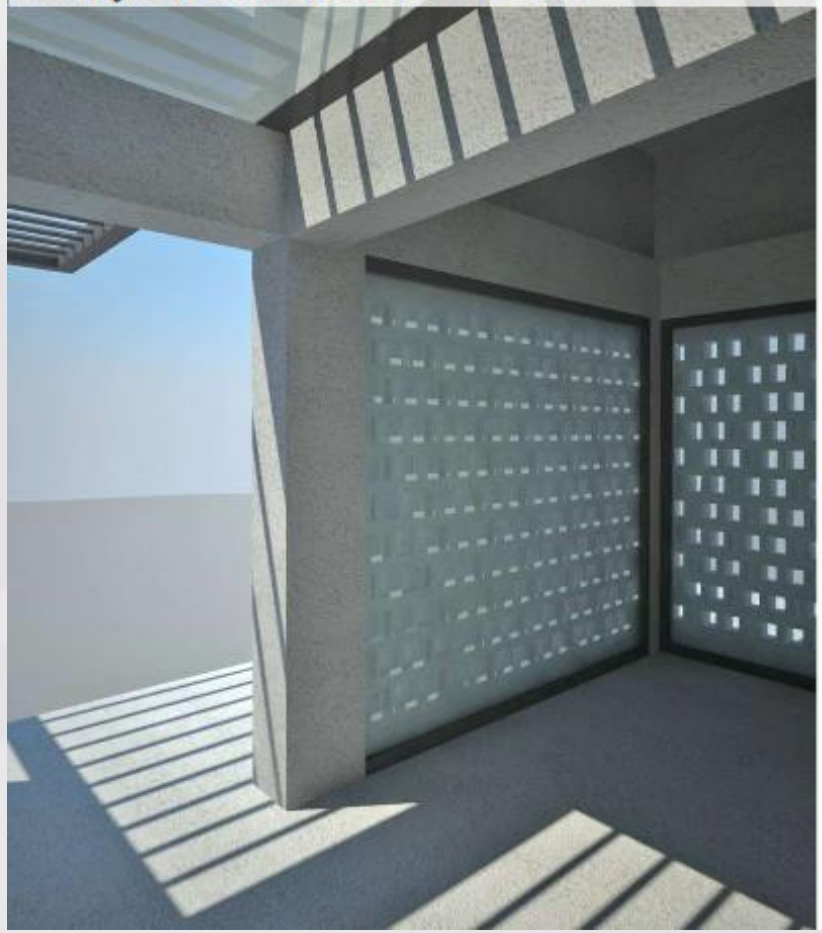
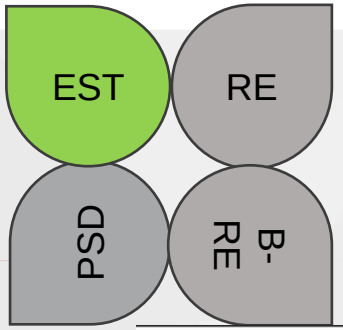
Conceptualization & Zoning



Study model and Simulations



Demand reduction



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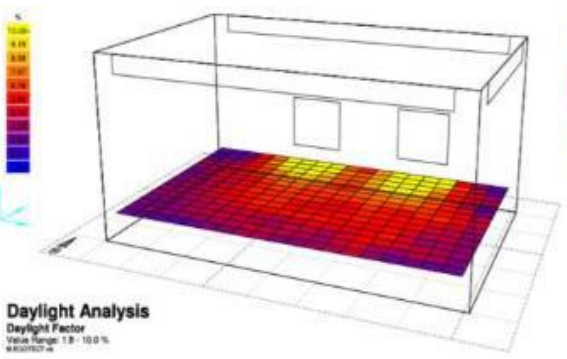
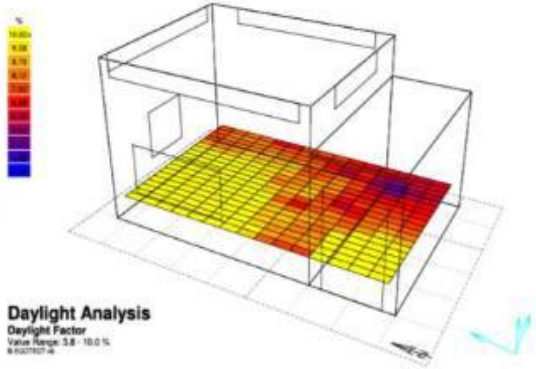
Bringing Sustainability into the Built Form

Effective Daylight Integration

Leading To Reduction In Artificial Lighting Loads





Total Living Area (sq.m.)	123.03
Total Daylight Zone Area (sq.m.)	120.15
Percentage of living area falling under Daylight zone	97.66

Bringing Sustainability into the Built Form

Energy Efficient HVAC and Lighting Appliances

Total Building Area	199.05 sq.m.	Lighting Power Density	6.38 w/sq.m.
Total Lighting Load	1271 wattage	LPD Benchmark (SVA GRIHA)	10.8 w/sq.m.

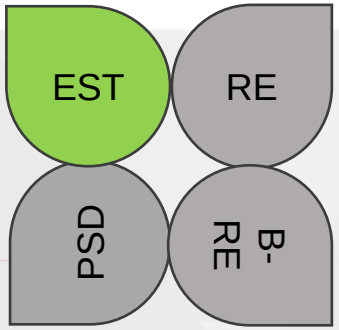
Other Features

- Water savings through low-flow CP and sanitary fixtures.

Water Use Reduction ▶	48.46

- Energy efficient HVAC installation through BEE 5-Star rated inverter ACs.

Demand reduction



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Bringing Sustainability into the Built Form

Other Features

Energy efficiency through

- Spray – foam insulation on roof to minimize cooling loads
- Installation of double – glazed uPVC doors and windows

Savings achieved with 2" XPS Insulation on Roof:

	Proposed case	Without Roof Insulation	Savings %
HVAC Load TR	8	10	20
HVAC Energy consumption (kWh)	15,295	18,340	16.6

Solar rooftop

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We look at **every** building/development as an opportunity for sustainable development

Lean construction	Biodiversity management
Air quality	Water management
Energy management	Waste and material management
Social accountability	Site planning

Construction Activities

Site planning	Climate responsive architecture
Apt materials	Waste and Water management
Energy efficient	Disaster management
Indoor air quality management	

Building

Leveraging green ratings to lower carbon footprint

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Green Building Rating systems can qualitatively and quantitatively rate the buildings on the degree of their "Greenness"

Evaluates the building over its life cycle for – opportunities

- ✓ *Resource Consumption*
- ✓ *Minimal environmental footprint*
- ✓ *Health and wellbeing of the occupants.*

Green Building Approach

Site Selection and Planning

Water Efficiency

Energy Efficiency

Materials

Indoor Environmental Quality

Site Selection and Planning

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Efficient planning strategies

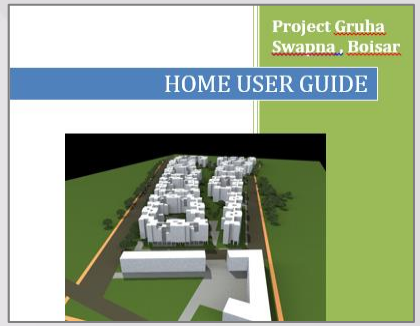
7 Basic Household amenities within 1 kms distance

Heat Island Effect designed for 100% Roof and Non-roof areas

14% of Visitors Car Parking provided

The project has been designed for Differently Abled

Green Home User Guide, Post Occupancy



Water Efficiency

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Water Conservation, water treatment, recycling

Rain Water Harvesting- 100% Roof, non roof	Water Efficient Flow and flush fixtures- 40% savings	100% Waste Water Treatment- SBR Technology
Limiting Turf in Landscape- 20%		Efficient Irrigation Systems
	Use of Draught Tolerant species- 44%	

Energy Efficiency

Energy Conservation, Efficient Building Envelop, Thermal Comfort

Over 20% Energy savings

Wall Assembly- 1.6 W/m2 CLC Blocks	Roof Assembly- 0.53 W/m2	Reduced Solar Heat Gain- Effective shading
Effective Wall Window Ratio (WWR)- 21%	Desired Lighting Power Densities maintained in the common areas	66% Efficient Pumps, 75% Efficient Motors

Materials and Resources

Green Supply Chain Management

Green Supply Chain Management policy

Encouraging Local Procurement

Reduction in CO2 emissions (Scope 3)

Sourcing 75% Building Materials within 400 kms

Building Materials with 20% Recycled content

Construction Waste Management- 75%

Waste Segregation at every household (dry, wet)

Organic Waste Management- OWC System 1,604 kgs/day

Indoor Environmental Quality

Wall Window Ratio (WWR)- 21%

Maximum Daylighting- 100% daylight factor

Fresh Air Ventilation- more than 75%

Living rooms-13%

Kitchens- 10%

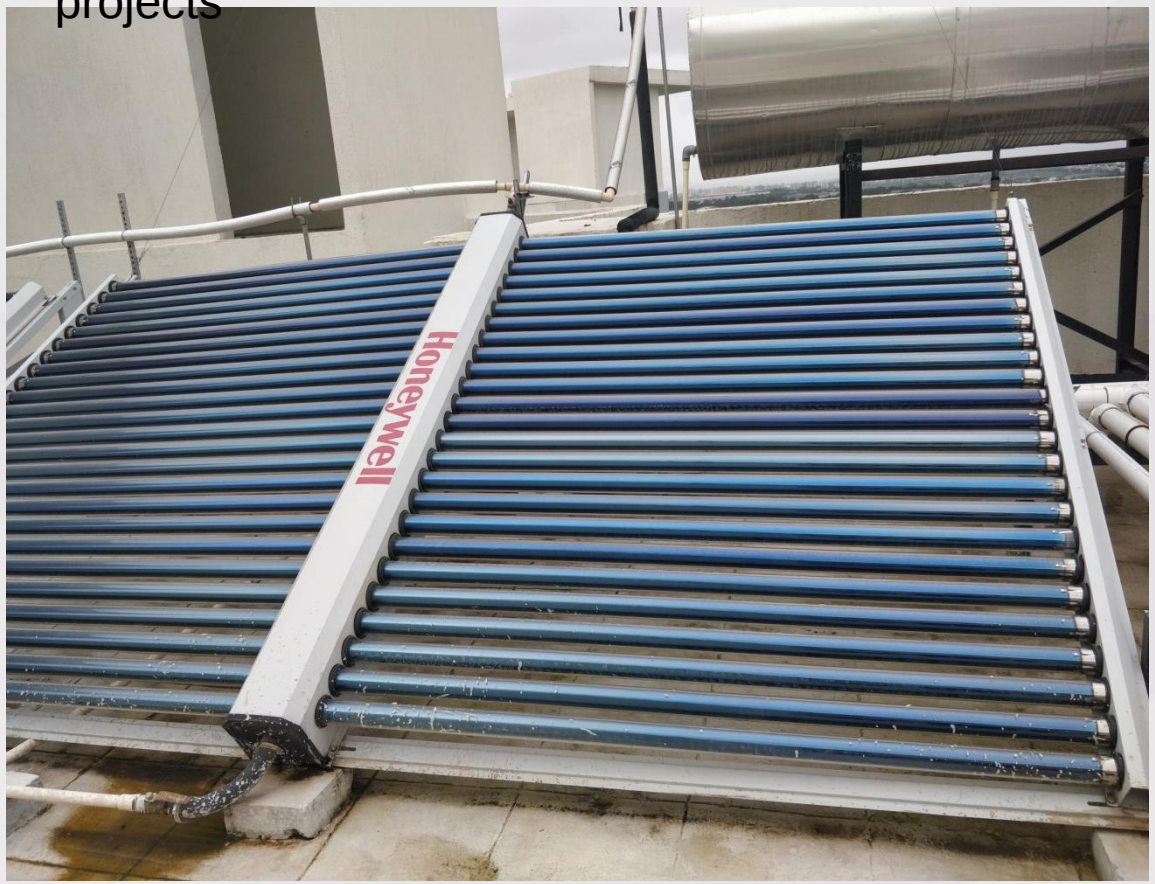
Bathrooms- 5%

Low VOC Paints, Adhesives

Smoke Free Common Areas

Renewables

- Solar Water Heater – Must have in most projects



- Consideration of moving to solar PVs for common area 100%

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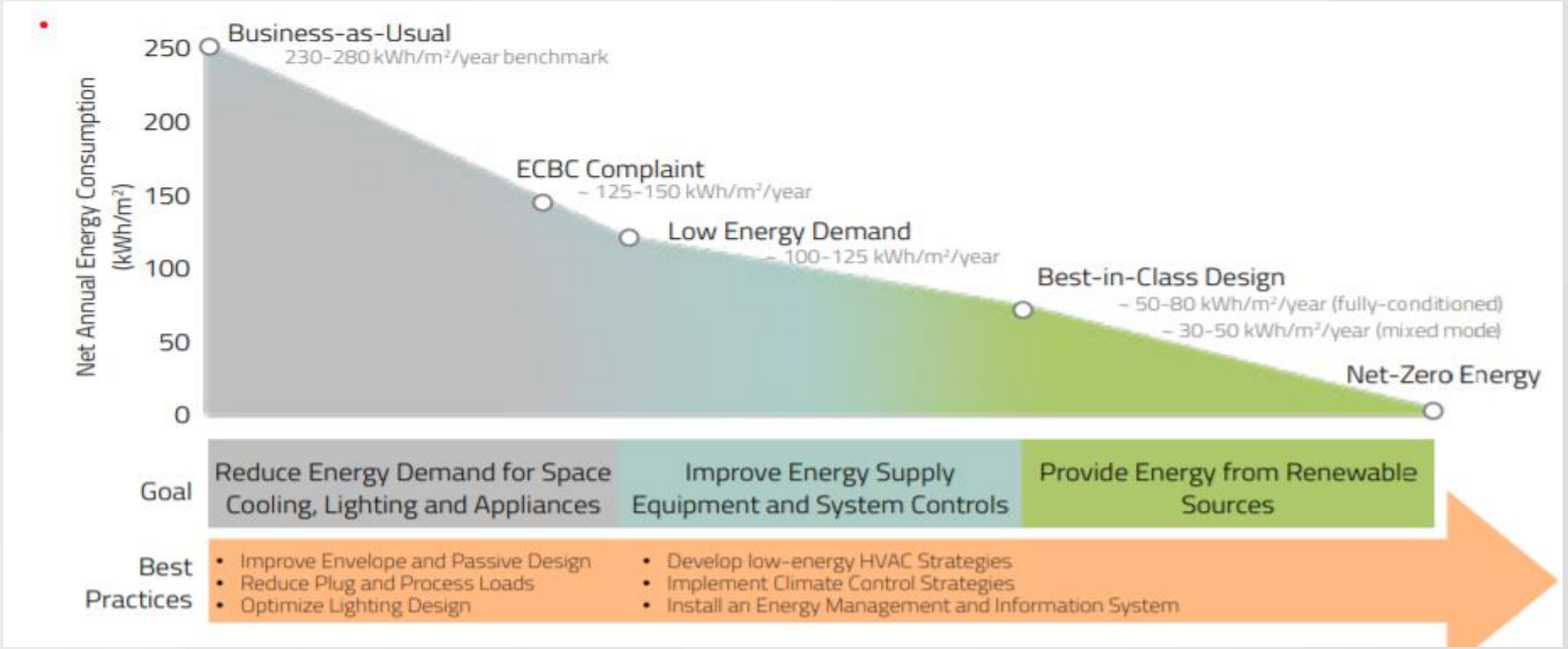
Sequential approach to moving to Net Zero



Source: Building Innovation Guide – LBNL 2018

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Strategies

Influence outward

Mahindra TERI Centre of Excellence (CoE)

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To build a greener urban future by developing innovative energy efficient solutions tailored to Indian climates

The focus will be on **market-ready, scalable and viable technologies** to support and encourage the real estate industry.

- Standardisation of Building Materials
- Building Envelope studies
- Comfort studies
- Sustainable water use in habitat

Mahindra TERI Centre of Excellence (CoE)

Mahindra TERI Center of Excellence (COE) was inaugurated on the 12th of June 2018 by Mr. Anand Mahindra.

During the year, the scope, objective, research activities and some of the early research outputs (e.g. Glare Indices) were presented to the various advisory committees formed to strengthen the research outputs.

As part of Dissemination strategy various platforms have been identified to communicate the outcomes to the key stakeholders such as Architects, Developers, Practitioners, consultants, suppliers and Govt. bodies

Vision: To build a greener urban future by developing innovative energy efficient solutions tailored to Indian climates

Sustainable Housing Leadership Consortium (SHLC)

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CEO Led Think Tank

Mainstream sustainability in India's urban housing sector and support the transition to a low carbon economy

The Objectives set for the consortium are

To make 100% of own housing portfolio sustainable by 2017 as evidenced by appropriate green building certification(s)

To achieve 20% reduction in incremental variable costs for sustainable housing construction to further improve the business case for green buildings

To provide leadership and advocacy for broader industry and government policy actions that make 20% of India’s new multi-family housing construction sustainable by 2022

Climate Positive Development Program (C40 Cities)

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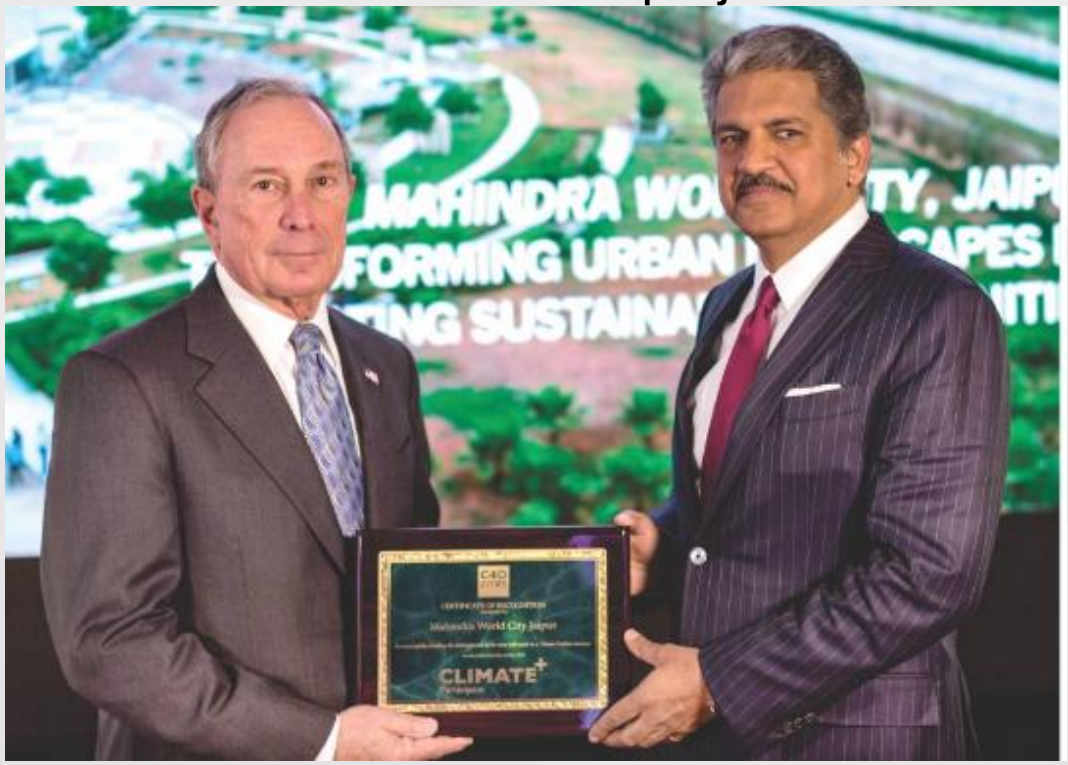
Mahindra World City, Jaipur becomes the first Asian project to receive C40 Stage 2 Certification



Sustainability is an integral part of Mahindra Group's 'Rise' philosophy and we are committed to driving sustainable practices across our businesses. The C40 has contributed greatly toward implementing meaningful and sustainable policiesand programs that address the issue of global climate change. We are honoured to have received this certification

Anand Mahindra

The Green Army Impact

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Schools
100

Students
20,000

Citizens
80,000

Energy (Units)
9,00,000

Water (Mn litres)
13,797

Waste (Kgs)
18,25,000

Over **250+** schools, Over **50,000** students, **2 lakh** citizens since inception
Cities: Mumbai, MMR, Pune, Nagpur, Chennai, Delhi, Ahmedabad

Creating 'A Million Caring Citizens'

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Journey begins now!